

**CONSTRUCTION PERMIT
OFFICE OF AIR MANAGEMENT**

**Praxair, Inc.
Foot of Standard Avenue
Whiting, Indiana 46394**

is hereby authorized to construct

a modification to the industrial gas manufacturing plant, consisting of the following equipment:

- (a) one (1) natural gas fired boiler, identified as Boiler No. 3, rated at 38.8 million British thermal units (MMBtu) per hour, exhausting at one (1) stack, identified as S/V 007;
- (b) one (1) steam methane reformer, identified as Reformer No. 2, equipped with low NOx burners, using a mixture of process tail gas and natural gas as fuel, rated at 37.1 million British thermal units per hour, and exhausting at one (1) stack, identified as S/V 008. During Reformer No. 2 startup, carbon monoxide (CO) containing process gas will exhaust through one (1) process vent stack, identified as S/V 010; and
- (c) one (1) carbon dioxide (CO₂) purification system for recovering and purifying CO₂ generated by the two (2) reformers at the source, capable of processing 112,700 cubic feet per hour (SCFH) of feed gas. The by-product stream from the system is used as part of the gas feed for the existing Reformer No. 1, which exhausts through one (1) stack, identified as S/V 003. When Reformer No. 1 is not operating, the by-product stream will exhaust through one (1) process vent stack, identified as S/V 006, with a maximum design flow rate of 60,000 standard cubic feet per hour (SCFH) and containing no more than 0.05% by volume of carbon monoxide (CO).

This permit is issued to the above mentioned company (herein known as the Permittee) under the provisions of 326 IAC 2-1 and 40 CFR 52.780, with conditions listed on the attached pages.

Construction Permit No.: CP-089-8510-00435	
Issued by: Paul Dubenetzky, Branch Chief Office of Air Management	Issuance Date:

Construction Conditions

General Construction Conditions

1. That the data and information supplied with the application shall be considered part of this permit. Prior to any proposed change in construction which may affect allowable emissions, the change must be approved by the Office of Air Management (OAM).
2. That this permit to construct does not relieve the permittee of the responsibility to comply with the provisions of the Indiana Environmental Management Law (IC 13-11 through 13-20; 13-22 through 13-25; and 13-30), the Air Pollution Control Law (IC 13-17) and the rules promulgated thereunder, as well as other applicable local, state, and federal requirements.

Effective Date of the Permit

3. That pursuant to IC 13-15-5-3, this permit becomes effective upon its issuance.
4. That pursuant to 326 IAC 2-1-9(b)(Revocation of Permits), the Commissioner may revoke this permit if construction is not commenced within eighteen (18) months after receipt of this approval or if construction is suspended for a continuous period of one (1) year or more.
5. That notwithstanding Construction Condition No. 6, all requirements and conditions of this construction permit shall remain in effect unless modified in a manner consistent with procedures established for modifications of construction permits pursuant to 326 IAC 2 (Permit Review Rules).

First Time Operation Permit

6. That this document shall also become a first-time operation permit pursuant to 326 IAC 2-1-4 (Operating Permits) 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 Management (OAM), Permit Administration & Development Section, verifying that the facilities were constructed as proposed in the application. The facilities covered in the Construction Permit may begin operating on the date the Affidavit of Construction is postmarked or hand delivered to IDEM.
 - (b) If construction is completed in phases; i.e., the entire construction is not done continuously, a separate affidavit must be submitted for each phase of construction. Any permit conditions associated with operation start up dates such as stack testing for New Source Performance Standards (NSPS) shall be applicable to each individual phase.
 - (c) 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 operation permit will be subject to annual operating permit fees pursuant to 326 IAC 2-1-7-19 (Fees).
 - (e) Pursuant to 326 IAC 2-7-4, the Permittee shall apply for a modification to FESOP or a Title V operating permit within twelve (12) months of the postmarked submission date of the Affidavit of Construction. If the construction is completed in phases, the 12-month period starts at the postmarked submission date of the Affidavit of Construction that triggers the Title V applicability. The operation permit issued shall contain as a minimum the conditions in the Operation Conditions section of this permit.

NSPS Reporting Requirement

7. That pursuant to the New Source Performance Standards (NSPS), 40 CFR Part 60.40c through 60.48c, Subpart Dc, 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);
and
 - (c) Actual start-up date (within 15 days after such date).

Reports are to be sent to:

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

and

IDEM Northwest Indiana Office
Gainer Bank Building
Suite 418
504 North Broadway
Gary, Indiana 46402

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

8. That when the facility is constructed and placed into operation the following operation conditions shall be met:

Operation Conditions

General Operation Conditions

1. That the data and information supplied in the application shall be considered part of this permit. Prior to any change in the operation which may result in an increase in allowable emissions exceeding those specified in 326 IAC 2-1-1 (Construction and Operating Permit Requirements), the change must be approved by the Office of Air Management (OAM).
2. That the permittee shall comply with the provisions of the Indiana Environmental Management Law (IC 13-11 through 13-20; 13-22 through 13-25; and 13-30), the Air Pollution Control Law (IC 13-17) and the rules promulgated thereunder.

Preventive Maintenance Plan

3. That pursuant to 326 IAC 1-6-3 (Preventive Maintenance Plans), the Permittee shall prepare and maintain a preventive maintenance plan, including the following information:
 - (a) Identification of the individual(s) responsible for inspecting, maintaining, and repairing emission control devices.
 - (b) A description of the items or conditions that will be inspected and the inspection schedule for said items or conditions.
 - (c) Identification of the replacement parts which will be maintained in inventory for quick replacement.

The preventive maintenance plan shall be submitted to IDEM, OAM upon request and shall be subject to review and approval.

Transfer of Permit

4. That pursuant to 326 IAC 2-1-6 (Transfer of Permits):
 - (a) In the event that ownership of this industrial gas manufacturing plant is changed, the Permittee shall notify OAM, Permit Branch, within thirty (30) days of the change. Notification shall include the date or proposed date of said change.
 - (b) The written notification shall be sufficient to transfer the permit from the current owner to the new owner.
 - (c) The OAM shall reserve the right to issue a new permit.

Permit Revocation

5. That pursuant to 326 IAC 2-1-9(a)(Revocation of Permits), this permit to construct and operate may be revoked for any of the following causes:
 - (a) Violation of any conditions of this permit.
 - (b) Failure to disclose all the relevant facts, or misrepresentation in obtaining this permit.
 - (c) Changes in regulatory requirements that mandate either a temporary or permanent

reduction of discharge of contaminants. However, the amendment of appropriate sections of this permit shall not require revocation of this permit.

- (d) Noncompliance with orders issued pursuant to 326 IAC 1-5 (Episode Alert Levels) to reduce emissions during an air pollution episode.
- (e) For any cause which establishes in the judgment of IDEM, the fact that continuance of this permit is not consistent with purposes of 326 IAC 2-1 (Permit Review Rules).

Availability of Permit

- 6. That pursuant to 326 IAC 2-1-3(l), the Permittee shall maintain the applicable permit on the premises of this source and shall make this permit available for inspection by the IDEM, IDEM Northwest Indiana Office or other public official having jurisdiction.

Performance Testing

- 7. That pursuant to 326 IAC 2-1-3 (Construction and Operating Permit Requirements) compliance stack tests shall be performed for: (i) both CO and NO_x for (a) Boiler No. 3, (b) Reformer No. 1 and (c) Reformer No. 2, and (ii) CO for process vents in Plant No.1 and Plant No. 2, within 60 days after achieving maximum production rate, but no later than 180 days after initial start-up. These tests shall be performed according to 326 IAC 3-2.1 (Source Sampling Procedures) using the methods specified in the rule or as approved by the Commissioner.
 - (a) A test protocol shall be submitted to the OAM, Compliance Data Section, 35 days in advance of the test.
 - (b) The Compliance Data Section shall be notified of the actual test date at least two (2) weeks prior to the date.
 - (c) All test reports must be received by the Compliance Data Section within 45 days of completion of the testing.
 - (d) Whenever the results of the stack test performed exceed the level specified in this permit, appropriate corrective actions shall be implemented within thirty (30) days of receipt of the test results. These actions shall be implemented immediately unless notified by OAM that they are acceptable. The Permittee shall minimize emissions while the corrective actions are being implemented.
 - (e) Whenever the results of the stack test performed exceed the level specified in this permit, a second test to demonstrate compliance shall be performed within 120 days. Failure of the second test to demonstrate compliance may be grounds for immediate revocation of this permit to operate the affected facility.

PSD Minor Source Limit

- 8. That carbon monoxide (CO) emissions from the Plant No. 2 process vent stack shall be limited to 40.4 hours per month based a maximum hourly CO emission rate of 951 pounds per hour. A cumulative operating time meter, equipped with a continuous recorder for documenting the time of No. 2 process vent stack usages, shall be permanently installed. This operation limitation is also equivalent to limiting CO emissions from equipment covered in this permit to 249 tons per year. Therefore, the Prevention of Significant Deterioration (PSD) rules, 326 IAC 2-2 and 40 CFR 52.21, will not apply.

Emission Offset Minor Source Limit

9. That the monthly fuel (natural gas) usage for Boiler No. 3 shall be limited as follows:

$$Um = 17.7 + (56.6 - M) * 2.31$$

where: Um is the natural gas usage limit in million cubic feet per month (MMCF/mon) for Boiler No. 3;
M is the combined MMCF/mon fuel (process tail gas and natural gas) usage for Reformers #1 and #2.

This fuel usage limitation is equivalent to a NO_x emissions increase of 24 tons per year due to this modification. Therefore, the Emission Offset rules, 326 IAC 2-3, will not apply.

Annual Emission Reporting

10. That pursuant to 326 IAC 2-6 (Emission Reporting), the Permittee must annually submit an emission statement for the source. This statement must be received by April 15 of each year and must comply with the minimum requirements specified in 326 IAC 2-6-4. The annual statement must be submitted to:

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

and

IDEM Northwest Indiana Office
Gainer Bank Building
Suite 418
504 North Broadway
Gary, Indiana 46402

The annual emission statement covers the twelve (12) consecutive month time period starting December 1 and ending November 30.

Opacity Limitations

11. That pursuant to 326 IAC 5-1-2 (Visible Emission Limitations) except as provided in 326 IAC 5-1-3 (Temporary Exemptions), the visible emissions shall meet the following:
- (a) Visible emissions shall not exceed an average of 20% opacity in 24 consecutive readings.
 - (b) Visible emissions shall not exceed 60% opacity for more than a cumulative total of 15 minutes (60 readings) in a 6-hour period.

Particulate Matter Limitation

12. That pursuant to 326 IAC 6-2-4(a) (Particulate Emission Limitations for Sources of Indirect Heating), particulate matter (PM) emissions from the 38.8 million British thermal units per hour boiler shall be limited to 0.395 pound per million British thermal units heat input.

Reporting Requirements

13. That a log of information necessary to document compliance with operation permit condition nos. 8 and 9 shall be maintained. These records shall be kept for at least the past 36 month period and made available upon request to the Office of Air Management (OAM).

- (a) A quarterly summary shall be submitted to:

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

and

IDEM Northwest Indiana Office
Gainer Bank Building
Suite 418
504 North Broadway
Gary, Indiana 46402

within thirty (30) calendar days after the end of the quarter being reported in the format attached. These reports shall include monthly fuel usage for Boiler No. 3, Reformer No.1 and Reformer No. 2, as well as operating hours and CO emissions for the Plant No.2 vent stack.

- (b) Unless otherwise specified in this permit, any notice, report, or other submissions required by this permit shall be timely if:
- (i) Postmarked on or before the date it is due; or
 - (ii) Delivered by any other method if it is received and stamped by IDEM, OAM and IDEM Northwest Indiana Office, on or before the date it is due.
- (c) All instances of deviations from any requirements of this permit must be clearly identified in such reports.
- (d) Any corrective actions taken as a result of an exceedance of a limit, an excursion from the parametric values, or a malfunction that may have caused excess emissions must be clearly identified in such reports.
- (e) The first report shall cover the period commencing the postmarked submission date of the Affidavit of Construction.

Record Keeping Requirements

14. That pursuant to 40 CFR Part 60.48c, records of fuel combusted for the 38.8 million British thermal units per hour natural gas fired boiler shall be maintained. These records shall be kept for at least the past 24 month period and made available upon request to the Office of Air Management (OAM).

Open Burning

15. That the permittee shall not open burn any material except as provided in 326 IAC 4-1-3, 326 IAC 4-1-4 or 326 IAC 4-1-6.

Emergency Reduction Plans

16. Pursuant to 326 IAC 1-5-2 (Emergency Reduction Plans; Submission):

(a) The Permittee shall prepare written emergency reduction plans (ERPs) consistent with safe operating procedures.

(b) These ERPs shall be submitted for approval to:

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

within 180 calendar days from the date on which the equipment covered in this permit commences operation.

(c) If the ERP is disapproved by IDEM, OAM and IDEM Northwest Indiana Office, the Permittee shall have an additional thirty (30) days to resolve the differences and submit an approvable ERP. If after this time, the Permittee does not submit an approvable ERP, IDEM, OAM and IDEM Northwest Indiana Office, shall supply such a plan.

(d) These ERPs shall state those actions that will be taken, when each episode level is declared, to reduce or eliminate emissions of the appropriate air pollutants.

(e) Said ERPs shall also identify the sources of air pollutants, the approximate amount of reduction of the pollutants, and a brief description of the manner in which the reduction will be achieved.

(g) Upon direct notification by IDEM, OAM and IDEM Northwest Indiana Office, that a specific air pollution episode level is in effect, the Permittee shall immediately put into effect the actions stipulated in the approved ERP for the appropriate level. [326 IAC 1-5-3]

**INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
 OFFICE OF AIR MANAGEMENT
 COMPLIANCE DATA SECTION
 and
 IDEM NORTHWEST INDIANA OFFICE**

Quarterly Report

Source Name: Praxair, Inc.
 Source Address: Foot of Standard Avenue, Whiting, Indiana 46394
 FESOP No.: F089-8510-00435
 Facility: Boiler #3, Reformer #1 and Reformer #2
 Parameter: Nitrogen Oxides (NOx)
 Limit: Boiler #3 Fuel (Natural Gas) usage based on the following formula:

$$Um = 17.7 + (56.6 - M) * 2.31$$

where: Um is the natural gas usage limit in MMCF/mon for Boiler No. 3;
 M is the combined MMCF/mon fuel (process tail gas and natural gas) usage in Reformers #1 and #2.

Month: _____ Year: _____

Month	Fuel Usage in Reformers, M (MMCF/mon)	Calculated Boiler #3 Natural Gas Usage Limit, Um (MMCF/mon)	Actual Boiler #3 Natural Gas Usage (MMCF/mon)

9 No deviation occurred in this month.

9 Deviation(s) occurred in this month.
 Deviation has been reported on: _____

Submitted by: _____
 Title/Position: _____
 Signature: _____
 Date: _____

**INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR MANAGEMENT
COMPLIANCE DATA SECTION
and
IDEM NORTHWEST INDIANA OFFICE**

Quarterly Report

Source Name: Praxair, Inc.
Source Address: Foot of Standard Avenue, Whiting, Indiana 46394
FESOP No.: F089-8510-00435
Facility: Plant # 2 process vent stack
Parameter: No. of hours carbon monoxide (CO) vented through the stack
Limit: 40.4 hours per month

Month: _____ Year: _____

Month	No. of Hours This Month (Hours)

- 9 No deviation occurred in this month.
- 9 Deviation(s) occurred in this month.
Deviation has been reported on: _____

Submitted by: _____
Title/Position: _____
Signature: _____
Date: _____

Indiana Department of Environmental Management
Office of Air Management
and
IDEM Northwest Indiana Office

Technical Support Document (TSD) for New Construction and Operation

Source Background and Description

Source Name:	Praxair, Inc.
Source Location:	Foot of Standard Avenue, Whiting, IN 46394
County:	Lake
Construction Permit No.:	CP-089-8510-0435
SIC Code:	2813
Permit Reviewer:	Scott Pan/Enviroplan Consulting

The Office of Air Management (OAM) has reviewed an application from Praxair, Inc. relating to the construction and operation of a modification to the industrial gas manufacturing plant, consisting of the following equipment:

- (a) one (1) natural gas fired boiler, identified as Boiler No. 3, rated at 38.8 million British thermal units (MMBtu) per hour, exhausting at one (1) stack, identified as S/V 007;
- (b) one (1) steam methane reformer, identified as Reformer No. 2, equipped with low NO_x burners, using a mixture of process tail gas and natural gas as fuel, rated at 37.1 million British thermal units per hour, and exhausting at one (1) stack, identified as S/V 008. During Reformer No. 2 startup, carbon monoxide (CO) containing process gas will exhaust through one (1) process vent stack, identified as S/V 010; and
- (c) one (1) carbon dioxide (CO₂) purification system for recovering and purifying CO₂ generated by the two (2) reformers at the source, capable of processing 112,700 cubic feet per hour (SCFH) of feed gas. The by-product stream from the system is used as part of the gas feed for the existing Reformer No. 1, which exhausts through one (1) stack, identified as S/V 003. When Reformer No. 1 is not operating, the by-product stream will exhaust through one (1) process vent stack, identified as S/V 006, with a maximum design flow rate of 60,000 standard cubic feet per hour (SCFH) and containing no more than 0.05% by volume of carbon monoxide (CO).

Stack Summary

Stack ID	Operation	Height (feet)	Diameter (feet)	Flow Rate (acfm)	Temperature (°F)
003	Reformer No. 1	50	3.0	17,000	390
006	By-product Vent	101	0.33	54	100
007	Boiler No.3	30	2.0	10,353	381
008	Reformer No. 2	50	2.44	9,966	307
010	Process Vent	101	0.33	18,000	700

Recommendation

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

Information, unless otherwise stated, 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 April 23, 1997, with additional information received on June 2, 1997.

Emissions Calculations

See Appendix A (Emissions Calculation Spreadsheets) for detailed calculations (6 pages).

Total Potential and Allowable Emissions

Indiana Permit Allowable Emissions Definition (after compliance with applicable rules, based on 8,760 hours of operation per year at rated capacity):

Pollutant	Allowable Emissions (tons/year)	Potential Emissions (tons/year)
Particulate Matter (PM)	20.1	7.1
Particulate Matter (PM10)	20.1	7.1
Sulfur Dioxide (SO ₂)	---	0.3
Volatile Organic Compounds (VOC)	---	5.3
Carbon Monoxide (CO)	249	4,183.8
Nitrogen Oxides (NO _x)	24	34.3
Single Hazardous Air Pollutant (HAP)	---	Negligible
Combination of HAPs	---	Negligible

- (a) Allowable emissions are determined from the applicability of rule 326 IAC 2-2 (PSD) and 326 IAC 2-3 (Emission Offset). See attached spreadsheets for detailed calculations.
- (b) The allowable emissions based on the rules cited are less than the potential emissions, therefore, the allowable emissions are used for the permitting determination.
- (c) Allowable emissions (as defined in the Indiana Rule) of CO are greater than 25 tons per year. Therefore, pursuant to 326 IAC 2-1, Sections 1 and 3, a construction permit is required.

County Attainment Status

- (a) Volatile organic compounds (VOC) and oxides of nitrogen (NO_x) are precursors for the formation of ozone. Therefore, VOC and NO_x emissions are considered when evaluating the rule applicability relating to the ozone standards. Lake County has been designated as severe nonattainment for ozone. Therefore, VOC and NO_x emissions were reviewed pursuant to the requirements for Emission Offset, 326 IAC 2-3.

- (b) Lake County has been classified as nonattainment for PM, PM-10 and SO₂. Therefore, these emissions were reviewed pursuant to the requirements for Emission Offset, 326 IAC 2-3.
- (c) Lake County has been classified as attainment for CO. Therefore, CO 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 (the total limited emissions of the FESOP the source had applied for which will soon be issued)

Pollutant	Emissions (ton/yr)
PM	3.4
PM10	3.4
SO ₂	0.3
VOC	1.0
CO	99.0
NO _x	18.3

- (a) This existing source is **not** a major stationary source because no attainment regulated pollutant is emitted at a rate of 250 tons per year or more, no nonattainment regulated pollutant is emitted at a rate of 100 tons per year, VOC and NO_x are emitted at a rate of less than 25 tons per year, and it is not in one of the 28 listed source categories.
- (b) These emissions were based on the FESOP (F089-5553-00435) issued on June 13, 1997.

Proposed Modification

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

Pollutant	PM (ton/yr)	PM10 (ton/yr)	SO ₂ (ton/yr)	VOC (ton/yr)	CO (ton/yr)	NO _x (ton/yr)
Proposed Modification	6.2 *	6.2 *	0.3	4.2	249.0	24.0**
PSD or Offset Threshold Level	100	100	100	25	250	25

* Limited PM emissions are less than the potential PM emissions due to the fuel usage limitation.

** Total NO_x emissions from Boiler No. 3, Reformer No. 2 and Reformer No. 1 after modification are limited at 32.0 tons per year. Based on the information provided by the applicant, no NO_x generating facility was added to the source in the past five (5) years and average NO_x emissions for the two (2) most recent representative years (1994 and 1996) are 8.0 tons per year. During 1995, the source experienced excessive downtime and production problems and the emissions of the year are excluded from being considered as representative of typical facility operations. Therefore, the NO_x emission increase due to the modification = 32.0 ton/yr - 8.0 ton/yr = 24.0 ton/yr. This modification to an existing minor stationary source is not major because the emission increase is less than the PSD and the Emission Offset significant levels. Therefore, pursuant to 326 IAC

2-2, 40 CFR 52.21 and 326 IAC 2-3, the PSD requirements and the Emission Offset requirements do not apply.

Part 70 Permit Determination

326 IAC 2-8 (FESOP) and 326 IAC 2-7 (Part 70 Permit Program)

This existing source has been issued a FESOP (F-089-5553-00435) on June 13, 1997. The applicant has indicated that this source will apply for a Title V operating permit, within twelve (12) months after the operation of equipment covered under this proposed modification.

Federal Rule Applicability

There are no NESHAP (40 CFR Part 63) applicable to this facility.

326 IAC 12, 40 CFR Part 60.40c through 60.48c, Subpart Dc (Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units)

The 38.8 MMBtu/hr natural gas fired Boiler No. 3 is subject to the requirements of 40 CFR Part 60.40c, Subpart Dc. This rule applies to steam generating units constructed after June 9, 1989, which have a maximum design heat input capacity between 10 and 100 MMBtu/hr. Pursuant to this rule, the owner or operator shall submit notification of the date of construction, anticipated startup and actual startup, as well as maintain records of the natural gas combusted during each day.

State Rule Applicability

326 IAC 2-2 (Prevention of Significant Deterioration)

This proposed modification is not subject to the requirements of 326 IAC 2-2 (Prevention of Significant Deterioration). Carbon monoxide (CO) emissions from the Plant No. 2 process vent stack shall be limited to 19.2 tons or 40.4 hours per month based on a maximum hourly CO emission rate of 951 pounds per hour or the maximum emission rate determined in the latest stack test. CO emissions are due to purging of process gas and have no relationship to fuel usage or material input rate. CO emissions are thus calculated based on number of process gas purging hours and maximum hourly CO emission rate. This operation limitation is equivalent to limiting CO emissions from equipment covered under this permit to 249 tons per year. Therefore, the Prevention of Significant Deterioration (PSD) rules, 326 IAC 2-2 and 40 CFR 52.21, will not apply.

326 IAC 2-3 (Emission Offset)

This proposed modification is not subject to the requirements of 326 IAC 2-3 (Emission Offset). Total NO_x emissions from Boiler No. 3, Reformer No. 2 and Reformer No. 1 after modification are limited at 32.0 tons per year by limiting Boiler No.3 natural gas and Reformers Nos. 1 and 2 equivalent fuel usages (see detailed calculation in Appendix A, page 1 of 6) based on the following formula:

$$\begin{aligned} \text{Ua} &= 212.1 + (678.9 - A) * 2.31 \\ \text{or} \quad \text{Um} &= 17.7 + (56.6 - M) * 2.31 \end{aligned}$$

- where:
- (1) Ua is the annual natural gas usage limit in million cubic feet (MMCF) per year for Boiler No. 3.
 - (2) A is the combined MMCF fuel (process tail gas and natural gas) usage per year for Reformers #1 and #2.
 - (3) Um is the monthly natural gas usage limit in MMCF per month for Boiler No. 3.

- (4) M is the combined MMCF fuel (process tail gas and natural gas) usage per month for Reformers #1 and #2.

This fuel usage limitation is equivalent to limiting NO_x emission increase due to the proposed modification to 24.0 ton/yr (see explanation in page 3 of this TSD). Therefore, the Emission Offset rules, 326 IAC 2-3, will not apply.

326 IAC 2-6 (Emission Reporting)

This facility is subject to 326 IAC 2-6 (Emission Reporting), because the source emits more than 10 tons/yr of NO_x. Pursuant to this rule, the owner/operator of this facility must annually submit an emission statement of the facility. The annual statement must be received by April 15 of each year and must contain the minimum requirements as specified in 326 IAC 2-6-4.

26 IAC 5-1-2 (Opacity Regulations - Visible Emission Limitations)

This source is subject to 326 IAC 5-1-2 (Visible Emission Limitations) which limits visible emissions from a source or facility located in either attainment or nonattainment counties. Pursuant to 326 IAC 5-1-2 (2), visible emissions for sources located in the nonattainment portion of Lake County shall meet the following limitations:

- (a) visible emissions shall not exceed an average of twenty percent (20%) opacity in twenty-four (24) consecutive readings; and
- (b) visible emissions shall not exceed sixty percent (60%) opacity for more than a cumulative total of fifteen (15) minutes in a six (6) hour period.

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

The 38.8 MMBtu/hr natural gas fired boiler is subject 326 IAC 6-2 (Particulate Emissions Limitations for Sources of Indirect Heating). Pursuant to 326 IAC 6-2-4, the particulate matter (PM) emissions shall be limited to 0.395 pounds per MMBtu heat input (see calculation below).

Compliance Calculation:

Total heat input rating for existing boilers = 2 boilers * 5.3 MMBtu/hr = 10.6 MMBtu/hr

Pursuant to 326 IAC 6-2-4, allowable PM emission (in lb/MMBtu) for the new Boiler No. 3
= $1.09 / Q^{0.26}$ (Q is total source maximum operating capacity rating in MMBtu/hr)
= $1.09 / (38.8 + 10.6)^{0.26}$
= 0.395 lb/MMBtu

Potential PM Emissions for the new Boiler No. 3

= 2.38 tons per year (see page 2 of 6 of Appendix A)
= (2.38 tons PM/year) * (2,000 lbs/ton) * (1 year/8,760 hours) * (1 hour/38.8 MMBtu/hr)
= 0.014 lbs PM per MMBtu

Based on these calculations, the controlled potential emissions are less than the allowable emissions, therefore, this boiler complies with the rule.

326 IAC 8-1-6 (New Facilities, General Reduction Requirements)

This modification is not subject to the provisions of 326 IAC 8-1-6. This rule requires all facilities constructed after January 1, 1980, which have potential VOC emission rates of 25 or more tons per year, and which are not otherwise regulated by other provisions of 326 IAC 8, to reduce VOC emissions using Best Available Control Technology (BACT). Since the equipment included in this modification are not subject to the requirements of other provisions of 326 IAC 8 and have a

potential VOC emissions of less than 25 tons per year. Therefore, the requirements of 326 IAC 8-1-6 do not apply.

No other Article 8 rules that apply.

No Article 9 rules that apply.

Air Toxic Emissions

Indiana presently requests applicants to provide information on emissions of the 189 hazardous air pollutants set out in the Clean Air Act Amendments of 1990. These pollutants are either carcinogenic or otherwise considered toxic and are commonly used by industries. They are listed as air toxics on the Office of Air Management (OAM) Construction Permit Application Form Y.

- (a) This modification will emit levels of air toxics less than those which constitute a major source according to Section 112 of the 1990 Amendments to Clean Air Act.
- (b) See attached spreadsheets for detailed air toxic calculations.

Conclusion

The construction of this modification to the industrial gas manufacturing plant will be subject to the conditions of the attached proposed **Construction Permit No. CP-089-8510-00435**.

Appendix A: Emissions Summary (Page 1 of 6)

Company Name: Praxair, Inc.
 Address City IN Zip: Foot of Standard Avenue, Whiting, Indiana 46394
 Operation Permit Number: 089-8510-00435
 Reviewer: Scott Pan/Enviroplan Consulting
 Date: May 29, 1996

Allowable Emissions (tons/year)						
Pollutant	Boiler #3	Reformers		Process Vent Stack		Total
		NO. 1	No.2	No. 1	No.2	
PM	15.33 *	2.48	2.27	0.00	0.00	20.08
PM-10	15.33 *	2.48	2.27	0.00	0.00	20.08
SO2	0.10	0.11	0.10	0.00	0.00	0.31
NOx	3.82	14.69	13.49	0.00	0.00	32.00
VOC	2.89	1.24	1.14	0.00	0.00	5.27
CO	6.29	2.48	2.27	9.55	228.41	249.00
Allowable Emissions based on rated capacity assuming operations at 8,760 hours per year with no controls.						
Potential Emissions (tons/year)						
Pollutant	Boiler #3	Reformers		Process Vent Stack		Total
		NO. 1	No.2	No. 1	No.2	
PM	2.38	2.48	2.27	0.00	0.00	7.13
PM-10	2.38	2.48	2.27	0.00	0.00	7.13
SO2	0.10	0.11	0.10	0.00	0.00	0.31
NOx	6.12	14.69	13.49	0.00	0.00	34.30
VOC	2.89	1.24	1.14	0.00	0.00	5.27
CO	6.29	2.48	2.27	9.55	4,163.19	4183.78
Potential Emissions based on rated capacity assuming operations at 8,760 hours per year with no controls.						
Limited Emissions (tons/year)						
Pollutant	Boiler #3 **	Reformers		Process Vent Stack		Total
		NO. 1	No.2	No. 1	No.2	
PM	1.48	2.48	2.27	0.00	0.00	6.23
PM-10	1.48	2.48	2.27	0.00	0.00	6.23
SO2	0.06	0.11	0.10	0.00	0.00	0.27
NOx	3.82	14.69	13.49	0.00	0.00	32.00
VOC	1.80	1.24	1.14	0.00	0.00	4.18
CO	3.92	2.48	2.27	9.55	230.78	249.00

* Allowable PM emissions are per 326 IAC 6-2-4 (0.395 lb/MMBtu) and boiler capacity of 38.8 MMBtu/hr.

** Limited NOx emissions are based on limited fuel (natural gas) throughput of 212.1 MMCF/yr for Boiler #3 added to the combined potential fuel throughput of 678.9 MMCF/yr for Reformer #1 and Reformer #2. Source may maintain the same NOx limit by burning more than 212.1 MMCF/yr of natural gas in Boiler #3 while burning less than 678.9 MMCF/yr of fuel (mixture of natural gas and process tail gas) in the two (2) reformers.

Natural gas consumption limit for Boiler #3 is expressed as follows:

$$212.1 + (678.9 - A)/2.31 \text{ MMCF/yr} \quad (A \text{ is the combined annual fuel usage for Reformers \#1 and \#2})$$

or $17.7 + (56.6 - M)/2.31 \text{ MMCF/month} \quad (M \text{ is the combined monthly fuel usage for Reformers \#1 and \#2})$

Appendix A: Emissions Calculations Natural Gas Combustion of Boiler No. 3

Company Name: Praxair, Inc.
Address City IN Zip: Foot of Standard Avenue, Whiting, Indiana 46394
Operation Permit Number: 089-8510-00435
Reviewer: Scott Pan/Enviroplan Consulting
Date: May 29, 1996

Potential To Emit (Emissions at 8,760 hours of operation per year without control):

*Heat Input Capacity MMBtu/hr	Potential Throughput MMCF/yr
38.8	339.9

*Heat Input Capacity (MMBtu/hr) includes one (1) 38.8 MMBtu/hr Boiler equipped with low NOx burners.

Emission Factor in lb/MMCF	Pollutant					
	PM	PM-10	SO2	NOx	VOC	CO
	14.0	14.0	0.6	36.0	17.0	37.0
Potential Emission in tons/yr	2.38	2.38	0.10	6.12	2.89	6.29

Limited Emissions (Emissions after annual fuel usage limitation):

*Heat Input Capacity MMBtu/hr	Annual Fuel Usage Limitation	Limited Throughput MMCF/yr
38.8	62.4%	212.1

Emission Factor in lb/MMCF	Pollutant					
	PM	PM-10	SO2	NOx	VOC	CO
	14.0	14.0	0.6	36.0	17.0	37.0
Limited Emission in tons/yr	1.48	1.48	0.06	3.82	1.80	3.92

Methodology

MMBtu = 1,000,000 Btu

MMCF = 1,000,000 Cubic Feet of Gas

Emission Factors for NOx, CO and VOC are based on vendor-provided data and shall be stack tested after permit issuance.

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

Limited Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,000 MMBtu * Annual Fuel Usage Limitation

Emission Factors are from AP 42 (revised 10/96), Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3, SCC #1-02-006-03

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

**Appendix A: Emission Calculations
Plant #1 Process Vent Stack**

Company Name: Praxair, Inc.
Address City IN Zip: Foot of Standard Avenue, Whiting, Indiana 46394
Operation Permit Number: 089-8510-00435
Reviewer: Scott Pan/Enviroplan Consulting
Date: May 29, 1996

When Plant No. 1 is not operating, the CO2 byproduct stream from the CO2 Plant that is fed to Reformer No. 1 will be vented to the atmosphere through Plant No. 1 vent stack.

Potential To Emit (tons/yr):

Process	CO Content (%)	Vent Rate (scf/hr)	Potential CO Venting Rate	
			(lb/hr)	(tons/yr)
Venting of CO2 Byproduct Stream	0.05%	60,000	2.18	9.55

Methodology

- (1) CO content and vent rate are based on design data.
- (2) Potential Emissions (lb/hr) = 60000 scf/hr / (359 cf/lb-mole * (460 + 68)/(460 + 32)) * CO Content (0.05%) * MW of CO (28 lb/lb-mole)
- (3) Potential Emissions (ton/yr) = Emissions in lb/hr * 8760 hr/yr / 2000 (lb/ton)

Limited Emissions (tons/yr):

Process	CO Content (%)	Vent Rate (scf/hr)	Limited CO Venting Rate	
			Op. Capacity	(tons/yr)
Venting of CO2 Byproduct Stream	0.05%	60,000	100%	9.55

Limited Emissions (ton/yr) = Potential Emissions (ton/yr) * % Operation Capacity

**Appendix A: Emission Calculations
Plant #2 Process Startup Vent Stack**

**Company Name: Praxair, Inc.
Address City IN Zip: Foot of Standard Avenue, Whiting, Indiana 46394
Operation Permit Number: 089-8510-00435
Reviewer: Scott Pan/Enviroplan Consulting
Date: May 29, 1996**

Potential To Emit (tons/yr):

Process	Emission Rate (lbs/hr)	Uncontrolled Emissions (lbs/yr)	Uncontrolled Emissions (tons/yr)
Vent Stack	951	8,326,380.00	4,163.19

Methodology

Potential Emissions (ton/yr) = Emission Rate (lbs/hr) * 8,760 hrs/yr * 1 ton/2,000 lbs

Limited Emissions (tons/yr):

Process	Emission Rate (lbs/hr)	Usage Limitation	Limited Emissions (lbs/yr)	Limited Emissions (tons/yr)
Vent Stack	951	5.54%	461,564.55	230.78

Methodology

Limited Emissions (ton/yr) = Potential Emissions (ton/yr) * Usage Limitation

Emission rate provided by the applicant and shall be subject to stack testing after permit issuance. During each plant startup, process gas containing CO is vented until the proper system equilibrium operating state is reached. The startup includes venting of CO from following locations: (1) CO₂ absorber feed line (1 hour/startup); (2) PSA feed line (2 hour/startup), and (3) PSA tail gas (1 hour/startup). Therefore, each startup will take a total of 4 hours.