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: April 9, 2008

RE: Koch Nitrogen Company / 017-24444-00042

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

Notice of Decision: Approval - Effective Immediately

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 13-15-5-3, this permit 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.

If you wish to challenge this decision, IC 4-21.5-3 and IC 13-15-6-1 require 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
FNPER.dot12/03/07

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We make Indiana a cleaner, healthier place to live.

Mitchell E. Daniels, Jr.
Governor

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100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251
(317) 232-8603
(800) 451-6027
www.IN.gov/idem

MINOR SOURCE OPERATING PERMIT
OFFICE OF AIR QUALITY

Koch Nitrogen Company
7430 East County Road 800 South
Walton, Indiana 46994

(herein known as the Permittee) is hereby authorized to operate subject to the conditions contained herein, the source described in Section A (Source Summary) of this permit.

This permit is issued to the above mentioned company under the provisions of 326 IAC 2-1.1, 326 IAC 2-6.1 and 40 CFR 52.780, with conditions listed on the attached pages.

Indiana statutes from IC 13 and rules from 326 IAC, quoted in conditions in this permit, are those applicable at the time the permit was issued. The issuance or possession of this permit shall not alone constitute a defense against an alleged violation of any law, regulation or standard, except for the requirement to obtain a MSOP under 326 IAC 2-6.1.

Operation Permit No.: M017-24444-00042	
Issued by/Original Signed By: Iryn Calilung, Section Chief Permits Branch Office of Air Quality	Issuance Date: April 9, 2008 Expiration Date: April 9, 2013

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C.17 General Reporting Requirements [326 IAC 2-1.1-11] [326 IAC 2-6.1-2] [IC 13-14-1-13]

SECTION A SOURCE SUMMARY

This permit 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 Permittee 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 Permittee to obtain additional permits or seek modification of this permit pursuant to 326 IAC 2, or change other applicable requirements presented in the permit application.

A.1 General Information [326 IAC 2-5.1-3(c)][326 IAC 2-6.1-4(a)]

The Permittee owns and operates a stationary ammonia storage and distribution terminal.

Source Address:	7430 East County Road 800 South, Walton, Indiana 46994
Mailing Address:	4111 E. 37th St. North, Witchita, KS 67220
General Source Phone Number:	316-828-8705
SIC Code:	5191
County Location:	Cass
Source Location Status:	Attainment for all criteria pollutants
Source Status:	Minor Source Operating Permit Program Minor Source, under PSD Minor Source, Section 112 of the Clean Air Act Not 1 of 28 Source Categories

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) propane or natural gas fired ammonia heater, identified as H-1, constructed in July 1973, with a maximum heat input rate of 25 MMBtu per hour, exhausting to stack H1.

(b) One (1) propane or natural gas fired ammonia heater, identified as H-2, constructed in June 1977, with a maximum heat input rate of 22.9 MMBtu per hour, exhausting to stack H2.

(c) Eight (8) propane fired vaporizer units, identified as V-1 through V-8, constructed in 1997, each having a maximum heat input rate of 0.08 MMBtu/hour.

(d) One (1) propane or natural gas fired flare, identified as F-1, constructed in 1973, with a maximum heat input rate of 0.68 MMBtu/hour, used to control anhydrous ammonia emissions, and exhausting to stack F1.

(e) One (1) propane or natural gas fired flare, designated as F-2, constructed in 2003, having a maximum heat input rate of 0.27 MMBtu/hour, used to control anhydrous ammonia emissions, and exhausting to stack F2.

(f) One (1) 42 HP propane or natural gas fired emergency generator with a maximum heat input rate of 0.21 MMBtu/hour.

(g) Fugitive emissions from unpaved roads and parking lots.

(h) Propane tank loading.

(i) Two (2) purgers with a maximum release rate of 120 cubic feet of process gas per hour.

(j) Two (2) propane fired room heating systems rated at 0.095 MMBtu per hour and 0.080 MMBtu per hour.

SECTION B GENERAL CONDITIONS

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

Terms in this permit 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 Permit Term [326 IAC 2-6.1-7(a)][326 IAC 2-1.1-9.5][IC 13-15-3-6(a)]

(a) This permit, M017-24444-00042, is issued for a fixed term of five (5) years from the issuance date of this permit, as determined in accordance with IC 4-21.5-3-5(f) and IC 13-15-5-3. Subsequent revisions, modifications, or amendments of this permit do not affect the expiration date of this permit.

(b) If IDEM, OAQ, upon receiving a timely and complete renewal permit application, fails to issue or deny the permit renewal prior to the expiration date of this permit, this existing permit shall not expire and all terms and conditions shall continue in effect, until the renewal permit has been issued or denied.

B.3 Term of Conditions [326 IAC 2-1.1-9.5]

Notwithstanding the permit term of a permit to construct, a permit to operate, or a permit modification, any condition established in a permit issued pursuant to a permitting program approved in the state implementation plan shall remain in effect until:

(a) the condition is modified in a subsequent permit action pursuant to Title I of the Clean Air Act; or

(b) the emission unit to which the condition pertains permanently ceases operation.

B.4 Enforceability

Unless otherwise stated, all terms and conditions in this permit, including any provisions designed to limit the source's potential to emit, are enforceable by IDEM, the United States Environmental Protection Agency (U.S. EPA) and by citizens in accordance with the Clean Air Act.

B.5 Severability

The provisions of this permit are severable; a determination that any portion of this permit is invalid shall not affect the validity of the remainder of the permit.

B.6 Property Rights or Exclusive Privilege

This permit does not convey any property rights of any sort or any exclusive privilege.

B.7 Duty to Provide Information

(a) The Permittee shall furnish to IDEM, OAQ, within a reasonable time, any information that IDEM, OAQ may request in writing to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The submittal by the Permittee does require the certification by an "authorized individual" as defined by 326 IAC 2-1.1-1(1). Upon request, the Permittee shall also furnish to IDEM, OAQ copies of records required to be kept by this permit.

(b) For information furnished by the Permittee to IDEM, OAQ, the Permittee may include a claim of confidentiality in accordance with 326 IAC 17.1. When furnishing copies of requested records directly to U. S. EPA, the Permittee may assert a claim of confidentiality in accordance with 40 CFR 2, Subpart B.

B.8 Certification

(a) Where specifically designated by this permit or required by an applicable requirement, any application form, report, or compliance certification submitted shall contain certification by an "authorized individual" of truth, accuracy, and completeness. This

certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

(b) One (1) certification shall be included, using the attached Certification Form, with each submittal requiring certification. One (1) certification may cover multiple forms in one (1) submittal.

(c) An "authorized individual" is defined at 326 IAC 2-1.1-1(1).

B.9 Annual Notification [326 IAC 2-6.1-5(a)(5)]

(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 permit.

(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.10 Preventive Maintenance Plan [326 IAC 1-6-3]

(a) If required by specific condition(s) in Section D of this permit, the Permittee shall prepare and maintain Preventive Maintenance Plans (PMPs) within ninety (90) days after issuance of this permit, including the following information on each facility:

(1) Identification of the individual(s) responsible for inspecting, maintaining, and repairing emission control devices;

(2) A description of the items or conditions that will be inspected and the inspection schedule for said items or conditions; and

(3) Identification and quantification of the replacement parts that will be maintained in inventory for quick replacement.

If, due to circumstances beyond the Permittee's control, the PMPs cannot be prepared and maintained within the above time frame, the Permittee may extend the date an additional ninety (90) days provided the Permittee notifies:

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

The PMP extension notification does not require the certification by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).

(b) A copy of the PMPs shall be submitted to IDEM, OAQ upon request and within a reasonable time, and shall be subject to review and approval by IDEM, OAQ. IDEM, OAQ may require the Permittee to revise its PMPs whenever lack of proper maintenance causes or is the primary contributor to an exceedance of any limitation on emissions or

potential to emit. The PMPs do not require the certification by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).

(c) To the extent the Permittee is required by 40 CFR Part 60/63 to have an Operation Maintenance, and Monitoring (OMM) Plan for a unit, such Plan is deemed to satisfy the PMP requirements of 326 IAC 1-6-3 for that unit.

B.11 Prior Permits Superseded [326 IAC 2-1.1-9.5]

(a) All terms and conditions of permits established prior to M017-24444-00042 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 permit.

B.12 Termination of Right to Operate [326 IAC 2-6.1-7(a)]

The Permittee's right to operate this source terminates with the expiration of this permit unless a timely and complete renewal application is submitted at least ninety (90) days prior to the date of expiration of the source's existing permit, consistent with 326 IAC 2-6.1-7.

B.13 Permit Renewal [326 IAC 2-6.1-7]

(a) The application for renewal shall be submitted using the application form or forms prescribed by IDEM, OAQ and shall include the information specified in 326 IAC 2-6.1-7. Such information shall be included in the application for each emission unit at this source. The renewal application does require the certification by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).

Request for renewal shall be submitted to:

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

(b) A timely renewal application is one that is:

(1) Submitted at least ninety (90) days prior to the date of the expiration of this permit; and

(2) 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.

(c) If the Permittee submits a timely and complete application for renewal of this permit, the source's failure to have a permit is not a violation of 326 IAC 2-6.1 until IDEM, OAQ takes final action on the renewal application, except that this protection shall cease to apply if, subsequent to the completeness determination, the Permittee fails to submit by the deadline specified in writing by IDEM, OAQ any additional information identified as being needed to process the application.

B.14 Permit Amendment or Revision [326 IAC 2-5.1-3(e)(3)][326 IAC 2-6.1-6]

(a) Permit amendments and revisions are governed by the requirements of 326 IAC 2-6.1-6 whenever the Permittee seeks to amend or modify this permit.

(b) Any application requesting an amendment or modification of this permit shall be submitted to:

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

Any such application shall be certified by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).

(c) The Permittee shall notify the OAQ within thirty (30) calendar days of implementing a notice-only change. [326 IAC 2-6.1-6(d)]

B.15 Source Modification Requirement

A modification, construction, or reconstruction is governed by the requirements of 326 IAC 2.

B.16 Inspection and Entry
[326 IAC 2-5.1-3(e)(4)(B)][326 IAC 2-6.1-5(a)(4)][IC 13-14-2-2][IC 13-17-3-2][IC 13-30-3-1]

Upon presentation of proper identification cards, credentials, and other documents as may be required by law, and subject to the Permittee's right under all applicable laws and regulations to assert that the information collected by the agency is confidential and entitled to be treated as such, the Permittee shall allow IDEM, OAQ, U.S. EPA, or an authorized representative to perform the following:

(a) Enter upon the Permittee's premises where a permitted source is located, or emissions related activity is conducted, or where records must be kept under the conditions of this permit;

(b) As authorized by the Clean Air Act, IC 13-14-2-2, IC 13-17-3-2, and IC 13-30-3-1, have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

(c) As authorized by the Clean Air Act, IC 13-14-2-2, IC 13-17-3-2, and IC 13-30-3-1, inspect, at reasonable times, any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under this permit;

(d) As authorized by the Clean Air Act, IC 13-14-2-2, IC 13-17-3-2, and IC 13-30-3-1, sample or monitor, at reasonable times, substances or parameters for the purpose of assuring compliance with this permit or applicable requirements; and

(e) As authorized by the Clean Air Act, IC 13-14-2-2, IC 13-17-3-2, and IC 13-30-3-1, utilize any photographic, recording, testing, monitoring, or other equipment for the purpose of assuring compliance with this permit or applicable requirements.

B.17 Transfer of Ownership or Operational Control [326 IAC 2-6.1-6]

(a) The Permittee must comply with the requirements of 326 IAC 2-6.1-6 whenever the Permittee seeks to change the ownership or operational control of the source and no other change in the permit is necessary.

(b) Any application requesting a change in the ownership or operational control of the source shall contain a written agreement containing a specific date for transfer of permit

responsibility, coverage and liability between the current and new Permittee. The application shall be submitted to:

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

The application which shall be submitted by the Permittee does require the certification by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).

(c) The Permittee may implement notice-only changes addressed in the request for a notice-only change immediately upon submittal of the request. [326 IAC 2-6.1-6(d)(3)]

B.18 Annual Fee Payment [326 IAC 2-1.1-7]

(a) The Permittee shall pay annual fees to IDEM, OAQ within thirty (30) calendar days of receipt of a billing.

(b) The Permittee may call the following telephone numbers: 1-800-451-6027 or 317-233-4230 (ask for OAQ, Billing, Licensing, and Training Section), to determine the appropriate permit fee.

B.19 Credible Evidence [326 IAC 1-1-6]

For the purpose of submitting compliance certifications or establishing whether or not the Permittee has violated or is in violation of any condition of this permit, nothing in this permit shall preclude the use, including the exclusive use, of any credible evidence or information relevant to whether the Permittee would have been in compliance with the condition of this permit if the appropriate performance or compliance test or procedure had been performed.

SECTION C SOURCE OPERATION CONDITIONS

Entire Source

Emission Limitations and Standards [326 IAC 2-6.1-5(a)(1)]

C.1 Particulate Emission Limitations For Processes with Process Weight Rates Less Than One Hundred (100) Pounds per Hour [326 IAC 6-3-2]

Pursuant to 326 IAC 6-3-2(e)(2), particulate emissions from any process not exempt under 326 IAC 6-3-1(b) or (c) which has a maximum process weight rate less than 100 pounds per hour and the methods in 326 IAC 6-3-2(b) through (d) do not apply shall not exceed 0.551 pounds per hour.

C.2 Permit Revocation [326 IAC 2-1.1-9]

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

(a) Violation of any conditions of this permit.

(b) Failure to disclose all the relevant facts, or misrepresentation in obtaining this permit.

(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 permit shall not require revocation of this permit.

(d) Noncompliance with orders issued pursuant to 326 IAC 1-5 (Episode Alert Levels) to reduce emissions during an air pollution episode.

(e) For any cause which establishes in the judgment of IDEM, the fact that continuance of this permit is not consistent with purposes of this article.

C.3 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 permit:

(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.4 Open Burning [326 IAC 4-1] [IC 13-17-9]

The Permittee shall not open burn any material except as provided in 326 IAC 4-1-3, 326 IAC 4-1-4 or 326 IAC 4-1-6. The previous sentence notwithstanding, the Permittee may open burn in accordance with an open burning approval issued by the Commissioner under 326 IAC 4-1-4.1.

C.5 Incineration [326 IAC 4-2] [326 IAC 9-1-2]

The Permittee shall not operate an incinerator or incinerate any waste or refuse except as provided in 326 IAC 4-2 and 326 IAC 9-1-2.

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

The Permittee 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).

C.7 Fugitive Particulate Matter Emission Limitations [326 IAC 6-5]

Pursuant to 326 IAC 6-5 (Fugitive Particulate Matter Emission Limitations), fugitive particulate matter emissions shall be controlled according to the plan submitted on January 25, 2008, or the most recent plan approved by the Commissioner. The plan is included as Attachment A.

C.8 Asbestos Abatement Projects [326 IAC 14-10] [326 IAC 18] [40 CFR 61, Subpart M]

(a) Notification requirements apply to each owner or operator. If the combined amount of regulated asbestos containing material (RACM) to be stripped, removed or disturbed is at least 260 linear feet on pipes or 160 square feet on other facility components, or at least thirty-five (35) cubic feet on all facility components, then the notification requirements of 326 IAC 14-10-3 are mandatory. All demolition projects require notification whether or not asbestos is present.

(b) The Permittee shall ensure that a written notification is sent on a form provided by the Commissioner at least ten (10) working days before asbestos stripping or removal work or before demolition begins, per 326 IAC 14-10-3, and shall update such notice as necessary, including, but not limited to the following:

(1) When the amount of affected asbestos containing material increases or decreases by at least twenty percent (20%); or

(2) If there is a change in the following:

(A) Asbestos removal or demolition start date;

(B) Removal or demolition contractor; or

(C) Waste disposal site.

(c) The Permittee shall ensure that the notice is postmarked or delivered according to the guidelines set forth in 326 IAC 14-10-3(2).

(d) The notice to be submitted shall include the information enumerated in 326 IAC 14-10-3(3).

All required notifications shall be submitted to:

Indiana Department of Environmental Management
Asbestos Section, Office of Air Quality
100 North Senate Avenue
MC 61-52 IGCN 1003
Indianapolis, Indiana 46204-2251

The notice shall include a signed certification from the owner or operator that the information provided in this notification is correct and that only Indiana licensed workers and project supervisors will be used to implement the asbestos removal project. The notifications do not require a certification by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).

(e) Procedures for Asbestos Emission Control
The Permittee shall comply with the applicable emission control procedures in 326 IAC 14-10-4 and 40 CFR 61.145(c). Per 326 IAC 14-10-1, emission control requirements are applicable for any removal or disturbance of RACM greater than three

(3) linear feet on pipes or three (3) square feet on any other facility components or a total of at least 0.75 cubic feet on all facility components.

(f) Demolition and Renovation
The Permittee shall thoroughly inspect the affected facility or part of the facility where the demolition or renovation will occur for the presence of asbestos pursuant to 40 CFR 61.145(a).

(g) Indiana Accredited Asbestos Inspector
The Permittee shall comply with 326 IAC 14-10-1(a) that requires the owner or operator, prior to a renovation/demolition, to use an Indiana Accredited Asbestos Inspector to thoroughly inspect the affected portion of the facility for the presence of asbestos. The requirement to use an Indiana Accredited Asbestos inspector is not federally enforceable.

Testing Requirements [326 IAC 2-6.1-5(a)(2)]

C.9 Performance Testing [326 IAC 3-6]

(a) All testing shall be performed according to the provisions of 326 IAC 3-6 (Source Sampling Procedures), except as provided elsewhere in this permit, utilizing any applicable procedures and analysis methods specified in 40 CFR 51, 40 CFR 60, 40 CFR 61, 40 CFR 63, 40 CFR 75, or other procedures approved by IDEM, OAQ.

A test protocol, except as provided elsewhere in this permit, shall be submitted to:

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

no later than thirty-five (35) days prior to the intended test date. The protocol submitted by the Permittee does not require certification by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).

(b) The Permittee shall notify IDEM, OAQ of the actual test date at least fourteen (14) days prior to the actual test date. The notification submitted by the Permittee does not require certification by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).

(c) Pursuant to 326 IAC 3-6-4(b), all test reports must be received by IDEM, OAQ not later than forty-five (45) days after the completion of the testing. An extension may be granted by IDEM, OAQ if the Permittee submits to IDEM, OAQ, a reasonable written explanation not later than five (5) days prior to the end of the initial forty-five (45) day period.

Compliance Requirements [326 IAC 2-1.1-11]

C.10 Compliance Requirements [326 IAC 2-1.1-11]

The commissioner may require stack testing, monitoring, or reporting at any time to assure compliance with all applicable requirements by issuing an order under 326 IAC 2-1.1-11. Any monitoring or testing shall be performed in accordance with 326 IAC 3 or other methods approved by the commissioner or the U. S. EPA.

Compliance Monitoring Requirements [326 IAC 2-6.1-5(a)(2)]

C.11 Compliance Monitoring [326 IAC 2-1.1-11]

Compliance with applicable requirements shall be documented as required by this permit. The Permittee shall be responsible for installing any necessary equipment and initiating any required monitoring related to that equipment. All monitoring and record keeping requirements not already legally required shall be implemented when operation begins.

C.12 Monitoring Methods [326 IAC 3] [40 CFR 60] [40 CFR 63]

Any monitoring or testing required by Section D of this permit shall be performed according to the provisions of 326 IAC 3, 40 CFR 60, Appendix A, 40 CFR 60, Appendix B, 40 CFR 63, or other approved methods as specified in this permit.

C.13 Instrument Specifications [326 IAC 2-1.1-11]

(a) When required by any condition of this permit, an analog instrument used to measure a parameter related to the operation of an air pollution control device shall have a scale such that the expected maximum reading for the normal range shall be no less than twenty percent (20%) of full scale.

(b) The Permittee may request that the IDEM, OAQ approve the use of an instrument that does not meet the above specifications provided the Permittee can demonstrate that an alternative instrument specification will adequately ensure compliance with permit conditions requiring the measurement of the parameters.

Corrective Actions and Response Steps

C.14 Actions Related to Noncompliance Demonstrated by a Stack Test

(a) When the results of a stack test performed in conformance with Section C - Performance Testing, of this permit exceed the level specified in any condition of this permit, the Permittee shall take appropriate response actions. The Permittee shall submit a description of these response actions to IDEM, OAQ, within thirty (30) days of receipt of the test results. The Permittee shall take appropriate action to minimize excess emissions from the affected facility while the response actions are being implemented.

(b) A retest to demonstrate compliance shall be performed within one hundred twenty (120) days of receipt of the original test results. Should the Permittee demonstrate to IDEM, OAQ that retesting in one hundred twenty (120) days is not practicable, IDEM, OAQ may extend the retesting deadline.

(c) IDEM, OAQ reserves the authority to take any actions allowed under law in response to noncompliant stack tests.

The response action documents submitted pursuant to this condition do require the certification by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).

Record Keeping and Reporting Requirements [326 IAC 2-6.1-5(a)(2)]

C.15 Malfunctions Report [326 IAC 1-6-2]

Pursuant to 326 IAC 1-6-2 (Records; Notice of Malfunction):

(a) A record shall be kept of all malfunctions, including startups or shutdowns of any facility or emission control equipment which result in violations of applicable air pollution control regulations or applicable emission limitations and such records shall be retained for a period of three (3) years and shall be made available to the commissioner upon request. When a malfunction of any facility or emission control equipment occurs which lasts more than one (1) hour, said condition shall be reported to the commissioner or his appointed representative. Notification shall be made by telephone or telegraph, as soon as practicable, but in no event later than four (4) daytime business hours after the beginning of said occurrence. Failure to report a malfunction of any emission control equipment subject to the requirements of this rule (326 IAC 1-6) shall constitute a violation of this rule (326 IAC 1-6) and any other applicable rules. Information of the scope and expected duration of the malfunction shall be provided including the following:

(1) Identification of the specific emission control device to be taken out of service, as well as the location and permit number of such equipment.

(2) The expected length of time that the emission control equipment will be out of service.

(3) The nature and quantity of emissions of air contaminants likely to occur during the shutdown period.

(4) Any measures such as the use of off-shift labor on equipment that will be utilized to minimize the length of the shutdown period.

(5) Any reasons that shutdown of the facility operation during the maintenance period would be impossible for the following reason:

(A) continued operation is required to provide essential services, provided, however, that continued operation solely for the economic benefit of the owner or operator shall not be sufficient reason;

(B) continued operation is necessary to prevent injury to persons or severe damage to equipment.

(b) Malfunction is defined as any sudden, unavoidable failure of any air pollution control equipment, process, or combustion or process equipment to operate in a normal and usual manner. [326 IAC 1-2-39]

C.16 General Record Keeping Requirements [326 IAC 2-6.1-5]

(a) Records of all required monitoring data, reports and support information required by this permit shall be retained for a period of at least five (5) years from the date of monitoring sample, measurement, report, or application. These records shall be physically present or electronically accessible at the source location for a minimum of three (3) years. The records may be stored elsewhere for the remaining two (2) years as long as they are available upon request. If the Commissioner makes a request for records to the Permittee, the Permittee shall furnish the records to the Commissioner within a reasonable time.

(b) Unless otherwise specified in this permit, all record keeping requirements not already legally required shall be implemented within ninety (90) days of permit issuance.

C.17 General Reporting Requirements [326 IAC 2-1.1-11] [326 IAC 2-6.1-2] [IC 13-14-1-13]

(a) Reports required by conditions in Section D of this permit shall be submitted to:

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

(b) Unless otherwise specified in this permit, any notice, report, or other submission required by this permit 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.

(c) Unless otherwise specified in this permit, all reports required in Section D of this permit shall be submitted within thirty (30) days of the end of the reporting period. All reports do require the certification by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).

(d) The first report shall cover the period commencing on the date of issuance of this permit and ending on the last day of the reporting period. Reporting periods are based on calendar years, unless otherwise specified in this permit. For the purpose of this permit

"calendar year" means the twelve (12) month period from January 1 to December 31 inclusive.

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR QUALITY
COMPLIANCE BRANCH

MINOR SOURCE OPERATING PERMIT
ANNUAL NOTIFICATION

This form should be used to comply with the notification requirements under 326 IAC 2-6.1-5(a)(5).

Company Name:	Koch Nitrogen Company
Address:	7430 East County Road 800 South
City:	Walton, Indiana 46994
Phone #:	316-828-8705
MSOP #:	M017-24444-00042

I hereby certify that Koch Nitrogen Company is :
- ☐ still in operation.
- ☐ no longer in operation.

I hereby certify that Koch Nitrogen Company is :
- ☐ in compliance with the requirements of MSOP M017-24444-00042.
- ☐ not in compliance with the requirements of MSOP M017-24444-00042.

Authorized Individual (typed):
Title:
Signature:
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:

MALFUNCTION REPORT

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR QUALITY
FAX NUMBER - 317 233-6865

This form should only be used to report malfunctions applicable to Rule 326 IAC 1-6 and to qualify for the exemption under 326 IAC 1-6-4.

THIS FACILITY MEETS THE APPLICABILITY REQUIREMENTS BECAUSE IT HAS POTENTIAL TO EMIT 25 TONS/YEAR PARTICULATE MATTER ?_____, 25 TONS/YEAR SULFUR DIOXIDE ?_____, 25 TONS/YEAR NITROGEN OXIDES?_____, 25 TONS/YEAR VOC ?_____, 25 TONS/YEAR HYDROGEN SULFIDE ?_____, 25 TONS/YEAR TOTAL REDUCED SULFUR ?_____, 25 TONS/YEAR REDUCED SULFUR COMPOUNDS ?_____, 25 TONS/YEAR FLUORIDES ?_____, 100 TONS/YEAR CARBON MONOXIDE ?_____, 10 TONS/YEAR ANY SINGLE HAZARDOUS AIR POLLUTANT ?_____, 25 TONS/YEAR ANY COMBINATION HAZARDOUS AIR POLLUTANT ?_____, 1 TON/YEAR LEAD OR LEAD COMPOUNDS MEASURED AS ELEMENTAL LEAD ?_____, OR IS A SOURCE LISTED UNDER 326 IAC 2-5.1-3(2) ?_____. EMISSIONS FROM MALFUNCTIONING CONTROL EQUIPMENT OR PROCESS EQUIPMENT CAUSED EMISSIONS IN EXCESS OF APPLICABLE LIMITATION _____.

THIS MALFUNCTION RESULTED IN A VIOLATION OF: 326 IAC _____ OR, PERMIT CONDITION # _____ AND/OR PERMIT LIMIT OF _____

THIS INCIDENT MEETS THE DEFINITION OF "MALFUNCTION" AS LISTED ON REVERSE SIDE ? Y N

THIS MALFUNCTION IS OR WILL BE LONGER THAN THE ONE (1) HOUR REPORTING REQUIREMENT ? Y N

COMPANY:_____PHONE NO. ( )_____
LOCATION: (CITY AND COUNTY)_____
PERMIT NO. _____ AFS PLANT ID: _____ AFS POINT ID: _____ INSP:_____
CONTROL/PROCESS DEVICE WHICH MALFUNCTIONED AND REASON:_____
_____

DATE/TIME MALFUNCTION STARTED: _____/_____/ 20____ _____ AM / PM

ESTIMATED HOURS OF OPERATION WITH MALFUNCTION CONDITION: _____

DATE/TIME CONTROL EQUIPMENT BACK-IN SERVICE_____/_____/ 20____ _____ AM/PM

TYPE OF POLLUTANTS EMITTED: TSP, PM-10, SO2, VOC, OTHER:_____

ESTIMATED AMOUNT OF POLLUTANT EMITTED DURING MALFUNCTION: _____

_____

MEASURES TAKEN TO MINIMIZE EMISSIONS:_____

_____

REASONS WHY FACILITY CANNOT BE SHUTDOWN DURING REPAIRS:

CONTINUED OPERATION REQUIRED TO PROVIDE ESSENTIAL* SERVICES:_____
CONTINUED OPERATION NECESSARY TO PREVENT INJURY TO PERSONS:_____
CONTINUED OPERATION NECESSARY TO PREVENT SEVERE DAMAGE TO EQUIPMENT:_____
INTERIM CONTROL MEASURES: (IF APPLICABLE)_____
_____
_____

MALFUNCTION REPORTED BY:_____TITLE:_____
(SIGNATURE IF FAXED)

MALFUNCTION RECORDED BY:_____DATE:_____TIME:_____
*SEE PAGE 2

Please note - This form should only be used to report malfunctions applicable to Rule 326 IAC 1-6 and to qualify for the exemption under 326 IAC 1-6-4.

326 IAC 1-6-1 Applicability of rule

Sec. 1. This rule applies to the owner or operator of any facility required to obtain a permit under 326 IAC 2-5.1 or 326 IAC 2-6.1.

326 IAC 1-2-39 "Malfunction" definition

Sec. 39. Any sudden, unavoidable failure of any air pollution control equipment, process, or combustion or process equipment to operate in a normal and usual manner.

***Essential services** are interpreted to mean those operations, such as, the providing of electricity by power plants. Continued operation solely for the economic benefit of the owner or operator shall not be sufficient reason why a facility cannot be shutdown during a control equipment shutdown.

If this item is checked on the front, please explain rationale:

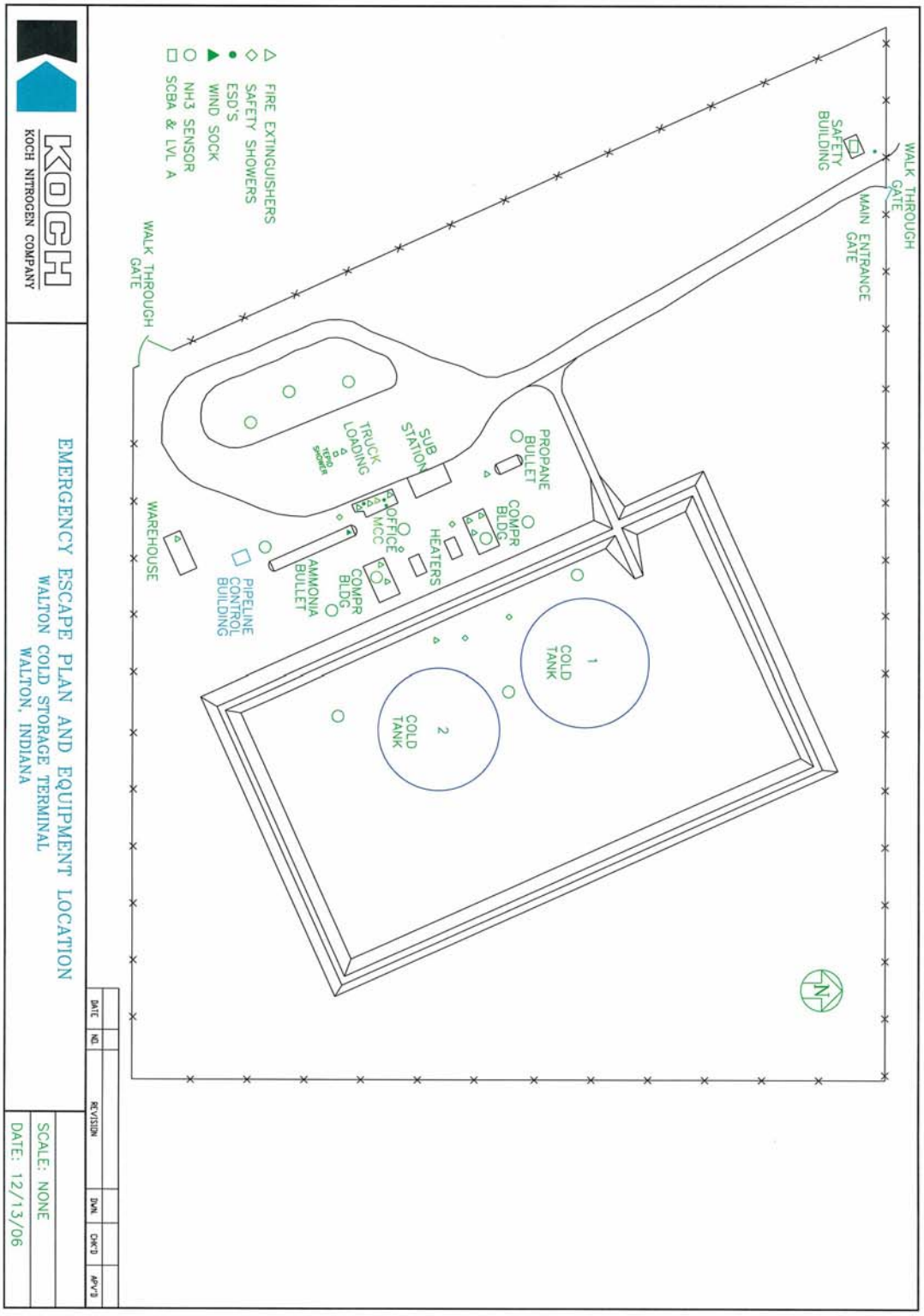
_____
_____

ATTACHMENT A
FUGITIVE DUST CONTROL PLAN

Fugitive Particulate Matter Control Plan
Koch Nitrogen Company Walton Ammonia Terminal

326 IAC 6-5-5 Section 5 (a)	
1. Name and Address of the Source:	Koch Nitrogen Company Walton Ammonia Terminal 7438 East County Road 800 South Walton, Indiana 46994
2. Name and Address of the owner or operator responsible for execution of the plan:	Koch Nitrogen Company 4111 East 37th Street North Wichita, Kansas 67220
3. Identification of all processes, operations and areas which have the potential to emit fugitive particulate matter in accordance with 326 IAC 6-5-4:	Unpaved roads from property boundary at county road to truck loading area.
4. A map of the source showing aggregate pile areas, access areas around the aggregate pile, unpaved roads, paved roads, parking lots, and location of conveyor transfer points, etc.	Attached is a site plan with the unpaved roads identified.
5. The number and mix of vehicular activity occurring on paved roads, unpaved roads, and parking lots.	Trucks on unpaved roads: 21170 maximum (approx. 95% ammonia trucks/ 5% pickups. Vehicle miles: 9126 miles maximum
6. Type and quantity of material handled.	Anhydrous ammonia; maximum of 394,200 tons/year
7. Equipment used to maintain aggregate piles.	Not applicable
8. A description of the measures to be implemented to control fugitive particulate matter emissions resulting from emission points identified in subdivision (3).	(E) Equivalent alternate measures: Vehicle restrictions have been implemented at the site. The enforced speed limit is 5 miles per hour.
9. A description of the dust suppressant material such as oil or chemical including the estimated frequency of application rates and concentrations.	Not applicable. Historical experience at the facility has demonstrated that fugitive dust emissions are effectively controlled with the existing vehicle restrictions.
10. A specification of the particulate matter collection equipment used as a fugitive particulate matter emission control measure.	Not applicable
11. A schedule of compliance with the provisions of the control plan. Such schedule shall specify the amount of time the source requires to award any necessary contracts, commence and complete construction, installation, or modification of the fugitive particulate matter control measures.	Vehicle Restrictions: The speed limit is currently in place and enforced through training of the drivers. Drivers violating this speed limit are stopped and informed they are speeding. If a driver continues to violate the speed limit, access to the site is denied.
12. Other relevant data that may be requested by the commissioner, to evaluate the effectiveness of the control plan.	To be determined

Records shall be kept and maintained that document the control measures under this plan. The records shall be available upon the request of the commissioner and shall be retained for three years.


WALK THROUGH GATE
MAIN ENTRANCE GATE
SAFETY BUILDING
WALK THROUGH GATE
FIRE EXTINGUISHERS
SAFETY SHOWERS
ESD'S
WIND SOCK
NH3 SENSOR
SCBA & LVL A
TRUCK LOADING
SUB STATION
PROPANE BULLET
COMPR BLDG
OFFICE MCC
HEATERS
AMMONIA BULLET
COMPR BLDG
WAREHOUSE
PIPELINE CONTROL BUILDING
1 COLD TANK
2 COLD TANK
N
KOCH
KOCH NITROGEN COMPANY
EMERGENCY ESCAPE PLAN AND EQUIPMENT LOCATION
WALTON COLD STORAGE TERMINAL
WALTON, INDIANA
DATE
NO
REVISION
DWN
CHK'D
APV'D
SCALE: NONE
DATE: 12/13/06

Indiana Department of Environmental Management
Office of Air Quality

Technical Support Document (TSD) for a Minor Source Operating Permit (MSOP)

Source Background and Description

Source Name:	Koch Nitrogen Company
Source Location:	7430 East County Road 800 South, Walton, Indiana 46994
County:	Cass
SIC Code:	5191
Operation Permit No.:	E017-16725-00042
Operation Permit Issuance Date:	January 6, 2003
Permit No.:	M017-24444-00042
Permit Reviewer:	ERG/JR

The Office of Air Quality (OAQ) has reviewed an application from Koch Nitrogen Company relating to an ammonia storage and distribution terminal.

History

Koch Nitrogen Company (KNC) is an ammonia storage and distribution terminal that was issued an exemption No.: 017-16725-00042 on January 6, 2003. On March 13, 2007, KNC sent an application to update the facility's potential to emit calculations. A reevaluation of the facility's calculations has determined that the facility requires a minor source operating permit.

Note: The ammonia handled at this plant is anhydrous ammonia which is considered a regulated air pollutant.

Permitted Emission Units and Pollution Control Equipment

The source consists of the following unpermitted emission units and pollution control devices:

(a) One (1) propane or natural gas fired ammonia heater, identified as H-1, constructed in July 1973, with a maximum heat input rate of 25 MMBtu per hour, exhausting to stack H1.

(b) One (1) propane or natural gas fired ammonia heater, identified as H-2, constructed in June 1977, with a maximum heat input rate of 22.9 MMBtu per hour, exhausting to stack H2.

(c) Eight (8) propane fired vaporizer units, identified as V-1 through V-8, constructed in 1997, each having a maximum heat input rate of 0.08 MMBtu/hour.

(d) One (1) propane or natural gas fired flare, identified as F-1, constructed in 1973, with a maximum heat input rate of 0.68 MMBtu/hour, used to control anhydrous ammonia emissions, and exhausting to stack F1.

(e) One (1) propane or natural gas fired flare, designated as F-2, constructed in 2003, having a maximum heat input rate of 0.27 MMBtu/hour, used to control anhydrous ammonia emissions, and exhausting to stack F2.

(f) One (1) 42 HP propane or natural gas fired emergency generator with a maximum heat input rate of 0.21 MMBtu/hour.

(g) Fugitive emissions from unpaved roads and parking lots.

(h) Propane tank loading.

(i) Two (2) purgers with a maximum release rate of 120 cubic feet of process gas per hour.

(j) Two (2) propane fired room heating systems rated at 0.095 MMBtu per hour and 0.080 MMBtu per hour.

New Emission Units

There are no new emissions units proposed for this source at the time of this review.

Existing Approvals

The source has been operating under previous approvals including the following:

(a) Amendment 017-18324-00042, issued January 12, 2004,

(b) E017-16725-00042, issued January 6, 2003,

(c) E017-15103-00042, issued January 7, 2002,

(d) Amendment 017-14222-00042, issued June 1, 2001; and

(e) CP017-8982-00042, issued January 5, 1998.

All conditions from previous approvals were incorporated into this MSOP.

Enforcement Issue

(a) IDEM is aware that equipment has been operating prior to receipt of the proper permit. The subject equipment is listed in this Technical Support Document under the condition entitled “Permitted Emission Units and Pollution Control Equipment”. As previously stated, this source was issued an Exemption on January 6, 2003. However, based on the new potential to emit calculations provided by the applicant, this source does not qualify for an Exemption.

(b) IDEM is reviewing this matter and will take appropriate action. This proposed permit is intended to satisfy the requirements of the operating permit rules.

Stack Summary

Stack ID	Operation	Height (ft)	Diameter (ft)	Flow Rate (acfm)	Temperature (^{o}F)
F-1	Flare F-1	80	0.3	25.4	1,200
F-2	Flare F-2	80	0.5	25.4	1,200
H-1	Heater H-1	28	1.7	6,000	800
H-2	Heater H-2	28	1.5	8,500	800

Recommendation

The staff recommends to the Commissioner that the MSOP be approved. This recommendation is based on the following facts and conditions:

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 March 13, 2007, with additional information received on October 17, 2007, October 31, 2007, and December 12, 2007.

Emission Calculations

This facility can operate under four different scenarios. These scenarios are:

(1) Hot Terminal (Propane Primary Fuel)
(2) Hot Terminal (Natural Gas Primary Fuel)
(3) Cold Terminal (Propane Primary Fuel)
(4) Cold Terminal (Natural Gas Primary Fuel)

However, the most significant operating difference in emissions depends on whether the facility is operating in "hot" or "cold" mode. The heaters cannot operate unless cold ammonia flows through them; therefore, the heaters only operate during cold terminal operations. During cold terminal operations, the heaters are used to heat cold ammonia and transfer it into truck tanks. During hot terminal operations, ammonia is sent to the flares and/or atmosphere instead of being loaded into trucks via the heaters. In addition to these two scenarios (hot or cold terminal), the heaters and flares can burn either natural gas or propane.

See Appendix A of this document for detailed emission calculations that consist of the four possible operating scenarios for this source.

Potential to Emit of the Source Before Controls

Pursuant to 326 IAC 2-1.1-1(16), Potential to Emit is defined as “the maximum capacity of a stationary source or emissions unit to emit any air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of a source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or type or amount of material combusted, stored, or processed shall be treated as part of its design if the limitation is enforceable by the U.S. EPA, the department, or the appropriate local air pollution control agency.”

Pollutant	Potential to Emit* (tons/yr)
PM	38.4
PM10	11.6
SO_2	0.47
VOC	3.26
CO	3.95
NO_x	9.27
Anhydrous NH_3**	11.7

* PTE dependent on worst case scenario for each pollutant:
PM and PM10 - Hot Terminal (Natural Gas or Propane Primary Fuel)
NOx, VOC, and SO2 - Cold Terminal (Propane Primary Fuel)
CO - Cold Terminal (Natural Gas Primary Fuel)
** Anhydrous NH_3 is a regulated pollutant under Section 112(r)(3) of the Clean Air Act.

HAPs	Potential to Emit (tons/yr)
Total	Neg.

(a) The potential to emit (as defined in 326 IAC 2-7-1(29)) of all criteria pollutants are less than 100 tons per year. The source is not subject to the provisions of 326 IAC 2-7. The potential to emit of PM is greater than 25 tons per year. Therefore, pursuant to 326 IAC 2-6.1, the source will be issued an MSOP.

(b) The potential to emit (as defined in 326 IAC 2-7-1(29)) of any single HAP is less than ten (10) tons per year and the potential to emit (as defined in 326 IAC 2-7-1(29)) of a combination of HAPs is less than twenty-five (25) tons per year.

County Attainment Status

The source is located in Cass County.

Pollutant	Status
PM10	attainment
PM2.5	attainment
SO_2	attainment
NO_2	attainment
8-hour Ozone	attainment
CO	attainment
Lead	attainment

(a) Cass County has been classified as attainment or unclassifiable 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 surrogate for PM2.5 emissions. See the State Rule Applicability - Entire Source Section.

(b) Volatile organic compounds (VOC) and Nitrogen Oxides (NOx) emissions 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. Cass 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. See the State Rule Applicability - Entire Source Section

(b) Cass County has been classified as attainment or unclassifiable in Indiana for PM10, SO_2, NO_2, Ozone, CO and Lead. Therefore, these emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2. See the State Rule Applicability - Entire Source Section.

(e) Fugitive Emissions
Since this type of operation is not one of the 28 listed source categories under 326 IAC 2-2 or 2-3 and since there are no applicable New Source Performance Standards that were in effect on August 7, 1980, the fugitive particulate matter (PM) and volatile organic compound (VOC) emissions are not counted toward determination of PSD applicability.

Source Status

Existing Source PSD Definition (emissions after controls, based on 8760 hours of operation per year at rated capacity and/or as otherwise limited):

Pollutant	Emissions (tons/yr)
PM	26.7
PM10	7.52
SO_2	0.03
VOC	1.16
CO	3.96
NO_x	13.7
Ammonia	11.5
Single HAP	Neg.
Combination HAPs	Neg.

(a) This existing source is not a PSD major stationary source because no attainment regulated pollutant is emitted at a rate of 250 tons per year or greater and it is not one of the 28 listed source gategories. Therefore, the requirements of PSD do not apply.

(b) The emissions are based on the potential to emit of this source (see Appendix A).

Part 70 Permit Determination

326 IAC 2-7 (Part 70 Permit Program)

This existing source is not subject to the Part 70 Permit requirements because the potential to emit (PTE) of:

(a) each criteria pollutant is less than 100 tons per year,

(b) a single hazardous air pollutant (HAP) is less than 10 tons per year, and

(c) any combination of HAPs is less than 25 tons per year.

Federal Rule Applicability

(a) There are no New Source Performance Standards (NSPS) (326 IAC 12 and 40 CFR Part 60) included in this MSOP.

(1) The requirements of the New Source Performance Standards for Stationary Compression Ignition Internal Combustion Engines (326 IAC 12, 40 CFR 60.4200 - 4209, Subpart IIII) are not included in the permit. The emergency generator commenced construction before July 11, 2005 and was manufactured before April 1, 2006.

(b) There are no National Emission Standards for Hazardous Air Pollutants (NESHAP) (326 IAC 14, 326 IAC 20 and 40 CFR Part 63) included in this MSOP.

State Rule Applicability - Entire Source

326 IAC 2-2 (Prevention of Significant Deterioration)

This source is not subject to the requirements of 326 IAC 2-2 (Prevention of Significant Deterioration) because this source does not have the potential to emit greater than two hundred fifty (250) tons per year of any criteria pollutant and this source is not one (1) of the twenty-eight (28) listed source categories.

326 IAC 2-4.1 (Hazardous Air Pollutants)

This source is not subject to the requirements of 326 IAC 2-4.1 (Hazardous Air Pollutants), because this source was constructed before July 27, 1997, and does not have the potential to

emit greater than ten (10) tons per year of a single HAP or greater than twenty-five (25) tons per year of any combination of HAPs.

326 IAC 2-6 (Emission Reporting)

This source is located in Cass County, is not required to operate under a Part 70 permit, and does not have the potential to emit equal to or greater than 5 tons per year of lead. Therefore, the source is only subject to 326 IAC 2-6-5 (Additional Information Requests).

326 IAC 5-1 (Visible Emissions 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:

(a) Opacity shall not exceed an average of forty percent (40%) 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.

326 IAC 6-4 (Fugitive Dust Emissions)

The Permittee 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).

326 IAC 6-5 (Fugitive Particulate Matter Emission Limitations)

This source is subject to the requirements of 326 IAC 6-5 (Fugitive Particulate Matter Emission Limitations) because this source did not receive all the necessary construction approvals before 1985 and has the potential to emit greater than twenty-five (25) tons per year of fugitive particulate matter.

State Rule Applicability - Heaters

326 IAC 6-2 (Particulate Emission Limitations for Sources of Indirect Heating)

The two (2) ammonia heaters, H-1 and H-2, are not subject to the requirements of 326 IAC 6-2 (Particulate Emission Limitations for Sources of Indirect Heating) because the heaters are not indirect heating units. The ammonia is heated directly.

326 IAC 6-3 (Particulate Emissions Limitations)

326 IAC 6-3 (Particulate Emissions Limitations) does not apply to the two (2) ammonia heaters, H-1 and H-2, because each of these emissions units has a potential to emit PM emissions less than five hundred fifty-one thousandths (0.551) pound per hour.

326 IAC 7-1.1-1 (Sulfur Dioxide Emissions Limitations)

326 IAC 7-1.1-1 (Sulfur Dioxide Emissions Limitations) does not apply to the heaters, H-1 and H-2, because they do not have the potential to emit twenty-five (25) tons per year or ten (10) pounds per hour of sulfur dioxide.

State Rule Applicability – Vaporizer Units

326 IAC 6-2-4 (Particulate Matter Limitations for Sources of Indirect Heating)

The eight (8) propane-fired vaporizer units, identified as V-1 through V-8, are not subject to the requirements of 362 IAC 6-2-4 because they are not indirect heating units.

326 IAC 6-3 (Particulate Emissions Limitations)

326 IAC 6-3 (Particulate Emissions Limitations) does not apply to the eight (8) propane-fired vaporizer units, identified as V-1 through V-8, because each of these emissions units has a potential to emit PM emissions less than five hundred fifty-one thousandths (0.551) pound per hour.

326 IAC 7-1.1-1 (Sulfur Dioxide Emissions Limitations)

326 IAC 7-1.1-1 (Sulfur Dioxide Emissions Limitations) does not apply to the eight (8) propane-fired vaporizer units, identified as V-1 through V-8, because these units do not have the potential to emit twenty-five (25) tons per year or ten (10) pounds per hour of sulfur dioxide.

State Rule Applicability – Emergency Generator

326 IAC 6-3 (Particulate Emissions Limitations)

326 IAC 6-3 (Particulate Emissions Limitations) does not apply to the emergency generator, because this unit has a potential to emit PM emissions less than five hundred fifty-one thousandths (0.551) pound per hour.

326 IAC 9-1-2 (Carbon Monoxide Emission Requirements)

This source is not among the listed source categories in 326 IAC 9-1-2. Therefore, the emergency generator is not subject to the requirements of 326 IAC 9-1-2.

326 IAC 10-1 (Nitrogen Oxide Emission Requirements)

This source is not located in Clark or Floyd County. Therefore, the emergency generator is not subject to the requirements of 326 IAC 10-1.

Conclusion

The operation of this ammonia storage and distribution terminal shall be subject to the conditions of MSOP 017-24444-00042.

Appendix A: Emission Calculations
PTE Summary - TERMINAL WIDE TOTALS - All Scenarios

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: Source Calculations Reviewed By ERG/JR
Date: 12/3/2007

Potential To Emit (TPY)		NH3	NOx	CO	VOC	SO2	PM	PM10
Scenario 1	Hot Terminal (Propane Primary Fuel)	5.47	2.28	1.22	3.07	0.07	38.4	11.6
Scenario 2	Hot Terminal (Natural Gas Primary Fuel)	5.48	1.90	1.20	0.26	1.65E-03	38.4	11.6
Scenario 3	Cold Terminal (Propane Primary Fuel)	11.6	9.27	2.44	3.26	0.47	27.9	8.55
Scenario 4	Cold Terminal (Natural Gas Primary Fuel)	11.7	4.94	3.95	0.44	0.02	27.9	8.56
	WORSE CASE TOTAL	**11.7**	**9.27**	**3.95**	**3.26**	**0.47**	**38.4**	**11.6**

Note: PTE dependent on worst case scenario for each pollutant. This facility can operate under four different scenarios. These scenarios are:
(1) Hot Terminal (Propane Primary Fuel)
(2) Hot Terminal (Natural Gas Primary Fuel)
(3) Cold Terminal (Propane Primary Fuel)
(4) Cold Terminal (Natural Gas Primary Fuel)
However, the most significant operating difference in emissions depends on whether the facility is operating in "hot" or "cold" mode. The heaters cannot operate unless cold ammonia flows through them; therefore, the heaters only operate during cold terminal operations. During cold terminal operations, the heaters are used to heat cold ammonia and transfer it into truck tanks. During hot terminal operations, ammonia is sent to the flares and/or atmosphere instead of being loaded into trucks via the heaters. In addition to these two scenarios (hot or cold terminal), the heaters and flares can either burn natural gas or propane.

Appendix A: Emission Calculations
PTE Summary - (Propane Primary Fuel) - HOT TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: Source Calculations Reviewed By ERG/JR
Date: 12/3/2007

Potential To Emit (TPY)	NH3	NOx	CO	VOC	SO2	PM	PM10
Flare #1	2.02	0.75	1.10	2.78	3.42E-02	-	-
Flare #2	3.39	0.93	0.04	0.26	3.19E-03	-	-
Heater 1*	HEATERS NOT OPERATING						
Heater 2*	HEATERS NOT OPERATING						
Vaporizers #1 - #8	-	0.43	0.06	0.02	0.03	0.01	0.01
Propane Tank Loading	-	-	-	7.80E-04	-	-	-
42 HP Emergency Generator	-	0.17	0.02	6.34E-03	3.11E-05	2.03E-03	2.03E-03
Road Fugitives	-	-	-	-	-	38.4	11.6
Purger Emissions (if vented to atmosphere)	PURGERS NOT OPERATING						
Truck loading (if vented to atmosphere)	0.06	-	-	-	-	-	-
TERMINAL WIDE TOTALS	**5.47**	**2.28**	**1.22**	**3.07**	**0.07**	**38.4**	**11.6**

* Heaters are used to heat cold ammonia. Heaters are not used in hot terminal operations.

Appendix A: Emission Calculations
MAXIMUM FACILITY CAPACITIES- HOT TERMINAL

Company Name: **Koch Fertilizer Storage and Terminal Company**
Address: **7438 East County Road 800S, Walton, IN 46994**
MSOP: **017-24444-00042**
Reviewer: **Source Calculations Reviewed By ERG/JR**
Date: **12/3/2007**

Input			
Maximum ammonia pipeline flow rate input	45	tons/ hr	Facility Data-Maximum the facility can receive via pipeline
Maximum number of hours pipeline can operate	8760	hr	
Maximum ammonia pipeline flow rate input	394200	tpy	This equals the maximum amount of ammonia that can possibly be entering the facility
Refrigeration*			
Maximum Refrigeration system capability for incomming ammonia	0	tpy	No refrigeration in hot terminal operation
Storage			
Total Tank Capacity for ammonia	0	tons	Tanks are vented to atmosphere. Hence, no vented storage in hot terminal operation
Output **			
Maximum theoretical ammonia for output	394200	tpy	pipeline rate plus storage capacity
Maximum refrigerated ammonia for output	0	tpy	Maximum refrigerated throughput through the facility
Maximum capabilty of Heater Line 1	100	tons/ hr	BSB Heater Specifications
Maximum capabilty of Heater Line 2	150	tons/ hr	Smalling Heater Design Specifications
Maximum Heater 1 hours for refrigerated product	0.00	hours /year	
Maximum Heater 2 hours for refrigerated product	0.00	hours/year	
Maximum Heater 1 rate for refrigerated product	0.00	hours per day	calculated as 2752.80/365
Maximum Heater 2 rate for refrigerated product	0.00	hours per day	calculated as 1835.20/365

*Refrigeration is needed to put incoming ammonia into tanks

**Heaters are used to heat ammonia into truck tanks. Heaters cannot operate unless cold ammonia flows through the unit

Appendix A: Emission Calculations
POTENTIAL FLARE 1 EMISSIONS (Propane Primary Fuel)- HOT TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: Source Calculations Reviewed By ERG/JR
Date: 12/3/2007

Note: Emergency Flare emissions are based on a reasonable worse case scenario of 240 hours of ammonia flaring per year with the remaining hours in an idling mode

Flare Name	4" Emergency Flare	
Pilot Fuel Type	Propane	
Molecular weight	44	lb/lb mole
Fuel Heat Content	90,500	BTU/gallon liquid
Fuel Heat Content	2,516	BTU/ft^3 vapor
Conversion factor	36	ft3 vapor/gallon propane liquid
Conversion factor	4.24	lb propane/1 gallon liquid propane

Assumptions			**Basis**
Composition of Ammonia during Flaring	98.585	Volume percent	Calculated (1)
Composition of Propane during Flaring	1.415	Volume percent	Calculated
Composition of Ammonia during Flaring	96.419	Wt. percent	Calculated (2)
Composition of Propane during Flaring	3.581	Wt. percent	Calculated
Maximum Input Rating during Flaring	0.68	MMBtu/hr	Calculated from total fuel consumed during Flaring (3)
Maximum Input Rating during Flare idling	0.68	MMBtu/hr	Calculated from total fuel consumed during Flare idling
Maximum Propane consumption rate during Flare idling	269.77	ft3/hr	10/14/02, David Bevers email, Koch (180 gal/day, always full open)
Maximum Propane consumption rate during flaring	269.77	ft3/hr	10/14/02, David Bevers email, Koch (180 gal/day, always full open)
Fuel Heat Content with Flaring	390	Btu/scf	
Fuel Heat Content during Flare idling	2516	Btu/scf	National Propane gas Association
Maximum Annual Hours of Operation	8760	hrs/yr	
VOC Flare efficiency	98	percent	4/28/03 Koch supplied assumption

During Pilot Idling (Propane Combustion Only)

Annual Hours of operation during Flare idling	8,520		
Sulfur Content in Propane	123.00	ppm	10-22-03 discussion with Franger Gas, Walton propane supplier
Propane Consumption during Flare idling	2,298,470	ft3/yr	Calculated from Hourly usage and hours of flaring (4)
Propane Consumption during Flare idling	270,709	lb/yr	Calculated from conversion of units (5)
Mass of Sulfur during Flare idling	33.30	lb/yr	Calculated from sulfur content and propane consumption (6)

Pollutant	Emission Factor		Emission Rates		Basis of Estimate
NOx	0.068	lb/MM BTU	**0.20**	**tpy (7)**	AP-42: Table 13.5-1(9-1991)
CO	0.37	lb/MM BTU	**1.07**	**tpy**	AP-42: Table 13.5-1(9-1991)
PM	0	lb/MM BTU	**0.00**	**tpy**	AP-42: Table 13.5-1(9-1991) non-smoking flare
VOC	2	% of total VOCs	**2.71**	**tpy (8)**	AP-42: Chapter 13.5 (9-1991)
SO2	2	lb/# Sulfur in propane	**0.03**	**tpy (9)**	Assumed all sulfur converted to SO2

During Flaring (Ammonia and Propane Combustion)

			Basis
Annual Flare hours of operation	240.00	hours	Maintenance Emissions
Ammonia flow rate during Flaring	18800	ft3/hr	Engg Estimate
Annual Ammonia flow rate during Flaring	4,512,000	ft3/yr	Calculated (10)
Annual Propane Consumption during Flaring	64,746	ft3/yr	Calculated (11)
Annual Fuel Consumption during Flaring	4,576,746	ft3/yr	Calculated (12)
Assumed temperature	60	F	
Gas Constant	0.7302	(atm*ft3)/(lb mole*R)	
Assumed Pressure	1	Atm	Standard atmospheric pressure
Nox flare emission factor (13)	11.1	lb Nox/ton ammonia	Koch Supplied
Pounds of ammonia sent to flare per yr	202009.99		Calculated (14)
Pounds of ammonia combusted per year	197969.79		98% combusted, 2% to atmosphere (15)
Pounds of Nox from ammonia combustion	1098.73	lbs	Calculated (16) Based on TNRCC emission factor
NOx tons per year from ammonia combustion	0.55	TPY	
Pounds of ammonia to atmosphere per year	4040.20	lbs	
Ammonia to atmosphere	2.02	TPY	
Propane Consumption During Flaring	64746	scf/yr	
Propane Consumption During Flaring	7,626	lb/yr	Calculated from conversion of units
Mass of Sulfur during Flaring	0.938	lb/yr	Calculated from sulfur content and propane consumption

Pollutant	Emission Factor		Emission Rates		Basis of Estimate
NOx	0.068	lb/MMBTU	**5.54E-03**	**tpy**	AP-42: Table 13.5-1(9-1991)
CO	0.37	lb/MMBTU	**3.01E-02**	**tpy**	AP-42: Table 13.5-1(9-1991)
PM	0	lb/MMBTU	**0.00**	**tpy**	AP-42: Table 13.5-1(9-1991) non-smoking flare
VOC	2	% of total VOC	**7.63E-02**	**tpy**	AP-42: Chapter 13.5 (9-1991)
SO2	2	lb/lb Sulfur in Propane	**9.38E-04**	**tpy**	Assumed all sulfur converted to SO2

Total propane used	2,363,215	ft3/yr	65,700	gallon/yr

TOTAL Emissions:

Pollutant	Emission Rates	
NOx	**0.75**	**tpy**
CO	**1.10**	**tpy**
PM	**0.00**	**tpy**
VOC	**2.78**	**tpy**
SO2	**0.03**	**tpy**
NH3	**2.02**	**tpy**

Methodology

(1) Volume % of ammonia during flaring = ammonia flow rate during flaring (ft^3/yr)/total fuel consumption during flaring (ft^3/yr) * 100

(2) Weight % of ammonia during flaring = (volume % of ammonia during flaring x 17 lb/lb.mol) / [(volume % of ammonia during flaring) x 17 lb/ lb.mol) + (volume % of propane in flare) x 44 lb/lb.mol)] x 100

(3) Maximum Input Rating during Flaring = [propane + ammonia consumption rate during flaring (ft3/hr)] x [fuel heat content (BTU/ft3)] / [1,000,000]

(4) Annual propane consumption during pilot idling = Maximum Propane consumption rate during Flare idling (ft3/hr) x Annual hours of pilot idling operation

(5) Propane consumption during pilot idling (lb/yr) = [Propane consumption (ft3/yr)] /[1 gal propane/36 ft3 propane] x [4.24 lb propane/1 gallon liquid propane]

(6) Mass of sulfur from propane combustion (lb/yr) = [propane consumption (lb/yr)] x [0.0123 lb sulfur/100 lb propane]

(7) Emission rate for NOx, CO, or PM (tons/yr) = [emission factor (lb/MMBTU)] x [hours of pilot idling/yr] x [maximum propane input rating during idling (MMBTU/hr)] / [2000 lb/ton]

(8) Emission rate for VOCs (tons/yr) = [propane consumption during idling (lb/yr)] x [(100%-98%)] x [1 ton/2000 lb]
For VOC emissions, a 98% destruction efficiency is assumed, and propane is assumed to have a 100% by weight VOC content

(9) Emission rate for SO_2 (tons/yr) = [Mass of sulfur combusted (lb/yr)] x [2 lb SO_2/1 lb sulfur] x [1 ton SO_2/2000 lb SO_2]

(10) Ammonia flowrate during flaring (ft^3/yr) = Hours of flare operation x Ammonia flaring flow rate (ft3/hr)

(11) Propane Consumption during Flaring (ft3/yr) = Hours of flare operation x Maximum propane consumption rate during flaring (ft3/hr)

(12) Total fuel consumption during flaring (ft^3/yr) = Ammonia flowrate during flaring (ft^3/yr) + Propane flowrate during flaring (ft^3/yr)

(13) The emission factor for converting Ammonia to NOx is based on an Air Permit Technical Guidance for Chemical Sources: Flares and Oxidizers from the Texas Natural Resource Conservation Commission (October 2000, RG-109 draft).

(14) Pounds of ammonia sent to flare/year= [annual ammonia flaring flow rate (ft^3/yr) /0.7302 atm.ft^3/lb.mol.R]/[459 +60^{o}F] R x [17lb/lb.mol]

(15) Pounds of ammonia combusted by flare per yr = Pounds of ammonia sent to flare each year x Flare efficiency

(16) Pounds of NOx emitted per yr = Pounds of ammonia combusted each year x (1ton/2000 lbs) x NOx emission factor (lb NOx/ton ammonia)

Appendix A: Emission Calculations
POTENTIAL FLARE 2 EMISSIONS (Propane Primary Fuel)- HOT TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: Source Calculations Reviewed By ERG/JR
Date: 12/3/2007

Note: Emergency Flare emissions are based on a reasonable worse case scenario of 240 hours of ammonia flaring per year with the remaining hours in an idling mode

Flare Name	Stackmatch with Double Pilots	
Pilot Fuel Type	Propane	
Molecular weight	44	lb/lb mole
Fuel Heat Content	90,500	BTU/gallon liquid
Fuel Heat Content	2,516	BTU/ft^3 vapor
Conversion factor	36	ft3 vapor/gallon propane liquid
Conversion factor	4.24	lb propane/1 gallon liquid propane

Assumptions			**Basis**
Composition of Ammonia during Flaring	97.209	Volume percent	Calculated (1)
Composition of Propane during Flaring	2.791	Volume percent	Calculated
Composition of Ammonia during Flaring	93.083	Wt. percent	Calculated (2)
Composition of Propane during Flaring	6.917	Wt. percent	Calculated
Maximum Input Rating during Flaring	0.27	MMBtu/hr	Calculated (3)
Maximum Input Rating during Flare idling	0.02	MMBtu/hr	Calculated
Maximum Propane consumption rate during Flare idling	8.00	ft3/hr	Manufacturer's Literature @ 25 psig
Maximum Propane consumption rate during flaring	634.00	ft3/hr	Manufacturer's Literature @ 25 psig
Fuel Heat Content with Flaring	419	Btu/scf	
Fuel Heat Content during Flare idling	2516	Btu/scf	
Maximum Annual Hours of Operation	8760	hrs/yr	

During Pilot Idling (Propane Combustion Only)

Annual Hours of operation during Flare idling	8,520	hrs/yr	
Propane Consumption during Flare idling	68,160	ft3/yr	Calculated (4)
Propane Consumption during Flare idling	8,034	lb/yr	Calculated (5)
Sulfur Content in Propane	123	ppmw	10-22-03 discussion with Franger Gas, Walton propane supplier
Percent Sulfur in Propane	0.0123	% by weight	
Mass of Sulfur Produced by Propane Combustion	1	lb/yr	Calculated (6)

Pollutant	Emission Factor		Emission Rates		Basis of Estimate
NOx	0.068	lb/MMBTU	5.83E-03	tpy (7)	AP-42: Table 13.5-1(9-1991)
CO	0.37	lb/MMBTU	3.17E-02	tpy	AP-42: Table 13.5-1(9-1991)
PM	0	lb/MMBTU	0.00	tpy	AP-42: Table 13.5-1(9-1991) non-smoking flare
VOC	2	% of total VOC	8.03E-02	tpy (8)	AP-42: Chapter 13.5 (9-1991), assume 98% VOC control efficiency
SO2	2	lb/lb Sulfur in Prc	9.88E-04	tpy (9)	Assumed all sulfur converted to SO2

During Flaring (Ammonia and Propane Combustion)

			Basis
Annual Flare hours of operation	240.00	hours	Maintenance Emissions
Ammonia flow rate during Flaring	22084	ft3/hr	Engg Estimate
Annual Ammonia flow during Flaring	5,300,160	ft3/yr	Calculated (10)
Annual Propane consumption during flaring	152,160	ft3/yr	Calculated (11)
Annual Fuel Consumption during Flaring	5,452,320	ft3/yr	Calculated (12)
Assumed temperature	60	F	
Gas Constant	0.7302	(atm*ft3)/(lb mole*R)	
Assumed Pressure	1	Atm	Standard atmospheric pressure
Nox flare emission factor (13)	11.1	lb Nox/ton amm	TNRCC Guidance
Pounds of ammonia sent to flare per yr	237297.26		Calculated (14)
Pounds of ammonia sent to flare from truck loading	102012.83		
Pounds of ammonia sent to flare from purgers	0.00		
Total pounds of ammonia sent to flare per year	339310.09		
Pounds of ammonia combusted per yr	332523.89		98% combusted, 2% to atmosphere
Pounds of Nox from ammonia combustion	1845.51	lbs/year	Calculated (15) Based on TNRCC emission factor
NOx tons per year from ammonia combustion	0.92	TPY	
Pounds of ammonia to atmophere per year	6786.20		
Ammonia to atmophere	3.39	TPY	
Propane Consumption During Flaring	152160.0	scf/yr	
Propane Consumption During Flaring	17,936	lb/yr	
Sulfur Content in Propane	123	ppmw	10-22-03 discussion with Franger Gas, Walton propane supplier
Percent Sulfur in Propane	0.0123	% by weight	
Mass of Sulfur Produced by Propane Combustion	2	lb/yr	

Pollutant	Emission Factor		Emission Rates		Basis of Estimate
NOx	0.068	lb/MMBTU	2.17E-03	tpy	AP-42: Table 13.5-1(9-1991)
CO	0.37	lb/MMBTU	1.18E-02	tpy	AP-42: Table 13.5-1(9-1991)
PM	0	lb/MMBTU	0.00	tpy	AP-42: Table 13.5-1(9-1991) non-smoking flare
VOC	2	% of total VOC	0.18	tpy	AP-42: Chapter 13.5 (9-1991), assume 98% VOC control efficiency
SO2	2	lb/lb Sulfur in Prc	2.21E-03	tpy	Assumed all sulfur converted to SO2

TOTAL Emissions:

Pollutant	Emission Rates	
NOx	**0.93**	**tpy**
CO	**0.04**	**tpy**
PM	**0.00**	**tpy**
VOC	**0.26**	**tpy**
SO2	**3.19E-03**	**tpy**
NH3	**3.39**	**tpy**

Total propane used 220,320 ft3/yr 6,125 gallon/yr

Methodology

(1) Volume % of ammonia during flaring = ammonia flow rate during flaring (ft^3/yr)/total fuel consumption during flaring (ft^3/yr) * 100
(2) Weight % of ammonia during flaring = (volume % of ammonia during flaring x 17 lb/lb.mol) / [(volume % of ammonia during flaring) x 17 lb/ lb.mol) + (volume % of propane in flare) x 44 lb/lb.mol)] x 100
(3) Maximum Input Rating during Flaring = [propane+ ammonia consumption rate during flaring (ft3/hr)] x [fuel heat content (BTU/ft3)] / [1,000,000]
(4) Annual propane consumption during pilot idling = Maximum Propane consumption rate during Flare idling (ft3/hr) x Annual hours of pilot idling operation
(5) Propane consumption during pilot idling (lb/yr) = [Propane consumption (ft3/yr)] /[1 gal propane/36 ft3 propane] x [4.24 lb propane/1 gallon liquid propane]
(6) Mass of sulfur from propane combustion (lb/yr) = [propane consumption (lb/yr)] x [0.0123 lb sulfur/100 lb propane]
(7) Emission rate for NOx, CO, or PM (tons/yr) = [emission factor (lb/MMBTU)] x [hours of pilot idling/yr] x [maximum propane input rating during idling (MMBTU/hr)] / [2000 lb/ton]
(8) Emission rate for VOCs (tons/yr) = [propane consumption during idling (lb/yr)] x [(100%-98%)] x [1 ton/2000 lb]
For VOC emissions, a 98% destruction efficiency is assumed, and propane is assumed to have a 100% by weight VOC content
(9) Emission rate for SO_2 (tons/yr) = [Mass of sulfur combusted (lb/yr)] x [2 lb SO_2/1 lb sulfur] x [1 ton SO_2/2000 lb SO_2]
(10) Ammonia flowrate during flaring (ft^3/yr) = Hours of flare operation x Ammonia flaring flow rate (ft3/hr)
(11) Propane Consumption during Flaring (ft3/yr) = Hours of flare operation x Maximum propane consumption rate during flaring (ft3/hr)
(12) Total fuel consumption during flaring (ft^3/yr) = Ammonia flowrate during flaring (ft^3/yr) + Propane flowrate during flaring (ft^3/yr)
(13) The emission factor for converting Ammonia to NOx is based on an Air Permit Technical Guidance for Chemical Sources: Flares and Oxidizers from the Texas Natural Resource Conservation Commission (October 2000, RG-109 draft).
(14) Pounds of ammonia sent to flare/year= [annual ammonia flaring flow rate (ft^3/yr) /0.7302 atm.ft^3/lb.mol.R)/[459 +60^{0}F] R x [17lb/lb.mol]
(15) Pounds of ammonia combusted by flare per yr = Pounds of ammonia sent to flare each year x Flare efficiency
(16) Pounds of NOx emitted per yr = Pounds of ammonia combusted each year x (1ton/2000 lbs) x NOx emission factor (lb NOx/ton ammonia)

Appendix A: Emission Calculations
POTENTIAL VAPORIZER EMISSIONS - HOT TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: Source Calculations Reviewed By ERG/JR
Date: 12/3/2007

Vaporizers #1 - #8

Manufacturer	Mitchell 70		
Heater Fuel Type	Propane		
Fuel Heat Content	90,500	BTU/gallon	AP-42: Chapter 1.5.1(10-1996)
Heat Duty of Vaporizer	0.08	MMBtu/hr	Mitchell (70)
Fuel Consumption Rate	0.88	Gallons/hr	Calculated (1)
Annual Hours of Operation	8760	hrs/yr	Assumed worst case

Number of Vaporizers	8		
Annual Propane Consumption	61,949	gallons/yr	Calculated from fuel consumption and operational hours (total max for all 8 vaporizers)
Mass of Propane Consumed	262,664	lb/yr	Calculated (2)
Sulfur Content in Propane	123.00	ppm	10-22-03 discussion with Franger Gas, Walton propane supplier
Percent Sulfur in Propane	0.0123	% by weight	
Mass of Sulfur from Propane	32.31	lb/yr	Calculated (3)

Pollutant	Emission Factor		Emission Rates				Basis of Estimate
NOx	0.014	lb/gallon	0.0990	lbs/hr	**0.43**	**tpy (4)**	AP-42: Table 1.5-1(10-1996) for Heat content < 10 MMBTU/hr
CO	0.0019	lb/gallon	0.0134	lbs/hr	**0.06**	**tpy**	AP-42: Table 1.5-1(10-1996) for Heat content < 10 MMBTU/hr
PM	0.0004	lb/gallon	0.0028	lbs/hr	**0.01**	**tpy**	AP-42: Table 1.5-1(10-1996) for Heat content < 10 MMBTU/hr
VOC	0.0005	lb/gallon	0.0035	lbs/hr	**0.02**	**tpy**	AP-42: Table 1.5-1(10-1996) for Heat content < 10 MMBTU/hr
SO2	2	lb/lb sulfur in propane	0.0074	lbs/hr	**0.03**	**tpy (5)**	Assumed all sulfur converted to SO2

Methodology

(1) Fuel Consumption Rate (gallons/hr) = Heat Duty of Vaporizer (MMBtu/hr) x 1,000,000 (Btu/ MMBtu) / Fuel heat content of propane (BTU/gallon)
(2) Convert propane consumption to lb/yr = [propane consumption (gallon/yr)] x [4.24 lb liquid propane/1 gallon liquid propane]
(3) Mass of sulfur from propane (lb/yr) = [propane consumption (lb/yr)] x [0.0123 lb sulfur/100 lb propane]
(4) Pollutant Emission Rate for NOx, CO, PM, or VOCs (tons/yr) = (Pollutant Emission factor, lbs/gallon) x (Fuel consumption, gallons/yr) / (2000 lbs/ton)
(5) Emission rate for SO2 (tons/yr) = [Mass of sulfur combusted (lb/yr)] x [2 lb SO2/1 lb sulfur] x [1 ton SO2/2000 lb SO2]

Appendix A: Emission Calculations
POTENTIAL AMMONIA EMISSIONS FROM TRUCK LOADING - HOT TERMINAL

Company Name: **Koch Fertilizer Storage and Terminal Company**
Address: **7438 East County Road 800S, Walton, IN 46994**
MSOP: **017-24444-00042**
Reviewer: **Source Calculations Reviewed By ERG/JR**
Date: **12/3/2007**

Note: Hot terminal operations will send liquid ammonia in pipe to flare and vapor to flare and/or atmosphere.

Truck Blowdown

Maximum Number of trucks loading ammonia	54.0	trucks per day	Max receipt through pipe 45 tph * 24 hrs/20 tons per truck
Pipe length	6	feet	
Pipe diameter	2	inches	
Volume of Pipe	0.13	ft^3	
Volume of pipe	0.98	gallons	
Total volume in pipe during all unloading events	7.069	ft^3/day	
Total volume in pipe during all unloading events	2580	ft^3/yr	Calculated using volume of pipe and number of trucks per year
Total volume in pipe during all unloading events	19299	Gallons	
Density of liquid ammonia @ 40F	5.28	lb/gallon	Storage and Handling of Anhydrous Ammonia - Tanner Industries
Liquid ammonia sent to flare per year	50.95	tons	

Determine pounds of NH3 vapor released to flare or atmosphere per year

Ideal Gas Law: pV = nRT
where:

p =	1	atm
V =	2580	ft^3/yr
T =	60	^{o} F
R =	0.7302	(atm*ft3)/(lb mole*R)

n = pV/RT = 6.8080 lb.mole/yr

Molecular weight of NH3 =	17	lb/lb.mole
Pounds of NH3 released to flare or atmosphere=	116	lb/yr
	0.32	**lb/day**
Federal Notification Level for NH3 =	100	lb/day
NH3 Vapor emitted per year to flare or atmosphere	**0.058**	**tons/yr**

Appendix A: Emission Calculations
POTENTIAL EMERGENCY GENERATOR EMISSIONS (Propane Primary Fuel)- HOT TERMINAL

Company Name: **Koch Fertilizer Storage and Terminal Company**
Address: **7438 East County Road 800S, Walton, IN 46994**
MSOP: **017-24444-00042**
Reviewer: **Source Calculations Reviewed By ERG/JR**
Date: **12/3/2007**

Size: 20 KW
Pilot Fuel Type: Propane

Assumptions

Fuel Heat Content	90500	BTU/gal	National Propane Gas Association
Fuel Heat Content	2516	Btu/ft3	National Propane Gas Association
Density	36	ft3/gal	National Propane Gas Association
Annual Hours of Operation	500	hrs/yr	
Maximum Fuel Usage	84.00	ft3/hr	Product Literature
	2.33	gallons/hr	
	0.21	MMBTU/hr	Calculated (2)
	1166.67	gallons/yr	

Pollutant	Emission Factor		Emission Rates				Basis of Estimate
Nitrogen Oxides	3.17	lb/MMBTU	0.67	lbs/hr (3)	**0.17**	**tpy**	AP-42: Table 3.2-1 (8-2000)
Carbon Monoxide	0.386	lb/MMBTU	0.08	lbs/hr	**0.02**	**tpy**	AP-42: Table 3.2-1 (8-2000)
Particulate Matter	0.0384	lb/MMBTU	8.12E-03	lbs/hr	**2.03E-03**	**tpy**	AP-42: Table 3.2-1 (8-2000)
Non-methane VOC	0.12	lb/MMBTU	0.03	lbs/hr	**6.34E-03**	**tpy**	AP-42: Table 3.2-1 (8-2000)
Sulfur Dioxide	0.000588	lb/MMBTU	1.24E-04	lbs/hr	**3.11E-05**	**tpy**	AP-42: Table 3.2-1 (8-2000)

Methodology
(1) Maximum Fuel Usage (gallons/hr) = Fuel usage (ft3/hr) / Propane Density (gal/ft3)
(2) Maximum Fuel Usage (MMBTU/hr) = Fuel usage (ft3/hr) * Fuel heat content (BTU/ft3) /1000000 BTU/1 MMBTU
(3) Pollutant Emission Rate (lbs/hr) = (Pollutant Emission factor, lbs/gallon) x (Fuel consumption, gallons/yr) / (2000 lbs/ton)

Appendix A: Emission Calculations
POTENTIAL VOC EMISSIONS FROM PROPANE TANK LOADING - HOT TERMINAL

Company Name: **Koch Fertilizer Storage and Terminal Company**
Address: **7438 East County Road 800S, Walton, IN 46994**
MSOP: **017-24444-00042**
Reviewer: **Source Calculations Reviewed By ERG/JR**
Date: **12/3/2007**

Maximum Gallons needed	134,941	Gallons	Total Gallons of propane from all sources
Number of trucks unloading propane	13	trucks per year	Assume 10,000 gallons / truck
Hose length	20	feet	
Hose diameter	3	inches	
Volume of hose	0.98175	ft3 vapor	Calculated
	0.03	gallons	Calculated

density of liquid propane	4.24	lb/gallon	National Propane gas Association

Assume entire hose contents is emitted

VOCs emitted per year	1.560300031	lbs	Calculated
VOCs emitted per year	**7.80E-04**	**tons**	Calculated

Appendix A: Fugitive Emission From Unpaved Roads - HOT TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: ERG/JR
Date: 12/3/2007

1. Unpaved Road Emission Factors: AP-42

According to AP-42, Section 13.2.2 Unpaved Roads, November 2006, the PM/PM10 emission factors for unpaved roads can be estimated from the following equation:

lbs/VMT Equation: $E = k (s/12)^a (W/3)^b \times (365-P)/365$

Where:

Particle size multiplier	k	4.9	dimensionless (PM-30 or TSP)	1.5	dimensionless PM-10
surface material silt content (%)	s	11	Source tested Dec. 2007.		
mean vehicle weight	W	29.0	tons		
Equation constants	a	0.7	PM-30 or TSP Table 13.2.2-2	0.9	PM-10 Table 13.2.2-2
	b	0.45	PM-30 or TSP Table 13.2.2-2	0.45	PM-10 Table 13.2.2-2
	P	125			

PM Emission Factor = $(4.9) \times (6.4/12)^{0.7} \times (29/3)^{0.45} \times (365-125)/365$ = **8.41** lbs/mile

PM10 Emission Factor = $(1.5) \times (6.4/12)^{0.9} \times (29/3)^{0.45} \times (365-125)/365$ = **2.53** lbs/mile

2. Potential to Emit (PTE) of PM/PM10 from unpaved Roads:

Emission Area	Number of Round Trips (Trip/yr)	Miles Traveled per Trip (miles/Trip)	Unpaved Total VMT	Total Vehicle Emissions (lb/yr)	Total Vehicle Emissions (tpy)	TOTAL (tpy)
Ammonia Trucks (PM)	19710	0.43	8,497	71,499	**35.7**	**38.4**
Pickup Trucks (PM)	1460	0.43	629	5,296	**2.65**	
Ammonia Trucks (PM10)	19710	0.43	8,497	21,510	**10.75**	**11.55**
Pickup Trucks (PM10)	1460	0.43	629	1,593	**0.80**	

Methodology

Total Vehicle Emissions (tons/yr) = Unpaved Total VMT (miles/yr) x PM/PM10 Emission Factors x 1 ton/2000 lbs
Total unpaved road length = 1288 feet (A main segments of lengths 476 feet, plus 4 branches of 270, 133, 271, and 138 feet).
Assume two round trips per week (1 round trip = 2 x 1288 feet = 0.488 miles)

POTENTIAL EMISSION ESTIMATES, EMISSION FACTORS (Propane Primary Fuel)
KOCH NITROGEN COMPANY, WALTON AMMONIA TERMINAL

Vaporizers

Fuel: Propane
Size: ***<10 MMBTU***

Sulfur Content in Propane: 123 ppm per 10-22-03 discussion with Franger Gas, Walton propane supplier

Combustion Products	*Emission Factor*		*Basis of Estimate*
Nitrogen Oxides	0.014	lb/gallon	AP-42: Table 1.5-1(10-1996) for Heat content < 10 MMBTU/hr
Carbon Monoxide	0.0019	lb/gallon	AP-42: Table 1.5-1(10-1996) for Heat content < 10 MMBTU/hr
Particulate Matter	0.0004	lb/gallon	AP-42: Table 1.5-1(10-1996) for Heat content < 10 MMBTU/hr
Non-methane VOC	0.0005	lb/gallon	AP-42: Table 1.5-1(10-1996) for Heat content < 10 MMBTU/hr
Sulfur Dioxide	2	lb/lb sulfur in propane	Assumed all sulfur converted to SO_2

Heaters

Fuel: Propane
Size: ***>10 MMBTU***

Sulfur Content in Propane: 123 ppm per 10-22-03 discussion with Franger Gas, Walton propane supplier

Combustion Products	*Emission Factor*		*Basis of Estimate*
Nitrogen Oxides	0.019	lb/gallon	AP-42: Table 1.5-1(10-1996) for Heat content > 10 MMBTU/hr
Carbon Monoxide	0.0032	lb/gallon	AP-42: Table 1.5-1(10-1996) for Heat content > 10 MMBTU/hr
Particulate Matter	0.0006	lb/gallon	AP-42: Table 1.5-1(10-1996) for Heat content > 10 MMBTU/hr
Non-methane VOC	0.0005	lb/gallon	AP-42: Table 1.5-1(10-1996) for Heat content > 10 MMBTU/hr
Sulfur Dioxide	2	lb/lb sulfur in propane	Assumed all sulfur converted to SO_2

Flares

Pilot: Propane
Efficiency: 98

Combustion Products	*Emission Factor*		*Basis of Estimate*
Nitrogen Oxides	0.068	lb/MMBTU	AP-42: Table 13.5-1(9-1991)
Carbon Monoxide	0.37	lb/MMBTU	AP-42: Table 13.5-1(9-1991)
Particulate Matter	0	lb/MMBTU	AP-42: Table 13.5-1(9-1991) non-smoking flare
Non-methane VOC	2	% of total VOC	AP-42: Chapter 13.5 (9-1991), assume 98% VOC control efficiency
Sulfur Dioxide	2	lb/lb Sulfur in Propane	Assumed all sulfur converted to SO2

Generator

Fuel: Propane

Combustion Products	*Emission Factor*		*Basis of Estimate*
Nitrogen Oxides	3.17	lb/MMBTU	AP-42: Table 3.2-1 (8-2000)
Carbon Monoxide	0.386	lb/MMBTU	AP-42: Table 3.2-1 (8-2000)
Particulate Matter	0.0384	lb/MMBTU	AP-42: Table 3.2-1 (8-2000)
Non-methane VOC	0.12	lb/MMBTU	AP-42: Table 3.2-1 (8-2000)
Sulfur Dioxide	0.000588	lb/MMBTU	AP-42: Table 3.2-1 (8-2000)

Appendix A: Emission Calculations
PTE Summary - (Natural Gas) - HOT TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: Source Calculations Reviewed By ERG/JR
Date: 12/3/2007

Potential To Emit (TPY)	NH3	NOx	CO	VOC	SO2	PM	PM10
Flare #1	2.03	0.75	1.10	0.24	1.57E-03	-	0.00
Flare #2	3.39	0.94	0.08	0.02	3.90E-05	-	0.00
Heater 1*	HEATERS NOT OPERATING						
Heater 2*	HEATERS NOT OPERATING						
42 HP Emergency Generator	5.73E-04	0.21	0.03	7.94E-03	3.89E-05	2.54E-03	2.54E-03
Road Fugitives (2006 Method)[d]	-	-	-	-	-	38.4	11.6
Purger Emissions (if vented to atmosphere)	PURGERS NOT OPERATING						
Truck loading (if vented to atmosphere)	0.06	-	-	-	-	-	-
TERMINAL WIDE TOTALS	**5.48**	**1.90**	**1.20**	**0.26**	**1.65E-03**	**38.4**	**11.6**

* Heaters are used to heat cold ammonia. Heaters are not used in hot terminal operations.

Appendix A: Emission Calculations
HAP PTE Summary - (Natural Gas) - HOT TERMINAL

Company Name: **Koch Fertilizer Storage and Terminal Company**
Address: **7438 East County Road 800S, Walton, IN 46994**
MSOP: **017-24444-00042**
Reviewer: **Source Calculations Reviewed By ERG/JR**
Date: **12/3/2007**

Maximum Natural Gas Consumption
6,177,514 ft3/yr From Natural Gas usage spreadsheet

Pollutant		Emission Factor (lb/10^6 ft^3)		Emission Rate (lb/yr)	Basis of Estimate
	Lead		0.0005	0.003	AP-42: Table 1.4-2 dated 7/98
91-57-6	2-Methylnaphthalene		2.40E-05	0.000	AP-42: Table 1.4-3 dated 7/98
56-49-5	3-Methylchloranthrene	<	1.80E-06	0.000	AP-42: Table 1.4-3 dated 7/98
	7,12-Dimethylbenz(a)anthracene	<	1.60E-05	0.000	AP-42: Table 1.4-3 dated 7/98
83-32-9	Acenaphthene	<	1.80E-06	0.000	AP-42: Table 1.4-3 dated 7/98
203-96-8	Acenaphthylene	<	1.80E-06	0.000	AP-42: Table 1.4-3 dated 7/98
120-12-7	Anthracene	<	2.40E-06	0.000	AP-42: Table 1.4-3 dated 7/98
56-55-3	Benz(a)anthracene	<	1.80E-06	0.000	AP-42: Table 1.4-3 dated 7/98
71-43-2	Benzene		2.10E-03	0.013	AP-42: Table 1.4-3 dated 7/98
50-32-8	Benzo(a)pyrene	<	1.20E-06	0.000	AP-42: Table 1.4-3 dated 7/98
205-99-2	Benzo(b)fluoranthene	<	1.80E-06	0.000	AP-42: Table 1.4-3 dated 7/98
191-24-2	Benzo(g,h,i)perylene	<	1.20E-06	0.000	AP-42: Table 1.4-3 dated 7/98
205-82-3	Benzo(k)fluoranthene	<	1.80E-06	0.000	AP-42: Table 1.4-3 dated 7/98
218-01-9	Chrysene	<	1.80E-06	0.000	AP-42: Table 1.4-3 dated 7/98
53-70-3	Dibenzo(a,h)anthracene	<	1.20E-06	0.000	AP-42: Table 1.4-3 dated 7/98
25321-22-6	Dichlorobenzene		1.20E-03	0.007	AP-42: Table 1.4-3 dated 7/98
206-44-0	Fluoranthene		3.00E-06	0.000	AP-42: Table 1.4-3 dated 7/98
86-73-7	Fluorene		2.80E-06	0.000	AP-42: Table 1.4-3 dated 7/98
50-00-0	Formaldehyde		7.50E-02	0.463	AP-42: Table 1.4-3 dated 7/98
110-54-3	Hexane		1.80E+00	11.120	AP-42: Table 1.4-3 dated 7/98
193-39-5	Indeno(1,2,3-cd)pyrene	<	1.80E-06	0.000	AP-42: Table 1.4-3 dated 7/98
91-20-3	Naphthalene		6.10E-04	0.004	AP-42: Table 1.4-3 dated 7/98
85-01-8	Phenanathrene		1.70E-05	0.000	AP-42: Table 1.4-3 dated 7/98
129-00-0	Pyrene		5.00E-06	0.000	AP-42: Table 1.4-3 dated 7/98
108-88-3	Toluene		3.40E-03	0.021	AP-42: Table 1.4-3 dated 7/98
7440-38-2	Arsenic		2.00E-04	0.001	AP-42: Table 1.4-4 dated 7/98
7440-41-7	Beryllium	<	1.20E-05	0.000	AP-42: Table 1.4-4 dated 7/98
7440-43-9	Cadmium		1.10E-03	0.007	AP-42: Table 1.4-4 dated 7/98
7440-47-3	Chromium		1.40E-03	0.009	AP-42: Table 1.4-4 dated 7/98
7440-48-4	Cobalt		8.40E-05	0.001	AP-42: Table 1.4-4 dated 7/98
7439-96-5	Manganese		3.80E-04	0.002	AP-42: Table 1.4-4 dated 7/98
7439-97-6	Mercury		2.60E-04	0.002	AP-42: Table 1.4-4 dated 7/98
7440-02-0	Nickel		2.10E-03	0.013	AP-42: Table 1.4-4 dated 7/98
7782-49-2	Selenium	<	2.40E-05	0.000	AP-42: Table 1.4-4 dated 7/98

TOTAL HAP EMISSIONS (lb/yr) 11.663
TOTAL HAP EMISSIONS (tons/yr) **0.006**

MAX INDIVIDUAL HAP EMISSION (lb/yr) 11.120
MAX INDIVIDUAL HAP EMISSION (ton/yr) 0.006

Methodology:
TOTAL HAP EMISSIONS (tons/yr) = Maximum Natual Gas Consumption (ft^3/yr) * Emission Factor (lb/10^6 ft^3) * (1 ton / 2000 lbs)

Appendix A: Emission Calculations
TOTAL POTENTIAL NATURAL GAS USAGE - HOT TERMINAL

Company Name: **Koch Fertilizer Storage and Terminal Company**
Address: **7438 East County Road 800S, Walton, IN 46994**
MSOP: **017-24444-00042**
Reviewer: **Source Calculations Reviewed By ERG/JR**
Date: **12/3/2007**

Usage for Flare 1	5,662,714	ft3	Calculated from flare spreadsheet
Usage for Flare 2	388,800	ft3	Calculated from flare spreadsheet
Usage for emergency generator	126,000	ft3	
Usage for heater 1	0	ft3	
Usage for heater 2	0	ft3	
Total potential facility natural gas usage	**6,177,514**	**ft3**	**Total of above equipment usage**

Appendix A: Emission Calculations
MAXIMUM FACILITY CAPACITIES- HOT TERMINAL

Company Name: **Koch Fertilizer Storage and Terminal Company**
Address: **7438 East County Road 800S, Walton, IN 46994**
MSOP: **017-24444-00042**
Reviewer: **Source Calculations Reviewed By ERG/JR**
Date: **12/3/2007**

Input			
Maximum ammonia pipeline flow rate input	45	tons/ hr	Facility Data-Maximum the facility can receive via pipeline
Maximum number of hours pipeline can operate	8760	hr	
Maximum ammonia pipeline flow rate input	394200	tpy	This equals the maximum amount of ammonia that can possibly be entering the facility
Refrigeration*			
Maximum Refrigeration system capability for incomming ammonia	0	tpy	No refrigeration in hot terminal operation
Storage			
Total Tank Capacity for ammonia	0	tons	Tanks are vented to atmosphere. Hence, no vented storage in hot terminal operation
Output **			
Maximum theoretical ammonia for output	394200	tpy	pipeline rate plus storage capacity
Maximum refrigerated ammonia for output	0	tpy	Maximum refrigerated throughput through the facility
Maximum capabilty of Heater Line 1	100	tons/ hr	BSB Heater Specifications
Maximum capabilty of Heater Line 2	150	tons/ hr	Smalling Heater Design Specifications
Maximum Heater 1 hours for refrigerated product	0.00	hours /year	
Maximum Heater 2 hours for refrigerated product	0.00	hours/year	
Maximum Heater 1 rate for refrigerated product	0.00	hours per day	calculated as 2752.80/365
Maximum Heater 2 rate for refrigerated product	0.00	hours per day	calculated as 1835.20/365

*Refrigeration is needed to put incoming ammonia into tanks
**Heaters are used to heat ammonia into truck tanks. Heaters cannot operate unless cold ammonia flows through the unit

Appendix A: Emission Calculations
POTENTIAL FLARE 1 EMISSIONS (Natural Gas Primary Fuel)- HOT TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: Source Calculations Reviewed By ERG/JR
Date: 12/3/2007

Note: Emergency Flare emissions are based on a reasonable worse case scenario of 240 hours of ammonia flaring per year with the remaining hours in an idling mode

Flare Name:	4" Emergency Flare		
Pilot Fuel Type:	Natural Gas		
Molecular Weight	16	lb/lb mole	
Fuel Heat Content	1,050	BTU/ft^3	AP-42: Supplement D, Section 1.4.1 (7-1998)

Assumptions			***Basis***
Composition of Ammonia in Flare	96.676	Volume percent	Calculated (1)
Composition of Natural Gas in Flare	3.324	Volume percent	Calculated
Composition of Ammonia in Flare	96.865	Wt. percent	Calculated (2)
Composition of Natural Gas in Flare	3.135	Wt. percent	Calculated
Maximum Natural Gas Input Rating during pilot idling	0.68	MMBTU/hr	Assume same BTU/hr as propane
Maximum Natural Gas Input Rating during Flaring	0.68	MMBTU/hr	Assume same BTU/hr as propane
Maximum Natural gas consumption rate during pilot idling	646.43	ft3/hr	Calculated from Input Rating
Maximum Natural gas consumption rate during flaring	646.43	ft3/hr	Calculated from Input Rating
Fuel Heat Content during pilot idling	1,050	BTU/ft^3	Fuel heat content of natural gas
Fuel Heat Content during Flaring	382	BTU/ft^3	Calculated (4)
Annual Hours of Operation	8,760	hrs/yr	

During Pilot Idling (Natural Gas Combustion Only)

Annual Hours of operation during pilot idling	8,520		Maximum Annual hours
Natural Gas Consumption during pilot idling	5,507,571	ft3/yr	Calculated (5)

Pollutant	Emission Factor		Emission Rates			Basis of Estimate
NH3	0.0000032	lb/ft3	2.07E-03	lb/hr	8.81E-03	tpy	WebFIRE Database (4-2006)
NOx	0.068	lb/MM BTU	0.05	lb/hr	0.20	tpy	AP-42: Table 13.5-1(9-1991) (6)
CO	0.37	lb/MM BTU	0.25	lb/hr	1.07	tpy	AP-42: Table 13.5-1(9-1991)
PM	0	lb/MM BTU	0.00	lb/hr	0.00	tpy	AP-42: Table 13.5-1(9-1991) non-smoking flare
VOC	2	% of VOC flared	0.05	lb/hr	0.23	tpy	AP-42: Chapter 13.5 (9-1991) (7)
SO2	2	lb/lb S	1.85E-07	lb/hr	1.57E-03	tpy	Assumed all sulfur converted to SO2 (8)

During Flaring (Ammonia only)

			Basis
Annual Flaring hours of operation	240.00	hours	Maximum Annual hours
Ammonia Flaring flow rate	18800	ft3/hr	Engg Estimate
Annual Ammonia Flare flow rate	4,512,000	ft^3/yr	Calculated (9)
Natural Gas Consumption During Flaring	155,143	ft^3/yr	Calculated (10)
Annual Fuel Consumption during Flaring	4,667,143	ft^3/yr	Calculated (11)
Assumed temperature	60	F	
Gas Constant	0.7302	(atm*ft^3)/(lb mole*R)	
Assumed Pressure	1	Atm	Standard atmospheric pressure
NOx flare emission factor (12)	11.1	lb NOx/ton ammonia	TNRCC Air Permit & Technical Guidance for Chemical Sources (Flares & Oxidizers)
Moles of ammonia sent to flare per yr	11,883		Calculated (13)
Pounds of ammonia sent to flare each year	202,010		Calculated (14)
Flare Efficiency	0.98		
Pounds of ammonia combusted each year	197,970		Calculated (15)
Tons of ammonia emitted each year	2.020		Calculated (16)
Maximum pounds of ammonia emitted per hour	16.834		Calculated (17)
Average daily ammonia emission over year (lb/day)	11		Calculated (18)
Pounds of ammonia emitted each flaring day	9,024		Calculated (19)
Pounds of NOx emitted per yr	1,098.73		Calculated (20)
Pounds of NOx emitted per hour	4.578		
Tons of NOx emitted per yr	0.549		

Pollutant	Emission Factor		Emission Rates			Basis of Estimate
NH3	0.0000032	lb/ft3	2.07E-03	lb/hr	2.48E-04	tpy	WebFIRE Database (4-2006)
NOx	0.068	lb/MM BTU	4.62E-02	lb/hr	5.54E-03	tpy	AP-42: Table 13.5-1(9-1991) (6)
CO	0.37	lb/MM BTU	2.51E-01	lb/hr	3.01E-02	tpy	AP-42: Table 13.5-1(9-1991)
PM	0	lb/MM BTU	0.00	lb/hr	0.00	tpy	AP-42: Table 13.5-1(9-1991) non-smoking flare
VOC	2	% of VOC flared	5.44E-02	lb/hr	6.53E-03	tpy	AP-42: Chapter 13.5 (9-1991) (7)
SO2	2	lb/lb S	6.86E-08	lb/hr	8.23E-09	tpy	Assumed all sulfur converted to SO2 (8)

TOTAL Emissions:

Pollutant	Emission Rates			
NH3	**16.84**	**lb/hr**	**2.03**	**tpy**
NOx	**4.62**	**lb/hr**	**0.75**	**tpy**
CO	**0.25**	**lb/hr**	**1.10**	**tpy**
PM	**0.00**	**lb/hr**	**0.00**	**tpy**
VOC	**0.05**	**lb/hr**	**0.24**	**tpy**
SO2	**6.86E-08**	**lb/hr**	**1.57E-03**	**tpy**

Methodology

(1) Volume % of ammonia during flaring = ammonia flow rate during flaring (ft^3/hr)/total fuel consumption during flaring (ft^3/hr) * 100

(2) Weight % of ammonia during flaring = (volume % of ammonia during flaring x 17 lb/lb.mol) / [(volume % of ammonia during flaring) x 17 lb/ lb.mol) + (volume % of natural gas in flare) x 16 lb/lb.mol)] x 100

(4) Fuel heat content during flaring = [(volume % of ammonia during flaring/100) x 359 BTU/ft^3]+[(volume % of natural gas during flaring/100) x 1050 BTU/ft^3]

(5) Annual natural gas consumption during pilot idling = Maximum Natural gas consumption rate during pilot idling (ft3/hour) x Annual hours of pilot idling operation

(6) Emission rate for NOx, CO, or PM (tons/yr) = [emission factor (lb/MMBTU)] x [hours of pilot idling/yr] x [maximum natural gas input rating during pilot idling (MMBTU/hr)] / [2000 lb/ton]

(7) Emission rate for VOCs (tons/yr) = [natural gas consumption during pilot idling (ft^3/yr)] x [1 mole/380 ft^3] x [16 lb/mole natural gas] x [0.05 x (1-0.98)] x [1 ton/2000 lb]
For VOC emissions, a 98% destruction efficiency is assumed, and natural gas is assumed to have a 10% by weight VOC content

(8) Emission rate for SO_2 (tons/yr) = [Natural gas consumed during pilot idling (ft^3/yr)] x [2000 grains sulfur/1,000,000 ft^3 natural gas] x [1 lb sulfur/7,000 grains sulfur]
x [64 lb SO2/32 lb sulfur] x [1 ton SO2/2,000 lb SO2]

Assumptions: 2000 grains of sulfur per 10^6 cubic feet natural gas (Footnote D of AP-42 Table 1.4-2 dated 7/98) and a ratio of 64 lb SO2 per 32 lb of S

(9) Annual ammonia flaring flow rate = [ammonia flaring flow rate (ft^3/hr)] x [annual hours of flare operation]

(10) Annual natural gas flaring flow rate (ft3/yr) = [maximum natural gas consumption rate during flaring (ft^3/hr)] x [annual hours of flaring operation]

(11) Total fuel consumption during flaring = [annual natural gas flaring flow rate (ft^3/yr)]+ [ammonia flaring flow rate (ft^3/yr)]

(12) The emission factor for converting Ammonia to NOx is based on an Air Permit Technical Guidance for Chemical Sources: Flares and Oxidizers from the Texas Natural Resource Conservation Commission (October 2000, RG-109 draft).

(13) Moles of ammonia sent to flare each year = [annual ammonia flaring flow rate (ft^3/yr) /0.7302 atm.ft^3/lb.mol.R]/[459 +60^{o}F] R

(14) Pounds of ammonia sent to flare each year = Moles of ammonia combusted per year x 17 lb ammonia/1 lb.mol ammonia

(15) Pounds of ammonia combusted each year = Pounds of ammonia sent to flare each year x Flare efficiency

(16) Tons of ammonia emitted each year = (Pounds of ammonia sent to flare each year - Pounds of ammonia combusted each year) x (1 ton/2000 pounds)

(17) Pounds of ammonia emitted per hour = (Pounds of ammonia sent to flare each year - Pounds of ammonia combusted each year) x (1year/365 days) x (1 day/24 hours)

(18) Average daily ammonia emission over year (lb/day) = (Pounds of ammonia sent to flare each year - Pounds of ammonia combusted each year) x (1year/365 days)

(19) Pounds of ammonia emitted each flaring day = Ammonia flaring flow rate (lb/hr) x (24 hours/day) x (100% - Flaring Efficiency %)

(20) Pounds of NOx emitted per year = Pounds of ammonia combusted per year x (1ton/2000 lbs) x NOx emission factor (lb NOx/ton ammonia)

(21) The truck loading blow down is to the cold storage tank and not to the flare.

Appendix A: Emission Calculations
POTENTIAL FLARE 2 EMISSIONS (Natural Gas Primary Fuel)- HOT TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: Source Calculations Reviewed By ERG/JR
Date: 12/3/2007

Note: Emergency Flare emissions are based on a reasonable worse case scenario of 240 hours of ammonia flaring per year with the remaining hours in an idling mode

Flare Name:	Stackmatch with Double Pilots		
Pilot Fuel Type:	Natural Gas		
Molecular Weight	16	lb/lb mole	
Fuel Heat Content	1,050	BTU/ft^3	AP-42: Supplement D, Section 1.4.1 (7-1998)

Assumptions			**Basis**
Composition of Ammonia in Flare	95.453	Volume percent	Calculated (1)
Composition of Natural Gas in Flare	4.547	Volume percent	Calculated
Composition of Ammonia in Flare	95.709	Wt. percent	Calculated (2)
Composition of Natural Gas in Flare	4.291	Wt. percent	Calculated
Maximum Natural Gas Input Rating during pilot idling	0.02		MMBtu/hr Calculated (3)
Maximum Natural Gas Input Rating during Flaring	1.10		MMBtu/hr Calculated
Maximum Natural gas consumption rate during pilot idling	16.00	ft3/hr	Manufacturer's Literature @ 25 psig
Maximum Natural gas consumption rate during flaring	1052.00	ft3/hr	Manufacturer's Literature @ 25 psig
Fuel Heat Content during pilot idling	1,050	BTU/ft^3	Fuel heat content of natural gas
Fuel Heat Content during Flaring	390	BTU/ft^3	Calculated (4)
Annual Hours of Operation	8,760	hrs/yr	

During Pilot Idling (Natural Gas Combustion Only)

Annual Hours of operation during pilot idling	8,520		Maximum Annual hours
Natural Gas Consumption during pilot idling	136,320	ft3/yr	Calculated (5)

Pollutant	Emission Factor		Emission Rates				Basis of Estimate
NH3	0.0000032	lb/ft3	5.12E-05	lb/hr	2.18E-04	tpy	WebFIRE Database (4-2006)
NOx	0.068	lb/MM BTU	1.14E-03	lb/hr	4.87E-03	tpy	AP-42: Table 13.5-1(9-1991) (6)
CO	0.37	lb/MM BTU	6.22E-03	lb/hr	2.65E-02	tpy	AP-42: Table 13.5-1(9-1991)
PM	0	lb/MM BTU	0.00	lb/hr	0.00	tpy	AP-42: Table 13.5-1(9-1991) non-smoking flare
VOC	2	% of VOC flared	1.35E-03	lb/hr	5.74E-03	tpy	AP-42: Chapter 13.5 (9-1991) (7)
SO2	2	lb/lb S	4.57E-09	lb/hr	3.89E-05	tpy	Assumed all sulfur converted to SO2 (8)

During Flaring (Ammonia only)

			Basis
Annual Flaring hours of operation	240.00	hours	Maximum Annual hours
Ammonia Flaring flow rate	22084	ft3/hr	Engg Estimate
Annual Ammonia Flare flow rate	5,300,160	ft^3/yr	Calculated (9)
Natural Gas Consumption During Flaring	252,480	ft^3/yr	Calculated (10)
Annual Fuel Consumption during Flaring	5,552,640	ft^3/yr	Calculated (11)
Assumed temperature	60	F	
Gas Constant	0.7302	(atm*ft^3)/(lb mole*R)	
Assumed Pressure	1	Atm	Standard atmospheric pressure
NOx flare emission factor (12)	11.1	lb NOx/ton ammonia	TNRCC Air Permit & Technical Guidance for Chemical Sources (Flares & Oxidizers)
Moles of ammonia sent to flare per yr	13,959		Calculated (13)
Pounds of ammonia sent to flare each year including purger and truck blowdown	339,310		Calculated (14)
Flare Efficiency	0.98		
Pounds of ammonia combusted each year	332,524		Calculated (15)
Tons of ammonia emitted each year	3.393		Calculated (16)
Maximum pounds of ammonia emitted per hour	28.276		Calculated (17)
Average daily ammonia emission over year (lb/day)	19		Calculated (18)
Pounds of ammonia emitted each flaring day	10,600		Calculated (19)
Pounds of NOx emitted per yr	1,845.51		Calculated (20)
Pounds of NOx emitted per hour	7.690		
Tons of NOx emitted per yr	0.923		

Pollutant	Emission Factor		Emission Rates				Basis of Estimate
NH3	0.0000032	lb/ft3	3.37E-03	lb/hr	4.04E-04	tpy	WebFIRE Database (4-2006)
NOx	0.068	lb/MM BTU	0.08	lb/hr	0.01	tpy	AP-42: Table 13.5-1(9-1991) (6)
CO	0.37	lb/MM BTU	0.41	lb/hr	0.05	tpy	AP-42: Table 13.5-1(9-1991)
PM	0	lb/MM BTU	0.00	lb/hr	0.00	tpy	AP-42: Table 13.5-1(9-1991) non-smoking flare
VOC	2	% of VOC flared	0.09	lb/hr	0.01	tpy	AP-42: Chapter 13.5 (9-1991) (7)
SO2	2	lb/lb S	6.86E-08	lb/hr	8.23E-09	tpy	Assumed all sulfur converted to SO2 (8)

TOTAL Emissions:

Pollutant	Emission Rates			
NH3	**28.3**	**lb/hr**	**3.39**	**tpy**
NOx	**7.76**	**lb/hr**	**0.94**	**tpy**
CO	**0.41**	**lb/hr**	**0.08**	**tpy**
PM	**0.00**	**lb/hr**	**0.00**	**tpy**
VOC	**0.09**	**lb/hr**	**0.02**	**tpy**
SO2	**6.86E-08**	**lb/hr**	**3.90E-05**	**tpy**

Methodology

(1) Volume % of ammonia during flaring = ammonia flow rate during flaring (ft^3/hr)/total fuel consumption during flaring (ft^3/hr) * 100

(2) Weight % of ammonia during flaring = (volume % of ammonia during flaring x 17 lb/lb.mol) / [(volume % of ammonia during flaring) x 17 lb/ lb.mol) + (volume % of natural gas in flare) x 16 lb/lb.mol)] x 100

(3) Maximum Input Rating during Flaring = [natural gas consumption rate during flaring (ft3/hr)] x [fuel heat content (BTU/ft3)] / [1,000,000]

(4) Fuel heat content during flaring = [(volume % of ammonia during flaring/100) x 359 BTU/ft^3]+[(volume % of natural gas during flaring/100) x 1050 BTU/ft^3]

(5) Annual natural gas consumption during pilot idling = Maximum Natural gas consumption rate during pilot idling (ft3/hour) x Annual hours of pilot idling operation

(6) Emission rate for NOx, CO, or PM (tons/yr) = [emission factor (lb/MMBTU)] x [hours of pilot idling/yr] x [maximum natural gas input rating during pilot idling (MMBTU/hr)] / [2000 lb/ton]

(7) Emission rate for VOCs (tons/yr) = [natural gas consumption during pilot idling (ft^3/yr)] x [1 mole/380 ft^3] x [16 lb/mole natural gas] x [0.05 x (1-0.98)] x [1 ton/2000 lb]
For VOC emissions, a 98% destruction efficiency is assumed, and natural gas is assumed to have a 10% by weight VOC content

(8) Emission rate for SO_2 (tons/yr) = [Natural gas consumed during pilot idling (ft^3/yr)] x [2000 grains sulfur/1,000,000 ft^3 natural gas] x [1 lb sulfur/7,000 grains sulfur] x [64 lb SO2/32 lb sulfur] x [1 ton SO2/2,000 lb SO2]

Assumptions: 2000 grains of sulfur per 10^6 cubic feet natural gas (Footnote D of AP-42 Table 1.4-2 dated 7/98) and a ratio of 64 lb SO2 per 32 lb of S

(9) Annual ammonia flaring flow rate = [ammonia flaring flow rate (ft^3/hr)] x [annual hours of flare operation]

(10) Annual natural gas flaring flow rate (ft3/yr) = [maximum natural gas consumption rate during flaring (ft^3/hr)] x [annual hours of flaring operation]

(11) Total fuel consumption during flaring = [annual natural gas flaring flow rate (ft^3/yr)]+ [ammonia flaring flow rate (ft^3/yr)]

(12) The emission factor for converting Ammonia to NOx is based on an Air Permit Technical Guidance for Chemical Sources: Flares and Oxidizers from the Texas Natural Resource Conservation Commission (October 2000, RG-109 draft).

(13) Moles of ammonia sent to flare each year = [annual ammonia flaring flow rate (ft^3/yr) /0.7302 atm.ft^3/lb.mol.R]/[459 +60^{o}F] R

(14) Pounds of ammonia sent to flare each year = Moles of ammonia combusted per year x 17 lb ammonia/1 lb.mol ammonia + tons of ammonia from purgers and truck blowdown*2000

(15) Pounds of ammonia combusted each year = Pounds of ammonia sent to flare each year x Flare efficiency

(16) Tons of ammonia emitted each year = (Pounds of ammonia sent to flare each year - Pounds of ammonia combusted each year) x (1 ton/2000 pounds)

(17) Pounds of ammonia emitted per hour = (Pounds of ammonia sent to flare each year - Pounds of ammonia combusted each year) x (1year/365 days) x (1 day/24 hours)

(18) Average daily ammonia emission over year (lb/day) = (Pounds of ammonia sent to flare each year - Pounds of ammonia combusted each year) x (1year/365 days)

(19) Pounds of ammonia emitted each flaring day = Ammonia flaring flow rate (lb/hr) x (24 hours/day) x (100% - Flaring Efficiency %)

(20) Pounds of NOx emitted per year = Pounds of ammonia combusted per year x (1ton/2000 lbs) x NOx emission factor (lb NOx/ton ammonia)

(21) The truck loading blow down is to the cold storage tank and not to the flare.

Appendix A: Emission Calculations
POTENTIAL AMMONIA EMISSIONS FROM TRUCK LOADING - HOT TERMINAL

Company Name: **Koch Fertilizer Storage and Terminal Company**
Address: **7438 East County Road 800S, Walton, IN 46994**
MSOP: **017-24444-00042**
Reviewer: **Source Calculations Reviewed By ERG/JR**
Date: **12/3/2007**

Note: Hot terminal operations will send liquid ammonia in pipe to flare and vapor to flare and/or atmosphere.

Truck Blowdown

Maximum Number of trucks loading ammonia	54.0	trucks per day	Max receipt through pipe 45 tph * 24 hrs/20 tons per truck
Pipe length	6	feet	
Pipe diameter	2	inches	
Volume of Pipe	0.13	ft^3	
Volume of pipe	0.98	gallons	
Total volume in pipe during all unloading events	7.069	ft^3/day	
Total volume in pipe during all unloading events	2580	ft^3/yr	Calculated using volume of pipe and number of trucks per year
Total volume in pipe during all unloading events	19299	Gallons	
Density of liquid ammonia @ 40F	5.28	lb/gallon	Storage and Handling of Anhydrous Ammonia - Tanner Industries
Liquid ammonia sent to flare per year	50.95	tons	

Determine pounds of NH3 vapor released to flare or atmosphere per year

Ideal Gas Law: pV = nRT
where:

p =	1	atm
V =	2580	ft^3/yr
T =	60	^{o} F
R =	0.7302	(atm*ft3)/(lb mole*R)

n = pV/RT = 6.8080 lb.mole/yr

Molecular weight of NH3 =	17	lb/lb.mole
Pounds of NH3 released to flare or atmosphere=	116	lb/yr
	0.32	**lb/day**
Federal Notification Level for NH3 =	100	lb/day
NH3 Vapor emitted per year to flare or atmosphere	**0.058**	**tons/yr**

Appendix A: Emission Calculations
POTENTIAL EMERGENCY GENERATOR EMISSIONS (Natural Gas Fuel)- HOT TERMINAL

Company Name: **Koch Fertilizer Storage and Terminal Company**
Address: **7438 East County Road 800S, Walton, IN 46994**
MSOP: **017-24444-00042**
Reviewer: **Source Calculations Reviewed By ERG/JR**
Date: **12/3/2007**

Size: 20 KW
Pilot Fuel Type: Natural gas

Assumptions

Fuel Heat Content	1050	Btu/ft3	(max per USEPA guidance)
Annual Hours of Operation	500	hrs/yr	
Maximum Fuel Usage	252.00	ft3/hr	Product literature at full load
	126000.00	ft3/yr	
	0.26	MMBTU/hr	Calculated (1)

Pollutant	Emission Factor		Emission Rates				Basis of Estimate
NOx	3.17	lb/MMBTU	0.84	lbs/hr (2)	**0.21**	**tpy**	AP-42: Table 3.2-1 (8-2000)
CO	0.386	lb/MMBTU	0.10	lbs/hr	**0.03**	**tpy**	AP-42: Table 3.2-1 (8-2000)
PM	0.0384	lb/MMBTU	0.01	lbs/hr	**2.54E-03**	**tpy**	AP-42: Table 3.2-1 (8-2000)
VOC	0.12	lb/MMBTU	0.03	lbs/hr	**7.94E-03**	**tpy**	AP-42: Table 3.2-1 (8-2000)
SO2	0.000588	lb/MMBTU	1.56E-04	lbs/hr	**3.89E-05**	**tpy**	AP-42: Table 3.2-1 (8-2000)
NH3	9.1E-06	lb/ft3	2.29E-03	lbs/hr	**5.73E-04**	**tpy**	WebFIRE Database (4-2006)

Methodology

(1) Maximum Fuel Usage (MMBTU/hr) = Fuel usage (ft3/hr) * Fuel heat content (BTU/ft3) /1000000 BTU/1 MMBTU
(2) Pollutant Emission Rate (lbs/hr) = (Pollutant Emission factor, lbs/gallon) x (Fuel consumption, gallons/yr) / (2000 lbs/ton)

Appendix A: Fugitive Emission From Unpaved Roads - HOT TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: ERG/JR
Date: 12/3/2007

1. Unpaved Road Emission Factors: AP-42

According to AP-42, Section 13.2.2 Unpaved Roads, November 2006, the PM/PM10 emission factors for unpaved roads can be estimated from the following equation:

lbs/VMT Equation: $E = k (s/12)^a (W/3)^b \times (365-P)/365$

Where:

Particle size multiplier	k	4.9	dimensionless (PM-30 or TSP)	1.5	dimensionless PM-10
surface material silt content (%)	s	11	Source tested Dec. 2007.		
mean vehicle weight	W	29.0	tons		
Equation constants	a	0.7	PM-30 or TSP Table 13.2.2-2	0.9	PM-10 Table 13.2.2-2
	b	0.45	PM-30 or TSP Table 13.2.2-2	0.45	PM-10 Table 13.2.2-2
	P	125			

PM Emission Factor = $(4.9) \times (6.4/12)^{0.7} \times (29/3)^{0.45} \times (365-125)/365$ = **8.41** lbs/mile

PM10 Emission Factor = $(1.5) \times (6.4/12)^{0.9} \times (29/3)^{0.45} \times (365-125)/365$ = **2.53** lbs/mile

2. Potential to Emit (PTE) of PM/PM10 from unpaved Roads:

Emission Area	Number of Round Trips (Trip/yr)	Miles Traveled per Trip (miles/Trip)	Unpaved Total VMT	Total Vehicle Emissions (lb/yr)	Total Vehicle Emissions (tpy)	TOTAL (tpy)
Ammonia Trucks (PM)	19710	0.43	8,497	71,499	**35.7**	**38.4**
Pickup Trucks (PM)	1460	0.43	629	5,296	**2.65**	
Ammonia Trucks (PM10)	19710	0.43	8,497	21,510	**10.75**	**11.55**
Pickup Trucks (PM10)	1460	0.43	629	1,593	**0.80**	

Methodology

Total Vehicle Emissions (tons/yr) = Unpaved Total VMT (miles/yr) x PM/PM10 Emission Factors x 1 ton/2000 lbs
Total unpaved road length = 1288 feet (A main segments of lengths 476 feet, plus 4 branches of 270, 133, 271, and 138 feet).
Assume two round trips per week (1 round trip = 2 x 1288 feet = 0.488 miles)

POTENTIAL EMISSION ESTIMATES, EMISSION FACTORS
KOCH NITROGEN COMPANY, WALTON AMMONIA TERMINAL
EXPANDED SCOPE - NATURAL GAS

Generator Emission Factors

	Combustion Products	*Emission Factor (1)*	*Basis of Estimate*
Fuel: Natural Gas	Ammonia (2)	0.0000091 lb/ft3	WebFIRE Database (4-2006)
Engine: 4-Stroke	Nitrogen Oxides	3.17 lb/MMBTU	AP-42: Table 3.2-1 (8-2000)
	Carbon Monoxide	0.386 lb/MMBTU	AP-42: Table 3.2-1 (8-2000)
	Particulate Matter	0.0384 lb/MMBTU	AP-42: Table 3.2-1 (8-2000)
	Non-methane VOC	0.12 lb/MMBTU	AP-42: Table 3.2-1 (8-2000)
	Sulfur Dioxide	0.000588 lb/MMBTU	AP-42: Table 3.2-1 (8-2000)

Heater Emission Factors

Fuel: Natural Gas	*Combustion Products*	*Emission Factor*	*Basis of Estimate*
Size: ***>10 MMBTU***	Ammonia (2)	0.0000032 lb/ft3	WebFIRE Database (4-2006)
	Nitrogen Oxides	0.0001 lb/ft^3	AP-42: Table 1.4-1 dated 7/98
	Carbon Monoxide	0.000084 lb/ft^3	AP-42: Table 1.4-1 dated 7/98
	Particulate Matter	0.0000076 lb/ft^3	WebFIRE Database (4-2006)
	PM-10	0.0000076 lb/ft^3	WebFIRE Database (4-2006)
	PM-2.5	0.0000076 lb/ft^3	WebFIRE Database (4-2006)
	Non-methane VOC	0.0000055 lb/ft^3	AP-42: Table 1.4-2 dated 7/98
	Sulfur Dioxide	0.0000006 lb/ft^3	AP-42: Table 1.4-2 dated 7/98

Flare Emission Factors

Pilot: Natural Gas	*Combustion Products*	*Emission Factor*	*Basis of Estimate*
	Ammonia (2)	0.0000032 lb/ft3	WebFIRE Database (4-2006)
	Nitrogen Oxides	0.068 lb/MM BTU	AP-42: Table 13.5-1(9-1991)
	Carbon Monoxide	0.37 lb/MM BTU	AP-42: Table 13.5-1(9-1991)
	Particulate Matter	0 lb/MM BTU	AP-42: Table 13.5-1(9-1991) non-smoking flare
	Non-methane VOC	2 % of VOC flared	AP-42: Chapter 13.5 (9-1991), assume 98% control efficiency
	Sulfur Dioxide	2 lb/lb S	Assumed all sulfur converted to SO2

Explanation of Calculation Methodology

(1) Generator Emission Factors (except NH3) = Emission Factor (lb/MMBTU) x Fuel Heat Content of Natural Gas (BTU/lb) x [1 MMBTU/ 1,000,000 BTU]

(2) Ammonia is a product of the combustion of natural gas

Appendix A: Emission Calculations
PTE Summary - (Propane Primary Fuel) - COLD TERMINAL

Company Name: **Koch Fertilizer Storage and Terminal Company**
Address: **7438 East County Road 800S, Walton, IN 46994**
MSOP: **017-24444-00042**
Reviewer: **Source Calculations Reviewed By ERG/JR**
Date: **12/3/2007**

Potential To Emit (TPY)	NH3	NOx	CO	VOC	SO2	PM	PM10
Flare #1	2.02	0.75	1.10	2.78	3.42E-02	-	-
Flare #2	2.51	0.69	0.04	0.26	3.19E-03	-	-
Heater 1	-	7.22	1.22	0.19	0.40	0.23	0.23
Heater 2*	-	-	-	-	-	-	-
Vaporizers #1 - #8	-	0.43	0.06	0.02	0.03	0.01	0.01
Propane Tank Loading	-	-	-	0.01	-	-	-
42 HP Emergency Generator	-	0.17	0.02	0.01	3.11E-05	2.03E-03	2.03E-03
Road Fugitives	-	**-**	**-**	**-**	**-**	27.6	8.31
Purger Emissions (if vented to atmosphere)	7.01	**-**	**-**	**-**	**-**	-	-
Truck loading (vented to tank)	0.06	**-**	**-**	**-**	**-**	-	-
TERMINAL WIDE TOTALS	**11.6**	**9.27**	**2.44**	**3.26**	**0.47**	**27.9**	**8.55**

*Maximum emissions occur if all ammonia leaving the facility is heated by Heater 1. Hence, Heater 2 emissions are not included.

Appendix A: Emission Calculations
MAXIMUM FACILITY CAPACITIES- COLD TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: Source Calculations Reviewed By ERG/JR
Date: 12/3/2007

Input			
Maximum ammonia pipeline flow rate input	45	tons/ hr	Facility Data-Maximum the facility can receive via pipeline
Maximum number of hours pipeline can operate	8760	hr	
Maximum ammonia pipeline flow rate input	394200	tpy	This equals the maximum amount of ammonia that can possibly be entering the facility
Refrigeration*			
Maximum Refrigeration system capability for incomming ammonia	245280	tpy	This equals the maximum amount of ammonia that be heated (28 tons/hr)
Storage			
Total Tank Capacity for ammonia	30000	tons	
Output **			
Maximum theoretical ammonia for output	424200	tpy	pipeline rate plus storage capacity
Maximum refrigerated ammonia for output	275280	tpy	Maximum refrigerated throughput through the facility (245,280 + 30,000)
Maximum capabilty of Heater Line 1	100	tons/ hr	BSB Heater Specifications
Maximum capabilty of Heater Line 2	150	tons/ hr	Smalling Heater Design Specifications
Maximum Heater 1 hours for refrigerated product	2752.80	hours /year	
Maximum Heater 2 hours for refrigerated product	1835.20	hours/year	
Maximum Heater 1 rate for refrigerated product	7.54	hours per day	calculated as 2752.80/365
Maximum Heater 2 rate for refrigerated product	5.03	hours per day	calculated as 1835.20/365

*Refrigeration is needed to put incoming ammonia into tanks

**Heaters are used to heat ammonia into truck tanks. Heaters cannot operate unless cold ammonia flows through the unit

Appendix A: Emission Calculations
POTENTIAL HEATER 1 EMISSIONS (Propane Primary Fuel)- COLD TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: Source Calculations Reviewed By ERG/JR
Date: 12/3/2007

Heater #1

Manufacturer	BS&B Uniflux Heater
Heater Fuel Type	Propane

Fuel Heat Content	90,500	BTU/gallon	AP-42: Chapter 1.5.1(10-1996)
Heat Duty of Heater	25.00	MMBtu/hr	BS&B Specification sheet
Fuel Consumption	276.24	Gallons/hr	Calculated (1)
Annual Hours of Operation	2752.80	hrs/yr	Maximum number of hours that all facility ammonia can be heated for transport
Propane Consumption	760,442	gallons/yr	Calculated (2)
Sulfur Content in Propane	123.00	ppm	10-22-03 discussion with Franger Gas, Walton propane supplier
Mass of Propane Consumed	3,224,274	lb/yr	Calculated (3)
Percent Sulfur in Propane	0.0123	% by weight	
Mass of Sulfur from Propane Consumption	397	lb/yr	Calculated (4)

Pollutant	Emission Factor		Emission Rates				Basis of Estimate
NOx	0.019	lb/gallon	1.65	lbs/hr	**7.22**	**tpy (5)**	AP-42: Table 1.5-1(10-1996) for Heat content > 10 MMBTU/hr
CO	0.0032	lb/gallon	0.28	lbs/hr	**1.22**	**tpy**	AP-42: Table 1.5-1(10-1996) for Heat content > 10 MMBTU/hr
PM	0.0006	lb/gallon	0.05	lbs/hr	**0.23**	**tpy**	AP-42: Table 1.5-1(10-1996) for Heat content > 10 MMBTU/hr
VOC	0.0005	lb/gallon	0.04	lbs/hr	**0.19**	**tpy**	AP-42: Table 1.5-1(10-1996) for Heat content > 10 MMBTU/hr
SO2	2	lb/lb sulfur in propane	0.09	lbs/hr	**0.40**	**tpy (6)**	Assumed all sulfur converted to SO2

Methodology

(1) Fuel Consumption = Heat Duty of Heater (MMBtu/hr) * 1,000,000 (Btu/ MMBtu) / Fuel Heat Content of Propane (BTU/gallon)

(2) Propane Consumption = Fuel Consumption(gallons/hr) x Annual Hours of Operation

(3) Convert propane consumption to lb/yr = [propane consumption (gallon/yr)] x [4.24 lb liquid propane/1 gallon liquid propane]

(4) Mass of sulfur from propane consumption = [propane consumption (lb/yr)] x [0.0123 (percent sulfur by weight)] /100

(5) Pollutant Emission Rate

for NOx, CO, PM, or VOCs (tons/yr) = (Pollutant Emission factor, lbs/gallon) x (Fuel consumption, gallons/yr) / (2000 lbs/ton)

(6) Emission rate for SO_2 (tons/yr) = [Mass of sulfur from propane combustion (lb/yr)] x [2 lb SO2/1 lb sulfur] x [1 ton SO2/2000 lb SO2]

Appendix A: Emission Calculations
POTENTIAL HEATER 2 EMISSIONS (Propane Primary Fuel)- COLD TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: Source Calculations Reviewed By ERG/JR
Date: 12/3/2007

Heater #2

Manufacturer	Smalling
Heater Fuel Type	Propane

Fuel Heat Content	90,500	BTU/gallon	AP-42: Chapter 1.5.1(10-1996)
Heat Duty of Heater	22.90	MMBtu/hr	Smalling Specification sheet
Fuel Consumption	253.04	Gallons/hr	Calculated (1)
Annual Hours of Operation	1835.20	hrs/yr	Maximum number of hours that all facility ammonia can be heated for transport
Propane Consumption	464,377	gallons/yr	Calculated (2)
Sulfur Content in Propane	123.00	ppm	10-22-03 discussion with Franger Gas, Walton propane supplier
Mass of Propane Consumed	1,968,957	lb/yr	Calculated (3)
Percent Sulfur in Propane	0.0123	% by weight	
Mass of Sulfur from Propane Consumption	242	lb/yr	Calculated (4)

Pollutant	Emission Factor		Emission Rates				Basis of Estimate
NOx	0.019	lb/gallon	1.01	lbs/hr	**4.41**	**tpy (5)**	AP-42: Table 1.5-1(10-1996) for Heat content > 10 MMBTU/hr
CO	0.0032	lb/gallon	0.17	lbs/hr	**0.74**	**tpy**	AP-42: Table 1.5-1(10-1996) for Heat content > 10 MMBTU/hr
PM	0.0006	lb/gallon	0.03	lbs/hr	**0.14**	**tpy**	AP-42: Table 1.5-1(10-1996) for Heat content > 10 MMBTU/hr
VOC	0.0005	lb/gallon	0.03	lbs/hr	**0.12**	**tpy**	AP-42: Table 1.5-1(10-1996) for Heat content > 10 MMBTU/hr
SO2	2	lb/lb sulfur in propane	0.06	lbs/hr	**0.24**	**tpy (6)**	Assumed all sulfur converted to SO2

Methodology

(1) Fuel Consumption = Heat Duty of Heater (MMBtu/hr) * 1,000,000 (Btu/ MMBtu) / Fuel Heat Content of Propane (BTU/gallon)

(2) Propane Consumption = Fuel Consumption(gallons/hr) x Annual Hours of Operation

(3) Convert propane consumption to lb/yr = [propane consumption (gallon/yr)] x [4.24 lb liquid propane/1 gallon liquid propane]

(4) Mass of sulfur from propane consumption = [propane consumption (lb/yr)] x [0.0123 (percent sulfur by weight)] /100

(5) Pollutant Emission Rate
for NOx, CO, PM, or VOCs (tons/yr) = (Pollutant Emission factor, lbs/gallon) x (Fuel consumption, gallons/yr) / (2000 lbs/ton)

(6) Emission rate for SO_2 (tons/yr) = [Mass of sulfur from propane combustion (lb/yr)] x [2 lb SO2/1 lb sulfur] x [1 ton SO2/2000 lb SO2]

Appendix A: Emission Calculations
POTENTIAL FLARE 1 EMISSIONS (Propane Primary Fuel)- COLD TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: Source Calculations Reviewed By ERG/JR
Date: 12/3/2007

Note: Emergency Flare emissions are based on a reasonable worse case scenario of 240 hours of ammonia flaring per year with the remaining hours in an idling mode

Flare Name	4" Emergency Flare	
Pilot Fuel Type	Propane	
Molecular weight	44	lb/lb mole
Fuel Heat Content	90,500	BTU/gallon liquid
Fuel Heat Content	2,516	BTU/ft^3 vapor
Conversion factor	36	ft3 vapor/gallon propane liquid
Conversion factor	4.24	lb propane/1 gallon liquid propane

Assumptions			**Basis**
Composition of Ammonia during Flaring	98.585	Volume percent	Calculated (1)
Composition of Propane during Flaring	1.415	Volume percent	Calculated
Composition of Ammonia during Flaring	96.419	Wt. percent	Calculated (2)
Composition of Propane during Flaring	3.581	Wt. percent	Calculated
Maximum Input Rating during Flaring	0.68	MMBtu/hr	Calculated from total fuel consumed during Flaring (3)
Maximum Input Rating during Flare idling	0.68	MMBtu/hr	Calculated from total fuel consumed during Flare idling
Maximum Propane consumption rate during Flare idling	269.77	ft3/hr	10/14/02, David Bevers email, Koch (180 gal/day, always full open)
Maximum Propane consumption rate during flaring	269.77	ft3/hr	10/14/02, David Bevers email, Koch (180 gal/day, always full open)
Fuel Heat Content with Flaring	390	Btu/scf	
Fuel Heat Content during Flare idling	2516	Btu/scf	National Propane gas Association
Maximum Annual Hours of Operation	8760	hrs/yr	
VOC Flare efficiency	98	percent	4/28/03 Koch supplied assumption

During Pilot Idling (Propane Combustion Only)

Annual Hours of operation during Flare idling	8,520		
Sulfur Content in Propane	123.00	ppm	10-22-03 discussion with Franger Gas, Walton propane supplier
Propane Consumption during Flare idling	2,298,470	ft3/yr	Calculated from Hourly usage and hours of flaring (4)
Propane Consumption during Flare idling	270,709	lb/yr	Calculated from conversion of units (5)
Mass of Sulfur during Flare idling	33.30	lb/yr	Calculated from sulfur content and propane consumption (6)

Pollutant	Emission Factor		Emission Rates		Basis of Estimate
NOx	0.068	lb/MM BTU	**0.20**	**tpy (7)**	AP-42: Table 13.5-1(9-1991)
CO	0.37	lb/MM BTU	**1.07**	**tpy**	AP-42: Table 13.5-1(9-1991)
PM	0	lb/MM BTU	**0.00**	**tpy**	AP-42: Table 13.5-1(9-1991) non-smoking flare
VOC	2	% of total VOCs	**2.71**	**tpy (8)**	AP-42: Chapter 13.5 (9-1991)
SO2	2	lb/# Sulfur in pro	**0.03**	**tpy (9)**	Assumed all sulfur converted to SO2

During Flaring (Ammonia and Propane Combustion)

			Basis
Annual Flare hours of operation	240.00	hours	Maintenance Emissions
Ammonia flow rate during Flaring	18800	ft3/hr	Engg Estimate
Annual Ammonia flow rate during Flaring	4,512,000	ft3/yr	Calculated (10)
Annual Propane Consumption during Flaring	64,746	ft3/yr	Calculated (11)
Annual Fuel Consumption during Flaring	4,576,746	ft3/yr	Calculated (12)

Assumed temperature	60	F	
Gas Constant	0.7302	(atm*ft3)/(lb mole*R)	
Assumed Pressure	1	Atm	Standard atmospheric pressure
Nox flare emission factor (13)	11.1	lb Nox/ton NH3	Koch Supplied

Pounds of ammonia sent to flare per yr	202009.99		Calculated (14)
Pounds of ammonia combusted per year	197969.79		98% combusted, 2% to atmosphere (15)
Pounds of Nox from ammonia combustion	1098.73	lbs	Calculated (16) Based on TNRCC emission factor
NOx tons per year from ammonia combustion	0.55	TPY	
Pounds of ammonia to atmosphere per year	4040.20	lbs	
Ammonia to atmosphere	2.02	TPY	

Propane Consumption During Flaring	64746	scf/yr	
Propane Consumption During Flaring	7,626	lb/yr	Calculated from conversion of units
Mass of Sulfur during Flaring	0.938	lb/yr	Calculated from sulfur content and propane consumption

Pollutant	Emission Factor		Emission Rates		Basis of Estimate
NOx	0.068	lb/MMBTU	**0.01**	**tpy**	AP-42: Table 13.5-1(9-1991)
CO	0.37	lb/MMBTU	**0.03**	**tpy**	AP-42: Table 13.5-1(9-1991)
PM	0	lb/MMBTU	**0.00**	**tpy**	AP-42: Table 13.5-1(9-1991) non-smoking flare
VOC	2	% of total VOC	**0.08**	**tpy**	AP-42: Chapter 13.5 (9-1991), assume 98% VOC control effici
SO2	2	lb/lb Sulfur in Pr	**0.00**	**tpy**	Assumed all sulfur converted to SO2

Total propane used 2,363,215 ft3/yr 65700 gallon/yr

TOTAL Emissions:

Pollutant	Emission Rates
NOx	**0.75 tpy**
CO	**1.10 tpy**
PM	**0.00 tpy**
VOC	**2.78 tpy**
SO2	**0.03 tpy**
NH3	**2.02 tpy**

Methodology

(1) Volume % of ammonia during flaring = ammonia flow rate during flaring (ft^3/yr)/total fuel consumption during flaring (ft^3/yr) * 100

(2) Weight % of ammonia during flaring = (volume % of ammonia during flaring x 17 lb/lb.mol) / [(volume % of ammonia during flaring) x 17 lb/ lb.mol) + (volume % of propane in flare) x 44 lb/lb.mol)] x 100

(3) Maximum Input Rating during Flaring = [propane + ammonia consumption rate during flaring (ft3/hr)] x [fuel heat content (BTU/ft3)] / [1,000,000]

(4) Annual propane consumption during pilot idling = Maximum Propane consumption rate during Flare idling (ft3/hr) x Annual hours of pilot idling operation

(5) Propane consumption during pilot idling (lb/yr) = [Propane consumption (ft3/yr)] /[1 gal propane/36 ft3 propane] x [4.24 lb propane/1 gallon liquid propane]

(6) Mass of sulfur from propane combustion (lb/yr) = [propane consumption (lb/yr)] x [0.0123 lb sulfur/100 lb propane]

(7) Emission rate for NOx, CO, or PM (tons/yr) = [emission factor (lb/MMBTU)] x [hours of pilot idling/yr] x [maximum propane input rating during idling (MMBTU/hr)] / [2000 lb/ton]

(8) Emission rate for VOCs (tons/yr) = [propane consumption during idling (lb/yr)] x [(100%-98%)] x [1 ton/2000 lb]
For VOC emissions, a 98% destruction efficiency is assumed, and propane is assumed to have a 100% by weight VOC content

(9) Emission rate for SO_2 (tons/yr) = [Mass of sulfur combusted (lb/yr)] x [2 lb SO_2/1 lb sulfur] x [1 ton SO_2/2000 lb SO_2]

(10) Ammonia flowrate during flaring (ft^3/yr) = Hours of flare operation x Ammonia flaring flow rate (ft3/hr)

(11) Propane Consumption during Flaring (ft3/yr) = Hours of flare operation x Maximum propane consumption rate during flaring (ft3/hr)

(12) Total fuel consumption during flaring (ft^3/yr) = Ammonia flowrate during flaring (ft^3/yr) + Propane flowrate during flaring (ft^3/yr)

(13) The emission factor for converting Ammonia to NOx is based on an Air Permit Technical Guidance for Chemical Sources: Flares and Oxidizers from the Texas Natural Resource Conservation Commission (October 2000, RG-109 draft).

(14) Pounds of ammonia sent to flare/year= [annual ammonia flaring flow rate (ft^3/yr) /0.7302 atm.ft^3/lb.mol.R)/[459 +60^{0}F] R x [17lb/lb.mol]

(15) Pounds of ammonia combusted by flare per yr = Pounds of ammonia sent to flare each year x Flare efficiency

(16) Pounds of NOx emitted per yr = Pounds of ammonia combusted each year x (1ton/2000 lbs) x NOx emission factor (lb NOx/ton ammonia)

Appendix A: Emission Calculations
POTENTIAL FLARE 2 EMISSIONS (Propane Primary Fuel)- COLD TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: Source Calculations Reviewed By ERG/JR
Date: 12/3/2007

Note: Emergency Flare emissions are based on a reasonable worse case scenario of 240 hours of ammonia flaring per year with the remaining hours in an idling mode

Flare Name	Stackmatch with Double Pilots	
Pilot Fuel Type	Propane	
Molecular weight	44	lb/lb mole
Fuel Heat Content	90,500	BTU/gallon liquid
Fuel Heat Content	2,516	BTU/ft^3 vapor
Conversion factor	36	ft3 vapor/gallon propane liquid
Conversion factor	4.24	lb propane/1 gallon liquid propane

Assumptions			***Basis***
Composition of Ammonia during Flaring	97.209	Volume percent	Calculated (1)
Composition of Propane during Flaring	2.791	Volume percent	Calculated
Composition of Ammonia during Flaring	93.083	Wt. percent	Calculated (2)
Composition of Propane during Flaring	6.917	Wt. percent	Calculated
Maximum Input Rating during Flaring	0.27	MMBtu/hr	Calculated (3)
Maximum Input Rating during Flare idling	0.02	MMBtu/hr	Calculated
Maximum Propane consumption rate during Flare idling	8.00	ft3/hr	Manufacturer's Literature @ 25 psig
Maximum Propane consumption rate during flaring	634.00	ft3/hr	Manufacturer's Literature @ 25 psig
Fuel Heat Content with Flaring	419	Btu/scf	
Fuel Heat Content during Flare idling	2516	Btu/scf	
Maximum Annual Hours of Operation	8760	hrs/yr	

During Pilot Idling (Propane Combustion Only)

Annual Hours of operation during Flare idling	8,520	hrs/yr	
Propane Consumption during Flare idling	68,160	ft3/yr	Calculated (4)
Propane Consumption during Flare idling	8,034	lb/yr	Calculated (5)
Sulfur Content in Propane	123	ppmw	10-22-03 discussion with Franger Gas, Walton propane supplier
Percent Sulfur in Propane	0.0123	% by weight	
Mass of Sulfur Produced by Propane Combustion	1	lb/yr	Calculated (6)

Pollutant	Emission Factor		Emission Rates		Basis of Estimate
NOx	0.068	lb/MMBTU	**0.01**	tpy (7)	AP-42: Table 13.5-1(9-1991)
CO	0.37	lb/MMBTU	**0.03**	tpy	AP-42: Table 13.5-1(9-1991)
PM	0	lb/MMBTU	**0.00**	tpy	AP-42: Table 13.5-1(9-1991) non-smoking flare
VOC	2	% of total VOC	**0.08**	tpy (8)	AP-42: Chapter 13.5 (9-1991), assume 98% VOC control efficiency
SO2	2	lb/lb Sulfur in Propane	**0.00**	tpy (9)	Assumed all sulfur converted to SO2

During Flaring (Ammonia and Propane Combustion)

			Basis
Annual Flare hours of operation	240.00	hours	Maintenance Emissions
Ammonia flow rate during Flaring	22084	ft3/hr	Engg Estimate
Annual Ammonia flow during Flaring	5,300,160	ft3/yr	Calculated (10)
Annual Propane consumption during flaring	152,160	ft3/yr	Calculated (11)
Annual Fuel Consumption during Flaring	5,452,320	ft3/yr	Calculated (12)

Assumed temperature	60	F	
Gas Constant	0.7302	(atm*ft3)/(lb mole*R)	
Assumed Pressure	1	Atm	Standard atmospheric pressure
Nox flare emission factor (13)	11.1	lb Nox/ton ammonia	TNRCC Guidance

Pounds of ammonia sent to flare per yr	237297.26		Calculated (14)
Pounds of ammonia sent to flare from truck loading	115.74		
Pounds of ammonia sent to flare from purgers	14016.00		
Total pounds of ammonia sent to flare per year	251429.00		
Pounds of ammonia combusted per yr	246400.42		98% combusted, 2% to atmosphere
Pounds of Nox from ammonia combustion	1367.52	lbs/year	Calculated (15) Based on TNRCC emission factor
NOx tons per year from ammonia combustion	0.68	TPY	
Pounds of ammonia to atmophere per year	5028.58		
Ammonia to atmophere	2.51	TPY	
Propane Consumption During Flaring	152160.0	scf/yr	
Propane Consumption During Flaring	17,936	lb/yr	
Sulfur Content in Propane	123	ppmw	10-22-03 discussion with Franger Gas, Walton propane supplier
Percent Sulfur in Propane	0.0123	% by weight	
Mass of Sulfur Produced by Propane Combustion	2	lb/yr	

Pollutant	Emission Factor		Emission Rates		Basis of Estimate
NOx	0.068	lb/MMBTU	**2.17E-03**	**tpy**	AP-42: Table 13.5-1(9-1991)
CO	0.37	lb/MMBTU	**0.01**	**tpy**	AP-42: Table 13.5-1(9-1991)
PM	0	lb/MMBTU	**0.00**	**tpy**	AP-42: Table 13.5-1(9-1991) non-smoking flare
VOC	2	% of total VOC	**0.18**	**tpy**	AP-42: Chapter 13.5 (9-1991), assume 98% VOC control efficiency
SO2	2	lb/lb Sulfur in Propane	**2.21E-03**	**tpy**	Assumed all sulfur converted to SO2

Total propane used 220,320 ft3/yr 6125 gallon/yr

TOTAL Emissions:

Pollutant	Emission Rates	
NOx	**0.69**	**tpy**
CO	**0.04**	**tpy**
PM	**0.00**	**tpy**
VOC	**0.26**	**tpy**
SO2	**3.19E-03**	**tpy**
NH3	**2.51**	**tpy**

Methodology

(1) Volume % of ammonia during flaring = ammonia flow rate during flaring (ft^3/yr)/total fuel consumption during flaring (ft^3/yr) * 100
(2) Weight % of ammonia during flaring = (volume % of ammonia during flaring x 17 lb/lb.mol) / [(volume % of ammonia during flaring) x 17 lb/ lb.mol) + (volume % of propane in flare) x 44 lb/lb.mol)] x 100
(3) Maximum Input Rating during Flaring = [propane+ ammonia consumption rate during flaring (ft3/hr)] x [fuel heat content (BTU/ft3)] / [1,000,000]
(4) Annual propane consumption during pilot idling = Maximum Propane consumption rate during Flare idling (ft3/hr) x Annual hours of pilot idling operation
(5) Propane consumption during pilot idling (lb/yr) = [Propane consumption (ft3/yr)] /[1 gal propane/36 ft3 propane] x [4.24 lb propane/1 gallon liquid propane]
(6) Mass of sulfur from propane combustion (lb/yr) = [propane consumption (lb/yr)] x [0.0123 lb sulfur/100 lb propane]
(7) Emission rate for NOx, CO, or PM (tons/yr) = [emission factor (lb/MMBTU)] x [hours of pilot idling/yr] x [maximum propane input rating during idling (MMBTU/hr)] / [2000 lb/ton]
(8) Emission rate for VOCs (tons/yr) = [propane consumption during idling (lb/yr)] x [(100%-98%)] x [1 ton/2000 lb]
For VOC emissions, a 98% destruction efficiency is assumed, and propane is assumed to have a 100% by weight VOC content
(9) Emission rate for SO_2 (tons/yr) = [Mass of sulfur combusted (lb/yr)] x [2 lb SO_2/1 lb sulfur] x [1 ton SO_2/2000 lb SO_2]
(10) Ammonia flowrate during flaring (ft^3/yr) = Hours of flare operation x Ammonia flaring flow rate (ft3/hr)
(11) Propane Consumption during Flaring (ft3/yr) = Hours of flare operation x Maximum propane consumption rate during flaring (ft3/hr)
(12) Total fuel consumption during flaring (ft^3/yr) = Ammonia flowrate during flaring (ft^3/yr) + Propane flowrate during flaring (ft^3/yr)
(13) The emission factor for converting Ammonia to NOx is based on an Air Permit Technical Guidance for Chemical Sources: Flares and Oxidizers from the Texas Natural Resource Conservation Commission (October 2000, RG-109 draft).
(14) Pounds of ammonia sent to flare/year= [annual ammonia flaring flow rate (ft^3/yr) /0.7302 atm.ft^3/lb.mol.R)/[459 +60^{0}F] R x [17lb/lb.mol]
(15) Pounds of ammonia combusted by flare per yr = Pounds of ammonia sent to flare each year x Flare efficiency
(16) Pounds of NOx emitted per yr = Pounds of ammonia combusted each year x (1ton/2000 lbs) x NOx emission factor (lb NOx/ton ammonia)

Appendix A: Emission Calculations
POTENTIAL VAPORIZER EMISSIONS - COLD TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: Source Calculations Reviewed By ERG/JR
Date: 12/3/2007

Vaporizers #1 - #8

Manufacturer	Mitchell 70		
Heater Fuel Type	Propane		
Fuel Heat Content	90,500	BTU/gallon	AP-42: Chapter 1.5.1(10-1996)
Heat Duty of Vaporizer	0.08	MMBtu/hr	Mitchell (70)
Fuel Consumption Rate	0.88	Gallons/hr	Calculated (1)
Annual Hours of Operation	8760	hrs/yr	Assumed worst case

Number of Vaporizers	8		
Annual Propane Consumption	61,949	gallons/yr	Calculated from fuel consumption and operational hours (total max for all 8 vaporizers)
Mass of Propane Consumed	262,664	lb/yr	Calculated (2)
Sulfur Content in Propane	123.00	ppm	10-22-03 discussion with Franger Gas, Walton propane supplier
Percent Sulfur in Propane	0.0123	% by weight	
Mass of Sulfur from Propane	32.31	lb/yr	Calculated (3)

Pollutant	Emission Factor		Emission Rates				Basis of Estimate
NOx	0.014	lb/gallon	0.0990	lbs/hr	**0.43**	**tpy (4)**	AP-42: Table 1.5-1(10-1996) for Heat content < 10 MMBTU/hr
CO	0.0019	lb/gallon	0.0134	lbs/hr	**0.06**	**tpy**	AP-42: Table 1.5-1(10-1996) for Heat content < 10 MMBTU/hr
PM	0.0004	lb/gallon	0.0028	lbs/hr	**0.01**	**tpy**	AP-42: Table 1.5-1(10-1996) for Heat content < 10 MMBTU/hr
VOC	0.0005	lb/gallon	0.0035	lbs/hr	**0.02**	**tpy**	AP-42: Table 1.5-1(10-1996) for Heat content < 10 MMBTU/hr
SO2	2	lb/lb sulfur in propane	0.0074	lbs/hr	**0.03**	**tpy (5)**	Assumed all sulfur converted to SO2

Methodology

(1) Fuel Consumption Rate (gallons/hr) = Heat Duty of Vaporizer (MMBtu/hr) x 1,000,000 (Btu/ MMBtu) / Fuel heat content of propane (BTU/gallon)
(2) Convert propane consumption to lb/yr = [propane consumption (gallon/yr)] x [4.24 lb liquid propane/1 gallon liquid propane]
(3) Mass of sulfur from propane (lb/yr) = [propane consumption (lb/yr)] x [0.0123 lb sulfur/100 lb propane]
(4) Pollutant Emission Rate for NOx, CO, PM, or VOCs (tons/yr) = (Pollutant Emission factor, lbs/gallon) x (Fuel consumption, gallons/yr) / (2000 lbs/ton)
(5) Emission rate for SO2 (tons/yr) = [Mass of sulfur combusted (lb/yr)] x [2 lb SO2/1 lb sulfur] x [1 ton SO2/2000 lb SO2]

Appendix A: Emission Calculations
POTENTIAL AMMONIA EMISSIONS FROM TRUCK LOADING - COLD TERMINAL

Company Name: **Koch Fertilizer Storage and Terminal Company**
Address: **7438 East County Road 800S, Walton, IN 46994**
MSOP: **017-24444-00042**
Reviewer: **Source Calculations Reviewed By ERG/JR**
Date: **12/3/2007**

Note: Cold terminal operations will send liquid ammonia in pipe to storage tank. Residual vapors are sent to flare and atmosphere.

Truck Blowdown

Maximum Number of trucks loading ammonia	54.0	trucks per day	Max receipt through pipe 45 tph * 24 hrs/20 tons per truck
Pipe length	6	feet	
Pipe diameter	2	inches	
Volume of Pipe	0.13	ft^3	
Volume of pipe	0.98	gallons	
Total volume in pipe during all unloading events	7.069	ft^3/day	
Total volume in pipe during all unloading events	2580	ft^3/yr	Calculated using volume of pipe and number of trucks per year

Determine pounds of NH3 vapor released to flare or atmosphere per year

Ideal Gas Law: pV = nRT
where:

p = 1 atm
V = 2580 ft^3/yr
T = 60 ^{o} F
R = 0.7302 (atm*ft3)/(lb mole*R)

n = pV/RT = 6.8080 lb.mole/yr

Molecular weight of NH3 =	17	lb/lb.mole
Pounds of NH3 released to flare or atmosphere=	116	lb/yr
	0.32	**lb/day**
Federal Notification Level for NH3 =	100	lb/day
NH3 Vapor emitted per year to flare or atmosphere	**0.058**	**tons/yr**

Appendix A: Emission Calculations
POTENTIAL INERT PURGING EMISSION ESTIMATES- COLD TERMINAL

Company Name: **Koch Fertilizer Storage and Terminal Company**
Address: **7438 East County Road 800S, Walton, IN 46994**
MSOP: **017-24444-00042**
Reviewer: **Source Calculations Reviewed By ERG/JR**
Date: **12/3/2007**

Hours of purging	8760	hr	
Rate of Gas Release:	2	ft^3/min/purge	Neil Wick, Hansen Technologies, 5/26/0
Rate of Gas Release:	120	ft^3/hr	
Rate of Ammonia released	2	lb NH3/300 ft^3 gas	Manufacturer's design literature

Number of Purgers at site 2

Amount of NH3 released to Flare or Atmosphere 1.6 lb/hr
7.01 **tons/year**

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Appendix A: Emission Calculations
POTENTIAL EMERGENCY GENERATOR EMISSIONS (Propane Primary Fuel)- COLD TERMINAL

Company Name: **Koch Fertilizer Storage and Terminal Company**
Address: **7438 East County Road 800S, Walton, IN 46994**
MSOP: **017-24444-00042**
Reviewer: **Source Calculations Reviewed By ERG/JR**
Date: **12/3/2007**

Size: 20 KW
Pilot Fuel Type: Propane

Assumptions

Fuel Heat Content	90500	BTU/gal	National Propane Gas Association
Fuel Heat Content	2516	Btu/ft3	National Propane Gas Association
Density	36	ft3/gal	National Propane Gas Association
Annual Hours of Operation	500	hrs/yr	
Maximum Fuel Usage	84.00	ft3/hr	Product Literature
	2.33	gallons/hr	Calculated (1)
	0.21	MMBTU/hr	Calculated (2)
	1166.67	gallons/yr	

Pollutant	Emission Factor		Emission Rates				Basis of Estimate
NOx	3.17	lb/MMBTU	0.67	lbs/hr (3)	**0.17**	**tpy**	AP-42: Table 3.2-1 (8-2000)
CO	0.386	lb/MMBTU	0.08	lbs/hr	**0.02**	**tpy**	AP-42: Table 3.2-1 (8-2000)
PM	0.0384	lb/MMBTU	0.01	lbs/hr	**0.00**	**tpy**	AP-42: Table 3.2-1 (8-2000)
VOC	0.12	lb/MMBTU	0.03	lbs/hr	**0.01**	**tpy**	AP-42: Table 3.2-1 (8-2000)
SO2	0.000588	lb/MMBTU	1.24E-04	lbs/hr	**3.11E-05**	**tpy**	AP-42: Table 3.2-1 (8-2000)

Methodology
(1) Maximum Fuel Usage (gallons/hr) = Fuel usage (ft3/hr) / Propane Density (gal/ft3)
(2) Maximum Fuel Usage (MMBTU/hr) = Fuel usage (ft3/hr) * Fuel heat content (BTU/ft3) /1000000 BTU/1 MMBTU
(3) Pollutant Emission Rate (lbs/hr) = (Pollutant Emission factor, lbs/gallon) x (Fuel consumption, gallons/yr) / (2000 lbs/ton)

Appendix A: Emission Calculations
POTENTIAL VOC EMISSIONS FROM PROPANE TANK LOADING - COLD TERMINAL

Company Name: **Koch Fertilizer Storage and Terminal Company**
Address: **7438 East County Road 800S, Walton, IN 46994**
MSOP: **017-24444-00042**
Reviewer: **Source Calculations Reviewed By ERG/JR**
Date: **12/3/2007**

Maximum Gallons needed	1,359,760	Gallons	Total Gallons of propane from all sources
Number of trucks unloading propane	136	trucks per year	Assume 10,000 gallons / truck
Hose length	20	feet	
Hose diameter	3	inches	
Volume of hose	0.98175	ft3 vapor	Calculated
	0.03	gallons	Calculated

density of liquid propane	4.24	lb/gallon	National Propane Gas Association

Assume entire hose contents is emitted

VOCs emitted per year	15.7	lbs	Calculated
VOCs emitted per year	**7.86E-03**	**tons**	Calculated

Appendix A: Fugitive Emission From Unpaved Roads - COLD TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: ERG/JR
Date: 12/3/2007

1. Unpaved Road Emission Factors: AP-42

According to AP-42, Section 13.2.2 Unpaved Roads, November 2006, the PM/PM10 emission factors for unpaved roads can be estimated from the following equation:

lbs/VMT Equation: $E = k (s/12)^a (W/3)^b \times (365-P)/365$

Where:

Particle size multiplier	k	4.9	dimensionless (PM-30 or TSP)	1.5	dimensionless PM-10
surface material silt content (%)	s	11	Source Tested Silt Content on Dec. 2007.		
mean vehicle weight	W	29.0	tons		
Equation constants	a	0.7	PM-30 or TSP Table 13.2.2-2	0.9	PM-10 Table 13.2.2-2
	b	0.45	PM-30 or TSP Table 13.2.2-2	0.45	PM-10 Table 13.2.2-2
	P	125			

PM Emission Factor = $(4.9) \times (6.4/12)^{0.7} \times (29/3)^{0.45} \times (365-125)/365$ = **8.41** lbs/mile

PM10 Emission Factor = $(1.5) \times (6.4/12)^{0.9} \times (29/3)^{0.45} \times (365-125)/365$ = **2.53** lbs/mile

2. Potential to Emit (PTE) of PM/PM10 from unpaved Roads:

Emission Area	Number of Round Trips (Trip/yr)	Miles Traveled per Trip (miles/Trip)	Unpaved Total VMT	Total Vehicle Emissions (lb/yr)	Total Vehicle Emissions (tpy)	TOTAL (tpy)
Ammonia Trucks (PM)	13764	0.43	5,934	49,930	**25.0**	**27.6**
Pickup Trucks (PM)	1460	0.43	629	5,296	**2.65**	
Ammonia Trucks (PM10)	13764	0.43	5,934	15,021	**7.51**	**8.31**
Pickup Trucks (PM10)	1460	0.43	629	1,593	**0.80**	

Methodology

Total Vehicle Emissions (tons/yr) = Unpaved Total VMT (miles/yr) x PM/PM10 Emission Factors x 1 ton/2000 lbs
Total unpaved road length = 1288 feet (A main segments of lengths 476 feet, plus 4 branches of 270, 133, 271, and 138 feet).
Assume two round trips per week (1 round trip = 2 x 1288 feet = 0.488 miles)

POTENTIAL EMISSION ESTIMATES, EMISSION FACTORS (Propane Primary Fuel)
KOCH NITROGEN COMPANY, WALTON AMMONIA TERMINAL

Vaporizers

Fuel: Propane
Size: ***<10 MMBTU***

Sulfur Content in Propane: 123 ppm per 10-22-03 discussion with Franger Gas, Walton propane supplier

Combustion Products	*Emission Factor*		*Basis of Estimate*
Nitrogen Oxides	0.014	lb/gallon	AP-42: Table 1.5-1(10-1996) for Heat content < 10 MMBTU/hr
Carbon Monoxide	0.0019	lb/gallon	AP-42: Table 1.5-1(10-1996) for Heat content < 10 MMBTU/hr
Particulate Matter	0.0004	lb/gallon	AP-42: Table 1.5-1(10-1996) for Heat content < 10 MMBTU/hr
Non-methane VOC	0.0005	lb/gallon	AP-42: Table 1.5-1(10-1996) for Heat content < 10 MMBTU/hr
Sulfur Dioxide	2	lb/lb sulfur in propane	Assumed all sulfur converted to SO_2

Heaters

Fuel: Propane
Size: ***>10 MMBTU***

Sulfur Content in Propane: 123 ppm per 10-22-03 discussion with Franger Gas, Walton propane supplier

Combustion Products	*Emission Factor*		*Basis of Estimate*
Nitrogen Oxides	0.019	lb/gallon	AP-42: Table 1.5-1(10-1996) for Heat content > 10 MMBTU/hr
Carbon Monoxide	0.0032	lb/gallon	AP-42: Table 1.5-1(10-1996) for Heat content > 10 MMBTU/hr
Particulate Matter	0.0006	lb/gallon	AP-42: Table 1.5-1(10-1996) for Heat content > 10 MMBTU/hr
Non-methane VOC	0.0005	lb/gallon	AP-42: Table 1.5-1(10-1996) for Heat content > 10 MMBTU/hr
Sulfur Dioxide	2	lb/lb sulfur in propane	Assumed all sulfur converted to SO_2

Flares

Pilot: Propane
Efficiency: 98

Combustion Products	*Emission Factor*		*Basis of Estimate*
Nitrogen Oxides	0.068	lb/MMBTU	AP-42: Table 13.5-1(9-1991)
Carbon Monoxide	0.37	lb/MMBTU	AP-42: Table 13.5-1(9-1991)
Particulate Matter	0	lb/MMBTU	AP-42: Table 13.5-1(9-1991) non-smoking flare
Non-methane VOC	2	% of total VOC	AP-42: Chapter 13.5 (9-1991), assume 98% VOC control efficiency
Sulfur Dioxide	2	lb/lb Sulfur in Propane	Assumed all sulfur converted to SO2

Generator

Fuel: Propane

Combustion Products	*Emission Factor*		*Basis of Estimate*
Nitrogen Oxides	3.17	lb/MMBTU	AP-42: Table 3.2-1 (8-2000)
Carbon Monoxide	0.386	lb/MMBTU	AP-42: Table 3.2-1 (8-2000)
Particulate Matter	0.0384	lb/MMBTU	AP-42: Table 3.2-1 (8-2000)
Non-methane VOC	0.12	lb/MMBTU	AP-42: Table 3.2-1 (8-2000)
Sulfur Dioxide	0.000588	lb/MMBTU	AP-42: Table 3.2-1 (8-2000)

Appendix A: Emission Calculations
PTE Summary - (Natural Gas) - COLD TERMINAL

Company Name: **Koch Fertilizer Storage and Terminal Company**
Address: **7438 East County Road 800S, Walton, IN 46994**
MSOP: **017-24444-00042**
Reviewer: **Source Calculations Reviewed By ERG/JR**
Date: **12/3/2007**

Potential To Emit (TPY)	NH3	NOx	CO	VOC	SO2	PM	PM10
Flare #1	2.03	0.75	1.10	0.24	1.57E-03	-	-
Flare #2	2.51	0.70	0.08	0.02	3.90E-05	-	-
Heater 1	0.10	3.28	2.75	0.18	0.02	0.25	0.25
Heater 2*	-	-	-	-	-	-	-
42 HP Emergency Generator	0.00	0.21	0.03	0.01	3.89E-05	2.54E-03	2.54E-03
Road Fugitives	-	-	-	-	-	27.6	8.31
Purger Emissions (if vented to atmosphere)	7.01	-	-	-	-	-	-
Truck loading (vented to tank)	0.06	-	-	-	-	-	-
TERMINAL WIDE TOTALS	**11.7**	**4.94**	**3.95**	**0.44**	**0.02**	**27.9**	**8.56**

*Maximum emissions occur if all ammonia leaving the facility is heated by Heater 1. Hence, Heater 2 emissions are not included.

Appendix A: Emission Calculations
HAP PTE Summary - (Natural Gas) - COLD TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: Source Calculations Reviewed By ERG/JR
Date: 12/3/2007

Maximum Natual Gas Consumption
111,745,210 ft3/yr From Natural Gas usage spreadsheet

Pollutant		Emission Factor ($lb/10^6$ ft^3)		Emission Rate (lb/yr)	Basis of Estimate
	Lead		0.0005	0.056	AP-42: Table 1.4-2 dated 7/98
91-57-6	2-Methylnaphthalene		2.40E-05	0.003	AP-42: Table 1.4-3 dated 7/98
56-49-5	3-Methylchloranthrene	<	1.80E-06	0.000	AP-42: Table 1.4-3 dated 7/98
	7,12-Dimethylbenz(a)anthracene	<	1.60E-05	0.002	AP-42: Table 1.4-3 dated 7/98
83-32-9	Acenaphthene	<	1.80E-06	0.000	AP-42: Table 1.4-3 dated 7/98
203-96-8	Acenaphthylene	<	1.80E-06	0.000	AP-42: Table 1.4-3 dated 7/98
120-12-7	Anthracene	<	2.40E-06	0.000	AP-42: Table 1.4-3 dated 7/98
56-55-3	Benz(a)anthracene	<	1.80E-06	0.000	AP-42: Table 1.4-3 dated 7/98
71-43-2	Benzene		2.10E-03	0.235	AP-42: Table 1.4-3 dated 7/98
50-32-8	Benzo(a)pyrene	<	1.20E-06	0.000	AP-42: Table 1.4-3 dated 7/98
205-99-2	Benzo(b)fluoranthene	<	1.80E-06	0.000	AP-42: Table 1.4-3 dated 7/98
191-24-2	Benzo(g,h,i)perylene	<	1.20E-06	0.000	AP-42: Table 1.4-3 dated 7/98
205-82-3	Benzo(k)fluoranthene	<	1.80E-06	0.000	AP-42: Table 1.4-3 dated 7/98
218-01-9	Chrysene	<	1.80E-06	0.000	AP-42: Table 1.4-3 dated 7/98
53-70-3	Dibenzo(a,h)anthracene	<	1.20E-06	0.000	AP-42: Table 1.4-3 dated 7/98
25321-22-6	Dichlorobenzene		1.20E-03	0.134	AP-42: Table 1.4-3 dated 7/98
206-44-0	Fluoranthene		3.00E-06	0.000	AP-42: Table 1.4-3 dated 7/98
86-73-7	Fluorene		2.80E-06	0.000	AP-42: Table 1.4-3 dated 7/98
50-00-0	Formaldehyde		7.50E-02	8.381	AP-42: Table 1.4-3 dated 7/98
110-54-3	Hexane		1.80E+00	201.141	AP-42: Table 1.4-3 dated 7/98
193-39-5	Indeno(1,2,3-cd)pyrene	<	1.80E-06	0.000	AP-42: Table 1.4-3 dated 7/98
91-20-3	Naphthalene		6.10E-04	0.068	AP-42: Table 1.4-3 dated 7/98
85-01-8	Phenanathrene		1.70E-05	0.002	AP-42: Table 1.4-3 dated 7/98
129-00-0	Pyrene		5.00E-06	0.001	AP-42: Table 1.4-3 dated 7/98
108-88-3	Toluene		3.40E-03	0.380	AP-42: Table 1.4-3 dated 7/98
7440-38-2	Arsenic		2.00E-04	0.022	AP-42: Table 1.4-4 dated 7/98
7440-41-7	Beryllium	<	1.20E-05	0.001	AP-42: Table 1.4-4 dated 7/98
7440-43-9	Cadmium		1.10E-03	0.123	AP-42: Table 1.4-4 dated 7/98
7440-47-3	Chromium		1.40E-03	0.156	AP-42: Table 1.4-4 dated 7/98
7440-48-4	Cobalt		8.40E-05	0.009	AP-42: Table 1.4-4 dated 7/98
7439-96-5	Manganese		3.80E-04	0.042	AP-42: Table 1.4-4 dated 7/98
7439-97-6	Mercury		2.60E-04	0.029	AP-42: Table 1.4-4 dated 7/98
7440-02-0	Nickel		2.10E-03	0.235	AP-42: Table 1.4-4 dated 7/98
7782-49-2	Selenium	<	2.40E-05	0.003	AP-42: Table 1.4-4 dated 7/98

TOTAL HAP EMISSIONS (lb/yr) 210.970
TOTAL HAP EMISSIONS (tons/yr) 0.105

MAX INDIVIDUAL HAP EMISSION (lb/yr) 201.141
MAX INDIVIDUAL HAP EMISSION (ton/yr) 0.101

Methodology:
TOTAL HAP EMISSIONS (tons/yr) = Maximum Natual Gas Consumption (ft^3/yr) * Emission Factor ($lb/10^6$ ft^3) * (1 ton / 2000 lbs)

Appendix A: Emission Calculations
TOTAL POTENTIAL NATURAL GAS USAGE - COLD TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: Source Calculations Reviewed By ERG/JR
Date: 12/3/2007

Usage for Flare 1	5,662,714	ft3	Calculated from flare spreadsheet
Usage for Flare 2	388,800	ft3	Calculated from flare spreadsheet
Usage for emergency generator	126,000	ft3	Calculated from generator spreadsheet
Usage for heater 1	65,542,857	ft3	Calculated from heater spreadsheet
Usage for heater 2	40,024,838	ft3	Calculated from heater spreadsheet
Total potential facility natural gas usage	**111,745,210**	**ft3**	**Total of above equipment usage**

Appendix A: Emission Calculations
MAXIMUM FACILITY CAPACITIES- COLD TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: Source Calculations Reviewed By ERG/JR
Date: 12/3/2007

Input				
	Maximum ammonia pipeline flow rate input	45	tons/ hr	Facility Data-Maximum the facility can receive via pipeline
	Maximum number of hours pipeline can operate	8760	hr	
	Maximum ammonia pipeline flow rate input	394200	tpy	This equals the maximum amount of ammonia that can possibly be entering the facility
Refrigeration*				
	Maximum Refrigeration system capability for incomming ammonia	245280	tpy	This equals the maximum amount of ammonia that be heated (28 tons/hr)
Storage				
	Total Tank Capacity for ammonia	30000	tons	
Output **				
	Maximum theoretical ammonia for output	424200	tpy	pipeline rate plus storage capacity
	Maximum refrigerated ammonia for output	275280	tpy	Maximum refrigerated throughput through the facility (245,280 + 30,000)
	Maximum capabilty of Heater Line 1	100	tons/ hr	BSB Heater Specifications
	Maximum capabilty of Heater Line 2	150	tons/ hr	Smalling Heater Design Specifications
	Maximum Heater 1 hours for refrigerated product	2752.80	hours /year	
	Maximum Heater 2 hours for refrigerated product	1835.20	hours/year	
	Maximum Heater 1 rate for refrigerated product	7.54	hours per day	calculated as 2752.80/365
	Maximum Heater 2 rate for refrigerated product	5.03	hours per day	calculated as 1835.20/365

*Refrigeration is needed to put incoming ammonia into tanks

**Heaters are used to heat ammonia into truck tanks. Heaters cannot operate unless cold ammonia flows through the unit)

Appendix A: Emission Calculations
POTENTIAL HEATER 1 EMISSIONS (Natural Gas Primary Fuel))- COLD TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: Source Calculations Reviewed By ERG/JR
Date: 12/3/2007

Heater #1

Manufacturer	BS&B Uniflux Heater		
Heater Fuel Type	Natural Gas		
NG Fuel Heat Content	1050	Btu/ft^3	
Heat Duty of Heater	25.00	MMBtu/hr	BS&B Specification sheet
Hours of Operation	2752.80	Hours	Maximum number of hours that all facility ammonia can be heated for transport
Natural Gas Consumption	65,542,857	ft^3/yr	

Pollutant	Emission Factor		Emission Rates				Basis of Estimate
NH3	0.0000032	lb/ft3	0.10	tpy	0.08	lb/hr	WebFIRE Database (4-2006)
NOx	0.0001	lb/ft3	3.28	tpy	2.38	lb/hr	AP-42: Table 1.4-1 dated 7/98
CO	0.000084	lb/ft3	2.75	tpy	2.00	lb/hr	AP-42: Table 1.4-1 dated 7/98
PM	0.0000076	lb/ft3	0.25	tpy	0.18	lb/hr	WebFIRE Database (4-2006)
PM10	0.0000076	lb/ft3	0.25	tpy	0.18	lb/hr	WebFIRE Database (4-2006)
PM2.5	0.0000076	lb/ft3	0.25	tpy	0.18	lb/hr	WebFIRE Database (4-2006)
VOC	0.0000055	lb/ft3	0.18	tpy	0.13	lb/hr	AP-42: Table 1.4-2 dated 7/98
SO2	0.0000006	lb/ft3	0.02	tpy	0.01	lb/hr	AP-42: Table 1.4-2 dated 7/98

Methodology
Pollutant Emission Rate (tons/yr) = Emission Factor (lb/ft3) x Natural gas consumption (ft3/yr) x (1 ton / 2000 lbs)

Appendix A: Emission Calculations
POTENTIAL HEATER 2 EMISSIONS (Natural Gas Primary Fuel))- COLD TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: Source Calculations Reviewed By ERG/JR
Date: 12/3/2007

Heater #2

Manufacturer	Smalling		
Heater Fuel Type	Propane		
NG Fuel Heat Content	1050	Btu/ft^3	
Heat Duty of Heater	22.90	MMBtu/hr	Specification sheet
Hours of Operation	1835.20	Hours	Maximum number of hours that all facility ammonia can be heated for transport
Natural Gas Consumption	40,024,838	ft^3/yr	

Pollutant	Emission Factor		Emission Rates				Basis of Estimate
NH3	0.0000032	lb/ft3	0.064	tpy	0.070	lb/hr	WebFIRE Database (4-2006)
NOx	0.0001	lb/ft3	2.001	tpy	2.181	lb/hr	AP-42: Table 1.4-1 dated 7/98
CO	0.000084	lb/ft3	1.681	tpy	1.832	lb/hr	AP-42: Table 1.4-1 dated 7/98
PM	0.0000076	lb/ft3	0.152	tpy	0.166	lb/hr	WebFIRE Database (4-2006)
PM10	0.0000076	lb/ft3	0.152	tpy	0.166	lb/hr	WebFIRE Database (4-2006)
PM2.5	0.0000076	lb/ft3	0.152	tpy	0.166	lb/hr	WebFIRE Database (4-2006)
VOC	0.0000055	lb/ft3	0.110	tpy	0.120	lb/hr	AP-42: Table 1.4-2 dated 7/98
SO2	0.0000006	lb/ft3	0.012	tpy	0.013	lb/hr	AP-42: Table 1.4-2 dated 7/98

Methodology

Pollutant Emission Rate (tons/yr) = Emission Factor (lb/ft3) x Natural gas consumption (ft3/yr) x (1 ton / 2000 lbs)

Appendix A: Emission Calculations
POTENTIAL FLARE 1 EMISSIONS (Natural Gas)- COLD TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: Source Calculations Reviewed By ERG/JR
Date: 12/3/2007

Note: Emergency Flare emissions are based on a reasonable worse case scenario of 240 hours of ammonia flaring per year with the remaining hours in an idling mode

Flare Name:	4" Emergency Flare		
Pilot Fuel Type:	Natural Gas		
Molecular Weight	16	lb/lb mole	
Fuel Heat Content	1,050	BTU/ft^3	AP-42: Supplement D, Section 1.4.1 (7-1998)

Assumptions			**Basis**
Composition of Ammonia in Flare	96.676	Volume percent	Calculated (1)
Composition of Natural Gas in Flare	3.324	Volume percent	Calculated
Composition of Ammonia in Flare	96.865	Wt. percent	Calculated (2)
Composition of Natural Gas in Flare	3.135	Wt. percent	Calculated
Maximum Natural Gas Input Rating during pilot idling	0.68	MMBTU/hr	Assume same BTU/hr as propane
Maximum Natural Gas Input Rating during Flaring	0.68	MMBTU/hr	Assume same BTU/hr as propane
Maximum Natural gas consumption rate during pilot idling	646.43	ft3/hr	Calculated from Input Rating
Maximum Natural gas consumption rate during flaring	646.43	ft3/hr	Calculated from Input Rating
Fuel Heat Content during pilot idling	1,050	BTU/ft^3	Fuel heat content of natural gas
Fuel Heat Content during Flaring	382	BTU/ft^3	Calculated (4)
Annual Hours of Operation	8,760	hrs/yr	

During Pilot Idling (Natural Gas Combustion Only)

Annual Hours of operation during pilot idling	8,520		Maximum Annual hours
Natural Gas Consumption during pilot idling	5,507,571	ft3/yr	Calculated (5)

Pollutant	Emission Factor		Emission Rates			Basis of Estimate
NH3	0.0000032	lb/ft3	2.07E-03	lb/hr	**0.01** tpy	WebFIRE Database (4-2006)
NOx	0.068	lb/MM BTU	4.62E-02	lb/hr	**0.20** tpy	AP-42: Table 13.5-1(9-1991) (6)
CO	0.37	lb/MM BTU	2.51E-01	lb/hr	**1.07** tpy	AP-42: Table 13.5-1(9-1991)
PM	0	lb/MM BTU	0.00	lb/hr	**0.00** tpy	AP-42: Table 13.5-1(9-1991) non-smoking flare
VOC	2	% of VOC flared	5.44E-02	lb/hr	**0.23** tpy	AP-42: Chapter 13.5 (9-1991) (7)
SO2	2	lb/lb S	1.85E-07	lb/hr	**0.00** tpy	Assumed all sulfur converted to SO2 (8)

During Flaring (Ammonia only)

			Basis
Annual Flaring hours of operation	240.00	hours	Maximum Annual hours
Ammonia Flaring flow rate	18800	ft3/hr	Engg Estimate
Annual Ammonia Flare flow rate	4,512,000	ft^3/yr	Calculated (9)
Natural Gas Consumption During Flaring	155,143	ft^3/yr	Calculated (10)
Annual Fuel Consumption during Flaring	4,667,143	ft^3/yr	Calculated (11)
Assumed temperature	60	F	
Gas Constant	0.7302	(atm*ft^3)/(lb mole*R)	
Assumed Pressure	1	Atm	Standard atmospheric pressure
NOx flare emission factor (12)	11.1	lb NOx/ton ammonia	TNRCC Air Permit & Technical Guidance for Chemical Sources (Flares & Oxidizers)
Moles of ammonia sent to flare per yr	11,883		Calculated (13)
Pounds of ammonia sent to flare each year	202,010		Calculated (14)
Flare Efficiency	0.98		
Pounds of ammonia combusted each year	197,970		Calculated (15)
Tons of ammonia emitted each year	2.020		Calculated (16)
Maximum pounds of ammonia emitted per hour	16.834		Calculated (17)
Average daily ammonia emission over year (lb/day)	11		Calculated (18)
Pounds of ammonia emitted each flaring day	9,024		Calculated (19)
Pounds of NOx emitted per yr	1,098.73		Calculated (20)
Pounds of NOx emitted per hour	4.578		
Tons of NOx emitted per yr	0.549		

Pollutant	Emission Factor		Emission Rates			Basis of Estimate
NH3	0.0000032	lb/ft3	2.07E-03	lb/hr	**2.48E-04** tpy	WebFIRE Database (4-2006)
NOx	0.068	lb/MM BTU	4.62E-02	lb/hr	**5.54E-03** tpy	AP-42: Table 13.5-1(9-1991) (6)
CO	0.37	lb/MM BTU	2.51E-01	lb/hr	**3.01E-02** tpy	AP-42: Table 13.5-1(9-1991)
PM	0	lb/MM BTU	0	lb/hr	**0.00** tpy	AP-42: Table 13.5-1(9-1991) non-smoking flare
VOC	2	% of VOC flared	5.44E-02	lb/hr	**6.53E-03** tpy	AP-42: Chapter 13.5 (9-1991) (7)
SO2	2	lb/lb S	6.86E-08	lb/hr	**8.23E-09** tpy	Assumed all sulfur converted to SO2 (8)

TOTAL Emissions:

Pollutant	Emission Rates			
NH3	**16.8**	**lb/hr**	**2.03**	**tpy**
NOx	**4.62**	**lb/hr**	**0.75**	**tpy**
CO	**0.25**	**lb/hr**	**1.10**	**tpy**
PM	**-**	**lb/hr**	**0.00**	**tpy**
VOC	**0.05**	**lb/hr**	**0.24**	**tpy**
SO2	**6.86E-08**	**lb/hr**	**1.57E-03**	**tpy**

Methodology

(1) Volume % of ammonia during flaring = ammonia flow rate during flaring (ft^3/hr)/total fuel consumption during flaring (ft^3/hr) * 100

(2) Weight % of ammonia during flaring = (volume % of ammonia during flaring x 17 lb/lb.mol) / [(volume % of ammonia during flaring) x 17 lb/ lb.mol) + (volume % of natural gas in flare) x 16 lb/lb.mol)] x 100

(4) Fuel heat content during flaring = [(volume % of ammonia during flaring/100) x 359 BTU/ft^3]+[(volume % of natural gas during flaring/100) x 1050 BTU/ft^3]

(5) Annual natural gas consumption during pilot idling = Maximum Natural gas consumption rate during pilot idling (ft3/hour) x Annual hours of pilot idling operation

(6) Emission rate for NOx, CO, or PM (tons/yr) = [emission factor (lb/MMBTU)] x [hours of pilot idling/yr] x [maximum natural gas input rating during pilot idling (MMBTU/hr)] / [2000 lb/ton]

(7) Emission rate for VOCs (tons/yr) = [natural gas consumption during pilot idling (ft^3/yr)] x [1 mole/380 ft^3] x [16 lb/mole natural gas] x [0.05 x (1-0.98)] x [1 ton/2000 lb]
For VOC emissions, a 98% destruction efficiency is assumed, and natural gas is assumed to have a 10% by weight VOC content

(8) Emission rate for SO_2 (tons/yr) = [Natural gas consumed during pilot idling (ft^3/yr)] x [2000 grains sulfur/1,000,000 ft^3 natural gas] x [1 lb sulfur/7,000 grains sulfur] x [64 lb SO2/32 lb sulfur] x [1 ton SO2/2,000 lb SO2]

Assumptions: 2000 grains of sulfur per 10^6 cubic feet natural gas (Footnote D of AP-42 Table 1.4-2 dated 7/98) and a ratio of 64 lb SO2 per 32 lb of S

(9) Annual ammonia flaring flow rate = [ammonia flaring flow rate (ft^3/hr)] x [annual hours of flare operation]

(10) Annual natural gas flaring flow rate (ft3/yr) = [maximum natural gas consumption rate during flaring (ft^3/hr)] x [annual hours of flaring operation]

(11) Total fuel consumption during flaring = [annual natural gas flaring flow rate (ft^3/yr)]+ [ammonia flaring flow rate (ft^3/yr)]

(12) The emission factor for converting Ammonia to NOx is based on an Air Permit Technical Guidance for Chemical Sources: Flares and Oxidizers from the Texas Natural Resource Conservation Commission (October 2000, RG-109 draft).

(13) Moles of ammonia sent to flare each year = [annual ammonia flaring flow rate (ft^3/yr) /0.7302 atm.ft^3/lb.mol.R)/[459 +60^{0}F] R

(14) Pounds of ammonia sent to flare each year = Moles of ammonia combusted per year x 17 lb ammonia/1 lb.mol ammonia

(15) Pounds of ammonia combusted each year = Pounds of ammonia sent to flare each year x Flare efficiency

(16) Tons of ammonia emitted each year = (Pounds of ammonia sent to flare each year - Pounds of ammonia combusted each year) x (1 ton/2000 pounds)

(17) Pounds of ammonia emitted per hour = (Pounds of ammonia sent to flare each year - Pounds of ammonia combusted each year) x (1year/365 days) x (1 day/24 hours)

(18) Average daily ammonia emission over year (lb/day) = (Pounds of ammonia sent to flare each year - Pounds of ammonia combusted each year) x (1year/365 days)

(19) Pounds of ammonia emitted each flaring day = Ammonia flaring flow rate (lb/hr) x (24 hours/day) x (100% - Flaring Efficiency %)

(20) Pounds of NOx emitted per year = Pounds of ammonia combusted per year x (1ton/2000 lbs) x NOx emission factor (lb NOx/ton ammonia)

(21) The truck loading blow down is to the cold storage tank and not to the flare.

Appendix A: Emission Calculations
POTENTIAL FLARE 2 EMISSIONS (Natural Gas)- COLD TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: Source Calculations Reviewed By ERG/JR
Date: 12/3/2007

Note: Emergency Flare emissions are based on a reasonable worse case scenario of 240 hours of ammonia flaring per year with the remaining hours in an idling mode

Flare Name:	Stackmatch with Double Pilots		
Pilot Fuel Type:	Natural Gas		
Molecular Weight	16	lb/lb mole	
Fuel Heat Content	1,050	BTU/ft^3	AP-42: Supplement D, Section 1.4.1 (7-1998)

Assumptions			**Basis**
Composition of Ammonia in Flare	95.453	Volume percent	Calculated (1)
Composition of Natural Gas in Flare	4.547	Volume percent	Calculated
Composition of Ammonia in Flare	95.709	Wt. percent	Calculated (2)
Composition of Natural Gas in Flare	4.291	Wt. percent	Calculated
Maximum Natural Gas Input Rating during pilot idling	0.02		MMBtu/hr Calculated (3)
Maximum Natural Gas Input Rating during Flaring	1.10		MMBtu/hr Calculated
Maximum Natural gas consumption rate during pilot idling	16.00	ft3/hr	Manufacturer's Literature @ 25 psig
Maximum Natural gas consumption rate during flaring	1052.00	ft3/hr	Manufacturer's Literature @ 25 psig
Fuel Heat Content during pilot idling	1,050	BTU/ft^3	Fuel heat content of natural gas
Fuel Heat Content during Flaring	390	BTU/ft^3	Calculated (4)
Annual Hours of Operation	8,760	hrs/yr	

During Pilot Idling (Natural Gas Combustion Only)

Annual Hours of operation during pilot idling	8,520		Maximum Annual hours
Natural Gas Consumption during pilot idling	136,320	ft3/yr	Calculated (5)

Pollutant	Emission Factor		Emission Rates				Basis of Estimate
NH3	0.0000032	lb/ft3	5.12E-05	lb/hr	2.18E-04	tpy	WebFIRE Database (4-2006)
NOx	0.068	lb/MM BTU	1.14E-03	lb/hr	4.87E-03	tpy	AP-42: Table 13.5-1(9-1991) (6)
CO	0.37	lb/MM BTU	6.22E-03	lb/hr	2.65E-02	tpy	AP-42: Table 13.5-1(9-1991)
PM	0	lb/MM BTU	0.00	lb/hr	0.00	tpy	AP-42: Table 13.5-1(9-1991) non-smoking flare
VOC	2	% of VOC flared	1.35E-03	lb/hr	5.74E-03	tpy	AP-42: Chapter 13.5 (9-1991) (7)
SO2	2	lb/lb S	4.57E-09	lb/hr	3.89E-05	tpy	Assumed all sulfur converted to SO2 (8)

During Flaring (Ammonia only)

			Basis
Annual Flaring hours of operation	240.00	hours	Maximum Annual hours
Ammonia Flaring flow rate	22084	ft3/hr	Engg Estimate
Annual Ammonia Flare flow rate	5,300,160	ft^3/yr	Calculated (9)
Natural Gas Consumption During Flaring	252,480	ft^3/yr	Calculated (10)
Annual Fuel Consumption during Flaring	5,552,640	ft^3/yr	Calculated (11)
Assumed temperature	60	F	
Gas Constant	0.7302	(atm*ft^3)/(lb mole*R)	
Assumed Pressure	1	Atm	Standard atmospheric pressure
NOx flare emission factor (12)	11.1	lb NOx/ton ammonia	TNRCC Air Permit & Technical Guidance for Chemical Sources (Flares & Oxidizers)
Moles of ammonia sent to flare per yr	13,959		Calculated (13)
Pounds of ammonia sent to flare each year including purger and truck blowdown	251,429		Calculated (14)
Flare Efficiency	0.98		
Pounds of ammonia combusted each year	246,400		Calculated (15)
Tons of ammonia emitted each year	2.514		Calculated (16)
Maximum pounds of ammonia emitted per hour	20.952		Calculated (17)
Average daily ammonia emission over year (lb/day)	14		Calculated (18)
Pounds of ammonia emitted each flaring day	10,600		Calculated (19)
Pounds of NOx emitted per yr	1,367.52		Calculated (20)
Pounds of NOx emitted per hour	5.698		
Tons of NOx emitted per yr	0.684		

Pollutant	Emission Factor		Emission Rates				Basis of Estimate
NH3	0.0000032	lb/ft3	3.37E-03	lb/hr	4.04E-04	tpy	WebFIRE Database (4-2006)
NOx	0.068	lb/MM BTU	7.51E-02	lb/hr	9.01E-03	tpy	AP-42: Table 13.5-1(9-1991) (6)
CO	0.37	lb/MM BTU	4.09E-01	lb/hr	4.90E-02	tpy	AP-42: Table 13.5-1(9-1991)
PM	0	lb/MM BTU	0.00	lb/hr	0.00	tpy	AP-42: Table 13.5-1(9-1991) non-smoking flare
VOC	2	% of VOC flared	8.86E-02	lb/hr	1.06E-02	tpy	AP-42: Chapter 13.5 (9-1991) (7)
SO2	2	lb/lb S	6.86E-08	lb/hr	8.23E-09	tpy	Assumed all sulfur converted to SO2 (8)

TOTAL Emissions:

Pollutant	Emission Rates			
NH3	**21.0**	**lb/hr**	**2.51**	**tpy**
NOx	**5.77**	**lb/hr**	**0.70**	**tpy**
CO	**0.41**	**lb/hr**	**0.08**	**tpy**
PM	**0.00**	**lb/hr**	**0.00**	**tpy**
VOC	**0.09**	**lb/hr**	**0.02**	**tpy**
SO2	**6.86E-08**	**lb/hr**	**3.90E-05**	**tpy**

Explanation of Calculation Methodology

(1) Volume % of ammonia during flaring = ammonia flow rate during flaring (ft^3/hr)/total fuel consumption during flaring (ft^3/hr) * 100
(2) Weight % of ammonia during flaring = (volume % of ammonia during flaring x 17 lb/lb.mol) / [(volume % of ammonia during flaring) x 17 lb/ lb.mol) + (volume % of natural gas in flare) x 16 lb/lb.mol)] x 100
(3) Maximum Input Rating during Flaring = [natural gas consumption rate during flaring (ft3/hr)] x [fuel heat content (BTU/ft3)] / [1,000,000]
(4) Fuel heat content during flaring = [(volume % of ammonia during flaring/100) x 359 BTU/ft^3)]+[(volume % of natural gas during flaring/100) x 1050 BTU/ft^3)]
(5) Annual natural gas consumption during pilot idling = Maximum Natural gas consumption rate during pilot idling (ft3/hour) x Annual hours of pilot idling operation
(6) Emission rate for NOx, CO, or PM (tons/yr) = [emission factor (lb/MMBTU)] x [hours of pilot idling/yr] x [maximum natural gas input rating during pilot idling (MMBTU/hr)] / [2000 lb/ton]
(7) Emission rate for VOCs (tons/yr) = [natural gas consumption during pilot idling (ft^3/yr)] x [1 mole/380 ft^3] x [16 lb/mole natural gas] x [0.05 x (1-0.98)] x [1 ton/2000 lb]
For VOC emissions, a 98% destruction efficiency is assumed, and natural gas is assumed to have a 10% by weight VOC content
(8) Emission rate for SO_2 (tons/yr) = [Natural gas consumed during pilot idling (ft^3/yr)] x [2000 grains sulfur/1,000,000 ft^3 natural gas] x [1 lb sulfur/7,000 grains sulfur] x [64 lb SO2/32 lb sulfur] x [1 ton SO2/2,000 lb SO2]
Assumptions: 2000 grains of sulfur per 10^6 cubic feet natural gas (Footnote D of AP-42 Table 1.4-2 dated 7/98) and a ratio of 64 lb SO2 per 32 lb of S
(9) Annual ammonia flaring flow rate = [ammonia flaring flow rate (ft^3/hr)] x [annual hours of flare operation]
(10) Annual natural gas flaring flow rate (ft3/yr) = [maximum natural gas consumption rate during flaring (ft^3/hr)] x [annual hours of flaring operation]
(11) Total fuel consumption during flaring = [annual natural gas flaring flow rate (ft^3/yr)]+ [ammonia flaring flow rate (ft^3/yr)]
(12) The emission factor for converting Ammonia to NOx is based on an Air Permit Technical Guidance for Chemical Sources: Flares and Oxidizers from the Texas Natural Resource Conservation Commission (October 2000, RG-109 draft).
(13) Moles of ammonia sent to flare each year = [annual ammonia flaring flow rate (ft^3/yr) /0.7302 atm.ft^3/lb.mol.R]/[459 +60°F] R
(14) Pounds of ammonia sent to flare each year = Moles of ammonia combusted per year x 17 lb ammonia/1 lb.mol ammonia + tons of ammonia from purgers and truck blowdown*2000
(15) Pounds of ammonia combusted each year = Pounds of ammonia sent to flare each year x Flare efficiency
(16) Tons of ammonia emitted each year = (Pounds of ammonia sent to flare each year - Pounds of ammonia combusted each year) x (1 ton/2000 pounds)
(17) Pounds of ammonia emitted per hour = (Pounds of ammonia sent to flare each year - Pounds of ammonia combusted each year) x (1year/365 days) x (1 day/24 hours)
(18) Average daily ammonia emission over year (lb/day) = (Pounds of ammonia sent to flare each year - Pounds of ammonia combusted each year) x (1year/365 days)
(19) Pounds of ammonia emitted each flaring day = Ammonia flaring flow rate (lb/hr) x (24 hours/day) x (100% - Flaring Efficiency %)
(20) Pounds of NOx emitted per year = Pounds of ammonia combusted per year x (1ton/2000 lbs) x NOx emission factor (lb NOx/ton ammonia)
(21) The truck loading blow down is to the cold storage tank and not to the flare.

Appendix A: Emission Calculations
POTENTIAL AMMONIA EMISSIONS FROM TRUCK LOADING - COLD TERMINAL

Company Name: **Koch Fertilizer Storage and Terminal Company**
Address: **7438 East County Road 800S, Walton, IN 46994**
MSOP: **017-24444-00042**
Reviewer: **Source Calculations Reviewed By ERG/JR**
Date: **12/3/2007**

Note: Cold terminal operations will send liquid ammonia in pipe to storage tank. Residual vapors are sent to flare and atmosphere.

Truck Blowdown

Maximum Number of trucks loading ammonia	54.0	trucks per day	Max receipt through pipe 45 tph * 24 hrs/20 tons per truck
Pipe length	6	feet	
Pipe diameter	2	inches	
Volume of Pipe	0.13	ft3	
Volume of pipe	0.98	gallons	
Total volume in pipe during all unloading events	7.069	ft^3/day	
Total volume in pipe during all unloading events	2580	ft^3/yr	Calculated using volume of pipe and number of trucks per year

Determine pounds of NH3 vapor released to flare or atmosphere per year

Ideal Gas Law: pV = nRT
where:

p = 1 atm
V = 2580 ft^3/yr
T = 60 ^{o} F
R = 0.7302 (atm*ft3)/(lb mole*R)

n = pV/RT = 6.8080 lb.mole/yr

Molecular weight of NH3 =	17	lb/lb.mole
Pounds of NH3 released to flare or atmosphere=	116	lb/yr
	0.32	**lb/day**
Federal Notification Level for NH3 =	100	lb/day
NH3 Vapor emitted per year to flare or atmosphere	**0.058**	**tons/yr**

Appendix A: Emission Calculations
POTENTIAL INERT PURGING EMISSION ESTIMATES- COLD TERMINAL

Company Name: Koch Fertilizer Storage and Terminal Company
Address: 7438 East County Road 800S, Walton, IN 46994
MSOP: 017-24444-00042
Reviewer: Source Calculations Reviewed By ERG/JR
Date: 12/3/2007

Hours of purging	8760	hr	
Rate of Gas Release:	2	ft^3/min/purge	Neil Wick, Hansen Technologies, 5/26/0
Rate of Gas Release:	120	ft^3/hr	
Rate of Ammonia released	2	lb NH3/300 ft^3 gas	Manufacturer's design literature

Number of Purgers at site 2

Amount of NH3 released to Flare or Atmosphere 1.6 lb/hr
7.01 **tons/year**

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Appendix A: Emission Calculations
POTENTIAL EMERGENCY GENERATOR EMISSIONS (Natural Gas Fuel)- COLD TERMINAL

Company Name: **Koch Fertilizer Storage and Terminal Company**
Address: **7438 East County Road 800S, Walton, IN 46994**
MSOP: **017-24444-00042**
Reviewer: **Source Calculations Reviewed By ERG/JR**
Date: **12/3/2007**

Size: 20 KW
Pilot Fuel Type: Natural gas

Assumptions

Fuel Heat Content	1050	Btu/ft3	(max per USEPA guidance)
Annual Hours of Operation	500	hrs/yr	
Maximum Fuel Usage	252.00	ft3/hr	Product literature at full load
	126000.00	ft3/yr	
	0.26	MMBTU/hr	Calculated (1)

Pollutant	Emission Factor		Emission Rates				Basis of Estimate
NOx	3.17	lb/MMBTU	0.84	lbs/hr (2)	**0.21**	**tpy**	AP-42: Table 3.2-1 (8-2000)
CO	0.386	lb/MMBTU	0.10	lbs/hr	**0.03**	**tpy**	AP-42: Table 3.2-1 (8-2000)
PM	0.0384	lb/MMBTU	0.01	lbs/hr	**2.54E-03**	**tpy**	AP-42: Table 3.2-1 (8-2000)
VOC	0.12	lb/MMBTU	0.03	lbs/hr	**7.94E-03**	**tpy**	AP-42: Table 3.2-1 (8-2000)
SO2	0.000588	lb/MMBTU	1.56E-04	lbs/hr	**3.89E-05**	**tpy**	AP-42: Table 3.2-1 (8-2000)
NH3	9.1E-06	lb/ft3	2.29E-03	lbs/hr	**5.73E-04**	**tpy**	WebFIRE Database (4-2006)

Methodology

(1) Maximum Fuel Usage (MMBTU/hr) = Fuel usage (ft3/hr) * Fuel heat content (BTU/ft3) /1000000 BTU/1 MMBTU
(2) Pollutant Emission Rate (lbs/hr) = (Pollutant Emission factor, lbs/gallon) x (Fuel consumption, gallons/yr) / (2000 lbs/ton)

Appendix A: Fugitive Emission From Unpaved Roads - COLD TERMINAL

Company Name: **Koch Fertilizer Storage and Terminal Company**
Address: **7438 East County Road 800S, Walton, IN 46994**
MSOP: **017-24444-00042**
Reviewer: **ERG/JR**
Date: **12/3/2007**

1. Unpaved Road Emission Factors: AP-42

According to AP-42, Section 13.2.2 Unpaved Roads, November 2006, the PM/PM10 emission factors for unpaved roads can be estimated from the following equation:

lbs/VMT Equation: $E = k\,(s/12)^a\,(W/3)^b \times (365-P)/365$

Where:

Particle size multiplier	k	4.9	dimensionless (PM-30 or TSP)	1.5	dimensionless PM-10
surface material silt content (%)	s	11	Source tested in Dec. 2007.		
mean vehicle weight	W	29.0	tons		
Equation constants	a	0.7	PM-30 or TSP Table 13.2.2-2	0.9	PM-10 Table 13.2.2-2
	b	0.45	PM-30 or TSP Table 13.2.2-2	0.45	PM-10 Table 13.2.2-2
	P	125			

PM Emission Factor = $(4.9) \times (6.4/12)^{0.7} \times (29/3)^{0.45} \times (365-125)/365 =$ **8.41** lbs/mile

PM10 Emission Factor = $(1.5) \times (6.4/12)^{0.9} \times (29/3)^{0.45} \times (365-125)/365 =$ **2.53** lbs/mile

2. Potential to Emit (PTE) of PM/PM10 from unpaved Roads:

Emission Area	Number of Round Trips (Trip/yr)	Miles Traveled per Trip (miles/Trip)	Unpaved Total VMT	Total Vehicle Emissions (lb/yr)	Total Vehicle Emissions (tpy)	TOTAL (tpy)
Ammonia Trucks (PM)	13764	0.43	5,934	49,930	**25.0**	**27.6**
Pickup Trucks (PM)	1460	0.43	629	5,296	**2.65**	
Ammonia Trucks (PM10)	13764	0.43	5,934	15,021	**7.51**	**8.31**
Pickup Trucks (PM10)	1460	0.43	629	1,593	**0.80**	

Methodology

Total Vehicle Emissions (tons/yr) = Unpaved Total VMT (miles/yr) x PM/PM10 Emission Factors x 1 ton/2000 lbs
Total unpaved road length = 1288 feet (A main segments of lengths 476 feet, plus 4 branches of 270, 133, 271, and 138 feet).
Assume two round trips per week (1 round trip = 2 x 1288 feet = 0.488 miles)

POTENTIAL EMISSION ESTIMATES, EMISSION FACTORS- COLD TERMINAL
KOCH NITROGEN COMPANY, WALTON AMMONIA TERMINAL
EXPANDED SCOPE - NATURAL GAS

Generator Emission Factors

Fuel: Natural Gas
Engine: 4-Stroke

Combustion Products	*Emission Factor (1)*	*Basis of Estimate*
Ammonia (2)	0.0000091 lb/ft3	WebFIRE Database (4-2006)
Nitrogen Oxides	3.17 lb/MMBTU	AP-42: Table 3.2-1 (8-2000)
Carbon Monoxide	0.386 lb/MMBTU	AP-42: Table 3.2-1 (8-2000)
Particulate Matter	0.0384 lb/MMBTU	AP-42: Table 3.2-1 (8-2000)
Non-methane VOC	0.12 lb/MMBTU	AP-42: Table 3.2-1 (8-2000)
Sulfur Dioxide	0.000588 lb/MMBTU	AP-42: Table 3.2-1 (8-2000)

Heater Emission Factors

Fuel: Natural Gas
Size: ***>10 MMBTU***

Combustion Products	*Emission Factor*	*Basis of Estimate*
Ammonia (2)	0.0000032 lb/ft3	WebFIRE Database (4-2006)
Nitrogen Oxides	0.0001 lb/ft^3	AP-42: Table 1.4-1 dated 7/98
Carbon Monoxide	0.000084 lb/ft^3	AP-42: Table 1.4-1 dated 7/98
Particulate Matter	0.0000076 lb/ft^3	WebFIRE Database (4-2006)
PM-10	0.0000076 lb/ft^3	WebFIRE Database (4-2006)
PM-2.5	0.0000076 lb/ft^3	WebFIRE Database (4-2006)
Non-methane VOC	0.0000055 lb/ft^3	AP-42: Table 1.4-2 dated 7/98
Sulfur Dioxide	0.0000006 lb/ft^3	AP-42: Table 1.4-2 dated 7/98

Flare Emission Factors

Pilot: Natural Gas

Combustion Products	*Emission Factor*	*Basis of Estimate*
Ammonia (2)	0.0000032 lb/ft3	WebFIRE Database (4-2006)
Nitrogen Oxides	0.068 lb/MM BTU	AP-42: Table 13.5-1(9-1991)
Carbon Monoxide	0.37 lb/MM BTU	AP-42: Table 13.5-1(9-1991)
Particulate Matter	0 lb/MM BTU	AP-42: Table 13.5-1(9-1991) non-smoking flare
Non-methane VOC	2 % of VOC flared	AP-42: Chapter 13.5 (9-1991), assume 98% control efficiency
Sulfur Dioxide	2 lb/lb S	Assumed all sulfur converted to SO2

Explanation of Calculation Methodology

(1) Generator Emission Factors (except NH3) = Emission Factor (lb/MMBTU) x Fuel Heat Content of Natural Gas (BTU/lb) x [1 MMBTU/ 1,000,000 BTU]

(2) Ammonia is a product of the combustion of natural gas