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

PART 70 SIGNIFICANT SOURCE MODIFICATION AND MAJOR MODIFICATION UNDER PREVENTION OF SIGNIFICANT DETERIORATION

OFFICE OF AIR QUALITY

Iron Dynamics, Inc.
4500 County Road 59,
Butler, Indiana 46721

(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 permit is issued under the provisions of 326 IAC 2 and 40 CFR Part 52.21 (Prevention of Significant Deterioration) and 40 CFR 124 (Procedure for Decision Making), with conditions listed on the attached pages.

This approval is also issued in accordance with 40 CFR 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.

Significant Source Modification No.: 033-12992-00076	
Issued by: Original Signed by Paul Dubenetzky Paul Dubenetzky, Branch Chief Office of Air Quality	Issuance Date: May 15, 2002

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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.3 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 Direct Reduced Iron facility.

Responsible Official: Mark Millett
Source Address: 4500 County Road 59, Butler, Indiana 46721
Mailing Address: 4500 County Road 59, Butler, Indiana 46721
General Source Phone Number: 219-868-8185
SIC Code: 3312
County Location: DeKalb
Source Location Status: Attainment for all criteria pollutants
Source Status: Part 70 Permit Program
Major Source, under PSD Rules;
Major Source, Section 112 of the Clean Air Act

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

This modification to a stationary source is approved to construct and operate the following emission unit and pollution control device:

(a) One (1) coal dryer identified as 75 with nominal capacity of 25 MMBtu/hour and processes 60 tons per hour of coal, exhausting to stack (identified as S-75), equipped with a baghouse (B-75).

(b) One (1) ore dryer identified as 76 with nominal capacity of 27 MMBtu/hour and processes 115 tons per hour of ore, exhausting to stack (identified as S-76), equipped with a baghouse (B-76).

A.3 Specifically Regulated Insignificant Activities [326 IAC 2-7-1(21)] [326 IAC 2-7-4(c)] [326 IAC 2-7-5(15)]

This modification to a stationary source does not involve any insignificant activities, as defined in 326 IAC 2-7-1(21).

A.4 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 (U.S. 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 40 CFR Parts 124.15, 124.19 and 124.20, if public comments are received on the draft permit during the public comment period, the effective date of this permit will be thirty-three (33) days from its issuance. If no public comments are received, the effective date of this permit will be the date of issuance of the permit.

B.3 Permit Expiration Date [326 IAC 2-2-8(a)(1)] [40 CFR 52.21(r)(2)]

Pursuant to 40 CFR 52.21(r)(2) and 326 IAC 2-2-8(a)(1) (PSD Requirements: Source Obligation) this permit to construct shall expire if construction is not commenced within eighteen (18) months after receipt of this approval or if construction is discontinued for a continuous period of eighteen (18) months or more, or if construction is not completed within reasonable time. 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 the following requirements are met:

(a) The attached affidavit of construction shall be submitted to the Office of Air Quality (OAQ), Permit Administration & Development Section, verifying that the emission units were constructed as indicated in 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.

(b) If actual construction of the emissions units differs from the construction proposed in the application or the permit, the source may not begin operation until the source modification has been revised pursuant to 326 IAC 2-7-11 or 326 IAC 2-7-12 and an Operation Permit Validation Letter is issued.

(c) The Permittee shall receive an Operation Permit Validation Letter from the Chief of the Permit Administration & Development Section and attach it to this document.

(d) The changes covered by the Significant Source Modification will be incorporated in the Part 70 Operating Permit for this Source.

B.5 NSPS Reporting Requirement

Pursuant to the New Source Performance Standards (NSPS), Part 60.7, Part 60.8, the Source owner/operator is hereby advised of the requirement to report the following at the appropriate times:

(a) Commencement of construction date (no later than 30 days after such date);

(b) Anticipated start-up date (not more than 60 days or less than 30 days prior to such date);

(c) Actual start-up date (within 15 days after such date); and

(d) 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 Data Section, 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, or its equivalent, with each submittal requiring certification.

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

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

(a) If required by specific condition(s) in Section D of this permit, the Permittee shall prepare and maintain Preventive Maintenance Plans (PMPs) when operation begins, including the following information on each facility:

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

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

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

The PMP does not require the certification by the “responsible official” as defined by 326 IAC 2-7-1(34).

(b) The Permittee shall implement the PMPs as necessary to ensure that failure to implement a PMP does not cause or contribute to a violation 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 contributes to any violation. The PMP does not require the certification by the “responsible official” as defined by 326 IAC 2-7-1(34).

(d) Records of preventive maintenance shall be retained for a period of at least five (5) years. These records shall be kept 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.

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)]

C.4 Inspection and Entry [326 IAC 2-7-6]

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

(a) Enter upon the Permittee's premises where a Part 70 source is located, or emissions related activity is conducted, or where records must be kept under the conditions of this approval;

(b) Have access to and copy, at reasonable times, any records that must be kept under this title or the conditions of this approval or any operating permit revisions;

(c) Inspect, at reasonable times, any processes, emissions units (including monitoring and air pollution control equipment), practices, or operations regulated or required under this approval or any operating permit revisions;

(d) Sample or monitor, at reasonable times, substances or parameters for the purpose of assuring compliance with this approval or applicable requirements; and

(e) Utilize any photographic, recording, testing, monitoring, or other equipment for the purpose of assuring compliance with this approval or applicable requirements.

C.5 Opacity [326 IAC 5-1]

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

(a) Opacity shall not exceed an average of forty percent (40%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.

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

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

The Permittee shall not allow fugitive dust to escape beyond the property line or boundaries of the property, right-of-way, or easement on which the source is located, in a manner that would violate 326 IAC 6-4 (Fugitive Dust Emissions). 326 IAC 6-4-2(4) is not federally enforceable.

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

C.7 Performance Testing [326 IAC 3-6][326 IAC 2-1.1-11]

(a) Compliance testing on new emission units shall be conducted within 60 days after achieving maximum production rate, but no later than 18 months after issuance of this permit, if specified in Section D of this approval. All testing shall be performed according to the provisions of 326 IAC 3-6 (Source Sampling Procedures), except as provided elsewhere in this approval, 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 approval, 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 within forty-five (45) days after the completion of the testing. An extension may be granted by IDEM, OAQ, if the source submits to IDEM, OAQ, a reasonable written explanation within five (5) days prior to the end of the initial forty-five (45) day period.

Compliance Requirements [326 IAC 2-1.1-11]

C.8 Compliance Requirements [326 IAC 2-1.1-11]

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

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

C.9 Compliance Monitoring [326 IAC 2-7-5(3)] [326 IAC 2-7-6(1)]

If required by Section D, all monitoring and record keeping requirements 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.

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

C.10 Compliance Response Plan - 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 within ninety (90) days after issuance of this permit by the Permittee, supplemented from time to time by the Permittee, maintained on site, and comprised of:

(1) Reasonable response steps that may be implemented in the event that a response step is needed pursuant to the requirements of Section D of this permit; and an expected timeframe for taking reasonable response steps.

(2) 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 response steps taken.

(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:

(1) Reasonable response steps shall be taken as set forth in the Permittee's current Compliance Response Plan; or

(2) If none of the reasonable response steps listed in the Compliance Response Plan is applicable or responsive to the excursion, the Permittee shall devise and implement additional response steps as expeditiously as practical. Taking such additional response steps shall not be considered a deviation from this permit so long as the Permittee documents such response steps in accordance with this condition.

(3) If the Permittee determines that additional response steps would necessitate that the emissions unit or control device be shut down, the IDEM, OAQ shall be promptly notified of the expected date of the shut down, the status of the applicable compliance monitoring parameter with respect to normal, and the results of the actions taken up to the time of notification.

(4) Failure to take reasonable response steps shall constitute a violation of the permit.

(c) The Permittee is not required to take any further response steps for any of the following reasons:

(1) A false reading occurs due to the malfunction of the monitoring equipment and prompt action was taken to correct the monitoring equipment.

(2) 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.

(3) An automatic measurement was taken when the process was not operating.

(4) The process has already returned or is returning to operating within "normal" parameters and no response steps are required.

(d) The Permittee shall record all instances when 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.

(e) 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.11 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) Pursuant to 326 IAC 2-7-16 (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:

(1) An emergency occurred and the Permittee can, to the extent possible, identify the causes of the emergency;

(2) The permitted facility was at the time being properly operated;

(3) 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;

(4) 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

(5) 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).

(6) 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)(10) 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.

C.12 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 - 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, not later than thirty (30) days after 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 not later than one hundred twenty (120) days after 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 noncompliant stack tests.

The documents submitted pursuant to this condition do not 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.13 General Record Keeping Requirements [326 IAC 2-7-5(3)][326 IAC 2-7-6]

(a) Records of all required data, reports and support information 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 kept 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 when the new or modified equipment begins normal operation.

C.14 General Reporting Requirements [326 IAC 2-7-5(3)(C)]

(a) The source 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 response steps taken must be reported. This report shall be submitted not later than thirty (30) days after 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. Reporting periods are based on calendar years.

SECTION D.1 FACILITY OPERATION CONDITIONS

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

(a) One (1) coal dryer identified as 75 with nominal capacity of 25 MMBtu/hour and processes 60 tons per hour of coal, exhausting to stack (identified as S-75), equipped with a baghouse (B-75).

(b) One (1) ore dryer identified as 76 with nominal capacity of 27 MMBtu/hour and processes 115 tons per hour of ore, exhausting to stack (identified as S-76), equipped with a baghouse (B-76).

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

Emission Limitations and Standards

D.1.1 Particulate Matter (PM/PM-10) - Best Available Control Technology [326 IAC 2-2-3]

Pursuant to 326 IAC 2-2-3, the PM/PM10 (where PM10 includes both filterable and condensable components) emissions from the Coal Dryer and Ore Dryer baghouses B-75 and B-76 shall not exceed a PM/PM-10 emission rate of 0.0052 grains per dscf through stacks 75 and 76 each. The PM/PM10 shall not exceed 1.11 lb per hour and 1.56 lb per hour from Coal Dryer and Ore Dryer stacks 75 and 76, respectively. If the stack test required under Condition D.1.11 shows that these PM/PM-10 limits are not achievable in practice for the dryers, the Department may revise the permit to adjust these PM/PM10 limitations. The Department may, at its discretion, use the authority under IC 13-15-7-2 to re-open and revise the limit to more closely reflect the actual stack test results. The Department will provide an opportunity for public notice and comment prior to finalizing any permit revision. IC 13-15-7-3 (Revocation or Modification of a Permit: Appeal to Board) shall apply to this permit condition.

D.1.2 Particulate Matter (PM/PM-10) – Process Weight Rate Limit [326 IAC 6-3-2]

The particulate matter (PM) from the Coal Dryer and Ore Dryer shall be limited as follows:

Process	Process Weight (lbs/hr)	PM Emission Limit (lbs/hr)
Coal Dryer	120,000	46.3
Ore Dryer	230,000	52.7

These limits were calculated as follows:

Interpolation and extrapolation of the data for the process weight rate in excess of sixty thousand (60,000) pounds per hour shall be accomplished by use of the equation:

$E = 55.0\ P^{0.11} - 40$ where E = rate of emission in pounds per hour and
P = process weight rate in tons per hour

D.1.3 Opacity Limitation - Best Available Control Technology [326 IAC 2-2-3]

(a) Pursuant to 326 IAC 2-2-3, the visible emissions discharged into the atmosphere from the Coal Dryer and Ore Dryer stacks 75 and 76 shall not exceed three percent (3%) opacity determined by a six (6) minute average (24 reading taken in accordance with EPA Method 9, Appendix A) pursuant to 326 IAC 5-1-4.

(b) Pursuant to 326 IAC 2-2-3, the visible emissions discharged into the atmosphere from the vents and openings in the buildings housing Coal Dryer and Ore Dryer shall not exceed three percent (3%) opacity determined by a six (6) minute average (24 reading taken in accordance with EPA Method 9, Appendix A) pursuant to 326 IAC 5-1-4.

D.1.4 40 CFR 60, Subpart Y (Coal Preparation Plant)

Pursuant to 326 IAC 12-1 and 40 CFR 60, Subpart Y (Coal Preparation Plant), the PM emissions from the thermal coal dryer 75 shall not exceed 0.031 grain per dscf through stack 75. The visible emissions from the stack 75 shall not exceed 20%.

D.1.5 Nitrogen Oxides (NO_x) - Best Available Control Technology [326 IAC 2-2-3]

Pursuant to 326 IAC 2-2-3, the nitrogen oxide(s) emissions from the Coal Dryer and Ore Dryer shall be controlled by the use of low-NOx natural gas-fired burners and shall not exceed 0.049 pounds per MMBtu of heat input. The NOx emissions shall not exceed 1.25 pounds per hour and 1.35 pounds per hour from the Coal Dryer and Ore Dryer stacks 75 and 76 respectively.

D.1.6 Carbon Monoxide (CO) - Best Available Control Technology [326 IAC 2-2-3]

Pursuant to 326 IAC 2-2-3, the carbon monoxide emissions from the Coal Dryer and Ore Dryer shall not exceed 0.082 pounds per MMBtu of heat input. The CO emissions shall not exceed 2.1 pounds per hour and 2.3 pounds per hour from the Coal Dryer and Ore Dryer stacks 75 and 76 respectively.

D.1.7 Volatile Organic Compounds (VOC) - Best Available Control Technology [326 IAC 2-2-3]

Pursuant to 326 IAC 2-2-3, the volatile organic compound emissions from the Coal Dryer and Ore Dryer shall not exceed 0.0053 pounds per MMBtu of heat input. The VOC emissions shall not exceed 0.14 pounds per hour and 0.15 pounds per hour from the Coal Dryer and Ore Dryer stacks 75 and 76 respectively.

D.1.8 Sulfur Dioxide (SO_2) - Best Available Control Technology [326 IAC 2-2-3]

Pursuant to 326 IAC 2-2-3, the sulfur dioxide emissions from the Coal Dryer and Ore Dryer shall not exceed 0.00059 pounds per MMBtu of heat input. The SO_2 emissions shall not exceed 0.015 pounds per hour and 0.016 pounds per hour from the Coal Dryer and Ore Dryer stacks 75 and 76 respectively.

D.1.9 Preventive Maintenance Plan [326 IAC 2-7-5(13)]

A Preventive Maintenance Plan, in accordance with Section C - Preventive Maintenance Plan, of this permit, is required for the control devices B-75 and B-76.

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

D.1.10 Particulate Matter (PM)

The baghouses B-75 and B-76 for PM control shall be in operation and control emissions from the Coal Dryer and Ore Dryer at all times when the dryers are in operation.

D.1.11 Testing Requirements [326 IAC 2-7-6(1), (6)] [326 IAC 2-1.1-11] [40 CFR 60 Subpart Y]

Within 60 days of achieving maximum production rate, but no later than 18 months after issuance of this permit, for the dryers, in order to demonstrate compliance with conditions D.1.1, D.1.3 and D.1.4, the Permittee shall perform PM and PM-10 testing utilizing methods as approved by the Commissioner. The PM-10 includes both filterable and condensable components. Testing shall be conducted in accordance with Section C- Performance Testing and as specified in 40 CFR 60.254.

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

D.1.12 Visible Emissions Notations

(a) Visible emission notations of the Coal Dryer and Ore Dryer stacks exhaust shall be performed once per shift during normal daylight operations when exhausting to the atmosphere. A trained employee shall record whether emissions are normal or abnormal.

(b) For processes operated continuously, "normal" means those conditions prevailing, or expected to prevail, eighty percent (80%) of the time the process is in operation, not counting startup or shut down time.

(c) In the case of batch or discontinuous operations, readings shall be taken during that part of the operation that would normally be expected to cause the greatest emissions.

(d) A trained employee is an employee who has worked at the plant at least one (1) month and has been trained in the appearance and characteristics of normal visible emissions for that specific process.

(e) The Compliance Response Plan for these units shall contain troubleshooting contingency and response steps for when an abnormal emission is observed. Failure to take response steps in accordance with Section C - Compliance Response Plan, Preparation, Implementation, Records and Reports, shall be considered a violation of this permit.

D.1.13 Baghouse Inspections

An inspection shall be performed each calendar quarter of all bags controlling the dryers. All defective bags shall be replaced or repaired.

D.1.14 Broken or Failed Bag Detection

In the event that bag failure has been observed the associated process will be shut down promptly until the failed units have been repaired or replaced. Operations may continue only if the event qualifies as an emergency and the Permittee satisfies the requirements of the emergency provisions of this permit (Section C - Emergency Provisions).

D.1.15 Monitoring of Operations [40 CFR 60.253 subpart Y]

(a) The Permittee shall install, calibrate, maintain and continuously operate a monitoring device for the measurement of the temperature of the gas stream at the exit of the thermal dryer on a continuous basis. The monitoring device is to be certified by the manufacturer to be accurate within $\pm 3^{o}$ Fahrenheit.

(b) The monitoring device under paragraph (a) shall be recalibrated annually in accordance with procedure under 40 CFR 60.13(b).

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

D.1.16 Record Keeping Requirements

(a) To document compliance with Condition D.1.12 the Permittee shall maintain records of visible emission notations of the Coal Dryer and Ore Dryer stack exhausts once per shift.

(b) To document compliance with Condition D.1.13, the Permittee shall maintain records of the results of the inspections required.

(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
COMPLIANCE BRANCH
100 North Senate Avenue
P.O. Box 6015
Indianapolis, Indiana 46206-6015
Phone: 317-233-5674
Fax: 317-233-5967

PART 70 OPERATING PERMIT
EMERGENCY OCCURRENCE REPORT

Source Name: Iron Dynamics, Inc.
Source Address: 4500 County Road 59, Butler, Indiana 46721
Mailing Address: 4500 County Road 59, Butler, Indiana 46721
Permit No.: 033-12992-00076

This form consists of 2 pages **Page 1 of 2**

9 This is an emergency as defined in 326 IAC 2-7-1(12)
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
The Permittee must submit notice in writing or by facsimile within two (**2**) days (Facsimile Number: 317-233-5967), and follow the other requirements of 326 IAC 2-7-16.

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:

If any of the following are not applicable, mark N/A **Page 2 of 2**

Date/Time Emergency started:
Date/Time Emergency was corrected:
Was the facility being properly operated at the time of the emergency? Y N
Type of Pollutants Emitted: TSP, PM-10, SO_2, 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/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:

Phone:

A certification is not required for this report.

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

PART 70 SOURCE MODIFICATION CERTIFICATION

Source Name: Iron Dynamics, Inc.
Source Address: 4500 County Road 59, Butler, Indiana 46721
Mailing Address: 4500 County Road 59, Butler, Indiana 46721
Permit No.: 033-12992-00076

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:

9 Test Result (specify)

9 Report (specify)

9 Notification (specify)

9 Affidavit (specify)

9 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

PART 70 OPERATING PERMIT
QUARTERLY DEVIATION AND COMPLIANCE MONITORING REPORT

Source Name: Iron Dynamics, Inc.
Source Address: 4500 County Road 59, Butler, Indiana 46721
Mailing Address: 4500 County Road 59, Butler, Indiana 46721
Permit No.: 033-12992-00076

Months: ___________ to ____________ Year: ______________

Page 1 of 2

This report is an affirmation that the source has met all the requirements stated in this permit. This report shall be submitted quarterly based on a calendar year. Any deviation from the requirements, the date(s) of each deviation, the probable cause of the deviation, and the 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. Additional pages may be attached if necessary. If no deviations occurred, please specify in the box marked "No deviations occurred this reporting period".	
9 NO DEVIATIONS OCCURRED THIS REPORTING PERIOD.	
9 THE FOLLOWING DEVIATIONS OCCURRED THIS REPORTING PERIOD	
Permit Requirement (specify permit condition #)	
Date of Deviation:	**Duration of Deviation:**
Number of Deviations:	
Probable Cause of Deviation:	
Response Steps Taken:	
Permit Requirement (specify permit condition #)	
Date of Deviation:	**Duration of Deviation:**
Number of Deviations:	
Probable Cause of Deviation:	
Response Steps Taken:	

Page 2 of 2

Permit Requirement (specify permit condition #)	
Date of Deviation:	**Duration of Deviation:**
Number of Deviations:	
Probable Cause of Deviation:	
Response Steps Taken:	
Permit Requirement (specify permit condition #)	
Date of Deviation:	**Duration of Deviation:**
Number of Deviations:	
Probable Cause of Deviation:	
Response Steps Taken:	
Permit Requirement (specify permit condition #)	
Date of Deviation:	**Duration of Deviation:**
Number of Deviations:	
Probable Cause of Deviation:	
Response Steps Taken:	

Form Completed By:

Title/Position:

Date:

Phone:

Attach a signed certification to complete this report.

Mail to: Permit Administration & Development Section
Office Of Air Quality
100 North Senate Avenue
P. O. Box 6015
Indianapolis, Indiana 46206-6015

Iron Dynamics, Inc.
4500 County Road 59,
Butler, Indiana 46721

Affidavit of Construction

I, ____, being duly sworn upon my oath, depose and say:
(Name of the Authorized Representative)

1. I live in ______________________________ County, Indiana and being of sound mind and over twenty-one (21) years of age, I am competent to give this affidavit.

2. I hold the position of ________________________ for ________________________.
(Title) (Company Name)

3. By virtue of my position with Iron Dynamics, Inc., I have personal

knowledge of the representations contained in this affidavit and am authorized to make

these representations on behalf of Iron Dynamics, Inc.

4. I hereby certify that Iron Dynamics, Inc., 4500 County Road 59, Butler, Indiana 46721, has constructed the Coal Dryer and Ore Dryer Exhaust stacks in conformity with the requirements and intent of the construction permit application received by the Office of Air Quality on December 5, 2000 and as permitted pursuant to **Source Modification No. 033-12992-00076** issued on ____________________

Further Affiant said not.

I affirm under penalties of perjury that the representations contained in this affidavit are true, to the best of my information and belief.

____
Signature

____
Date

STATE OF INDIANA)
)SS

COUNTY OF ____________________)

Subscribed and sworn to me, a notary public in and for ________________________ County and State of Indiana on this ____________________ day of ______________________, 20 _________ .

My Commission expires: ________________________

____
Signature

____
Name (typed or printed)

Indiana Department of Environmental Management
Office of Air Quality

Addendum to the
Technical Support Document for a Part 70 Significant Source Modification requiring PSD Review

Source Background and Description

Source Name:	Iron Dynamics, Inc.
Source Location:	4500 County Road 59, Butler, IN 46721
County:	Dekalb
SIC Code:	3312
Operation Permit No.:	033-12614-00076
Operation Permit Issuance Date:	Not yet issued
Significant Source Modification No.:	033-12992-00076
Permit Reviewer:	Gurinder Saini

On March 18, 2002, the Office of Air Quality (OAQ) had a notice published in the Auburn Evening Star, Auburn, Indiana, stating that Iron Dynamics, Inc., had applied for a modification approval to the coal and ore dryer for the Rotary Hearth Furnace (RHF) at the existing steel production source. The public notice also stated that the IDEM, OAQ proposed to issue the PSD permit for this operation and provided information on how the public could review the proposed approval and other documentation. Finally, the notice informed interested parties that there was a period of thirty (30) days to provide comments on the draft permit.

Written comments were received from Mr. Stephen Loeschner of Fort Wayne, Indiana, on April 08, 2002. Comments were also received from Steel Dynamics, Inc. on behalf of Iron Dynamics, Inc. (IDI) on April 08, 2002. These comments and IDEM, OAQ responses, including changes to the permit (where language deleted is shown with strikeout and that added is shown in bold) are as follows:

Comments from Barry Smith of Steel Dynamics, Inc. and IDEM, OAQ responses are as follows:

Comment 1:

GeneralIDI disagrees that this permit should be treated as a PSD source.

Response 1:

The IDEM, OAQ has explained in the “history” and the “controlled potential to emit” sections of the TSD, in detail, why the provisions of 326 IAC 2-2 (Prevention of Significant Deterioration) apply to this modification. No changes are made to any permit conditions.

Comment 2:

A.2, D.1 — Heat input values on pieces of equipment are engineering design numbers and do not necessarily reflect a particular unit’s performance under varying operating conditions. As such, the word “nominal” should be inserted before the word “maximum” in each section.

Response 2:

The maximum capacities listed in the emission unit descriptions in A.1 through A.3 are used by IDEM OAQ in order to completely describe the units and to assess the source's potential to emit. The process specific emissions limitations identified in Section D of the permit are often determined from this information. Physical changes or changes in the method of operation that change the capacity may also increase the emission unit's potential to emit. Documenting the capacity will assist both the Permittee and the IDEM in evaluating whether such a change requires a pre-construction permit or other approvals. If these capacities are not accurate, the source is required to notify IDEM OAQ since this may change the applicability of the air permitting rules, and may result in an administrative amendment to the permit. Since these maximum capacities are subject to change it might be best for this permit to read "nominal capacity" in order to clarify the variations in equipment capabilities due to heat content variations. Therefore, Section A.2 and the facility descriptions in Section D.1 have been changed as follows:

A.2 Emission Units and Pollution Control Equipment Summary [326 IAC 2-7-4(c)(3)] [326 IAC 2-7-5(15)]
This modification to a stationary source is approved to construct and operate the following emission unit and pollution control device:

(a) One (1) coal dryer identified as 75 with ~~maximum~~ **nominal** capacity of 25 MMBtu/hour and processes 60 tons per hour of coal, exhausting to stack (identified as S-75), equipped with a baghouse (B-75).

(b) One (1) ore dryer identified as 76 with ~~maximum~~ **nominal** capacity of 27 MMBtu/hour and processes 115 tons per hour of ore, exhausting to stack (identified as S-76), equipped with a baghouse (B-76).

SECTION D.1 FACILITY OPERATION CONDITIONS

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

(a) One (1) coal dryer identified as 75 with ~~maximum~~ **nominal** capacity of 25 MMBtu/hour and processes 60 tons per hour of coal, exhausting to stack (identified as S-75), equipped with a baghouse (B-75).

(b) One (1) ore dryer identified as 76 with ~~maximum~~ **nominal** capacity of 27 MMBtu/hour and processes 115 tons per hour of ore, exhausting to stack (identified as S-76), equipped with a baghouse (B-76).

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

Comment 3:

IDI requested the condition B.4 to be changed as follows:

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), Permit Administration & Development Section, verifying that the emission units were constructed as ~~proposed in the application~~**provided in the permit**. *[ed. The permit calls for conditions different than the permit application. Thus we cannot certify construction* *in accordance with the application, since it will not match the permit requirements.]* 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.

(c) ~~The Permittee shall receive~~**IDEM-OAQ shall provide** an Operation Permit Validation Letter from the Chief of the Permit Administration & Development Section and **the permittee shall** attach it to this document.

(d) The changes covered by the Significant Source Modification will be included in the Title V draft **for the complete IDI facility**.

Response 3:

The changes proposed by the IDI other than the changes in the item (c) of the condition B.4 have been accepted. The changes recommended by the IDI to the item (c) do not affect the intent of the IDEM, OAQ and the interpretation of the rule. Therefore, item (c) is not modified.

The condition B.4 is modified as follows:

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), Permit Administration & Development Section, verifying that the emission units were constructed as ~~proposed in the application or~~ **indicated in** 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.

(b) If actual construction of the emissions units differs from the construction proposed in the application or the permit, the source may not begin operation until the source modification has been revised pursuant to 326 IAC 2-7-11 or 326 IAC 2-7-12 and an Operation Permit Validation Letter is issued.

(c) The Permittee shall receive an Operation Permit Validation Letter from the Chief of the Permit Administration & Development Section and attach it to this document.

(d) The changes covered by the Significant Source Modification will be ~~included~~ **incorporated** in the ~~Title V draft for the complete IDI facility~~ **Part 70 Operating Permit for this Source**.

Comment 4:

The IDI requested the condition B.5 to be deleted because the IDEM, OAQ states that these emission units are already constructed and that this permit is being reviewed under the original IDI PSD permit. As such, condition B.5 is no longer applicable since it was accounted for under the original IDI permit for the Rotary Hearth Furnace.

Response 4:

The condition B.5 states the reporting requirements for units subject to NSPS. The coal dryer at the IDI is subject to the requirements of 40 CFR 60, NSPS, subpart Y (Coal Preparation Plant). Therefore, this equipment is subject to general reporting requirements under 40 CFR 60.7. The IDEM, OAQ recognizes that this equipment is already constructed and has operated, but to fulfill the requirements of NSPS, the Source is required to report this information as the events occurred historically.

Comment 5:

The condition C.1 (b) should be modified, to allow the Source to use the equivalent certification form containing similar information, as follows:

C.1 (b) One (1) certification shall be included, using the attached Certification Form**, or its equivalent**, with each submittal requiring certification.

Response 5:

The condition C.1 (b) is modified as follows:

C.1 (b) One (1) certification shall be included, using the attached Certification Form**, or its equivalent**, with each submittal requiring certification.

Comment 6:

The rule cite in condition C.2 is not applicable. The condition C.2 should be modified as follows:

C.2 Preventive Maintenance Plan [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 and maintain Preventive Maintenance Plans (PMPs) when operation begins, including the following information on each facility:

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

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

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

The PMP does not require the certification by the “responsible official” as defined by 326 IAC 2-7-1(34).

~~(b) The Permittee shall implement the PMPs as necessary to ensure that failure to implement a PMP does not cause or contribute to a violation 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 **reasonable** approval by IDEM, OAQ. IDEM, OAQ, may require the Permittee to revise its PMPs whenever lack of proper maintenance causes or contributes to any violation. The PMP does not require the certification by the “responsible official” as defined by 326 IAC 2-7-1(34).

Response 6:

The item (b) is included in the permit condition C.2 to provide a standard for assessing the way that a PMP is implemented. In the past Permittees have expressed the concern that a violation could result if a PMP is not followed, even if there were no environmental impacts as a result of the failure. The IDEM, OAQ included this condition as part of the standard language to clarify that the variations from the PMP, such as occasional departure from maintenance schedules (lubrication of control equipment performed at 35 days when PMP states at 30 days) do not cause the violation.

The word “reasonable” is not added to the item (c) in the condition C.2. The IDEM, OAQ believes that this change will add subjectivity to this approval. The PMP will have to be approved by the IDEM, OAQ. The IDEM, OAQ has agreed to change the rule cite to remove the non-applicable part cited. The condition C.2 is modified as follows:

C.2 Preventive Maintenance Plan [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 and maintain Preventive Maintenance Plans (PMPs) when operation begins, including the following information on each facility:

Comment 7:

The dryers have already been constructed and have operated for some time. Therefore, the requirement that the stack testing be completed within 180 days of startup does not apply to these units. The condition C.7 should be modified as follows:

C.7 Performance Testing [326 IAC 3-6][326 IAC 2-1.1-11]

(a) Compliance testing on new emission units shall be conducted within 60 days after achieving maximum production rate, ~~but no later than 180 days after initial start-up,~~ if specified in Section D of this approval. All testing shall be performed according to the provisions of 326 IAC 3-6 (Source Sampling Procedures), except as provided elsewhere in this approval, 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.

Response 7:

The condition C.7 quoted above by the IDI is different from the condition C.7 in this PSD permit 033-12992-00076. The permit condition C.7 is revised to set a time frame for the stack testing as follows:

C.7 Performance Testing [326 IAC 3-6][326 IAC 2-1.1-11]

(a) Compliance testing on new emission units shall be conducted within 60 days after achieving maximum production rate**, but no later than 18 months after issuance of this permit,** if specified in Section D of this approval. All testing shall be performed according to the provisions of 326 IAC 3-6 (Source Sampling Procedures), except as provided elsewhere in this approval, 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.

Comment 8:

IDI requested that the condition C.9 should be modified as follows:

C.9 Compliance Monitoring [326 IAC 2-7-5(3)] [326 IAC 2-7-6(1)]
If required by Section D, all monitoring and record keeping requirements 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.~~

Response 8:

This is a general condition requiring the Permittee to install equipment to ensure compliance monitoring and is left unchanged.

Comment 9:

The item (d) in condition C.10 cites Section B. Deviation, where no such condition exists in the Section B of the permit. Therefore the condition C.10 should be modified as follows:

C.10 Compliance Response Plan – Preparation, Implementation, Records, and Reports

~~(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 B-Deviations from Permit Requirements and Conditions.~~

Response 9:

The IDEM, OAQ agrees that the condition cited is not applicable. Therefore, the item (d) in the condition C.10 is deleted as follows:

C.10 Compliance Response Plan – Preparation, Implementation, Records, and Reports

~~(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 B-Deviations from Permit Requirements and Conditions.~~

The subsequent items in the condition C.10 are renumbered.

Comment 10:

The condition C.11 does not refer the rule cite in the permit. In addition the IDI has requested to change the term "immediately" to "promptly". Therefore the condition C.11 should be modified as follows:

C.11 Emergency Provisions

(b) **Pursuant to 326 IAC 2-7-16(b) a**~~A~~n emergency, as defined in 326 IAC 2-7-1(12), constitutes an affirmative defense to an action brought for noncompliance with a health-based or 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:

(6) The Permittee ~~immediately~~ **promptly** took all reasonable steps to correct the emergency.

(g) Operations may continue during an emergency only if the following conditions are met:

(1) 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 **promptly** ~~immediately~~ takes all reasonable steps to correct the emergency and minimize emissions.

(2) If an emergency situation causes a deviation from a health-based limit, the Permittee may not continue to operate the affected emissions facilities unless:

(A) The Permittee **promptly** ~~immediately~~ takes all reasonable steps to correct the emergency situation and to minimize emissions; and

Response 10:

The rule cites in item (b) in condition C.11 is added. The change of word “immediately” with “promptly” is not implemented because, the text as it is reflects the text in the rule.

C.11 Emergency Provisions

(b) **Pursuant to 326 IAC 2-7-16(b) a**~~A~~n emergency, as defined in 326 IAC 2-7-1(12), constitutes an affirmative defense to an action brought for noncompliance with a health-based or 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:

Comment 11:

Comments on D.1.1

Under D.1.4, IDEM indicates that 40 CFR 60 Subpart Y (Coal Preparation Plant) regulations apply to the coal dryer with an emission limit of 0.031 gr/dscf and a 20 percent opacity limit. IDEM’s BACT analysis shows, at best, a comparable emission limit of 0.02 gr/dscf for coal dryers. Thus, there is no supporting foundation to require IDI to meet a lower limit than what has already been established as BACT by IDEM’s review. Therefore, we request a limit of 0.02 gr/dscf for the coal dryer.

Similarly, IDEM’s BACT analysis found no comparable sources with an emission limit less than 0.01 gr/dscf for the ore dryer. IDI selected lower emission limits in the permit application to mirror the Rotary Hearth Furnace operations since this is where the dryer exhaust gases originally vented. We had no other information from which to prepare an application. Based on IDEM’s BACT review, we now realize this was not appropriate. Therefore, we request a limit of 0.01 gr/dscf for the ore dryer.

Further review of the BACT figures used by IDEM shows that the limits are representative of filterable emissions only. See, e.g., Subpart Y (requires Method 5 to show compliance with particulate limits). Condensible emissions are not captured by conventional control devices and are not accounted for in established emission factors. If condensible emissions are incorporated into the permit limit, we will be unfairly restricted to a controlled emission limit for which there is no control, and which is not applicable to any other company. Therefore, we request that only filterable PM_{10} be recognized in D.1.1 and D.1.11.

Response 11:

The IDEM, OAQ received the request for modification to the coal and ore dryers at the IDI plant on December 05, 2000. The application described that these dryers were presently exhausting through the common stack with the rotary hearth furnace (RHF). The RHF modification was subject to the provisions of 326 IAC 2-2 (Prevention of Significant Deterioration) and was issued a PSD permit 033-8091-00043. The RHF PM/PM10 emissions are controlled using a baghouse. The operation condition 22 of this permit limits the PM/PM10 emissions from the RHF to less than 0.0052 grains per dry standard cubic feet of the exhaust gas. As the exhausts from the coal and ore dryers were routed through the same stack as RHF, therefore, these emissions were subject to the same limitation of 0.0052 grain/dscf for PM/PM10.

With this background and because of following factors, the coal and ore dryers PM/PM10 limit remains unchanged:

1. Even though not permitted along with the RHF, the coal and ore dryers were subject to requirements of PSD permit 033-8091-00043, (because the exhaust stream was combined with the RHF) and should have been subject to BACT limitation of 0.0052 grains/dscf.

2. The administrative record for this application submitted on December 05, 2000, by the IDI, stated that the dryers would comply with PM/PM10 emission limit of 0.0052 grains/dscf by employing individual baghouses exhausting to separate stacks.

3. The BACT discussion (Appendix C of the TSD) for this modification identifies many dryers located at various sources, including few dryers located at the coal handling facility used in similar application. IDI had predetermined in the application that the PM/PM10 emissions shall not exceed 0.0052 grains/dscf. Therefore, IDEM, OAQ compared this limitation with the lowest limit for this process type at similar source categories. IDEM, OAQ concurs that it did not perform a detailed emission unit by emission unit comparison, since, the IDI had agreed to the lowest emission limit in that category using similar controls (baghouse at 0.005 grains/dscf).

4. The IDI's claim now that the 0.0052 grain/dscf limit should not apply to the coal and ore dryers is incorrect. The lowest limit for the similar process in the table shown in the appendix C of the TSD is 0.005 grains/dscf (using baghouse as control).

5. The issue of PM10 limit not accounting for condensable component as argued by the IDI is incorrect to some extent. The NSPS limitation and performance test (Method 5 only) has little or no bearing on the BACT assessment for this modification for PM10. For long IDEM, OAQ and other federal, state and local agencies have explained that per the definition of PM10, the PM10 included both filterable and condensable components. In a letter [1]to IOWA DNR, the US EPA stated that "… CPM (condensable PM) is considered PM 10 and, when emitted can contribute to ambient PM 10 levels, applicants for PSD permits must address CPM if the proposed emission unit is a potential CPM emitter. The IDEM, OAQ, has the authority and obligation to regulate both filterable and condensable components of the PM10 emissions. Therefore, the present argument that NSPS subpart Y referencing only Method 5 is not relevant because the definition of PM10 includes both filterable and condensable components of particulate matter less than 10 micron in size. The IDEM, OAQ has consistently enforced PM10 (filterable + condensable) standards in its permits in recent years.

Therefore, IDEM, OAQ, disagrees with the IDI that the BACT limit of 0.0052 grains/dscf is not applicable to the coal and ore dryers. Though limited, the available information for the control equipment suggests that this limit is applicable and achievable for this type of processes. The IDI's argument does not show any elaborate technical discussion towards why the PM10 emissions from the dryers cannot meet the emission limits in the permit. However, the IDEM, OAQ, concurs with the IDI's argument that, there is some uncertainty about the quantity of the condensable component of PM 10 emissions from the Coal and Ore Drying operations. Therefore, IDEM, OAQ has agreed to add the provision that will allow the readjustment of this limit, if necessary to reflect actual condensable emissions, once the equipment is tested. In that regard, the Department will provide opportunity to the general public to review and comment on the permit modification before implementing the change. The condition D.1.1 of the permit is changed as follows:

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[1] See Letter from Thompson G. Pace, Acting Chief, SO2/ PM Programs branch to Sean Fitzsimmons of Iowa Department of Natural Resources dated March 31, 1994.

D.1.1 Particulate Matter (PM/PM-10) - Best Available Control Technology [326 IAC 2-2-3]

Pursuant to 326 IAC 2-2-3, the PM/PM10 (where PM10 includes both filterable and condensable components) emissions from the Coal Dryer and Ore Dryer baghouses B-75 and B-76 shall not exceed a PM/PM-10 emission rate of 0.0052 grains per dscf through stacks 75 and 76 each. The PM/PM10 shall not exceed 1.11 lb per hour and 1.56 lb per hour from Coal Dryer and Ore Dryer stacks 75 and 76, respectively. **If the stack test required under Condition D.1.11 shows that these PM/PM-10 limits are not achievable in practice for the dryers, the Department may revise the permit to adjust these PM/PM10 limitations. The Department may, at its discretion, use the authority under IC 13-15-7-2 to re-open and revise the limit to more closely reflect the actual stack test results. The Department will provide an opportunity for public notice and comment prior to finalizing any permit revision. IC 13-15-7-3 (Revocation or Modification of a Permit: Appeal to Board) shall apply to this permit condition.**

Comment 12:

D.1.3 Opacity limitations
There is no basis or supporting BACT analysis for an opacity limit of 3 percent for the dryers and building openings. As such, the 3 percent opacity limitation should be removed from the permit. Based on findings outlined under D.1.1 above, we request that the coal dryer limit under Subpart Y be 20 percent. In addition, since a 3 percent limit is not supported by the BACT analysis, we request the generic limit of 40 percent under 326 IAC 5-1-2(1) for the ore dryer.

Response 12:

The Federal Regulation[1] states: "Best available control technology means an emissions limitation (including a visible emissions standard) based on the maximum degree of reduction for each pollutant subject to regulation under the Act which would be emitted from any proposed major stationary source or major modification which the reviewing authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combination techniques for control of such pollutant.....". This regulation and the identical State rule 326 IAC 2-2-1 (h) support the visible emission standard being set as emission limitations for the dryers.

This issue was further clarified in a judgement[2] by the District Columbia Circuit Court, where the court decided that "Under the language of the stature, a visible emission standard to be incorporated into BACT must constitute a 'requirement…which limits the *quantity, rate or concentration*' of pollutant emissions. An emission standard pertaining to air opacity is one such means of measuring and limiting emissions; such a standard sets limits on the emissions of pollutants according to their density in ways that therefore affect, for example human vision… we believe that PSD permitting authorities could fairly have construed the term 'emission standard' to comprehend 'visible emission standard'". The court further stated that ".. EPA's inclusion of visible emission standards (among others) to be used to determine compliance with BACT sets no single standard that all PSD permittees must meet. Instead, the regulations contemplate only the factoring of an opacity standard into other BACT consideration such as 'energy, environmental, economic impacts and other costs'' to be applied on a 'case by case basis' to emission facilities. As such the regulation is far from oppressive or unduly expansive; it merely defines with some specificity an area in which the permitting authority, which in most cases will be a state, may exercise reasonable discretion."

[1] See: 40 CFR 52.21 (Prevention of Significant Deterioration) item (b) (12) "Best Available Control Technology".

[2] See, pages 407-409 "636F.2d 323(1979), Judgement by District of Columbia Circuit Court, in the case of "Alabama Power Company vs. Douglas M. Costle, Administrator Environmental Protection Agency" No. 78-1006, Decided December 14, 1979 and Amended April 21, 1980.

As discussed previously the construction of RHF project and other equipment were permitted in the PSD permit 033-8091-00043 on June 25, 1997, at the IDI Source. Various pieces of equipment and the building opening in this permit (033-8091-00043) were limited to less than 3% of the opacity. The coal and ore dryers were constructed and form the part of the same project and therefore are subject to the opacity limitations of 3% applicable to other equipment permitted along with the RHF. The dryers employ baghouses to control PM/PM10 emissions. The background information and the technical data suggest that the dryers should be able to comply with a 3 % opacity limitation. Following further supports this argument:

1. The dryer exhausts were routed through the main stack on RHF. A baghouse and scrubber controlled the combined emissions from the RHF and dryers.

2. The combined exhaust after add on control was subject to the following limitations as part of the BACT determination:
   (A) PM/PM10 emissions to be limited to 0.0052 grains per dscf.
   (B) Visible emissions to be limited to less than 3%.

3. The scrubbing operation using lime injection to control SO2 emissions in the main stack is also expected to contribute to PM/PM10 emissions. This aspect had not been completely researched and quantified at the time of issuance of the permit. Therefore, the PM/PM10 emissions were limited to a higher grain loading of 0.0052 grains per dscf.

4. By separating the dryer exhaust from the main stack on the RHF, the dryer exhaust is no longer subject to the scrubber operation. Therefore, the additional PM/PM10 contribution due to scrubber operation is not present with separate exhaust stacks for the dryers. The applicant had proposed to install baghouse on the individual dryer stack, to control the PM/PM10 emissions are maintained at a level less than 0.0052 grains per dscf of exhaust gas.

5. Therefore, the expected control efficiency for the PM/PM10 emissions for the baghouses on the main stack for the RHF and the dryers' exhausts is similar. The visible emissions at any stack are caused by the presence of PM/PM10 in the exhaust gases before, they are dissipated in the ambient air by various factors like temperature, flow rates and wind speed. As the two baghouses have similar control efficiencies, the stack opacity is not expected to be a lot dissimilar. Based on above discussion, the IDEM, OAQ, has concluded that the exhausts from the dryer stacks will be able to comply with an opacity emission standard of 3%.

Therefore, no change is made to any permit condition.

Comment 13:

D.1.5, D.1.6, D.1.7, D.1.8 - Similar to our discussion for D.1.1, we request that the emission limits for NO_x, CO, and VOC be based on the IDEM BACT analysis. Thus the emission limits for the coal dryer should be 0.59 lbs NOx/MMBtu, 0.18 lbs CO/MMBtu, and 0.83 lbs VOC/MMBtu. The emission limits for the ore dryer should be 0.15 lbs NOx/MMBtu and 2.02 lbs CO/MMBtu.

Response 13:

As explained in the response to the comment 11 above, the BACT analysis for the emission unit compares the proposed unit with the similar unit performing similar function at other sources. The dryers using natural gas as fuel have achieved the limitations proposed in the permit. The natural gas combustion characteristics (products of combustion) do not change, if the burner is used to dry coal or some other product. Therefore, IDI's argument that higher limit for NOx, VOC and CO emissions should be allowed for the coal and ore dryers are not supported by any technical arguments. The IDEM, OAQ believes that by using low NOx burner with exhaust gas re-circulation the dryers at IDI plant shall be able to comply with the limitations in the permit as demonstrated by similar applications at other sources. Therefore, no changes are made to any permit conditions.

Comment 14:

In addition, IDEM prorated the AP-42 emission factors for natural gas combustion from 1020 MMBtu/MMscf to 1000 MMBtu/MMscf, thereby lowering the emission limits slightly. IDEM erroneously assumed that IDI's gas heating content is 1000 MMBtu/MMscf, when in fact the permit application and historical data submitted in the IDEM i-STEPS annual database shows 1030 MMBtu/MMscf. Therefore, the correlating emission limits should be slightly higher than the AP-42 emission factors. Therefore, the following wording should be placed after each emission limit if IDEM intends to prorate the limits to 1000 MMBtu/MMscf, "….pounds per MMBtu of heat input based on a heat input of 1000 MMBtu/MMscf."

Response 14:

The IDEM, OAQ did not use 1000 MMBtu/MMSCF for calculating the emissions limits for various pollutants. The IDEM, OAQ used 1020 MMBtu/MMSCF of natural gas combusted. For example the NOx emission limit of 0.049 lb/MMBtu was derived as follows:

The vendor information for NOx emissions from the burners = 50 lb/MMSCF of NG

Using 1020 MMBtu/MMSCF

The NOx emissions limit in lb/MMBtu = 50/1020 = 0.049 lb/MMBtu

Using 1030 MMBtu/MMSCF this limit can be recalculated as 50/1030 = 0.049 lb/MMBtu

As there is no difference in the limit based on two heating values, therefore no changes are required to any permit conditions.

Comment 15:

The condition D.1.9 should be changed as follows to remove the requirement for PMP for the emission units.

D.1.9 Preventive Maintenance Plan [326 IAC 2-7-5(13)]
A Preventive Maintenance Plan, in accordance with Section C - Preventive Maintenance Plan, of this permit, is required for ~~this facility and its~~ control devices **B-75 and B-76**.

Response 15:

Because the dryers have control devices and the allowable emissions are low, condition D.1.9 is modified as follows:

D.1.9 Preventive Maintenance Plan [326 IAC 2-7-5(13)]

A Preventive Maintenance Plan, in accordance with Section C - Preventive Maintenance Plan, of this permit, is required for ~~these processes and their~~ **the** control devices **B-75 and B-76**.

Comment 16:

The condition D.1.13 should be changed to allow inspection of baghouse during outages.

D.1.13 Baghouse Inspections
An inspection shall be performed each calendar quarter **or during scheduled outages** of all bags controlling the dryers. All defective bags shall be replaced or repaired.

Response 16:

Inspections can be performed during scheduled outages as long it falls within the calendar quarter. The IDEM, OAQ feels that the intent of the language in condition D.1.13 is to perform quarterly inspections. No change is made to the permit condition.

Comment 17:

The condition D.1.14 should be modified as follows:

D.1.14 Broken or Failed Bag Detection
In the event that bag failure has been observed:

(2) In the event that bag failure has been observed the associated process will be shut down ~~immediately~~ **promptly** until the failed units have been repaired or replaced. Operations may continue only if the event qualifies as an emergency and the Permittee satisfies the requirements of the emergency provisions of this permit (Section C - Emergency Provisions).

Response 18:

The condition D.1.14 is modified as follows:

D.1.14 Broken or Failed Bag Detection
In the event that bag failure has been observed:

(2) In the event that bag failure has been observed the associated process will be shut down ~~immediately~~ **promptly** until the failed units have been repaired or replaced. Operations may continue only if the event qualifies as an emergency and the Permittee satisfies the requirements of the emergency provisions of this permit (Section C - Emergency Provisions).

Further, the IDEM, OAQ has decided to make the following change to condition D.1.11:

D.1.11 Testing Requirements [326 IAC 2-7-6(1), (6)] [326 IAC 2-1.1-11] [40 CFR 60 Subpart Y]

~~During the period between 3 and 6 months after issuance of this permit~~, **Within 60 days of achieving maximum production rate, but no later than 18 months after issuance of this permit, for the dryers,** in order to demonstrate compliance with conditions D.1.1, D.1.3 and D.1.4, the Permittee shall perform PM and PM-10 testing utilizing methods as approved by the Commissioner. The PM-10 includes both filterable and condensable components. Testing shall be conducted in accordance with Section C- Performance Testing and as specified in 40 CFR 60.254.

Comments from Mr. Stephen Loeschner and IDEM, OAQ responses are as follows:

Comment 1:

Common ownership, property, and control
The IDI facility, numbered by DEM as 033-00076, shares the 4500 County Road 59 address of the Steel Dynamics, Inc. ("SDI") facility numbered by DEM as 033- 00043. There would seem to be no physical or ownership fence between the two, and, absent such fences, they must be viewed for regulatory purposes as one and the same. Does DEM intend to view them as such, and if DEM intends to view them as distinct, on what basis is DEM basing that view?

Response 1:

The IDEM, OAQ does not consider the Iron Dynamics, Inc. as a separate source from the Steel Dynamics, Inc. both located at 4500 Count Road 59, Butler, IN 46721.

To clarify this point, IDEM, OAQ states as follows:

This steel manufacturing plant consists of a source with a on-site contractor:

(a) Plant 1 - Steel Dynamics, Inc., the primary operation, is located at, 4500 Count Road 59, Butler, IN 46721; and

(b) Plant 2 – Iron Dynamics, Inc., the supporting operation, is located at 4500 Count Road 59, Butler, IN 46721.

IDEM has determined that Plant 1 Steel Dynamics, Inc. and Plant 2 Iron Dynamics, Inc. are under the common control of Steel Dynamics, Inc. These two plants are considered one source due to contractural control. Therefore, the term “source” in the Part 70 documents refers to both Steel Dynamics, Inc. and Iron Dynamics, Inc. as one source.

Separate Part 70 permits will be issued to Steel Dynamics, Inc. and Iron Dynamics, Inc. solely for administrative purposes.

Comment 2:

I understand that DEM numbers facilities consecutively chronologically by county. While there was considerable industrial growth in DeKalb County following the permitting of SDI, number 43, it would seem to not give such a rise such that IDI would be number 76. Please explain the rather large increase.

Response 2:

The DRI manufacturing facility construction was permitted under the PSD permit 033-8091-00043 issued to the Steel Dynamics, Inc. by the IDEM, OAQ in 1997. In August 2000, the IDEM, OAQ received the application for the Part 70 Operating permit for the Iron Dynamics, Inc. as a sub contractor for the Steel Dynamics, Inc. for the operation of DRI manufacturing facility. Therefore, in 2000, IDEM, OAQ assigned new source identification 033-00076 to the Iron Dynamics, Inc. part of the Source. The Steel Dynamics, Inc. was constructed under source identification number 033-00043 in early 1990s. Therefore, a large difference in the two source identification numbers is expected. This difference in source identification numbers has no bearing on the permit content.

Comment 3:

<u>“Particulate Matter” definitions</u>
From reading 40 CFR 51.100(oo), (pp), (qq), (rr), and (ss), 40 CFR 60.254(b)(1), and several other texts, the definitions seem rather unclear. 40 CFR 51.100(qq) will be considered as inapplicable as it seems ambient oriented, rather than stack test oriented. PM10 is assumed to be defined by 40 CFR 51.100(rr). Particulate matter that is condensible (”PMc”) will be assumed to be entirely within PM10. PM10 will be assumed to consist of exactly two components, PMc and PMfs (filterable small). It will be assumed that 40 CFR 60 Method 5 does not find PMc. Thus 40 CFR 60.254(b)(1) PMY (40 CFR 60 Subpart Y, 40 CFR 60.250 *et seq.*) will be assumed to consist of exactly two components, PMfs and PMfl (filterable large). It would appear that PMY may be less than 40 CFR 51.100(oo), less than (pp), and less than (ss).

<u>Limit multiplicity</u>

There being a New Source Performance Standard ("NSPS") for the coal dryer, 40 CFR 60 Subpart Y, there was an obligation to have dual limits for the coal dryer. It is entirely possible that the PMY limit may be reached by IDI prior to IDI reaching the PM10 limit. However, while ore dryers may not have a NSPS, there is no reason at all why the PMY limit should not be applied to the ore dryer as an additional Best Available Control Technology ("BACT," 42 USC 7479(3), 40 CFR 52.21(b)(12)) condition.

Response 3:

The IDEM, OAQ can not assign arbitrary limitation to the ore dryer, when the limitation is not supported by regulation. The coal dryer is subject to dual limits because there is an applicable New Source Performance Standard (40 CFR 60 Subpart Y) in addition to the BACT limitations for this emission unit. Per the BACT determination for the ore dryer, the PM emissions (as determined by 40 CFR 60 Method 5) or the PM10 (including filterable and condensable components) from the ore dryer are limited to less than 0.0052 grain/dscf. Therefore, the PM (filterable only) emissions from the ore dryer are limited to 0.0052 grains/dscf. This limit is more stringent then the 0.031 grains/dscf specified in the 40 CFR 60 Subpart Y for the coal dryer for the PM (filterable only) emissions. Therefore, no change is necessary to any permit condition.

Comment 4:

<u>PM10 BACT determination</u>

BACT to control PM10 required DEM to do an analysis of what pollution control equipment ("PCE") should be applied at what cost and at what level of control. While 12992 Technical Support Document ("TSD") Appendix C pp. 20-24 and 36-38 give some background, there is nothing suggesting discussion of the 12992 D.1.1 5.2 grains PM10 per thousand dry standard cubic feet ("g/kdscf," where "g" means grain and not gram) conclusion. That number is arbitrary, capricious, and an abuse of discretion. DEM supplied no information at all in re numerous stack tests of fabric filter PCE placed into the permitting records of Indiana Facility 185- 00030, all of which (including the related U.S. Environmental Appeals Board "EAB" record) is incorporated herein by reference. PM10 emission rates (where PM10 includes PMfs plus PMc) of far less than 5.2 g/kdscf have been achieved repeatedly in past practice.

DEM placed nothing in re economic matters, nothing in re environmental (human health implied) matters and nothing in re energy costs of PM10 PCE into the 12992 record as required by law and regulation. It is as if DEM set out to miss the mark of all BACT requirements. This matter must be completely redone, and all permit records of all states plus all stack test data to which DEM has been exposed must be considered in re a proper decision which, no doubt, would be much less than 5.2 g/kdscf PM10.

Response 4:

The BACT emission limit selection for PM/PM10 emissions from the coal and ore dryers have been explained in detail in appendix C of the TSD and in response to comment 11 by IDI. The applicant proposed PM/PM10 emission limit of 0.0052 grains/dscf for the dryers. As part of the BACT determination, the OAQ, IDEM conducted an information search to determine limits assigned to similar operations in a PSD or Emissions Offset permits at various sources throughout the nation. This data was compiled in the form of a list with the lowest limit on the top followed by less stringent limit in the order of decreasing stringency. The emission limit proposed by IDI for the dryers matched the most stringent emission limit for similar processes at other

Sources using the equivalent control equipment (baghouse). In the NSR Workshop Manual[1] by US EPA, it is stated that ".. an applicant proposing the top control alternative need not provide cost and other detailed information in regard to other control options." Therefore, as the commentator does not present any technical or factual documentation of a lower limit being applicable to this type of process at any other source, IDEM, OAQ stands by its BACT determination.

Further the commentator has argued that the actual stack test information (the emission rate observed in the test) for any baghouse at any kind of process to be used to establish BACT limitation for the dryer processes. The IDEM, OAQ disagrees with this argument. In a recent Environmental Appeals Board (EAB) order denying the review[2] of a permit the EAB agreed with the Shasta County Air Quality District on this aspect. The District argued against setting a CO emission limit based on CEMs data showing emission rate of 0.5 ppm at one facility when the permit for the same facility contained an emission limit of 6 ppm. The facility in this case was a combustion turbine. The EAB agreed with the District's position that, "It is erroneous to suggest that.. [T]he CO BACT should be determined strictly from operational data from a 32 MW gas turbine application without regard to specifying an emission limitation that the proposed facility can demonstrate compliance with under all operational circumstances and have sufficient margin over actual operational data to avoid continual compliance difficulties."

In a similar matter, the EAB in the matter[3] of the Steel Dynamics, Inc. Whitley County Source stated that "Permit agencies have discretion to set BACT limits at levels that do not necessarily reflect the highest possible control efficiencies but, rather, will allow permittees to achieve compliance on a consistent basis…. (There is nothing inherently wrong with setting an emission limitation that takes into account a reasonable safety factor)".

Further the commentator's discussion about the baghouse emission limits with respect to the EAB review of the Steel Dynamics, Inc. source in the Whitley County, (referred to as 185- 00030 by the commentator) is for the emissions from the electric arc furnace (EAF). The emission characteristics of EAF are very different than that from the dryers, because of the nature of processes. Therefore, data from those stack tests are not relevant to these processes. No changes are made to any permit conditions.

Comment 5:

<u>PM10 emergency</u>
The coal and ore drying processes simply cannot have a 12992 D.1.14 emergency that would create a "need" to continue operation. Whenever the PCE is observed malfunctioning, the main burner fuel flow must be cut off within six minutes and the rest of the operations shut down promptly. Continuing production is the only reason why that would not be done, and continuing production with malfunctioning PCE must not be permitted. The emergency text must be sstruck from the 12992 draft prior to issuance.

Response 5:

The provisions of 326 IAC 2-7-16 apply to the operation of equipment (in this case the dryers) in the case of an emergency. The commentator's argument that the fuel flow to be stopped within 6 minutes do not have any regulatory basis and therefore cannot be justified. Irrespective of IDEM, OAQ deleting this part of the condition D.1.4, provisions of 326 IAC 2-7-16 (Emergency

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[1] See Chapter B, page B.8 "Best Available Control Technology", in the, "New Source Review Workshop Manual", by US EPA, Draft – October 1990.

[2] See "Three Mountain Power, LLC", PSD Appeal No. 01-05, Order denying review, before Environmental Appeals Board, decided May 30, 2001.

[3] See "Steel Dynamics, Inc.", PSD Appeal No. 99-04 & 99-05, Order granting review in part and denying review in part, before Environmental Appeals Board, decided June 22, 2000.

Provisions) are available to the Permittee for this operation. Therefore, in case of operation of the equipment during an emergency, the burden of proof lies on the Permittee to show that adequate measures to minimize emissions were taken. Also Permittee has to justify the occurrence of an event as an emergency and why the operation was necessary. Therefore, no change is made to any permit condition.

Comment 6:

PM10 federal enforceability
Continuous emissions monitors ("CEM") are not widely used to assure that PM10 limits are 40 CFR 52.21(b)(17) federally enforceable ("federally enforceable") on a more or less continuous basis. Instead, a selection of surrogate permit conditions is imposed *à la carte* cafeteria style in order to try to assure compliance on a more or less continuous basis. While the USC and CFR are somewhat lacking in re the specifics of the discretion that DEM may apply to the case, the U.S. Environmental Protection Agency ("EPA") published an October 1990 draft *New Source Review Workshop Manual* ("WM" incorporated herein by reference) which has been held in rather high regard by the EAB. The WM mentions such surrogacy on p. H.4, Table H.1; p. H.6 middle para.; and p. H.7, H.8, H.10, I.3, I.4, and I.6. The WM p. H.6 language is the strongest, "Where continuous, quantitative measurements [of the regulated pollutant] are infeasible, surrogate parameters *must* be expressed in the permit" (emphasis added). Conditions include, but are not limited to:

(1) periodic stack testing of the regulated PM10,
(2) periodic visual inspection and recording much more frequently than Condition 1,
(3) continuous monitoring and recording of baghouse flow,
(4) continuous monitoring and recording of baghouse pressure differential,
(5) continuous monitoring and recording of baghouse fan motor power or current,
(6) continuous monitoring and recording of baghouse flow temperature, and
(7) continuous monitoring and recording of baghouse effluent opacity.

The combination of the various conditions of 12992 D.1.10 through D.1.16 simply cannot lead a reasonable person to conclude that DEM attempted to impose federal enforceability for PM10. While the 12992 emission units are small in comparison with the entire IDI+SDI source, there is still a responsibility to have federal enforceability. As a minimum: the Condition 1 stack test must be obligated at intervals not greater than 18 months and one of the following must be obligated: Conditions 3 through 6 or Conditions 3 and 7.

Response 6:

The IDEM, OAQ has required IDI to test the PM/PM10 emissions from the dryers to show compliance with the conditions D.1.11, D.1.3 and D.1.4. Further the company is required to take Visible Emission notations once per shift and perform quarterly baghouse inspections. In IDEM, OAQ's experience these parameters are sufficient to ensure reasonable compliance with the limits in the permit. The initial stack test is performed to establish the performance of the equipment as part of construction stage of the permit. This source is subject to the requirements of 326 IAC 2-7 (Part 70 Operating Permit). The OAQ will review the result of the initial stack test and consider future repeat testing as part of the Part 70 Operating Permit required for this source.

Comment 7:

The permit must specify approved test methods for the Condition 1 stack test, including 40 CFR 60 Method 5 and 40 CFR 51 Methods 201, 201A and 202; and the permit must require the use of approved test methods. Further, in accordance with the WM p. H.10 Table H.2 point 9 text: "Performance tests should determine *both emissions and control equipment efficiency*" (emphasis in original). It appears that DEM has made no mention of the PCE efficiency in the 12992 permit draft.

Response 7:

The IDEM, OAQ as a policy does not specify the test method for various pollutants in the permit itself. The permit requirements focus on the pollutants to be tested and the applicable limits. The IDEM, OAQ does not specify the test methods because in the course of time more elaborate and accurate test methods might be developed. The department does not want to be restricted to using the old less accurate methods to test when a newer version is available. Therefore, recent applicable test method is specified every time a Permittee sends in a request for observing the stack test to the Compliance Data Section of the IDEM, OAQ. Further information in this regard can be obtained from the Compliance Data Section of the IDEM, OAQ.

The control efficiency of the add-on emission control system is not an enforceable parameter and is very difficult to demonstrate compliance with. The IDEM, OAQ does not generally specify the control efficiency in the permits. The allowable emission rate in the form of a permit limit in lb/hour and/or lb/ton is calculated using the highest control efficiency and is included in the permit. Demonstrating compliance with this emission rate is assumed to be sufficient to show that the control devices are operating at the expected efficiency.

Comment 8:

SO2 federal enforceability
DEM has placed a sulfur (“S”) dioxide (“SO2”) BACT pollutant emission per unit fuel limit in 12992 at D.1.8. However that limit is devoid of federal enforceability. It appears that SO2 is absent from 12992 D.1.10 through D.1.16, and that is clear error.

As with PM10, an *à la carte* cafeteria style approach is possible to create federal enforceability, however in re SO2, the choices reasonably become fewer and more rigid. SO2 CEM is very well-developed, but its use on such small emission units is burdensome in cost. Most, perhaps in excess of 98%, of the coal and ore dryers SO2 emission is expected to be as a result of the S content of the fuel, and the expected weight of the SO2 will be nearly exactly twice the weight of the fuel S. As with the CEM, continuous fuel testing is excessively burdensome in cost. Yet the federal enforceability obligation in accordance with the CFR and WM remains.

Therefore: Prior to 12992 issuance, permit conditions must be added to require monthly testing and recording of the natural gas (“NG”) fuel S content by the use of the American Society for Testing and Materials (“ASTM”) methods D 1072-80 or 90, D 3031-81, D 3246-81, 92, or 96 or D 4084-82 or 94. DEM should maintain a copy of those ASTM methods in its public file room. Those methods must be incorporated into the permit by reference along with the caveat that the applicable ranges of some ASTM methods mentioned above are not adequate to measure the levels of S in some fuel gases. Dilution of samples before analysis (with verification of the dilution ratio) may be used, subject to the approval of the EPA and DEM. IDI, a service contractor retained by IDI, the fuel vendor, or any other qualified agency may perform the monthly tests. The test results must be submitted to DEM as quarterly reports, such that they become *public* records, unlike records maintained by polluters that may be inspected by DEM— public access to such often being denied.

IDI may object to that requirement as being burdensome for such small emission units. And that claim would be valid if there were only those units. However the IDI+SDI NG usage capability may exceed 5.0 trillion BTU per year, and a single monthly NG S test effectively covers the SO2 from NG combustion for the entire IDI+SDI complex. Thus the monthly test and record is valuable in terms of the data, is economical in terms of cost of data, and is thus appropriate.

What is the “as built” capability of IDI+SDI to consume NG in terms of trillion BTU per year to at least two significant digits?

With the proper implementation of the monthly NG S test and record, a once every 5 year SO2 stack test of the coal and ore dryers' stacks would serve well to assure SO2 federal enforceability.

Response 8:

The SO2 potential to emit (PTE) from the two dryers combined at 8760 hours of operation in a year is 0.14 tons. Therefore, the dryers have very small contribution to the SO2 emissions from the entire source. The commentator's argument that the fuel sulfur monitoring should be required is flawed and extraneous because of the following:

1. The dryers use natural gas as fuel, which is a clean fuel.

2. US EPA has defined natural gas[1] as "…. a naturally occurring fluid mixture of hydrocarbons (e.g., methane, ethane, or propane) produced in geological formations beneath the Earth's surface that maintains a gaseous state at standard atmospheric temperature and pressure under ordinary conditions. Natural gas contains 1.0 grain or less of hydrogen sulfide per 100 standard cubic feet and the hydrogen sulfide constitutes more than 50% (by weight) of the total sulfur in the gas fuel. Additionally, natural gas must meet either be composed of at least 70% methane by volume or have a gross calorific value between 950 and 1100 Btu per standard cubic foot. Natural gas does not include the following gaseous fuels: landfill gas, digester gas, refinery gas, sour gas, blast furnace gas, coal- derived gas, producer gas, coke oven gas, or any gaseous fuel produced in a process which might result in highly variable sulfur content or heating value."

3. Based on the above definition, the sulfur content in the "natural gas" will always be less than 2.0 grains per 100 standard cubic feet.

4. The SO2 emissions from the combustion of natural gas are calculated based on emission factor. The AP-42[2], documents the emission factor of 0.6 lb/MMSCF of natural gas burned at the sulfur content of 2 grains per 100 cubic feet of natural gas. It also assumes 100% conversion of fuel sulfur to the SO2.

5. The PTE of SO2 emissions from the dryers at 0.14 tons per year was calculated using the above worst-case emission factor.

6. The SO2 emissions are unlikely to increase beyond any significance threshold due to any variations in the fuel sulfur content.

7. The requirements of this construction and first time operation permit apply only to the coal and the ore dryers, the emission units being permitted in this permit and not to the entire source, consisting of Steel Dynamics and Iron Dynamics. The IDEM, OAQ, can specify additional conditions for other emission units, if the same were affected by the construction of these new units.

8. The source-wide natural gas usage has no relevance to the permit requirements related to the construction of coal and ore dryers. The requirements for the entire source operation will form the part of the Part 70 Operating permits, which are presently being drafted for this source. These permits are identified as:

   Steel Dynamics, Inc. – T033-8068-00043 Part 70 Operating Permit
   Iron Dynamics, Inc. – T033-12614-00076 Part 70 Operating Permit

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[1] See 40 CFR 72.2 Subpart A "Acid Rain Program General Provisions: Definitions", revised as of July 1, 2001

[2] See Chapter 1.4 Table 1.4-2, "Compilation of Air Pollutant Emission Factors: Natural Gas Combustion", July 1998

This PSD permit will be incorporated in the Part 70 operating permit for the Iron Dynamics, Inc. before its issuance. The IDEM, OAQ will like to take this opportunity, and bring to the attention of the permit reviewer for these Part 70 operating permits the comments made by the commentator, and see if it meets the regulatory basis for the compliance determination and monitoring in the Part 70 Operating Permits.

Therefore, no changes are made to any permit conditions.

Comment 9:

Contumacy

There is rather basic information in the 12992 Notice of Opportunity to Comment and pp. 1-2 of the 12992 TSD in re the coal dryer and ore dryer being constructed and operated without a permit. How and when was this discovered? Has a notice of violation ("NOV") been issued? If a NOV has been issued, then supply its text and date; if not, then why not. If a NOV is planned, when is it expected to be issued? When is it believed that the coal dryer and ore dryer construction commenced? What fines, supplemental environmental projects, etc. have been discussed in re the violation?

Precisely what opportunities are given to the People to participate in the decision- making process?

Response 9:

It has been stated in the TSD for this permit that the IDEM, OAQ received an application from the IDI on December 5, 2000 for modification to the exhaust from the coal and ore dryers. It is further explained that during the review of this application, it was discovered that the coal and ore dryers were un-permitted units. The administrative record for this permit shows that a Notice of Deficiency was sent on February 27, 2001 to the source explaining that the dryers require a Major PSD review and required the source to submit additional information per the requirements of 326 IAC 2-2 (Prevention of Significant Deterioration). The notice of violation for this has not been issued. The IDEM is presently investigating the details of this case and will be evaluating the items referred by the commentator subsequently.

Indiana Department of Environmental Management
Office of Air Quality

Technical Support Document (TSD) for a Part 70 Significant Source Modification

Source Background and Description

Source Name:	Iron Dynamics, Inc.
Source Location:	4500 County Road 59, Butler, IN 46721
County:	Dekalb
SIC Code:	3312
Operation Permit No.:	033-12614-00076
Operation Permit Issuance Date:	Not yet issued
Significant Source Modification No.:	033-12992-00076
Permit Reviewer:	Gurinder Saini

The Office of Air Quality (OAQ) has reviewed a modification application from Iron Dynamics, Inc. relating to the exhaust stacks for coal dryer and ore dryer for the Rotary Hearth Furnace (RHF). The RHF has already been permitted in CP 033-8091-00043. The new units are as follows:

(a) One (1) coal dryer identified as 75 with maximum capacity of 25 MMBtu/hour and processes 60 tons per hour of coal, exhausting to stack (identified as S-75), equipped with a baghouse (B-75).

(b) One (1) ore dryer identified as 76 with maximum capacity of 27 MMBtu/hour and processes 115 tons per hour of ore, exhausting to stack (identified as S-76), equipped with a baghouse (B-76).

History

On December 5, 2000, Iron Dynamics, Inc. submitted an application to IDEM, OAQ requesting permission to modify their coal dryer and ore dryer stacks. Iron Dynamics' Part 70 permit application is currently under review by IDEM, OAQ. These coal and ore dryers provide raw material to the RHF and were part of the same project. Originally, Iron Dynamics planned to dry coal and ore by using the exhaust from the RHF. However, because the RHF exhaust temperature at startup would be insufficient for drying needs, the plans were altered to include the coal and ore dryers. The exhausts from these dryers are presently routed to the RHF exhaust that passes through a bag house and a scrubber before being released to the atmosphere. After the modification the Coal Dryer and Ore Dryer will use separate bag houses B-75 and B-76 and exhaust to atmosphere using stacks 75 and 76, respectively. The RHF will continue to exhaust through the existing bag house and scrubber. The coal and ore dryers have been shut down and have not operated since June 2001.

The RHF was reviewed under the requirements of 326 IAC 2-2 (Prevention of Significant Deterioration) and was permitted in CP 033-8091-00043 issued on June 25, 1997. As the coal dryer and ore dryer were not included in this permit, the OAQ has determined that these emission units were constructed and operated without a permit. The coal and ore dryers are part of the RHF project, and should have been part of the original PSD application and PSD permit for the RHF. Therefore, these emission units and the requested modifications are reviewed pursuant to 326 IAC 2-2.

Existing Approvals

The source has been operating under previous approvals including, but not limited to, the following:

(a) CP 033-8091-00043, issued on June 25, 1997.

The conditions in this approval are in addition to the ones already contained in the above permit.

Enforcement Issue

(a) IDEM is aware that equipment has been constructed and operated prior to receipt of the proper permit.

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

Stack Summary

Stack ID	Operation	Height (feet)	Diameter (feet)	Flow Rate (acfm)	Temperature (^{0}F)
S-75	Coal Dryer	10	3.5	25,000	120
S-76	Ore Dryer	10	4.2	35,000	120

Recommendation

The staff recommends to the Commissioner that the Part 70 Significant Source Modification be approved. This recommendation is based on the following facts and conditions:

Unless otherwise stated, information used in this review was derived from the application and additional information submitted by the applicant.

An application for the purposes of this review was received on December 5, 2000. Additional information was received on August 02, 2001.

Emission Calculations

See Appendix A of this document for detailed emissions calculations (pages 1 through 5). The PTE for PM/ PM10 emissions is based on allowable emissions. The emissions from the coal and ore handling had been accounted for in CP 033-8091-00076.

Uncontrolled Potential To Emit

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."

This table reflects the PTE before controls. Control equipment is not considered federally enforceable until it has been required in a federally enforceable permit.

Pollutant	Potential To Emit (tons/year)
PM	11.7
PM-10	11.7
SO_2	0.1
VOC	1.2
CO	19.1
NO_x	11.3

Justification for Modification

The Part 70 Source is being modified through a Part 70 Significant Source Modification. This modification is being performed pursuant to 326 IAC 2-7-10.5 (f) (1) because this modification is major for 326 IAC 2-2 (Prevention of Significant Deterioration).

County Attainment Status

The source is located in Dekalb County.

Pollutant	Status
PM-10	Attainment
SO_2	Attainment
NO_2	Attainment
Ozone	Attainment
CO	Attainment
Lead	Attainment

(a) Volatile organic compounds (VOC) are precursors for the formation of ozone. Therefore, VOC emissions are considered when evaluating the rule applicability relating to the ozone standards. Dekalb 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 and 40 CFR 52.21.

(b) Dekalb County has been classified as attainment or unclassifiable for PM-10, SO_2, CO and Lead. Therefore, these emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2 and 40 CFR 52.21.

Source Status

Existing Source PSD, Part 70 or FESOP Definition (emissions after controls, based on 8,760 hours of operation per year at rated capacity and/or as otherwise limited):

Pollutant	Emissions (tons/year)
PM	>100
PM-10	>100
SO_2	>100
VOC	>100
CO	>100
NOx	>100

(a) This existing source is a major stationary source because attainment regulated pollutants are emitted at a rate of 100 tons per year or more, and it is one of the 28 listed source categories.

Controlled Potential to Emit

PTE from the proposed modification (based on 8,760 hours of operation per year at rated capacity including enforceable emission control and production limit, where applicable):

Pollutant	PM (ton/yr)	PM10 (ton/yr)	SO_2 (ton/yr)	VOC (ton/yr)	CO (ton/yr)	NO_x (ton/yr)
Proposed Modification	11.7	11.7	0.1	1.2	19.1	11.3
PSD or Offset Significant Level	25	15	40	40	100	40

(a) The net emissions increase because of this modification to an existing major stationary source is not major because these are less than the PSD significant levels. However, this equipment was constructed as part of Rotary Hearth Furnace (RHF) Project. The RHF is major for PSD and went through the PSD review as part of CP 033-9187-00043, issued on March 24, 1998. The information related to coal dryer and ore dryer was not included in the application for the construction permit.

(b) The PM and PM 10 emissions from the two dryers will be controlled using two baghouses operating at 99%control efficiency.

Part 70 Permit Determination

326 IAC 2-7 (Part 70 Permit Program)
This existing source has submitted their Part 70 (T 033-12614-00076) application on August 8, 2000. The equipment being reviewed under this permit shall be incorporated in the submitted Part 70 application.

Federal Rule Applicability

(a) The coal dryer is subject to the requirements of the New Source Performance Standard, 326 IAC 12, 40 CFR 60.250, Subpart Y, because it processes more than 200 tons of coal per day.

This rule requires the particulate emissions from:

(a) the coal dryer to be limited to twenty percent (20%) opacity or less, and

(b) the thermal coal dryer particulate matter to be limited to 0.031 grains per dscf or less.

The Best Available Control Technology Review limits the PM emission rate to less than 0.0052 grain per dscf which is more stringent than the NSPS requirement.

(b) There are no New Source Performance Standards (NSPS)(326 IAC 12 and 40 CFR Part 60) applicable to this proposed modification.

(c) There are no National Emission Standards for Hazardous Air Pollutants (NESHAPs)(326 IAC 14 and 40 CFR Part 63) applicable to this proposed modification.

State Rule Applicability - Individual Facilities

326 IAC 1-6-3 (Preventive Maintenance):

(a) The Permittee shall prepare and maintain Preventive Maintenance Plans (PMP) within ninety (90) days after commencement of operation, including the following information:

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

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

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

(b) The Permittee shall implement the Preventive Maintenance Plans as necessary to ensure that lack of proper maintenance does not cause or contribute to a violation of any limitation on emissions or potential to emit.

(c) PMP's shall be submitted to IDEM and OAQ upon request and shall be subject to review and approval by IDEM and OAQ.

326 IAC 1-7 (Stack Height Provisions):

Stacks for coal dryer and ore dryer not subject to the requirements of 326 IAC 1-7 (Stack Height Provisions) because the potential emissions, which exhaust through the above-mentioned stack, are less than 25 tons per year of PM and SO_2.

326 IAC 2-4.1-1 (New Source Toxics Rule)

The New Source Toxics Control rule requires any new or reconstructed major source of hazardous air pollutants (HAPs) for which there are no applicable NESHAP to implement maximum achievable control technology (MACT), determined on a case-by-case basis, when the potential to emit is greater than 10 tons per year of any single HAP. Information on emissions of the 187 hazardous air pollutants are listed in the OAQ Construction Permit Application, Form Y (set forth in the Clean Air Act Amendments of 1990).

The HAPs emissions from the addition of Coal Dryer and Ore Dryer are added to the HAPs emissions from the emission units listed in CP 033-8091-00043. As the Coal Dryer and Ore Dryer were part of same modification, combined HAPs emissions will be considered for the applicability of this rule.

The New Source Toxic Rule is not applicable because any single HAP emission is not greater than or equal to 10 tons per year and any combination HAP emissions are not greater than or equal to 25 tons per year.

326 IAC 2-2-3 (Best Available Control Technology)

As the Coal Dryer and the Ore Dryer are part of the Rotary Hearth Furnace (RHF) project, these are subject to the requirements of 326 IAC 2-2 (Prevention of Significant Deterioration) for emissions of PM, PM_{10}, SO_2, CO, NO_X and are required to employ BACT to control emissions.

Therefore, the PSD provisions require that this modification be reviewed to ensure compliance with the National Ambient Air Quality Standard (NAAQS), the applicable PSD air quality increments, and the requirements to apply the Best Available Control Technology (BACT) for the affected pollutants.

The attached modeling analysis, included in Appendix B, was conducted to show that the major new source does not violate the NAAQS and does not exceed the incremental consumption above eighty percent (80%) of the PSD increment for any affected pollutant.

The BACT Analysis Report, included in Appendix C, was conducted for the PSD pollutants for each process on a case-by-case basis by reviewing similar process controls and new available technologies. The BACT determination is based on the cost per ton of pollutant removed, energy requirements, and environmental impacts. The following BACT emission limitations apply to the proposed source:

Coal Dryer – 25 MMBtu/Hour

Pollutant	Control Technology	Limit lb/MMSCF
NO_X	Low-NOx Burners	50
CO	Good Combustor Design and Combustion Control	84
VOC	Good Combustion Control	5.5
SO_2	Natural Gas as Sole Fuel	0.6
PM/PM_{10}	Natural Gas as Sole Fuel and Good Combustion Practice	0.0052 (gr/dscf)
Opacity	Natural Gas as Sole Fuel and Good Combustion Practice	3%

Ore Dryer – 27 MMBtu/Hour

Pollutant	Control Technology	Limit lb/MMSCF
NO_X	Low-NOx Burners	50
CO	Good Combustor Design and Combustion Control	84
VOC	Good Combustion Control	5.5
SO_2	Natural Gas as Sole Fuel	0.6
PM/PM_{10}	Natural Gas as Sole Fuel and Good Combustion Practice	0.0052 (gr/dscf)
Opacity	Natural Gas as Sole Fuel and Good Combustion Practice	3%

326 IAC 5-1 (Opacity Limitations)

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

(a) Opacity shall not exceed an average of forty percent (40%) any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.

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

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

This modification is not subject to the requirements of 326 IAC 6-2 (Particulate Emission Limitations for Sources of Indirect Heating) because the Dryers are not utilized for indirect heating.

326 IAC 6-3-2 (Process Operations)

The particulate matter (PM) from the coal dryer and ore dryer shall be limited as follows:

Process	Process Weight (lbs/hr)	PM Emission Limit (lbs/hr)
Coal Dryer	120,000	46.3
Ore Dryer	230,000	52.7

These limits were calculated as follows:

Interpolation and extrapolation of the data for the process weight rate in excess of sixty thousand (60,000) pounds per hour shall be accomplished by use of the equation:

$E = 55.0\ P^{0.11} - 40$ where E = rate of emission in pounds per hour and
P = process weight rate in tons per hour

The baghouse (B-75 and B-76) shall be in operation at all times the coal dryer and ore dryer are in operation, in order to comply with these limits.

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

This modification of addition of Dryers is not subject to the requirements of 326 IAC 7-1.1-1 (Sulfur Dioxide Emission Limitations) because the potential to emit of the sulfur dioxide from these facilities are less than 25 tons per year. The Dryers shall only combust natural gas.

326 IAC 8-1-6 (New facilities; General Reduction Requirements):

This modification is not subject to the requirements of 326 IAC 8-1-6 (New facilities; general reduction requirements) because the potential to emit of VOC from this modification is less than 25 tons per year per unit.

326 IAC 9 (Carbon Monoxide Emission Limits):

Pursuant to 326 IAC 9 (Carbon Monoxide Emission Limits), the modification is subject to this rule because it is a stationary source which emits CO emissions and commenced operation after March 21, 1972. Under this rule, there is not a specific emission limit because the source is not an operation listed under 326 IAC 9-1-2.

326 IAC 10 (Nitrogen Oxides)

This new source is not subject to the requirements of 326 IAC 10 (Nitrogen Oxides) because the source is not located in the specified counties (Clark and Floyd) listed under 326 IAC 10-1-1.

Testing Requirements

The Baghouses B-75 and B-76 are used to control PM emissions from Coal Dryer and Ore Dryer. The operation of these units without the baghouses can trigger additional permit requirements. Therefore, the Permittee is required to test the exhaust from these baghouses. During the period between 3 and 6 months after issuance of this permit, in order to demonstrate compliance with PM and PM10 limits, the Permittee shall perform PM and PM-10 testing utilizing methods as approved by the Commissioner. PM-10 includes filterable and condensable PM-10.

At this time the Permittee is not required to stack test for NOx or CO emissions because these are less than the threshold requiring testing. IDEM, OAQ reserves the discretion to require additional testing if required in the future.

Compliance Requirements

Permits issued under 326 IAC 2-7 are required to ensure the source can demonstrate compliance with applicable state and federal rules on a more or less continuous basis. All state and federal rules contain compliance provisions; however, these provisions do not always fulfill the requirement for a more or less continuous demonstration. When this occurs, IDEM, OAQ, in conjunction with the source, must develop specific conditions to satisfy 326 IAC 2-7-5. As a result, compliance requirements are divided into two sections: Compliance Determination Requirements and Compliance Monitoring Requirements.

Compliance Determination Requirements in Section D of the permit are those conditions that are found more or less directly within state and federal rules and the violation of which serves as grounds for enforcement action. If these conditions are not sufficient to demonstrate continuous compliance, they will be supplemented with Compliance Monitoring Requirements, also Section D of the permit. Unlike Compliance Determination Requirements, failure to meet Compliance Monitoring conditions would serve as a trigger for corrective actions and not grounds for enforcement action. However, a violation in relation to a compliance monitoring condition will arise through a source's failure to take the appropriate corrective actions within a specific time period.

The compliance monitoring requirements applicable to this modification are as follows:

The Baghouses B-75 and B-76 have applicable compliance monitoring conditions specified below:

(a) Visible emissions notations of the coal dryer and ore dryer baghouse exhaust shall be performed once per shift. A trained employee will record whether emissions are normal or abnormal. For processes operated continuously "normal" means those conditions prevailing, or expected to prevail, eighty percent (80%) of the time the process is in operation, not counting startup or shut down time. In the case of batch or discontinuous operations, readings shall be taken during that part of the operation that would normally be expected to cause the greatest emissions. A trained employee is an employee who has worked at the plant at least one (1) month and has been trained in the appearance and characteristics of normal visible emissions for that specific process. The Compliance Response Plan for this unit shall contain troubleshooting contingency and response steps for when an abnormal emission is observed. Failure to take response steps in accordance with Section C - Compliance Response Plan - Preparation, Implementation, Records, and Reports, shall be considered a violation of this permit.

(b) An inspection shall be performed each calender quarter or during shutdown of all bags. A baghouse inspection shall be performed within three months of redirecting vents to the atmosphere and every three months thereafter. All defective bags shall be replaced or repaired.

(c) In the event that bag failure has been observed the failed units and the associated process will be shut down immediately until the failed units have been repaired or replaced. Operations may continue only if the event qualifies as an emergency and the Permittee satisfies the requirements of the emergency provisions of this permit (Section C.14 - Emergency Provisions).

These monitoring conditions are necessary in order to ensure compliance with all applicable rules.

Conclusion

The construction and operation of this proposed modification shall be subject to the conditions of the attached Part 70 Significant Source Modification No. 033-12992-00076.

Appendix A: Emissions Calculations
Emissions Summary

Company Name: **Iron Dynamics, Inc.**
Address City IN Zip: **Butler, Indiana 46721**
CP: **033-12992**
Plt ID: **033-00076**
Reviewer: GS
Date: 09/18/01

Pollutant	Coal Dryer PTE (tons/year)	Ore Dryer PTE (tons/year)	Type of Control	Total Controlled PTE
PM*	4.9	6.8	two baghouses	11.71
PM-10*	4.9	6.8	two baghouses	11.71
SO2	0.1	0.1	None	0.14
NOx	5.5	5.9	Low-NOx burners	11.39
VOC	0.6	0.7	None	1.25
CO	9.2	9.9	None	19.13

* The PTE for PM/ PM10 emissions is based on allowable emissions.

Appendix A: Emissions Calculations
Natural Gas Combustion
MM BTU/HR <100
Coal Dryer

Company Name: **Iron Dynamics, Inc.**
Address City IN Zip: **Butler, Indiana 46721**
CP: **033-12992**
Plt ID: **033-00076**
Reviewer: GS
Date: 05/22/01

Heat Input Capacity MMBtu/hr	Potential Throughput MMCF/yr
25.0	219.0

Combustion — Pollutant

	PM*	PM10*	SO2	NOx	VOC	CO
Emission Factor in lb/MMCF	0.0052 (gr/dscf)	0.0052 (gr/dscf)	0.6	50.0 **see below	5.5	84.0
Potential Emission in tons/yr	4.9	4.9	0.1	5.5	0.6	9.2

**Emission Factors for NOx: is for Low NOx Burner = 50
*** Emission Factors for PM and PM-10 based on allowable emissions and assuming PM = PM 10

Methodology

All emission factors are based on design capacity.
MMBtu = 1,000,000 Btu
MMCF = 1,000,000 Cubic Feet of Gas
PM/PM10 = (flow rate in dscf/min) x (0.0052gr/dscf) / (7000gr/lb) x (60min/hr) x 8760/2000
Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,000 MMBtu
Emission Factors are from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03 (SUPPLEMENT D 7/98)
Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton

Appendix A: Emissions Calculations
Natural Gas Combustion
MM BTU/HR <100
Ore Dryer

Company Name: **Iron Dynamics, Inc.**
Address City IN Zip: **Butler, Indiana 46721**
CP: **033-12992**
Plt ID: **033-00076**
Reviewer: GS
Date: 05/22/01

Heat Input Capacity MMBtu/hr	Potential Throughput MMCF/yr
27.0	236.5

Combustion — Pollutant

	PM*	PM10*	SO2	NOx	VOC	CO
Emission Factor in lb/MMCF	0.0052 (gr/dscf)	0.0052 (gr/dscf)	0.6	50.0 **see below	5.5	84.0
Potential Emission in tons/yr	6.8	6.8	0.1	5.9	0.7	9.9

**Emission Factors for NOx is for Low NOx Burner = 50
*** Emission Factors for PM and PM-10 based on allowable emissions and assuming PM = PM 10

Methodology

All emission factors are based on design capacity.
MMBtu = 1,000,000 Btu
MMCF = 1,000,000 Cubic Feet of Gas
PM/PM10 = (flow rate in dscf/min) x (0.0052gr/dscf) / (7000gr/lb) x (60min/hr) x 8760/2000
Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,000 MMBtu
Emission Factors are from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03 (SUPPLEMENT D 7/98)
Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton

Iron Dynamics, Inc. **CP 033-12992**
Butler, IN **Plt ID 033-00076**

Air Quality Analysis

Introduction

Iron Dynamics, Inc. has applied for a Prevention of Significant Deterioration (PSD) permit to modify a direct reduced iron facility near Butler in Dekalb County, Indiana. The site is located at Universal Transverse Mercator (UTM) coordinates 673929.0 East and 4581869.0 North. The modification is to change the exhaust configuration of the coal dryer and ore dryer of the direct reduced iron plant. Currently the coal dryer and the ore dryer exhaust ducts to the rotary hearth furnace stack. Iron Dynamics would have a separate stack for each of the coal dryer and ore dryer. Dekalb County is designated as attainment for the National Ambient Air Quality Standards. These standards for Nitrogen Dioxide (NO_2), Sulfur Dioxide (SO_2), Carbon Monoxide (CO) and Particulate Matter less than 10 microns (PM_{10}) are set by the United States Environmental Protection Agency (U.S. EPA) to protect the public health and welfare.

URS prepared the PSD permit application for Iron Dynamics. The permit application was received by the Office of Air Quality (OAQ) on December 5, 2000 with a revised application received on April 12, 2001. This document provides OAQ=s Air Quality Modeling Section's review of the PSD permit application including an air quality analysis performed by the OAQ.

Air Quality Analysis Objectives

The OAQ review of the air quality impact analysis portion of the permit application will accomplish the following objectives:

A. Establish which pollutants require an air quality analysis based on source emissions.
B. Determine the ambient air concentrations of the source's emissions and provide analysis of actual stack height with respect to Good Engineering Practice (GEP).
C. Demonstrate that the source will not cause or contribute to a violation of the National Ambient Air Quality Standard (NAAQS) or Prevention of Significant Deterioration (PSD) increment.
D. Perform an analysis of any air toxic compound for the health risk factor on the general population.
E. Perform a brief qualitative analysis of the source's impact on general growth, soils, vegetation, endangered species and visibility in the impact area with emphasis on any Class I areas. The nearest Class I area is Kentucky's Mammoth Cave National Park which is 475 kilometers from the Iron Dynamics site in Dekalb County, Indiana.

Summary

Iron Dynamics has applied for a PSD construction permit to modify a direct reduced iron facility near Butler in Dekalb County, Indiana. The PSD application was prepared by URS of Rolling Meadows, IL. Dekalb County is currently designated as attainment for all criteria pollutants. Emission rates of four pollutants (Nitrogen Dioxide (NO_2), Sulfur Dioxide (SO_2), Carbon Monoxide (CO) and Particulate Matter less than 10 microns (PM_{10})) associated with the facility did not exceed significant emission rates established in state and federal law. However, Iron Dynamics was requested to conduct an air quality analysis to demonstrate compliance with the PSD increment and NAAQS. Modeling results taken from the Industrial Source Complex Short Term (ISCST3) model showed NO_2 impacts were predicted to be greater than the significant impact increments and significant monitoring de minimis levels for purposes of a National Ambient Air Quality Standards analysis. Previous analysis had shown PM_{10} impacts to be near the PSD increment and NAAQS and modeling was conducted to insure compliance. Refined modeling for NO_2, and PM_{10} showed no violations of the NAAQS. Analysis for PSD increment consumption was necessary for NO_2, and PM_{10}. Results from the PSD increment analysis of Iron Dynamics showed increment consumption below 80% of the available PSD increment for NO_2. The 24-hour PM 10 increment was consumed. Further modeling determined the modification will not exceed more than 80% of the remaining increment. Hazardous Air Pollutant (HAPs) modeling was not completed since the emission levels were below the 10 tons single HAP and 25 tons total HAPS limits. There was no impact review conducted for the nearest Class I area, which is Mammoth Cave National Park in Kentucky. No Class I analysis is required if a source is located more than 100 kilometers (61 miles) from the nearest Class I area. An additional impact analysis on the surrounding area was conducted and no significant impact on economic growth, soils, vegetation, federal and state endangered species or visibility from the Iron Dynamics was expected.

Part A - Pollutants Analyzed for Air Quality Impact

Indiana Administrative Code (326 IAC 2-2) PSD requirements apply in attainment and unclassifiable areas and require an air quality impact analysis of each regulated pollutant emitted in significant amounts by a new major stationary source or modification. Significant emission levels for each pollutant are defined in 326 IAC 2-2-1. CO, NO_x, SO_2, VOCs and PM_{10} will be emitted from Iron Dynamics. An air quality analysis is required for CO, NO_x, SO_2 and PM_{10}, to insure the impacts from the proposed modification do not threaten the PSD increment and the NAAQS. Significant emission rates are listed in Table 1. It should be noted that all emissions are based on the Best Available Control Technology (BACT) determination and other limitations resulting from the OAQ review of the application.

TABLE 1 – Iron Dynamics Significant Emission Rates (tons/yr)

Pollutant	Maximum Allowable Emissions	Significant Emission Rate
CO	19.1	100.0
NO_x	11.4	40.0
SO_2	0.2	40.0
PM_{10}	4.4	15.0
Sulfur Acid Mist (H_2SO_4)	4.1	7.0
VOC (ozone)	1.3	40.0

Significant emission rates are established to determine whether a source is required to conduct an air quality analysis. If a source exceeds the significant emission rate for a pollutant, air dispersion modeling is required for that specific pollutant. A modeling analysis for each pollutant is conducted to determine whether the source's modeled concentrations will exceed significant impact levels. Modeled concentrations below significant impact levels do not require further air quality modeling. Modeled concentrations exceeding the significant impact level require that more refined modeling which includes source inventories and background data. These procedures are defined in AGuidelines for Air Quality Maintenance Planning and Analysis, Volume 10, Procedures for Evaluating Air Quality Impacts of New Stationary Sources@ October 1977, U.S. EPA Office of Air Quality Planning and Standards (OAQPS).

Part B - Significant Impact Analysis

An air quality analysis, including air dispersion modeling, was performed to determine the maximum concentrations of the source emissions on receptors outside of the facility property lines. A worst-case approach for emission estimates has been taken due to the nature of the operational capability of the facility.

Model Description

The Office of Air Quality review used the Industrial Source Complex Short Term (ISCST3) model, Version 3, dated April 10, 2000 to determine maximum off-property concentrations or impacts for each pollutant. All regulatory default options were utilized in the United States Environmental Protection Agency (U.S. EPA) approved model, as listed in the 40 Code of Federal Register Part 51, Appendix W AGuideline on Air Quality Models@. The Auer Land Use Classification scheme was referenced to determine the land use in a 3 kilometer (1.9 miles) radius from the source. The area is considered primarily agricultural, therefore a rural classification was used. The model also utilized the Schulman-Scire algorithm to account for building downwash effects. Stacks associated with the modification are below the Good Engineering Practice (GEP) formula for stack heights. This indicates wind flow over and around surrounding buildings can influence the dispersion of concentrations coming from the stacks. 326 IAC 1-7-3 requires a study to demonstrate that excessive modeled concentrations will not result from stacks with heights less than the GEP stack height formula. These aerodynamic downwash parameters were calculated using U.S. EPA=s Building Profile Input Program (BPIP).

Meteorological Data

The meteorological data used in the ISCST3 model consisted of the latest five years of available surface data from the Fort Wayne, IN National Weather Service station merged with the mixing heights from Dayton, OH Airport National Weather Service station. The 1990-1994 meteorological data was purchased through the National Oceanic and Atmospheric Administration (NOAA) and National Climatic Data Center (NCDC) and preprocessed into ISCST3-ready format with a version of U.S. EPA=s PCRAMMET.

Receptor Grid

Ground-level points (receptors) surrounding the source are input into the model to determine the maximum modeled concentrations that would occur at each point. OAQ modeling utilized receptor grids out to 20 kilometers (12.4 miles) for all pollutants. Dense receptor grids surround the property with receptors spaced every 100 meters (328 feet) out to 2 kilometers (1.25 miles), receptors spaced every 200 meters (656 feet) from 2 kilometers to 4 kilometers (2.5 miles), receptors spaced every 500 meters (1640 feet) from 4 kilometers to 10 kilometers (6.2 miles) and 1000 meters (3280 feet) from 10 kilometers to 20 kilometers. Discrete receptors were placed 100 meters or 328 feet apart on Iron Dynamics property lines.

Modeled Emissions Data

The modeling used the emission rates listed in Section 4 of the application and was reviewed and revised by OAQ. The modeling results reflect these emissions and are considered the controlling results for this air quality analysis.

Modeled Results

Maximum modeled concentrations for each pollutant over its significant emission rate are listed below in Table 3 and are compared to each pollutant=s significant impact level for Class II areas, as specified by U.S. EPA in the Federal Register, Volume 43, No. 118, pg 26398 (Monday, June 19, 1978).

TABLE 3 - Summary of OAQ Significant Impact Analysis (ug/m3)					
Pollutant	**Year**	**Time-Averaging Period**	**Iron Dynamics Maximum Modeled Impacts**	**Significant Impact Levels**	**Significant Monitoring Levels**
CO	1990	1-hour	171	**2000.0**	a
CO	1990	8-hour	41.4	**500.0**	575.0
NO_2	1990	Annual - 8760 hrs/yr	1.7	**1.0**	14.0
SO_2	1990	3-hour	0.69	**25.0**	a
SO_2	1990	24-hour	0.09	**5.0**	13.0
SO_2	1990	Annual - 8760 hrs/yr	0.01	**1.0**	a
PM_{10}	1990	24-hour	2.96	**5.0**	10.0
PM_{10}	1990	Annual - 8760 hrs/yr	0.34	**1.0**	a

[a] No limit exists for this time-averaged period

Background Concentrations

Modeling results indicate that of the pollutants which were modeled, PM_{10} impacts were not above pre-construction monitoring de minimus levels specified in 326 IAC 2-2. Table 3 above shows the results of the pre-construction monitoring analysis.

Background concentrations for use in the NAAQS analysis were added for NO_2, and PM_{10}. The background concentrations are listed below in Table 4.

TABLE 4 - Background Concentrations (ug/m3)			
Pollutant	**Monitor Location**	**Time-Averaging Period**	**Monitored Concentrations**
NO_2	SOUTH BEND	Annual	30.1
PM_{10}	4500 COUNTY ROAD 59	2nd highest 24-hour	48.7
PM_{10}	4500 COUNTY ROAD 59	Annual	34.0

Part C - Analysis of Source Impact on NAAQS

NAAQS Compliance Analysis and Results

Emission inventories of NO_2, and PM_{10} sources in Indiana within a 50 kilometer radius of Iron Dynamics, taken from the OAQ emission statement database as required by 326 IAC 2-6, were supplied to the consultants. EPA and OAQ have approved a screening method, using the ISCST3 model, to eliminate NO_2, and PM_{10} NAAQS sources and NO_2, and PM_{10} PSD sources from the inventory that have no significant impact in the source significant impact area for each pollutant. This method modeled all NO_2, and PM_{10} NAAQS and PSD sources in the 50 kilometer radius from the site. Any source that has modeled concentrations less than the significant impact increment in the significant impact area of Iron

Dynamics was removed from the NAAQS and PSD inventories. Sources which did not screen out of the NAAQS and PSD inventories were included in NO_2, and PM_{10} refined air quality modeling. A summary of the screening results are listed in the permit application.

NAAQS modeling was conducted to compare to each pollutant=s respective NAAQS limits. OAQ modeling results are shown in Table 5. All maximum concentrations of NO_2, and PM_{10} for every time-averaged period were below their respective NAAQS limit and further modeling was not required.

TABLE 5 - National Ambient Air Quality Standards Analysis (ug/m3)

Pollutant	**Year**	**Time-Averaging Period**	**Modeled Source Impacts**	**Background**	**Total**	**NAAQS Limits**
NO_2	1990	Annual	14.5	30.1	44.6	100.0
PM_{10}	1990	Highest 2nd high 24-hour	33.3	48.7	82.0	150.0
PM_{10}	1991	Highest 4th high 24-hour	12.4	48.7	61.1	150.0
PM_{10}	1993	Annual	5.2	34.0	39.2	50.0

Part D - Analysis and Results of Source Impact on PSD Increment

Maximum allowable increases (PSD increments) are established by 326 IAC 2-2 for NO_2, and PM_{10}. This rule limits a source to no more than 80 percent of the available PSD increment to allow for future growth. Since the impacts for NO_2, and PM_{10} from Iron Dynamics were modeled near or above significant impact increments, a PSD increment analysis for the existing major sources in Dekalb County and its surrounding counties was conducted. The PSD minor source baseline date in Dekalb County for NO_2, and PM_{10}, was established on February 8, 1988. All PSD sources in Dekalb County and surrounding counties from Iron Dynamics were screened.

TABLE 6 - Prevention of Significant Deterioration Analysis (ug/m3)

Pollutant	**Year**	**Time-Averaging Period**	**Modeled Concentrations**	**PSD Increment**	**Impact on PSD Increments**
NO_2	1988	Annual	5.0	25.0	20.0%
PM_{10}	1994	Highest 2nd high 24-hour	26.8	30.0	89.3%
PM_{10}	1990	Annual	5.0	17.0	29.4%

326 IAC 2-2-6 describes the availability of PSD increment and maximum allowable increases as Aincreased emissions caused by the proposed major PSD source ... will not exceed 80% of the available maximum allowable increases over the baseline concentrations for sulfur dioxide, particulate matter and nitrogen dioxide...@. The baseline concentrations are determined from modeling the existing PSD sources that impact Iron Dynamics significant impact area. Table 6 shows the results of the PSD increment analysis for NO_2, and PM_{10}. There are no violations of 80 percent of the PSD increment for NO_2. The 24-hour PM_{10} concentration exceeds the 80% PSD increment, URS conducted further modeling to determine that the modification did not exceed 80% of the remaining increment. Table 7 contains the results of the days when the total increment consumption was greater than 80% and shows that the modification will not consume more than 80% of the remaining increment.

TABLE 7- Remaining Increment Consumption

Day	Concentration	Previous high before modification	Available Increment	Increase due to Modificaiton	Percentage of Available increment consumed
10/29/1990	25.4	23.2	5.44	2.2	40.441
06/01/1990	24	23	5.6	1	17.857
03/01/1991	26.3	25.4	3.68	0.9	24.457
06/27/1991	26.1	24.9	4.08	1.2	29.412
11/22/1991	25.5	25.5	3.6	0	0.000
08/27/1991	25.1	24.2	4.64	0.9	19.397
11/05/1991	24.3	22.5	6	1.8	30.000
03/05/1992	24.1	24.1	4.72	0	0.000
11/24/1993	25.9	25.7	3.44	0.2	5.814
03/06/1993	25.8	25.8	3.36	0	0.000
03/15/1993	25	24.6	4.32	0.4	9.259
09/26/1994	26.8	24.2	4.64	2.6	56.034
07/19/1994	24	21.8	6.56	2.2	33.537

Part E - Additional Impact Analysis

PSD regulations require that additional impact analysis be conducted to show that impacts associated with the facility would not adversely affect the surrounding area. Iron Dynamic's PSD permit application provided an additional impact analysis performed by URS. This analysis included an impact on economic growth, soils, vegetation and visibility and is listed in Section 6 of their application.

Economic Growth and Impact of Construction Analysis

A minimal construction workforce is expected and Iron Dynamics will employ few new people selected from the local and regional area once the facility is operational. Secondary emissions are not expected to significantly impact the area as all roadways will be paved. Industrial and residential growth is predicted to have negligible impact in the area since it will be dispersed over a large area and new home construction is not expected to significantly increase. Any commercial growth, as a result of the proposed facility, will occur at a gradual rate and will be accounted for in the background concentration measurements from air quality monitors. A minimal number of support facilities will be needed. There will be no adverse impact in the area due to industrial, residential or commercial growth.

Soils Analysis

Secondary NAAQS limits were established to protect general welfare, which includes soils, vegetation, animals and crops. Soil types in Dekalb County are of the Blount, Morley, Nappanee, Pewamo Association of which is predominately Miami silt loam with Clyde silty clay loam (Soil Survey of DeKalb County, U.S. Department of Agriculture). The general landscape consists of Tipton Till Plain or flat to gently rolling terrain (1816-1966 Natural Features of Indiana - Indiana Academy of Science). According to the insignificant modeled concentrations CO, NO_2, SO_2 and PM_{10} analysis, the soils will not be adversely affected by the facility.

Vegetation Analysis

Due to the agricultural nature of the land, crops in the Dekalb County area consist mainly of corn, wheat, oats, soybeans and hay (1992 Agricultural Census for Dekalb County). The maximum modeled concentrations of Iron Dynamics for CO, NO_2, SO_2 and PM_{10} are well below the threshold limits necessary to have adverse impacts on surrounding vegetation such as autumn bent, nimblewill, barnyard grass, bishopscap and horsetail milkweed (Flora of Indiana - Charles Deam). Livestock in the county consist mainly of hogs, beef and milk cows, sheep and chickens (1992 Agricultural Census for Dekalb County) and will not be adversely impacted from the modification. Trees in the area are mainly Beech, Maple, Oak and Hickory. These are hardy trees and due to the insignificant modeled concentrations, no significant adverse impacts are expected.

Federal and State Endangered Species Analysis

Federally endangered or threatened species as listed in the U.S. Fish and Wildlife Service , Division of Endangered Species for Indiana include 12 species of mussels, 4 species of birds, 2 species of bat and butterflies and 1 species of snake. The mussels and birds listed are commonly found along major rivers and lakes while the bats are found near caves. The agricultural nature of the land overall has disturbed the habitats of the butterflies and snake and the proposed facility is not expected to impact the area.

Federally endangered or threatened plants as listed in the U.S. Fish and Wildlife Service, Division of Endangered Species for Indiana list two threatened and one endangered species of plants. The endangered plant is found along the sand dunes in northern Indiana while the two threatened species do not thrive on cultivated or grazing land. The proposed facility is not expected to impact the area.

The state of Indiana=s list of endangered, special concern and extirpated nongame species, as listed in the Department of Natural Resources, Division of Fish and Wildlife, contains species of birds, amphibians, fish, mammals, mollusks and reptiles which may be found in the area of Iron Dynamics. However, the impacts are not expected to have any additional adverse effects on the habitats of the species than what has already occurred from the agricultural activity in the area.

Additional Analysis Conclusions

The nearest Class I area to the proposed merchant power facility is the Mammoth Cave National Park located approximately 475 km southwest in Kentucky. Operation of the proposed facility will not adversely affect the visibility at this Class I area. Iron Dynamics is located well beyond 100 kilometers (61 miles) from Mammoth Cave National Park and will not have significant impact on the Class I area. The results of the additional impact analysis conclude the Iron Dynamic's proposed facility will have no adverse impact on economic growth, soils, vegetation, endangered or threatened species or visibility on any Class I area.

APPENDIX C

BEST AVAILABLE CONTROL TECHNOLOGY (BACT) DETERMINATION

Source Background and Description

Source Name:	Iron Dynamics, Inc.
Source Location:	4500 County Road 59, Butler, IN 46721
County:	Dekalb
Significant Source Modification No.	033-12992-00076
SIC Code:	3312
Permit Reviewers:	Gurinder Saini

Background

Iron Dynamics, Inc. (IDI) is proposing to duct the coal dryer and the ore dryer exhaust through separate stacks. The coal dryer uses natural gas (with propane for emergency backup) and has a maximum heat input rate of 25 MMBtu/hour. The ore dryer uses natural gas (with propane for emergency backup) and has a maximum heat input rate of 27 MMBtu/hour. The coal dryer and ore dryer were constructed along with direct reduction plant containing 296 MMBtu/hour Rotary Hearth Furnace (RHF) to process iron ore and coal to produce 96 tons per hour of direct reduced iron. The RHF was permitted in a Prevention of Significant Deterioration (PSD) permit CP 033-8091-00043 issued on June 25, 1997. The coal and ore dryers even though constructed as part of project which was Significant for PSD were not reviewed because information related to these emission units was not included in the application submitted by the source. Presently the Permittee is proposing to modify these emission units, therefore IDEM, OAQ has determined that a PSD review for these emission units will be required. Therefore, following Best Available Control Technology (BACT) review for Coal and Ore Dryer are performed based on present information and technology review. This is based on a guidance memo by US Environmental Protection Agency titled “Transmission of Guidance on the Appropriate Injunctive Relief for Violations of Major New Source Review Requirements” dated March 08, 1999. This memo states “..a source that constructed without an NSR/PSD permit to *(construct and operate, should)* now obtain such a permit if, at the time that it undertook construction, it was required to obtain an NSR/PSD permit. The US EPA requires such a source to undergo NSR/PSD review as if it had not yet commenced construction”. In a November 17, 1998 memo for Injunctive Relief guidance for Major sources US EPA states “.. BACT determination is made at the time a source goes through a NSR permit review”. Therefore the BACT determination for the Coal and Ore dryers is performed as if this modification is the NSR/PSD permit for their construction. Thus level of control available now instead of BACT in 1997 will be evaluated.

BACT Analysis

The Indiana Department of Environmental Management (IDEM) has performed the following federal BACT review for the proposed construction of separate stacks for the coal and ore dryers.

The source is located in Dekalb County which is designated as attainment or unclassifiable for all criteria pollutants. Based upon the emission calculations, the coal and ore dryers along with the RHF project exceeds the PSD significant threshold levels stated in 326 IAC 2-2-1 for PM, PM_{10}, NOx, CO, and SO_2. Therefore, these pollutants were reviewed pursuant to the PSD Program (326 IAC 2-2 and 40 CFR 52.21). The PSD Program requires a BACT review and air quality modeling. BACT is an emission limitation based on the maximum degree of reduction of each pollutant subject to the PSD requirements. In accordance with the *“Top-Down” Best Available*

Control Technology Guidance Document outlined in the 1990 draft USEPA *New Source Review Workshop Manual*, this BACT analysis takes into account the energy, environmental, and economic impacts on the source.

The following BACT determinations are based on information obtained from the PSD permit application submitted by Iron Dynamics on April 11, 2000, additional documentation provided by Iron Dynamics subsequent to the submittal of the application, and the EPA RACT/BACT/LAER (RBLC) Clearinghouse.

The key steps in the top-down process are:

1. Identify viable options;
2. Eliminate technically infeasible options;
3. Rank remaining alternatives by control effectiveness;
4. Evaluate most effective controls, considering energy, environmental and economic impacts and other costs; and
5. Select BACT.

The sources of information for control alternatives vary based on the emission units being analyzed. The following information resources may be consulted in searching for the alternatives:

1. Online USEPA RACT/BACT/LAER Clearinghouse (RBLC) System;
2. USEPA/State/Local Air Quality Permits;
3. Federal/State/Local Permit Engineers;
4. Control Technology Vendors; and
5. Inspection/Performance Test Reports.

Once the technically feasible control alternatives have been identified, they are ranked in order of control effectiveness, with the most effective control alternative at the top. The ranked alternatives are reviewed with respect to environmental, energy, and economic considerations specific to the proposed modification. If the analysis determines that the examined alternative is not appropriate as BACT due to any of these considerations, then the next most stringent alternative is subjected to the same review. This process is repeated until a control alternative is justified to represent BACT. The proposed BACT must provide emission limitations which are at least as stringent as the applicable federally-approved State Implementation Plan (SIP) or the federal NSPS and National Emission Standards for Hazardous Air Pollutants (NESHAP) emission standards.

The impact analysis of the BACT review focuses on environmental, energy, and economic impacts. The net environmental impact associated with the control alternative should be reviewed. The dispersion modeling normally considers a “worst-case” scenario, thus constituting an assessment of the maximum environmental impacts. The energy impact analysis estimates the direct energy impacts of the control alternatives in units of energy consumption. The economic impact of a control option is typically assessed in terms of cost-effectiveness and ultimately whether the option is economically reasonable.

(A) Coal Dryer

The coal dryer will combust natural gas (with propane for emergency backup) and have a maximum heat input rate of 25 MMBtu per hour. The dryer is equipped with low NOx burners and 15-20% exhaust gas recirculation.

(a) Oxides of Nitrogen (NOx) Emissions

The NO_x emissions from the coal dryer are as a result of combustion of natural gas. NO_x formation occurs by different mechanisms. In the case of natural gas-fired dryers, a portion of the NO_x forms from thermal dissociation and subsequent reaction of nitrogen and oxygen molecules in the combustion air. This mechanism of NO_x formation is referred to as thermal NO_x. The second mechanism of NO_x formation known as fuel NO_x (due to the evolution and reaction of fuel-bound nitrogen compounds with oxygen) has a contribution to the NO_x being emitted from a natural gas-fired dryer. The third kind of NO_x formation known as prompt NO_x (due to the formation of HCN followed by oxidation to NO_x) is thought to have a minimal contribution to NO_x emissions for this application.

The proposed NO_x emission rate for the coal dryer is 50 lbs NO_x per MMscf of natural gas (0.0485 lb/MMBtu), referenced in USEPA AP-42 Table 1.4-1 for small boilers controlled with low NO_x burners (LNB). Based on a maximum heat input of 25 MMBtu/hr, the dryer will have an emission rate of 5.32 tpy for natural gas combustion.

The following table lists the permit limit for NOx emissions from dryers in RBLC database:

FACILITY	STATE	PROCESS	LIMIT	UNITS	DESCRIPTION
FRISMAR, INC.	CT	COATER, ROLL & DRYER, KCA	0.038	LB/H	
KRAFT GENERAL FOODS, INC.	CA	DRYER, SPRAY, WHEY	0.04	LB/MMBTU	LOW NOX BURNER, FUEL SPEC: USE OF NATURAL GAS
GRAIN PROCESSING CORP.	IN	CGF FINAL DRYER	0.047	LB/MMBTU	LOW NOX BURNER WITH FLUE GAS RECIRCULATION (FGR)
STEEL DYNAMICS, INC.	IN	TUNDISH DRYER	0.1	LB/MMBTU	LOW NOX BURNERS
QUALITECH STEEL CORP.	IN	TUNDISH DRYER	0.1	LBS/MMBTU	LOW NOX BURNERS
QUALITECH STEEL CORP.	IN	TUNDISH PREHEATERS (2)	0.1	LBS/MMBTU	LOW NOX BURNERS
STEEL DYNAMICS, INC.	IN	DRYERS, NATURAL GAS FIRED; (PREHEATERS)	0.1	LB/MMBTU	LOW NOX BURNERS
FERTECH ENVIRO SYSTEMS, INC.	CA	SOIL REMEDIATION DRYER/KILN/AFTERBURNER	0.12	LBM/MMBTU	KILN BURNER/AFTERBURNER (SEE NOTES)
SOLVAY SODA ASH JOINT VENTURE TRONA MINE/SODA ASH	WY	SODA ASH NATURAL GAS, DRYER	0.15	LB/MMBTU	BURNER DESIGNED FOR LOW NOX" PERFORMANCE "NORTH AMERICAN FLAME GRID" UNIT"
TEXASGULF SODA ASH PLANT	WY	ROTARY DRYER, SODA ASH	0.15	LB/MMBTU	LOW NOX BURNERS - NORTH AMERICAN BURNER
THE TIMKEN CO.	OH	DRYER, LADLE, NAT GAS FIRED	0.5	LB/MMBTU	BURNER CONTROL
CONSOLIDATED PENNSYLVANIA COAL CO., BAILY MINES	PA	THERMAL COAL DRYER NO. 2	0.59	LB/MMBTU	LNB WITH SOFA, FGR
CONSOL PENNSYLVANIA COAL COMPANY	PA	DRYER, THERMAL, BITUMINOUS COAL	0.63	LB/MMBTU	COMBUSTION CONTROL
CONSOLIDATED PENNSYLVANIA COAL CO., BAILY MINES	PA	THERMAL COAL DRYER NO. 1	0.8	LB/MMBTU	
E.I. DUPONT DE NEMOURS & CO., INC.	MS	DRYER, GAS FIRED	4.4	LB/H	LOW NOX BURNERS, LEA, O2 TRIM CONTROL
WEYERHAEUSER COMPANY	NC	FIBER DRYING SYSTEM	6.3	LBS/HR	
J.M. HUBER CORPORATION; WOOD PRODUCTS DIVISION	VA	DRYERS/PRESS	31.31	LB/HR	WESP AND RTO (SEE NOTES)
A & M PRODUCTS	CA	ROTARY AGGREGATE DRYER	44.5	LBM/DAY	FUEL SPEC: LPG FIRING
WEYERHAEUSER COMPANY	NC	MICROBOARD DRYERS	61.8	LBS/HR	SCR AS AN INTEGRAL PART OF THE RCO
COLUMBIAN CHEMICALS COMPANY	AR	DRYERS, UNIT B, 3	150	PPMV	GOOD COMBUSTION PRACTICE

Based on the review of the RBLC database, the majority of dryers listed in the database are not from similar industry applications. Most of the listed dryers are in other industries such as chemical, pulp and paper industry, printing, sewage sludge dryers, and various agricultural product dryers for grain, starch, gluten, germ, fibers etc. These listed dryers are not used for drying coal and are therefore, not applicable for direct comparison with the present application. Specifically, the only listed coal dryers are the following:

1. Consolidated Pennsylvania Coal, Baily Mines, Washington, PA - 2 thermal coal dryers with NO_x emission limits of 0.59 and 0.80 lb/MMBtu. However, both the emission limits are LAER with one of the dryers being equipped with LNB and FGR; and
2. Consolidated Pennsylvania Coal, Richhill Township, PA - a thermal coal dryer with NO_x emission limit of 0.63 lb/MMBtu. The emission limit is BACT with combustion control.

The proposed NO_x emission limit for the coal dryer is lower than the above applicable BACT determination. However, the RBLC database lists other dryers with comparable BACT determinations which are discussed below:

(a) Frismar Inc., Clinton, CT - Roller and dryer coater with NO_x emission limits of 0.038 lb/hr without any controls. The facility used to manufacture coated paper for mimeograph machines and typewriters from 1946 until 1980. It seems that a percentage of the equipment throughput of 38.25 lb/hr was utilized to generate the NO_x emissions limit. Such an emissions limit is deemed as untenable for comparison with the present application and will be precluded from further consideration in this analysis;
(b) Kraft General Foods, Inc., Tulave, CA - a 15 MMBtu/hr whey spray dryer with NO_x emission limits of 0.04 lb/MMBtu with LNB and combustion with natural gas. A spray dryer application is very different from the present application since the heating component in the spray dryer application is used to control the approach to saturation temperature and ultimately the size classification of the final whey product. The unit in question is a smaller application and despite the differences in the drying application, the NO_x emission limits are comparable;
(c) Grain Processing Corporation, Washington, IN - an 80 MMBtu/hr CGF Final Dryer with NO_x emission limits of 0.047 lb/MMBtu with LNB and FGR. A grain drying application may be similar to a coal drying application. The unit in question is a larger application and the NO_x emission limits are comparable.

The NO_x control technologies currently available for fossil-fueled boilers, stationary combustion engines, and turbines could be applied to coal dryers. Thus, these control alternatives are potentially available to control NO_x from the coal dryer. These control options are reviewed for technical feasibility in this BACT analysis. At this time, there are no known successful applications of post-combustion control technologies to similar coal dryer NO_x emissions.

Potential Coal Dryer NO_x Control Alternatives

(1) Combustion Controls;
(2) Selective Catalytic Reduction (SCR);
(3) Non-Selective Catalytic Reduction (NSCR);
(4) $SCONO_x$ Catalytic Oxidation/Absorption;
(5) Shell $DeNO_x$ System (modified SCR);

(6) Selective Non-Catalytic Reduction (SNCR) options -
- Exxon's Thermal DeNO$_x$®
- Nalco Fuel Tech's NO$_x$OUT®
- Low Temperature Oxidation (LTO)

Technical Feasibility of NO$_x$ Control Alternatives

The test for technical feasibility of any control option is whether it is both available and applicable to reducing NO_x emissions from the coal dryer.

1. **Combustion Controls** -- There is an entire family of combustion controls for NO_x reduction from various combustion units as follows:

   a. Low-NO$_x$ Burners (LNB);
   b. Reduced Combustion Air Temperature; and
   c. Exhaust Gas Recirculation (EGR)

   The proposed coal dryer will employ **Low-NO$_x$ burners** (LNB) which have been additionally modified to work in a potentially explosive environment constituted by a mixture of coal dust and air.

   The **Reduced Combustion Air Temperature option** inhibits thermal NO_x production. However, the option is limited to equipment with combustion air preheaters which are not applicable to coal dryers. Thus, this option is considered technically infeasible and will be not be considered further in this BACT analysis.

   The **EGR option** involves recirculating a portion of the dryer exhaust gas into the flame with baffle burners. Air enters the burner body directly and the gas passes through the body separated from the air with the fuel tube. The refractory baffle separates the body from the burner block (port) which is within the wall of the furnace. Air passes through the port through a series of holes around the circumference of the baffle. The natural gas enters the port through a hole in the center of the baffle. Only after the air and gas enter the port area they mix together and allow ignition to occur. Typically, EGR is useful in reducing thermal NO_x formation by lowering the oxygen concentration in the combustion zone.

   The primary limitation of EGR is that it alters the distribution of heat (resulting in cold spots) and lowers the efficiency of the heater. However, owing to the improved design of baffles and optimization of the port geometries, the issue of cold spots is effectively negated and the technology is technically feasible for coal dryers. The IDI application proposes to use EGR in the coal dryer to abate NO_x emissions.

(2) **Selective Catalytic Reduction (SCR)** -- In this process, ammonia (NH_3), usually diluted with air or steam, is injected through a grid system into the exhaust gas stream upstream of a catalyst bed. On the catalyst surface the NH_3 reacts with NO_x to form molecular nitrogen and water. The basic reactions are as follows:

   $4NH_3 + 4NO + O_2$ 6 $4N_2 + 6H_2O$ . . . . (i)
   $8NH_3 + 6NO_2$ 6 $7N_2 + 12H_2O$ . . . . (ii)

The reactions take place on the surface of the catalyst. Usually, a fixed bed catalytic reactor is used for SCR systems. Depending on system design, NO_x removal of 80 - 90 percent is achievable under optimum conditions (refer, USEPA "ACT Document - NO_x Emissions from Iron and Steel Mills", Sept., 1994). The reaction of NH_3 and NO_x is favored by the presence of excess oxygen. A major variable affecting NO_x reduction is exhaust gas temperature.

The greatest NO_x reduction occurs within a reaction window at catalyst bed temperatures between 600EF - 750EF for conventional (vanadium or titanium-based) catalyst types, and 470EF - 510EF for platinum-based catalysts. Performance for a given catalyst depends largely on the temperature of the exhaust gas stream being treated. A given catalyst exhibits optimum performance when the temperature of the exhaust gas stream is at the midpoint of the reaction temperature window for applications where exhaust gas oxygen concentrations are greater than 1 percent. Below the optimum temperature range, the catalyst activity is greatly reduced, significantly eroding the effectiveness of the control technology and potentially allowing large amounts of un-reacted NO_x and ammonia to be emitted directly to the atmosphere.

The IDI coal dryer exhaust gas temperature will be around 120EF and based upon discussions with both the process equipment vendor and a control technology vendor, the system does not afford a temperature regime which will allow the successful installation of an SCR system. In addition, for SCR technology to be effective - stable gas flow rates, an optimum temperature window, and consistent pollutant concentrations should be available. A coal dryer environment may not always be capable of sustaining these conditions during the various operational cycles. Despite firing only natural gas fuel, there will be a nominal particulate loading. There are realistic concerns that the SCR catalyst will be susceptible to the presence of particulates which will be in evidence in the inlet stream.

Thus, there are significant reservations about the technical feasibility of the SCR technology for the given application. In conclusion, SCR technology is not considered technically feasible for the coal dryer application and will be precluded from further discussion in this BACT analysis.

(3) **Non-Selective Catalytic Reduction (NSCR)** -- The NSCR system is a post-combustion add-on exhaust gas treatment system. It is often referred to as a “three-way conversion” catalyst since it reduces NO_x, unburned hydrocarbons (UBH), and CO simultaneously. In order to operate properly, the combustion process must be stoichiometric or near-stoichiometric which is not maintained in a coal dryer and can vary under regular operation. Under stoichiometric conditions, in the presence of the catalyst, NO_x is reduced by CO, resulting in nitrogen and carbon dioxide. Currently, NSCR systems are limited to rich-burn IC engines with fuel rich ignition system applications. In view of the above limitations, the NSCR option is considered technically infeasible and will not be considered further in this BACT analysis.

(4) **$SCONO_x$-Catalytic Oxidation/Absorption** -- This is an emerging catalytic oxidation/ absorption technology that has been applied for reductions of NO_x, CO and VOC from an assortment of combustion applications that mostly include – small turbines, boilers and lean-burn engines. However, the technology has

never been applied to similar coal dryer applications. $SCONO_x$ employs a single catalyst for converting NO_x, CO and VOC. The flue gas temperature should be in the 300-700°F range for optimal performance without deleterious effects on the catalyst assembly. The technology was developed as an alternative to traditional SCR applications which utilize ammonia resulting in additional operational safeguards, unfavorable environmental impacts and excessive costs. In the initial oxidation cycle, the CO is oxidized to CO_2, the NO gets converted to NO_2 and the VOC gets oxidized to carbon dioxide and water. The NO_2 is then absorbed on the potassium carbonate coated (K_2CO_3) catalyst surface forming potassium nitrites and nitrates (KNO_2, KNO_3). Prior to saturation of the catalyst surface, the catalyst enters the regeneration cycle.

As discussed earlier, the IDI coal dryer exhaust gas temperature will be around 120EF, and as in the earlier case the system does not afford a temperature regime which will allow the successful installation of a $SCONO_x$ system. In addition, the technology makes similar demands for effective application - stable gas flow rates, an optimum temperature window, and consistent pollutant concentrations should be available. A coal dryer environment may not always be capable of sustaining these conditions during the various operational cycles. Despite firing only natural gas fuel, there will be a nominal particulate loading. There are realistic concerns that the catalyst will be susceptible to particulate fouling which will be in evidence in the inlet stream.

Thus, there are significant reservations about the technical feasibility of the technology for the given application. In conclusion, $SCONO_x$ technology is not considered technically feasible for the coal dryer application and will be precluded from further discussion in this BACT analysis.

(5) **Shell $DeNO_x$ System (modified SCR)** -- The Shell $DeNO_x$ system is a variant of traditional SCR technology which utilizes a high activity dedicated ammonia oxidation catalyst based on a combination of metal oxides. Due to the intrinsically high activity of the catalyst, the technology is suited for NO_x conversions at lower temperatures with a typical operating range of 250-660EF. From a coal dryer application standpoint, the technology effective temperature regime does not match the exhaust gas temperature of 120EF.

In addition, the technology makes similar demands for effective application - stable gas flow rates, an optimum temperature window, and consistent pollutant concentrations should be available. A coal dryer environment may not always be capable of sustaining these conditions during the various operational cycles. Despite firing only natural gas fuel, there will be a nominal particulate loading. There are realistic concerns that the catalyst will be susceptible to particulate fouling which will be in evidence in the inlet stream.

Thus, there are significant reservations about the technical feasibility of the technology for the given application. In conclusion, Shell $DeNO_x$ technology is not considered technically feasible for the coal dryer application and will be precluded from further discussion in this BACT analysis.

(6) **Selective Non-Catalytic Reduction (SNCR)** --The three commercially available SNCR systems are Exxon's Thermal $DeNO_x$® system, Nalco Fuel Tech's

NO_xOUT® system and Low Temperature Oxidation (LTO). These technologies are reviewed below for technical feasibility in controlling coal dryer NO_x emissions.

Exxon's Thermal DeNO$_x$® - Exxon's Thermal DeNO$_x$® system is a non-catalytic process for NO_x reduction. The process involves the injection of gas-phase ammonia (NH_3) into the exhaust gas stream to react with NO_x. The ammonia and NO_x react according to the following competing reactions:

$2NO + 4NH_3 + 2O_2$ 6 $3N_2 + 6H_2O$ . . . . (I)
$4NH_3 + 5O_2$ 6 $4NO + 6H_2O$ . . . . (II)

The temperature of the exhaust gas stream is the primary criterion controlling the above selective reaction. Reaction (I) dominates in the temperature window of 1,600EF - 2,200EF resulting in a reduction of NO_x. However above 2,200EF, reaction (II) begins to dominate, resulting in enhanced NO_x production. Below 1,600EF, neither reaction has sufficient activity to produce or destroy NO_x. Thus, the optimum temperature window for the Thermal DeNO$_x$® process is approximately 1,600EF - 1,900EF. The above reaction temperature window can be shifted down to approximately 1,300EF - 1,500EF with the introduction of readily oxidizable hydrogen gas. In addition, the process also requires a minimum of 1.0 second residence time in the desired temperature window for any significant NO_x reduction.

From a coal dryer application standpoint, the technology effective temperature range is beyond the exhaust gas temperature of 120EF. In addition, the technology makes similar demands for effective application - stable gas flow rates, an optimum temperature window, and consistent pollutant concentrations should be available. A coal dryer environment may not always be capable of sustaining these conditions during the various operational cycles.

In conclusion, this technology is not technically feasible for the coal dryer application and will be precluded from further discussion in this BACT analysis.

Nalco Fuel Tech's NO$_x$OUT® - The NO$_x$OUT® process is very similar in principle to the Thermal DeNO$_x$® process, except that it involves the injection of a liquid urea compound (as opposed to NH_3) into the high temperature combustion zone to promote NO_x reduction. The reaction involves the decomposition of urea at temperatures of approximately 1,700EF - 3,000EF. Certain proprietary additive developments have allowed the operational temperature window to shift to approximately 1,400EF - 2,000EF. However, the process still has similar constraints as the Thermal DeNO$_x$® system. The limitations are dictated by the reaction-controlling variables such as stable gas flow rates for a minimum residence time of 1.0 second in the desired temperature window to ensure proper mixing.

From a coal dryer application standpoint, the technology effective temperature range is beyond the exhaust gas temperature of 120EF. In addition, the technology makes similar demands for effective application - stable gas flow rates, an optimum temperature window, and consistent pollutant concentrations should be available. A coal dryer environment may not always be capable of sustaining these conditions during the various operational cycles.

Thus, there are significant reservations about the technical feasibility of the technology for the given application. In conclusion, NO_xOUT® technology is not considered technically feasible for the coal dryer application and will be precluded from further discussion in this BACT analysis.

Low Temperature Oxidation (LTO) -- LTO technology is a relatively new technology and has not been applied for any similar coal dryer application. The vendor has listed applications for mostly industrial boilers and cogeneration gas turbines which have a more favorable energy balance. The technology is a variant of SNCR technology using ozone.

For optimal performance, the technology requires stable gas flows, lack of thermal cycling, invariant pollutant concentrations and residence times on the order of 1-1.5 seconds. In addition, LTO technology requires frequent calibration of analytical instruments which sense the NO_x concentrations for proper adjustment of ozone injection. Since LTO uses ozone injection, it has a potential for ozone slip which can vary between 5-10 ppmv. Also, the technology requires a cooler flue gas of less than 300EF at the point of ozone injection, otherwise the reactive gas is rendered redundant. The technology also suffers from low NO_x conversion rates (40-60%), potential for nitric acid vapor release (in the event of a scrubber malfunction) with subsequent regional haze impacts and the handling, treatment and disposal issues for the spent scrubber effluent.

In conclusion, the technology is still nascent and evolving out of the earlier bench scale solution to effect a reliable SNCR application utilizing reactive gas-phase ozone to control NO_x emissions from combustion applications. The technology is neither applicable nor proven for similar coal dryer applications and attendant limitations render it technically infeasible in its current manifestation. In view of the above, the LTO control option is considered technically infeasible and will not be considered further in this BACT analysis.

Evaluation of Most Effective NO_x Controls For Coal Dryer

Various control alternatives were reviewed for technical feasibility in controlling NO_x emissions from the modified coal dryer application. With the exception of combustion controls utilizing existing Low-NO_x burners (LNB) and EGR, the applicability of the remaining control options is considered technically infeasible. The primary reservation being that the dryer exhaust gas temperature at 120EF is considered too cool for the effective application of any of the above control options. In addition, there are realistic concerns about the availability of steady-state conditions during all phases of operation, potential for particulate fouling and the fact that none of these control technologies have been successfully applied for NO_x control from a similar application. Since, only a single control option (LNB + EGR) was ascertained to be technically feasible, no ranking of control alternatives has been provided.

At this time, the successful application of post-combustion control technologies to control similar coal dryer NO_x emissions are not known. Due to the relatively small amount of NO_x emissions (5.32 tpy) from the present application, the application of add-on controls is considered impractical and will be precluded from further consideration in this BACT analysis.

Proposal for NO_x BACT for Coal Dryer

In conclusion, BACT for controlling NO_x emissions from the coal dryer is the use of natural gas combustion with Low-NO_x burners (LNB) and Exhaust Gas Recirculation (EGR), and good combustion practices per manufacturer's guidance to meet a NO_x emission rate of 50 lbs per million standard cubic feet of natural gas (0.049 lb of NOx per MMBtu of heat input).

(b) Control of Carbon Monoxide (CO) Emissions

The primary source of CO emissions from the coal dryer are from the combustion of natural gas fuel. CO will be emitted as a byproduct of incomplete or inefficient combustion of natural gas in the coal dryer. Typically, CO emissions from combustion sources depend on the oxidation efficiency of the fuel. By controlling the combustion process carefully, CO emissions can be minimized. Also, smaller combustion units tend to emit more CO than comparable larger units, because smaller units usually have a higher ratio of heat transfer surface area to flame volume than larger combustors. This leads to reduced flame temperature and combustion intensity, and therefore lower combustion efficiency. CO emissions result when there is an insufficient residence time at high temperature to complete the final step in HC oxidation.

The proposed CO emission rate for the coal dryer is 84 lbs per MMscf of natural gas (0.082 lb/MMBtu), referenced in USEPA AP-42 Table 1.4-1 for small boilers. Based on a maximum heat input of 25 MMBtu/hr, the dryer will have an emission rate of 8.93 tpy for natural gas combustion.

The following table lists the permit limit for CO emissions from dryers in RBLC database:

FACILITY	STATE	PROCESS	LIMIT	UNIT	DESCRIPTION
ALLIED PRINTING SERVICES	CT	DRYER, WEB OFFSET PRESS	0.018	LB/H	
THE TIMKEN CO.	OH	DRYER, LADLE, NAT GAS FIRED	0.04	LB/MMBTU	BURNER CONTROL
CONSOL PENNSYLVANIA COAL COMPANY	PA	DRYER, THERMAL, BITUMINOUS COAL	0.18	LB/MMBTU	COMBUSTION CONTROL
CONSOLIDATED PENNSYLVANIA COAL CO., BAILY MINES	PA	THERMAL COAL DRYER NO. 2	0.52	LB/MMBTU	
LOUISIANA PACIFIC CORP.	AL	DRYER, ROTARY DRUM, WOOD WAFER, #1 & 2	0.9	LB/TON DRY WAFERS AN	REGENERATIVE THERMAL OXIDIZERS (RTO)
E.I. DUPONT DE NEMOURS & CO., INC.	MS	DRYER, GAS FIRED	1	LB/H	CHANGING PROCESS CONDITIONS
LOUISIANA PACIFIC CORP.	AL	DRYER, ROTARY DRUM, WOOD WAFER, #3, 4, & 5	1.33	LB/TON DRY WAFERS AN	REGENERATIVE THERMAL OXIDIZERS (RTO)
AMERICAN SODA, LLP, PARACHUTE FACILITY	CO	SODIUM CARBONATE PROD., SODA ASH DRYER, NAT GAS	2.02	LB/MMBTU	GOOD COMBUSTION MANAGEMENT.
E.I. DUPONT DE NEMOURS & CO., INC.	MS	DRYER, GAS FIRED	2.2	LB/H	CHANGING PROCESS CONDITIONS
CONSOLIDATED PENNSYLVANIA COAL CO., BAILY MINES	PA	THERMAL COAL DRYER NO. 1	2.28	LB/MMBTU	
THE TIMKEN CO.	OH	PREHEATER, LADLE, NAT GAS FIRED	3.68	T/YR	BURNER CONTROL
MINNESOTA CORN PROCESSORS	MN	CORN GLUTEN DRYER	6	LB/HR	FUEL SPEC: FUEL LIMITED TO NATURAL GAS OR BIOGAS GENERATED ONSITE
GEORGIA-PACIFIC ORIENTED STRANDBOARD FACILITY	AR	DRYER, 5, EACH	6.72	LB.H	RTO WITH MULTICLONES, GOOD COMBUSTION
GRAIN PROCESSING CORP.	IN	CGF FINAL DRYER	61	LB/MM CF NG	GOOD COMBUSTION CONTROL

As discussed earlier, based on a review of the RBLC database, the majority of dryers listed in the database do not refer to similar industry applications. Most of the listed dryers are applications in other industries such as chemical, pulp and paper, printing sewage sludge dryers, and various agricultural product dryers for grain, starch, gluten, germ, fibers etc. These listed dryers are not coal dryers and are not applicable for direct comparison with the present application. Specifically, the only listed coal dryers are the following:

! Consolidated Pennsylvania Coal, Richhill Township, PA - a thermal coal dryer with CO emission limit of 0.18 lb/MMBtu. The emission limit is non-BACT (listed as “Other”) with combustion control; and

! Consolidated Pennsylvania Coal, Baily Mines, Washington, PA - 2 thermal coal dryers with CO emission limits of 0.52 and 2.28 lb/MMBtu. Both the emission limits are BACT with no controls.

The proposed CO emission limit for the coal dryer is lower than the above applicable BACT determination. However, the RBLC database lists other comparable BACT determinations which are discussed below:

- Allied Printing Services, Manchester, CT - a web offset press dryer with a CO emission limit of 0.018 lb/hr. The emission limit is BACT with no control. Since this is a completely different type of dryer configuration than for the IDI application, the emissions limit is deemed untenable for comparison with the present application and will be precluded from further consideration in this analysis;
- The Timken Company, Perry Twp., OH - a 16.8 MMBtu/hr ladle dryer with CO emission limit of 0.04 lb/MMBtu. The emission limit is BACT with burner control. Since this is a ladle dryer for a steel mill application which does not compare well with the type of dryer configuration for the IDI application, the emissions limit is deemed untenable for comparison with the present application and will be precluded from further consideration in this analysis;

In addition, based on consultations with various experts knowledgeable about similar industry operations (process equipment vendors for the respective dryer systems, and proposed control equipment vendors), it transpired that besides the use of natural gas as fuel and good combustion control, other CO control technologies have not been applied to similar coal dryer applications. However, there are potential CO control technologies that are available to abate emissions from combustion sources. These control options will be reviewed for technical feasibility in this BACT analysis.

Potential Coal Dryer CO Control Alternatives

The alternatives available to control CO emissions from the modified coal dryer include the following:

(1) Fuel Spec: Clean-Burn Fuel;
(2) Good Combustion Practice;
(3) Flaring of CO Emissions;
(4) CO Oxidation Catalysts; and
(5) Catalytic Incineration.

Technical Feasibility of CO Control Alternatives
The test for technical feasibility of any control option is whether it is both available and applicable for reducing CO emissions from the coal dryer.

(1) **Fuel Spec: Clean-Burn Fuel** -- In order to reduce CO emissions from the coal dryer, combustion of a clean burning fuel such as natural gas is almost imperative. Among traditional fuels, natural gas is considered a clean-burn fuel since it has a very low potential for generating CO emissions. The coal dryer will utilize natural gas as the primary fuel and propane as backup fuel. Based on a review of the RBLC database, natural gas is the clean burn fuel of choice for similar dryer applications.

(2) **Good Combustion Practice** -- Based upon a review of the previously listed information resources including the RBLC database, good combustion practice and combustion control has been listed as the means of reducing CO emissions from similar dryer applications. IDI already implements good combustion

practices and will maintain the coal dryer in good working order per manufacturer's guidance to minimize CO emissions.

(3) **Flaring of CO Emissions** -- Based upon a review of the previously listed information resources including the RBLC database, there are no known applications of flaring for similar dryer exhaust gases for CO control. Flaring of emissions for CO destruction would require raising the exhaust gas temperature to 1,300EF with a residence time of 0.5 second. Presently, the exhaust gas stream from the coal dryer is around 25,000 acfm at 120EF. Based on the large gas volumetric flow at a substantial temperature differential, the auxiliary fuel requirements needed to operate the flare would be overwhelmingly large. Additionally, it can be speculated as to whether the flare would actually result in a decrease of CO emissions or increase thereof from supplemental fuel combustion, which would also result in an increase of NO_x emissions. Consequently, this control alternative is not considered technically feasible for coal dryer exhausts and thus, will not be considered further in this BACT analysis.

(4) **CO Oxidation Catalysts** -- Based upon a review of the previously listed information resources including the RBLC database, there are no known applications of CO oxidation catalysts to control CO emissions from similar industry dryer applications.

The optimal working temperature range for CO oxidation catalysts is approximately 850EF - 1,100EF with a minimum exhaust gas stream temperature of 500EF for minimally acceptable CO control. As indicated earlier, exhaust gases from the coal dryer are at approximately 120EF which is much cooler than the effective temperature range for effective operation of CO oxidation catalyst. Additionally, the particulate loading in the exhaust gas stream may be a detriment to efficient operation of a CO oxidation catalyst. Masking effects such as plugging and coating of the catalyst surface would almost certainly result in impractical maintenance requirements, and would significantly degrade the performance of the catalyst. Although, a natural gas-fired coal dryer may not emit significant amount of particulates, nevertheless, the catalyst remains susceptible to particulate fouling. The catalyst integrity may also be affected by the presence of moisture which may be introduced into the system under certain atmospheric conditions during unit shutdowns. Consequently, this control alternative is not considered technically feasible for coal dryer exhaust and thus, will not be considered further in this BACT analysis.

(5) **Catalytic Incineration** -- Based upon a review of the previously listed information resources including the RBLC database, there are no known applications of catalytic incineration to control CO emissions from similar industry operations.

Catalytic incinerators use a bed of catalyst that facilitates the complete combustion of gases. The catalyst increases the reaction rate and allows the conversion of CO to CO_2 at lower temperatures than a thermal incinerator.

The catalyst remains susceptible to particulate interference despite the fact that a natural gas-fired coal dryer does not have appreciable particulate loading. Also, the catalyst integrity may be compromised upon contact with moisture which can condense under certain atmospheric conditions during unit shutdowns. The technology performs best under stable gas flows with nominal perturbations in pollutant concentrations and temperature - conditions which may not be always sustained under all phases of heater operation. Notwithstanding the reservations regarding its effective technical applicability and potential adverse operating issues, an economic feasibility analysis was performed for a fixed-bed catalytic oxidation system to control CO emissions from a coal dryer.

Evaluation of Most Effective CO Controls For Coal Dryer

Various control alternatives were reviewed for technical feasibility in controlling CO emissions from the coal dryer. With the exception of catalytic oxidation (albeit with reservations pertaining to effective technical applicability and adverse operational issues), the applicability of the remaining control options are considered technically infeasible and will not be considered any further in this BACT analysis.

Since only a single control option was ascertained to be technically feasible, no ranking of control alternatives has been provided. The catalytic oxidation control alternative is shown below with CO control efficiency based on engineering judgment. It is thought that the following CO control level is representative of the best-case scenario if the technology were applied to coal dryers.

CO CONTROL OPTION	EFFICIENCY (%)
Fixed-Bed Catalytic Oxidation	95

The above control alternative was assessed further for economic feasibility in the following section.

Economic Feasibility of CO Control Alternatives for Coal Dryer

Total capital and annualized costs for the identified control alternative were developed based on the cost estimating structure and guidance provided in the US EPA reference, “OAQPS Control Cost Manual”, Fifth Edition, EPA 453/B-96-001 (February 1996), other relevant information provided by the respective equipment vendors, inputs from plant personnel and engineering judgment. The various cost factors are based on guidance provided under OAQPS Manual Chapter 3 - Catalytic and Thermal Incinerators. Typically, the costs are divided into two broad categories -- capital costs and operation & maintenance (O&M) costs.

For a fixed-bed catalytic oxidation system with an estimated CO control efficiency of 95% the total annualized capital costs and O&M costs for the control alternative are $362,000 with a cost effectiveness of $42,700 per ton of CO removed.

The use of catalytic oxidation technology is economically prohibitive even with very optimistic CO control removal efficiencies. Based on excessive cost effectiveness and associated energy impact the catalytic oxidation control option is considered infeasible and will not be considered further in this BACT analysis.

Proposal for CO BACT for Coal Dryer

In conclusion, BACT for controlling CO emissions from the coal dryer is the use of natural gas combustion with combustion practices per manufacturer's guidance to meet a CO emission rate of 84 lbs per million standard cubic feet of natural gas (0.082 lb of CO per MMBtu of heat input).

(c) Control of Volatile Organic Compound (VOC) Emissions

The VOC are emitted as a by-product of incomplete or inefficient combustion of natural gas in the coal dryer. The VOCs may be constituted by a wide spectrum of volatile and semi-volatile organic compounds. They are emitted to the atmosphere when some of the fuel natural gas remains unburned or partially burned during combustion. In the case of natural gas fuel, some of the organics are carryover, unreacted, trace constituents of the gas while others may be pyrolysis products of the heavier hydrocarbon constituents.

VOC emissions are typically manifest as a function of incomplete combustion resulting in emission of varying molecular weight hydrocarbons. The IDI project has sought to fire only natural gas which combusts cleanly thereby minimizing VOC emissions from the coal dryer. The proposed annual VOC emissions from the coal dryer due to natural gas combustion is very nominal at 0.58 tpy (based on 5.5 lbs per million standard cubic feet of natural gas; refer USEPA AP-42 Table 1.4-2).

The following table lists the permit limit for VOC emissions from dryers in RBLC database:

FACILITY	STATE	PROCESS	LIMIT	UNIT	DESCRIPTION
RESOURCE RENEWAL TECHNOLOGIES, INC.	CA	DRYER/MIXER	0.0028	LBM/MMBTU	FUEL SPEC: SWITCH FROM DIESEL TO LPG OR NATURAL GAS
ETG ENVIRONMENTAL, INC.	OH	DRYER, SLUDGE	0.0625	LB/HR	ACTIVATED CARBON
ETG ENVIRONMENTAL, INC.	OH	DRYER, SLUDGE	0.0625	LB/HR	ACTIVATED CARBON
CARGILL, INC.	IA	GLUTEN FLASH DRYERS (2)	0.07	LB/HR	
CARMET CO.	MI	DRYER, SPRAY & DRYER, PAN, 3	0.16	LB/LB TUNGSTON CARBI	CHILLED MIXERS, CENTRIFUGE, CONDENSERS
E.I. DUPONT DE NEMOURS & CO., INC.	MS	DRYER, GAS FIRED	0.172	LB/H	FUEL SPEC: NAT GAS FIRING ONLY
CARGILL, INC.	IA	FIBER DRYER SYSTEM	0.2	LB/HR	
WEYERHAEUSER COMPANY	MS	DRYER, VENEER	0.22	LB/MSF 3/8	REGENERATIVE CATALYTIC OXIDIZER
PFIZER INC.	CT	DRYER	0.43	TONS/YR	AIREX C.2500 CATALYTIC OXIDIZER
CONSOL PENNSYLVANIA COAL COMPANY	PA	DRYER, THERMAL, BITUMINOUS COAL	0.83	LB/MMBTU	COMBUSTION CONTROL
CLEAN SOILS INC.	CA	DRYER, DRUM, SOIL & INCINERATOR	1.11	LB/H	VOC INCINERATOR
CHRYSLER CORPORATION	MI	DRYER, PAINT SLUDGE	1.9	LB VOC/H	THERMAL OXIDIZER
WEYERHAEUSER CO.	AL	DRYER, RADIO FREQUENCY	2.3	LB/HR	
ALLIED PRINTING SERVICES	CT	DRYER, WEB OFFSET PRESS	2.907	LB/H	CATALYTIC INCINERATOR
LOUISIANA PACIFIC CORP.	WI	DRYER, WOOD	3.67	LB/HR	WOOD SPECIE, RTO
KAY AUTOMOTIVE GRAPHICS	MI	SILK SCREEN PRINTING, 6; DRYERS, 5 QUICK; OVENS, 2	12	LB/GAL ACS - INK	
SUPERIOR AGRESOURCES	CA	DRYERS AND PELLETIZING EQUIPMENT	13.7	LBM/DAY	FUEL SPEC: NATURAL GAS FIRING
PROCTER AND GAMBLE	GA	DRYER, LAUNDRY DETERGENT MANUFACTURING	16.6	LBS/HR	
WEYERHAEUSER COMPANY	NC	FIBER DRYING SYSTEM	28.9	LBS/HR	REGENERATIVE CATALYTIC OXIDIZER
LOUISIANA PACIFIC CORP.	MI	WAFER DRYERS	31.6	PPH	COMBUSTION
CONSOLIDATED PENNSYLVANIA COAL CO., BAILY MINES	PA	THERMAL COAL DRYER NO. 1	70	LB/HR	
CONSOLIDATED PENNSYLVANIA COAL CO., BAILY MINES	PA	THERMAL COAL DRYER NO. 2	109	LB/HR	

As discussed earlier, based on a review of the RBLC database, the majority of dryers listed in the database do not refer to similar industry applications. Most of the listed dryers are applications in other industries such as the chemical industry (e.g., trona dryers - trona is hydrated sodium bicarbonate carbonate which is the type mineral for several sodium carbonates that form in non-marine evaporite deposits), pulp and paper industry, printing industry, sewage sludge dryers, and various agricultural product dryers for grain, starch, gluten, germ, fibers etc. These listed dryers are not coal dryers and are therefore, not applicable for direct comparison with the present application. Specifically, the only listed coal dryers are the following:

- Consolidated Pennsylvania Coal, Richhill Township, PA - a thermal coal dryer with VOC emission limit of 0.83 lb/MMBtu. The emission limit is LAER with combustion control; and
- Consolidated Pennsylvania Coal, Baily Mines, Washington, PA - 2 thermal coal dryers with VOC emission limits of 70 and 109 lb/hr. Both the emission limits are LAER with no controls.

The proposed VOC emission limit for the coal dryer is lower than the above determinations. Based on a review of other industrial dryers in the RBLC database with comparable BACT determinations, there is a host of the following industrial dryers:

- ETG Environmental, Oregon and Toledo, OH - 2 sludge dryers with VOC emission limits of 0.0625 lb/hr each achieved with activated carbon controls. Activated carbon adsorption is effective for adsorbing specific VOC compounds. However, it is not considered technically feasible for the present application for reasons discussed later. Due to the use of an infeasible control technology for the present application, the BACT determination is deemed untenable for comparison with the present application and will be precluded from further consideration in this BACT analysis; and
- Cargill Inc., Eddyville, IA - two 25 MMBtu/hr gluten flash dryers with VOC emission limit of 0.07 lb/hr each achieved with no referenced VOC controls. Based on straight numerical comparison, the BACT emission limit is lower than for the present application. However, due to higher residual volatile organic content in the gluten dryer throughput, it should be expected that the uncontrolled VOC emission limit of the dryer would be higher than the nominal VOC emissions derived from natural gas combustion alone. It is possible that the facility has incorporated certain process controls not indicated in the RBLC database to reduce the VOC emission limit. Such process controls are not relevant for the coal dryer in the present application. As such, due to differences intrinsic to the respective processes, the BACT determination is deemed untenable for comparison with the present application and will be precluded from further consideration in this BACT analysis.

In addition, based on consultations with various experts knowledgeable about similar industry operations (process equipment vendors for the respective dryer systems, and control equipment vendors), it appears that besides natural gas combustion and good combustion control, some other VOC control technologies have been applied in some cases to industrial dryer applications. There are potential VOC control technologies that are available to abate emissions from combustion sources. These control options will be reviewed for technical feasibility in this BACT analysis.

Potential Coal Dryer VOC Control Alternatives

Traditional VOC controls such as thermal and/or catalytic oxidation are not considered feasible for the present application, since the exhaust gas stream calorific value would be very low owing to the small amount of VOC emissions due to natural gas combustion from the nominal emission source. The auxiliary fuel requirements would serve to enhance the emission levels of criteria pollutant emissions resulting in a larger natural gas emission source than the present application. The alternatives available to control VOC emissions from the coal dryer include the following:

(1) Fuel Spec: Clean-Burn Fuel;
(2) Good Combustion Practice;
(3) VOC Oxidation Catalyst; and
(4) Activated Carbon Adsorption

Technical Feasibility of VOC Control Alternatives

The test for technical feasibility of any control option is whether it is both available and applicable to reducing VOC emissions from the coal dryer. The previously listed information resources were consulted to determine the extent of applicability of each identified control alternative.

(1) **Fuel Spec: Clean-Burn Fuel** -- In order to reduce VOC emissions from the coal dryer, combustion of a clean burning fuel such as natural gas is almost imperative. Among traditional fuels, natural gas is considered a clean-burn fuel since it has a very low potential for generating VOC emissions. The modified coal dryer will utilize only natural gas as the primary fuel. Based on a review of the RBLC database, natural gas is the clean burn fuel of choice for similar applications.

(2) **Good Combustion Practice** -- Based upon a review of the previously listed information resources including the RBLC database, good combustion practice and combustion control has been listed as the means of reducing VOC emissions from similar dryer applications. The implications of this control alternative are that IDI operators will maintain the coal dryer in good working order per manufacturer's guidance and implement good combustion practice to minimize VOC emissions.

(3) **VOC Oxidation Catalysts** -- Based upon a review of the previously listed information resources including the RBLC database, there are no known applications of VOC oxidation catalysts to control VOC emissions from a similar dryer operation.

The optimal working temperature range for VOC oxidation catalysts is approximately 650EF - 900EF for effective VOC control. Thus, the temperature of the coal dryer exhaust (at 120EF) will be below the lower end of the optimum temperature window for VOC oxidation catalysts. Additionally, the catalyst will be susceptible to particulate and moisture interference which may affect either the performance or the integrity of the catalyst. Although the natural gas-fired coal dryer will only have a nominal particulate loading, nevertheless the catalyst performance may be affected by masking effects such as plugging and coating of the catalyst surface resulting in impractical maintenance and cleaning requirements. Thus, there are significant reservations about the technical feasibility of the technology for the given application, In conclusion VOC oxidation catalyst technology is not considered technically feasible for the coal dryer application and will be precluded from the further discussion in this BACT analysis.

(4) **Activated Carbon Adsorption** -- Activated carbon beds have a track record of successful application for adsorbing specific VOC compounds. However, the application of the technology is fraught with certain limitations which can become overriding factors in negating its effective applicability for specific organic streams. Whenever an effluent stream contains contaminants, particularly particulates and moisture, the technology loses its efficiency. The presence of moisture and particulates in the stream will require significant gas pre-conditioning since these interferents are deleterious to the efficiency of the carbon bed. In effect, they induce a masking phenomenon thereby reducing the available effective surface area. Although the natural gas-fired coal dryer will only have a nominal particulate loading, nevertheless the bed performance may be affected by aforesaid masking effects such as plugging and coating of the activated carbon surface resulting in impractical maintenance and cleaning requirements. In addition, the exhaust gas VOC concentration from natural gas combustion is expected to be fairly low in the order of a few ppm which will be on the order of the outlet concentration from the technology - without any real benefits from the use of the technology. Thus, there are significant reservations about the technical feasibility of the technology for the given application, In conclusion carbon adsorption technology is not considered technically feasible for the coal dryer application and will be precluded from the further discussion in this BACT analysis.

Evaluation of Most Effective VOC Controls For Coal Dryer

Various control alternatives were reviewed for technical feasibility in controlling VOC emissions from the coal dryer application. With the exception of natural gas combustion with good combustion practice the remaining technologies - VOC oxidation catalyst and activated carbon adsorption are considered technically infeasible with reservations pertaining to effective technical applicability and adverse operational issues.

As indicated earlier, control technologies for VOC abatement have not been widely applied to similar coal dryer applications. At this time, the successful application of post-combustion control technologies to control similar coal dryer VOC emissions are not known. Due to the nominal amount of VOC emissions from the present application, the application of add-on controls is considered impractical and will be precluded from further consideration in this BACT analysis.

Proposal for VOC BACT for Coal Dryer

In conclusion, BACT for controlling VOC emissions from the coal dryer is the use of natural gas combustion with good combustion practices per manufacturer’s guidance to meet a VOC emission rate of 5.5 lbs per million standard cubic feet of natural gas (0.0053 lb of VOC per MMBtu of heat input).

(d) Control of Particulate Matter (PM/PM_{10}) Emissions

Particulate matter emissions from the coal dryer result from the coal handling and carryover of non-combustible trace constituents in the fuel. Typically, particulates are hard to detect with natural gas firing due to the low ash content. The USEPA reference

AP-42 recommends that all particulate emissions from natural gas combustion are less than 1 micron in aerodynamic diameter, therefore, they are classified as PM_{10}. Particulate emissions from the coal dryer will be exhausted via its own stack.

The following table lists the permit limit for PM/PM10 emissions from dryers in RBLC database:

FACILITY	STATE	PROCESS	LIMIT	UNIT	DESCRIPTION
CARGILL INC - SIOUX CITY	IA	DRYER, GRAIN, BERICO	0.002	GR/DSCF	PRECLEAN BEANS, SETTLING CHAMBER AND EXIT SCREENS.
CARGILL, INC.	IA	CONDITIONING DRYER	0.005	GR/SCF	BAGFILTER MODEL #: 120MCF572 MANUFACTURER: MAC
CARGILL INC - SIOUX CITY	IA	MILL/MILLING PROCESS (MEAL DRYER/COOLER)	0.005	GR/DSCF	SEE PROCESS DESCRIPTION FOR ALTERNATIVE CONTROL OPTION INFORMATION. COST INFORMATION AVAILABLE
SOLVAY SODA ASH JOINT VENTURE TRONA MINE/SODA ASH	WY	SODA ASH NATURAL GAS, DRYER	0.01	GR/SCF	ELECTROSTATIC PRECIPITATOR 130,000 ACFM
TEXASGULF SODA ASH PLANT	WY	ROTARY DRYER, SODA ASH	0.01	GR/DSCF	ELECTROSTATIC PRECIPITATOR 124,000 ACFM
THE TIMKEN CO.	OH	DRYER, LADLE, NAT GAS FIRED	0.02	LB/MMBTU	BAGHOUSE
CONSOL PENNSYLVANIA COAL COMPANY	PA	DRYER, THERMAL, BITUMINOUS COAL	0.02	GR/DSCF	CYCLONE/VENTURI SCRUBBER
CONSOLIDATED PENNSYLVANIA COAL CO., BAILY MINES	PA	THERMAL COAL DRYER NO. 2	0.02	GR/DSCF	VENTURI SCRUBBER
OMYA, INC.	VT	DRYERS, FLASH, 2	0.02	GR/DSCF	FABRIC FILTER
WYETH NUTRITIONALS, INC.	VT	DRYER, DAIRY WHEY	0.02	GR/DSCF	PACKED BED SCRUBBER
TARMAC FLORIDA, INC.	FL	PORTLAND CEMENT MFG, SLAG DRYER	0.02	GR/DSCF	BAGHOUSE
CONSOL PENNSYLVANIA COAL COMPANY	PA	DRYER, THERMAL, BITUMINOUS COAL	0.02	GR/DSCF	CYCLONE/VENTURI SCRUBBER
ENGELHARD CORPORATION	GA	DRYER, SPRAY AND CALCINER	0.025	GR/DSCF	BAGHOUSE AFTER STARTUP
LOUISIANA PACIFIC CORP.	CO	DRYER, WAFER	0.03	GR/DSCF	WET ESP
CONSOLIDATED PENNSYLVANIA COAL CO., BAILY MINES	PA	THERMAL COAL DRYER NO. 1	0.031	GR/DSCF	VENTURI SCRUBBER
RESOURCE RENEWAL TECHNOLOGIES, INC.	CA	DRYER/MIXER	0.0314	LBM/TON	WATER SUPPRESSION AND VENTURI SCRUBBER, FUEL SPEC: SWITCH FROM DIESEL FUEL TO LPG OR NATURAL GAS
CLEAN SOILS INC.	CA	DRYER, DRUM, SOIL	1	LB/H	BAGHOUSE
OMYA, INC.	VT	DRYERS, SPRAY, 2	1.32	LB/H	MULT. CYCLONES FOLLOWED BY ESP
GRAIN PROCESSING CORP.	IN	MALTODEXTRIN DRYER	6.75	LB/HR	WATER SCRUBBER
E.I. DUPONT DE NEMOURS & CO., INC.	MS	DRYER, GAS FIRED	7.1	LB/H	BAGHOUSES & FILTERS

As discussed earlier, based on a review of the RBLC database, the majority of dryers listed in the database do not refer to similar industry applications. Most of the listed dryers are applications in other industries such as the chemical industry, pulp and paper industry, printing industry, sewage sludge dryers, and various agricultural product dryers for grain, starch, gluten, germ, fibers etc. These listed dryers are not coal dryers and are therefore, not applicable for direct comparison with the present application. Specifically, the only listed coal dryers are the following:

- Consolidated Pennsylvania Coal, Richhill Township, PA - a thermal coal dryer with particulate emission limit of 0.02 gr/dscf. The emission limit is BACT with the expedient of a cyclone precollector followed by a venturi scrubber; and
- Consolidated Pennsylvania Coal, Baily Mines, Washington, PA - 2 thermal coal dryers with particulate emission limits of 0.02 and 0.031 gr/dscf. Both the emission limits are BACT with venturi scrubber control.

The proposed particulate emission limit for the coal dryer application is lower than the above BACT determinations. In addition, based on consultations with various experts knowledgeable about similar industry operations (process equipment vendors for the respective dryer systems, and proposed control equipment vendors), it appears that certain particulate control technologies have been applied in some cases to industrial dryer applications. There are potential particulate control technologies that are available to abate emissions from combustion sources. These control options will be reviewed for technical feasibility in this BACT analysis.

Potential PM/PM_{10} Control Alternatives

The alternatives available to control PM/PM_{10} emissions from the coal dryer include the following:

1. Electrostatic Precipitators (ESPs);
2. Fabric Filters;
3. High-Energy Venturi Scrubbers; and
4. High-Efficiency Cyclones.

Technical Feasibility of PM/PM_{10} Control Alternatives

The test for technical feasibility of any control option is whether it is both available and applicable to reducing PM/PM_{10} emissions. The previously listed information resources were consulted to determine the extent of applicability of each identified control alternative.

1. **Electrostatic Precipitators (ESPs)** -- While ESPs have a very high removal efficiency (99+%) for many sources of particulate matter, the RBLC database does not indicate any application for similar coal dryer applications. Most of the ESP applications have been listed for much larger installations for soda ash dryers, trona (hydrated sodium bicarbonate carbonate which is the type mineral for several sodium carbonates) calciners, wet ESPs followed by RTOs for wafer dryers, multi cyclones followed by ESPs for spray dryers and assorted wood products. The control effectiveness of an ESP is strongly dependent among other parameters on the resistivity of the inlet gas stream. The resistivity of coal dryer exhaust stream does not readily lend itself to an ESP application without additional gas conditioning. In addition, a gas stream laden with fine coal dust

which will enter a high voltage electric field has the potential for unsafe operation since the inlet gas mixture can be explosively lethal in the presence of a migrating stray spark.

Also, based on a review of information resources referenced earlier, it is revealed that ESPs have never been successfully implemented to reduce PM/PM_{10} emissions from coal dryers. Consequently, this control alternative is not considered technically feasible and precluded from further consideration in this BACT analysis.

2. **Fabric Filters** -- Fabric filters or baghouses are regarded as one of the most efficient and versatile control devices for removal of PM/PM_{10} emissions from most industrial applications including natural gas-fired sources such as coal dryers. Fabric filter installations represent some of the lowest particulate emission limitations for industrial dryers in the RBLC database.

   IDI proposes to install a separate pulse-jet fabric filter system for the coal dryer with an exhaust of 25,000 acfm (or 22,755 dscfm). The proposed PM collection efficiency is 99.85% with an outlet grain loading of 0.0052 gr/dscf resulting in particulate emissions of 4.44 tpy. The proposed emission limit is lower than the listed BACT for coal dryers in the RBLC database with controls and is consistent with the permitted baghouse particulate emission limits for the earlier equipment configuration when the coal dryer was exhausting through the reheat furnace baghouse.

3. **High Energy Venturi Scrubbers** -- High-energy venturi scrubbers can achieve a high collection efficiency (90+%), but they have the potential for generating large quantities of sludge along with associated problems of sludge handling, dewatering and disposal. The operation of the scrubber and resulting sludge handling also requires a substantial energy input with the largest pressure drop penalty among all the particulate control options.

   Although based on a review of the information resources referenced earlier, it is revealed that venturi scrubbers have been utilized for mine coal dryer applications. However, since IDI is proposing to install a more efficient fabric filter system, venturi scrubbers are not considered viable and precluded from further consideration in this BACT analysis.

4. **High Efficiency Cyclones** -- Standard cyclones are efficient (30-80%) for large dust particles, but even high-efficiency cyclones do not provide the necessary collection and removal efficiency for smaller particles. Also, based on a review of the information resources referenced earlier, it is revealed that cyclones alone have never been successfully implemented to reduce PM/PM_{10} emissions from coal dryers. They have been used in tandem with other control options to serve as pre-collectors. However, since IDI is proposing to install a more efficient fabric filter system, cyclones are not considered viable and precluded from further consideration in this BACT analysis.

Proposal for PM/PM_{10} BACT for Coal Dryer

In conclusion, BACT for controlling PM/PM_{10} emissions from the coal dryer is the use of fabric filtration to meet a PM/PM_{10} (where PM_{10} includes Filterable and

Condensible components) emission rate of 0.0052 grain/dscf and 4.44 tons per year. The visible emissions discharged into the atmosphere from the Coal Dryer stack 75 shall not exceed three percent (3%) opacity determined by a six (6) minute average (24 reading taken in accordance with EPA Method 9, Appendix A).

(e) Control of Sulfur Dioxide (SO_2) Emissions

The source of SO_2 emissions from the coal dryer is the small quantity of sulfur in the natural gas fuel. The annual SO_2 emission rate for the coal dryer is 0.064 tons per year due to natural gas combustion (based on 0.6 lbs per million standard cubic feet; refer USEPA AP-42 Table 1.4-2). Due to the very small amount of emissions, the application of add-on controls is considered impractical and will be precluded from further consideration in this BACT analysis.

<u>Proposal for SO_2 BACT for Coal Dryer</u>

In conclusion, BACT for controlling SO_2 emissions from the coal dryer is the use of natural gas combustion practices per manufacturer's guidance to meet an SO_2 emission rate of 0.6 lb per million cubic feet of natural gas (0.00059 lb of SO_2 per MMBtu of heat input).

(B) BACT Analysis for Ore Dryer

The ore dryer will combust natural gas (with propane for emergency backup) and have a maximum heat input rate of 27 MMBtu/hr.

(a) Control of Oxides of Nitrogen (NO_x) Emissions

The primary source of NO_x emissions from the ore dryer are from combustion of natural gas fuel. NO_x is formed from the chemical reaction between nitrogen and oxygen at high temperatures in the dryer. NO_x formation occurs by different mechanisms. In the case of natural gas-fired dryers, a portion of the NO_x forms from thermal dissociation and subsequent reaction of nitrogen and oxygen molecules in the combustion air. This mechanism of NO_x formation is referred to as thermal NO_x. The second mechanism of NO_x formation known as fuel NO_x (due to the evolution and reaction of fuel-bound nitrogen compounds with oxygen), also has a contribution to the NO_x being emitted from a natural gas-fired dryer. The third kind of NO_x formation known as prompt NO_x (due to the formation of HCN followed by oxidation to NO_x) is thought to have a minimal contribution to NO_x emissions for this application.

The proposed NO_x emission rate for the ore dryer is 86 lbs NO_x per MMscf of natural gas (0.086 lb/MMBtu; refer Svedala emission estimates at maximum design conditions). Based on a maximum heat input of 27 MMBtu/hr, the dryer will have an emission rate of 10.17 tpy for natural gas combustion.

Based on a review of the RBLC database, the majority of dryers listed in the database do not refer to similar industry applications. Most of the listed dryers are applications in other industries such as the chemical industry, pulp and paper industry, printing industry, sewage sludge dryers, and various agricultural product dryers for grain, starch, gluten, germ, fibers etc. The only dryer that can be possibly construed to be a mineral ore dryer is for a trona (hydrated sodium bicarbonate carbonate which is the type mineral for several sodium carbonates that form in non-marine evaporite deposits)/ soda ash dryer.

BACT for the dryer was listed at 0.15 lb/MMBtu with the burner designed for low-NO_x performance. The remaining listed dryers are not industry application ore dryers and are therefore, not applicable for direct comparison with the present application.

The proposed NO_x emission limit for the ore dryer is lower than the above BACT determination. In the earlier discussion on coal dryers, a few other comparable industrial dryer applications from the RBLC database were reviewed. The IDI application contains an improved burner low-emission design compatible for the application that results in nominal NO_x emissions with emissions in the range of 0.075 - 0.086 lb/MMBtu for the range of operations. In the RBLC database, there is a wide range of BACT determinations for low-NO_x burners for industrial dryers with emission limits in the range of 0.1 - 0.05 lb/MMBtu. Although some of these industrial dryers are used for varying drying applications, their NO_x emission limits are comparable to the present application.

In addition, based on consultations with various individuals knowledgeable about similar industry operations (process equipment vendors for respective dryer systems, and proposed control equipment vendors), it appears that control technologies for NO_x abatement have not been widely applied to similar ore dryer applications. However, NO_x control technologies are currently available for fossil-fueled boilers, stationary combustion engines, and turbines. Thus, these control alternatives are potentially available to control NO_x from an ore dryer. These control options will be reviewed for technical feasibility in this BACT analysis. At this time, the successful application of post-combustion control technologies to control similar ore dryer NO_x emissions are not known.

Potential Ore Dryer NO_x Control Alternatives

(1) Combustion Controls;
(2) Selective Catalytic Reduction (SCR);
(3) Non-Selective Catalytic Reduction (NSCR);
(4) $SCONO_x$ Catalytic Oxidation/Absorption;
(5) Shell $DeNO_x$ System (modified SCR);
(6) Selective Non-Catalytic Reduction (SNCR) options -
- Exxon's Thermal $DeNO_x$®
- Nalco Fuel Tech's NO_xOUT®
- Low Temperature Oxidation (LTO)

Technical Feasibility of NO_x Control Alternatives

The test for technical feasibility of any control option is whether it is both available and applicable to reducing NO_x emissions from the ore dryer. The previously listed information resources were consulted to determine the extent of applicability of each identified control alternative.

1. **Combustion Controls** -- There is an entire family of combustion controls for NO_x reduction from various combustion units as follows:

   a. Low-NO_x Burners (LNB);
   b. Reduced Combustion Air Temperature; and
   c. Exhaust Gas Recirculation (EGR)

   The proposed ore dryer will employ an improved burner low-emission design compatible for the application that provides emission levels comparable to **Low-NO_x burners** (LNB).

The **Reduced Combustion Air Temperature option** inhibits thermal NO_x production. However, the option is limited to equipment with combustion air preheaters which are not applicable to ore dryers. Thus, this option is considered technically infeasible and will be not be considered further in this BACT analysis.

The **EGR option** has already been described earlier. Essentially, the technology involves recirculating a portion of the dryer exhaust gas into the flame with baffle burners. The EGR is useful in reducing thermal NO_x formation by lowering the oxygen concentration in the combustion zone.

The primary limitation of EGR is that it alters the distribution of heat (resulting in cold spots) and lowers the efficiency of the heater. However, owing to the improved design of baffles and optimization of the port geometries, the issue of cold spots is effectively negated and the technology is technically feasible for similar dryer applications. The IDI application proposes to use an improved burner design compatible for the application that does not reflect the use of EGR to abate NO_x emissions.

(2) **Selective Catalytic Reduction (SCR)** -- In this process, ammonia (NH_3), usually diluted with air or steam, is injected through a grid system into the exhaust gas stream upstream of a catalyst bed. On the catalyst surface the NH_3 reacts with NO_x to form molecular nitrogen and water. The technology has already been described earlier.

The reactions take place on the surface of the catalyst. Usually, a fixed bed catalytic reactor is used for SCR systems. Depending on system design, NO_x removal of 80 - 90 percent is achievable under optimum conditions (refer, USEPA "ACT Document - NO_x Emissions from Iron and Steel Mills", Sept., 1994). The reaction of NH_3 and NO_x is favored by the presence of excess oxygen. A major variable affecting NO_x reduction is exhaust gas temperature.

As discussed earlier, the greatest NO_x reduction occurs within a reaction window at catalyst bed temperatures between 600EF - 750EF for conventional (vanadium or titanium-based) catalyst types, and 470EF - 510EF for platinum-based catalysts. Performance for a given catalyst depends largely on the temperature of the exhaust gas stream being treated. A given catalyst exhibits optimum performance when the temperature of the exhaust gas stream is at the midpoint of the reaction temperature window for applications where exhaust gas oxygen concentrations are greater than 1 percent. Below the optimum temperature range, the catalyst activity is greatly reduced, significantly eroding the effectiveness of the control technology and potentially allowing large amounts of unreacted NO_x and ammonia to be emitted directly to the atmosphere.

The IDI ore dryer exhaust gas temperature will be around 120EF and based upon discussions with both the process equipment vendor and a control technology vendor, the system does not afford a temperature regime which will allow the successful installation of an SCR system. In addition, for SCR technology to be effective - stable gas flow rates, an optimum temperature window, and consistent pollutant concentrations should be available. A ore dryer environment may not always be capable of sustaining these conditions during the various operational cycles. Despite firing only natural gas fuel, there will be a nominal particulate loading. There are realistic concerns that the SCR catalyst will be susceptible to the presence of particulates which will be in evidence in the inlet stream.

Thus, there are significant reservations about the technical feasibility of the technology for the given application. In conclusion, SCR technology is not considered technically feasible for the ore dryer application and will be precluded from further discussion in this BACT analysis.

(3) **Non-Selective Catalytic Reduction (NSCR)** -- The NSCR system is a post-combustion add-on exhaust gas treatment system. It is often referred to as a "three-way conversion" catalyst since it reduces NO_x, unburned hydrocarbons (UBH), and CO simultaneously. In order to operate properly, the combustion process must be stoichiometric or near-stoichiometric which is not maintained in an ore dryer and can vary under regular operation. Under stoichiometric conditions, in the presence of the catalyst, NO_x is reduced by CO, resulting in nitrogen and carbon dioxide. Currently, NSCR systems are limited to rich-burn IC engines with fuel rich ignition system applications. In view of the above limitations, the NSCR option is considered technically infeasible and will not be considered further in this BACT analysis.

(4) **$SCONO_x$-Catalytic Oxidation/Absorption** -- This is an emerging catalytic oxidation/ absorption technology that has been applied for reductions of NO_x, CO and VOC from an assortment of combustion applications that mostly include – small turbines, boilers and lean-burn engines. The technology which has never been applied to similar ore dryer applications has been described earlier. $SCONO_x$ employs a single catalyst for converting NO_x, CO and VOC. The flue gas temperature should be preferably in the 300-700°F range for optimal performance without deleterious effects on the catalyst assembly.

As discussed earlier, the IDI ore dryer exhaust gas temperature will be around 120EF, and as in the earlier case the system does not afford a temperature regime which will allow the successful installation of a $SCONO_x$ system. In addition, the technology makes similar demands for effective application - stable gas flow rates, an optimum temperature window, and consistent pollutant concentrations should be available. Ore dryer environment may not always be capable of sustaining these conditions during the various operational cycles. Despite firing only natural gas fuel, there will be a nominal particulate loading. There are realistic concerns that the catalyst will be susceptible to particulate fouling which will be in evidence in the inlet stream.

Thus, there are significant reservations about the technical feasibility of the technology for the given application. In conclusion, $SCONO_x$ technology is not considered technically feasible for the ore dryer application and will be precluded from further discussion in this BACT analysis.

(5) **Shell $DeNO_x$ System (modified SCR)** -- The Shell $DeNO_x$ system is a variant of traditional SCR technology which utilizes a high activity dedicated ammonia

oxidation catalyst based on a combination of metal oxides. Due to the intrinsically high activity of the catalyst, the technology is suited for NO_x conversions at lower temperatures with a typical operating range of 250-660EF. From an ore dryer application standpoint, the technology effective temperature range is beyond the exhaust gas temperature of 120EF.

In addition, the technology makes similar demands for effective application - stable gas flow rates, an optimum temperature window, and consistent pollutant concentrations should be available. An ore dryer environment may not always be capable of sustaining these conditions during the various operational cycles. Despite firing only natural gas fuel, there will be a nominal particulate loading. There are realistic concerns that the catalyst will be susceptible to particulate fouling which will be in evidence in the inlet stream.

Thus, there are significant reservations about the technical feasibility of the technology for the given application. In conclusion, Shell $DeNO_x$ technology is not considered technically feasible for the ore dryer application and will be precluded from further discussion in this BACT analysis.

(6) **Selective Non-Catalytic Reduction (SNCR)** --The three commercially available SNCR systems are Exxon's Thermal $DeNO_x$® system, Nalco Fuel Tech's NO_xOUT® system and Low Temperature Oxidation (LTO). These technologies are reviewed below for technical feasibility in controlling ore dryer NO_x emissions.

Exxon's Thermal $DeNO_x$® - Exxon's Thermal $DeNO_x$® system is a non-catalytic process for NO_x reduction. The process involves the injection of gas-phase ammonia (NH_3) into the exhaust gas stream to react with NO_x. The ammonia and NO_x react according to the following competing reactions:

$2NO + 4NH_3 + 2O_2$ 6 $3N_2 + 6H_2O$ . . . . (I)
$4NH_3 + 5O_2$ 6 $4NO + 6H_2O$ . . . . (II)

The temperature of the exhaust gas stream is the primary criterion controlling the above selective reaction. Reaction (I) dominates in the temperature window of 1,600EF - 2,200EF resulting in a reduction of NO_x. However above 2,200EF, reaction (II) begins to dominate, resulting in enhanced NO_x production. Below 1,600EF, neither reaction has sufficient activity to produce or destroy NO_x. Thus, the optimum temperature window for the Thermal $DeNO_x$® process is approximately 1,600EF - 1,900EF. The above reaction temperature window can be shifted down to approximately 1,300EF - 1,500EF with the introduction of readily oxidizable hydrogen gas. In addition, the process also requires a minimum of 1.0 second residence time in the desired temperature window for any significant NO_x reduction.

From an ore dryer application standpoint, the technology effective temperature range is beyond the exhaust gas temperature of 120EF. In addition, the technology makes similar demands for effective application - stable gas flow rates, an optimum temperature window, and consistent pollutant concentrations should be available. An ore dryer environment may not always be capable of sustaining these conditions during the various operational cycles.

Thus, there are significant reservations about the technical feasibility of the technology for the given application. In conclusion, Thermal $DeNO_x$® technology is not considered technically feasible for the ore dryer application and will be precluded from further discussion in this BACT analysis.

Nalco Fuel Tech's NO_xOUT® - The NO_xOUT® process is very similar in principle to the Thermal $DeNO_x$® process, except that it involves the injection of a liquid urea compound (as opposed to NH_3) into the high temperature combustion zone to promote NO_x reduction. The reaction involves the decomposition of urea at temperatures of approximately 1,700EF - 3,000EF. Certain proprietary additive developments have allowed the operational temperature window to shift to approximately 1,400EF - 2,000EF. However, the process still has similar constraints as the Thermal $DeNO_x$® system. The limitations are dictated by the reaction-controlling variables such as stable gas flow rates for a minimum residence time of 1.0 second in the desired temperature window to ensure proper mixing.

From an ore dryer application standpoint, the technology effective temperature range is beyond the exhaust gas temperature of 120EF. In addition, the technology makes similar demands for effective application - stable gas flow rates, an optimum temperature window, and consistent pollutant concentrations should be available. A coal dryer environment may not always be capable of sustaining these conditions during the various operational cycles.

Thus, there are significant reservations about the technical feasibility of the technology for the given application. In conclusion, NO_xOUT® technology is not considered technically feasible for the ore dryer application and will be precluded from further discussion in this BACT analysis.

Low Temperature Oxidation (LTO) -- LTO technology is a relatively new technology and has not been applied for any similar coal dryer application. The vendor has listed applications for mostly industrial boilers and cogeneration gas turbines which have a more favorable energy balance. The technology is a variant of SNCR technology using ozone.

For optimal performance, the technology requires stable gas flows, lack of thermal cycling, invariant pollutant concentrations and residence times on the order of 1-1.5 seconds. In addition, LTO technology requires frequent calibration of analytical instruments which sense the NO_x concentrations for proper adjustment of ozone injection. Since LTO uses ozone injection, it has a potential for ozone slip which can vary between 5-10 ppmv. Also, the technology requires a cooler flue gas of less than 300EF at the point of ozone injection, otherwise the reactive gas is rendered redundant. The technology also suffers from low NO_x conversion rates (40-60%), potential for nitric acid vapor release (in the event of a scrubber malfunction) with subsequent regional haze impacts and the handling, treatment and disposal issues for the spent scrubber effluent.

In conclusion, the technology is still nascent and evolving out of the earlier bench scale solution to effect a reliable SNCR application utilizing reactive gas-phase ozone to control NO_x emissions from combustion applications. The technology is neither applicable nor proven for similar ore dryer applications and attendant limitations render it technically infeasible in its current manifestation.

In view of the above, the LTO control option is considered technically infeasible and will not be considered further in this BACT analysis.

Evaluation of Most Effective NO_x Controls For Ore Dryer

Various control alternatives were reviewed for technical feasibility in controlling NO_x emissions from the modified ore dryer application. With the exception of combustion controls utilizing existing low-emission burner design, the applicability of the remaining control options is questionable and is considered technically infeasible. The primary reservation being that the dryer exhaust gas temperature at 120EF is considered too cool for the effective application of any of the above control options. In addition, there are realistic concerns about the availability of steady-state conditions during all phases of operation, potential for particulate fouling and the fact that none of these control technologies have been successfully applied for NO_x control from a similar application. Since, only a single control option - low-emission burner design compatible for the application was ascertained to be technically feasible, no ranking of control alternatives has been provided.

At this time, the successful application of post-combustion control technologies to control similar ore dryer NO_x emissions are not known. Due to the relatively small amount of NO_x emissions (10.17 tpy) from the present application, the application of add-on controls is considered impractical and will be precluded from further consideration in this BACT analysis.

Proposal for NO_x BACT for Ore Dryer

In conclusion, BACT for controlling NO_x emissions from the ore dryer is the use of natural gas combustion with Low-NO_x burners (LNB) and Exhaust Gas Recirculation (EGR), and good combustion practices per manufacturer's guidance to meet a NO_x emission rate of 50 lbs per million standard cubic feet of natural gas (0.049 lb of NOx per MMBtu of heat input).

(b) Control of Carbon Monoxide (CO) Emissions

The CO emissions from the ore dryer result from combustion of natural gas fuel. CO will be emitted as a byproduct of incomplete or inefficient combustion of natural gas in the ore dryer. Typically, CO emissions from combustion sources depend on the oxidation efficiency of the fuel. By controlling the combustion process carefully, CO emissions can be minimized. Also, smaller combustion units tend to emit more CO than comparable larger units, because smaller units usually have a higher ratio of heat transfer surface area to flame volume than larger combustors. This leads to reduced flame temperature and combustion intensity, and therefore lower combustion efficiency. CO emissions result when there is an insufficient residence time at high temperature to complete the final step in HC oxidation.

The proposed CO emission rate for the ore dryer is 84 lbs CO per MMscf of natural gas (0.0815 lb/MMBtu) referenced in USEPA AP-42 Table 1.4-1 for small boilers. Based on a maximum heat input of 27 MMBtu/hr, the dryer will have an emission rate of 9.65 tpy for natural gas combustion.

As discussed earlier, based on a review of the RBLC database, the majority of dryers listed in the database do not refer to similar industry applications. Most of the listed dryers are applications in other industries such as the chemical industry, pulp and paper industry, printing industry, sewage sludge dryers, and various agricultural product dryers for grain, starch, gluten, germ, fibers etc. These listed dryers are not ore dryers and are therefore, not applicable for direct comparison with the present application.

In the section under coal dryers, multiple comparisons were provided for various industrial dryers - the coal dryers had higher emission limits, the web offset press dryer was not comparable and although the ladle dryer does not compare well with the present IDI application, the CO emission limits are comparable.

In addition, based on consultations with various experts knowledgeable about similar industry operations (process equipment vendors for the respective dryer systems, and proposed control equipment vendors), besides natural gas combustion and good combustion control, other CO control technologies have not been applied to similar ore dryer applications. However, there are potential CO control technologies that are available to abate emissions from combustion sources. These control options will be reviewed for technical feasibility in this BACT analysis.

Potential Ore Dryer CO Control Alternatives

The alternatives available to control CO emissions from the modified ore dryer include the following:

(1) Fuel Spec: Clean-Burn Fuel;
(2) Good Combustion Practice;
(3) Flaring of CO Emissions;
(4) CO Oxidation Catalysts; and
(5) Catalytic Incineration.

Technical Feasibility of CO Control Alternatives

The test for technical feasibility of any control option is whether it is both available and applicable to reducing CO emissions from the ore dryer. The previously listed information resources were consulted to determine the extent of applicability of each identified control alternative.

(1) **Fuel Spec: Clean-Burn Fuel** -- In order to reduce CO emissions from the ore dryer, combustion of a clean burning fuel such as natural gas is almost imperative. Among traditional fuels, natural gas is considered a clean-burn fuel since it has a very low potential for generating CO emissions. The ore dryer will utilize natural gas as the primary fuel. Based on a review of the RBLC database, natural gas is the clean burn fuel of choice for similar dryer applications.

(2) **Good Combustion Practice** -- Based upon a review of the previously listed information resources including the RBLC database, good combustion practice and combustion control has been listed as the means of reducing CO emissions from similar dryer applications. IDI already implements good combustion practices and will maintain the ore dryer in good working order per manufacturer's guidance to minimize CO emissions.

(3) **Flaring of CO Emissions** -- Based upon a review of the previously listed information resources including the RBLC database, there are no known applications of flaring for similar dryer exhaust gases for CO control. Flaring of

emissions for CO destruction would require raising the exhaust gas temperature to 1,300EF at a residence time of 0.5 second. Presently, the exhaust gas stream from the ore dryer is around 35,000 acfm at 120EF. Thus, based on the large gas volumetric flow at a substantial temperature differential, the auxiliary fuel requirements needed to operate the flare would be overwhelmingly large. Additionally, it can be speculated as to whether the flare would actually result in a decrease of CO emissions or increase thereof from supplemental fuel combustion, which would also result in an increase of NO_x emissions. Consequently, this control alternative is not considered technically feasible for ore dryer exhausts and thus, will not be considered further in this BACT analysis.

(4) **CO Oxidation Catalysts** -- Based upon a review of the previously listed information resources including the RBLC database, there are no known applications of CO oxidation catalysts to control CO emissions from similar industry dryer applications.

The optimal working temperature range for CO oxidation catalysts is approximately 850EF - 1,100EF with a minimum exhaust gas stream temperature of 500EF for minimally acceptable CO control. As indicated earlier, exhaust gases from the ore dryer are approximately 120EF which is a lot cooler than the effective temperature range. Thus, the temperature will be below the minimum threshold for effective operation of CO oxidation catalysts. Additionally, the particulate loading in the exhaust gas stream may be a detriment to efficient operation of a CO oxidation catalyst. Masking effects such as plugging and coating of the catalyst surface would almost certainly result in impractical maintenance requirements, and would significantly degrade the performance of the catalyst. Although, a natural gas-fired ore dryer may not emit significant amounts of particulates, nevertheless, the catalyst remains susceptible to particulate fouling. The catalyst integrity may also be affected by the presence of moisture which may be introduced into the system under certain atmospheric conditions during unit shutdowns. Consequently, this control alternative is not considered technically feasible for ore dryer exhausts and thus, will not be considered further in this BACT analysis.

(5) **Catalytic Incineration** -- Based upon a review of the previously listed information resources including the RBLC database, there are no known applications of catalytic incineration to control CO emissions from similar industry operations.

Catalytic incinerators use a bed of catalyst that facilitates the overall combustion of combustible gases. The catalyst increases the reaction rate and allows the conversion of CO to CO_2 at lower temperatures than a thermal incinerator.

The catalyst remains susceptible to particulate interference despite the fact that a natural gas-fired coal dryer does not have appreciable particulate loading. Also, the catalyst integrity may be compromised upon contact with moisture which can condense under certain atmospheric conditions during unit shutdowns. The technology performs best under stable gas flows with nominal perturbations in pollutant concentrations and temperature - conditions which may not be always sustained under all phases of heater operation. Notwithstanding the reservations regarding its effective technical applicability and potential adverse operating issues, an economic feasibility analysis was performed for a fixed-bed catalytic oxidation system to control CO emissions from an ore dryer. In reiteration, it should be noted that there are no known applications of catalytic incineration to control CO emissions from similar ore dryer operations.

Evaluation of Most Effective CO Controls For Ore Dryer

Various control alternatives were reviewed for technical feasibility in controlling CO emissions from the ore dryer. With the exception of catalytic oxidation (albeit with reservations pertaining to effective technical applicability and adverse operational issues), the applicability of the remaining control options are considered technically infeasible and will not be considered any further in this BACT analysis.

Since only a single control option was ascertained to be technically feasible, no ranking of control alternatives has been provided. The catalytic oxidation control alternative is shown below with CO control efficiency based on engineering judgment. It is thought that the following CO control level is representative of the best-case scenario if the technology were applied to ore dryers. However, the reservations about effective technical applicability and potential adverse operational issues are still relevant.

CO CONTROL OPTION	EFFICIENCY (%)
Fixed-Bed Catalytic Oxidation	95

The above control alternative was assessed further for economic feasibility in the following section.

Economic Feasibility of CO Control Alternatives for Ore Dryer

In determining the economic feasibility of the single CO control option, guidance provided by the US EPA described earlier was utilized. The economic feasibility of a specific control alternative is generally expressed in terms of annualized dollars per ton of CO removed. By definition, cost effectiveness is the ratio of the total annualized cost of any control alternative to the annual quantity of pollutant the alternative removes from the process.

For a fixed-bed catalytic oxidation system with an estimated CO control efficiency of 95% the total annualized capital costs and O&M costs for the control alternative are $401,000 with a cost effectiveness of $43,800 per ton of CO removed.

The use of catalytic oxidation technology is economically prohibitive even with very optimistic CO control removal efficiencies. Given the effective technical applicability reservations regarding the technology discussed above, it is very probable that lower CO control efficiencies would be realized in practice. Thus, with additional costs for particulate abatement and lower control efficiencies, the cost effectiveness of the control technology option addressed above should therefore be considered a minimum. Based on excessive cost effectiveness and associated energy impact the catalytic oxidation control option is considered infeasible and will not be considered further in this BACT analysis.

<u>Proposal for CO BACT for Ore Dryer</u>

In conclusion, BACT for controlling CO emissions from the ore dryer is the use of natural gas combustion with good combustion practices per manufacturer's guidance to meet a CO emission rate of 84 lbs per million standard cubic feet of natural gas (0.082 lb of CO per MMBtu of heat input).

(c) Control of Volatile Organic Compound (VOC) Emissions

The VOCs will be emitted as a by-product of incomplete or inefficient combustion of natural gas in the ore dryer. The VOCs may be constituted by a wide spectrum of volatile and semi-volatile organic compounds. They are emitted to the atmosphere when some of the fuel natural gas remains unburned or partially burned during combustion. In the case of natural gas fuel, some of the organics are carryover, unreacted, trace constituents of the gas while others may be pyrolysis products of the heavier hydrocarbon constituents.

VOC emissions are typically manifest as a function of incomplete combustion resulting in emission of varying molecular weight hydrocarbons. The IDI project has sought to fire only natural gas which combusts cleanly thereby minimizing VOC emissions from the ore dryer. The proposed annual VOC emissions from the ore dryer due to natural gas combustion is very nominal at 0.63 tpy (5.5 lbs per million standard cubic feet; refer USEPA AP-42 Table 1.4-2).

As discussed earlier, based on a review of the RBLC database, the majority of dryers listed in the database do not refer to similar industry applications. Most of the listed dryers are applications in other industries such as the chemical industry, pulp and paper industry, printing industry, sewage sludge dryers, and various agricultural product dryers for grain, starch, gluten, germ, fibers etc. The only dryer that can be possibly construed to be a mineral ore dryer is for a trona (hydrated sodium bicarbonate carbonate which is the type mineral for several sodium carbonates that form in non-marine evaporite deposits)/ soda ash dryer. BACT for the dryer was listed without a VOC emission limit or controls. The remaining listed dryers are not ore dryers and are therefore, not applicable for direct comparison with the present application.

In the section under coal dryers, multiple comparisons were provided for various industrial dryers - the coal dryers had higher emission limits, and the other assorted dryers are precluded from further discussion in this BACT analysis for reasons stated earlier.

In addition, based on consultations with various experts knowledgeable about similar industry operations (process equipment vendors for the respective dryer systems, and proposed control equipment vendors), it appears that besides natural gas combustion and good combustion control, some other VOC control technologies have been applied in some cases to industrial dryer applications. There are potential VOC control technologies that are available to abate emissions from combustion sources. These control options will be reviewed for technical feasibility in this BACT analysis.

Potential Ore Dryer VOC Control Alternatives

Traditional VOC controls such as thermal and/or catalytic oxidation are not considered feasible for the present application, since the exhaust gas stream calorific value would be very low owing to the small amount of VOC emissions due to natural gas combustion from the nominal emission source. The attendant auxiliary fuel requirements would serve to enhance the emission levels of criteria pollutant emissions resulting in a larger natural gas emission source than the present application. The alternatives available to control VOC emissions from the modified ore dryer include the following:

(1) Fuel Spec: Clean-Burn Fuel;
(2) Good Combustion Practice;
(3) VOC Oxidation Catalyst; and
(4) Activated Carbon Adsorption

Technical Feasibility of VOC Control Alternatives

The test for technical feasibility of any control option is whether it is both available and applicable to reducing VOC emissions from the ore dryer. The previously listed information resources were consulted to determine the extent of applicability of each identified control alternative.

(1) **Fuel Spec: Clean-Burn Fuel** -- In order to reduce VOC emissions from the ore dryer, combustion of a clean burning fuel such as natural gas is almost imperative. Among traditional fuels, natural gas is considered a clean-burn fuel since it has a very low potential for generating VOC emissions. The modified ore dryer will utilize only natural gas as the primary fuel. Based on a review of the RBLC database, natural gas is the clean burn fuel of choice for similar applications.

(2) **Good Combustion Practice** -- Based upon a review of the previously listed information resources including the RBLC database, good combustion practice and combustion control has been listed as the means of reducing VOC emissions from similar dryer applications. The implications of this control alternative are that IDI operators will maintain the ore dryer in good working order per manufacturer's guidance and implement good combustion practice to minimize VOC emissions.

(3) **VOC Oxidation Catalysts** -- Based upon a review of the previously listed information resources including the RBLC database, there are no known applications of VOC oxidation catalysts to control VOC emissions from a similar dryer operation.

The optimal working temperature range for VOC oxidation catalysts is approximately 650EF - 900EF for effective VOC control. Thus, the temperature of the ore dryer exhaust (at 120EF) will be below the lower end of the optimum temperature window for VOC oxidation catalysts. Additionally, the catalyst will be susceptible to particulate and moisture interference which may affect either the performance or the integrity of the catalyst. Although the natural gas-fired ore dryer will only have a nominal particulate loading, nevertheless the catalyst performance may be affected by masking effects such as plugging and coating of the catalyst surface resulting in impractical maintenance and cleaning requirements. Thus, there are significant reservations about the technical feasibility of the technology for the given application, In conclusion VOC oxidation catalyst technology is not considered technically feasible for the ore dryer application and will be precluded from the further discussion in this BACT analysis.

(4) **Activated Carbon Adsorption** -- Activated carbon beds have a track record of successful application for adsorbing specific VOC compounds. However, the application of the technology is fraught with certain limitations which can become overriding factors in negating its effective applicability for specific organic streams. Whenever an effluent stream contains contaminants, particularly particulates and moisture, the technology loses its efficiency. The presence of moisture and particulates in the stream will require significant gas pre-conditioning since these interferents are deleterious to the efficiency of the carbon bed. In effect, they induce a masking phenomenon thereby reducing the available effective surface area. Although the natural gas-fired ore dryer will only have a nominal particulate loading, nevertheless the bed performance may be affected by aforesaid masking effects such as plugging and coating of the activated carbon surface resulting in impractical maintenance and cleaning requirements. In addition, the exhaust gas VOC concentration from natural gas combustion is expected to be fairly low on the order of a few ppm which will be on the order of the outlet concentration from the technology - without any real benefits from the use of the technology. Thus, there are significant reservations about the technical feasibility of the technology for the given application, In conclusion carbon adsorption technology is not considered technically feasible for the ore dryer application and will be precluded from the further discussion in this BACT analysis.

Evaluation of Most Effective VOC Controls For Ore Dryer

Various control alternatives were reviewed for technical feasibility in controlling VOC emissions from the ore dryer application. With the exception of natural gas combustion with good combustion practice the remaining technologies - VOC oxidation catalyst and activated carbon adsorption are considered technically infeasible with reservations pertaining to effective technical applicability and adverse operational issues.

As indicated earlier, control technologies for VOC abatement have not been widely applied to similar ore dryer applications. At this time, the successful application of post-combustion control technologies to control similar ore dryer VOC emissions are not known. Due to the nominal amount of VOC emissions from the present application, the application of add-on controls is considered impractical and will be precluded from further consideration in this BACT analysis.

Proposal for VOC BACT for Ore Dryer

In conclusion, BACT for controlling VOC emissions from the ore dryer is the use of natural gas combustion with good combustion practices per manufacturer's guidance to meet a VOC emission rate of 5.5 lbs per million cubic feet of natural gas (0.0053 lb of VOC per MMBtu of heat input).

(d) Control of Particulate Matter (PM/PM_{10}) Emissions

Particulate matter emissions from the ore dryer primarily result from the ore handling and carryover of non-combustible trace constituents in the fuel. Typically, particulates are hard to detect with natural gas firing due to the low ash content. The USEPA reference AP-42 recommends that all particulate emissions from natural gas combustion are less than 1 micron in aerodynamic diameter, therefore, they are classified as PM_{10}. Particulate emissions from the ore dryer will be exhausted via its own exhaust stack.

As discussed earlier, based on a review of the RBLC database, the majority of dryers listed in the database do not refer to similar industry applications. Most of the listed dryers are applications in other industries such as the chemical industry, pulp and paper industry, printing industry, sewage sludge dryers, and various agricultural product dryers for grain, starch, gluten, germ, fibers etc. The only dryers that can be possibly construed to be a mineral ore dryer is for a trona (hydrated sodium bicarbonate carbonate which is the type mineral for several sodium carbonates that form in non-marine evaporite deposits)/ soda ash dryers. BACT for these dryers was listed with an emission limitation of 0.01 - 0.017 gr/dscf with a mixture of either baghouse or ESP controls. The remaining listed dryers are not ore dryers and are therefore, not applicable for direct comparison with the present application.

Potential PM/PM_{10} Control Alternatives

The alternatives available to control PM_{10} emissions from the ore dryer include the following:

1. Electrostatic Precipitators (ESPs);
2. Fabric Filters;
3. High-Energy Venturi Scrubbers; and
4. High-Efficiency Cyclones.

Technical Feasibility of PM/PM_{10} Control Alternatives

The test for technical feasibility of any control option is whether it is both available and applicable to reducing PM/PM_{10} emissions. The previously listed information resources were consulted to determine the extent of applicability of each identified control alternative.

1. **Electrostatic Precipitators (ESPs)** -- While ESPs have a very high removal efficiency (99+%) for many sources of particulate matter, the RBLC database does not indicate any application for similar ore dryer applications. Most of the ESP applications have been listed for much larger volumetric installations for trona (hydrated sodium bicarbonate carbonate)/soda ash dryers. The control effectiveness of an ESP is strongly dependent among other parameters on the resistivity of the inlet gas stream. The resistivity of the ore dryer exhaust stream does not readily lend itself to an ESP application without additional gas conditioning.

   Moreover, the ore dryer exhaust stream contains a high concentration of ferric (iron) compounds which are particularly deleterious for effective ESP operation. The ferric compounds adhere too strongly to the charged ESP collection plates and cannot be readily dislodged during the clean cycle thereby, adversely affecting the particulate control efficiency.

Also, based on a review of information resources referenced earlier, it is revealed that ESPs have never been successfully implemented to reduce PM/PM_{10} emissions from similar ore dryers. Consequently, this control alternative is not considered technically feasible and precluded from further consideration in this BACT analysis.

2. **Fabric Filters** -- Fabric filters or baghouses are regarded as one of the most efficient and versatile control devices for removal of PM/PM_{10} emissions from most industrial applications including natural gas-fired sources such as similar ore dryers. Fabric filter installations represent some of the lowest particulate emission limitations for industrial dryers in the RBLC database.

   IDI proposes to install a separate pulse-jet fabric filter system for the ore dryer with an exhaust of 35,000 acfm (or 31,857 dscfm). The proposed PM collection efficiency is 99.85% with an outlet grain loading of 0.0052 gr/dscf resulting in particulate emissions of 6.22 tpy.

3. **High Energy Venturi Scrubbers** -- High-energy venturi scrubbers can achieve a high collection efficiency (90+%), but they have the potential for generating large quantities of sludge along with associated problems of sludge handling, dewatering and disposal. The operation of the scrubber and resulting sludge handling also requires a substantial energy input with the largest pressure drop penalty among all the particulate control options.

   Although based on a review of the information resources referenced earlier, it is revealed that venturi scrubbers have been utilized for certain dryer applications. However, since IDI is proposing to install a more efficient fabric filter system, venturi scrubbers are not considered viable and precluded from further consideration in this BACT analysis.

4. **High Efficiency Cyclones** -- Standard cyclones are efficient (30-80%) for large dust particles, but even high-efficiency cyclones do not provide the necessary collection and removal efficiency for smaller PM_{10} particles. Also, based on a review of the information resources referenced earlier, it is revealed that cyclones alone have never been successfully implemented to reduce PM/PM_{10} emissions from ore dryers. They have been used in tandem with other control options to serve as precollectors. However, since IDI is proposing to install a more efficient fabric filter system, cyclones are not considered viable and precluded from further consideration in this BACT analysis.

Proposal for PM/PM_{10} BACT for Ore Dryer

In conclusion, BACT for controlling PM/PM_{10} emissions from the ore dryer is the use of fabric filtration to meet a PM/PM_{10} (where PM_{10} includes Filterable and Condensible components) emission rate of 0.0052 grain/dscf and 6.22 tons per year. The visible emissions discharged into the atmosphere from the Ore Dryer stack 76 shall not exceed three percent (3%) opacity determined by a six (6) minute average (24 reading taken in accordance with EPA Method 9, Appendix A).

(e) Control of Sulfur Dioxide (SO_2) Emissions

The source of SO_2 emissions from the ore dryer is the small quantity of sulfur in the natural gas fuel. The annual SO_2 emission rate for the ore dryer is 0.069 tons per year due to natural gas combustion (0.6 lb per million cubic feet; refer USEPA AP-42 Table 1.4-2). Due to the very small amount of emissions, the application of add-on controls is considered impractical and will be precluded from further consideration in this BACT analysis.

Proposal for SO_2 BACT for Ore Dryer

In conclusion, BACT for controlling SO_2 emissions from the ore dryer is the use of natural gas combustion practices per manufacturer's guidance to meet an SO_2 emission rate of 0.6 lb per million cubic feet of natural gas (0.00059 lb of SO_2 per MMBtu of heat input).