



Joseph E. Kernan
Governor

Lori F. Kaplan
Commissioner

May 27, 2004

100 North Senate Avenue
P.O. Box 6015
Indianapolis, Indiana 46206-6015
(317) 232-8603
(800) 451-6027
www.in.gov/idem

TO: Interested Parties / Applicant

RE: Nucor Steel / PSD/SSM 107-18314-00038

FROM: Paul Dubenetzky
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, Room 1049, 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.dot 9/16/03



INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

We make Indiana a cleaner, healthier place to live.

Joseph E. Kernan
Governor

Lori F. Kaplan
Commissioner

100 North Senate Avenue
P.O. Box 6015
Indianapolis, Indiana 46206-6015
(317) 232-8603
(800) 451-6027
www.IN.gov/idem

**Prevention of Significant Deterioration
Part 70 Significant Source Modification**

OFFICE OF AIR QUALITY

**Nucor Steel
4537 South Nucor Street
Crawfordsville, IN 47933**

(herein known as the Permittee) is hereby authorized to construct and operate subject to the conditions contained herein, the emission units described in Section A (Source Summary) of this approval.

This approval is issued in accordance with 326 IAC 2 and 40 CFR Part 70 Appendix A and contains the conditions and provisions specified in 326 IAC 2-7 as required by 42 U.S.C. 7401, et. seq. (Clean Air Act as amended by the 1990 Clean Air Act Amendments), 40 CFR Part 70.6, IC 13-15 and IC 13-17.

This permit is also issued under the provisions of 326 IAC 2-2 (Prevention of Significant Deterioration (PSD)).

The Permittee must comply with all conditions of this permit. Noncompliance with any provisions of this permit is grounds for enforcement action; permit termination, revocation and reissuance, or modification; or denial of a permit renewal application. Noncompliance with any provision of this permit, except any provision specifically designated as not federally enforceable, constitutes a violation of the Clean Air Act. It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. An emergency does constitute an affirmative defense in an enforcement action provided the Permittee complies with the applicable requirements set forth in Section C, Emergency Provisions.

PSD/SSM No.: 107-18314-00038	
Issued by: Original signed by Paul Dubenetzky Paul Dubenetzky, Branch Chief Office of Air Quality	Issuance Date: May 27, 2004

TABLE OF CONTENTS

A SOURCE SUMMARY

- A.1 General Information [326 IAC 2-7-4(c)] [326 IAC 2-7-5(15)]
- A.2 Emission Units and Pollution Control Equipment Summary [326 IAC 2-7-4(c)(3)]
- A.3 Part 70 Permit Applicability [326 IAC 2-7-2]

B GENERAL CONSTRUCTION CONDITIONS

- B.1 Definitions [326 IAC 2-7-1]
- B.2 Effective Date of the Permit [IC13-15-5-3]
- B.3 Revocation of Permits [326 IAC 2-2-8]
- B.4 Significant Source Modification [326 IAC 2-7-10.5(h)]
- B.5 General Provisions and NSPS Reporting [326 IAC 12-1] [40 CFR 60, Subpart A]

C GENERAL OPERATION CONDITIONS

- C.1 Certification [326 IAC 2-7-4(f)] [326 IAC 2-7-6(1)] [326 IAC 2-7-5(3)(C)]
- C.2 Preventive Maintenance Plan (PMP) [326 IAC 2-7-5(1),(3) and (13)]
[326 IAC 2-7-6(1) and (6)] [326 IAC 1-6-3]
- C.3 Permit Amendment or Modification [326 IAC 2-7-11] [326 IAC 2-7-12]
- C.4 Opacity [326 IAC 5-1]
- C.5 Fugitive Dust Emissions [326 IAC 6-4]
- C.6 Operation of Equipment [326 IAC 2-7-6(6)]
- C.7 Asbestos Abatement [326 IAC 14-10] [326 IAC 18] [40 CFR 61, Subpart M]
- C.8 Performance Testing [326 IAC 3-6] [326 IAC 2-1.1-11]
- C.9 Compliance Requirements [326 IAC 2-1.1-11]
- C.10 Compliance Monitoring [326 IAC 2-7-5(3)] [326 IAC 2-7-6(1)]
- C.11 Monitoring Methods [326 IAC 3] [40 CFR 60] [40 CFR 63]
- C.12 Instrument Specifications [326 IAC 2-1.1-11] [326 IAC 2-7-5(3)] [326 IAC 2-7-6(1)]
- C.13 Compliance Response Plan (CRP) - Preparation, Implementation, Records and Reports
[326 IAC 2-7-5] [326 IAC 2-7-6]
- C.14 Deviations from Permit Requirements and Conditions [326 IAC 2-7-5(3)(C)(ii)]
- C.15 Emergency Provisions [326 IAC 2-7-16]
- C.16 Actions Related to Noncompliance Demonstrated by a Stack Test [326 IAC 2-7-5]
[326 IAC 2-7-6]
- C.17 Emission Statement [326 IAC 2-7-5(3)(C)(iii)] [326 IAC 2-7-5(7)]
[326 IAC 2-7-19(c)] [326 IAC 2-6]
- C.18 General Record Keeping Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-6]
- C.19 General Reporting Requirements [326 IAC 2-7-5(3)(C)]
- C.20 Part 2 Maximum Achievable Control technology (MACT) Application

D.1 FACILITY OPERATION CONDITIONS

- Emission Limitations and Standards [326 IAC 2-7-5(1)]**
 - D.1.1 Vacuum Degasser PSD BACT Limits [326 IAC 2-2]
 - D.1.2 Operational Flexibility [326 IAC 2-2]
 - D.1.3 Flare (12 MMBTU/hour) PSD BACT Limits [326 IAC 2-2]
 - D.1.4 Preventive Maintenance Plan (PMP) [326 IAC 2-7-5(13)]
 - D.1.5 Control Equipment Operation [326 IAC 2-2]
- Compliance Determination Requirements [326 IAC 2-1.1-11]**
 - D.1.6 Testing Requirements [326 IAC 2-7-6(1),(6)] [326 IAC 2-1.1-11] [326 IAC 2-2]
- Compliance Monitoring Requirements [326 IAC 2-7-6(1)] [326 IAC 2-7-5(1)]**
 - D.1.7 Flare Operating Parameters [326 IAC 2-7-5] [326 IAC 2-7-6]

Record Keeping and Reporting Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

D.1.8 Record Keeping Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

D.1.9 Vendor Certification [326 IAC 2-2]

D.2 FACILITY OPERATION CONDITIONS

Emission Limitations and Standards [326 IAC 2-7-5(1)]

D.2.1 Boiler No. 501 PSD BACT Limits [326 IAC 2-2]

D.2.2 General Provisions Relating to NSPS and NESHAP [326 IAC 12-1][40 CFR Part 60, Subpart A] [326 IAC 20-1-1] [40 CFR Part 63, Subpart A]

D.2.3 National Emission Standards for Hazardous Air Pollutants (NESHAP) for Industrial, Commercial, and Institutional Boilers and Process Heaters [40 CFR Part 63, Subpart DDDDD]

D.2.4 Startup, Shutdown or Malfunction Plan (SSMP) [40 CFR Part 63, Subpart DDDDD]

D.2.5 Preventive Maintenance Plan (PMP) [326 IAC 2-7-5(13)]

Compliance Determination Requirements [326 IAC 2-1.1-11]

D.2.6 Low NO_x Burners [326 IAC 2-2]

Compliance Monitoring Requirements [326 IAC 2-7-6(1)] [326 IAC 2-7-5(1)]

D.2.7 Initial Compliance [40 CFR Part 63, Subpart DDDDD]

D.2.8 Continuous Compliance [40 CFR Part 63, Subpart DDDDD]

Record Keeping and Reporting Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

D.2.9 Initial Notification [40 CFR 63, Subpart DDDDD]

D.2.10 Record Keeping Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

D.2.11 Vendor Certification [326 IAC 2-2]

D.2.12 Reporting Requirements [326 IAC 2-1.1-11] [40 CFR 60.276a]

D.3 FACILITY OPERATION CONDITIONS

Emission Limitations and Standards [326 IAC 2-7-5(1)]

D.3.1 Ladle Preheater PSD BACT Limits [326 IAC 2-2]

D.3.2 Cooling Towers PSD BACT Limits [326 IAC 2-2]

D.3.3 Alloy Handling PSD BACT Limits [326 IAC 2-2]

D.3.4 Preventive Maintenance Plan (PMP) [326 IAC 2-7-5(13)]

Compliance Determination Requirements [326 IAC 2-1.1-11]

D.3.5 Low NO_x Burner [326 IAC 2-2]

D.3.6 Control Operation [326 IAC 2-2]

Compliance Monitoring Requirements [326 IAC 2-7-6(1)] [326 IAC 2-7-5(1)]

None

Record Keeping and Reporting Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

D.3.7 Vendor Certification [326 IAC 2-2]

D.3.8 Record Keeping Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

Certification

Quarterly Deviation and Compliance Monitoring Report

Emergency Occurrence Report

Semiannual Natural Gas Fired Boiler Certification

Semiannual Compliance Report (40 CFR Part 63, Subpart DDDDD)

SECTION A SOURCE SUMMARY

This approval is based on information requested by the Indiana Department of Environmental Management (IDEM), Office of Air Quality (OAQ). The information describing the emission units contained in conditions A.1 through 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 approval pursuant to 326 IAC 2, or change other applicable requirements presented in the permit application.

A.1 General Information [326 IAC 2-7-4(c)] [326 IAC 2-7-5(15)]

The Permittee owns and operates a stationary steel mini-mill that produces all grades of carbon and stainless steel, all grades of alloy steel, all grades of ultra low and low carbon steel, flat rolled, hot rolled, cold rolled, galvanized, pickled and oiled steel (slabs, sheets) products.

Source Name:	Nucor Steel
Source Location:	4537 South Nucor Street, Crawfordsville, IN 47933
Mailing Address:	4537 South Nucor Street, Crawfordsville, IN 47933 RR2, Box 311, Crawfordsville, IN 47933
General Telephone Number:	765-364-1323
General Facsimile Number:	765-364-5311
Responsible Official:	General Manager
County Location:	Montgomery
SIC Code:	3312 (Steel Mill)
Source Categories:	1 of 28 Listed Source Categories Major PSD Source Major Source, CAA Section 112

A.2 Emission Units and Pollution Control Equipment Summary [326 IAC 2-7-4(c)(3)] [326 IAC 2-7-5(15)]

This stationary source is approved to construct, modify and operate the following emission units and pollution control devices:

- (1) One (1) vacuum degasser with process gas lances. This vacuum degasser has a maximum capacity of 135 tons of steel/hour. This vacuum degasser will be used to remove entrained gases from the steel. **Desulfurization and/or decarburization may also occur during the degassing process.**

This vacuum degasser will use an **open** flare to control carbon monoxide (CO) emissions. The **open** flare **burner** has a maximum capacity of 12 MMBTU/hour, uses natural gas as primary fuel with propane as back up fuel, and operates within the temperature range of 1,400 to 1,600 °F. Controlled emissions will exhaust through a stack identified as Stack 500.

The maximum capacity of the vacuum degasser is the same as the ladle metallurgical station (LMS) and Caster in the Castrip Line.

- (2) One (1) natural gas fueled low NO_x boiler, rated at 71.04 million British Thermal Unit per hour (MMBTU/hour). This boiler, identified as Boiler No. 501, will provide steam to the vacuum degasser. Propane will be used as back up fuel. Emissions from this boiler will exhaust through a stack identified as Stack 501.
- (3) One (1) natural gas fueled ladle preheater, rated at 12 MMBTU/hour. Propane will be used as back up fuel. Emissions from the ladle preheater will exhaust through roof monitor (S-21, also identified as 105,106). Some emissions of this ladle preheater may also exhaust through the Castrip LMS Baghouse stack S-20.

The addition of this ladle preheater will result in a total of 3 ladle preheaters for the Castrip Line.

- (4) One (1) contact cooling tower, rated at 8,000 gallons/minute, with drift/mist eliminators for particulate control. Emissions from this cooling tower will exhaust through stacks identified as Stack 502 and Stack 503.
- (5) One (1) noncontact cooling tower, rated at 8,000 gallons/minute, with drift/mist eliminators for particulate control. Emissions from this cooling tower will exhaust from stacks identified as Stack 504 and Stack 505.
- (6) Chemical storage tanks for sulfuric or similar acid, sodium hypochlorite or similar disinfectant, caustic, polymer, and phosphate.
- (7) Associated alloy unloading, storage and feed systems:
 - (a) One (1) truck dump station
 - (b) Truck unloading/conveyors
 - (c) Eight (8) storage hoppers, all exhausting to a common bin vent, rated at 0.01 grains/dry standard cubic foot, into the building.

Alloy unloading is performed in a 3-sided building along the side of the existing Castrip building.

A.3 Part 70 Permit Applicability [326 IAC 2-7-2]

This stationary source is required to have a Part 70 permit by 326 IAC 2-7-2 (Applicability) because:

- (a) It is a major source, as defined in 326 IAC 2-7-1(22);
- (b) It is a source in a source category designated by the United States Environmental Protection Agency (US EPA) under 40 CFR 70.3 (Part 70 - Applicability).

SECTION B GENERAL CONSTRUCTION CONDITIONS

B.1 Definitions [326 IAC 2-7-1]

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 2-7) shall prevail.

B.2 Effective Date of the Permit [IC13-15-5-3]

Pursuant to IC 13-15-5-3, this permit becomes effective upon its issuance.

B.3 Revocation of Permits [326 IAC 2-2-8]

Pursuant to 326 IAC 2-2-8(a)(1), this permit to construct shall expire if construction is not commenced within eighteen (18) months after receipt of this approval, if construction is discontinued for a period of eighteen (18) months or more, or if construction is not completed within a reasonable time. The IDEM may extend the eighteen (18) month period upon satisfactory showing that an extension is justified.

B.4 Significant Source Modification [326 IAC 2-7-10.5(h)]

This document shall also become the approval to operate pursuant to 326 IAC 2-7-10.5(h) when, prior to start of operation, the following requirements are met:

- (a) The attached affidavit of construction shall be submitted to the Office of Air Quality (OAQ), verifying that the emission units were constructed or modified as proposed in the application or the permit. The emissions units covered in the Significant Source Modification approval may begin operating on the date the affidavit of construction is postmarked or hand delivered to IDEM if constructed as proposed.

If construction is completed in phases: i.e.: the entire construction is not done continuously, a separate affidavit must be submitted for each phase of construction. Any permit conditions associated with operation start up dates such as stack testing for NSPS shall be applicable for to each individual phase.

- (b) If actual construction or modification of the emissions units differs from the construction or modification proposed in the application or the permit in a manner that is regulated under the provisions of 326 IAC 2-2, the Permittee may not begin operation until the source modification has been revised pursuant to the provisions of that rule and the provisions of 326 IAC 2-1.1-6 and an Operation Permit Validation Letter is issued.
- (c) If actual construction of the emissions units differs from the construction proposed in the application or the permit in a manner that is not regulated under the provisions of 326 IAC 2-2, the Permittee may not begin operation until the source modification has been revised pursuant to the provisions of that rule and the provisions of 326 IAC 2-7-11 or 326 IAC 2-7-12 and an Operation Permit Validation Letter is issued.
- (d) The Permittee shall attach the Operation Permit Validation Letter received from the OAQ.

- (e) The changes covered by the Significant Source Modification will be included in the Title V draft.
- (f) In the event that the Part 70 application is being processed at the same time as this application, the following additional procedures shall be followed for obtaining the right to operate:
 - (i) If the Part 70 draft permit has not gone on public notice, then the change/addition covered by the Significant Source Modification will be included in the Part 70 draft.
 - (ii) If the Part 70 permit has gone through final EPA proposal and would be issued ahead of the Significant Source Modification, the Significant Source Modification will go through a concurrent 45 day EPA review. Then the Significant Source Modification will be incorporated into the final Part 70 permit at the time of issuance.
 - (iii) If the Part 70 permit has gone through public notice, but has not gone through final EPA review and would be issued after the Significant Source Modification is issued, then the Modification would be added to the proposed Part 70 permit, and the Title V permit will issued after EPA review.

B.5 General Provisions and NSPS Reporting [326 IAC 12-1][40 CFR Part 60, Subpart A]

- (a) The provisions of 40 CFR Part 60, Subpart A (General Provisions), which are incorporated by reference in 326 IAC 12-1, apply to Boiler No. 501.
- (b) Pursuant to the New Source Performance Standards (NSPS), 40 CFR Subpart Dc, the Permittee shall report the following at the appropriate times:
 - (i) Commencement of construction date (no later than 30 days after such date) of Boiler No. 501. [40 CFR 60.7a(10)]
 - (ii) Actual start-up date (within 15 days after such date) of Boiler No. 501. [40 CFR 60.7a(3)]
 - (iii) Date of performance testing (at least 30 days prior to such date), when required by a condition elsewhere in this permit.

Reports are to be sent to:

Indiana Department of Environmental Management
Compliance Branch, Office of Air Quality
100 North Senate Avenue, P. O. Box 6015
Indianapolis, IN 46206-6015

The application and enforcement of these standards have been delegated to the IDEM, OAQ. The requirements of 40 CFR Part 60 are also federally enforceable.

SECTION C	GENERAL OPERATION CONDITIONS
------------------	-------------------------------------

C.1 Certification [326 IAC 2-7-4(f)][326 IAC 2-7-6(1)][326 IAC 2-7-5(3)(C)]

- (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 a responsible official 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.
- (c) A responsible official is defined at 326 IAC 2-7-1(34).

C.2 Preventive Maintenance Plan (PMP) [326 IAC 2-7-5(1),(3) and (13)] [326 IAC 2-7-6(1) and (6)] [326 IAC 1-6-3]

- (a) If required by specific condition(s) in Section D of this permit, the Permittee shall prepare, maintain and implement Preventive Maintenance Plans (PMPs) upon start up of the new emission units, including the following information on each facility:
 - (i) Identification by jobs or titles of the individual(s) responsible for inspecting, maintaining, and repairing emission control devices;
 - (ii) A description of the items or conditions that will be inspected and the inspection schedule for said items or conditions; and
 - (iii) Identification and quantification of the replacement parts that will be maintained in inventory for quick replacement.
- (b) The Permittee shall implement the PMPs, including any required record keeping, as necessary to ensure that failure to implement a PMP does not cause or contribute to an exceedance of any limitation on emissions or potential to emit.
- (c) 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 PMP does not require the certification by the responsible official as defined by 326 IAC 2-7-1(34).
- (d) To the extent the Permittee is required by 40 CFR Part 60 or 40 CFR 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.

C.3 Permit Amendment or Modification [326 IAC 2-7-11] [326 IAC 2-7-12]

- (a) Permit amendments and modifications are governed by the requirements of 326 IAC 2-7-11 or 326 IAC 2-7-12 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, P.O. Box 6015
Indianapolis, Indiana 46206-6015

Any such application shall be certified by the responsible official as defined by 326 IAC 2-7-1(34).
- (c) The Permittee may implement administrative amendment changes addressed in the request for an administrative amendment immediately upon submittal of the request. [326 IAC 2-7-11(c)(3)]
- (d) No permit amendment or modification is required for the addition, operation or removal of a nonroad engine, as defined in 40 CFR 89.2.

C.4 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.

326 IAC 5-1-2 (Opacity Limitations) is not federally enforceable.

C.5 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).

326 IAC 6-4-2(4) is not federally enforceable.

C.6 Operation of Equipment [326 IAC 2-7-6(6)]

Except as otherwise provided by statute or rule, or in this permit, all air pollution control equipment listed in this permit and used to comply with an applicable requirement shall be operated at all times that the emission units vented to the control equipment are in operation.

C.7 Asbestos Abatement Projects [326 IAC 14-10] [326 IAC 18] [40 CFR 61, Subpart M]

The Permittee shall comply with the applicable requirements of 326 IAC 14-10, 326 IAC 18, and 40 CFR 61.140.

Testing Requirements [326 IAC 2-7-6(1)]

C.8 Performance Testing [326 IAC 3-6][326 IAC 2-1.1-11]

- (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, P. O. Box 6015
Indianapolis, Indiana 46206-6015
- no later than thirty-five (35) days prior to the intended test date. The protocol submitted by the Permittee does not require certification by the responsible official as defined by 326 IAC 2-7-1(34).
- (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 the responsible official as defined by 326 IAC 2-7-1(34).
- (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.9 Compliance Requirements [326 IAC 2-1.1-11]

- (a) 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.
- (b) Any monitoring or testing shall be performed in accordance with 326 IAC 3 or other methods approved by the commissioner or the US EPA.

Compliance Monitoring Requirements [326 IAC 2-7-5(1)] [326 IAC 2-7-6(1)]

C.10 Compliance Monitoring [326 IAC 2-7-5(3)] [326 IAC 2-7-6(1)]

Except as otherwise provided in Section D, all monitoring and record keeping requirements, as required in Section D, shall be implemented when operation begins. The Permittee shall be responsible for installing any necessary equipment and initiating any required monitoring related to that equipment.

C.11 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.12 Instrument Specifications [326 IAC 2-1.1-11] [326 IAC 2-7-5(3)] [326 IAC 2-7-6(1)]

Whenever a condition in this permit requires the measurement of a temperature, the instrument employed shall have a scale such that the expected normal reading shall be no less than twenty percent (20%) of full scale and be accurate within plus or minus two percent (± 2%) of full scale reading.

Corrective Actions and Reasonable Response Steps [326 IAC 2-7-5] [326 IAC 2-7-6]

C.13 Compliance Response Plan (CRP) - Preparation, Implementation, Records, and Reports
[326 IAC 2-7-5] [326 IAC 2-7-6]

- (a) The Permittee is required to prepare a Compliance Response Plan (CRP) for each compliance monitoring condition of this permit.

A CRP shall be submitted to IDEM, OAQ upon request.

The CRP shall be prepared, prior to the start up operation of the modified units, by the Permittee, supplemented from time to time by the Permittee, maintained on site, and comprised of:

- (i) Reasonable response steps that may be implemented in the event that a **reasonable** response step is needed pursuant to the requirements of Section D of this permit; and an expected timeframe for taking reasonable response steps.
- (ii) If, at any time, the Permittee takes reasonable response steps that are not set forth in the Permittee's current Compliance Response Plan and the Permittee documents such response in accordance with subsection (e) below, the Permittee shall amend its Compliance Response Plan to include such **reasonable** response steps taken.

If a Permittee is required to have an Operation, Maintenance and Monitoring (OMM) Plan or Parametric Monitoring Plan and Start-up, Shutdown, and Malfunction (SSM) Plan under 40 CFR 60 or 40 CFR 63 , such plans shall be deemed to satisfy the requirements for a CRP for those compliance monitoring conditions.

- (b) For each compliance monitoring condition of this permit, reasonable response steps shall be taken when indicated by the provisions of that compliance monitoring condition as follows:
- (i) Reasonable response steps shall be taken as set forth in the Permittee's current Compliance Response Plan or Operation, Maintenance and Monitoring (OMM) Plan or Parametric Monitoring Plan and Start-up, Shutdown, and Malfunction (SSM) Plan; or
 - (ii) If none of the reasonable response steps listed in the Compliance Response Plan or Operation, Maintenance and Monitoring (OMM) Plan or Parametric Monitoring Plan and Start-up, Shutdown, and Malfunction (SSM) Plan is applicable or responsive to the excursion, the Permittee shall devise and implement additional **reasonable** response steps as expeditiously as practical. Taking such additional **reasonable** response steps shall not be considered a deviation from this permit so long as the Permittee documents such **reasonable** response steps in accordance with this condition.

- (iii) If the Permittee determines that additional reasonable response steps would necessitate that the emissions unit or control device be shut down, and it will be ten (10) days or more until the unit or device will be shut down, then the Permittee shall promptly notify the IDEM, OAQ of the expected date of the shut down. The notification shall also include the status of the applicable compliance monitoring parameter with respect to normal, and the results of the response actions taken up to the time of notification.
- (iv) Failure to take reasonable response steps shall be considered a deviation from the permit.

The OMM Plan or Parametric Monitoring and SMM Plan shall be submitted (as applicable) within the time frames specified by the applicable 40 CFR 60 or 40 CFR 63 requirement.

- (c) The Permittee is not required to take any further reasonable response steps for any of the following reasons:
 - (i) A false reading occurs due to the malfunction of the monitoring equipment and prompt action was taken to correct the monitoring equipment.
 - (ii) The Permittee has determined that the compliance monitoring parameters established in the permit conditions are technically inappropriate, has previously submitted a request for a minor permit modification to the permit, and such request has not been denied.
 - (iii) An automatic measurement was taken when the process was not operating.
 - (iv) The process has already returned or is returning to operating within normal parameters and no reasonable response steps are required.
- (d) When implementing reasonable steps in response to a compliance monitoring condition, if the Permittee determines that an exceedance of an emission limitation has occurred, the Permittee shall report such deviations pursuant to Section C-Deviations from Permit Requirements and Conditions.
- (e) The Permittee shall record all instances when, in accordance with Section D, reasonable response steps are taken. In the event of an emergency, the provisions of 326 IAC 2-7-16 (Emergency Provisions) requiring prompt corrective action to mitigate emissions shall prevail.
- (f) Except as otherwise provided by a rule or provided specifically in Section D, all monitoring as required in Section D shall be performed when the emission unit is operating, except for time necessary to perform quality assurance and maintenance activities.

C.14 Deviations from Permit Requirements and Conditions [326 IAC 2-7-5(3)(C)(ii)]

- (a) Deviations from any permit requirements (for emergencies see Section C.15 - Emergency Provisions), the probable cause of such deviations, and any reasonable response steps or preventive measures taken shall be reported to:

Indiana Department of Environmental Management
Compliance Data Section, Office of Air Quality
100 North Senate Avenue, P.O. Box 6015
Indianapolis, Indiana 46206-6015

using the attached Quarterly Deviation and Compliance Monitoring Report, or its equivalent. A deviation required to be reported pursuant to an applicable requirement that exists independent of this permit, shall be reported according to the schedule stated in the applicable requirement and does not need to be included in this report.

The Quarterly Deviation and Compliance Monitoring Report does require the certification by the responsible official as defined by 326 IAC 2-7-1(34).

- (b) A deviation is an exceedance of a permit limitation or a failure to comply with a requirement of the permit.

C.15 Emergency Provisions [326 IAC 2-7-16]

- (a) An emergency, as defined in 326 IAC 2-7-1(12), is not an affirmative defense for an action brought for noncompliance with a federal or state health-based emission limitation.
- (b) An emergency, as defined in 326 IAC 2-7-1(12), constitutes an affirmative defense to an action brought for noncompliance with a technology-based emission limitation if the affirmative defense of an emergency is demonstrated through properly signed, contemporaneous operating logs or other relevant evidence that describe the following:
 - (i) An emergency occurred and the Permittee can, to the extent possible, identify the causes of the emergency;
 - (ii) The permitted facility was at the time being properly operated;
 - (iii) During the period of an emergency, the Permittee took all reasonable steps to minimize levels of emissions that exceeded the emission standards or other requirements in this permit;
 - (iv) For each emergency lasting one (1) hour or more, the Permittee notified IDEM, OAQ, within four (4) daytime business hours after the beginning of the emergency, or after the emergency was discovered or reasonably should have been discovered;

Telephone Number: 1-800-451-6027 (ask for Office of Air Quality, Compliance Section),

or

Telephone Number: 317-233-5674 (ask for Compliance Section)

Facsimile Number: 317-233-5967

- (v) For each emergency lasting one (1) hour or more, the Permittee submitted the attached Emergency Occurrence Report Form or its equivalent, either by mail or facsimile to:

Indiana Department of Environmental Management
Compliance Branch, Office of Air Quality

100 North Senate Avenue, P. O. Box 6015
Indianapolis, Indiana 46206-6015

within two (2) working days of the time when emission limitations were exceeded due to the emergency.

The notice fulfills the requirement of 326 IAC 2-7-5(3)(C)(ii) and must contain the following:

- (A) A description of the emergency;
- (B) Any steps taken to mitigate the emissions; and
- (C) Corrective actions taken.

The notification which shall be submitted by the Permittee does not require the certification by the responsible official as defined by 326 IAC 2-7-1(34).

- (vi) The Permittee immediately took all reasonable steps to correct the emergency.
- (c) In any enforcement proceeding, the Permittee seeking to establish the occurrence of an emergency has the burden of proof.
- (d) This emergency provision supersedes 326 IAC 1-6 (Malfunctions). This permit condition is in addition to any emergency or upset provision contained in any applicable requirement.
- (e) IDEM, OAQ may require that the Preventive Maintenance Plans required under 326 IAC 2-7-4-(c)(9) be revised in response to an emergency.
- (f) Failure to notify IDEM, OAQ, by telephone or facsimile of an emergency lasting more than one (1) hour in accordance with (b)(4) and (5) of this condition shall constitute a violation of 326 IAC 2-7 and any other applicable rules.
- (g) If the emergency situation causes a deviation from a technology-based limit, the Permittee may continue to operate the affected emitting facilities during the emergency provided the Permittee immediately takes all reasonable steps to correct the emergency and minimize emissions.
- (h) The Permittee shall include all emergencies in the Quarterly Deviation and Compliance Monitoring Report.

C.16 Actions Related to Noncompliance Demonstrated by a Stack Test [326 IAC 2-7-5]
[326 IAC 2-7-6]

- (a) When the results of a stack test performed in conformance with Section C.8 - 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 and 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 noncompliance stack tests.

The response action documents submitted pursuant to this condition do require the certification by the responsible official as defined by 326 IAC 2-7-1(34).

Record Keeping and Reporting Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

C.17 Emission Statement [326 IAC 2-7-5(3)(C)(iii)][326 IAC 2-7-5(7)][326 IAC 2-7-19(c)] [326 IAC 2-6]

- (a) The Permittee shall submit an emission statement certified pursuant to the requirements of 326 IAC 2-6. This statement must be received in accordance with the compliance schedule specified in 326 IAC 2-6-3 and must comply with the minimum requirements specified in 326 IAC 2-6-4. The submittal should cover the period identified in 326 IAC 2-6. The emission statement shall meet the following requirements:
 - (i) Indicate estimated actual emission of pollutants from the source, in compliance with 326 IAC 2-6 (Emission Reporting);
 - (ii) Indicate estimated actual emissions of regulated pollutants (as defined by 326 IAC 2-7-1 (32) ("Regulated pollutant, which is used only for purposes of Section 19 of this rule") from the source, for purpose of fee assessment.

The statement must be submitted to:

Indiana Department of Environmental Management
Technical Support and Modeling Section, Office of Air Quality
100 North Senate Avenue, P.O. Box 6015
Indianapolis, Indiana 46206-6015

The emission statement does require the certification by the responsible official as defined by 326 IAC 2-1.1-1(1).

- (b) The emission statement 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.18 General Record Keeping Requirements [326 IAC 2-7-5(3)][326 IAC 2-7-6]

- (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.19 General Reporting Requirements [326 IAC 2-7-5(3)(C)]

- (a) The Permittee shall submit the attached Quarterly Deviation and Compliance Monitoring Report or its equivalent. Any deviation from permit requirements, the date(s) of each deviation, the cause of the deviation, and the **reasonable** response steps taken must be reported. This report shall be submitted within thirty (30) days of the end of the reporting period.

The Quarterly Deviation and Compliance Monitoring Report shall include the certification by the responsible official as defined by 326 IAC 2-7-1(34).

- (b) The report required in (a) of this condition and 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, P. O. Box 6015
Indianapolis, Indiana 46206-6015

- (c) 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.
- (d) 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 the responsible official as defined by 326 IAC 2-7-1(34).
- (e) 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.
- (f) Reporting periods are based on calendar years.

C.20 Part 2 Maximum Achievable Control technology (MACT) Application

Pursuant to the application Requirements for Section 112(j) of the Clean Air Act [40 CFR 63.52(e)] [40 CFR 63.56(a)] [40 CFR 63.9(b)] [326 IAC 2-7-12]

- (a) The Permittee shall submit a Part 2 Maximum Achievable Control technology (MACT) Application in accordance with 40 CFR 63.52(e)(1). The Part 2 MACT Application shall meet the requirements of 40 CFR 63.53(b).
- (b) Notwithstanding paragraph (a), the Permittee is not required to submit a Part 2 MACT Application if the Permittee no longer meets the applicability criteria of 40 CFR 63.50 by the application deadline in 40 CFR 63.52(e)(1). For example, the Permittee would not have to submit a Part 2 MACT Application if, by the application deadline:

- (i) The source is no longer a major source of hazardous air pollutants, as defined in 40 CFR 63.2;
 - (ii) The MACT standard or standards for the affected source categories included at the source are promulgated.
- (c) Notwithstanding paragraph (a), pursuant to 40 CFR 63.56(a), the Permittee shall comply with an applicable promulgated MACT standard in accordance with the schedule provided in the MACT standard if the MACT standard is promulgated prior to the Part 2 MACT Application deadline or prior to the issuance of permit with a case-by-case Section 112(j) MACT determination. The MACT requirements include the applicable General Provisions requirements of 40 CFR 63, Subpart A. Pursuant to 40 CFR 63.9(b), the Permittee shall submit an initial notification not later than 120 days after the effective date of the MACT, unless the MACT specifies otherwise. The initial notification shall be submitted to:

Indiana Department of Environmental Management
Compliance Data Section, Office of Air Quality
100 North Senate Avenue, P.O. Box 6015
Indianapolis, Indiana 46206-6015

and

United States Environmental Protection Agency, Region V
Director, Air and Radiation Division
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

SECTION D.1 FACILITY OPERATION CONDITIONS

Facility Description [326 IAC 2-7-5(15)]

One (1) vacuum degasser with process gas lances. This vacuum degasser has a maximum capacity of 135 tons of steel/hour. This vacuum degasser will be used to remove entrained gases from the steel. **Desulfurization and/or decarburization may also occur during the degassing process.**

This vacuum degasser will use an **open** flare to control carbon monoxide (CO) emissions. The **open flare burner** has a maximum capacity of 12 MMBTU/hour, uses natural gas as primary fuel with propane as back up fuel, and operates within the temperature range of 1,400 to 1,600 °F. Controlled emissions will exhaust through a stack identified as Stack 500.

The maximum capacity of the vacuum degasser is the same as the ladle metallurgical station (LMS) and Caster in the Castrip Line.

(The information describing the process contained in this facility description box is descriptive information and does not constitute enforceable conditions.)

Emission Limitations and Standards [326 IAC 2-7-5(1)]

D.1.1 Vacuum Degasser PSD BACT Limits [326 IAC 2-2]

Pursuant to 326 IAC 2-2 Prevention of Significant Deterioration (PSD), the Permittee shall comply with the following Best Available Control Technology (BACT) requirements:

- (a) The carbon monoxide (CO) emissions from the vacuum degasser shall be controlled by a flare that uses natural gas as primary fuel, and propane as back up fuel.
- (b) The carbon monoxide (CO) emissions from the vacuum degasser shall not exceed 0.075 pounds per ton of steel, and 10.125 pounds per hour, based on a 3-hour block average.
- (c) The sulfur dioxide (SO₂) emissions from the vacuum degasser shall not exceed 0.02 pounds per ton of steel, and 2.7 pounds per hour, based on a 3-hour block average.
- (d) The nitrogen oxides (NO_x) emissions from the vacuum degasser shall not exceed 0.005 pounds per ton of steel, and 0.675 pounds per hour, based on a 3-hour block average.
- (e) The volatile organic compound (VOC) emissions from the vacuum degasser shall not exceed 0.005 pounds per ton of steel, and 0.675 pounds per hour, based on a 3-hour block average.
- (f) The particulate emissions from the vacuum degasser shall not exceed 0.008 grain per dry standard cubic foot, and 0.45 pounds per hour, based on a 3-hour block average.
- (g) The opacity from the vacuum degasser open **flare stack** (Stack 500) shall not exceed 3% opacity, based on a six-minute average.

D.1.2 Operational Flexibility [326 IAC 2-2]

Pursuant to 326 IAC 2-2 Prevention of Significant Deterioration (PSD), the Permittee may operate the vacuum degasser as follows:

- (a) The gases can be removed from the steel after the steel has gone through the Castrip Ladle Metallurgical Station (LMS).
Or
- (b) The gases can be removed from the steel before the steel goes through the Castrip Ladle Metallurgical Station (LMS).
Or
- (c) The gases can be removed from the steel and the steel sent back to the Meltshop Continuous Casters for casting.
Or
- (d) The steel may bypass the vacuum degassing process.

D.1.3 Flare (12 MMBTU/hour) PSD BACT Limits [326 IAC 2-2]

Pursuant to 326 IAC 2-2 Prevention of Significant Deterioration (PSD), the Permittee shall comply with the following Best Available Control Technology (BACT) requirements:

- (a) The 12 million British Thermal Unit per hour (MMBTU/hour) open flare burner shall use natural gas as primary fuel and propane as back up fuel.
- (b) The collateral nitrogen oxide (NO_x) emissions from the 12 MMBTU/hour flare burner shall not exceed 0.10 pounds per MMBTU.
- (c) The collateral sulfur dioxide (SO₂) emissions from the 12 MMBTU/hour flare burner shall not exceed 0.0006 pounds per MMBTU.
- (d) The collateral carbon monoxide (CO) emissions from the 12 MMBTU/hour flare burner shall not exceed 0.084 pounds per MMBTU.
- (e) The collateral volatile organic compound (VOC) emissions from the 12 MMBTU/hour flare burner shall not exceed 0.0055 pounds per MMBTU.
- (f) The collateral PM_(filterable) emissions from the 12 MMBTU/hour flare burner shall not exceed 0.0019 pounds per MMBTU.
- (g) The collateral PM_{10 (filterable and condensable)} emissions from the 12 MMBTU/hour flare burner shall not exceed 0.0076 pounds per MMBTU.

D.1.4 Preventive Maintenance Plan (PMP) [326 IAC 2-7-5(13)]

A Preventive Maintenance Plan (PMP), in accordance with Section C - Preventive Maintenance Plan (PMP), of this permit, is required for the vacuum degasser and its flare.

Compliance Determination Requirements [326 IAC 2-1.1-11]

D.1.5 Control Equipment Operation [326 IAC 2-2]

The flare shall be in operation and control carbon monoxide (CO) emissions at all times when the vacuum degasser is in operation.

D.1.6 Testing Requirements [326 IAC 2-7-6(1),(6)] [326 IAC 2-1.1-11] [326 IAC 2-2]

(a) Within 60 days after achieving maximum production rate, but no later than 180 days after initial start-up of the vacuum degasser and open flare, the Permittee shall determine:

- (i) either the heat content and the maximum tip velocity specifications of the open flare,
- (ii) or the maximum and actual exit velocity specifications of the open flare.

(A) The net heating value of the gas being combusted in the flare shall be calculated using the following equation:

$$H_T = K \sum_{i=1}^n C_i H_i$$

where:

HT = Net heating value of the sample, MJ/scm; where the net enthalpy per mole of offgas is based on combustion at 25 °C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20 °C.

$$K = \text{Constant} \cdot 1.740 \times 10^{-7} \left(\frac{1}{\text{ppm}} \right) \left(\frac{\text{g mole}}{\text{scm}} \right) \left(\frac{\text{MJ}}{\text{kcal}} \right)$$

where the standard temperature for $\left(\frac{\text{g mole}}{\text{scm}} \right)$ is 20°C;

Ci = Concentration of sample component i in ppm on a wet basis, as measured for organics by Reference Method 18 and measured for hydrogen and carbon monoxide by ASTM D1946-77 or 90 (Reapproved 1994).

Hi= Net heat of combustion of sample component i, kcal/g mole at 25 °C and 760 mm Hg. The heats of combustion may be determined using ASTM D2382-76 or 88 or D4809-95 if published values are not available or cannot be calculated.

(B) The maximum permitted velocity of the flare shall be determined by the following equation:

$$V_{\max} = (XH2-K1)* K2$$

Where:

V_{max} = Maximum permitted velocity, m/sec.

K1=Constant, 6.0 volume-percent hydrogen.

K2=Constant, 3.9(m/sec)/volume-percent hydrogen.

XH2 = The volume-percent of hydrogen, on a wet basis, as calculated by using the American Society for Testing and Materials (ASTM) Method D1946–77.

- (C) The actual exit velocity of the flare shall be determined by dividing the volumetric flowrate (in units of standard temperature and pressure), as determined by Reference Methods 2, 2A, 2C, or 2D as appropriate; by the unobstructed (free) cross sectional area of the flare tip.
- (b) The determinations of either the heat content and the maximum tip velocity specifications of the open flare or the maximum and actual exit velocity specifications of the open flare shall be repeated at least once every 5 years from the date of a valid compliance demonstration.
- (c) These tests or determinations shall be performed using methods as approved by the Commissioner.
- (d) Testing shall be conducted in accordance with Section C - Performance Testing.

Compliance Monitoring Requirements [326 IAC 2-7-6(1)] [326 IAC 2-7-5(1)]

D.1.1.7. Flare Operating Parameters [326 IAC 2-7-5] [326 IAC 2-7-6]

- (a) The flare for the carbon monoxide (CO) emissions reductions shall be operated with a flame present at all times when the vacuum degasser is in operation.
- (b) The presence of a flare pilot flame shall be monitored using a thermocouple or any equivalent device to detect the presence of the flame.

Record Keeping and Reporting Requirement [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

D.1.8 Record Keeping Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

- (a) The Permittee shall maintain records required under 326 IAC 3-5-6 at the source in a manner that they may be inspected by the IDEM, OAQ, or the US EPA, if so requested or required.
- (b) The Permittee shall maintain records of the operating temperature of the flare, and make available upon request to IDEM, OAQ and the US EPA.
- (c) The Permittee shall maintain records of any additional inspections prescribed by the Preventive Maintenance Plan (PMP), and make available upon request to IDEM, OAQ and the US EPA.
- (d) Records necessary to demonstrate compliance shall be available within 30 days of the end of each compliance period.
- (e) All records shall be maintained in accordance with Section C - General Record Keeping Requirements of this permit.

SECTION D.2

FACILITY OPERATION CONDITIONS

Facility Description [326 IAC 2-7-5(15)]

One (1) natural gas fueled low NO_x boiler, rated at 71.04 million British Thermal Unit **per hour** (MMBTU/hour). This boiler, identified as Boiler No. 501, will provide steam to the vacuum degasser. Propane will be used as back up fuel. Emissions from this boiler will exhaust through a stack identified as Stack 501.

(The information describing the process contained in this facility description box is descriptive information and does not constitute enforceable conditions.)

Emission Limitations and Standards [326 IAC 2-7-5(1)]

D.2.1 Boiler No. 501 PSD BACT Limits [326 IAC 2-2]

Pursuant to 326 IAC 2-2 Prevention of Significant Deterioration (PSD), the Permittee shall comply with the following Best Available Control Technology (BACT) requirements:

- (a) Boiler No. 501 shall use natural gas as primary fuel and propane as backup fuel.
- (b) The nitrogen oxides (NO_x) emissions from Boiler No. 501 shall not exceed 0.035 pounds per MMBTU.
- (c) The carbon monoxide (CO) emissions from Boiler No. 501 shall not exceed 0.061 pounds per MMBTU.
- (d) The volatile organic compound (VOC) emissions from Boiler No. 501 shall not exceed 0.0026 pounds per MMBTU.
- (e) The sulfur dioxide (SO₂) emissions from Boiler No. 501 shall not exceed 0.0006 pounds per MMBTU.
- (f) The **PM/PM₁₀** (filterable and condensable) emissions from Boiler No. 501 shall not exceed 0.0076 pounds per MMBTU.

D.2.2 General Provisions Relating to NSPS and NESHAP

[326 IAC 12-1][40 CFR Part 60, Subpart A] [326 IAC 20-1-1] [40 CFR Part 63, Subpart A]

- (a) The provisions of 40 CFR Part 60, Subpart A (General Provisions), which are incorporated by reference in 326 IAC 12-1, apply to Boiler No. 501, except when otherwise specified in 40 CFR Part 60, Subpart Dc.
- (b) The provisions of 40 CFR Part 63, Subpart A (General Provisions), which are incorporated by reference in 326 IAC 20-1-1, apply to Boiler No. 501, except when otherwise specified in 40 CFR Part 63, Subpart DDDDD.

D.2.3 National Emission Standards for Hazardous Air Pollutants (NESHAP) for Industrial, Commercial, and Institutional Boilers and Process Heaters [40 CFR Part 63, Subpart DDDDD]

- (a) Boiler No. 501 is subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Industrial, Commercial, and Institutional Boilers and Process Heaters, (40 CFR 63, Subpart DDDDD), and considered a new affected source because Boiler No. 501 is going to be constructed after January 13, 2003 and will be use for manufacturing and processing to provide steam.
- (b) The definitions of 40 CFR 63, Subpart DDDDD at 40 CFR 63.7575 are applicable to Boiler No. 501.
- (c) Pursuant to 40 CFR Part 63.7500 and Table 1 to Subpart DDDDD, upon start up, the Permittee shall maintain the carbon monoxide (CO) emissions from Boiler No. 501 at or below an exhaust concentration of 400 parts per million (ppm) by volume on a dry basis corrected to 3% oxygen (3-run average for units less than 100 MMBTU/hour).

D.2.4 Startup, Shutdown or Malfunction Plan (SSMP) [40 CFR Part 63, Subpart DDDDD]

- (a) Pursuant 40 CFR Part 63.7505(e), the Permittee shall develop and implement a written startup, shutdown and malfunction plan (SSMP) for carbon monoxide (CO) according to the provisions of 40 CFR Part 63.6(e)(3).
- (b) Pursuant to 40 CFR Part 63.7540(c), during periods of startup, shutdown or malfunctions, the Permittee shall operate in accordance with the written SSMP.
- (c) Pursuant to 40 CFR Part 63.7540(d), deviations that occur during a period of startup, shutdown, or malfunction are not violations if the Permittee demonstrate that operations were in accordance with the written SSMP.

D.2.5 Preventive Maintenance Plan (PMP) [326 IAC 2-7-5(13)]

- (a) A Preventive Maintenance Plan (PMP), in accordance with Section C - Preventive Maintenance Plan (PMP), of this permit, is required for Boiler No. 501.
- (b) To the extent the Permittee is required by 40 CFR Part 63, Subpart DDDDD to have a Startup, Shutdown or Malfunction plan (SSMP) for Boiler No. 501, such SSM Plan is deemed to satisfy the PMP requirements of 326 IAC 1-6-3 for Boiler No. 501.

Compliance Determination Requirements [326 IAC 2-1.1-11]

D.2.6 Low NO_x Burners [326 IAC 2-2]

Pursuant to 326 IAC 2-2 Prevention of Significant Deterioration (PSD), the Permittee shall equip and operate Boiler No. 501 with natural gas fueled low NO_x burners and perform good combustion practices.

Compliance Monitoring Requirements [326 IAC 2-7-6(1)] [326 IAC 2-7-5(1)]

D.2.7 Initial Compliance [40 CFR Part 63, Subpart DDDDD]

Pursuant to 40 CFR Part 63.7530, the Permittee shall demonstrate initial compliance by conducting initial performance test for CO according to Table 5 of 40 CFR Part 63, Subpart DDDDD.

D.2.8 Annual Carbon Monoxide (CO) Performance Tests 40 CFR Part 63, Subpart DDDDD

Pursuant to 40 CFR Part 63.7515(a), the Permittee shall conduct a CO performance test on an annual basis. CO annual performance tests must be completed between 10 and 12 months after the previous performance test.

Record Keeping and Reporting Requirement [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

D.2.9 Initial Notification [40 CFR 63, Subpart DDDDD]

- (a) Pursuant to 40 CFR 63.7545(c), the Permittee shall submit an Initial Notification no later than 120 days after the initial startup of Boiler No. 501.
- (b) Pursuant to 40 CFR Part 63.7445(c)(1), the Initial Notification shall contain the information specified in 40 CFR 63.9(b).
- (c) The Initial Notification shall be submitted to:

Indiana Department of Environmental Management
Compliance Data Section, Office of Air Quality
100 North Senate Avenue, P.O. Box 6015
Indianapolis, Indiana 46206-6015

and

United States Environmental Protection Agency, Region V
Director, Air and Radiation Division
77 West Jackson Boulevard
Chicago, Illinois 60604-3590
- (d) The Initial Notification requires the certification by the responsible official as defined by 326 IAC 2-7-1(34).

D.2.10 Record Keeping Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

- (a) Pursuant to 40 CFR 63.7555(d)(1) and 40 CFR Part 60, Subpart Dc, the Permittee shall keep records of monthly fuel used by Boiler No. 501, including the types of fuel and amount used.
- (b) Pursuant to 40 CFR 63.7555(a)(1), the Permittee shall keep records of a copy of each notification and report to comply with 40 CFR Part 63, Subpart DDDDD, including all documentation supporting any Initial Notification or Notification of Compliance Status or semiannual compliance report.
- (c) Pursuant to 40 CFR Part 63.7555(a)(2), the Permittee shall keep records related to startup, shutdown and malfunction.
- (d) The Permittee shall maintain records of any additional inspections prescribed by the Preventive Maintenance Plan (PMP), and make available upon request to IDEM, OAQ and the US EPA.
- (e) Records necessary to demonstrate compliance shall be available within 30 days of the end of each compliance period.

- (f) All records shall be maintained in accordance with Section C - General Record Keeping Requirements of this permit.

D.2.11 Vendor Certification [326 IAC 2-2]

Pursuant to 326 IAC 2-2 Prevention of Significant Deterioration (PSD), the Permittee shall obtain and submit with the Affidavit of Construction (Condition B.4) all vendor guarantees for Boiler No. 501 to demonstrate compliance with the BACT limits specified in Condition D.2.1 of this permit.

D.2.12 Reporting Requirements [326 IAC 2-1.1-11] [40 CFR 63, Subpart DDDDD]

- (a) Pursuant to 40 CFR Part 63.7550 and Table 10 to Subpart DDDDD, the Permittee shall submit a semi annual compliance report, using the Semiannual Report Form at the end of this permit or its equivalent.

- (i) The first **semiannual compliance report** must cover the period beginning on the compliance date specified in 40 CFR Part 63.7495 and ending June 30 or December 31, whichever date is the first date that occurs at least 180 days after the compliance date that is specified for this source in 40 CFR Part 63.7595.

This first compliance report must be postmarked or delivered no later than July 31 or January 31, whichever date is the first date following the end of the first calendar half after the **compliance date that is specified in 40 CFR Part 63.7495**.

- (ii) Each subsequent compliance report must cover the semi annual reporting period from January 1 through June 30 or the semi annual reporting period from July 1 through December 31. Each subsequent compliance report must be postmarked or delivered no later than July 31 or January 31, whichever date is the first date following the end of the semi annual reporting period.

- (iii) The compliance report must contain the following information:

- | | | |
|-----|--|------------------------|
| (A) | Company name and address | [40 CFR 63.7550(c)(1)] |
| (B) | Responsible Official Certification | [40 CFR 63.7550(c)(2)] |
| (C) | Date of report and beginning and ending dates of the reporting period | [40 CFR 63.7550(c)(3)] |
| (D) | The total fuel used by Boiler No. 501, for each calendar month within the semi annual reporting period, including, but not limited to a description of the fuel and the total fuel usage amount. | [40 CFR 63.7550(c)(4)] |
| (E) | A signed statement indicating that no new type of fuel was burned. | [40 CFR 63.7550(c)(6)] |
| (F) | Actions taken consistent with the SSMP during start up, shutdown, or malfunction. | [40 CFR 63.7550(c)(9)] |

- (b) The natural gas boiler certification for Boiler No. 501 shall be submitted semi-annually to the address listed in Section C - General Reporting Requirements, of this permit, using the reporting form (Semi Annual Natural Gas Fired Boiler Certification) located at the end of this permit, or its equivalent, within thirty (30) days after the end of the six (6) month period being reported.

The natural gas-fired boiler certification does require the certification by the responsible official as defined by 326 IAC 2-7-1(34).

SECTION D.3 FACILITY OPERATION CONDITIONS

Facility Description [326 IAC 2-7-5(15)]

- (1) One (1) natural gas fueled ladle preheater, rated at 12 MMBTU/hour. Propane will be used as back up fuel. Emissions from the ladle preheater will exhaust through roof monitor (S-21, also identified as 105,106). Some emissions of this ladle preheater may also exhaust through the Castrip LMS Baghouse stack S-20.

The addition of this ladle preheater will result in a total of 3 ladle preheaters for the Castrip Line.

- (2) One (1) contact cooling tower, rated at 8,000 gallons/minute, with drift/mist eliminators for particulate control. Emissions from this cooling tower will exhaust through stacks identified as Stack 502 and Stack 503.
- (3) One (1) noncontact cooling tower, rated at 8,000 gallons/minute, with drift/mist eliminators for particulate control. Emissions from this cooling tower will exhaust from stacks identified as Stack 504 and Stack 505.
- (4) Chemical storage tanks for sulfuric or similar acid, sodium hypochlorite or similar disinfectant, caustic, polymer, and phosphate.
- (5) Associated alloy unloading, storage and feed systems:
 - (a) One (1) truck dump station
 - (b) Truck unloading/conveyors
 - (c) Eight (8) storage hoppers, all exhausting to a common bin vent, rated at 0.01 grains/dry standard cubic foot, into the building.

Alloy unloading is performed in a 3-sided building along the side of the existing Castrip building.

(The information describing the process contained in this facility description box is descriptive information and does not constitute enforceable conditions.)

Emission Limitations and Standards [326 IAC 2-7-5(1)]

D.3.1 Ladle Preheater PSD BACT Limits [326 IAC 2-2]

Pursuant to 326 IAC 2-2 Prevention of Significant Deterioration (PSD), the Permittee shall comply with the following Best Available Control Technology (BACT) requirements:

- (a) The ladle preheater shall use natural gas as main fuel and propane as back up fuel.
- (b) The nitrogen oxides (NO_x) emissions from the ladle preheater shall not exceed 0.10 pounds per MMBTU.
- (c) The carbon monoxide (CO) emissions from the ladle preheater shall not exceed 0.084 pounds per MMBTU.

- (d) The volatile organic compound (VOC) emissions from the ladle preheater shall not exceed 0.0055 pounds per MMBTU.
- (e) The sulfur dioxide (SO₂) emissions from the ladle preheater shall not exceed 0.0006 pounds per MMBTU.
- (f) The PM/PM₁₀ (filterable and condensable) emissions from the ladle preheater shall not exceed 0.0076 pounds per MMBTU.

D.3.2 Cooling Towers PSD BACT Limits [326 IAC 2-2]

Pursuant to 326 IAC 2-2 Prevention of Significant Deterioration (PSD), the Permittee shall comply with the following Best Available Control Technology (BACT) requirements:

- (a) The drift rate from each cooling tower shall not exceed 0.005%.
- (b) The visible emissions from each cooling tower shall not exceed 20% opacity, based on a 6-minute average.

D.3.3 Alloy Handling PSD BACT [326 IAC 2-2]

- (a) Pursuant to 326 IAC 2-2 Prevention of Significant Deterioration (PSD), the Permittee shall perform alloy unloading in a 3-sided building.
- (b) Pursuant to 326 IAC 2-2 Prevention of Significant Deterioration (PSD), the visible emissions from the alloy unloading shall not exceed 3% opacity, based on a 6-minute average.

D.3.4 Preventive Maintenance Plan (PMP) [326 IAC 2-7-5(13)]

A Preventive Maintenance Plan (PMP), in accordance with Section C - Preventive Maintenance Plan (PMP), of this permit, is required for the drift/mist eliminators.

Compliance Determination Requirements [326 IAC 2-1.1-11]

D.3.5 Low NO_x Burners [326 IAC 2-2]

Pursuant to 326 IAC 2-2 Prevention of Significant Deterioration (PSD), the Permittee shall equip and operate the ladle preheater with natural gas fueled low NO_x burner and perform good combustion practices.

D.3.6 Control Operation [326 IAC 2-2]

- (a) The drift/mist eliminators shall be in operation and control particulate emissions at all times when the cooling towers are in operation.
- (b) The common bin vent shall be in operation and control particulate emissions at all times when one or more of the eight storage hoppers are in operation.

Compliance Monitoring Requirements [326 IAC 2-7-6(1)] [326 IAC 2-7-5(1)]

None

Record Keeping and Reporting Requirement [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

D.3.7 Vendor Certification [326 IAC 2-2]

Pursuant to 326 IAC 2-2 Prevention of Significant Deterioration (PSD), the Permittee shall obtain and submit with the Affidavit of Construction (Condition B.4) all vendor guarantees for the:

- (i) ladle preheater, and
- (ii) cooling towers

to demonstrate compliance with the BACT limits specified in Conditions D.3.1 and D.3.2(a) of this permit.

D.3.8 Record Keeping Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

- (a) The Permittee shall maintain records of any additional inspections prescribed by the Preventive Maintenance Plan (PMP), and make available upon request to IDEM, OAQ and the US EPA.
- (b) Records necessary to demonstrate compliance shall be available within 30 days of the end of each compliance period.
- (c) All records shall be maintained in accordance with Section C - General Record Keeping Requirements of this permit.

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

CERTIFICATION

Source Name: Nucor Steel
Source Location: 4537 South Nucor Street, Crawfordsville, IN 47933
Mailing Address: 4537 South Nucor Street, Crawfordsville, IN 47933
RR2, Box 311, Crawfordsville, IN 47933

This certification shall be included when submitting monitoring, testing reports/results or other documents as required by this approval.

Please check what document is being certified:

- Test Result (specify)
- Report (specify)
- Notification (specify)
- Affidavit (specify)
- 40 CFR 63, Subpart DDDDD)
- Other (specify)

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

Signature:

Printed Name:

Title/Position:

Date:

**INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR QUALITY
COMPLIANCE DATA SECTION**

QUARTERLY DEVIATION AND COMPLIANCE MONITORING REPORT

Source Name: Nucor Steel
Source Location: 4537 South Nucor Street, Crawfordsville, IN 47933
Mailing Address: 4537 South Nucor Street, Crawfordsville, IN 47933
RR2, Box 311, Crawfordsville, IN 47933

Months: _____ to _____ Year: _____

<p>This report shall be submitted quarterly based on a calendar year.</p> <p>Any deviation from the requirements, the date(s) of each deviation, the probable cause of the deviation, and the reasonable response steps taken must be reported. Deviations that are required to be reported by an applicable requirement shall be reported according to the schedule stated in the applicable requirement and do not need to be included in this report. If no deviations occurred, please specify in the box marked "No deviations occurred this reporting period".</p> <p>Additional pages may be attached if necessary.</p>
<p>9 NO DEVIATIONS OCCURRED THIS REPORTING PERIOD.</p>
<p>9 THE FOLLOWING DEVIATIONS OCCURRED THIS REPORTING PERIOD</p>
<p>Permit Requirement (specify permit condition #)</p>
<p>Date of Deviation:</p>
<p>Duration of Deviation:</p>
<p>Number of Deviations:</p>
<p>Probable Cause of Deviation:</p>
<p>Reasonable Response Steps Taken:</p>
<p>Permit Requirement (specify permit condition #)</p>
<p>Date of Deviation:</p>
<p>Duration of Deviation:</p>
<p>Number of Deviations:</p>
<p>Probable Cause of Deviation:</p>
<p>Reasonable Response Steps Taken:</p>

Form Completed By:
Title/Position:
Date:
Telephone:

A certification by the responsible official as defined by 326 IAC 2-7-1(34) is required for this report.

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

EMERGENCY OCCURRENCE REPORT

Source Name: Nucor Steel
Source Location: 4537 South Nucor Street, Crawfordsville, IN 47933
Mailing Address: 4537 South Nucor Street, Crawfordsville, IN 47933
RR2, Box 311, Crawfordsville, IN 47933

☛ This is an emergency as defined in 326 IAC 2-7-1(12)

C The Permittee must notify the Office of Air Quality (OAQ), within four (4) business hours (1-800-451-6027 or 317-233-5674, ask for Compliance Section); and

C The Permittee must submit notice in writing or by facsimile within two (2) working days (Facsimile Number: 317-233-5967), and follow the other requirements of 326 IAC 2-7-16.

Address: 100 North Senate Avenue P.O. Box 6015, Indianapolis, Indiana 46206-6015

This EMERGENCY OCCURRENCE REPORT consists of 2 pages.

If any of the following are not applicable, mark N/A

Facility/Equipment/Operation:

Control Equipment:

Permit Condition or Operation Limitation in Permit:

Description of the Emergency:

Describe the cause of the Emergency:

Date/Time Emergency started:

Date/Time Emergency was corrected:

Page 2 of 2 of the EMERGENCY OCCURRENCE REPORT

Was the facility being properly operated at the time of the emergency? Y N

Describe:

Type of Pollutants Emitted: TSP, PM₁₀, SO₂, VOC, NO_x, CO, Pb, other:

Estimated amount of pollutant(s) emitted during emergency:

Describe the steps taken to mitigate the problem:

Describe the corrective actions/ [reasonable](#) response steps taken:

Describe the measures taken to minimize emissions:

If applicable, describe the reasons why continued operation of the facilities are necessary to prevent imminent injury to persons, severe damage to equipment, substantial loss of capital investment, or loss of product or raw materials of substantial economic value:

Form Completed By:
Title/Position:
Date:
Telephone:

A certification by the responsible official as defined by 326 IAC 2-7-1(34) is NOT required for this report.

**INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR QUALITY
COMPLIANCE DATA SECTION**

SEMI ANNUAL NATURAL GAS FIRED BOILER CERTIFICATION

Source Name: Nucor Steel
Source Location: 4537 South Nucor Street, Crawfordsville, IN 47933
Mailing Address: 4537 South Nucor Street, Crawfordsville, IN 47933
RR2, Box 311, Crawfordsville, IN 47933

<input checked="" type="radio"/> Natural Gas Only
<input checked="" type="radio"/> Alternate Fuel Burned
From: _____ To: _____

I certify that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.
Signature:
Printed Name:
Title/Position:
Telephone:
Date:

A certification by the responsible official as defined by 326 IAC 2-7-1(34) is required for this report.

**Indiana Department of Environmental Management
Office of Air Quality**

Technical Support Document (TSD)
Prevention of Significant Deterioration (PSD)
Part 70 Significant Source Modification (SSM)

Source Background and Description
--

Source Name:	Nucor Steel
Source Location:	4537 South Nucor Street, Crawfordsville, IN 47933
Mailing Address:	4537 South Nucor Street, Crawfordsville, IN 47933 RR2, Box 311, Crawfordsville, IN 47933
General Telephone Number:	765-364-2323
General Facsimile Number:	765-364-5311
Responsible Official:	General Manager
County Location:	Montgomery
SIC Code:	3312 (Steel Mill)
Source Categories:	1 of 28 Listed Source Categories Major PSD Source Major Source, CAA Section 112
PSD/SSM:	107-18314-00038
Permit Writer:	Iryn Calilung 317/233-5692 icalilun@dem.state.in.us

Permitting History of the Strip Caster (Castrip) Line
--

On January 19, 2001, the Office of Air Quality (OAQ) issued a Prevention of Significant Deterioration (PSD) permit (PSD 107-12143-00038) for the construction and operation of a Strip Caster Line in the existing steel mill plant. The Strip Caster (Castrip) Line has a maximum steel production of 135 tons/hour.

This line is also sometimes identified as Castrip Line.

The Castrip Line accepts molten steel at a maximum rate of 135 tons/hour from the existing electric arc furnaces (EAFs) in the Meltshop area. The Line is capable of producing all grades of carbon, low carbon, alloy, and stainless steel at various widths, thickness and sizes. The coiled product from the Strip Caster Line may be shipped directly to the market or may be routed through the existing Hot Mill or Cold Mill of the plant for further processing.

The Strip Caster Line consists of a ladle metallurgical station (LMS) with a baghouse for particulate control, tundish, rolling stand, coilers, ladle preheaters, tundish preheaters, tundish nozzle preheaters, tundish dryers, cooling towers and associated alloy storage and handling operations.

This Castrip Line project is a research and development project by Nucor Steel because it uses a new technology not widely used in USA. The goal of the proposed modification is to achieve certain steel specifications for commercial production.

Description of Proposed Project

The purpose of the proposed project is to improve the quality of the product produced by the Castrip Line. The proposed modification will also enable the Castrip Line increase its utilization. For the past 14 months of operation of the Castrip Line, full maximum production has not been attained. There is no expected increase beyond the permitted maximum capacity of the line.

On December 15, 2003, the Office of Air Quality (OAQ) received an application to modify the existing Strip Castrip Line by installing the following processes:

- (1) One (1) vacuum degasser with process gas lances. This vacuum degasser has a maximum capacity of 135 tons of steel/hour and 1.5 tons of alloys/hour. This vacuum degasser will be used to remove entrained gases from the steel. Desulfurization also occurs during the degassing process.

This vacuum degasser will use a flare to control carbon monoxide (CO) emissions. The flare has a maximum capacity of 12 MMBTU/hour, uses natural gas as primary fuel with propane as back up fuel, and operates within the temperature range of 1,400 to 1,600 °F. Controlled emissions will exhaust through a stack identified as Stack 500.

The maximum capacity of the vacuum degasser is the same as the ladle metallurgical station (LMS) and Caster in the Castrip Line.

- (2) One (1) natural gas fueled low NO_x boiler, rated at 71.04 million British Thermal Unit (MMBTU/hour). This boiler, identified as Boiler No. 501, will provide steam to the vacuum degasser. Propane will be used as back up fuel. Emissions from this boiler will exhaust through a stack identified as Stack 501.
- (3) One (1) natural gas fueled ladle preheater, rated at 12 MMBTU/hour. Propane will be used as back up fuel. Emissions from the ladle preheater will exhaust through roof monitor (S-21, also identified as 105,106). Some emissions of this ladle preheater may also exhaust through the Castrip LMS Baghouse stack S-20.

The addition of this ladle preheater will result in a total of 3 ladle preheaters for the Castrip Line.

- (4) One (1) contact cooling tower, rated at 8,000 gallons/minute, with drift/mist eliminators for particulate control. Emissions from this cooling tower will exhaust through stacks identified as Stack 502 and Stack 503.
- (5) One (1) noncontact cooling tower, rated at 8,000 gallons/minute, with drift/mist eliminators for particulate control. Emissions from this cooling tower will exhaust from stacks identified as Stack 504 and Stack 505.
- (6) Associated alloy unloading, storage and feed systems:
 - (a) One (1) truck dump station
 - (b) Truck unloading/conveyors
 - (c) Eight (8) storage hoppers, all exhausting to a common bin vent, rated at 0.01 grains/dry standard cubic foot, into the building.

Alloy unloading is performed in a 3-sided building along the side of the existing Castrip building.

These are possible operating scenarios that the Strip Caster (Castrip) line is going to operate with the addition of the degasser.

- (1) The gases can be removed from the steel after the steel has gone through the Castrip Ladle Metallurgical Station (LMS).
Or
- (2) The gases can be removed from the steel before the steel goes through the Castrip Ladle Metallurgical Station (LMS).
Or
- (3) The gases can be removed from the steel and the steel sent back to the Meltshop Continuous Casters for casting.
Or
- (4) The steel may bypass the vacuum degassing process.

Emission Calculations

Tables 1 to 5 show the detailed calculations of the new emission units described in the previous pages of this document.

Table 1 Vacuum Degasser (135 tons/hour)			
Pollutant	Emission Factor (EF) (lbs/ton)	PTE (tons/year)	
		(Before Control)	(After Control)
SO ₂	0.02	11.83	11.83
NO _x	0.005	2.96	2.96
VOC	0.005	2.96	2.96
CO	0.075	888.0	44.4
PM	0.008 gr/dscf	1.95	1.95
PM ₁₀	0.008 gr/dscf	1.95	1.95

Maximum capacity = 135 tons/hour
 The EFs were submitted by Nucor Steel and were based on engineering calculations and assumptions and vendor's data. These rates are also the proposed BACT limits.
 $PTE = (\text{Maximum capacity } 135 \text{ tons/hour}) * (\text{EF lbs/ton}) * (8,760 \text{ hours/year}) * (1 \text{ ton}/2000 \text{ lbs})$
 The control device for the vacuum degasser is a flare, with an estimated efficiency of 95%.
 $CO_{(\text{before Flare})} = (135 \text{ tons/hour}) * (0.075 \text{ lbs/ton}) * (8,760 \text{ hours/year}) * (1 \text{ ton}/2000 \text{ lbs}) / (1 - 0.95 \text{ Eff})$
 $CO_{(\text{after Flare})} = (CO \text{ before flare}) * (1 - 0.95 \text{ Eff}) = 44.4 \text{ tons/year}$
 $PM/PM_{10} = (0.008 \text{ gr/dscf}) * (1 \text{ lb}/7,000 \text{ gr}) * (6,500 \text{ ft}^3/\text{min}) * (8,760 \text{ hours/year}) * (1 \text{ ton}/2000 \text{ lbs})$

Table 2 Natural Gas Low NO _x Boiler (71.04 MMBTU/hr)			
Pollutant	Emission Factor (EF) (lbs/MMBTU)	PTE (tons/year)	
SO ₂	0.0006	0.19	
NO _x	0.035	10.89	
VOC	0.0026	0.81	
CO	0.061	18.98	
PM	0.0019	0.59	
PM ₁₀	0.0076	2.36	
Lead	5.0x10 ⁻⁷	1.55x10 ⁻⁴	

Maximum capacity = 71.04 MMBTU/hour
 PM EF is filterable only. PM₁₀ EF is condensible and filterable combined.
 The EFs for the criteria pollutants are based on similar boiler permitted for Nucor Steel under PSD 107-16823-00038, issued on November 21, 2003.
 $PTE = (\text{Heat Input MMBTU/hr}) * (\text{EF lbs/MMBTU}) * (8760 \text{ hour/year}) * (1 \text{ ton}/2000 \text{ lbs})$

Table 3 Natural Gas Ladle Preheater (12.0 MMBTU/hr)		
Pollutant	Emission Factor (EF) (lbs/MMCF)	PTE (tons/year)
SO ₂	0.0006	0.031
NO _x	0.050	2.63
VOC	0.0055	0.29
CO	0.084	4.41
PM	0.0019	0.1
PM ₁₀	0.0076	0.4
Lead	0.0005	2.63x10 ⁻⁶

Maximum capacity = 12.0 MMBTU/hour
 These emissions are due to combustion of natural gas fuel.
 PM EF is filterable only. PM₁₀ EF is condensible and filterable combined.
 All EFs are based on normal firing. 1MMBTU = 1,000,000 BTU
 EFs are the BACT mass limits considered.
 PTE = (Heat Input MMBTU/hour)*(EF lbs/MMBTU)*(8760 hours/year)*(1ton/2000 lbs)

Table 4 Flare (12.0 MMBTU/hr)		
Pollutant	Emission Factor (EF) (lbs/MMBTU)	PTE (tons/year)
SO ₂	0.0006	0.031
NO _x	0.100	5.3
VOC	0.0055	0.29
CO	0.084	4.41
PM	0.0019	0.1
PM ₁₀	0.0076	0.4
Lead	0.0005	2.63x10 ⁻⁶

Maximum capacity = 12.0 MMBTU/hour
 These collateral emissions from the flare are due to combustion of natural gas fuel.
 PM EF is filterable only. PM₁₀ EF is condensible and filterable combined.
 All EFs are based on normal firing. 1MMBTU = 1,000,000 BTU
 EFs are the BACT mass limits considered.
 PTE = (Heat Input MMBTU/hour)*(EF lbs/MMBTU)*(8760 hours/year)*(1ton/2000 lbs)

Table 5 Strip Caster Cooling Towers				
Cooling Towers	Capacity (gal/min)	TDS Fraction	Drift Losses	PM PTE (tons/year)
Contact Cooling Tower	8,000	0.0075	0.0005	6.58
Noncontact Cooling Tower	8,000	0.0025	0.0005	2.19
Total	16,000			8.77

Nucor Steel provided the TDS Fraction and Drift losses.
 Cooling Tower PM/PM₁₀ = (Maximum Rate gals/min)*(TDS fraction)*(8.34 lbs/gal)*(60 mins/hour)
 *(drift losses)

Potential To Emit of Modification

Pursuant to 326 IAC 2-1.1-1(16), Potential to Emit is defined as “the maximum capacity of a stationary source 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.

Total PTE = (Table 1) + (Table 2) + (Table 3) + (Table 4) + (Table 5)

Table 6 Total PTE of the New Units Only		
Pollutant	PTE Before Control (tons/year)	PTE After Control (tons/year)
SO ₂	12.08	12.08
NO _x	21.78	21.78
VOC	4.35	4.35
CO	915.8	72.2
PM	11.51	11.51
PM ₁₀	13.88	13.88

This table shows the total potential to emit of the proposed new units only.

Permitting Level Determination

Nucor Steel is an existing Part 70 source; thus the level of approval for the proposal to construct or modify the source is evaluated under 326 IAC 2-7-10.5.

- (1) 326 IAC 2-7-10.5(f)(5)
 This modification is considered a significant source modification to the existing Part 70 source because the CO PTE before control is greater than 100 tons/year. (See Table 6)
- (2) 326 IAC 2-7-10.5(d)(4)(D)
 This modification is not considered a minor source modification because the CO potential to emit in 326 IAC 2-7-10.5 (f) (5) refers to the PTE before the control of the emission unit. (See Table 6)
- (3) 326 IAC 2-7-10.5(d)(6)
 Even though one of the units (Boiler No. 501) involved in this modification is subject to a New Source Performance Standards (NSPS) 40 CFR 60; this modification is not considered a minor source modification because the NSPS applicable requirement for the boiler is not the most stringent applicable requirement. (See Federal Rule Applicability section of this document)
- (4) 326 IAC 2-7-10.5(d)(9)
 This modification is not considered a minor source modification because one of the units (vacuum degasser) that Nucor is adding is not of the same type of unit that is already permitted in the source. Nucor Steel has removed their degasser in the Meltshop operation in 2000. (See Nucor Steel PSD permit 107-16823-00038, issued on November 21, 2003)

PSD Applicability Determination

To determine if this proposed modification would be a major modification, the following emissions have to be determined. Since this type of operation is one of the 28 listed source categories under 326 IAC 2-2-1(y)(1), the fugitive PM emissions are counted toward determination of PSD applicability.

- (1) Emissions increases occurring at all new or modified units:
 - (a) The new emissions units involved in this modification are:
 - A vacuum degasser with a flare to control CO emissions,
 - A natural gas fired low NO_x boiler,
 - A ladle preheater,
 - 2 cooling towers, and
 - Alloy unloading and storage systems.
 - (b) There are no other units that are being physically modified.
 - (c) The table below shows the emissions increases from the proposed new units (this is the same as Table 6). For the detailed calculations, see Tables 1 to 5 in the Emission Calculations section of this document.

Table 7	Total PTE of the New Units Only
Pollutant	PTE After Control (tons/year)
SO ₂	12.08
NO _x	21.78
VOC	4.35
CO	72.2
PM	11.51
PM ₁₀	13.88

- (2) Any other increases at existing emissions units not being modified, which could experience emissions increases that will result from the change:
 - (a) Castrip Line
 - (i) The Castrip Line is expected to experience increase in utilization due to the addition of the new units. Therefore, the emissions due to increase utilization were accounted for in the PSD evaluation.
 - (ii) The Castrip Line started operation in April 2002. The Castrip Line has intermittently operated at the rate of approximately 119 tons/hour. The maximum capacity of the Castrip Line is 135 tons/hour.
 - (iii) Based on the reports submitted by Nucor Steel, the actual throughput from April 2002 to April 2003 was 71,247 tons/year. The actual throughput from December 2002 to December 2003 was 96,840 tons/year. Since there is no sufficient data to determine actual emissions for a full period of 2 years, the actual production for the most recent 12 month will be used to determine the actual emissions. The assumed average actual throughput for the 24-month period is 96,840 tons/year. It can also be assumed that the actual emissions for the past years were equal to zero. In both assumptions, the conclusion is the same.

- (iv) The table below shows the emissions due to the increase utilization of the Castrip Line.

Table 8 Emissions Due to Increase Utilization				
Pollutant	Emission Factor (lbs/ton)	PTE (tons/year)	Past Actual (tons/year)	Increase Emissions (PTE- Past Actual)
SO ₂	0.03	35,478	2,905.2	32,572.8
NO _x	0.007	8,278.2	677	7,601.2
VOC *	--	less than 40	less than 40	--
CO	0.04	47,304	3,873.6	43,430.4
PM	0.0003 gr/dscf	39 **	6.5 ***	32.5
PM ₁₀	0.0003 gr/dscf	39 **	6.5 ***	32.5

Maximum Capacity = 135 tons/hour
 Average Actual Steel Throughput = 96,840 tons/year

The emission factors are based on the stack tests performed by Nucor Steel in January 2003.

* There was no VOC limit specified for the Castrip under PSD permit 107-12143-00038, issued on January 19, 2001 because the VOC net emissions are less than the PSD Significant level of 40 tons/year.

** The PM and PM₁₀ PTE were derived from the PSD permit 107-12143-00038, issued on January 19, 2001.

*** The PM and PM₁₀ actual emissions are estimates based on the actual tested grain loading.

PTE = (Emission Factor lbs/ton)*(135 tons/hour)*(8760 hours/year)
 Actual Emissions = (Emission Factor lbs/ton)*(96,840 tons/year) = tons/year
 Increase Emissions = (PTE) - (Actual Emissions) = tons/year

- (b) Meltshop Continuous Casters
 Since the steel from the Castrip Line after degassing can be send to the Meltshop Continuous Casters for casting, increase utilization is expected from the meltshop casting operations. However, the increase in emissions was not determined because it is not possible to segregate the actual emissions from the casting operations alone because the Meltshop Continuous Casters were limited as part of an overall Meltshop EAF operations exhausting to common baghouses. In any case, even without this specific increase in emissions, the PSD determination would arrive at the same conclusion.
- (3) Total Emissions Increases
- (a) The last step in the PSD determination is to add the emissions from the new/modified units and the emissions due to the increase utilization of existing units.
- (b) The table below shows the total emissions increases from the new units and increase utilization of the Castrip Line. (Table 7 + Table 8)
- (c) Based on the total emissions increase, SO₂, VOC, CO, PM, and PM₁₀ emissions are greater than the PSD significant levels. Therefore, the PSD requirements under 326 IAC 2-2 apply.

Table 9 PSD Evaluation of the Modification					
Pollutant	New units (tons/year) (Table 7)	Increase Utilization of Castrip Line (tons/year) (Table 8)	Total	PSD Significant Levels (tons/year)	PSD (Yes or No)
SO ₂	12.08	32,572.8	32,584.88	40	Yes
NO _x	21.78	7,601.2	7,622.98	40	Yes
VOC	4.35	less than 40	less than 40	40	No
CO	72.2	43,430.4	43,502.6	100	Yes
PM	11.51	32.5	44.01	25	Yes
PM ₁₀	13.88	32.5	46.38	15	Yes
Pb		--		0.6	No
Mercury		--		0.1	No
Beryllium		--		0.0004	No
Asbestos		--		0.007	No
Vinyl Chloride		--		1.0	No
Fluorides		--		3.0	No
Sulfuric Acid Mist		--		7.0	No
Hydrogen Sulfide		--		10	No
Total Reduced Sulfur		--		10	No

Source Status

- (1) **PSD Major Source**
 Nucor Steel is an existing PSD major stationary source because at least one attainment regulated pollutant is emitted at a rate of 100 tons per year or greater.
- (2) **1 of 28 Listed Source Categories**
 Nucor Steel is considered one of the 28 listed source categories (326 IAC 2-2-1(y)).
- (3) **Part 70 Source**
 - (a) Nucor Steel submitted their Part 70 permit application on November 14, 1996.
 - (b) A notice of completeness was mailed to Nucor Steel on December 10, 1996.
 - (c) The Part 70 permit is still under review by the OAQ.
- (4) **Hazardous Air Pollutants (HAPs)**
 Nucor Steel is an existing major source in terms of HAPs emissions.

County Attainment Status

- (1) **Montgomery County**
The source is located in Montgomery County. The table below shows the attainment status of Montgomery County.

Table 10	Montgomery County
Pollutant	Status
PM ₁₀	Attainment
SO ₂	Attainment
NO ₂	Attainment
Ozone	Attainment
CO	Attainment
Lead	Attainment

- (2) Volatile organic compounds (VOC) and Ozone
VOC are precursors for the formation of ozone. Therefore, VOC emissions are considered when evaluating the rule applicability relating to the ozone standards. Montgomery County has been designated as attainment or unclassifiable for ozone. Therefore, VOC emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD) 326 IAC 2-2.
- (3) **Criteria Pollutants**
Montgomery County has been classified as attainment or unclassifiable for all the other pollutants. Therefore, these emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2.

Federal Rule Applicability Determination

- (1) **New Source Performance Standards (NSPS)**
- (a) Nucor Steel has been subject to 40 CFR Part 60 Subpart AAa (NSPS for steel plants: EAF and AOD).

The vacuum degasser is not specifically subject to this subpart.
- (b) Boiler No. 501 (71.04 MMBTU/hour) is subject to 40 CFR 60.40c Subpart Dc because it is going to be constructed after June 9, 1989, and it has a maximum capacity between 10 MMBTU/hour and 100 MMBTU/hour. [40 CFR Part 60.40c]
- (i) There is no SO₂ emission standard for Boiler No. 501 because it will use natural gas and propane as fuel.
- (ii) There is no PM emission standard for Boiler No. 501 because it will use natural gas and propane as fuel.
- (iii) Pursuant to 40 CFR Part 60.48c(a), notification of the date of construction, anticipated start up, and actual start up of Boiler No. 501 shall be submitted.

- (2) National Emission Standards for Hazardous Air Pollutants (NESHAP)
- (a) A NESHAP for integrated iron and steel manufacturing plants is in the proposed stage at this time. It is subject to sinter plants, blast furnaces and BOP shops. Nucor Steel, IN is not subject to this proposed NESHAP because it does not have the processes mentioned.
- (b) There are no NESHAPs that apply to the vacuum degasser.
- (c) Boiler No. 501 is subject to 40 CFR Part 63, Subpart DDDDD (NESHAPs for Industrial/Commercial/Institutional Boilers and Process Heaters).
- (i) Boiler No. 501 (a natural gas fueled low NO_x boiler, rated at 71.04 MMBTU/hour) is considered an industrial boiler because it will be use for manufacturing and processing to provide steam. [40 CFR 63.7575]
- (ii) Boiler No. 501 belongs to the large gaseous fuel category because it burns only gaseous fuels not combined with any liquid or solid fuels, has a rating capacity greater than 10 MMBTU/hour and has an annual capacity factor of greater than 10%. [40 CFR 63.7575]
- (iii) Boiler No. 501 is considered a new affected source because it will be constructed after January 13, 2003. [40 CFR Part 63.7490(b)]
- (iv) Compliance with the NESHAP Subpart DDDDD begins upon initial start up of Boiler No. 501. [40 CFR Part 63.7495(a)]
- (v) The CO emissions from Boiler No. 501 shall not exceed 400 parts per million (ppm) by volume on a dry basis corrected to 3% oxygen (3-run average for units less than 100 MMBTU/hour). (See Table 1 to Subpart DDDDD of Part 63). [40 CFR 63.7500]
- (3) Section 112(j) of the Clean Air Act (CAA)
- (a) Nucor Steel is considered a major source for HAPs because it has HAPs PTE of greater than 10 tons/year for a single HAP and 25 tons/year for any combination.
- (b) Nucor Steel submitted their Part 1 application on May 15, 2002. This source requested for a CAA section 112(j) application determination on some processes of the plant.
- (4) Prevention of Significant Deterioration (PSD) 40 CFR 52.21
On April 2, 2003, the State of Indiana has been granted a conditional approval for the PSD State Implementation Plan (SIP) under provisions of 40 CFR 51.166 and 40 CFR 52.770 and superceding the delegated PSD SIP authority under 40 CFR 52.793. Therefore, the PSD permits will be issued under the authority of 326 IAC 2-2 and will no longer be issued under the provision of 40 CFR 52.21 and 40 CFR 124.
- (5) 40 CFR 64 (Compliance Assurance Monitoring)
The carbon monoxide (CO) potential to emit of the vacuum degasser are greater than 100 tons/year. A flare will be used to control CO emissions from the vacuum degasser. Therefore, pursuant to 40 CFR 64.2(a)(2), the requirements of 40 CFR Part 64, Compliance Assurance Monitoring, are applicable to the vacuum degasser. Monitoring of the pollutant-specific emission unit will be conducted pursuant to 40 CFR Part 64.

State Rule Applicability Determination

- (1) 326 IAC 1-6-3 (Preventive Maintenance Plan (PMP))
Detailed evaluation of the applicability of the PMP requirements are shown in the subsequent pages of this document.
- (2) 326 IAC 1-7-1 (Stack Height Requirements)
The vacuum degasser, boiler, ladle preheater, each does not emit PM or SO₂ emissions greater than 25 tons/year. (See Table 7)
- (3) 326 IAC 2-1.1-8 (Time Periods For Determination On Permit Applications)
Pursuant to 326 IAC 2-1.1-8(a)(1), a final action needs to be issued no later than 270 calendar days from the receipt of the application, taking into account actions that can suspend the time period. The application was received on December 15, 2003. Without any suspension in the time period, the 270 day-period is estimated to end on September 15, 2004.
- (4) 326 IAC 2-2 (PSD)
Detailed PSD BACT determinations are shown in the subsequent pages of this document.
- (5) 326 IAC 2-3 (Emission Offset)
The Office of Air Quality (OAQ) has the authority to permit an applicant pursuant 326 IAC 2-3 and 40 CFR 51.166 (Nonattainment Rules) only when the source is located in a designated nonattainment area as specified in 40 CFR 81.315. Montgomery County has been designated as attainment area in 40 CFR 81.315. Therefore, the OAQ does not have the authority to require lowest achievable emission rate (LAER).
- (6) 326 IAC 2-6-1 (Emission Reporting)
Even prior to this proposed modification, Nucor Steel is already subject to this requirement because it has PTE of greater than 100 tons/year.
- (7) 326 IAC 2-7 (Part 70 Program)
Nucor Steel submitted their Part 70 permit application on November 14, 1996.

The Part 70 permit has not yet been issued and is still under review by the OAQ.
- (8) 326 IAC 3-5-1 (Continuous Monitoring of Emissions)
Nucor Steel will be required to install monitors to continuously monitor the operating temperature of the flare. A carbon monoxide continuous emission monitor system will not be required.
- (9) 326 IAC 4-1 (Open Burning)
Nucor Steel shall not open burn material except as provided in 326 IAC 4-1-3, 326 IAC 4-1-4, or 326 IAC 4-1-6.
- (10) 326 IAC 2-4.1 (Hazardous Air Pollutants)
The HAPs emissions from the degasser are less than 10 tons/year for any single HAP and less than 25 tons/year for any combination.
- (11) 326 IAC 5-1 (Opacity Limitations)
The opacity shall not exceed 40% based on a 6-minute average period, except otherwise specified under PSD BACT.
- (12) 326 IAC 6-1 (PM Nonattainment Limitation)

This rule does not apply to Nucor Steel because it is not located in a nonattainment area.

- (13) 326 IAC 6-2 (Particulate Emission Limitations for Sources of Indirect Heating)
 Based on this state requirement, Boiler No. 501 (71.04 MMBTU/hour) would be allowed to emit particulate based on the following equation.

$$Pt = (1.09)/Q^{0.26}$$

where: Q = total heat input of the plant

Existing Boilers:

2 Cold Mill Boilers = 34 MMBTU/hour (each)

BOC Gases Boiler = 15 MMBTU/hour

Total = 83 MMBTU/hour + 71.04 MMBTU/hour

= 154.04 MMBTU/hour

The Q (154.04 MMBTU/hour) is greater than 10 MMBTU/hour, therefore, 0.6 lbs/MMBTU is not the limit.

The Q (154.04 MMBTU/hour) is less than 10,000 MMBTU/hour, therefore, 0.1 lbs/MMBTU is not the limit.

$$Pt = (1.09)/(154.04)^{0.26}$$

$$Pt = 0.29 \text{ lbs/MMBTU}$$

However, since Boiler No. 501 is undergoing PSD major review, the limitations under PSD (326 IAC 2-2) prevail.

Table 11 Natural Gas Low NO _x Boiler (71.04 MMBTU/hr)		
Pollutant	Allowable Emissions Based on PSD BACT Limits (lbs/MMBTU)	Allowable Emission Based on 326 IAC 6-2-4 (lbs/MMBTU)
PM	0.0019	0.29
PM ₁₀	0.0076	0.29

- (14) 326 IAC 6-3 (Particulate Emission For Manufacturing Process)
 The vacuum degasser has a maximum capacity of 135 tons/hour (270,000 pounds/hour).

Based on this state rule, the vacuum degasser shall not emit particulate emissions greater than the rate determined by the following equation:

$$E = 55.0 P^{0.11} - 40$$

where:

E = rate of emission in pounds/hour

P = process weight rate in tons/hour

$$E = (55.0)(135 \text{ tons/hour})^{0.11} - 40$$

$$E = 54.32 \text{ pounds/hour}$$

However, since the vacuum degasser is undergoing PSD major review, the limitations under PSD (326 IAC 2-2) prevail.

- (15) 326 IAC 6-4 and 6-5 (Fugitive Dust)
 Even prior to this modification, Nucor Steel is already subject to these rules. Nucor has submitted fugitive dust plan to comply with these rules. Fugitive dust crossing the boundary or property line should not be visible.

- (16) 326 IAC 7-1 (SO₂ Limitation)
The vacuum degasser, boiler and ladle preheater are not subject to this rule because they emit less than 25 tons/year and 10 pounds/hour.
- (17) 326 IAC 8 (VOC)
The vacuum degasser, boiler and ladle preheater are not subject to this rule because they emit less than 25 tons/year.
- (18) 326 IAC 9 (CO Emission Rules)
This rule does not apply because there is no applicable requirements specified for a vacuum degasser, boiler or ladle preheater.
- (19) 326 IAC 10 (NO_x Rules)
This rule does not apply to Nucor Steel because this rule applies only to sources located in Clark or Floyd Counties. Nucor Steel is located in Montgomery County.
- (20) 326 IAC 11 (Source Specific Limitations)
Steel Mill is not one of the operation listed in this rule.
- (21) 326 IAC 12 (NSPS)
Compliance with this rule has been addressed under the Federal Rules Applicability of this supporting document.
- (22) 326 IAC 13 (Motor Vehicles Emissions)
Not applicable.
- (23) 326 IAC 14 (HAPs Emission)
This rule incorporates by reference the 40 CFR Part 61. No 40 CFR Part 61 applies to this source.
- (24) 326 IAC 15 (Lead Rules)
Nucor Steel is not one of the listed sources subject to this rule.
- (25) 326 IAC 16 (Environmental Assessment, Activities of State Agencies)
Environmental assessments and environmental impact studies for recommendations or reports on proposals for legislation and other major state actions significantly affecting the quality of the human environment have to be performed. However, 326 IAC 16 and the Indiana Code 13-12-4-8 specifically states that an environmental impact statement is not required under state law for the issuance of a license or permit by any state agency. Therefore, no environmental impact statement under 326 IAC 16 has been performed for this permit. Similar provisions exempt PSD permit actions from the National Environmental Policy Act [15 USC 793(c)(1)].
- (26) 326 IAC 17 (Public Records)
Nucor Steel provided additional information on January 20, 2004 that was requested to be treated as confidential information. The information was processed as confidential.
- (27) 326 IAC 18 (Asbestos Management at School)
Not applicable.
- (28) 326 IAC 19 (Mobile Source Rules)
These particular rules are applicable to employees in Lake and Porter Counties only. These are not applicable because Nucor Steel is located in Montgomery County.

PSD BACT Overview and General Discussion

The Prevention of Significant Deterioration (PSD) Program requires a best available control technology (BACT) review and air quality modeling to be performed on the proposed modification. All BACT analyses are conducted according to the guidelines set forth by the *“Top-Down Best Available Control Technology Guidance Document”* outlined in the 1990 draft USEPA *New Source Review Workshop Manual*. According to these guidance documents, the determination of BACT is dependent on both the technology and the limitation. BACT is a mass emission limitation based on the maximum degree of reduction of each pollutant that is subject to the PSD requirements. BACT analysis takes into account the energy, environmental, and economic impacts on the source. These reductions may be determined through the application of available control techniques, process design, work practices, and operational limitations. Such reductions are necessary to demonstrate that the emissions remaining after application of BACT will not cause or contribute to air pollution, thereby protecting public health and the environment.

These guidance documents specify a five-step process to make these determinations.

- (1) The first step is to identify all control technologies.
- (2) The second step is to eliminate technically infeasible options.
- (3) The third step is to rank the remaining control technologies by effectiveness.
- (4) The fourth step is to evaluate the most effective controls and document results.
- (5) The last step is to select the BACT control and mass emission limit.

In going through the feasible controls, there may be several different limits that have been set as BACT for the same control technology. The best alternative to be considered is the most stringent and the applicant would be required to demonstrate in a convincing manner why that limit is not feasible, either technically or economically. The final BACT determination would be the technology with the most stringent corresponding limit that is economically feasible.

There is no requirement at the State or Federal level to require innovative control to be used as BACT. Innovative control means a control that has not been demonstrated in a commercial application on similar units. Innovative controls are normally given a waiver from the BACT requirements due to the uncertainty of actual control efficiency. PSD BACT requires that the applicant installs the best available control technology, not create new ones. Based on this, the OAQ will not evaluate or require any innovative controls for this BACT analysis. Only available and proven control technologies are evaluated. A control technology is considered available when there are sufficient data indicating that the technology results to a reduction in emissions of regulated pollutants.

The primary goal of BACT is to assure that all new major sources and major modifications apply the best available control technology at the time of permit issuance. If the best available control technology happens to be the specific standard for the industry, the BACT analysis is not supposed to require above and beyond the existing BACT. But if in reviewing the existing control technologies it is determined that new similar controls can do better than the standard, then the limitations may become more stringent. In addition, the presumption that one stack test resulting to a lower limit can be used to establish a more stringent BACT limit is incorrect.

The following BACT determinations are based on information obtained from the PSD permit application submitted by Nucor Steel, the EPA RACT/BACT/LAER (RBLC) Clearinghouse and electronic data from other permitting agencies websites. The RBLC is a database system that provides emission limit data for industrial processes throughout the United States.

Vacuum Degasser PSD BACT Determination

Nucor Steel is proposing to install a vacuum degasser with a maximum capacity of 135 tons of steel/hour and 1.5 tons of alloys/hour. This vacuum degasser will be used to remove entrained gases from the steel. Desulfurization also occurs during the degassing process. The maximum capacity of the vacuum degasser is the same as the LMS and Caster in the Castrip Line.

The vacuum degasser will be undergoing PSD BACT review for SO₂, NO_x, CO, PM and PM₁₀.

The table below summarizes the existing BACT limits for vacuum degasser that IDEM is aware of. Some information were listed in the RBLC, and some were taken from existing PSD permits issued by IDEM. Search of the RBLC was based on the Process Code 81.007 (Vacuum Degasser). Sources are listed in alphabetical order.

Based on the evaluation of the available information, there are no consistent PSD BACT limits for vacuum degassers due to different arrangement of the degasser and its associated operations in steel mills. However, there are few sources that used flare as control device to reduce CO emissions.

CO PSD BACT Determination - - Vacuum Degasser

- (1) Carbon Monoxide (CO)
CO is the main pollutant exhausting from the vacuum degasser.
CO PTE before control = 888 tons/year

Nucor proposed to control CO emissions from the vacuum degasser by using a flare. The flare has a maximum capacity of 12 MMBTU/hour, uses natural gas as fuel and operates within the temperature range of 1,400 to 1,600 °F. CO emissions are estimated to be reduced by approximately 95%.

CO PTE after control = 44 tons/year

- (2) Sources not Considered for the BACT Determinations
Based on the preliminary evaluations as indicated in the table below, the following sources were eliminated for BACT considerations:
- Birmingham Steel, AL
 - Charter Steel, WI
 - CSC Limited, OH
 - North Star Steel, MI
 - Nucor Steel, NE
 - Nucor-Yamato, AR
 - Oregon Steel, OR
 - Pennsylvania Steel Technologies, PA
 - Republic Technologies, OH
 - SDI, Whitley, IN and
 - Stafford Railsteel Corp, AR

Table 12 PSD BACT Limits - - Vacuum Degasser		
Company Name	CO (control device)	Additional Information
Birmingham Steel, AL	--	Permits do not specify limits for the degasser. This will not be considered for BACT evaluation.
CF&I Steel, CO (dba Rocky Mountain Steel)	2.57 tons/year (flare)	The degassing operations were limited to 600,000 tons of steel year to process. The supporting document indicated the CO emission factor to be 0.00875 lbs/ton of steel. No stack testing was required to verify this limit.
Charter Steel, WI	--	The degasser is electric powered. The degasser exhausts to the Meltshop baghouse. No specific limits for the degasser. This will not be considered for BACT evaluation.
CSC Limited, OH	4lbs/hour (flare)	The degasser is no longer operating. This will not be considered for BACT evaluation.
North Star Steel, MI	--	The degasser is part of the ladle refining station. No limits specified for the degasser. This will not be considered for BACT evaluation.
Nucor Steel, IN	--	The degasser in the Meltshop area is no longer operating. This will not be considered for BACT evaluation.
	0.075 lbs/ton (flare) <i>proposed</i>	A new vacuum degasser is being proposed in the Castrip area. This vacuum degasser will be used to remove entrained gases from the steel.
Nucor Steel, NE	--	Permits do not specify limits for the degasser. This will not be considered for BACT evaluation.
Nucor-Yamato, AR	0.005 lbs/ton (flare)	The vacuum degasser has a maximum capacity of 225 tons of steel per hour. However, the degasser was never built. This will not be considered for BACT evaluation.
Oregon Steel, OR	--	No specific limit for the degasser. The plant has a plant wide allowable limit. This will not be considered for BACT evaluation.
Pennsylvania Steel Technologies, PA	--	Permits do not specify limits for the degasser. This will not be considered for BACT evaluation.
Republic Technologies, OH	--	The degasser exhausts into the Meltshop baghouse, no specific limits for the degasser only. This will not be considered for BACT evaluation.
SDI, Hendricks, IN (formerly Qualitech)	-- (flare)	No limits were specified for the degasser. The permit specified that the flare shall operate at all time when the vacuum degasser is in operation. Limits were specified for the boiler associated with the degasser.
SDI, Whitley, IN	--	No limits were specified for the degasser itself, because the gases from the tank drawn off the tank will be vented to the boiler to be combusted. Limits were specified with the boiler associated with the degasser. This is different configuration with the proposed modification. This will not be considered for BACT evaluation.
Stafford Railsteel Corp, AR	4.3 tons/year 0.99 lbs/hour	The meltshop operations have a maximum capacity of 125 tons of steel per hour. This plant was never built. This will not be

	(flare)	considered for BACT evaluation.
--	---------	---------------------------------

Eliminating the sources not considered in the BACT determinations, the table below summarizes the sources considered for evaluations (sources are arranged in terms of CO BACT limits (lbs/ton) in ascending order):

Company Name	Vacuum Degasser Capacity (tons/hour)	Control	BACT Limits	
			(lbs/ton)	--
CF&I Steel, CO	600,000 tons/year	Flare	0.00875	2.57 tons/year
Nucor Steel, IN (<i>proposed</i>)	135	Flare	0.075	10.125 lbs/hour
SDI, Hendricks, IN	125	Flare	--	--

CF&I Steel, CO uses their degasser to remove hydrogen from the steel and not carbon monoxide (CO), while Nucor Steel, IN will decarbonize the steel. Removal of carbon from steel contributes to the significant potential emissions of CO. Due to the difference in operations, the CO BACT limit (0.00875 lbs/ton) will not be considered as BACT for this evaluation. In addition, CF&I, CO was not required to perform test to verify compliance with the lbs/ton emission rate.

CO PSD BACT - - Vacuum Degasser

Based on the information presented above, the CO BACT standards and mass emission limitations for the vacuum degasser are:

- (1) The use of flare to control the CO emissions.
- (2) The mass CO emissions limit is 0.075 pounds of CO per ton of steel produced. This is equivalent to 10.125 pounds of CO per hour, based on a 3 hour period.

$$\text{CO} = (0.075 \text{ lbs/ton}) * (135 \text{ tons/hour}) = 10.125 \text{ lbs/hour.}$$

SO₂, NO_x, VOC, PM, and PM₁₀ PSD BACT Determination - - Vacuum Degasser

Due to the relatively small SO₂, NO_x, VOC, PM and PM₁₀ emissions from the vacuum degasser, there are no add-controls that can be considered feasible. Emissions are due to degassing of the liquid steel and due to combustion. Evaluation of the information taken from the RBLC resulted to no control has been used to reduce SO₂, NO_x, VOC, PM and PM₁₀ emissions from vacuum degassers in steel mills.

The proposed BACT mass limits for the vacuum degasser were based on the manufacturer's guarantee.

Pollutant	BACT limits (lbs/ton)	PTE (lbs/hour)
SO ₂	0.02	2.7
NO _x	0.005	0.675
VOC	0.005	0.675
PM/PM ₁₀	0.008 grain/dscf	1.95
Opacity	3% based on a 6-minute average	

Nucor Steel
Crawfordsville, Indiana
Permit Writer: Iryn Calilung

Page 18 of 38
TSD of PSD/SSM 107-18314-00038

Boiler No. 501 PSD BACT Determination

Nucor Steel is proposing to install one (1) natural gas fueled low NO_x boiler, rated at 71.04 million BTU/hour (MMBTU/hour). This boiler, identified as Boiler No. 501, will provide steam to the vacuum degasser. Propane will be used as back up fuel. Emissions from this boiler will exhaust through a stack identified as Stack 501.

In the next subsequent pages of this document, specific PSD BACT determinations for each pollutant emitted by Boiler No. 501 are explained.

PM and PM₁₀ PSD BACT Determination - - Boiler No. 501

There are three (3) potential sources of filterable emissions from combustion sources:

- (1) mineral matter found in the fuel, solids,
- (2) dust in the ambient air used for combustion, and
- (3) unburned carbon formed by incomplete combustion of the fuel.

Due to the fact that natural gas is a gaseous fuel, filterable particulate matter (PM) emissions are typically low. PM emissions from natural gas combustion has both filterable and condensible fractions. The PM generated from natural gas combustion is usually larger molecular weight hydrocarbons that are not fully combusted. Increased PM emissions may result from poor air and fuel mixing or improper maintenance.

There are two (2) sources of condensible particulate emissions from combustion sources:

- (1) condensible organic that are the result of incomplete combustion, and
- (2) sulfuric acid mist, which is, found as sulfuric acid dihydrate.

PM and PM₁₀ Control Options Evaluated - - Boiler No. 501

The following control options were evaluated in the BACT review:

- | | | | |
|-----|----------------------------------|----|------------------------|
| (1) | Fabric Filter (Baghouse) | -- | technically infeasible |
| (2) | Electrostatic Precipitator (ESP) | -- | technically infeasible |
| (3) | Wet Scrubber | -- | technically infeasible |
| (4) | Cyclones | -- | technically infeasible |

All control options are technically infeasible because the primary fuel for the proposed boiler is natural gas, which has little or no ash at all that would contribute to the formation of PM or PM₁₀. The particulate concentration in the boiler exhaust gas stream is too low to be economically and effectively controlled by any of these options.

Add-on controls have never been applied to commercial natural gas or propane fired boilers, therefore, add-on particulate matter control equipment is not considered to be proven on natural gas fueled boilers.

The potential particulate emissions from the boiler are very low (PM = 0.59 tons/year and PM₁₀ = 2.36 tons/year), which would make these options economically infeasible.

No further evaluation of add-on particulate controls is necessary.

IDEM's PSD Permits Recently Issued for Similar Boilers

The Best Available Control Technology (BACT) evaluations made by IDEM for the most recent PSD permits issued for Nucor Steel (combustion sources) and SDI (vacuum degasser boiler) have gone through extensive analysis. The Office of Air Quality (OAQ) determined that it is not necessary to perform such extensive similar analysis because there have been no changes in the BACT determinations due to the short period of time between evaluations.

The table below summarizes the PSD BACT of Recently Issued PSD permits for similar boilers.

Table 15 PM and PM ₁₀ PSD BACT Limits - - Boilers				
Company Name	PSD Permit Issuance Date	Unit Rating (MMBTU/hr)	PM (lbs/MMBTU)	PM ₁₀ (lbs/MMBTU)
Nucor Steel	November 21, 2003 (107-16823-00038)	34	0.0019	0.0076
	<i>(proposed)</i> (107-18314-00038)	71.04	0.0019	0.0076
SDI Hendricks	August 29, 2003 (063-16628-00037)	8.4	0.0019	0.0076
SDI Whitley	May 31, 2002 (183-15170-00030)	41.08	0.0076	

PM and PM₁₀ BACT - - Boiler No. 501

Based on the information presented above, the PM and PM₁₀ BACT standards and mass emission limitations for the vacuum degasser boiler (Boiler No. 501) are:

- (1) The observation of good combustion practices.
- (2) The use of pipeline natural gas or propane as fuel.
- (3) The PM mass BACT limit is 0.0019 lbs/MMBTU.
- (4) The PM₁₀ mass BACT limit is 0.0076 lbs/MMBTU.

Nucor Steel proposed a PM mass BACT limit of 0.005 lbs/MMBTU. This proposed limit is not comparable to the most recent BACT determination made, therefore it was not considered.

Compliance with the BACT mass limits is verified by vendor certification and guarantee.

NO_x PSD BACT Determination - - Boiler No. 501

Nitrogen oxide (NO_x) formation during combustion consists of three (3) types:

- (1) **Thermal NO_x**
The principal mechanism of NO_x formation in natural gas combustion is thermal NO_x. The thermal NO_x mechanism occurs through the thermal dissociation and subsequent reaction of nitrogen and oxygen molecules in the combustion air. Most NO_x formed through the thermal NO_x is affected by three factors: oxygen concentration, peak temperature, and time of exposure at peak temperature. As these factors increase, NO_x emission levels increase. The emission trends due to changes in these factors are fairly consistent for all types of natural gas-fired boilers and furnaces. Emission levels vary considerably with the type and size of combustor and with operating conditions (e.g. combustion air temperature, volumetric heat release rate, load, and excess oxygen level).
- (2) **Prompt NO_x**
The second mechanism of NO_x formation, prompt NO_x, occurs through early reactions of nitrogen molecules in the combustion air and hydrocarbon radicals from the fuel. Prompt NO_x reactions occur within the flame and are usually negligible when compared to the amount of NO_x formed through the thermal NO_x mechanism.
- (3) **Fuel NO_x**
The final mechanism of NO_x formation, fuel NO_x, stems from the evolution and reaction of fuel-bonded nitrogen compounds with oxygen. Due to the characteristically low fuel nitrogen content of natural gas, NO_x formation through the fuel NO_x mechanism is insignificant.

NO_x Control Options Evaluated - - Boiler No. 501

The following control options were evaluated in the BACT review:

- (1) **Selective Catalytic Reduction (SCR) - - technically feasible, not economically feasible**
Selective Catalytic Reduction (SCR) introduces a reducing agent (ammonia) into the flue gas, upstream of a catalyst bed, which is maintained at an elevated temperature. The ammonia reacts with NO_x formed during combustion to form molecular nitrogen and water. The use of SCR on boilers has been demonstrated to be technologically feasible and could be considered as BACT if found to be cost effective.

Implementing SCR would require substantial capital expenditures and additional energy to keep the catalyst bed at high temperature. SCR is considered economically infeasible for reducing NO_x for natural gas fueled boilers.
- (2) **Flue Gas Recirculation (FGR) - - technically feasible, not economically feasible**
Flue Gas Recirculation (FGR) incorporates the recirculation of a portion of the flue gas back to the primary combustion zone as a replacement for the combustion air. The recirculated combustion products provide inert gases that lower the adiabatic flame temperature and the overall oxygen concentration in the combustion zone. As a result, FGR controls NO_x emissions by reducing the generation of thermal NO_x. FGR has been demonstrated to be technically feasible for controlling NO_x emissions from natural gas-fired boilers and could be considered as BACT if found to be economically feasible.

In 2003, another Indiana source (SDI) of similar operation submitted a cost analysis for incorporating external FGR into the boiler design. The cost was based on information from a degassing system/boiler vendor. The vendor expressed concern regarding the cyclic demand on the boiler and flame instability from external FGR. Regardless, the vendor provided a cost estimate for the use of external FGR for the boiler. An estimated 50% control efficiency for NO_x was used for the purposes of completing the cost analysis. The annual cost effectiveness of using

external FGR was estimated to be in excess of \$40,000 per ton of NO_x reduced. This cost was not considered feasible.

IDEM compared the specifications of the 3 vacuum degasser boilers, and concluded that the FGR is also considered not cost effective for this proposed modification.

(3) Low NO_x burners - - technically feasible, economically feasible.

Low NO_x burners control mixing of fuel and air in a pattern that keeps the flame temperature low and dissipates the heat quickly. Low NO_x burners incorporate many different design principles to achieve low NO_x operation.

The use of low NO_x burners has been considered technically and economically feasible for natural fueled boilers.

(4) Selective Noncatalytic reduction (SNCR) - - not technically feasible

Selective Noncatalytic Reduction (SNCR) is a post-combustion process in which a reagent mixture is injected into the elevated temperature flue gas stream. Using urea solution as reagent, a portion of the NO_x is converted to nitrogen, water, and carbon monoxide. The process may release ammonia during the incomplete combustion of urea. The operating temperature of SNCR is much higher than the exit gas temperature from the boiler. This temperature difference makes SNCR technically infeasible.

IDEM's PSD Permits Recently Issued for Similar Boilers

The Best Available Control Technology (BACT) evaluations made for the most recent PSD permits issued for Nucor Steel (combustion sources) and SDI (vacuum degasser boiler) have gone through extensive analysis. The Office of Air Quality (OAQ) determined that it is not necessary to perform such extensive similar analysis because there have been no changes in the BACT determinations due to the short period of time between evaluations.

The table below summarizes the PSD BACT of Recently Issued PSD permits for similar boilers.

Table 16		NO _x PSD BACT Limits - - Boilers		
Company Name	PSD Permit Issuance Date	Unit/Rating (MMBTU/hour)	NO _x (lbs/MMBTU)	
Nucor Steel	November 21, 2003 (107-16823-00038)	34	0.035	
	<i>(proposed)</i> (107-18314-00038)	71.04	0.035	
SDI Hendricks	August 29, 2003 (063-16628-00037)	48.4	0.035	
SDI Whitley	May 31, 2002 (183-15170-00030)	41.08	0.04	

NO_x PSD BACT - - Boiler No. 501

Based on the information presented above, the NO_x BACT standards and mass emission limitations for the vacuum degasser boiler (Boiler No. 501) are:

- (1) The use of low NO_x burner design.
- (2) The use of pipeline natural gas or propane as fuel.
- (3) The NO_x mass BACT limit is 0.035 lbs/MMBTU.

Compliance with the BACT mass limits is verified by vendor certification and guarantee.

SO₂ PSD BACT Determination - - Boiler No. 501

Sulfur dioxide (SO₂) emissions from natural gas-fired combustion sources are low because pipeline quality gas has low sulfur content. A properly designed and operated boiler utilizing low sulfur natural gas will insure minimal SO₂ emissions.

SO₂ Control Options Evaluated - - Boiler No. 501

A flue gas desulfurization (FGD) system is comprised of a spray dryer that uses lime as a reagent followed by particulate control or wet scrubber. Lime is injected by a spray dryer into the flue gas in the form of fine droplets under well-controlled conditions such that the droplets will absorb SO₂ from the flue gas and then become dry particulate due to evaporation of water. A particulate control device then captures the dry particulate. The captured particles are removed from the system and disposed.

This control option will generate dry solid waste, consisting mainly of lime and CaSO₄. This waste must be disposed of in a solid waste landfill, giving this option additional environmental concerns. Removal efficiencies decrease as the amount of sulfur contained in the fuel decreases. Also pipeline quality natural gas contains very little sulfur, thus making any FGD economically infeasible. Based on additional environmental concerns with the FGD solid waste, low sulfur removal efficiencies, and not economically feasible to use, FGD is eliminated as a BACT control option.

IDEM's PSD Permits Recently Issued for Similar Boilers

The Best Available Control Technology (BACT) evaluations made for the most recent PSD permits issued for Nucor Steel (combustion sources) and SDI (vacuum degasser boiler) have gone through extensive analysis. The Office of Air Quality (OAQ) determined that it is not necessary to perform such extensive similar analysis because there have been no changes in the BACT determinations due to the short period of time between evaluations.

The table below summarizes the PSD BACT of Recently Issued PSD permits for similar boilers.

Table 17		SO ₂ PSD BACT Limits - - Boilers		
Company Name	PSD Permit Issuance Date	Rating (MMBTU/hour)	SO ₂ (lbs/MMBTU)	
Nucor Steel	November 21, 2003 (107-16823-00038)	34	0.0006	
	<i>(proposed)</i> (107-18314-00038)	71.04	0.0006	
SDI Hendricks	August 29, 2003 (063-16628-00037)	48.4	0.0006	
SDI Whitley	May 31, 2002 (183-15170-00030)	41.08	0.0006	

SO₂ BACT - - Boiler No. 501

Based on the information presented above, the SO₂ BACT standards and mass emission limitations for the vacuum degasser boiler (Boiler No. 501) are:

- (1) The use of pipeline natural gas or propane as fuel.
- (2) The observation of good combustion practices.
- (3) The SO₂ mass BACT limit is 0.0006 lbs/MMBTU.

Compliance with the BACT mass limits is verified by vendor certification and guarantee.

CO and VOC PSD BACT Determination - - Boiler No. 501

The carbon monoxide (CO) emissions from boilers are a result of incomplete combustion of natural gas. Improperly tuned and maintained boilers operating at off design levels decrease combustion efficiency resulting in increased CO emissions. Control measures taken to decrease the formation of NO_x during combustion may inhibit complete combustion, which could increase CO emissions. Lowering combustion temperatures through premixed fuel combustion can be counterproductive with regard to CO emissions. However, improved air and fuel mixing inherent to newer combustor design and control systems limits the impact of fuel staging on CO emissions.

The volatile organic compound (VOC) emissions from natural gas-fired sources are the result of two possible formation pathways: incomplete combustion and recombination of the products of incomplete combustion. Complete combustion is a function of three variables; time, temperature and turbulence. Once the combustion process begins, there must be enough residence time at the required combustion temperature to complete the process, and during combustion there must be enough turbulence or mixing to ensure that the fuel gets enough oxygen from the combustion air. Combustion systems with poor control of the fuel to air ratio, poor mixing, and insufficient residence time at combustion temperature contribute to higher VOC emissions.

CO and VOC Control Options Evaluated - - Boiler No. 501

The following control options were evaluated in this BACT review:

- (1) Thermal oxidizer - - not technically feasible, counterproductive
Thermal oxidation heats the flue gas to a temperature of 1200 to 2000 degrees Fahrenheit, at which carbon monoxide (CO) will burn to produce carbon dioxide (CO₂). This option has not been used on natural gas fired boilers and therefore, is not a proven technology for this type of application. The low levels of CO and VOC in the exhaust gas stream would likely make this technology ineffective. This option would also require additional natural gas to be combusted and produce secondary emissions, which would be counterproductive. As a result, this option is eliminated as a BACT control option.
- (2) Catalytic combustion - - not technically feasible, counterproductive
Catalytic combustion uses a catalyst bed to burn flue gas at a temperature of 600 to 800 degrees Fahrenheit, causing carbon monoxide (CO) to burn and produce carbon dioxide (CO₂). The catalyst bed contains heavy metals and requires replacement and recycling and/or disposal, which would create unwanted secondary environmental effects. This option would also require additional natural gas to be combusted and produce secondary emissions, which would be counterproductive. As a result, this option is eliminated as a BACT control option.
- (3) Flue Gas Recirculation (FGR) - - technically feasible, not economically feasible
Flue Gas Recirculation (FGR) incorporates the recirculation of a portion of the flue gas back to the primary combustion zone as a replacement for the combustion air. The recirculated combustion products provide inert gases that lower the adiabatic flame temperature and the overall oxygen concentration in the combustion zone. FGR has been demonstrated to be technically feasible for controlling NO_x emissions from natural gas-fired boilers, and has been found to reduce emissions of CO also. This option could be considered as BACT if found to be economically feasible.

Due to the minimal CO emissions (CO = 18.98 tons/year) and VOC emissions (0.81 tons/year), using FDR to further reduce these emissions is not economically feasible.

- (4) [Proper design and operation and good combustion control - - technically feasible](#)
 Proper design and operation and good combustion practices are typically used as the methods to reduce CO and VOC emissions from natural gas fired boilers. Burner manufacturers control CO and VOC emissions by maintaining various operational combustion parameters. Fuel conditions, mixing, and changes in air can be adjusted to insure good combustion.

IDEM's PSD Permits Recently Issued for Similar Boilers

The Best Available Control Technology (BACT) evaluations made for the most recent PSD permits issued for Nucor Steel (combustion sources) and SDI (vacuum degasser boiler) have gone through extensive analysis. The Office of Air Quality (OAQ) determined that it is not necessary to perform such extensive similar analysis because there have been no changes in the BACT determinations due to the short period of time between evaluations.

The table below summarizes the PSD BACT of Recently Issued PSD permits for similar boilers.

Table 18 CO and VOC PSD BACT Limits - - Boilers				
Company Name	PSD Permit Issuance Date	Unit/Rating (MMBTU/hr)	CO (lbs/MMBTU)	VOC (lbs/MMBTU)
Nucor Steel	November 21, 2003 (107-16823-0038)	34	0.061	0.0026
	<i>(proposed)</i> (107-18314-00038)	71.04	0.061	0.0026
SDI Hendricks	August 29, 2003 (063-16628-00037)	48.4	0.061	0.0026
SDI Whitley	May 31, 2002 (183-15170-00030)	41.08	0.084	0.0026

CO and VOC BACT - - Boiler No. 501

Based on the information presented above, the CO and VOC BACT standards and mass emissions limitations for the vacuum degasser boiler (Boiler No. 501) are:

- (1) The use of pipeline natural gas or propane as fuel.
- (2) The observation of good combustion practices.
- (3) The CO mass BACT limit is 0.061 lbs/MMBTU.
- (4) The VOC mass BACT limit is 0.0026 lbs/MMBTU.

Compliance with the BACT mass limits is verified by vendor certification and guarantee.

Ladle Preheater PSD BACT Determination

Nucor Steel is proposing to install one (1) natural gas fueled ladle preheater, rated at 12 MMBTU/hour. Propane will be used as back up fuel. Emissions from the ladle preheater will exhaust through roof monitor (S-21, also identified as 105,106). Some emissions of this ladle preheater may also exhaust through the Castrip LMS Baghouse stack S-20.

The addition of this ladle preheater will result in a total of 3 ladle preheaters for the Castrip Line.

The two (2) existing ladle preheaters in the Castrip Line are rated at 15 MMBTU/hour each. They are equipped with Low NO_x burners and restricted at a rate of 0.10 lbs of NO_x/MMBTU.

All emissions will be by-products of combustion.

Add-on control is considered infeasible due to the potential to emit of the ladle preheater (see Table 3), capacity and size of the burners, and lack of exhaust gas capture systems.

The Office of Air Quality (OAQ) is not aware of a steel mill using any add-on control technology to control combustion-related emissions from preheater or dryers.

IDEM's PSD Permits Recently Issued for Similar Ladle Preheaters

The Best Available Control Technology (BACT) evaluations made for the most recent PSD permit issued in Indiana have gone through extensive analysis. The Office of Air Quality (OAQ) determined that it is not necessary to perform such extensive similar analysis because there have been no changes in the BACT determinations due to the short period of time between evaluations.

In August 29, 2003, OAQ issued a PSD permit for SDI, Hendricks County, IN which covered among other units, five (5) ladle preheaters/dryers, each rated at 7.5 MMBTU/hour. Since this PSD was issued in less than a year, and the ladle preheaters used the same fuel and with in the same rating range as the proposed ladle preheater, the BACT will be the same for the proposed ladle preheater in Nucor Steel's Castrip Line.

The table below summarizes the PSD BACT of Recently Issued PSD permits for similar preheaters.

Table 19		PSD BACT Limits - - Ladle Preheater						
Company Name	Permit Issuance Date	Rating (MMBTU/hour)	SO ₂	NO _x	VOC	CO	PM	PM ₁₀
			lbs/MMBTU					
SDI Hendricks	August 2003	7.5	0.0006	0.050	0.0055	0.084	0.0019	0.0076
Nucor Steel	2003 <i>(Proposed)</i>	12	0.0006	0.050	0.0055	0.084	0.0019	0.0076
	January 2001	15	--	0.10	--	--	--	--
SDI Whitley	July 1999	10	--	0.10	--	--	--	--

Nucor Steel provided a letter from their vendor (Process Technology International Inc.) indicating that the NO_x emission rate is 0.1 lbs/MMBTU for a 10 MMBTU/hour preheater. It has to be noted that the preheater planned to be installed by Nucor Steel is different in heat rate input from the one indicated by the vendor.

Nucor Steel provided another vendor's guarantee (Air Liquide). However, the burner system mentioned by the vendor is different from the burner that Nucor Steel is planning to install. This vendor guarantee was not used for the evaluation because the burner systems are different and the emission rates (0.35 lbs/MMBTU and 0.45 lbs/MMBTU) guaranteed by the vendor are not comparable to existing BACT limits.

Nucor Steel proposed a NO_x BACT limit of 0.10 lbs/MMBTU because Nucor Steel is planning to install a natural gas-air burner similar to the existing preheaters in Castrip Line. No additional information was provided by Nucor Steel, such as comparisons and difference in ladle design/operation and costs, which can be used in the BACT determination. Nucor Steel's proposed limit is not comparable to the most recent BACT determination made, therefore it was not considered.

PSD BACT - - Ladle Preheater

Based on the information presented above, the PSD BACT standards and mass emissions limitations for the Ladle Preheater are:

- (1) The use of pipeline natural gas as primary fuel and propane as back up fuel.
- (2) The Ladle Preheater equipped with low-NO_x burners.
- (3) The observation of good combustion practices.
- (4) The nitrogen oxides (NO_x) emissions from the ladle preheater shall not exceed 0.050 pounds per MMBTU.
- (5) The carbon monoxide (CO) emissions from the ladle preheater shall not exceed 0.084 pounds per MMBTU.
- (6) The volatile organic compound (VOC) emissions from the ladle preheater shall not exceed 0.0055 pounds per MMBTU.
- (7) The sulfur dioxide (SO₂) emissions from the ladle preheater shall not exceed 0.0006 pounds per MMBTU.
- (8) The PM_(filterable) emissions from the ladle preheater shall not exceed 0.0019 pounds MMBTU.
- (9) The PM_{10 (filterable and condensable)} emissions from the ladle preheater shall not exceed 0.0076 pounds per MMBTU.

Compliance with the BACT mass limits is verified by vendor certification and guarantee.

Contact and Noncontact Cooling Towers PSD BACT Determination

The theory behind cooling towers is that heat is transferred from water drops to the surrounding air by the transfer of sensible and latent heat. Cooling towers fall into two main sub-divisions:

- (1) Natural draft designs use very large concrete chimneys to introduce air through the media. Due to the tremendous size of these towers (500 ft high and 400 ft in diameter at the base) they are generally used for water flow rates above 200,000 gal/min. Usually these types of towers are only used by utility power stations in the United States.
- (2) Mechanical draft cooling towers are much more widely used. These towers utilize large fans to force air through circulated water. The water falls downward over fill surfaces, which help increase the contact time between the water and the air. This helps maximize heat transfer between the two.

Most cooling towers are designed as simple wet cooling towers, but upon occasion, a tower will be designed to operate as a wet-dry cooling tower. A wet-dry cooling tower adds heat to the airflow prior to discharge through the cooling tower fan stack. The discharge air is warmed above the ambient dew point to eliminate any visible plume that could cause local environmental concerns or hazards to local roadways.

A cooling tower uses a combination of heat and mass transfer to cool process water. If improperly selected or poorly maintained, it will add financial costs, cause a loss in production due to increases in circulation water temperature and increase electrical operating costs. Emphasis must be placed on properly specified and designed cooling towers that require minimal maintenance. Factors in proper performance of cooling towers are: water flow rate, air flow rate, water inlet/outlet temperatures, and ambient bulb temperature.

Nucor Steel is proposing to install:

- (1) One (1) contact cooling tower, rated at 8,000 gallons/minute. Emissions from this cooling tower will exhaust through stacks identified as Stack 502 and Stack 503.
- (2) One (1) noncontact cooling tower, rated at 8,000 gallons/minute. Emissions from this cooling tower will exhaust from stacks identified as Stack 504 and Stack 505.

These cooling towers are in addition to the existing cooling towers for the Castrip Line. The existing cooling towers are:

- (1) one contact cooling tower with a maximum flow rate of 12,000 gallons per minute, and
- (2) one noncontact cooling tower with a maximum flow rate of 12,000 gallons per minute.

The capacity of these cooling towers is the amount of water (gal/min) that a cooling tower will cool through a specified range, at a specified approach and wet-bulb temperature.

The following table lists the sources with cooling towers controlled by drift/mist eliminators. Drift is the circulating water lost from the tower as liquid droplets entrained in the exhaust air stream, expressed in % of circulating water rate, gal/min or ppm. Mist eliminators are assembly of baffles or labyrinth passages, used to separate small droplets of liquid (mist) from gas streams by trapping the mist droplets through inertial impaction. Mist eliminator provides consistent high collection efficiency, requires very little maintenance and helps maintain a healthy work environment with increased productivity.

The search of the RBLC was not limited to steel mills only. There are few sources with cooling towers with no control specified in the RBLC. There is also a wide range of limits of particulates because of the different capacity and numbers of cooling towers in a specific source. PM limits are specified in pounds/hour emission rates. Some BACT limits were also indicated in terms of percent of drifts (ranging from 0.0005% to 0.01%).

Sources are listed in alphabetical order.

Table 20 Cooling Towers with Drift/Mist Eliminators		
Acadia, LA	Genova, OK	Perryville Power, LA
AES, NJ	Liberty Gen, NJ	Plaquemine, LA
AES, PR	Mustang Power, OK	Ponca City Energy, OK
AK Steel, IN	Mantua Creek, NJ	Puerto Rico electric, PR
Arkansas Electric, AR	Mueller Casting, MS	Redbud, OK
Charter Steel, WI	North American Power, CO	SDI, Hendricks, IN
Carville, LA	Nucor Steel, IN	Shell, LA
Cleo Midstream, LA	Occidental Chem, LA	Tenaska, IN
Cogentrix, IN	Power, IA	Tenaska, AR
Conoco Charles Refinery, LA	PPG, LA	Texaco, CA
Duke, AR	Rocky Mountain Energy, CO	United Wisconsin Grain, WI
Energetix, OK	PREPA, PR	Ventures Lease Co., LA
Exxon Mobil, LA	PCLP, NJ	Wallula Generation, WA
Formosa Plastics, TX	PCS Phosphate Co., NC	Williams Refining, TN

IDEM's PSD Permits Recently Issued for Similar Cooling Towers

The Best Available Control Technology (BACT) evaluations made for the most recent PSD permits issued in Indiana have gone through extensive analysis. The Office of Air Quality (OAQ) determined that it is not necessary to perform such extensive similar analysis because there have been no changes in the BACT determinations due to the short period of time between evaluations.

- (1) On November 21, 2003, Nucor Steel was permitted under the PSD program (326 IAC 2-2) to install numerous cooling towers, ranging from 2,400 to 5,000 gallons per minute. The visible emissions of these cooling towers were limited to 20% opacity, based on a 6-minute average. Nucor Steel was required to submit the drift design of the cooling towers upon initial start up of the towers.
- (2) In addition, on August 29, 2003, IDEM approved SDI, Hendricks County, IN to install numerous cooling towers, ranging from 2,000 to 26,700 gallons per minute. The visible emissions of these cooling towers were also limited to 20% opacity, based on a 6-minute average. SDI was also required to submit the drift design of the cooling towers upon initial start up of the towers.

The BACT requirements for the 2 new cooling towers for the Castrip Line will be based on these 2 most recent PSD permits.

Nucor Steel proposed a drift rate of 0.005% as BACT for the cooling towers. This proposed limit is not comparable to the most recent BACT determination made, therefore it was not considered.

PSD BACT - - Cooling Towers

Based on the information provided above, the PSD BACT standards and mass emissions limitations for the cooling towers are:

- (1) Use of drift/mist eliminators as particulate control.
- (2) The drift rate from each cooling tower shall not exceed 0.0005%.
- (3) The opacity BACT for the cooling towers shall not exceed 20%.

Compliance with the BACT mass limits is verified by vendor certification and guarantee.

Site Area Characteristics

Nucor Steel is located in Crawfordsville, Montgomery County, Indiana.

- (1) **Land Use Classification**
The steel mill is located in a rural area. This was based on USEPA Auer (1978) land-use typing methodology. Rural dispersion coefficients were used in the modeling analyses.
- (2) **Air Quality Impact On Vegetation**
 - (a) There will be no significant adverse impact on vegetation because the predicted concentrations are below the national ambient air quality standards.
 - (b) Vegetation in the area includes corn, soybean, winter wheat, tall fescue, orchard grass and alfalfa hay.
- (3) **Topography**
The elevation of the plant is approximately 870 feet above sea level. The topography of the site is essentially flat lands.
- (4) **Air Quality Impact On Soil**
No significant adverse impact on soil is anticipated, because the concentrations are below the national ambient air quality standards.
- (5) **Air Quality Impact On Visibility**
Nucor Steel will not adversely impact the visibility at the Class I area. Nucor Steel is not located within 200 kilometers radius of the closest Class 1 area. The closest Class I area is the Mammoth Cave National Park, Edmonson County, KY.
- (6) **Air Quality Status**
 - (a) Nucor Steel is not subject to additional requirements impacting Class I area because it does not impact a Class I area. The nearest Class 1 area is the Mammoth Cave National Park, Edmonson County, KY. The state of Indiana has no Class I and III areas.
 - (b) Nucor Steel is located in Montgomery County, which is classified as attainment for all criteria pollutants.
- (7) **Wind Flow Pattern**
The prevailing wind directions are from south to west, occurring approximately 44% of the time.
- (8) **Construction Impact**
 - (a) General construction vehicles (gasoline and diesel powered) will be used. Emissions from and during the general construction are not expected to cause significant impact. Fugitive dust during construction phase is expected to be minimal.
 - (b) The operation of the proposed PSD modification is not anticipated to increase residential growth in the area.

Endangered Species

The Clean Air Act (CAA) does not contain or express requirement for the applicant or the permitting agency to analyze or consider the impact of hazardous air pollutants on endangered species when applying for or making a decision on a PSD permit. The CAA only requires impacts to endangered species be considered when the US EPA modifies the HAPs list or promulgates a NESHAP. (42 USC 7412). In addition, Indiana’s state rules do not require the performance of studies or analyses to determine the effect of toxic emissions from a source on federal or state-listed endangered species in the PSD permitting process. Endangered species are protected under state and federal laws, which prohibit the unlawful taking of an endangered species. [IC 14-22-34 and 16 USC 701 et. seq.]

However, IDEM still evaluated the possible effect of the proposed modification to any endangered specified in Indiana. The OAQ is not aware of any federally-listed endangered species within the vicinity of this source (Montgomery County). Therefore, emissions from this source will not adversely affect any federally-listed endangered species or any state-listed endangered species.

Below is a listing of endangered, threatened or rare species in Indiana used in this review.

Table 21		Endangered, Threatened or Rare Species in Indiana	
Common Name	(Type)	County	Town Name
White Cat's Paw Pearlymussel	(Mollusk)	Allen	Fort Wayne, Cedarville, Woodburn, Grabill
		Kosciusko	Burket, Leesburg
Eastern Fanshell Pearlymussel	(Mollusk)	Wabash	Lagro, Wabash
Clubshell	(Mollusk)	Allen	Fort Wayne, Woodburn, Grabill, Cedarville
		Kosciusko	South Whitley, Mentone, Burket, Leesburg
		Huntington	Mount Etna
		Wabash	North Manchester
Northern Riffleshell	(Mollusk)	Allen	Fort Wayne, Grabill, Cedarville
		Kosciusko	Mentone, Burket, Leesburg, North Webster
Peregrine Falcon	(Bird)	Allen	Fort Wayne
		Kosciusko	North Webster
Indiana Bat Or Social Myotis	(Mammal)	Kosciusko	Warsaw
		Huntington	Mount Etna
		Wabash	Roann
Prairie White-Fringed Orchid	(Plant)	Noble	Merriam, Kendallville

Preventive Maintenance Plan (PMP)

(1) Authority to Require PMPs

The authority to require a Permittee to develop and implement PMPs is under the Part 70 program. The Part 70 rules indicate the PMP requirements in:

- (a) 326 IAC 2-7-4(c)(4)(9), which requires the Part 70 application confirms the existence of an on-site PMP.
- (b) 326 IAC 2-7-5(13), which requires the Part 70 operating permit to have a provision regarding a PMP.

Nucor Steel is an existing Part 70 source, and thus by the authority specified under 326 IAC 2-7 (Part 70), Nucor Steel has to developed, implement and maintained PMPs.

(2) Facility vs. Control Equipment

Since the State of Indiana already has an existing rule (326 IAC 1-6-3) regarding PMPs, the Part 70 Operating Permit rules reference this existing rule for the information to be included in the PMPs.

This existing rule (326 IAC 1-6-3) applies to any person responsible for operating a facility shall prepare and maintain a PMP including the following information:

- (a) Identification of the individual(s) responsible for inspecting, maintaining and repairing emission control devices. [326 IAC 1-6-3(a)(1)]
- (b) A description of the items or conditions that will be inspected and the inspection schedule for said items and conditions. [326 IAC 1-6-3(a)(2)]
- (c) Identification and quantification of the replacement parts which will be maintained in inventory for quick replacement. [326 IAC 1-6-3(a)(3)]

326 IAC 1-2-26 defines Facility as any one structure, piece of equipment, installation or operation, which emits or has the potential to emit any air contaminant.

Based on this, 326 IAC 1-6-3 applies to any person responsible for operating any one structure, piece of equipment, installation or operation, which emits or has the potential to emit any air contaminant shall prepare and maintain a PMP including the information specified in 326 IAC 1-6-3(a)(1) to (a)(3).

This PMP rule applies to a facility, and by definition, a facility does not necessarily should always have a control equipment.

This rule did not limit the authority to any person responsible for operating control device to prepare and maintain a PMP.

This PMP rule applies to a facility, which may or may not have a control device.

If the facility required to have a PMP has a control device, then the PMP should include the information of the individual(s) responsible for inspecting, maintaining and repairing emission control devices. [326 IAC 1-6-3(a)(1)]

This rule did not indicate that the PMP is limited to control equipment only, rather the rule indicates that the PMP shall include this specific information for the control device. In the same

manner, if the facility required to have a PMP does not have a control device, then the PMP should not include this specific information.

It has to be noted that there are at least 3 sets of information to be included in the PMP.

As the first set of information is limited to the personnel responsible for inspection, maintenance and repair of the emission control device(s), the other 2 remaining sets of information are not limited to control devices only.

- - A description of the items or conditions that will be inspected and the inspection schedule for said items and conditions. [326 IAC 1-6-3(a)(2)]
- - Identification and quantification of the replacement parts which will be maintained in inventory for quick replacement. [326 IAC 1-6-3(a)(3)]

(3) Emissions Units PMP Requirements

- (a) The vacuum degasser and its control device (flare) are subject to the PMP requirement.
- (b) Boiler No. 501 is subject to the PMP requirement.
- (c) The ladle preheater is not required to maintain a PMP because its emissions are minimal.
- (d) PMP will be required for the drift eliminators of the cooling towers.

Compliance Determination and Monitoring

The Office of Air Quality (OAQ) has evaluated monitoring requirements and recommends the following:

- (1) The flare for the CO emissions reductions shall be operated with a flame present at all times when the vacuum degasser is in operation.

The presence of a flare pilot flame shall be monitored using a thermocouple or any equivalent device to detect the presence of the flame.
- (2) Compliance is shown for the Boiler No. 501 by the use of natural gas fuel. Compliance certification will be required because a back up fuel (propane) is used.
- (3) No compliance monitoring will be required for the cooling towers.
- (4) No compliance monitoring will be required for the alloy storage and handling system.

Compliance Testing Requirements

- (1) CO compliance testing will be required for the vacuum degasser to verify that the flare is operating properly.
- (2) No compliance testing will be required for the boiler, ladle preheater, cooling towers and alloy storage and handling systems.

Public Health and Safety

The Office of Air Quality (OAQ) issues technically sound permits that are protective of public health. Within the boundaries of the law, the OAQ has conducted appropriate analysis of the impacts of this proposed facility on human health. State Implementation Plan (SIP) requirements are examples of health-based standards, because the SIP requirements were proposed by the state and approved by the U.S. EPA for the purposes of maintaining the National Ambient Air Quality Standards (NAAQS). These standards are health-based standards and based on the assessment of public health risks associated with certain levels of pollution in the ambient environment. The Clean Air Act (CAA) requires each state to develop air quality plans and outlines how the standards will be met.

U.S. EPA has established ambient levels that are protective of human health. Anticipated emissions can be modeled and the resulting ambient levels compared to the federal standard. If levels are not expected to increase above U.S. EPA's ambient standard, it is appropriate to conclude that the proposed facility will not pose an increased threat to public health.

Nucor Steel cannot sell steel that contains any radioactive quantities. Therefore, there is great incentive to keep radioactive material from being accepted as scrap metal. The scrap management plan specified that any loads of scrap material with radioactive materials or radiation are not to be accepted. The OAQ is not aware that radioactive materials will be used in this process.

Noise, Odor and Zoning

The Office of Air Quality (OAQ) does not have jurisdiction over noise pollution, odor, or zoning.

Environmental Justice (EJ)

Based on the 2000 US Census, there are 12.5% of Indiana residents who identified themselves as racial minority. An area is classified as High Racial Minority if it falls between 18.75% to 24.99 %. Montgomery County, IN, where Nucor Steel is located at, is not showing to be under this classification.

Based on the 1990 US Census, 28% of Indiana residents lived in households that received an income less than or equal to twice the poverty level. This is classified a Low Income Household. Montgomery County, IN is not showing to be under this classification.

If the source being reviewed is going to be located in an area considered to be either a High Racial Minority or Low Income Household, the Office of Air Quality (OAQ) attempts to published the notice for the public review in a non-English newspaper, and holds public meeting prior to the issuing a final action. Since Montgomery County is neither of these classifications, the OAQ will only publish the notice in the most circulated newspaper in the area.

For more information on EJ, please refer to <http://www.in.gov/idem/environmentaljustice>.

Recommendations and Conclusion

(1) Based on the facts, conditions and evaluations made, the Office of Air Quality (OAQ) recommends to the Indiana Department of Environmental Management (IDEM) Commissioner that the preliminary findings in the PSD/SSM 107-18314-00038 be provided to the public for review.

(2) 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 December 15, 2003. Addition information was received on January 5, 2004; January 20, 2004; March 5, 2004; and March 22, 2004.

(3) The applicant has provided a copy of the application in the Crawfordsville Public Library, 222 South Washington, Crawfordsville, IN 47933, Telephone: 765-362-2242.

(4) The following officials will be notified of this proposed modification:

(a) County Commissioner, 100 East Main Street, Crawfordsville, IN 47933 and

(b) Mayor, 300 East Pike Street, Crawfordsville, IN 47933.

(5) A notice of the preliminary findings will be published in the most circulated newspaper in the area. There will be a 30-day comment period. IDEM will also hold a public hearing during the comment period. For additional information about air permits and how the public can participate, see IDEM's Guide for Citizen Participation and Permit Guide on the Internet at: www.IN.gov/idem/guides.

(6) A copy of the preliminary findings is available on the Internet at: www.IN.gov/idem/air/permits/Air-Permits-Online.

(7) The construction of this proposed modification shall be subject to the conditions of the attached proposed PSD/SSM No. 107-18314-00038.

IDEM Contact

Questions regarding this proposed PSD permit can be directed to Iryn Calilung at the Indiana Department Environmental Management, Office of Air Quality, 100 North Senate Avenue, P.O. Box 6015, Indianapolis, Indiana 46206-6015 or by telephone at (317) 233-5692 or toll free at 1-800-451-6027 extension 3-5692 or at icalilun@dem.state.in.us.

**Indiana Department of Environmental Management
Office of Air Quality**

Technical Support Document Addendum (TSDA) for a
Prevention of Significant Deterioration (PSD) and
Part 70 Significant Source Modification (SSM)

Source Background and Description
--

Source Name:	Nucor Steel
Source Location:	4537 South Nucor Street, Crawfordsville, IN 47933
Mailing Address:	4537 South Nucor Street, Crawfordsville, IN 47933 RR2, Box 311, Crawfordsville, IN 47933
General Telephone Number:	765-364-1323
General Facsimile Number:	765-364-5311
Responsible Official:	General Manager
County Location:	Montgomery
SIC Code:	3312 (Steel Mill)
Source Categories:	1 of 28 Listed Source Categories Major PSD Source
Significant Source Modification:	Major Source, CAA Section 112 PSD 107-18314-00038
Permit Writer:	Iryn Calilung

Public Notification and Participation
--

On March 27, 2004, the Office of Air Quality (OAQ) had a notice published in the Journal Review, stating that Nucor Steel had applied for an air approval to modify their existing mini mill plant.

A public hearing was held on April 20, 2004, in the Southmont High School, 6425 US Highway 231 South, Crawfordsville, IN. The public hearing officer was Mack Sims. Transcript of the hearing was done by Accurate Reporting of Indiana, Carmel, IN.

The public comment period ended on April 26, 2004.

On April 23, 2004, Nucor Steel submitted comments. The comments are re-stated in the following pages with the **IDEM responses**. Changes made to the draft permit are shown in ~~strikeout~~ or **bold** fonts to show the difference.

The IDEM does not amend the Technical Support Document (TSD) and Appendices of the draft permit. They are maintained to document the original review. This addendum to the TSD documents the comments, responses, and revisions made from the time the permit was drafted until a final decision is made.

Section A General Information

(1) Condition A.1 General Information

Please revise the General Telephone Number of the facility as 765-364-1323, not 2323.

(2) Condition A.2 Emission Units and Pollution Control Equipment Summary

(a) To eliminate any confusion about how the vacuum degasser will be used, Nucor requests that the phrase “and 1.5 tons of alloys/hour” be deleted from the second line of Condition A.2(1), first paragraph.

The reference to 1.5 tons of alloys/hour is not a design or operational constraint that Nucor intended to request for inclusion in the permit. Indeed, Nucor’s application included a higher maximum rate than the 1.5 tons/hour referenced by the draft permit. While 1.5 tons of alloys/hour may be used at some times and is anticipated to be a typical amount, the vacuum degasser can and will operate at other rates and Nucor needs to preserve the flexibility to operate at those other rates.

(b) The last sentence of the first paragraph should be revised to reflect that decarburization may also occur as part of this process. Nucor recommends revising the last sentence to read: “Desulfurization and/or decarburization may also occur during the degassing process.”

(c) The flare burner has a maximum capacity of 12 MMBTU/hour, not the flare itself. Please revise the second paragraph to add “burner” after flare in the second line of the second paragraph.

(d) In the description of the low NOx boiler, the words “per hour” should be added after “British Thermal Unit”.

(e) In the last PSD permit (107-16823-00038), IDEM, OAQ added chemical storage tanks, even though exempt pursuant to 326 IAC 2-1.1-3(e). Nucor’s preference is to leave minor storage tanks off the permit. If IDEM, OAQ insists that tanks must be included in the permit, the water treatment chemical storage tanks for the cooling water systems include: sulfuric or similar acid; sodium hypochlorite or similar disinfectant; caustic; polymer, and phosphate.

(3) Description of the Proposed Project in the TSD

(a) Please revise the TSD to correspond to comments above by eliminating the reference to 1.5 tons alloys/hour and adding decarburization as stated in those comments.

(b) Please clarify in the TSD that the flare burner has a capacity of 12 MMBTU/hour.

IDEM Response:

IDEM agrees with the recommended changes. The chemical storage tanks for the cooling towers have been added to the list of emission units.

Additionally, the description for the flare has been revised to clarify that it is an "open flare".

- A.1 The Permittee owns and operates a stationary steel mini-mill that produces all grades of carbon and stainless steel, all grades of alloy steel, all grades of ultra low and low carbon steel, flat rolled, hot rolled, cold rolled, galvanized, pickled and oiled steel (slabs, sheets) products.

Source Name:	Nucor Steel
Source Location:	4537 South Nucor Street, Crawfordsville, IN 47933
Mailing Address:	4537 South Nucor Street, Crawfordsville, IN 47933 RR2, Box 311, Crawfordsville, IN 47933
General Telephone Number:	765-364-2323 1323
General Facsimile Number:	765-364-5311
Responsible Official:	General Manager
County Location:	Montgomery
SIC Code:	3312 (Steel Mill)
Source Categories:	1 of 28 Listed Source Categories Major PSD Source Major Source, CAA Section 112

- A.2 This stationary source is approved to construct, modify and operate the following emission units and pollution control devices:

- (1) One (1) vacuum degasser with process gas lances. This vacuum degasser has a maximum capacity of 135 tons of steel/hour ~~and 1.5 tons of alloys/hour~~. This vacuum degasser will be used to remove entrained gases from the steel. ~~Desulfurization also occurs during the degassing process.~~ **Desulfurization and/or decarburization may also occur during the degassing process.**

This vacuum degasser will use an **open** flare to control carbon monoxide (CO) emissions. The **open** flare **burner** has a maximum capacity of 12 MMBTU/hour, uses natural gas as primary fuel with propane as back up fuel, and operates within the temperature range of 1,400 to 1,600 °F. Controlled emissions will exhaust through a stack identified as Stack 500.

The maximum capacity of the vacuum degasser is the same as the ladle metallurgical station (LMS) and Caster in the Castrip Line.

- (2) One (1) natural gas fueled low NO_x boiler, rated at 71.04 million British Thermal Unit **per hour** (MMBTU/hour). This boiler, identified as Boiler No. 501, will provide steam to the vacuum degasser. Propane will be used as back up fuel. Emissions from this boiler will exhaust through a stack identified as Stack 501.
- (3) One (1) natural gas fueled ladle preheater, rated at 12 MMBTU/hour. Propane will be used as back up fuel. Emissions from the ladle preheater will exhaust through roof monitor (S-21, also identified as 105,106). Some emissions of this ladle preheater may also exhaust through the Castrip LMS Baghouse stack S-20.

The addition of this ladle preheater will result in a total of 3 ladle preheaters for the Castrip Line.

- (4) One (1) contact cooling tower, rated at 8,000 gallons/minute, with drift/mist eliminators for particulate control. Emissions from this cooling tower will exhaust through stacks identified as Stack 502 and Stack 503.
- (5) One (1) noncontact cooling tower, rated at 8,000 gallons/minute, with drift/mist eliminators for particulate control. Emissions from this cooling tower will exhaust from stacks identified as Stack 504 and Stack 505.
- (6) Chemical storage tanks for sulfuric or similar acid, sodium hypochlorite or similar disinfectant, caustic, polymer, and phosphate.**
- (6 7) Associated alloy unloading, storage and feed systems:
 - (a) One (1) truck dump station
 - (b) Truck unloading/conveyors
 - (c) Eight (8) storage hoppers, all exhausting to a common bin vent, rated at 0.01 grains/dry standard cubic foot, into the building.

Alloy unloading is performed in a 3-sided building along the side of the existing Castrip building.

Section C General Operating Conditions
--

(1) C.2 Preventive Maintenance Plans (PMPs)

- (a) Nucor hereby incorporates its objections to the Preventive Maintenance Plan (PMP) condition C.2 set forth in its appeal of the similar Preventive Maintenance Plan (PMP) conditions in PSD Permit No. 107-16823-00038, issued on November 21, 2003.
- (b) Nucor objects to the Preventive Maintenance Plan (PMP) requirements in the TSD for the same reasons it objected to similar conditions in PSD Permit No. 107-16823-00038, issued on November 21, 2003.

Nucor hereby incorporates its objections set forth in comments on PSD Permit No. 107-16823-00038 as its objections and comments to this permit. PSD Permit No. 107-16823-00038's incorporation of these preventive maintenance plan (PMP) requirements is presently under appeal before the Office of Environmental Adjudication (EAB).

- (c) The same objections were made for Conditions D.1.4, D.2.5(a) and D.3.4.

IDEM Response:

The Preventive Maintenance Plan (PMP) requirement must be included in every applicable Part 70 permit pursuant to 326 IAC 2-7-5 (13). This rule refers back to the Preventive Maintenance Plan (PMP) requirement found in 326 IAC 1-6-3. This Preventive Maintenance Plan (PMP) rule sets out the requirements for:

- (a) Identification of the individuals responsible for inspecting, maintaining and repairing the emission control equipment. [326 IAC 1-6-3 (a)(1)]
- (b) The description of the items or conditions in the facility that will be inspected and the inspection schedule for said items or conditions. [326 IAC 1-6-3(a)(2)]
- (c) The identification and quantification of the replacement parts for the facility, which the Permittee will maintain in inventory for quick replacement . [326 IAC 1-6-3(a)(2)]

The structure of 326 IAC 1-6-3 applies to the owner or operator of any facility required to obtain a permit and the PMP requirement affects the entirety of the applicable facilities.

Only 326 IAC 1-6-3 (a)(1) is limited, in that it requires identification of the personnel in charge of only the emission control equipment, and not any other facility equipment.

326 IAC 1-6-3(b) provides that "...as deemed necessary by the commissioner, any person operating a facility shall comply with the requirements of subsection (a) of this section."

In addition to preventive maintenance performed on the control devices, preventive maintenance should also be performed on the emission units themselves because lack of proper maintenance on the units can result in increased emissions. Many types of facilities require maintenance in order to prevent excess emissions.

There is no change to the permit as a result of this comment.

- (2) C.13 Compliance Response Plan (CRP)
- (a) Nucor hereby incorporates its objections to the Compliance Response Plan (CRP) condition set forth in its appeal of the similar Compliance Response Plan (CRP) condition in PSD Permit No. 107-16823-00038, issued on November 21, 2003.
- (b) There is no generally applicable requirement to submit the OMM or SSM plan to IDEM, OAQ. See 40 C.F.R. § 63.6(e)(3). IDEM, OAQ may certainly request a copy at any time.

IDEM Response:

An important goal of the Part 70 Operating Permit program is to assure that each Permittee has the ability to assure compliance with applicable requirements on a continuous basis.

During the development of the Part 70 permit program, IDEM worked with interested parties, such as the:

- Clean Air Strong Economy (CASE)
- Clean Air Act Advisory Council's Permit Committee,
- Indiana Manufacturing Association (IMA),
- Indiana Chamber of Commerce, and
- Individual Part 70 sources.

A consensus was reached that written plans, outside of the permit document, such as the Compliance Response Plan (CRP), are vital tools that the Permittee can implement to ensure compliance. Plans are also the documents to implement if an emission unit or air pollution control device deviates from its normal operation.

Even though 326 IAC 2-7-5 and 326 IAC 2-7-6 do not have or use the exact term "compliance response plan (CRP)", 326 IAC 2-7-6(6) provides the Department the authority to specify provisions in the Part 70 Operating Permit as the Commissioner may require with respect to ensuring compliance with applicable requirements. IDEM has determined that a CRP provision is necessary with respect to compliance assurance.

The requirement to develop and implement the plan does not prescribe any new applicable requirement. The CRP is a compilation of reasonable responses, schedules, work practices and other information developed by the Permittee from the standpoint of good business practices and the prevention of environmental problems. The Permittee has to implement these reasonable responses and schedules to maintain or return to compliance. The steps documented in the plan are reasonable actions to be taken for specific deviations that occur at the emission unit or control device.

Permittees already have maintenance schedules and trouble shooting guidelines that specify options and steps to be taken when the emission unit or control device is not operating or functioning properly. The Permittee has the knowledge, expertise and experience on how to operate the equipment at the plant, and is required to develop the CRP based on this knowledge, experience and expertise. The CRP maintains the documentation, such that changes in personnel will not hinder the proper operation of the emission unit and control device. The CRP provides the plant's employees a quick reference on how to respond when an emission unit or air pollution control device deviates from its normal operation, thus avoiding long periods of deviations.

In addition, the Indiana Code IC 13-14-1-13 (Duties of the Department: Monitoring and Reporting) states the following:

The Commissioner shall establish and administer monitoring and reporting requirements as necessary to carry out the duties and exercise the powers provided in the following:

- (1) Air pollution control laws.
- (2) Water pollution control laws.
- (3) Environmental management laws.

This Indiana statute provides broader authority than just allowing the Commissioner to simply copy monitoring and reporting requirements that are specifically established in some other law.

Condition C.13(b) has been revised to indicate that submission of OMM or SSM plan is required only when applicable.

C.13(b) The OMM Plan or Parametric Monitoring and SMM Plan shall be submitted (**as applicable**) within the time frames specified by the applicable 40 CFR 60 or 40 CFR 63 requirement.

- (3) C.14(a) Deviations from Permit Requirements and Condition
The first parenthetical should be corrected to “see Section C.15 – Emergency Provisions”.

IDEM Response:

IDEM agrees with the change.

C.14(a) Deviations from any permit requirements (for emergencies see Section C.15 - Emergency Provisions), the probable cause of such deviations, and any reasonable response steps or preventive measures taken shall be reported to:
Indiana Department of Environmental Management
Compliance Data Section, Office of Air Quality
100 North Senate Avenue, P.O. Box 6015
Indianapolis, Indiana 46206-6015

- (4) C.16(a) Actions Related to Noncompliance Demonstrated by a Stack Test
The first line should specify “Section C.8 – Performance Testing”.

IDEM Response:

IDEM agrees with the change.

C.16(a) When the results of a stack test performed in conformance with Section C.8 - 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.

Section D.1 Vacuum Degasser and Open Flare

(1) Facility Description of the Vacuum Degasser

- (a) The reference to 1.5 tons of alloys/hour is not a design or operational constraint that Nucor requested. While 1.5 tons of alloys/hour is typical of the alloy application rate, the vacuum degasser can and will operate with at other rates. In its application, Nucor noted that higher rates of alloy addition could be used. To eliminate any confusion about how the vacuum degasser will be used, Nucor requests that the phrase “and 1.5 tons of alloys/hour” be deleted from the second line of Condition A.2(1), first paragraph.

Please revise the TSD to correspond to comments above by eliminating the reference to 1.5 tons alloys/hour and adding decarburization as stated in those comments.

- (b) The last sentence of the first paragraph should be revised to reflect that decarburization may also occur as part of this process. Nucor recommends revising the last sentence in the TSD to read: “Desulfurization and/or decarburization may also occur during the degassing process.”
- (c) The flare burner has a maximum capacity of 12 MMBTU/hour, not the flare itself. Please revise the second paragraph to add “burner” after flare in the second line of the second paragraph.

Please clarify in the TSD that the flare burner has a capacity of 12 MMBTU/hour.

IDEM Response:

IDEM agrees with the changes, however, IDEM does not amend the technical support document (TSD). The TSD is maintained to document the original review. This TSD Addendum is used to document responses to comments and changes made from the time the permit was drafted until a final decision is made.

One (1) vacuum degasser with process gas lances. This vacuum degasser has a maximum capacity of 135 tons of steel/hour ~~and 1.5 tons of alloys/hour~~. This vacuum degasser will be used to remove entrained gases from the steel. ~~Desulfurization also occurs during the degassing process.~~ **Desulfurization and/or decarburization may also occur during the degassing process.**

This vacuum degasser will use an **open** flare to control carbon monoxide (CO) emissions. The **open** flare **burner** has a maximum capacity of 12 MMBTU/hour, uses natural gas as primary fuel with propane as back up fuel, and operates within the temperature range of 1,400 to 1,600 °F. Controlled emissions will exhaust through a stack identified as Stack 500.

The maximum capacity of the vacuum degasser is the same as the ladle metallurgical station (LMS) and Caster in the Castrip Line.

(2) D.1.1(f) Particulate Emissions Limitation

The pounds per hour rate should be 0.45, not 1.95.

IDEM Response:

IDEM corrected the particulate emission rate.

D.1.1(f) The particulate emissions from the vacuum degasser shall not exceed 0.008 grain per dry standard cubic foot, and ~~1.95~~ **0.45** pounds per hour, based on a 3-hour block average.

(3) D.1.1(g) and D.1.3(h) Vacuum Degasser and Open Flare Opacity Limitation

(a) There is no basis in the record for the proposed 3% opacity standard in D.1.1(g). The vacuum degasser is a “new” stack from a new process and is not subject to the existing facility opacity limits. A preliminary review of the RACT/BACT/LAER Clearinghouse shows no other degasser subject to an opacity limit.

Indeed, as the unit is located inside the Castrip building and exhausts through a flare, it is not apparent how an opacity limit on the unit (as opposed to the flare) would even be enforced. Nucor requests that the proposed opacity limit on the vacuum degasser itself be deleted.

(b) As outlined in Nucor’s comments on the draft permit condition D.1.1(g), the 3% opacity limit specified in the TSD is not justified. There are no comparable sources for which a 3% opacity standard is established. A review of the RBLC shows that opacity is generally not controlled because of the nature of flaring operations and the inconsistent flow and combustion rates. IDEM, OAQ has not justified in the TSD why a 3% standard is appropriate in this case.

Further, because this is a “new” operation, the existing opacity limits do not apply.

(c) There is no basis in the record for the proposed 3% opacity limit in D.1.3(h). The vacuum degasser flare is a “new” stack from a new process and is not subject to the existing facility opacity limits. A review of the RACT/BACT/LAER Clearinghouse reveals that for most flares, no opacity limit is specified because flares, by their nature, are used for controlling emissions, frequently on a sporadic basis under less than optimum combustion conditions. Because the vacuum degasser flare will be used in exactly this situation – to combust variable quantities of CO off-gassed from the degassing operation, it is similarly appropriate not to impose an opacity standard where the Permittee has little control over how or when the emissions will be routed to the flare. Nucor thus recommends that the flare be subject solely to the site wide opacity standard in Condition C.4 (40%).

IDEM Response:

IDEM disagrees that the opacity limit for the vacuum degasser stack should be deleted.

- The vacuum degasser is one of the processes in this modification that was subject to PSD major review, therefore, an opacity limitation has to be specified.
- It is also incorrect that no opacity limitation was specified for vacuum degassers. CF & I, located in Colorado, one of the steel mills used in the PSD BACT analysis, has an opacity limit of 20% specified for its vacuum degasser facility. Research of the PSD

BACT limits was not limited by using the RACT/BACT Clearinghouse database. This specific opacity limit was found in the Colorado Air Pollution Control Division Website: <http://www.cdphe.state.co.us/ap/aphom.asp>.

- The general provisions of the federal regulations New Source Performance Standards, 40 CFR Part 60.18(c)(1) requires flares to be operated with no visible emissions. IDEM acknowledges that this particular open flare is not specifically subject to the federal requirement (40 CFR Part 60), however, such a standard operating requirement can be used as a requirement for PSD BACT determination.
- On May 27, 1999, the Environmental Appeal Board (EAB) decided a PSD appeal for AES Puerto Rico that a reasonable approach on the part of the permitting agency can be used to determine a PSD BACT limit based on the fact that little guidance was available regarding the achievability of a PM10 emissions limit. The permitting agency was left to derive a PM10 limit by using a similar approach that the EAB upheld in Hadson Power, EAB 1992 PSD Appeal. The use of adjustable limit, constrained by certain parameters, is a reasonable approach.

IDEM used the same approach in setting up the opacity limit for the vacuum degasser. IDEM based the PSD BACT opacity standard on the available information on hand and practical achievability of the opacity limits.

IDEM compared the federal standard with the opacity limit specified for CF&I, CO. IDEM determined that 20% is not comparable with other operations in a major PSD source such as a steel mill, while no visible emissions (equivalent to 0%) is stringent and not achievable on a continuous basis. IDEM concluded that 3% is the appropriate opacity limit for the vacuum degasser/flare stack. This is the same opacity standard for the other operations involved in the Castrip Line.

- The OAQ electronic database shows the following source tested for opacity with no visible emissions observed.

Southside Landfill, Marion County has 5 flares, one of which is considered an open flare, similar to the one proposed by Nucor Steel. These five (5) flares were tested on November 18, 2002, with no visible emissions observed.

IDEM agrees that the opacity limitation should apply to the stack emissions from the degasser exhausting to the open flare. Condition D.1.1(g) is revised to clarify that the opacity limit applies to the open flare stack. Since Condition D.1.3(h) is redundant, it has been deleted.

D.1.1(g) The opacity from the vacuum degasser **open flare** stack (Stack 500) shall not exceed 3% opacity, based on a six-minute average.

~~D.1.3(h) The visible emission from the 12 MMBTU/hour flare shall not exceed 3% opacity, based on a 6-minute average as determined in 326 IAC 5-1-4.~~

(4) D.1.3 Open Flare Burner (12 MMBTU/hour) PSD BACT Limits

Nucor requests that the reference to “12 million British Thermal Unit per hour (MMBTU/hour)” be dropped throughout this condition because it is misleading. The flare burner flame is rated at 12 MMBTU/hour; the flare itself, when combusting CO, may exceed that figure.

IDEM Response:

Condition D.1.3 has been revised to clarify that the applicable PSD BACT requirements apply to the burner of the open flare.

D.1.3 Pursuant to 326 IAC 2-2 Prevention of Significant Deterioration (PSD), the Permittee shall comply with the following Best Available Control Technology (BACT) requirements:

- (a) The 12 million British Thermal Unit per hour (MMBTU/hour) **open flare burner** shall use natural gas as primary fuel and propane as back up fuel.
- (b) The collateral nitrogen oxide (NO_x) emissions from the 12 MMBTU/hour flare **burner** shall not exceed 0.10 pounds per MMBTU.
- (c) The collateral sulfur dioxide (SO₂) emissions from the 12 MMBTU/hour flare **burner** shall not exceed 0.0006 pounds per MMBTU.
- (d) The collateral carbon monoxide (CO) emissions from the 12 MMBTU/hour flare **burner** shall not exceed 0.084 pounds per MMBTU.
- (e) The collateral volatile organic compound (VOC) emissions from the 12 MMBTU/hour flare **burner** shall not exceed 0.0055 pounds per MMBTU.
- (f) The collateral PM_(filterable) emissions from the 12 MMBTU/hour flare **burner** shall not exceed 0.0019 pounds per MMBTU.
- (g) The collateral PM_{10 (filterable and condensable)} emissions from the 12 MMBTU/hour flare **burner** shall not exceed 0.0076 pounds per MMBTU.

(5) D.1.6 and D.1.7 Vacuum Degasser and Flare Testing Requirements

- (a) Nucor questions why IDEM, OAQ is requiring testing of the vacuum degasser (Condition D.1.6). IDEM, OAQ recently permitted a vacuum degasser at the SDI facility in PSD Permit 063-16628-00037, but did not impose any testing requirements, although the process is virtually identical. Nucor requests that the condition be eliminated or that IDEM, OAQ justify why it is treating Nucor and SDI differently.

In any event, Nucor is not certain how it can test CO emissions from the flare. The flare is a typical stack top flare with flame coming out the top of the stack. There is no place to monitor emissions effectively on this device. Nucor has contacted its stack tester, who has informed Nucor that there is no approved test method for testing the flare. A copy of the letter from the stack tester stating that testing is not possible is attached for IDEM, OAQ's consideration. Nucor therefore requests that the testing requirement be deleted.

Furthermore, Nucor does not believe that stack testing is necessary because the mechanics of flare operation are simple and well understood. CO will be oxidized in the presence of flame. Nucor believes that there are sufficient other indicators of compliance (e.g., burner flame monitoring and temperature monitoring) to provide an assurance of compliance. Nucor therefore requests that this condition be deleted.

Finally, Nucor questions how it is to demonstrate compliance with the vacuum degasser limit when the control device “collateral” emissions are higher. The inability to separate the emissions is yet another reason to eliminate the testing requirement.

- (b) As indicated in the comments on Condition D.1.6, Nucor has requested that the stack testing condition be deleted because it is not practicable on a flare. Nucor therefore requests that the phrase “from the date of issuance of this permit until the approved stack test results are available” be deleted in Condition D.1.7(c). In addition, Nucor does not want to run the flare burner during periods when the degasser will not be in operation because running the burner in such situation simply generates additional emissions with no corresponding environmental benefit. The revised condition would read:
“A continuous monitoring system shall be calibrated, maintained, and operated on the flare for measuring operating temperature when the degasser is in operation. The output of this system shall be recorded as an hourly average. The Permittee shall operate the flare at or above the hourly average temperature of 1400 F during those times that the flare is operating.
- (c) As noted in the comments above and the attached letter from Air Test Professionals, an air testing firm, it is not possible to stack test the flare. Nucor therefore requests that the stack testing requirement in the TSD be deleted. Adequate assurances of compliance are provided by the thermocouple monitoring requirements, which provides a good assurance of proper combustion.

IDEM Response:

Taking into account the newly acquired additional information that the proposed flare is an “open flare”, the test requirements have been modified as follows:

- D.1.6(a) Within 60 days after achieving maximum production rate, but no later than 180 days after initial start-up of the vacuum degasser **and open flare**, the Permittee shall perform compliance tests to verify compliance with the carbon monoxide (CO) emission limitation. shall determine:
- (i) **either the heat content and the maximum tip velocity specifications of the open flare,**
 - (ii) **or the maximum and actual exit velocity specifications of the open flare.**
- (A) **The net heating value of the gas being combusted in the flare shall be calculated using the following equation:**

$$H_T = K \sum_{i=1}^n C_i H_i$$

where:

**HT = Net heating value of the sample, MJ/scm;
where the net enthalpy per mole of offgas is based on combustion at 25 °C and 760 mm Hg, but the**

standard temperature for determining the volume corresponding to one mole is 20 °C.

$$K = \text{Constant, } 1.740 \times 10^{-7} \left(\frac{1}{\text{ppm}} \right) \left(\frac{\text{g mole}}{\text{scm}} \right) \left(\frac{\text{MJ}}{\text{kcal}} \right)$$

where the standard temperature for $\left(\frac{\text{g mole}}{\text{scm}} \right)$ is 20°C;

C_i = Concentration of sample component i in ppm on a wet basis, as measured for organics by Reference Method 18 and measured for hydrogen and carbon monoxide by ASTM D1946–77 or 90 (Reapproved 1994).

H_i= Net heat of combustion of sample component i, kcal/g mole at 25 °C and 760 mm Hg. The heats of combustion may be determined using ASTM D2382–76 or 88 or D4809–95 if published values are not available or cannot be calculated.

(B) The maximum permitted velocity of the flare shall be determined by the following equation:

$$V_{\max} = (XH2 - K1) * K2$$

Where:

V_{max} = Maximum permitted velocity, m/sec.

K1=Constant, 6.0 volume-percent hydrogen.

K2=Constant, 3.9(m/sec)/volume-percent hydrogen.

XH2 = The volume-percent of hydrogen, on a wet basis, as calculated by using the American Society for Testing and Materials (ASTM) Method D1946–77.

(C) The actual exit velocity of the flare shall be determined by dividing the volumetric flowrate (in units of standard temperature and pressure), as determined by Reference Methods 2, 2A, 2C, or 2D as appropriate; by the unobstructed (free) cross sectional area of the flare tip.

(b) The carbon monoxide (CO) tests determinations of **either the heat content and the maximum tip velocity specifications of the open flare or the maximum and actual exit velocity specifications of the open flare** shall be repeated at least once every 5 years from the date of a valid compliance demonstration.

(c) These tests **or determinations** shall be performed using methods as approved by the Commissioner.

- (d) Testing shall be conducted in accordance with Section C - Performance Testing.
- ~~D.1.7(c) A continuous monitoring system shall be calibrated, maintained, and operated on the flare for measuring operating temperature. The output of this system shall be recorded as an hourly average. From the date of issuance of this permit until the approved stack test results are available, the Permittee shall operate the flare at or above the hourly average temperature of 1400°F.~~
- ~~D.1.7(d) On and after the date the approved stack test results are available, the Permittee shall operate the flare at or above the hourly average temperature as observed during the compliant stack test.~~
- (6) D.1.8 Record Keeping Requirements
Add "(3)" after 326 IAC 2-7-5.

IDEM Response:

IDEM agrees.

D.1.8 Record Keeping Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

- (7) D.1.9 Vendor Guarantees
- (a) The requirement to submit vendor guarantees is not a control technology requirement and hence 326 IAC 2-2 Prevention of Significant Deterioration (PSD) is not an appropriate citation. 326 IAC 2-7-5, Recordkeeping, would be a more appropriate citation.
- Nucor does not have vendor guarantees for the vacuum degasser. Vacuum degasser emissions are based on engineering studies, process knowledge and calculations. Because it may or may not be possible to obtain vendor guarantees, Nucor objects to this condition as written. If IDEM, OAQ believes this condition is necessary, Nucor requests that it be revised to read as follows:
- Pursuant to 326 IAC 2-7-5, Permittee shall submit with the Affidavit of Construction (Condition B.4) any vendor guarantees for the vacuum degasser and its flare.
- (b) None of these values for the SO_x, NO_x, VOC, PM and PM₁₀ PSD BACT Determination – Vacuum Degasser - in the TSD were based on manufacturer's guarantees. All emissions estimates were based on vendor information, engineering calculations and process knowledge.

IDEM Response:

IDEM agrees that the requirement to provide vendor guarantees for the vacuum degasser can be deleted since CO is the main pollutant of concern and specifications of the flare are already required to be verified through design specifications (i.e. velocities).

~~D.1.9 Vendor Certification [326 IAC 2-2]~~

~~Pursuant to 326 IAC 2-2 Prevention of Significant Deterioration (PSD), the Permittee shall obtain and submit with the Affidavit of Construction (Condition B.4) all vendor guarantees for the vacuum degasser and its flare to demonstrate compliance with the BACT limits specified in Conditions D.1.1 and D.1.3 of this permit (except the CO BACT limit for the vacuum degasser).~~

Section D.2 Degasser Boiler No. 501

- (1) Facility Description of Boiler 501
Add “per hour” after “British Thermal Units”.

IDEM Response:

IDEM agrees with the change.

One (1) natural gas fueled low NO_x boiler, rated at 71.04 million British Thermal Unit **per hour** (MMBTU/hour). This boiler, identified as Boiler No. 501, will provide steam to the vacuum degasser. Propane will be used as back up fuel. Emissions from this boiler will exhaust through a stack identified as Stack 501.

- (2) D.2.1(f) Boiler 501 Filterable PM Limit
Nucor objects to the 0.0019 lbs PM/MMBTU filterable PM only limit. The PSD program is designed to protect ambient air quality and the National Ambient Air Quality Standards (NAAQS). PM is not a NAAQS pollutant; it is a surrogate for PM₁₀. Because PM is a surrogate, there is no need to impose a standard on the surrogate when a standard can be imposed on the regulated pollutant, in this case PM₁₀. Nucor agrees with IDEM, OAQ that a PM₁₀ limit of 0.0076 lbs/MMBTU is achievable and protects the NAAQS without the need for the surrogate PM limit.

Furthermore, Nucor believes that the 0.0019 lbs/MMBTU limit may not be achievable due to interference from background air particulate and instrument error at such low levels. Nucor has attached a letter from the burner manufacturer, COEN, stating that ambient dust may preclude compliance and noting the problems with testing and verifying emissions at these low levels. These issues are not present measuring the 0.0076 lbs/MMBTU limit.

Nucor believes that a single PM₁₀ limit is adequate.

IDEM Response:

IDEM agrees to make the following changes.

D.2.1(f) ~~The PM_(filterable) emissions from Boiler No. 501 shall not exceed 0.0019 pounds per MMBTU.~~

~~D.2.1(g)~~ The **PM/PM₁₀** (filterable and condensable) emissions from Boiler No. 501 shall not exceed 0.0076 pounds per MMBTU.

- (3) D.2.3(a) 40 CFR 63, Subpart DDDDD Applicability Date
The applicability/effective date for new units is January 13, 2003 and not January 3, 2003 as specified in the draft permit. The date should be corrected to correspond to 40 C.F.R. § 63.7490(b).

IDEM Response:

The typographical error has been corrected.

D.2.3(a) Boiler No. 501 is subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Industrial, Commercial, and Institutional Boilers and Process Heaters, (40 CFR 63, Subpart DDDDD), and considered a new affected source because Boiler No. 501 is going to be constructed after January 13, 2003 and will be use for manufacturing and processing to provide steam.

- (4) D.2.4(a) 40 CFR 63, Subpart DDDDD CO SSM Plan
A startup, shutdown and malfunction plan (SSMP) is required only for CO and is required pursuant to 40 C.F.R. Part 63.7505(e), not Part 63.7505(d). The draft Condition D.2.4(a) should be corrected.

IDEM Response:

IDEM revised the condition with the correct federal rule cite and to clarify that the SSMP is for CO emissions only.

D.2.4(a) Pursuant 40 CFR Part 63.7505(~~d~~ **e**), the Permittee shall develop and implement a written startup, shutdown and malfunction plan (SSMP) **for carbon monoxide (CO)**, according to the provisions of 40 CFR Part 63.6(e)(3).

- (5) D.2.7 and D.2.8 Initial Fuel Analysis and Backup Fuel
- (a) Nucor objects to the fuel assessment requirements in this condition D.2.7. Under NESHAP Subpart DDDDD, Nucor's new large gaseous fuel boiler is only subject to the CO work practice standard and not to the particulate matter, hydrogen chloride, or mercury and therefore does not need to conduct either a performance test or fuel analysis. See 40 C.F.R. Part 63, Subpart DDDDD, Table 1, #7.
- (b) Nucor objects to the requested condition D.2.8 as inconsistent with both the process description, which states that propane may be used as a backup fuel, and the NESHAP, which allows use of liquid fuels during gas curtailments and similar situations. Nucor requests confirmation from IDEM, OAQ that propane is a gaseous fuel for purposes of this condition. Finally, Nucor requests that the condition be modified in the final parentheses by substituting "(natural gas, with propane as a backup)".

IDEM Response:

There is no condition in the draft permit that specified particulate matter, hydrogen chloride, or mercury limits for Boiler No. 501, (see Condition D.2.3(c) below):

D.2.3(c) Pursuant to 40 CFR Part 63.7500 and Table 1 to Subpart DDDDD, upon start up, the Permittee shall maintain the carbon monoxide (CO) emissions from Boiler No. 501 at or below an exhaust concentration of 400 parts per million (ppm) by volume on a dry basis corrected to 3% oxygen (3-run average for units less than 100 MMBTU/hour).

This is the same requirement specified in Table 1, No. 7 of 40 CFR Part 63, Subpart DDDDD.

40 CFR Part 63.7530 required the Permittee to demonstrate initial compliance with each emission limit and work practice standard that applies to the Permittee by either conducting initial performance tests or conducting initial fuel analyses to determine emission rates and establishing operating limits.

Upon further evaluation of the requirements of the subpart, Table 5, No. 5 of the Subpart DDDDD, CO stack tests were specified to be conducted on an annual basis, instead of fuel analysis. Based on this, annual performance tests for CO have been added to the final permit.

D.2.7 Initial Compliance [40 CFR Part 63, Subpart DDDDD]

- (a) Pursuant to 40 CFR Part 63.7510(c) and 40 CFR 63.7530, the Permittee shall demonstrate initial compliance by conducting **initial performance test for CO according to Table 5 of 40 CFR Part 63, Subpart DDDDD.** ~~fuel analysis to determine emission rates and establishing operating limits.~~
- (b) ~~Fuel analysis must be conducted according to 40 CFR 63.7521 and follow the procedures in 40 CFR 63.7530(d)(1) through (d)(5).~~

D.2.8 ~~Continuous Compliance [40 CFR Part 63, Subpart DDDDD]~~

~~Pursuant to 40 CFR Part 63.7505(e), the Permittee shall show continuous compliance with the carbon monoxide (CO) emissions standard by using the same type of fuel (natural gas).~~

Annual Carbon Monoxide (CO) Performance Tests 40 CFR Part 63, Subpart DDDDD Pursuant to 40 CFR Part 63.7515(a), the Permittee shall conduct a CO performance test on an annual basis. CO annual performance tests must be completed between 10 and 12 months after the previous performance test.

(6) D.2.10(a) Record Keeping Requirements

There is no continuous emissions monitoring system required for this boiler. Therefore, there is no requirement to maintain the records listed in 326 IAC 3-5-6. Accordingly, Nucor requests that this condition (D.2.10(a)) be deleted.

IDEM Response:

IDEM agrees that Condition D.2.10(a) can be deleted because there is no continuous emission monitoring system required for Boiler No. 501. In addition, the requirement to keep records of fuel analysis has been deleted because the requirement does not apply to Boiler No. 501. Subsequent portions of Condition D.2.10 have been renumbered.

D.2.10 Record Keeping Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

- (a) ~~The Permittee shall maintain records required under 326 IAC 3-5-6 at the source in a manner that they may be inspected by the IDEM, OAQ, or the US EPA, if so requested or required.~~
- (b a) Pursuant to 40 CFR 63.7555(d)(1) and 40 CFR Part 60, Subpart Dc, the Permittee shall keep records of monthly fuel used by Boiler No. 501, including the types of fuel and amount used.
- (c b) Pursuant to 40 CFR 63.7555(a)(1), the Permittee shall keep records of a copy of each notification and report to comply with 40 CFR Part 63, Subpart DDDDD, including all documentation supporting any Initial Notification or Notification of Compliance Status or semiannual compliance report.
- (d c) Pursuant to 40 CFR Part 63.7555(a)(2), the Permittee shall keep records related to startup, shutdown and malfunction.

- (e) Pursuant to ~~40 CFR Part 63.7555(a)(3)~~, the Permittee shall keep records of fuel analyses.
 - (f d) The Permittee shall maintain records of any additional inspections prescribed by the Preventive Maintenance Plan (PMP), and make available upon request to IDEM, OAQ and the US EPA.
 - (g e) Records necessary to demonstrate compliance shall be available within 30 days of the end of each compliance period.
 - (h f) All records shall be maintained in accordance with Section C - General Record Keeping Requirements of this permit.
- (7) D.2.11 Boiler No. 501 Vendor Guarantees
The requirement to submit vendor guarantees is not a control technology requirement and hence 326 IAC 2-2 Prevention of Significant Deterioration (PSD) is not an appropriate citation. 326 IAC 2-7-5, Recordkeeping, would be a more appropriate citation.

Nucor has some vendor guarantees for Boiler 501, which Nucor will submit. Nucor understands this condition does not require Nucor to obtain any additional vendor guarantees. If IDEM, OAQ believes this condition is necessary, Nucor requests that it be revised to read as follows:

Pursuant to 326 IAC 2-7-5, Permittee shall submit with the Affidavit of Construction (Condition B.4) any vendor guarantees for Boiler No. 501.

IDEM Response:

Boiler No. 501 is an emission unit undergoing PSD major review and requirements. Condition D.2.1 of the proposed permit specified the PSD mass limits for Boiler No. 501. Compliance with these PSD mass limits have to be verified on a continuous basis. In lieu of conducting stack tests or performing compliance monitoring on a routine basis, IDEM requires Nucor Steel to submit vendor or manufacturer's specifications/guarantees that can confirm that Boiler No. 501 complies with these PSD BACT limits. IDEM has the authority to require such submission under 326 IAC 2-2.

There is no change to the draft permit due to this comment.

- (8) D.2.12(a)(i) First Compliance Report
Nucor requests that this condition be revised to reflect the requirements of 40 C.F.R. § 63.7550(b)(1), which provides:
The first compliance report must cover the period beginning on the compliance date that is specified for your affected source in §63.7495 and ending on June 30 or December 31, whichever date is the first date that occurs at least 180 days after the compliance date that is specified for your source in §63.7495.

The existing draft condition does not adequately address the 180 day period referenced in 40 C.F.R. § 63.7550(b)(1). Accordingly, Nucor requests that the condition be revised to read as follows:

The first semiannual compliance report must cover the period beginning on the compliance date specified in 40 CFR §63.7495 and ending on June 30 or December 31,

whichever date is the first date that occurs at least 180 days after the compliance date that is specified for your source in 40 CFR § 63.7595. The first compliance report must be postmarked or delivered no later than July 31 or January 31, whichever date is the first date following the end of the first calendar half after the compliance date that is specified in 40 CFR §63.7495.

IDEM Response:

IDEM agrees with the changes.

D.2.12(a) Pursuant to 40 CFR Part 63.7550 and Table 10 to Subpart DDDDD, the Permittee shall submit a semi annual compliance report, using the Semiannual Report Form at the end of this permit or its equivalent.

- (i) The first **semiannual compliance report** must cover the period beginning on the compliance date specified in 40 CFR Part 63.7495 ~~upon initial start up of Boiler No. 501~~ and ending June 30 or December 31, whichever **date** is the first **date that occurs at least 180 days after the compliance date that is specified for this source in 40 CFR Part 63.7595.** ~~following the end of the first calendar half after initial start up.~~

This first compliance report must be postmarked or delivered no later than July 31 or January 31, whichever date is the first date following the end of the first calendar half after the ~~initial start up~~ **compliance date that is specified in 40 CFR Part 63.7495.**

(9) D.2.12(c) Quarterly Reports

The condition requires submittal of reports quarterly, but all reports referenced in Condition D.2.12 are semiannual. Nucor requests clarification on what reports are required quarterly and how to reconcile paragraph (c) with the detailed provisions of paragraph (a) on when reports must be submitted. It may be preferable to simply delete paragraph (c) since paragraphs (a) and (b) already specify the applicable dates.

IDEM Response:

IDEM agrees with the proposed change.

~~D.2.12(e) These reports shall be submitted no later than thirty (30) calendar days following the end of each calendar quarter and in accordance with Section C – General Reporting Requirements of this permit.~~

The following portions of the reporting requirements have been deleted due to re-evaluation of the 40 CFR Part 63 reporting requirements.

D.2.12(a)(iii) The compliance report must contain the following information:

~~(G) A statement that there were no deviations from the CO emission limit during the reporting period if there are no deviations from the CO emission limit. [40 CFR 63.7550(e)(10)]~~

~~(H) Information required in 40 CFR 63.7550(d)(1) through (d)(10) for each deviation from the CO limit.~~

Section D.3 Ladle Preheater, Cooling Towers and Miscellaneous Emitting Units

(1) D.3.1(b) Nitrogen Oxides (NO_x) PSD BACT Limit

- (a) Nucor objects to the proposed ladle preheater NO_x BACT limit of 0.050 lbs NO_x per MMBTU. This limit is not supported by the record and is not technically achievable for low NO_x burners in this application.

In its BACT analysis for the ladle preheater, IDEM, OAQ relies upon a BACT evaluation prepared for SDI, Hendricks, which established NO_x BACT for oxy-fuel burners at 0.050 lbs/MMBTU. This reliance is misplaced for the following reasons:

- The only facility that has a 0.050 lbs/MMBTU NO_x limit is the SDI Hendricks plant. This limit has not been tested and relies upon the source's or manufacturer's representation that the limit is achievable.
- Nucor has contacted the vendor of the oxy-fuel burners installed at the SDI Hendricks facility, Air Liquide. Air Liquide stated that the burners installed at SDI Hendricks are not guaranteed to achieve a 0.050 lbs/MMBTU NO_x emissions rate and that Air Liquide would not extend such a guarantee to Nucor. Instead, the Air Liquide states that the burner system installed at SDI Hendricks would achieve an emission rate of 0.35 to 0.45 lbs NO_x/MMBTU. The vendor's information on the SDI system does not correspond with IDEM, OAQ's representations about the performance of that system. A copy of the Air Liquide letter is attached.
- Nucor is installing natural gas fired low NO_x burners of a different design than the oxy-fuel burners used at SDI Hendricks.
- Nucor has contacted its vendor, Process Technology International, Inc, to determine if a 0.050 lbs/MMBTU NO_x limit is achievable for the natural gas fired low NO_x burners. The vendor has declined to issue a continuing guarantee that such rate is achievable for Nucor's application. The vendor will guarantee a 0.10 lbs/MMBTU NO_x rate, which is consistent with prior BACT determinations. A copy of this letter is attached.
- Based on the preceding information, the 0.050 lbs NO_x/MMBTU limit proposed by IDEM, OAQ is not demonstrated in commercial practice for either low NO_x natural gas burners or oxy-fuel burners and hence is an innovative control technology as IDEM, OAQ defined the term on page 14 of the Technical Support Document. As IDEM, OAQ correctly points out, "there is no requirement at the State or Federal level to require innovative control to be used as BACT."
- Since IDEM, OAQ's proposed 0.05 lbs NO_x/MMBTU limit is an innovative control technology that does not qualify for consideration as BACT, the next most stringent limit is the limit proposed by Nucor at 0.10 lbs NO_x/MMBTU. Nucor therefore requests that the BACT limit for Nucor's natural gas fired low NO_x burners be established at 0.10 lbs

NO_x/MMBTU as requested in the initial application and as demonstrated by the manufacturer's guarantee.

- (b) Nucor objects to this on the grounds that the SDI-Hendricks facility's oxy-fuel ladle preheater is not "similar" to Nucor's natural gas fired low NO_x burner. The two burners use different fuels with different combustion characteristics.
- (c) Assuming that IDEM, OAQ agrees with Nucor's contention about NO_x BACT for the ladle preheater being 0.10 lbs/MMBTU and not 0.050 lbs/MMBTU, the PTE for NO_x in the TSD Potential Emissions of the TSD should be revised to 24.5 tpy .

IDEM Response:

IDEM agrees with the recommended NO_x PSD BACT of 0.1 lbs/MMBTU for the ladle preheater based on the supporting documents provided by Nucor Steel.

D.3.1(b) The nitrogen oxides (NO_x) emissions from the ladle preheater shall not exceed ~~0.050~~ **0.10** pounds per MMBTU.

(2) D.3.1(f) PM (filterable) Limit

Nucor does not believe the 0.0019 lbs/MMBTU PM (filterable) limit is appropriate or achievable. The PSD program is designed to protect ambient air quality and the National Ambient Air Quality Standards (NAAQS). PM is not a NAAQS pollutant; it is a surrogate for PM₁₀. Because PM is a surrogate, there is no need to impose a standard on the surrogate when a standard can be imposed on the regulated pollutant, in this case PM₁₀. Nucor agrees with IDEM, OAQ that a PM₁₀ limit of 0.0076 lbs/MMBTU is achievable and protects the NAAQS without the need for the surrogate PM limit. Furthermore, Nucor believes that the 0.0019 lbs/MMBTU limit may not be achievable due to interference from background air particulate and instrument error at such low levels. Nucor has attached a letter from the burner manufacturer, COEN, stating that ambient dust may preclude compliance and noting the problems with testing and verifying emissions at these low levels. The letter also notes that the level may be achievable only using excess air, adjusting the performance test methodology, possibly the installation of a larger fan and extended startup periods. While Nucor has not costed all of these items out, together they lead to a substantial impairment in the operability of the proposed boiler. These issues are not as significant for the 0.0076 lbs/MMBTU PM₁₀ limit.

Nucor requests that Condition D.3.1(f) be deleted and only the combined filterable and condensable limit 0.0076 lbs PM₁₀ be imposed.

IDEM Response:

IDEM agrees to make the following changes.

D.3.1(f) ~~The PM_(filterable) emissions from the ladle preheater shall not exceed 0.0019 pounds per MMBTU.~~

~~D.3.1(g)~~ The **PM/PM₁₀** (filterable and condensable) emissions from the ladle preheater shall not exceed 0.0076 pounds per MMBTU.

(3) D.3.2 Cooling Tower Drift Rate

(a) Nucor objects to the proposed 0.0005% drift rate for each cooling tower for the following reasons:

- IDEM, OAQ asserts in the technical support document that “some BACT limits were also indicated in terms of percent of drifts (ranging from 0.0005% to 0.01%.” However, OAQ fails to identify in the Technical Support Document which facilities ostensibly achieve these rates, preventing the public from verifying that the facility was ever constructed, that testing was conducted and the limit verified, or that the application is sufficiently similar to Nucor’s proposed operation to warrant consideration as a technology transfer.
- Of the four facilities that IDEM, OAQ separately indicated to Nucor as having been built with the 0.0005% drift rate, two were never built, possibly because the limit was determined to be impractical, one was a LAER determination and one was a BACT determination.
- Of the two facilities that were built, one was a lowest achievable emission rate (LAER) determination where cost is not a consideration. Because IDEM, OAQ chose not to consider Nucor’s proposal at all, which is by itself a violation of 326 IAC 2-2-1(h) case-by-case review requirements, it falls to OAQ to conduct the complete BACT analysis, including cost effectiveness. IDEM, OAQ’s analysis contains no cost figures and hence fails to demonstrate that the proposed BACT meets the mandatory cost-effectiveness criterion of 326 IAC 2-2-1(h). In fact, if IDEM, OAQ properly accounted for costs on a process contact cooling water system, including frequent replacement (at least annual) of the complete mist eliminator assembly to maintain operating specifications at an estimated cost of \$17,000 to \$18,000 for materials and labor as well as the additional \$15,000 to \$20,000 approximate additional initial cost and compared this difference to the *potential* 6 ton decrease in emissions, it would have determined that the 0.0005% drift limit is not cost effective and cannot be applied to contact cooling water systems. The cost becomes even more prohibitive if “likely reductions” using actual numbers are used instead of potentials, as required pursuant to EPA’s *NSR Workshop Manual*, which states that “realistic maximum emissions,” not “potential” emissions are to be used in assessing control technology cost effectiveness. If more realistic “reasonable maximum” emissions are used only four to five tons of PM will be eliminated. The requirement for a 0.0005% drift rate cannot be sustained.
- The other facility was a non-contact cooling tower. IDEM, OAQ has not explained how BACT for a non-contact cooling tower, which has considerably cleaner water, is relevant to the considerably dirtier contact water system. The contact water system will clog, requiring increased media replacement and media as outlined above.
- Even as applied to the non-contact cooling tower, IDEM, OAQ failed to conduct a proper BACT analysis, including a cost-effectiveness screen, since it chose not to consider Nucor’s proposal. At a minimum, IDEM, OAQ should compare the additional capital cost of \$15,000 to \$20,000 to the decrease in emissions allegedly attributable to the

improved drift elimination. It does not appear that IDEM, OAQ considered cost effectiveness prior to imposing the standard.

- The Marley Cooling Technologies Company has stated that drift determinations below 0.005% can be *predicted*, but such results are speculative because of the number of variables, including water loading, air velocity, proximity of nozzles/water distribution to drift elimination and installation issues, source water quality and treatment chemicals. Marley and its agents also note that test results demonstrating that such low drift rates as 0.0005% are achievable are highly speculative and erratic. Therefore, Marley states that they do not normally guarantee drift rates below 0.005%, which is the best that in their opinion can be demonstrated to reasonable scientific certainty. A copy of the Marley Cooling Technologies letter is attached.
 - Nucor therefore requests that the 0.005% drift rate proposed by Nucor be restored to the permit as the lower rates have not been verified, are not demonstrated in practice, and do not represent verifiable, replicable standards in the judgment of the vendors.
- (b) For the reasons stated above in Condition D.3.2, the 0.0005% drift factor may not be achievable for contact cooling towers. Instead, the 0.005% drift factor should be used and Table 5 revised accordingly. The PM PTE reported in Table 5 of the TSD already uses the 0.005% drift rate.
- (c) Nucor objects to the 0.0005% drift condition specified in the TSD.

IDEM Response:

IDEM agrees with the recommended PSD BACT for the cooling towers based on the additional information submitted by Nucor Steel.

D.3.2(a) The drift rate from each cooling tower shall not exceed ~~0.0005%~~.

(4) D.3.2(b) Cooling Tower Opacity Limitation

Nucor objects to the proposed 20% opacity limit on each cooling tower.

First, Nucor has never observed any opacity from any of its cooling towers, making the need for the proposed limits unclear.

Second, visible emissions from a cooling tower will be “uncombined water” that is not considered for purposes of Method 9 visible emissions observations.

Third, placing this limit in a PSD permit may require monitoring in a subsequent Part 70 operating permit. Sending a plant employee to look for non-existent emissions from a source that is essentially exempt from Method 9 observation is an exercise in futility.

Nucor respectfully requests that the Permit Branch inquire of the Compliance Branch whether any opacity has ever been observed from a cooling tower at an operation comparable to Nucor prior to specifying an opacity limit. Unless the Compliance Branch is aware of opacity issues at similar cooling towers, Nucor respectfully requests that the condition be deleted as unnecessary.

IDEM Response:

IDEM disagrees with the proposal to delete the opacity limit for the cooling towers. These cooling towers are subject to PSD review and requirements, therefore an opacity limit has to be specified.

As Nucor Steel claimed no visible emissions are expected to be observed from the cooling towers, a 20% opacity standard is achievable. The proposed permit did not specify that a trained employee has to observe normal or abnormal visible emissions from the cooling tower stacks or that a certified operator has to perform Method 9 observations to the cooling tower stacks.

The table below shows the sources with cooling towers and their opacity limit. This information was derived from the US EPA RBLC Clearinghouse. Based on this information, the 20% opacity limit specified for the proposed cooling towers is comparable with the other opacity limits documented in the database.

Cooling Towers Opacity Standard	
Company Name	Opacity (%)
Mid American Energy, IA	0
Chambers Energy, TX	5
AES Aurora, TX	5
Norton Energy, OH	10
British Petroleum, OH	20
Nucor Steel, IN	20
Jackson County Power, OH	20
Global Energy, OH	20
Calpine Corp., OH	20
Tesoro Alaska, AK	20
Choctaw Gas, MS	40
El Paso Merchant, MS	40

There is no change in the draft permit as a result of this comment.

(5) D.3.7 Vendor Guarantees

The requirement to submit vendor guarantees is not a control technology requirement and hence 326 IAC 2-2 Prevention of Significant Deterioration is not an appropriate citation. 326 IAC 2-7-5, Recordkeeping, would be a more appropriate citation.

Nucor has some vendor guarantees for these units, which Nucor will submit with the affidavit of construction. Nucor understands this condition does not require Nucor to obtain any additional vendor guarantees. If IDEM, OAQ believes this condition is necessary, Nucor requests that it be revised to read as follows:

Pursuant to 326 IAC 2-7-5, Permittee shall submit with the Affidavit of construction (Condition B.4) any vendor guarantees for the ladle preheater and the cooling towers.

IDEM Response:

As previously mentioned, the cooling towers are undergoing PSD major review and requirements. The proposed permit specified the PSD mass limits for these cooling towers. Compliance with these PSD mass limits have to be verified on a continuous basis. In lieu of conducting stack tests or performing compliance monitoring on a routine basis, IDEM requires Nucor Steel to submit vendor or manufacturer's specifications/guarantees that can confirm the cooling towers comply with these PSD BACT limits. IDEM has the authority to require such submission under 326 IAC 2-2.

To provide clarity, Condition D.3.7 has been revised as follows:

D.3.7 Pursuant to 326 IAC 2-2 Prevention of Significant Deterioration (PSD), the Permittee shall obtain and submit with the Affidavit of Construction (Condition B.4) all vendor guarantees for the:

- (i) ladle preheater, and
- (ii) cooling towers

to demonstrate compliance with the BACT limits specified in Conditions D.3.1 and D.3.2(a) of this permit.

- (6) D.3.8 Record Keeping Requirements
Add "(3)" after 326 IAC 2-7-5 reference in title line.

IDEM Response:

IDEM agrees.

D.3.8 Record Keeping Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]

Technical Support Document (TSD) for Draft PSD/SSM 107-18314-00038

The IDEM does not amend the technical support document (TSD). The TSD is maintained to document the original review. This TSD Addendum is used to document responses to comments and changes made from the time the permit was drafted until a final decision is made.

- (1) Permitting History of the Strip Caster (Castrip) Line
- (a) In the third paragraph, second line, replace "The Line" with "The Castrip Line".
 - (b) In the fourth paragraph, first line, replace "Strip Caster Line" with "Castrip Line".

IDEM Response:

IDEM agrees with the recommended changes.

The Castrip Line accepts molten steel at a maximum rate of 135 tons/hour from the existing electric arc furnaces (EAFs) in the Meltshop area. The **Castrip** Line is capable of producing all grades of carbon, low carbon, alloy, and stainless steel at various widths, thickness and sizes

The **Castrip Line (also sometimes referred to as the** Strip Caster Line) consists of a ladle metallurgical station (LMS) with a baghouse for particulate control, tundish, rolling stand, coilers, ladle preheaters, tundish preheaters, tundish nozzle preheaters, tundish dryers, cooling towers and associated alloy storage and handling operations.

- (2) Table 3 Natural Gas Ladle Preheater (12.0 MMBTU/hr)
- (a) Emission Factor column is in (lbs/MMBTU) not (lbs/MMCF).
 - (b) For the reasons stated above in Section D.3.1, the 0.050 lbs NO_x/MMBTU emission rate is not achievable. The PTE should be revised to 5.3 tpy using a 0.10 lbs NO_x/MMBTU emission rate as proposed by Nucor.

- (c) The lead factors are incorrect. The EF is 5×10^{-7} and the PTE is 2.63×10^{-5} .

IDEM Response:

- (a) IDEM agrees with the correction. There is no correction to the PTE due to this change in the units of the emission factors.
- (b) There is no change in the NOx PSD BACT limit for the ladle preheater, therefore there is no need to change the NOx potential to emit.
- (c) IDEM corrected the Lead emission factor and potential to emit.

$$\begin{aligned} \text{Lead PTE} &= (12 \text{ MMBTU/hour}) * (5.0 \times 10^{-7} \text{ lbs/MMBTU}) * (8760 \text{ hours/year}) * (1 \text{ ton}/2000 \text{ lbs}) \\ &= 2.63 \times 10^{-5} \text{ tons/year} \end{aligned}$$

- (3) Table 4 Open Flare Burner (12.0 MMBTU/hr)
The lead factors are incorrect. The EF is 5×10^{-7} and the PTE is 2.63×10^{-5}

IDEM Response:

IDEM agrees with the correction.

$$\begin{aligned} \text{Lead PTE} &= (12 \text{ MMBTU/hour}) * (5.0 \times 10^{-7} \text{ lbs/MMBTU}) * (8760 \text{ hours/year}) * (1 \text{ ton}/2000 \text{ lbs}) \\ &= 2.63 \times 10^{-5} \text{ tons/year} \end{aligned}$$

- (4) Permitting Level Determination

- (a) Nucor objects to this statement (see below) because it misstates the law. The PTE for new construction is determined *after* considering controls for all programs except Compliance Assurance Monitoring. [See 326 IAC 2-1.1-1(16) Definition of PTE]. As stated, IDEM, OAQ is taking the position that there can never be a synthetic minor or FESOP permit, which is obviously belied by IDEM, OAQ's own practice and regulations. Nucor's proposed modification is a "minor source" within the meaning of this provision.
- 326 IAC 2-7-10.5(f)(5) - - This modification is considered a significant source modification to the existing Part 70 source because the CO PTE before control is greater than 100 tons/year.
- (b) Nucor objects to this statement (see below) because it is erroneous. The addition of a new boiler is not a "modification" within the meaning of the NSPS regulations, it is "construction." Nucor agrees that more stringent requirements apply. The modification analysis is erroneous and should be deleted.
- 326 IAC 2-7-10.5(d)(6) - - Even though one of the units (Boiler No. 501) involved in this modification is subject to a New Source Performance Standards (NSPS) 40 CFR 60; this modification is not considered a minor source modification because the NSPS applicable requirement for the boiler is not the most stringent applicable requirement.
- (d) Nucor finds this statement true (see below), but misleading. Nucor does not need to rely upon the provisions of 326 IAC 2-7-10.5(d)(9) because it qualifies under 326 IAC 2-7-10.5(d)(4) as a minor source.

326 IAC 2-7-10.5(d)(9) - - This modification is not considered a minor source modification because one of the units (vacuum degasser) that Nucor is adding is not of the same type of unit that is already permitted in the source. Nucor Steel has removed their degasser in the Meltshop operation in 2000.

IDEM Response:

IDEM reaffirms that the above mentioned statements in the TSD, which are referenced in these comments are correct. These statements explained the state permitting applicability determinations and arrived at the same conclusion that the proposed project can not be processed as a minor source modification.

The CO potential to emit (PTE) of the vacuum degasser is greater than the applicability threshold for a minor source modification. The CO PTE after control can not be used as the applicability threshold because the CO control (flare) is not yet enforceable as a practical manner until a permit is issued. This is confirmed in the definition of "Potential to emit (PTE)" - - physical and operation design, such as air pollution control equipment, shall be treated as part of the emission units design, if the limitation is enforceable. At this time, the vacuum degasser and its flare are not enforceable because no permit for its construction and operation has been issued.

(5) PSD Applicability Determination

(a) Nucor objects to IDEM, OAQ's violation of the PSD applicability regulations in its analysis of this project. As Nucor stated in its application, the Castrip Line has never operated "normally" because of problems with gas retention that were not anticipated at the time of original construction. These problems have prevented the line from ever achieving consistent operation, much less operation at anticipated rates. Further, as Nucor stated and as IDEM, OAQ acknowledged, the Castrip Line is a research and development project. The project is still in its infancy, less than two years from initial construction. Under no objective set of criteria can a research and development project unable to operate consistently be held to be operating "normally."

In section (2) of the Technical Support Document's "PSD Applicability Determination" discussion, IDEM, OAQ acknowledges that "[t]he Castrip Line has intermittently operated at the rate of approximately 119 tons/hour." IDEM, OAQ then acknowledges that "there is no sufficient data to determine actual emissions." Rather than applying its regulations as written, IDEM, OAQ then creates a wholly fictitious "actual emissions rate" or else indulges a presumption that emission were zero. Both of IDEM, OAQ's approaches flatly contradict 326 IAC 2-2-1.

Pursuant to 326 IAC 2-2-1, if a source has not yet begun normal operation, the following rule applies:

For any emissions unit, other than an electric utility steam generating unit described in subdivision (4), which has not begun normal operations on the particular date, actual emissions shall equal the potential to emit of the unit on that date. 326 IAC 2-2-1(b)(3).

This rule is not discretionary; IDEM, OAQ is required to apply it. IDEM, OAQ's failure to apply the rule, despite being specifically informed of the rule and the facts underlying its application, constitutes error.

Nucor's invocation of 326 IAC 2-2-1(b) is appropriate and entirely within the intent of the rule. The intent of the rule is to allow a source, generally newly constructed, that is not operating as it was intended to operate, to make minor additions and changes to achieve the design operation without the necessity of taking the whole modification back through PSD, which is unnecessary because the modification just went through PSD shortly before. It is in this way that Nucor has properly invoked 326 IAC 2-2-1(b) to make some minor additions and adjustments to the Castrip Line to allow it to operate as intended.

Nucor objects in particular to Table 8. IDEM, OAQ has miscalculated the emissions by failing to convert pounds into tons, overstating emissions by a factor of 2000. The Past Actual column is in error by not applying 326 IAC 2-2-1(b). The corrected emissions should be:

SO ₂	PTE is 17.7 tpy	Pact Actual is 17.7	Increase is 0
NO _x	PTE is 4.1 tpy	Past Actual is 4.1	Increase is 0
VOC	Is correct		
CO	PTE is 23.7	Past Actual is 23.7	Increase is 0
PM	PTE is 39	Past Actual is 39	Increase is 0
PM ₁₀	PTE is 39	Past Actual is 39	Increase is 0

Nucor objects to Table 9, which carries over the errors in Table 8. The correct version of Table 9 would read as follows:

	New Units	Increase	Total	PSD Sig.	PSD Y or N
SO ₂	12.08	0	12.08	40	No
NO _x	21.78	0	21.78	40	No
VOC	4.35	0	4.35	40	No
CO	72.2	0	72.2	100	No
PM	11.51	0	11.51	25	No
PM ₁₀	13.88	0	13.88	15	No

[rest of the table is correct]

Nucor hopes that IDEM, OAQ will correct the erroneous calculations and approach to determining PSD applicability.

- (b) Nucor objects to (3) PSD of the State Rule Applicability Determination portion of the TSD for the reasons stated above. The proposed modification is subject to the 45 day time frame pursuant to 326 IAC 2-1.1-8(a)(4).

- (3) 326 IAC 2-1.1-8 (Time Periods For Determination On Permit Applications)

Pursuant to 326 IAC 2-1.1-8(a)(1), a final action needs to be issued no later than 270 calendar days from the receipt of the application, taking into account actions that can suspend the time period. The application was received on December 15, 2003. Without any suspension in the time period, the 270 day-period is estimated to end on September 15, 2004.

- (c) Nucor objects to (4) of the State Rule Applicability of the TSD for the reasons stated above. The proposed modification does not exceed the PSD triggers in 326 IAC 2-2 when the regulations are applied as written.
- (4) 326 IAC 2-2 (PSD)
Detailed PSD BACT determinations are shown in the subsequent pages of this document.
- (d) For the reasons stated above, Nucor objects to the BACT evaluation because the source is not subject to PSD review. Rather than restate this objection for each and every unit, Nucor makes it this one time.

IDEM Response:

IDEM disagrees with Nucor Steel's evaluation of the PSD applicability. IDEM reaffirms that the initial evaluation of the project in terms of PSD applicability is correct.

- The Castrip Line being considered as a research and development project by Nucor Steel has no bearing on the PSD determination, because any physical change or change in the method of operation resulting in a significant net emissions increase has to undergo PSD major review.
- IDEM disagrees with Nucor Steel's incorrect interpretation of what is considered "Normal Operations".

Nucor Steel started operation of the Castrip Line in April, 2002. For the first 12-consecutive month period of operation (April 2002 to April 2003), the actual throughput was 71,247 tons/year. Nucor Steel may have intermittently operated the Castrip Line during this period, however, acceptable products have been produced and sold to consumers. It also has to be noted that for the next full 12-consecutive month period (December 2002 to December 2003), the actual throughput of the Castrip Line increased to 96,840 tons/year. Even during the review of the proposed modification, the Castrip Line has continued operation.

Nucor Steel has conducted the required compliance tests in November 2003, at 89% of the full load capacity. Instead of revising the existing PSD permit to incorporate the derated capacity of the Castrip Line (as the usual next step for any operations tested at less than 95% of the maximum capacity for the tests to be acceptable), Nucor Steel proposed to install a vacuum degasser and other auxiliary emission units to reach the maximum capacity as originally stated in the permit 107-12143-00038, issued on January 19, 2001.

The Castrip Line has intermittently operated at approximately 89% of its estimated full hourly capacity since its initial start of operation. As this technology was initially unfamiliar to Nucor Steel at the time of initial permitting, it may be possible that the realistic capacity of the existing line was actually less than what was initially estimated. If

this is the case, the Castrip Line has been operating at close to its full capacity and the proposed modification is to attain the original estimated higher capacity and removed any design constraints. Under this scenario, the proposed modification also has to undergo PSD review and requirements.

Factors such as consumer demands and different specifications from initial engineering designs can not be used in the determination of whether the line has been operating normally. A line might have been operating at low production rate due to low consumer demands, but it does not mean that the line has not been operating normally. The fact that Nucor Steel now seeks to make modifications to the line to either improve the products or fulfill different consumer specifications does not mean that the line has not operated normally in the past, based on the way it is was originally constructed. Even established operations have to routinely perform modifications to address changes in consumer demands.

- The PSD determination was based on the net emissions increase of the units being constructed and other increases at existing emissions units not being modified, which will experience emissions increases as a result of the change. It is clear that there will be a significant emissions increase from the Castrip Line.

Another important element in conducting the PSD applicability determination is the “but for” test. That is, would the emissions increase from the existing Castrip Line occur but for the construction of the proposed modification. Based on this test, there will be significant emissions increase from the existing Castrip Line as a direct result of to the installation of the vacuum degasser and ladle preheaters.

- Nucor Steel referenced only a portion of the definition of “actual emissions” under 326 IAC 2-2-1(b). The specific applicability in 326 IAC 2-2-1(b)(3) that Nucor Steel specifically referenced does not apply to this modification:

For any emissions unit, other than an electric utility steam generating unit described in subdivision (4), which has not begun normal operations on the particular date, actual emissions shall equal the potential to emit of the unit on that date.

IDEM agrees that this rule is not discretionary and as a permitting agency, IDEM has the obligation to apply it correctly. However, the portion of the definition that Nucor Steel references does not apply to this specific modification.

IDEM has the authority to use a 2-year time period other than the most recent 24-month period for the determination of actual emissions if there is not sufficient data available. At the time of the application, the Castrip Line had less than 2 years of available emission data, therefore, IDEM prorated the actual emissions to a full 2-year period and used this as the average actual emissions.

At this stage of review, there has now been a full 24-consecutive month period of operation of the Castrip Line, which can be used to establish the average past actual emissions of the Castrip Line.

April 2002 to March 2003 = 71, 247 tons/year
April 2003 to March 2004 = 104,373 tons/year
2-year average = 87,810 tons/year

In this re-evaluation of the actual emissions based on the most recent emission data, IDEM arrives at the same conclusion that the net emissions increase due to the increase utilization of the Castrip line is subject to the PSD review and requirements.

- It should also be noted that the US EPA Region V permitting staff has concurred with IDEM's PSD applicability determination for this proposed modification.

(6) CO PSD BACT Determination – Vacuum Degasser

- (a) Carbon dioxide should be “Carbon monoxide.”
- (b) In the second line of the last paragraph, “will primarily decarbonizes the steel” should be changed to “may also decarburize the steel.”

IDEM Response:

- (a) IDEM can not find the “Carbon Dioxide” referenced in this comment to be corrected.
- (b) IDEM can not find in the TSD the phrase “will primarily decarbonizes the steel” referenced in this comment.

There are no changes to the permit due to these comments.

Other Supporting Documents for Draft PSD/SSM 107-18314-00038

The IDEM does not amend the Notice of Public Comment and Modeling documents. They are maintained to document the original review. This TSD Addendum is used to document responses to comments and changes made from the time the permit was drafted until a final decision is made.

(1) Notice of Public Comment

- (a) First paragraph, third line, “serious” should be “significant”.
- (b) Second paragraph, please add “contact and non-contact cooling towers” to equipment.
- (c) Table: NOx should be 24.5 tpy using the correct 0.10 lbs NOx/MMBTU factor.

IDEM Response:

- (a) IDEM agrees with the changes, and the Notice of Public Comment and Public Hearing should have read as follows:

The Indiana Department of Environmental Management (IDEM) has received an application from Nucor Steel, located at 4537 South Nucor Street, Crawfordsville, IN 47933, for a construction and operation permit under the Prevention of ~~Serious~~ **Significant** Deterioration (PSD) program (326 IAC 2-2). IDEM's Office of Air Quality (OAQ) issues this type of permit to regulate the construction and operation of sources that will emit relatively large amounts of air pollution. It requires the use of

Best Available Control Technology and an analysis demonstrating that U.S. EPA health-based standards will not be violated.

- (b) IDEM agrees that the cooling towers should have been included in the list of emission units.

IDEM has reviewed this application, and has developed preliminary findings, consisting of a draft permit and several supporting documents, that would allow Nucor Steel to construct and operate a vacuum degasser, boiler, ladle preheater, **cooling towers**, and alloy handling system

- (c) IDEM agrees with the recommended change for the NOx total potential to emit.

(2) Air Quality Analysis

On page 2, the first line of the first full paragraph should be revised to read as follows: "The modeling showed that the proposed modification was below the significant impact increments for CO."

IDEM Response:

IDEM agrees that the proposed statement has the same meaning as the current statement written in the Air Quality Analysis document.

Original statement in the air quality analysis document:

The modeling showed no violations of the significant impact levels for CO.

Nucor Steel's proposed statement:

The modeling showed that the proposed modification was below the significant impact increments for CO.

There is no change to the draft permit itself due to this comment.

(3) Affidavit of Construction

Please revise the Affidavit of Construction description of the vacuum tank degasser to correspond to comments on D.1 above by eliminating the reference to 1.5 tons alloys/hour and adding decarburization as stated in those comments. Please clarify that the flare burner has a capacity of 12 MMBTU/hour.

IDEM Response:

IDEM agrees with the changes. The Affidavit of Construction has been revised accordingly.

Revised Emission Calculations

Due to changes in emission rates and corrections of typographical errors, the tables below show the updated emission calculations. Updated items are shown in **bold font**.

Table 1 Vacuum Degasser (135 tons/hour)			
Pollutant	Emission Factor (EF) (lbs/ton)	PTE (tons/year)	
		(Before Control)	(After Control)
SO ₂	0.02	11.83	11.83
NO _x	0.005	2.96	2.96
VOC	0.005	2.96	2.96
CO	0.075	888.0	44.4
PM	0.008 gr/dscf	1.95	1.95
PM ₁₀	0.008 gr/dscf	1.95	1.95

Maximum capacity = 135 tons/hour
 The EFs were submitted by Nucor Steel and were based on engineering calculations and assumptions and vendor's data. These rates are also the proposed BACT limits.
 $PTE = (\text{Maximum capacity } 135 \text{ tons/hour}) * (\text{EF lbs/ton}) * (8,760 \text{ hours/year}) * (1 \text{ ton}/2000 \text{ lbs})$
 The control device for the vacuum degasser is a flare, with an estimated efficiency of 95%.
 $CO_{(\text{before Flare})} = (135 \text{ tons/hour}) * (0.075 \text{ lbs/ton}) * (8,760 \text{ hours/year}) * (1 \text{ ton}/2000 \text{ lbs}) / (1 - 0.95 \text{ Eff})$
 $CO_{(\text{after Flare})} = (CO \text{ before flare}) * (1 - 0.95 \text{ Eff}) = 44.4 \text{ tons/year}$
 $PM/PM_{10} = (0.008 \text{ gr/dscf}) * (1 \text{ lb}/7,000 \text{ gr}) * (6,500 \text{ ft}^3/\text{min}) * (8,760 \text{ hours/year}) * (1 \text{ ton}/2000 \text{ lbs})$

Table 2 Natural Gas Low NO _x Boiler (71.04 MMBTU/hr)		
Pollutant	Emission Factor (EF) (lbs/MMBTU)	PTE (tons/year)
SO ₂	0.0006	0.19
NO _x	0.035	10.89
VOC	0.0026	0.81
CO	0.061	18.98
PM/PM₁₀	0.0076	2.36
Lead	5.0x10 ⁻⁷	1.55x10 ⁻⁴

Maximum capacity = 71.04 MMBTU/hour
 PM EF is filterable only. PM₁₀ EF is condensible and filterable combined.
 The EFs for the criteria pollutants are based on similar boiler permitted for Nucor Steel under PSD 107-16823-00038, issued on November 21, 2003.
 $PTE = (\text{Heat Input MMBTU/hr}) * (\text{EF lbs/MMBTU}) * (8760 \text{ hour/year}) * (1\text{ton}/2000 \text{ lbs})$

Table 3 Natural Gas Ladle Preheater (12.0 MMBTU/hr)		
Pollutant	Emission Factor (EF) (lbs/MMBTU)	PTE (tons/year)
SO ₂	0.0006	0.031
NO _x	0.100	5.26
VOC	0.0055	0.29
CO	0.084	4.41
PM/PM₁₀	0.0076	0.4
Lead	5.0x10⁻⁷	2.63x10⁻⁵

Maximum capacity = 12.0 MMBTU/hour
 These emissions are due to combustion of natural gas fuel.
 PM EF is filterable only. PM₁₀ EF is condensible and filterable combined.
 All EFs are based on normal firing. 1MMBTU = 1,000,000 BTU
 EFs are the BACT mass limits considered.
 $PTE = (\text{Heat Input MMBTU/hour}) * (\text{EF lbs/MMBTU}) * (8760 \text{ hours/year}) * (1\text{ton}/2000 \text{ lbs})$

Pollutant	Emission Factor (EF) (lbs/MMBTU)	PTE (tons/year)
SO ₂	0.0006	0.031
NO _x	0.100	5.3
VOC	0.0055	0.29
CO	0.084	4.41
PM	0.0019	0.1
PM ₁₀	0.0076	0.4
Lead	5.0x10⁻⁷	2.63x10⁻⁵

Maximum capacity = 12.0 MMBTU/hour
 These collateral emissions from the flare are due to combustion of natural gas fuel.
 PM EF is filterable only. PM₁₀ EF is condensible and filterable combined.
 All EFs are based on normal firing. 1MMBTU = 1,000,000 BTU
 EFs are the BACT mass limits considered.
 PTE = (Heat Input MMBTU/hour)*(EF lbs/MMBTU)*(8760 hours/year)*(1ton/2000 lbs)

Cooling Towers	Capacity (gal/min)	TDS Fraction	Drift Losses (%)	PM PTE (tons/year)
Contact Cooling Tower	8,000	0.0075	0.005	6.58
Noncontact Cooling Tower	8,000	0.0025	0.005	2.19
Total	16,000			8.77

Nucor Steel provided the TDS Fraction and Drift losses.
 Cooling Tower PM/PM₁₀ = (Maximum Rate gals/min)*(TDS fraction)*(8.34 lbs/gal)*(60 mins/hour)
 (drift losses/100)(8760 hours/year)*(1 ton/2000 lbs)

Pollutant	PTE Before Control (tons/year)	PTE After Control (tons/year)
SO ₂	12.08	12.08
NO _x	24.41	24.41
VOC	4.35	4.35
CO	915.8	72.2
PM/PM₁₀	13.88	13.88

This table shows the total potential to emit of the proposed new units only.

Pollutant	PTE After Control (tons/year)
SO ₂	12.08
NO _x	24.41
VOC	4.35
CO	72.2
PM/PM₁₀	13.88

Pollutant	Emission Factor (lbs/ton)	PTE (tons/year)	Past Actual (tons/year)	Increase Emissions (PTE-Past Actual)
SO ₂	0.03	35,478	2,634.3	32,843.7
NO _x	0.007	8,278.2	614.67	7,663.53
VOC *	--	less than 40	less than 40	--
CO	0.04	47,304	3,512.4	43,791.6
PM	0.0003 gr/dscf	39 **	6.5 ***	32.5
PM ₁₀	0.0003 gr/dscf	39 **	6.5 ***	32.5

Maximum Capacity = 135 tons/hour
 Average Actual Steel Throughput = **87,810** tons/year
 The emission factors are based on the stack tests performed by Nucor Steel in January 2003.
 * There was no VOC limit specified for the Castrip under PSD permit 107-12143-00038, issued on January 19, 2001 because the VOC net emissions are less than the PSD Significant level of 40 tons/year.
 ** The PM and PM₁₀ PTE were derived from the PSD permit 107-12143-00038, issued on January 19, 2001.
 *** The PM and PM₁₀ actual emissions are estimates based on the actual tested grain loading.
 PTE = (Emission Factor lbs/ton)*(135 tons/hour)*(8760 hours/year)
 Actual Emissions = (Emission Factor lbs/ton)*(**87,810** tons/year) = tons/year
 Increase Emissions = (PTE) - (Actual Emissions) = tons/year

Pollutant	New units (tons/year) (Table 7)	Increase Utilization of Castrip Line (tons/year) (Table 8)	Total	PSD Significant Levels (tons/year)	PSD (Yes or No)
SO ₂	12.08	32,843.7	32,855.8	40	Yes
NO _x	24.41	7,663.53	7,687.9	40	Yes
VOC	4.35	less than 40	less than 40	40	No
CO	72.2	43,791.6	43,863.8	100	Yes
PM	13.88	32.5	46.38	25	Yes
PM ₁₀	13.88	32.5	46.38	15	Yes
Pb		--		0.6	No
Mercury		--		0.1	No
Beryllium		--		0.0004	No
Asbestos		--		0.007	No
Vinyl Chloride		--		1.0	No
Fluorides		--		3.0	No
Sulfuric Acid Mist		--		7.0	No
Hydrogen Sulfide		--		10	No
Total Reduced Sulfur		--		10	No

**Indiana Department of Environmental Management
Office of Air Quality**

Air Quality Analysis
Prevention of Significant Deterioration (PSD)
Part 70 Significant Source Modification (SSM)

Source Background and Description
--

Source Name:	Nucor Steel
Source Location:	4537 South Nucor Street, Crawfordsville, IN 47933
Mailing Address:	4537 South Nucor Street, Crawfordsville, IN 47933 RR2, Box 311, Crawfordsville, IN 47933
General Telephone Number:	765-364-2323
General Facsimile Number:	765-364-5311
Responsible Official:	General Manager
County Location:	Montgomery
SIC Code:	3312 (Steel Mill)
Source Categories:	1 of 28 Listed Source Categories Major PSD Source Major Source, CAA Section 112
PSD/SSM:	107-18314-00038
Air Modeler:	Krista Gremos

Introduction

Nucor Steel (Nucor) has applied for a significant modification permit for the Castrip facility at their steel mill located in Crawfordsville, Indiana. The site is located at Universal Transverse Mercator (UTM) coordinates 514765 East and 4424987 North. Montgomery County is designated as attainment for the National Ambient Air Quality Standards (NAAQS). These standards for Nitrogen Dioxide (NO₂), Sulfur Dioxide (SO₂), Carbon Monoxide (CO), and Particulate Matter less than 10 microns (PM₁₀) are set by the United States Environmental Protection Agency (U.S. EPA) to protect the public health and welfare.

URS Corporation prepared the previous PSD permit application for Nucor (CP107-16823). The current significant modification application (CP107-18314) was prepared by ERM and submitted to the Office of Air Quality (OAQ) Permit Branch on December 15, 2003. It was determined that a modeling analysis was needed and the project was forwarded to the TS&M group on March 5, 2004. The dispersion modeling analysis portion of the permit was submitted by ERM on March 5, 2004 and forwarded to TS&M on March 9, 2004. This document provides OAQ's TS&M review of the permit application, including an air quality analysis performed by the OAQ. The current permit is being considered as part of the previous permit modeling and is being modeled as an addendum.

Summary

Nucor has submitted a significant modification application. However, OAQ has determined that the proposed changes are a PSD major modification. Modeling was done to assess the impact of the proposed modification on the previous permit (CP107-16823). The Industrial Source Complex Short Term

(ISCST3) modeling from the previous permit showed pollutant impacts for NO₂, SO₂, CO, and PM₁₀. Previous modeling was utilized for the current modeling and therefore the receptor grid and meteorological data remained the same.

The modeling showed no violations of the significant impact levels for CO. Previous modeling showed pollutant impacts for NO₂, SO₂, and PM₁₀ were predicted to be greater than the significant impact levels for purposes of a NAAQS analysis. The refined modeling showed no violations of the NAAQS for NO₂, SO₂, and PM₁₀. Analysis for PSD increment consumption was necessary for NO₂, SO₂, and PM₁₀. Results from the PSD increment analysis showed increment consumption below 80% of the available PSD increment for NO₂, SO₂, and PM₁₀ (annual time averaging period). A refined increment analysis for PM₁₀ 24-hour time averaging period showed no violations of the available PSD increment.

Modeled Results

Maximum modeled concentrations for NO₂, SO₂, CO, and PM₁₀ are shown below in Table 1. CO was modeled to make sure the maximum modeled impacts did not increase above the significant impact levels. Previously modeled results are shown for NO₂, SO₂, and PM₁₀.

TABLE 1 – Summary of OAQ Significant Impact Analysis for Nucor Steel – Montgomery County (ug/m3)

Pollutant	Year	Time-Averaging Period	Maximum Modeled Impacts	Significant Impact Levels	Significant Monitoring Levels
CO	1991	1-hour	1254	2000	a
CO	1994	8-hour	370	500	575
NO ₂	1991	Annual	4.3	1	14
SO ₂	1994	3-hour	130.3	25	a
SO ₂	1992	24-hour	64.8	5	13
SO ₂	1991	Annual	5.4	1	a
PM ₁₀	1994	24-hour	9.6	5	10
PM ₁₀	1990	Annual	1.2	1	a

a No limit exists for this time-averaged period
 NO₂, SO₂, and PM₁₀ previous modeling results shown

Modeled concentrations for CO were below the significant impact level and the significant monitoring level for all time averaging periods. Previous modeling results for NO₂, SO₂, and PM₁₀ were above the significant impact levels and therefore, only the refined modeling was done for these pollutants.

Background Concentrations

Background concentrations for use in the NAAQS analysis were required since the results of the modeling for NO₂, SO₂ and PM₁₀ concentrations exceeded their significant impact levels. The background concentrations are listed below in Table 2.

TABLE 2 - Background Concentrations (ug/m3)			
Pollutant	Monitor Location	Time-Averaging Period	Monitored Concentrations
NO ₂	Naval Avionics Center, Indpls (Marion Co)	Annual	32.9
SO ₂	N. of SR 234, E. of Wabash River (Fountain Co)	2nd highest 3-hour	199.1
SO ₂	N. of SR 234, E. of Wabash River (Fountain Co)	2nd highest 24-hour	71.5
SO ₂	N. of SR 234, E. of Wabash River (Fountain Co)	Annual	13.4
PM ₁₀	1600 Hulman St. (Vigo Co)	2nd highest 24-hour	48.0
PM ₁₀	1600 Hulman St. (Vigo Co)	Annual	23.0

Analysis of Source Impact on NAAQS and PSD Increment

NAAQS modeling was conducted to compare to each pollutant's respective NAAQS limits. OAQ modeling results are shown in Table 3. All maximum concentrations of NO₂, SO₂ and PM₁₀ for every time-averaged period were below their respective NAAQS limit and further modeling was not required.

TABLE 3 - National Ambient Air Quality Standards Analysis (ug/m3)						
Pollutant	Year	Time-Averaging Period	Modeled Source Impacts	Background	Total	NAAQS Limits
NO ₂	1991	Annual	14.2	32.9	47.1	100.0
SO ₂	1992	Highest 2 nd high 3-hour	120.2	199.1	319.3	1300.0
SO ₂	1990	Highest 2 nd high 24-hour	44.4	71.5	115.9	365.0
SO ₂	1991	Annual	5.8	13.4	19.2	80.0
PM ₁₀	1994	Highest 2 nd high 24-hour	27.9	48	75.91	150.0
PM ₁₀	1990	Annual	6.8	23	29.8	50.0

Table 4 shows the results of the PSD increment analysis for NO₂, SO₂ and PM₁₀. No violations of 80 percent of the PSD increment for NO₂, SO₂ and PM₁₀ (annual) occurred and no further modeling was required for these pollutants. However, PM₁₀ exceeded the allowable 80 percent for the 24-hour time averaging period and more refined modeling was required.

TABLE 4 - Prevention of Significant Deterioration Analysis (ug/m3)					
Pollutant	Year	Time-Averaging Period	Modeled Concentrations	PSD Increment	Impact on PSD Increments
NO ₂	1991	Annual	14.2	25.0	56.9%
SO ₂	1992	Highest 2 nd high 3-hour	120.2	512.0	23.5%
SO ₂	1990	Highest 2 nd high 24-hour	39.7	91.0	43.6%
SO ₂	1991	Annual	4.9	20.0	24.6%
PM ₁₀	1994	Highest 2 nd high 24-hour	27.9	30.0	93.0%
PM ₁₀	1990	Annual	6.8	17.0	40.3%

Increment Modeling

An increment consumption analysis was performed for PM₁₀ 24-hour emissions. The results of this analysis are presented in Table 5. An example of the process utilized for this analysis is provided below:

- (1) In 1990, one receptor was identified with a high second high concentration that was above 24 ug/m3. This receptor had a predicted high second high concentration of 24.94 ug/m3.
- (2) The predicted impact at this receptor was evaluated in order to determine the contribution from the Nucor modification and the concentration from all other existing sources. This showed that the contribution from all other sources was 22.7 ug/m3.
- (3) Based on the impact from other sources, the increment available for the modification was computed by subtracting the other source impact from the total allowable impact of 30 ug/m3 and multiplying the result by 0.8. For this receptor, the available increment was computed to be 5.84 ug/m3 [(30-22.7) x 80%].
- (4) The available increment was then compared to the concentration contributed by the modification to assure that the available increment was not consumed. In this case, the modification concentration was 1.87 ug/m3 which is within the available increment of 5.84 ug/m3.

This process was repeated for each receptor where a concentration with a rank from 2 through 4, in excess of 24 ug/m3 (80% of the total Class II 24-hour average increment) was predicted. As illustrated in Table 5, all modeled impacts from the modification were shown to be within the available increment for each receptor of concern. No additional modeling is required.

TABLE 5 – PM ₁₀ 24-Hour Increment Analysis (ug/m3)							
Year	Date	Rank	Modeled Source Impact	Existing Sources	Available Increment (80%)	Plant Modification	Exceeds Increment?
1990	7/21	H2H	24.94	22.70	5.84	1.87	No
1990	8/27	H3H	24.52	21.99	6.41	2.53	No
1990	9/6	H4H	24.35	21.94	6.45	2.41	No
1994	8/26	H2H	27.91	23.57	5.14	2.38	No
1994	8/25	H2H	27.71	24.06	4.75	2.60	No
1994	8/26	H2H	27.53	24.65	4.28	1.94	No
1994	8/25	H2H	27.16	24.27	4.58	1.99	No
1994	8/26	H2H	26.31	22.78	5.78	1.86	No
1994	8/26	H2H	26.21	20.88	7.30	3.23	No
1994	8/25	H2H	25.48	5.86	19.31	0.00021	No
1994	9/2	H2H	25.38	23.39	5.29	1.7	No
1994	7/23	H2H	25.05	17.02	10.38	0.35	No
1994	8/25	H2H	24.78	22.06	6.35	2.67	No
1994	8/25	H2H	24.77	22.68	5.86	1.83	No
1994	9/9	H2H	24.51	14.65	12.28	0.33	No
1994	8/26	H2H	24.38	20.96	7.23	2.84	No
1994	8/26	H2H	24.27	21.89	6.49	2.09	No
1994	8/26	H2H	24.03	20.64	7.49	2.63	No