**INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT**
*We Protect Hoosiers and Our Environment.*
100 N. Senate Avenue • Indianapolis, IN 46204
(800) 451-6027 • (317) 232-8603 • www.idem.IN.gov

**Michael R. Pence**
*Governor*

**Thomas W. Easterly**
*Commissioner*

| | |
|---|---|
| To: | Interested Parties |
| Date: | May 8, 2014 |
| From: | Matthew Stuckey, Chief<br>Permits Branch<br>Office of Air Quality |
| Source Name: | Duke Energy Indiana, Inc. – Cayuga Generating Station |
| Permit Level: | Title V Operating Permit Renewal |
| Permit Number: | 165-33876-00001 |
| Source Location: | State Road 63, Cayuga, Indiana |
| Type of Action Taken: | Permit Renewal |

# Notice of Decision: Approval - Effective Immediately

Please be advised that on behalf of the Commissioner of the Department of Environmental Management, I have issued a decision regarding the matter referenced above.

The final decision is available on the IDEM website at: http://www.in.gov/apps/idem/caats/
To view the document, select Search option 3, then enter permit 33876.

If you would like to request a paper copy of the permit document, please contact IDEM's central file room:

Indiana Government Center North, Room 1201
100 North Senate Avenue, MC 50-07
Indianapolis, IN 46204
Phone: 1-800-451-6027 (ext. 4-0965)
Fax (317) 232-8659

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

*(continues on next page)*

If you wish to challenge this decision, IC 4-21.5-3-7 and IC 13-15-6-1(b) or IC 13-15-6-1(a) require that you file a petition for administrative review. This petition may include a request for stay of effectiveness and must be submitted to the Office of Environmental Adjudication, 100 North Senate Avenue, Government Center North, Suite N 501E, Indianapolis, IN 46204.

For an **initial Title V Operating Permit**, a petition for administrative review must be submitted to the Office of Environmental Adjudication within **thirty (30)** days from the receipt of this notice provided under IC 13-15-5-3, pursuant to IC 13-15-6-1(b).

For a **Title V Operating Permit renewal**, a petition for administrative review must be submitted to the Office of Environmental Adjudication within **fifteen (15)** days from the receipt of this notice provided under IC 13-15-5-3, pursuant to IC 13-15-6-1(a).

The filing of a petition for administrative review is complete on the earliest of the following dates that apply to the filing:

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

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

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

Pursuant to 326 IAC 2-7-18(d), any person may petition the U.S. EPA to object to the issuance of an initial Title V operating permit, permit renewal, or modification within sixty (60) days of the end of the forty-five (45) day EPA review period. Such an objection must be based only on issues that were raised with reasonable specificity during the public comment period, unless the petitioner demonstrates that it was impractible to raise such issues, or if the grounds for such objection arose after the comment period.

To petition the U.S. EPA to object to the issuance of a Title V operating permit, contact:

U.S. Environmental Protection Agency
401 M Street
Washington, D.C. 20406

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

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# Part 70 Operating Permit Renewal
# OFFICE OF AIR QUALITY

## Duke Energy Indiana, Inc., Cayuga Generating Station
## State Road 63
## Cayuga, Indiana 46168

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

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

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

| Operation Permit No.: T165-33876-00001 | |
|---|---|
| Issued by: for Tripurari P. Sinha<br>Tripurari P. Sinha, Ph. D., Section Chief Ph.D.<br>Permits Branch<br>Office of Air Quality | Issuance Date: May 8, 2014<br>Expiration Date: May 8, 2019 |

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Certification
Emergency Occurrence Report
Quarterly Report
Quarterly Deviation and Compliance Monitoring Report

**Attachment A - Fugitive Dust Control Plan**
**Attachment B - NSPS 40 CFR 60, Subpart OOO**
**Attachment C - NSPS 40 CFR 60, Subpart IIII**
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## SECTION A SOURCE SUMMARY

This permit is based on information requested by the Indiana Department of Environmental Management (IDEM), Office of Air Quality (OAQ). The information describing the source contained in conditions A.1 through A.5 is descriptive information and does not constitute enforceable conditions. However, the Permittee should be aware that a physical change or a change in the method of operation that may render this descriptive information obsolete or inaccurate may trigger requirements for the Permittee to obtain additional permits or seek modification of this permit pursuant to 326 IAC 2, or change other applicable requirements presented in the permit application.

### A.1 General Information [326 IAC 2-7-4(c)][326 IAC 2-7-5(14)][326 IAC 2-7-1(22)]

The Permittee owns and operates a stationary electric utility generating station.

| | |
|---|---|
| Source Address: | State Road 63, Cayuga, Indiana 46168 |
| General Source Phone Number: | 317-838-2108 |
| SIC Code: | 4911 |
| County Location: | Vermillion |
| Source Location Status: | Attainment for all criteria pollutants |
| Source Status: | Part 70 Operating Permit Program<br>Major Source, under PSD Rules<br>Major Source, Section 112 of the Clean Air Act<br>1 of 28 Source Categories |

### A.2 Part 70 Source Definition 326 IAC 2-7-1(22)]

Duke Energy Indiana, Inc.'s Cayuga Generating Station, identified as 165-00001, is located on the same property as Duke Energy Indiana, Inc.'s Unit 4 combustion turbine plant identified as 165-00086. IDEM, OAQ has examined whether the Cayuga Generating Station plant and the combustion turbine plant are part of the same major source. The term "major source" is defined at 326 IAC 2-7-1(22). In order for these two plants to be considered one major source, they must meet all three of the following criteria:

(1) the plants must be under common ownership or common control;

(2) the plants must belong to a single major industrial grouping or one must serve as a support facility for the other; and,

(3) the plants must be located on contiguous or adjacent properties.

The two plants are owned by Duke Energy Indiana, Inc. Since there is a common owner, the first element of the definition of major source is met.

The SIC Code Manual of 1987 sets out how to determine the proper SIC Code for each type of business, called establishments. The SIC Codes are divided up into eleven divisions, lettered A through K. Each division is broken down into separate major groups. Each major group has a distinct two-digit SIC Code. The two plants have the same two-digit SIC Code, 49, for Electric, Gas and Sanitary Services. Therefore the second element of the definition is met.

The two plants are located on the same piece of property in separate buildings. Since the plants are located on the same piece of property, they the third element of the definition. IDEM, OAQ finds that the two plants are part of the same major source. IDEM, OAQ will issue separate Part 70 permits to each plant solely for administrative purposes.

## A.3 Emission Units and Pollution Control Equipment Summary [326 IAC 2-7-4(c)(3)] [326 IAC 2-7-5(14)]

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

(a) One (1) dry bottom, pulverized coal-fired boiler, identified as Boiler No. 1, installed in 1967, with a nominal heat input capacity of 4,802 million Btu per hour (MMBtu/hr), with an electrostatic precipitator (ESP) for control of particulate matter, a flue gas desulfurization (FGD) system for control of $SO_2$, and exhausting to stack 1. Stack 1 has continuous emissions monitors (CEMs) for nitrogen oxides ($NO_X$) and sulfur dioxide ($SO_2$) and a continuous opacity monitor (COM). Boiler No. 1 was configured with a low $NO_X$ burner in 1993. Selective Catalytic Oxidation (SCR) to control NOx, Dry Sorbent Injection System to Control $SO_3$, Activated Carbon Injection System to assist in Control of Hg emissions scheduled to be installed by 2015.

(b) One (1) dry bottom, pulverized coal-fired boiler, identified as Boiler No. 2, installed in 1968, with a nominal heat input capacity of 4,802 million Btu per hour (MMBtu/hr), with an electrostatic precipitator (ESP) for control of particulate matter, a flue gas desulfurization (FGD) system for control of $SO_2$, and exhausting to stack 2. Stack 2 has continuous emissions monitors (CEMs) for nitrogen oxides ($NO_X$) and sulfur dioxide ($SO_2$) and a continuous opacity monitor (COM). Boiler No. 2 was configured with a low $NO_X$ burner in 1993. Selective Catalytic Oxidation (SCR) to control NOx, Dry Sorbent Injection System to Control $SO_3$, Activated Carbon Injection System to assist in Control of Hg emissions scheduled to be installed by 2015.

(c) One (1) no. 2 fuel oil-fired generator, identified as Unit No. 3A, installed in 1972, with a nominal heat input capacity of 30 million Btu per hour (MMBtu/hr), exhausting to stack 3A.

(d) One (1) no. 2 fuel oil-fired generator, identified as Unit No. 3B, installed in 1972, with a nominal heat input capacity of 30 million Btu per hour (MMBtu/hr), exhausting to stack 3B.

(e) One (1) no. 2 fuel oil-fired generator, identified as Unit No. 3C, installed in 1972, with a nominal heat input capacity of 30 million Btu per hour (MMBtu/hr), exhausting to stack 3C.

(f) One (1) no. 2 fuel oil-fired generator, identified as Unit No. 3D, installed in 1972, with a nominal heat input capacity of 30 million Btu per hour (MMBtu/hr), exhausting to stack 3D.

(g) A dual conveyor coal processing system, with a nominal throughput of 1900 tons of coal per hour (950 tons of coal per hour each side), consisting of the following equipment:

(1) One (1) railcar unloading station, with a drop point to two (2) hoppers identified as DP-1, with the drop point enclosed with emissions uncontrolled, and exhausting to the ambient air.

(2) One (1) storage area, having a nominal storage capacity including the active piles of 982,800 tons, with fugitive emissions controlled as needed by a watering truck.

(3) One (1) enclosed hopper, with a drop point to a conveyor identified as DP-2, with the drop point enclosed with emissions controlled by a water spray dust suppression system as needed, and exhausting to the ambient air.

(4) One (1) enclosed hopper and two (2) reclaim feeders, with an underground drop points identified as DP-11 and DP-12, with emissions controlled by the underground enclosure, and routed to the conveyor system.

(5) An enclosed dual conveyor system, with 6 drop points identified as DP-3 through DP-6, DP-8, and DP-13, with each drop point enclosed with emissions controlled by the enclosure. Drop points DP-3 through DP-5, DP-8, and DP-13 are controlled as needed by a water spray dust suppression system, and DP-6 is controlled by rotoclones.

(6) An enclosed conveyor system with drop point identified as DP-9, controlled by a telescoping chute.

(7) Coal bunker and coal scale exhausts and associated dust collector vents.

(h) One (1) limestone handling and storage system for the flue gas desulfurization system, constructed in 2006, with a maximum throughput rate of 1,000 tons per hour, consisting of the following:

(1) One (1) railcar/truck unloading operation, with a maximum capacity of 1,000 tons per hour, controlled by fog dust suppression, and exhausting to emission point EP-L1.

(2) Two (2) hoppers, each with a maximum capacity of 500 tons per hour, controlled by fog dust suppression, and exhausting to emission point EP-L2.

(3) Two (2) belt feeders, identified as LHBF-1 and LHBF-2, each with a maximum capacity of 500 tons per hour, controlled by fog dust suppression, and exhausting to emission point EP-L2.

(4) One (1) conveyor, identified as LH-1, controlled by a telescopic chute, and exhausting to emission point EP-L3. Under NSPS, Subpart OOO, this unit is considered a belt conveyor.

(5) One (1) active limestone stockout pile, with a maximum capacity of 7,700 tons.

(6) One (1) inactive limestone storage pile, with a maximum capacity of 45,000 tons.

(7) Two (2) reclaim hoppers, each with a maximum capacity of 200 tons per hour, controlled by fog dust suppression, and exhausting to emission point EP-L4.

(8) Two (2) belt feeders, identified as LHBF-3 and LHBF-4, each with a maximum capacity of 200 tons per hour, controlled by fog dust suppression, and exhausting to emission point EP-L4.

(9) One (1) conveyor, identified as LH-2, with a maximum capacity of 400 tons per hour, controlled by fog dust suppression. The emissions exhaust out the general building vents, identified as emission point EP-L18a and EP-L18b. Under NSPS, Subpart OOO, this unit is considered a belt conveyor.

(10) One (1) reversible conveyor, identified as LH-3, with a maximum capacity of 400 tons per hour, controlled by fog dust suppression. The emissions exhaust out the general building vents, identified as emission points EP-L18a and EP-L18b. Under NSPS, Subpart OOO, this unit is considered a belt conveyor.

(11) Two (2) day bins, each with a maximum throughput rate of 400 tons per hour. Each bin is equipped with a Baghouse to control particulate emissions. Baghouses BH-L1 and BH-L2 exhaust to EP-L16 and EP-L17, respectively. Under NSPS, Subpart OOO, these units considered storage bins.

(12) Two (2) wet ball mills, each with a maximum capacity of 51 tons of limestone slurry per hour. Under NSPS, Subpart OOO, these units are considered grinding mills.

(i) One (1) gypsum handling and storage system, constructed in 2006, consisting of the following:

(1) One (1) wet gypsum conveying system, with a maximum throughput rate of 150 tons per hour.

(2) Two (2) gypsum stock out piles. Gypsum can be stocked out to an outside pile or a pile located in the gypsum stock out building. The maximum gypsum storage capacity is 10,400 tons.

(3) One (1) emergency gypsum stockout pile, with a maximum capacity of 2,600 tons.

(4) One (1) dry gypsum transferring operation, transferring gypsum to landfills by trucks on paved roads.

(j) Auxiliary Boiler, identified as emission unit Aux, with a maximum heat input capacity of 72.76 MMBtu/hr fired with distillate oil and exhausting out one stack identified as stack Aux-1. The Auxiliary boiler was constructed before 1968.

(k) One (1) Arsenic Mitigation System consisting of (1) 700 ton Limestone Storage Silo and (1) 300 ton Limestone Surge Bin, scheduled to be installed by 2015. Limestone is pneumatically conveyed from delivery trucks to the Limestone Storage Silo and from the Limestone Storage Silo to the Limestone Surge Bin. Limestone in the Surge Bin is dropped on to the C-1 and C-2 coal conveyors. PM emissions generated during pneumatic conveying and transfer points to the C-1 and C-2 conveyor will be controlled by the bin vent filters. The Limestone Storage Silo and Limestone Surge Bin are identified as emissions points EP-01(LS) and EP-02(LS).

(l) Two (2) Dry Sorbent Injection (DSI) Systems, one for each Unit. Each DSI system consists of one (1) Sorbent Storage Silo with a storage capacity of 120 tons, three (3) Silo Weight Feeders to regulate sorbent from the silos and a system to inject the sorbent material into the flue gas, scheduled to be installed by 2015. PM emissions generated during loading operations are controlled by a Bin Vent Filter located on the top of each silo and the weight feeders. The two (2) Sorbent Silos are identified as emission points EP-01(DSI), and EP-03(DSI). The weight feeders are identified as EP-05A(DSI), EP-05B(DSI), EP-06A(DSI) and EP-06B(DSI) with spares EP-05C(DSI) and EP-06C(DSI).

(m) Two (2) Activated Carbon Injection (ACI) Systems, one for each Unit. Each ACI system consists of one (1) storage silo with a 120 ton storage capacity, two (2) Silo Weight Feeders to regulate carbon from the silos and a system for injecting the Activated Carbon into the flue gas, scheduled to be installed by 2015. PM emissions during the silo loading operation are controlled by the bin vent filters located on top of the silos. The two (2) Activated Carbon Storage Silos are identified as emission points EP-01(ACI) and EP-02(ACI). The weight feeders are identified as EP-03A(ACI) and EP-04A(ACI) with spares EP-03B(ACI) and EP-04B(ACI).

(n) Two (2) Dry Ash Handling Systems, one for each Unit. The dry ash handling system consists of a pneumatic conveying system, four (4) baghouse separators, one (1) ash silo with a storage capacity of 3,500 and an ash unloading system, scheduled to be installed by 2015.

(i) Baghouse Separators - Fly ash from the ESP Ash Hoppers, Air Heater Ash Hoppers, Economizer Ash Hoppers and SCR Large Particle Screen Ash Hopper will be pneumatically conveyed to one of four (4) baghouse separators. There will be two (2) baghouse separators for each unit. The dry fly ash is separated from the air stream in a baghouse separator. Each baghouse separator are identified as emissions points EP-01(DFA), EP--02(DFA), EP-03(DFA), and EP-04(DFA). The system is equipped with a spare exhauster identified as emissions point EP-05(DFA).

(ii) Ash Silos - Fly ash collected in the baghouse separators is dropped into a feeder and pneumatically conveyed to the ash silo. The ash silo is equipped with a bin vent filter to control particulate matter emissions from pneumatic conveying. The Ash Silo is identified as emission point EP-06(DFA).

(iii) Ash Unloading Operation - Fly ash collected in the silos can be unloaded into trucks or pneumatically conveyed to the ash fixation process. Fly ash unloaded into trucks can be unloaded dry or wet. Fly ash unloaded dry is gravity feed to a chute and unloaded into enclosed trucks. The emissions generated from unloading the ash dry are vented back to the silo and controlled by the silo bin vent filter. Ash unloaded wet is feed into a pin mixer where the ash is mixed with water and unloaded into open trucks

(o) One (1) Ash Fixation Process consisting of a pneumatic conveying system, one (1) lime silo, conveyors, and two (2) pin mixers, scheduled to be installed by 2015.

(i) Lime Silo – Lime will be delivered by truck and will pneumatically loaded into the silo. The storage capacity of the silo is 300 tons. The emissions generated by the pneumatic conveying will be controlled by a bin vent filter located on top of the lime silo. The Lime Silo is identified as emissions point EP-02(FIX).

(ii) Conveyor and Transfer Points – Fly ash, Lime and Gypsum will be conveyed to one of two (2) pin mixers where this material will be mixed with water to make the fixated ash. The fixated ash will be unloaded to a storage pile, and then loaded into trucks using front end loaders.

A.4 Specifically Regulated Insignificant Activities [326 IAC 2-7-1(21)] [326 IAC 2-7-4(c)] [326 IAC 2-7-5(14)]

This stationary source also includes the following insignificant activities which are specifically regulated, as defined in 326 IAC 2-7-1(21):

(a) Degreasing operations that do not exceed one hundred forty-five (145) gallons per twelve months, except if subject to 326 IAC 20-6. [326 IAC 8-3-2] [326 IAC 8-3-8]

(b) One 156.9 HP (100 kW), CI ICE with a displacement 4.4 liters, Diesel Fired Emergency Generator, Manufactured by Caterpillar Model Year 2007, Model D100-6, constructed in 2007, identified as ENG-1. This generator is located in the switch yard and is operated as backup for the black start diesel aux feed.

(c) One 713 Hp (450 kW), CI ICE with a displacement 15.2 liters, Diesel Fired Emergency Engine, Manufactured by Caterpillar, Model Year 2007, Model C15DITA, constructed in

2007, identified as ENG-2. This engine is use to quench the flue gas if the scrubber should fail.

## A.5 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).

(c) It is an affected source under Title IV (Acid Deposition Control) of the Clean Air Act, as defined in 326 IAC 2-7-1(3);

## SECTION B GENERAL 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 Permit Term [326 IAC 2-7-5(2)][326 IAC 2-1.1-9.5][326 IAC 2-7-4(a)(1)(D)][IC 13-15-3-6(a)]

(a) This permit, T165-33876-00001, is issued for a fixed term of five (5) years from the issuance date of this permit, as determined in accordance with IC 4-21.5-3-5(f) and IC 13-15-5-3. Subsequent revisions, modifications, or amendments of this permit do not affect the expiration date of this permit or of permits issued pursuant to Title IV of the Clean Air Act and 326 IAC 21 (Acid Deposition Control).

(b) If IDEM, OAQ, upon receiving a timely and complete renewal permit application, fails to issue or deny the permit renewal prior to the expiration date of this permit, this existing permit shall not expire and all terms and conditions shall continue in effect, including any permit shield provided in 326 IAC 2-7-15, until the renewal permit has been issued or denied.

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

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

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

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

### B.4 Enforceability [326 IAC 2-7-7] [IC 13-17-12]

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

### B.5 Severability [326 IAC 2-7-5(5)]

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

### B.6 Property Rights or Exclusive Privilege [326 IAC 2-7-5(6)(D)]

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

### B.7 Duty to Provide Information [326 IAC 2-7-5(6)(E)]

(a) The Permittee shall furnish to IDEM, OAQ, within a reasonable time, any information that IDEM, OAQ may request in writing to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. Upon request, the Permittee shall also furnish to IDEM, OAQ copies of records required to be kept by this permit.

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

B.8 Certification [326 IAC 2-7-4(f)][326 IAC 2-7-6(1)][326 IAC 2-7-5(3)(C)]

(a) A certification required by this permit meets the requirements of 326 IAC 2-7-6(1) if:

(1) it contains a certification by a "responsible official" as defined by 326 IAC 2-7-1(35), and

(2) the certification states that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

(b) The Permittee may use the attached Certification Form, or its equivalent with each submittal requiring certification. One (1) certification may cover multiple forms in one (1) submittal.

(c) A "responsible official" is defined at 326 IAC 2-7-1(35).

B.9 Annual Compliance Certification [326 IAC 2-7-6(5)]

(a) The Permittee shall annually submit a compliance certification report which addresses the status of the source's compliance with the terms and conditions contained in this permit, including emission limitations, standards, or work practices. All certifications shall cover the time period from January 1 to December 31 of the previous year, and shall be submitted no later than July 1 of each year to:

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

and

United States Environmental Protection Agency, Region V
Air and Radiation Division, Air Enforcement Branch - Indiana (AE-17J)
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

(b) The annual compliance certification report required by this permit shall be considered timely if the date postmarked on the envelope or certified mail receipt, or affixed by the shipper on the private shipping receipt, is on or before the date it is due. If the document is submitted by any other means, it shall be considered timely if received by IDEM, OAQ on or before the date it is due.

(c) The annual compliance certification report shall include the following:

(1) The appropriate identification of each term or condition of this permit that is the basis of the certification;

(2) The compliance status;

(3) Whether compliance was continuous or intermittent;

(4) The methods used for determining the compliance status of the source, currently and over the reporting period consistent with 326 IAC 2-7-5(3); and

(5) Such other facts, as specified in Sections D of this permit, as IDEM, OAQ may require to determine the compliance status of the source.

The submittal by the Permittee does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

B.10 Preventive Maintenance Plan [326 IAC 2-7-5(12)][326 IAC 1-6-3]

(a) A Preventive Maintenance Plan meets the requirements of 326 IAC 1-6-3 if it includes, at a minimum:

(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 Permittee shall implement the PMPs.

(b) If required by specific condition(s) in Section D of this permit where no PMP was previously required, the Permittee shall prepare and maintain Preventive Maintenance Plans (PMPs) no later than ninety (90) days after issuance of this permit or ninety (90) days after initial start-up, whichever is later, including the following information on each facility:

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

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

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

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

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

The PMP extension notification does not require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

The Permittee shall implement the PMPs.

(c) A copy of the PMPs shall be submitted to IDEM, OAQ upon request and within a reasonable time, and shall be subject to review and approval by IDEM, OAQ. IDEM, OAQ may require the Permittee to revise its PMPs whenever lack of proper maintenance

causes or is the primary contributor to an exceedance of any limitation on emissions. The PMPs and their submittal do not require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

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

B.11 Emergency Provisions [326 IAC 2-7-16]

(a) An emergency, as defined in 326 IAC 2-7-1(12), is not an affirmative defense for an action brought for noncompliance with a federal or state health-based emission limitation.

(b) An emergency, as defined in 326 IAC 2-7-1(12), constitutes an affirmative defense to an action brought for noncompliance with a technology-based emission limitation if the affirmative defense of an emergency is demonstrated through properly signed, contemporaneous operating logs or other relevant evidence that describe the following:

(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 and Enforcement Branch), or
Telephone Number: 317-233-0178 (ask for Office of Air Quality, Compliance and Enforcement Branch)
Facsimile Number: 317-233-6865

(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 and Enforcement Branch, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

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 a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

(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) The Permittee seeking to establish the occurrence of an emergency shall make records available upon request to ensure that failure to implement a PMP did not cause or contribute to an exceedance of any limitations on emissions. However, IDEM, OAQ may require that the Preventive Maintenance Plans required under 326 IAC 2-7-4(c)(8) 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.

B.12 Permit Shield [326 IAC 2-7-15][326 IAC 2-7-20][326 IAC 2-7-12]

(a) Pursuant to 326 IAC 2-7-15, the Permittee has been granted a permit shield. The permit shield provides that compliance with the conditions of this permit shall be deemed compliance with any applicable requirements as of the date of permit issuance, provided that either the applicable requirements are included and specifically identified in this permit or the permit contains an explicit determination or concise summary of a determination that other specifically identified requirements are not applicable. The Indiana statutes from IC 13 and rules from 326 IAC, referenced in conditions in this permit, are those applicable at the time the permit was issued. The issuance or possession of this permit shall not alone constitute a defense against an alleged violation of any law, regulation or standard, except for the requirement to obtain a Part 70 permit under 326 IAC 2-7 or for applicable requirements for which a permit shield has been granted.

This permit shield does not extend to applicable requirements which are promulgated after the date of issuance of this permit unless this permit has been modified to reflect such new requirements.

(b) If, after issuance of this permit, it is determined that the permit is in nonconformance with an applicable requirement that applied to the source on the date of permit issuance, IDEM, OAQ shall immediately take steps to reopen and revise this permit and issue a compliance order to the Permittee to ensure expeditious compliance with the applicable

requirement until the permit is reissued. The permit shield shall continue in effect so long as the Permittee is in compliance with the compliance order.

(c) No permit shield shall apply to any permit term or condition that is determined after issuance of this permit to have been based on erroneous information supplied in the permit application. Erroneous information means information that the Permittee knew to be false, or in the exercise of reasonable care should have been known to be false, at the time the information was submitted.

(d) Nothing in 326 IAC 2-7-15 or in this permit shall alter or affect the following:

(1) The provisions of Section 303 of the Clean Air Act (emergency orders), including the authority of the U.S. EPA under Section 303 of the Clean Air Act;

(2) The liability of the Permittee for any violation of applicable requirements prior to or at the time of this permit's issuance;

(3) The applicable requirements of the acid rain program, consistent with Section 408(a) of the Clean Air Act; and

(4) The ability of U.S. EPA to obtain information from the Permittee under Section 114 of the Clean Air Act.

(e) This permit shield is not applicable to any change made under 326 IAC 2-7-20(b)(2) (Sections 502(b)(10) of the Clean Air Act changes) and 326 IAC 2-7-20(c)(2) (trading based on State Implementation Plan (SIP) provisions).

(f) This permit shield is not applicable to modifications eligible for group processing until after IDEM, OAQ, has issued the modifications. [326 IAC 2-7-12(c)(7)]

(g) This permit shield is not applicable to minor Part 70 permit modifications until after IDEM, OAQ, has issued the modification. [326 IAC 2-7-12(b)(8)]

B.13 Prior Permits Superseded [326 IAC 2-1.1-9.5][326 IAC 2-7-10.5]

(a) All terms and conditions of permits established prior to T165-33876-00001 and issued pursuant to permitting programs approved into the state implementation plan have been either:

(1) incorporated as originally stated,

(2) revised under 326 IAC 2-7-10.5, or

(3) deleted under 326 IAC 2-7-10.5.

(b) Provided that all terms and conditions are accurately reflected in this permit, all previous registrations and permits are superseded by this Part 70 operating permit, except for permits issued pursuant to Title IV of the Clean Air Act and 326 IAC 21 (Acid Deposition Control)

B.14 Termination of Right to Operate [326 IAC 2-7-10][326 IAC 2-7-4(a)]

The Permittee's right to operate this source terminates with the expiration of this permit unless a timely and complete renewal application is submitted at least nine (9) months prior to the date of expiration of the source’s existing permit, consistent with 326 IAC 2-7-3 and 326 IAC 2-7-4(a).

B.15 Permit Modification, Reopening, Revocation and Reissuance, or Termination [326 IAC 2-7-5(6)(C)][326 IAC 2-7-8(a)][326 IAC 2-7-9]

(a) This permit may be modified, reopened, revoked and reissued, or terminated for cause. The filing of a request by the Permittee for a Part 70 Operating Permit modification, revocation and reissuance, or termination, or of a notification of planned changes or anticipated noncompliance does not stay any condition of this permit. [326 IAC 2-7-5(6)(C)] The notification by the Permittee does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

(b) This permit shall be reopened and revised under any of the circumstances listed in IC 13-15-7-2 or if IDEM, OAQ determines any of the following:

(1) That this permit contains a material mistake.

(2) That inaccurate statements were made in establishing the emissions standards or other terms or conditions.

(3) That this permit must be revised or revoked to assure compliance with an applicable requirement. [326 IAC 2-7-9(a)(3)]

(c) Proceedings by IDEM, OAQ to reopen and revise this permit shall follow the same procedures as apply to initial permit issuance and shall affect only those parts of this permit for which cause to reopen exists. Such reopening and revision shall be made as expeditiously as practicable. [326 IAC 2-7-9(b)]

(d) The reopening and revision of this permit, under 326 IAC 2-7-9(a), shall not be initiated before notice of such intent is provided to the Permittee by IDEM, OAQ at least thirty (30) days in advance of the date this permit is to be reopened, except that IDEM, OAQ may provide a shorter time period in the case of an emergency. [326 IAC 2-7-9(c)]

B.16 Permit Renewal [326 IAC 2-7-3][326 IAC 2-7-4][326 IAC 2-7-8(e)]

(a) The application for renewal shall be submitted using the application form or forms prescribed by IDEM, OAQ and shall include the information specified in 326 IAC 2-7-4. Such information shall be included in the application for each emission unit at this source, except those emission units included on the trivial or insignificant activities list contained in 326 IAC 2-7-1(21) and 326 IAC 2-7-1(42). The renewal application does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

Request for renewal shall be submitted to:

Indiana Department of Environmental Management
Permit Administration and Support Section, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

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

(1) Submitted at least nine (9) months prior to the date of the expiration of this permit; and

(2) If the date postmarked on the envelope or certified mail receipt, or affixed by the shipper on the private shipping receipt, is on or before the date it is due. If the

document is submitted by any other means, it shall be considered timely if received by IDEM, OAQ on or before the date it is due.

(c) If the Permittee submits a timely and complete application for renewal of this permit, the source's failure to have a permit is not a violation of 326 IAC 2-7 until IDEM, OAQ takes final action on the renewal application, except that this protection shall cease to apply if, subsequent to the completeness determination, the Permittee fails to submit by the deadline specified, pursuant to 326 IAC 2-7-4(a)(2)(D), in writing by IDEM, OAQ any additional information identified as being needed to process the application.

B.17 Permit Amendment or Modification [326 IAC 2-7-11][326 IAC 2-7-12] [40 CFR 72]

(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) Pursuant to 326 IAC 2-7-11(b) and 326 IAC 2-7-12(a), administrative Part 70 operating permit amendments and permit modifications for purposes of the acid rain portion of a Part 70 permit shall be governed by regulations promulgated under Title IV of the Clean Air Act. [40 CFR 72]

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

Indiana Department of Environmental Management
Permit Administration and Support Section, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

Any such application does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

(d) 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)]

B.18 Permit Revision Under Economic Incentives and Other Programs [326 IAC 2-7-5(8)][326 IAC 2-7-12(b)(2)]

(a) No Part 70 permit revision or notice shall be required under any approved economic incentives, marketable Part 70 permits, emissions trading, and other similar programs or processes for changes that are provided for in a Part 70 permit.

(b) Notwithstanding 326 IAC 2-7-12(b)(1) and 326 IAC 2-7-12(c)(1), minor Part 70 permit modification procedures may be used for Part 70 modifications involving the use of economic incentives, marketable Part 70 permits, emissions trading, and other similar approaches to the extent that such minor Part 70 permit modification procedures are explicitly provided for in the applicable State Implementation Plan (SIP) or in applicable requirements promulgated or approved by the U.S. EPA.

B.19 Operational Flexibility [326 IAC 2-7-20][326 IAC 2-7-10.5]

(a) The Permittee may make any change or changes at the source that are described in 326 IAC 2-7-20(b) or (c) without a prior permit revision, if each of the following conditions is met:

(1) The changes are not modifications under any provision of Title I of the Clean Air Act;

(2) Any preconstruction approval required by 326 IAC 2-7-10.5 has been obtained;

(3) The changes do not result in emissions which exceed the limitations provided in this permit (whether expressed herein as a rate of emissions or in terms of total emissions);

(4) The Permittee notifies the:

Indiana Department of Environmental Management
Permit Administration and Support Section, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

and

United States Environmental Protection Agency, Region V
Air and Radiation Division, Regulation Development Branch - Indiana (AR-18J)
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

in advance of the change by written notification at least ten (10) days in advance of the proposed change. The Permittee shall attach every such notice to the Permittee's copy of this permit; and

(5) The Permittee maintains records on-site, on a rolling five (5) year basis, which document all such changes and emission trades that are subject to 326 IAC 2-7-20(b)(1) and (c)(1). The Permittee shall make such records available, upon reasonable request, for public review.

Such records shall consist of all information required to be submitted to IDEM, OAQ in the notices specified in 326 IAC 2-7-20(b)(1) and (c)(1).

(b) The Permittee may make Section 502(b)(10) of the Clean Air Act changes (this term is defined at 326 IAC 2-7-1(37)) without a permit revision, subject to the constraint of 326 IAC 2-7-20(a). For each such Section 502(b)(10) of the Clean Air Act change, the required written notification shall include the following:

(1) A brief description of the change within the source;

(2) The date on which the change will occur;

(3) Any change in emissions; and

(4) Any permit term or condition that is no longer applicable as a result of the change.

The notification which shall be submitted is not considered an application form, report or compliance certification. Therefore, the notification by the Permittee does not require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

(c) Emission Trades [326 IAC 2-7-20(c)]
The Permittee may trade emissions increases and decreases at the source, where the applicable SIP provides for such emission trades without requiring a permit revision, subject to the constraints of Section (a) of this condition and those in 326 IAC 2-7-20(c).

(d) Alternative Operating Scenarios [326 IAC 2-7-20(d)]
The Permittee may make changes at the source within the range of alternative operating scenarios that are described in the terms and conditions of this permit in accordance with 326 IAC 2-7-5(9). No prior notification of IDEM, OAQ or U.S. EPA is required.

(e) Backup fuel switches specifically addressed in, and limited under, Section D of this permit shall not be considered alternative operating scenarios. Therefore, the notification requirements of part (a) of this condition do not apply.

(f) This condition does not apply to emission trades of $SO_2$ or $NO_X$ under 326 IAC 21 or 326 IAC 10-4.

B.20 Source Modification Requirement [326 IAC 2-7-10.5]

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

B.21 Inspection and Entry [326 IAC 2-7-6][IC 13-14-2-2][IC 13-30-3-1][IC 13-17-3-2]

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 permit;

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

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

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

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

B.22 Transfer of Ownership or Operational Control [326 IAC 2-7-11]

(a) The Permittee must comply with the requirements of 326 IAC 2-7-11 whenever the Permittee seeks to change the ownership or operational control of the source and no other change in the permit is necessary.

(b) Any application requesting a change in the ownership or operational control of the source shall contain a written agreement containing a specific date for transfer of permit responsibility, coverage and liability between the current and new Permittee. The application shall be submitted to:

Indiana Department of Environmental Management
Permit Administration and Support Section, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

Any such application does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

(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)]

B.23 Annual Fee Payment [326 IAC 2-7-19] [326 IAC 2-7-5(7)][326 IAC 2-1.1-7]

(a) The Permittee shall pay annual fees to IDEM, OAQ within thirty (30) calendar days of receipt of a billing. Pursuant to 326 IAC 2-7-19(b), if the Permittee does not receive a bill from IDEM, OAQ the applicable fee is due April 1 of each year.

(b) Except as provided in 326 IAC 2-7-19(e), failure to pay may result in administrative enforcement action or revocation of this permit.

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

B.24 Credible Evidence [326 IAC 2-7-5(3)][326 IAC 2-7-6][62 FR 8314] [326 IAC 1-1-6]

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

## SECTION C SOURCE OPERATION CONDITIONS

Entire Source

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

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

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

C.2 Opacity [326 IAC 5-1]

Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-1 (Applicability) and 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.3 Open Burning [326 IAC 4-1] [IC 13-17-9]

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

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

The Permittee shall not operate an incinerator except as provided in 326 IAC 4-2 or in this permit. The Permittee shall not operate a refuse incinerator or refuse burning equipment except as provided in 326 IAC 9-1-2 or in this permit.

C.5 Fugitive Dust Emissions [326 IAC 6-4]

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

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

Pursuant to 326 IAC 6-5 (Fugitive Particulate Matter Emission Limitations), fugitive particulate matter emissions shall be controlled according to the submitted plan. The plan is included as Attachment A.

C.7 Stack Height [326 IAC 1-7]

The Permittee shall comply with the applicable provisions of 326 IAC 1-7 (Stack Height Provisions), for all exhaust stacks through which a potential (before controls) of twenty-five (25) tons per year or more of particulate matter or sulfur dioxide is emitted. The provisions of 326 IAC 1-7-1(3), 326 IAC 1-7-2, 326 IAC 1-7-3(c) and (d), 326 IAC 1-7-4, and 326 IAC 1-7-5(a), (b), and (d) are not federally enforceable.

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

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

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

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

(a) For performance testing required by this permit, a test protocol, except as provided elsewhere in this permit, shall be submitted to:

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

no later than thirty-five (35) days prior to the intended test date. The protocol submitted by the Permittee does not require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

(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 a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

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

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

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

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

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

C.11 Compliance Monitoring [326 IAC 2-7-5(3)][326 IAC 2-7-6(1)][40 CFR 64][326 IAC 3-8]

(a) For new units:
Unless otherwise specified in the approval for the new emission unit(s), compliance monitoring for new emission units shall be implemented on and after the date of initial start-up.

(b) For existing units:
Unless otherwise specified in this permit, for all monitoring requirements not already legally required, the Permittee shall be allowed up to ninety (90) days from the date of permit issuance to begin such monitoring. If, due to circumstances beyond the Permittee's control, any monitoring equipment required by this permit cannot be installed and operated no later than ninety (90) days after permit issuance, the Permittee may extend the compliance schedule related to the equipment for an additional ninety (90) days provided the Permittee notifies:

Indiana Department of Environmental Management

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

in writing, prior to the end of the initial ninety (90) day compliance schedule, with full justification of the reasons for the inability to meet this date.

The notification which shall be submitted by the Permittee does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

(c) For monitoring required by CAM, at all times, the Permittee shall maintain the monitoring, including but not limited to, maintaining necessary parts for routine repairs of the monitoring equipment.

(d) For monitoring required by CAM, except for, as applicable, monitoring malfunctions, associated repairs, and required quality assurance or control activities (including, as applicable, calibration checks and required zero and span adjustments), the Permittee shall conduct all monitoring in continuous operation (or shall collect data at all required intervals) at all times that the pollutant-specific emissions unit is operating. Data recorded during monitoring malfunctions, associated repairs, and required quality assurance or control activities shall not be used for purposes of this part, including data averages and calculations, or fulfilling a minimum data availability requirement, if applicable. The owner or operator shall use all the data collected during all other periods in assessing the operation of the control device and associated control system. A monitoring malfunction is any sudden, infrequent, not reasonably preventable failure of the monitoring to provide valid data. Monitoring failures that are caused in part by poor maintenance or careless operation are not malfunctions.

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

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

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

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

C.13 Emergency Reduction Plans [326 IAC 1-5-2] [326 IAC 1-5-3]

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

(a) The Permittee shall maintain the most recently submitted written emergency reduction plans (ERPs) consistent with safe operating procedures.

(b) Upon direct notification by IDEM, OAQ 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 episode level. [326 IAC 1-5-3].

C.14 Risk Management Plan [326 IAC 2-7-5(12)] [40 CFR 68]

If a regulated substance, as defined in 40 CFR 68, is present at a source in more than a threshold quantity, the Permittee must comply with the applicable requirements of 40 CFR 68.

C.15 Response to Excursions or Exceedances [40 CFR 64][326 IAC 3-8][326 IAC 2-7-5] [326 IAC 2-7-6]

(I) Upon detecting an excursion where a response step is required by the D Section, or an exceedance of a limitation, not subject to CAM, in this permit:

(a) The Permittee shall take reasonable response steps to restore operation of the emissions unit (including any control device and associated capture system) to its normal or usual manner of operation as expeditiously as practicable in accordance with good air pollution control practices for minimizing excess emissions.

(b) The response shall include minimizing the period of any startup, shutdown or malfunction. The response may include, but is not limited to, the following:

(1) initial inspection and evaluation;

(2) recording that operations returned or are returning to normal without operator action (such as through response by a computerized distribution control system); or

(3) any necessary follow-up actions to return operation to normal or usual manner of operation.

(c) A determination of whether the Permittee has used acceptable procedures in response to an excursion or exceedance will be based on information available, which may include, but is not limited to, the following:

(1) monitoring results;

(2) review of operation and maintenance procedures and records; and/or

(3) inspection of the control device, associated capture system, and the process.

(d) Failure to take reasonable response steps shall be considered a deviation from the permit.

(e) The Permittee shall record the reasonable response steps taken.

(II)

(a) CAM *Response to excursions or exceedances.*

(1) Upon detecting an excursion or exceedance, subject to CAM, the Permittee shall restore operation of the pollutant-specific emissions unit (including the control device and associated capture system) to its normal or usual manner of operation as expeditiously as practicable in accordance with good air pollution control practices for minimizing emissions. The response shall include minimizing the period of any startup, shutdown or malfunction and taking any necessary corrective actions to restore normal operation and prevent the likely recurrence of the cause of an excursion or exceedance (other than those caused by excused startup or shutdown conditions). Such actions may include initial inspection and evaluation, recording that operations returned to normal without operator action (such as through response by a computerized

distribution control system), or any necessary follow-up actions to return operation to within the indicator range, designated condition, or below the applicable emission limitation or standard, as applicable.

(2) Determination of whether the Permittee has used acceptable procedures in response to an excursion or exceedance will be based on information available, which may include but is not limited to, monitoring results, review of operation and maintenance procedures and records, and inspection of the control device, associated capture system, and the process.

(b) If the Permittee identifies a failure to achieve compliance with an emission limitation, subject to CAM, or standard, subject to CAM, for which the approved monitoring did not provide an indication of an excursion or exceedance while providing valid data, or the results of compliance or performance testing document a need to modify the existing indicator ranges or designated conditions, the Permittee shall promptly notify the IDEM, OAQ and, if necessary, submit a proposed significant permit modification to this permit to address the necessary monitoring changes. Such a modification may include, but is not limited to, reestablishing indicator ranges or designated conditions, modifying the frequency of conducting monitoring and collecting data, or the monitoring of additional parameters.

(c) Based on the results of a determination made under paragraph (II)(a)(2) of this condition, the EPA or IDEM, OAQ may require the Permittee to develop and implement a QIP. The Permittee shall develop and implement a QIP if notified to in writing by the EPA or IDEM, OAQ.

(d) Elements of a QIP:
The Permittee shall maintain a written QIP, if required, and have it available for inspection. The plan shall conform to 40 CFR 64.8 b (2).

(e) If a QIP is required, the Permittee shall develop and implement a QIP as expeditiously as practicable and shall notify the IDEM, OAQ if the period for completing the improvements contained in the QIP exceeds 180 days from the date on which the need to implement the QIP was determined.

(f) Following implementation of a QIP, upon any subsequent determination pursuant to paragraph (II)(a)(2) of this condition the EPA or the IDEM, OAQ may require that the Permittee make reasonable changes to the QIP if the QIP is found to have:

(1) Failed to address the cause of the control device performance problems; or

(2) Failed to provide adequate procedures for correcting control device performance problems as expeditiously as practicable in accordance with good air pollution control practices for minimizing emissions.

(g) Implementation of a QIP shall not excuse the Permittee from compliance with any existing emission limitation or standard, or any existing monitoring, testing, reporting or recordkeeping requirement that may apply under federal, state, or local law, or any other applicable requirements under the Act.

(h) *CAM recordkeeping requirements.*

(1) The Permittee shall maintain records of monitoring data, monitor performance data, corrective actions taken, any written quality

improvement plan required pursuant to paragraph (II)(a)(2) of this condition and any activities undertaken to implement a quality improvement plan, and other supporting information required to be maintained under this condition (such as data used to document the adequacy of monitoring, or records of monitoring maintenance or corrective actions). Section C - General Record Keeping Requirements of this permit contains the Permittee's obligations with regard to the records required by this condition.

(2) Instead of paper records, the owner or operator may maintain records on alternative media, such as microfilm, computer files, magnetic tape disks, or microfiche, provided that the use of such alternative media allows for expeditious inspection and review, and does not conflict with other applicable recordkeeping requirements

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

(a) When the results of a stack test performed in conformance with Section C - Performance Testing, of this permit exceed the level specified in any condition of this permit, the Permittee shall submit a description of its response actions to IDEM, OAQ no later than seventy-five (75) days after the date of the test.

(b) A retest to demonstrate compliance shall be performed no later than one hundred eighty (180) days after the date of the test. Should the Permittee demonstrate to IDEM, OAQ that retesting in one hundred eighty (180) days is not practicable, IDEM, OAQ may extend the retesting deadline.

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

The response action documents submitted pursuant to this condition do require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

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

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

Pursuant to 326 IAC 2-6-3(a)(1), the Permittee shall submit by July 1 of each year an emission statement covering the previous calendar year. The emission statement shall contain, at a minimum, the information specified in 326 IAC 2-6-4(c) and shall meet the following requirements:

(1) Indicate estimated actual emissions of all pollutants listed in 326 IAC 2-6-4(a);

(2) Indicate estimated actual emissions of regulated pollutants as defined by 326 IAC 2-7-1(33) (“Regulated pollutant, which is used only for purposes of Section 19 of this rule”) from the source, for purpose of fee assessment.

The statement must be submitted to:

Indiana Department of Environmental Management
Technical Support and Modeling Section, Office of Air Quality
100 North Senate Avenue
MC 61-50 IGCN 1003
Indianapolis, Indiana 46204-2251

The emission statement does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35).

C.18 General Record Keeping Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-6] [326 IAC 2-2][326 IAC 2-3]

(a) Records of all required monitoring data, reports and support information required by this permit shall be retained for a period of at least five (5) years from the date of monitoring sample, measurement, report, or application. Support information includes the following, where applicable:

(AA) All calibration and maintenance records.
(BB) All original strip chart recordings for continuous monitoring instrumentation.
(CC) Copies of all reports required by the Part 70 permit.

Records of required monitoring information include the following, where applicable:

(AA) The date, place, as defined in this permit, and time of sampling or measurements.
(BB) The dates analyses were performed.
(CC) The company or entity that performed the analyses.
(DD) The analytical techniques or methods used.
(EE) The results of such analyses.
(FF) The operating conditions as existing at the time of sampling or measurement.

These records shall be physically present or electronically accessible at the source location for a minimum of three (3) years. The records may be stored elsewhere for the remaining two (2) years as long as they are available upon request. If the Commissioner makes a request for records to the Permittee, the Permittee shall furnish the records to the Commissioner within a reasonable time.

(b) Unless otherwise specified in this permit, for all record keeping requirements not already legally required, the Permittee shall be allowed up to ninety (90) days from the date of permit issuance or the date of initial start-up, whichever is later, to begin such record keeping.

(c) If there is a reasonable possibility (as defined in 326 IAC 2-2-8 (b)(6)(A), 326 IAC 2-2-8 (b)(6)(B), 326 IAC 2-3-2 (l)(6)(A), and/or 326 IAC 2-3-2 (l)(6)(B)) that a “project” (as defined in 326 IAC 2-2-1(oo) and/or 326 IAC 2-3-1(jj)) at an existing emissions unit, other than projects at a source with a Plantwide Applicability Limitation (PAL), which is not part of a “major modification” (as defined in 326 IAC 2-2-1(dd) and/or 326 IAC 2-3-1(y)) may result in significant emissions increase and the Permittee elects to utilize the “projected actual emissions” (as defined in 326 IAC 2-2-1(pp) and/or 326 IAC 2-3-1(kk)), the Permittee shall comply with following:

(1) Before beginning actual construction of the “project” (as defined in 326 IAC 2-2-1(oo) and/or 326 IAC 2-3-1(jj)) at an existing emissions unit, document and maintain the following records:

(A) A description of the project.

(B) Identification of any emissions unit whose emissions of a regulated new source review pollutant could be affected by the project.

(C) A description of the applicability test used to determine that the project is not a major modification for any regulated NSR pollutant, including:

(i) Baseline actual emissions;

(ii) Projected actual emissions;

(iii) Amount of emissions excluded under section 326 IAC 2-2-1(pp)(2)(A)(iii) and/or 326 IAC 2-3-1 (kk)(2)(A)(iii); and

(iv) An explanation for why the amount was excluded, and any netting calculations, if applicable.

(d) If there is a reasonable possibility (as defined in 326 IAC 2-2-8 (b)(6)(A) and/or 326 IAC 2-3-2 (l)(6)(A)) that a "project" (as defined in 326 IAC 2-2-1(oo) and/or 326 IAC 2-3-1(jj)) at an existing emissions unit, other than projects at a source with a Plantwide Applicability Limitation (PAL), which is not part of a "major modification" (as defined in 326 IAC 2-2-1(dd) and/or 326 IAC 2-3-1(y)) may result in significant emissions increase and the Permittee elects to utilize the "projected actual emissions" (as defined in 326 IAC 2-2-1(pp) and/or 326 IAC 2-3-1(kk)), the Permittee shall comply with following:

(1) Monitor the emissions of any regulated NSR pollutant that could increase as a result of the project and that is emitted by any existing emissions unit identified in (1)(B) above; and

(2) Calculate and maintain a record of the annual emissions, in tons per year on a calendar year basis, for a period of five (5) years following resumption of regular operations after the change, or for a period of ten (10) years following resumption of regular operations after the change if the project increases the design capacity of or the potential to emit that regulated NSR pollutant at the emissions unit.

C.19 General Reporting Requirements [326 IAC 2-7-5(3)(C)] [326 IAC 2-1.1-11] [326 IAC 2-2][326 IAC 2-3] [40 CFR 64][326 IAC 3-8]

(a) The Permittee shall submit the attached Quarterly Deviation and Compliance Monitoring Report or its equivalent. Proper notice submittal under Section B –Emergency Provisions satisfies the reporting requirements of this paragraph. Any deviation from permit requirements, the date(s) of each deviation, the cause of the deviation, and the response steps taken must be reported except that a deviation required to be reported pursuant to an applicable requirement that exists independent of this permit, shall be reported according to the schedule stated in the applicable requirement and does not need to be included in this report. 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 a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35). A deviation is an exceedance of a permit limitation or a failure to comply with a requirement of the permit.

On and after the date by which the Permittee must use monitoring that meets the requirements of 40 CFR Part 64 and 326 IAC 3-8, the Permittee shall submit CAM reports to the IDEM, OAQ.

A report for monitoring under 40 CFR Part 64 and 326 IAC 3-8 shall include, at a minimum, the information required under paragraph (a) of this condition and the following information, as applicable:

(1) Summary information on the number, duration and cause (including unknown cause, if applicable) of excursions or exceedances, as applicable, and the corrective actions taken;

(2) Summary information on the number, duration and cause (including unknown cause, if applicable) for monitor downtime incidents (other than downtime associated with zero and span or other daily calibration checks, if applicable); and

(3) A description of the actions taken to implement a QIP during the reporting period as specified in Section C-Response to Excursions or Exceedances. Upon completion of a QIP, the owner or operator shall include in the next summary report documentation that the implementation of the plan has been completed and reduced the likelihood of similar levels of excursions or exceedances occurring.

The Permittee may combine the Quarterly Deviation and Compliance Monitoring Report and a report pursuant to 40 CFR 64 and 326 IAC 3-8.

(b) The address for report submittal is:

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

(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) Reporting periods are based on calendar years, unless otherwise specified in this permit. For the purpose of this permit “calendar year” means the twelve (12) month period from January 1 to December 31 inclusive.

(e) If the Permittee is required to comply with the recordkeeping provisions of (d) in Section C - General Record Keeping Requirements for any “project” (as defined in 326 IAC 2-2-1 (oo) and/or 326 IAC 2-3-1 (jj)) at an existing emissions unit, and the project meets the following criteria, then the Permittee shall submit a report to IDEM, OAQ:

(1) The annual emissions, in tons per year, from the project identified in (c)(1) in Section C- General Record Keeping Requirements exceed the baseline actual emissions, as documented and maintained under Section C- General Record Keeping Requirements (c)(1)(C)(i), by a significant amount, as defined in 326 IAC 2-2-1 (ww) and/or 326 IAC 2-3-1 (pp), for that regulated NSR pollutant, and

(2) The emissions differ from the preconstruction projection as documented and maintained under Section C - General Record Keeping Requirements (c)(1)(C)(ii).

(f) The report for project at an existing emissions unit shall be submitted no later than sixty (60) days after the end of the year and contain the following:

(1) The name, address, and telephone number of the major stationary source.

(2) The annual emissions calculated in accordance with (d)(1) and (2) in Section C - General Record Keeping Requirements.

(3) The emissions calculated under the actual-to-projected actual test stated in 326 IAC 2-2-2(d)(3) and/or 326 IAC 2-3-2(c)(3).

(4) Any other information that the Permittee wishes to include in this report such as an explanation as to why the emissions differ from the preconstruction projection.

Reports required in this part shall be submitted to:

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

(g) The Permittee shall make the information required to be documented and maintained in accordance with (c) in Section C- General Record Keeping Requirements available for review upon a request for inspection by IDEM, OAQ. The general public may request this information from the IDEM, OAQ under 326 IAC 17.1.

**Stratospheric Ozone Protection**

C.20 Compliance with 40 CFR 82 and 326 IAC 22-1

Pursuant to 40 CFR 82 (Protection of Stratospheric Ozone), Subpart F, except as provided for motor vehicle air conditioners in Subpart B, the Permittee shall comply with applicable standards for recycling and emissions reduction.

**Ambient Monitoring Requirements [326 IAC 7-3]**

C.21 Ambient Monitoring [326 IAC 7-3]

(a) The Permittee shall operate continuous ambient sulfur dioxide air quality monitors and a meteorological data acquisition system according to a monitoring plan submitted to the commissioner for approval. The monitoring plan shall include requirements listed in 326 IAC 7-3-2(a)(1), 326 IAC 7-3-2(a)(2) and 326 IAC 7-3-2(a)(3).

(b) The Permittee and other operators subject to the requirements of this rule, located in the same county, may submit a joint monitoring plan to satisfy the requirements of this rule. [326 IAC 7-3-2(c)]

(c) The Permittee may petition the commissioner for an administrative waiver of all or some of the requirements of 326 IAC 7-3 if such owner or operator can demonstrate that ambient monitoring is unnecessary to determine continued maintenance of the sulfur dioxide ambient air quality standards in the vicinity of the source. [326 IAC 7-3-2(d)]

## SECTION D.1 EMISSIONS UNIT OPERATION CONDITIONS

**Emissions Unit Description:**

(a) One (1) dry bottom, pulverized coal-fired boiler, identified as Boiler No. 1, installed in 1967, with a nominal heat input capacity of 4,802 million Btu per hour (MMBtu/hr), with an electrostatic precipitator (ESP) for control of particulate matter, a flue gas desulfurization (FGD) system for control of $SO_2$, and exhausting to stack 1. Stack 1 has continuous emissions monitors (CEMs) for nitrogen oxides ($NO_X$) and sulfur dioxide ($SO_2$) and a continuous opacity monitor (COM). Boiler No. 1 was configured with a low $NO_X$ burner in 1993. Selective Catalytic Oxidation (SCR) to control NOx, Dry Sorbent Injection System to Control $SO_3$, Activated Carbon Injection System to assist in Control of Hg emissions scheduled to be installed by 2015.

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

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

D.1.1 Particulate Emission Limitations for Sources of Indirect Heating [326 IAC 6-2-3]

The Particulate Matter emissions from Boiler #1 shall be limited to 0.227 lbs/MMBtu. Compliance with this limit satisfies the requirements of 326 IAC 6-2-3 (Particulate Emission Limitations for Sources of Indirect Heating). This emissions limit is based on the historic Particulate Matter emission limit established under 326 IAC 6-2-3.

D.1.2 Temporary Alternative Opacity Limitations [326 IAC 5-1-3]

(a) Pursuant to 326 IAC 5-1-3(e) (Temporary Alternative Opacity Limitations), the following applies:

(1) When building a new fire in Boiler No. 1, opacity may exceed the applicable limitation established in 326 IAC 5-1-2 for a period not to exceed three (3) hours (30 six minute-averaged periods) or until the flue gas temperature entering the electrostatic precipitator (ESP) reaches 250 degrees Fahrenheit, whichever occurs first.

(2) When shutting down a boiler, opacity may exceed the applicable limitation established in 326 IAC 5-1-2 for a period not to exceed three (3) hours (30 six minute-averaged periods) or until the flue gas temperature entering the electrostatic precipitator (ESP) has dropped below 250 degrees Fahrenheit.

(3) Operation of the electrostatic precipitator is not required during these times.

(b) Firing a boiler as part of the chemical cleaning operations of the boiler and its associated tubes is considered a “startup condition” pursuant to 326 IAC 1-2-76 and subject to the exemptions as set forth in D.1.2(a).

(c) When removing ashes from the fuel bed or furnace in a boiler or blowing tubes, opacity may exceed the applicable limit established in 326 IAC 5-1-2. However, opacity levels shall not exceed sixty percent (60%) for any six (6)-minute averaging period and opacity in excess of the applicable limit shall not continue for more than one (1) six (6)-minute averaging periods in any sixty (60) minute period. The averaging periods shall not be permitted for more than three (3) six (6)-minute averaging periods in a twelve (12) hour period.

(d) Permittee is also allowed one start up and one shut down per calendar year as follows:

(i) When building a new fire in a boiler, opacity may exceed the 40% opacity limitation established in 326 IAC 5-1-2 for a period not to exceed a total of seven (7) hours (seventy (70) six (6)-minute averaging periods, consecutive or non-consecutive) or until the flue gas temperature reaches two hundred fifty (250) degrees Fahrenheit, whichever occurs first.

(ii) When shutting down a boiler, opacity may exceed the 40% opacity limitation established in 326 IAC 5-1-2 for a period not to exceed a total of five (5) hours (fifty (50) six (6)-minute averaging periods, consecutive or non-consecutive).

D.1.3 Sulfur Dioxide ($SO_2$) [326 IAC 7-4-8] [326 IAC 7-2-1]

Pursuant to 326 IAC 7-4-8 (Vermillion County Sulfur Dioxide Emission Limitations), the $SO_2$ emissions from Boiler No. 1 shall not exceed 4.40 pounds per million Btu (lbs/MMBtu), demonstrated using a thirty (30) day weighted rolling average. This limitation will ensure that $SO_2$ emissions do not exceed the amount assumed in the modeling analysis performed for the Vermillion County $SO_2$ SIP limits.

D.1.4 Reserved

D.1.5 Preventive Maintenance Plan [326 IAC 2-7-5(13)]

A Preventive Maintenance Plan (PMP) is required for this unit and its control device. Section B - Preventive Maintenance Plan contains the Permittee's obligations with regard to the preventive maintenance plan required by this condition.

**Compliance Determination Requirements**

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

In order to determine compliance with the PM limitation, the Permittee shall perform PM testing for the pulverized coal-fired boiler, identified as Boiler No. 1, utilizing methods as approved by the Commissioner. This test shall be repeated at least once every two (2) calendar years following this valid compliance demonstration. Testing shall be conducted in accordance with the provisions of 326 IAC 3-6 (Source Sampling Procedures). Section C - Performance Testing contains the Permittee's obligations with regard to the performance testing required by this condition.

D.1.7 Operation of Electrostatic Precipitator and Flue Gas Desulfurization (FGD) [326 IAC 2-7-6(6)]

(a) Except as otherwise provided by statute or rule or in this permit, the electrostatic precipitator shall be operated at all times that Boiler No. 1 is in operation and combusting solid fuel or any combination of solid fuels or other fuels.

(b) Except as otherwise provided by statute or rule or in this permit, the flue gas desulfurization (FGD) system shall be operated as needed to maintain compliance with applicable $SO_2$ emission limits.

D.1.8 Maintenance of Continuous Opacity Monitoring Equipment [326 IAC 2-7-5(3)(A)(iii)] [40 CFR 64]

(a) The Permittee shall install, calibrate, maintain, and operate all necessary continuous opacity monitoring systems (COMS) and related equipment. For a boiler, the COMS shall be in operation at all times that the induced draft fan is in operation.

(b) All COMS shall meet the performance specifications of 40 CFR 60, Appendix B, Performance Specification No. 1, and are subject to monitor system certification requirements pursuant to 326 IAC 3-5.

(c) In the event that a breakdown of a COMS occurs, a record shall be made of the times and reasons of the breakdown and efforts made to correct the problem.

(d) Whenever a COMS is malfunctioning or is down for maintenance or repairs for a period of twenty-four (24) hours or more and a backup COMS is not online within twenty-four (24) hours of shutdown or malfunction of the primary COMS, the Permittee shall provide a certified opacity reader, who may be an employee of the Permittee or an independent contractor, to self-monitor the emissions from the emission unit stack.

(1) Visible emission readings shall be performed in accordance with 40 CFR 60, Appendix A, Method 9, for a minimum of five (5) consecutive six (6) minute averaging periods beginning not more than twenty-four (24) hours after the start of the malfunction or down time.

(2) Method 9 opacity readings shall be repeated for a minimum of five (5) consecutive six (6) minute averaging periods at least twice per day during daylight operations, with at least four (4) hours between each set of readings, until a COMS is online.

(3) Method 9 readings may be discontinued once a COMS is online.

(4) Any opacity exceedances determined by Method 9 readings shall be reported with the Quarterly Opacity Exceedances Reports.

(e) Nothing in this permit shall excuse the Permittee from complying with the requirements to operate a continuous opacity monitoring system pursuant to 326 IAC 3-5, (and 40 CFR 60 and/or 40 CFR 63).

D.1.9 Maintenance of Continuous Emission Monitoring Equipment [326 IAC 2-7-5(3)(A)(iii)] [40 CFR 64]

(a) The Permittee shall install, calibrate, maintain, and operate all necessary continuous emission monitoring systems (CEMS) and related equipment as specified in Section D.

(b) All continuous emission monitoring systems shall meet all applicable performance specifications of 40 CFR 60, 40 CFR 75 or any other performance specification, and are subject to monitor system certification requirements pursuant to 326 IAC 3-5-3.

(c) In the event that a breakdown of a continuous emission monitoring system occurs, a record shall be made of the times and reasons of the breakdown and efforts made to correct the problem.

(d) Whenever a continuous emission monitor other than an opacity monitor is malfunctioning or will be down for calibration, maintenance, or repairs, the following shall be used as an alternative to continuous data collection:

(1) If the CEM is required for monitoring $NO_x$ or $SO_2$ emissions pursuant to 40 CFR 75 (Title IV Acid Rain program) or 326 IAC 24 ($SO_2$ and $NO_x$ Trading Program), the Permittee shall comply with the relevant requirements of 40 CFR 75 Subpart D- Missing Data Substitution Procedures.

(2) If the CEM is not used to monitor $NO_x$ or $SO_2$ emissions pursuant to 40 CFR 75 or 326 IAC 24 ($SO_2$ and $NO_x$ Trading Program), then supplemental or intermittent monitoring of the parameter shall be implemented as specified in Section D of this permit until such time as the emission monitor system is back in operation.

(e) Nothing in this permit shall excuse the Permittee from complying with the requirements to operate a continuous emission monitoring system pursuant to 40 CFR 60, Subpart GG 326 IAC 3-5, 40 CFR 60 or 40 CFR 75.

D.1.10 Sulfur Dioxide Emissions and Sulfur Content [326 IAC 2-7-5(A)] [326 IAC 2-7-6] [326 IAC 7-2]

(a) Pursuant to 326 IAC 7-2-1(c), the Permittee shall demonstrate that the sulfur dioxide emissions from Unit 1 do not exceed the equivalents of the limits specified in Conditions D.1.3 (Sulfur Dioxide ($SO_2$)) using a thirty (30) day rolling weighted average.

(b) Pursuant to 326 IAC 7-2-1(e) and 326 IAC 3-7, coal sampling and analysis data shall be collected as follows:

(1) Coal sampling shall be performed using the methods specified in 326 IAC 3-7-2(a), and sample preparation and analysis shall be performed as specified in 326 IAC 3-7-2(c), (d), and (e); or

(2) Pursuant to 326 IAC 3-7-3, manual or other non-ASTM automatic sampling and analysis procedures may be used upon a demonstration, submitted to the department for approval, that such procedures provide sulfur dioxide emission estimates representative either of estimates based on coal sampling and analysis procedures specified in 326 IAC 3-7-2 or of continuous emissions monitoring.

(c) If using CEMS, continuous emission monitoring data collected and reported pursuant to 326 IAC 3-5 shall be used as the means for determining compliance with the emission limitations in 326 IAC 7.

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

D.1.11 Transformer-Rectifier (T-R) Sets [326 IAC 2-7-6(1)] [326 IAC 2-7-5(1)] [40 CFR 64]

(a) The ability of the ESP to control particulate emissions shall be monitored once per day, when the unit is in operation, by measuring and recording the number of T-R sets in service and the primary and secondary voltages and the currents of the T-R sets.

(b) Reasonable response steps shall be taken in accordance with Section C - Response to Excursions or Exceedances whenever the percentage of T-R sets in service falls below ninety percent (90%). T-R set failure resulting in less than ninety percent (90%) availability is not a deviation from this permit. Failure to take response steps in accordance with Section C - Response to Excursions or Exceedances, shall be considered a deviation from this permit.

ESP Parameters

| | Unit 1 ESP |
|---|---|
| Primary Voltage | 215 – 450 V |
| Secondary Voltage | 30 – 175 kV |
| T-R Set Secondary Current | 200 – 1200 mA |

D.1.12 Opacity Readings [326 IAC 2-7-6(1)] [326 IAC 2-7-5(1)]

(a) Appropriate response steps shall be taken in accordance with Section C - Response to Excursions or Exceedances whenever the opacity exceeds twenty-five percent (25%) for three (3) consecutive six (6) minute averaging periods. In the event of opacity exceeding twenty-five percent (25%), response steps will be taken such that the cause(s) of the excursion are identified and corrected and opacity levels are brought back below twenty-

five percent (25%). Examples of expected response steps include, but are not limited to, boiler loads being reduced and ESP T-R sets being returned to service.

(b) Opacity readings in excess of twenty-five percent (25%) but not exceeding the opacity limit for the unit are not a deviation from this permit. Failure to take response steps in accordance with Section C - Response to Excursions or Exceedances, shall be considered a deviation from this permit.

(c) The requirements of (a) and (b), do not apply to Boiler No. 1 during startup and shutdown of Boiler No. 1 and do not apply when Boiler No. 1 is being controlled by the flue gas desulfurization (FGD) system.

D.1.13 $SO_2$ Monitoring System Downtime [326 IAC 2-7-6] [326 IAC 2-7-5(3)]

Whenever the $SO_2$ continuous emission monitoring system (CEMS) is malfunctioning or down for repairs or adjustments for twenty-four (24) hours or more, the Permittee shall monitor and record the boiler load, recirculation pH, slurry feed rate, and number of recirculation pumps in service, to demonstrate that the operation of the scrubber continues in a manner typical for the boiler load and sulfur content of the coal fired. Scrubber parametric monitoring readings shall be recorded at least twice per day until the primary CEMS or a backup CEMS is brought online.

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

D.1.14 Record Keeping Requirements

(a) To document the compliance status with Section C - Opacity and Conditions D.1.1, D.1.2, D.1.9, D.1.11 and D.1.12, the Permittee shall maintain records in accordance with (1) through (4) below. Records shall be complete and sufficient to establish compliance with the limits established in Section C - Opacity and in Conditions D.1.1 and D.1.2.

(1) Data and results from the most recent stack test.

(2) All continuous opacity monitoring data, pursuant to 326 IAC 3-5-6.

(3) The results of all Method 9 visible emission readings taken during any periods of COMS downtime.

(4) All ESP parametric monitoring readings.

(b) To document the compliance status with Conditions D.1.3, D.1.10 and D.1.13, the Permittee shall maintain records in accordance with (1) and (2) below. Records shall be complete and sufficient to establish compliance with the $SO_2$ limits as required in Conditions D.1.3 and D.1.10. The Permittee shall maintain records in accordance with (2) and (3) below during $SO_2$ CEM system downtime if a backup CEM is not used.

The Permittee shall maintain the following records:

(1) All $SO_2$ continuous emissions monitoring data pursuant to 326 IAC 3-5-6.

(2) All scrubber parametric monitoring readings taken during any periods of CEMS downtime, in accordance with Condition D.1.13.

(3) Actual fuel usage during each $SO_2$ CEMS downtime.

(c) Section C - General Record Keeping Requirements contains the Permittee's obligations with regard to the record keeping required by this condition.

D.1.15 Reporting Requirements

(a) Pursuant to 326 IAC 3-5-7, a quarterly report of opacity exceedances and a quarterly summary of the information to document compliance with Condition D.1.8 shall be submitted not later than thirty (30) days following the end of each calendar quarter. The report submitted by the Permittee does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35). Section C - General Reporting Requirements contains the Permittee's obligations with regard to the reporting required by this condition.

(b) Pursuant to 326 IAC 3-5-7, a quarterly report of $SO_2$ exceedances shall be submitted not later than thirty (30) days following the end of each calendar quarter. The report submitted by the Permittee does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35). Section C - General Reporting Requirements contains the Permittee's obligations with regard to the reporting required by this condition.

(c) Pursuant to 326 IAC 3-5-5(e), a quarterly report of the continuous emissions monitoring system performance audits shall be submitted not later than thirty (30) days following the end of each calendar quarter. The report submitted by the Permittee does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35). Section C - General Reporting Requirements contains the Permittee's obligations with regard to the reporting required by this condition.

(d) Pursuant to 326 IAC 3-5-7(5), a quarterly report of the continuous monitoring system instrument downtime shall be submitted not later than thirty (30) days following the end of each calendar quarter. The report submitted by the Permittee does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a "responsible official" as defined by 326 IAC 2-7-1(35). Section C - General Reporting Requirements contains the Permittee's obligations with regard to the reporting required by this condition.

## SECTION D.2 EMISSIONS UNIT OPERATION CONDITIONS

**Emissions Unit Description:**

(b) One (1) dry bottom, pulverized coal-fired boiler, identified as Boiler No. 2, installed in 1968, with a nominal heat input capacity of 4,802 million Btu per hour (MMBtu/hr), with an electrostatic precipitator (ESP) for control of particulate matter, a flue gas desulfurization (FGD) system for control of $SO_2$, and exhausting to stack 2. Stack 2 has continuous emissions monitors (CEMs) for nitrogen oxides ($NO_X$) and sulfur dioxide ($SO_2$) and a continuous opacity monitor (COM). Boiler No. 2 was configured with a low $NO_X$ burner in 1993. Selective Catalytic Oxidation (SCR) to control NOx, Dry Sorbent Injection System to Control $SO_3$, Activated Carbon Injection System to assist in Control of Hg emissions scheduled to be installed by 2015.

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

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

D.2.1 Particulate Emission Limitations for Sources of Indirect Heating [326 IAC 6-2-3]

The Particulate Matter emissions from Boiler #2 shall be limited to 0.227 lbs/MMBtu. Compliance with this limit satisfies the requirements of 326 IAC 6-2-3 (Particulate Emission Limitations for Sources of Indirect Heating). This limit is based on the historic particulate matter emissions limit established under 326 IAC 6-2-3.

D.2.2 Temporary Alternative Opacity Limitations [326 IAC 5-1-3]

(a) Pursuant to 326 IAC 5-1-3(e) (Temporary Alternative Opacity Limitations), the following applies:

(1) When building a new fire in Boiler No. 2, opacity may exceed the applicable limitation established in 326 IAC 5-1-2 for a period not to exceed three (3) hours (30 six minute-averaged periods) or until the flue gas temperature entering the electrostatic precipitator (ESP) reaches 250 degrees Fahrenheit, whichever occurs first.

(2) When shutting down a boiler, opacity may exceed the applicable limitation established in 326 IAC 5-1-2 for a period not to exceed three (3) hours (30 six minute-averaged periods) or until the flue gas temperature entering the electrostatic precipitator (ESP) has dropped below 250 degrees Fahrenheit, whichever occurs first.

(3) Operation of the electrostatic precipitator is not required during these times.

(b) Firing a boiler as part of the chemical cleaning operations of the boiler and its associated tubes is considered a “startup condition” pursuant to 326 IAC 1-2-76 and subject to the exemptions as set forth in D.2.2(a).

(c) When removing ashes from the fuel bed or furnace in a boiler or blowing tubes, opacity may exceed the applicable limit established in 326 IAC 5-1-2. However, opacity levels shall not exceed sixty percent (60%) for any six (6)-minute averaging period and opacity in excess of the applicable limit shall not continue for more than one (1) six (6)-minute averaging periods in any sixty (60) minute period. The averaging periods shall not be permitted for more than three (3) six (6)-minute averaging periods in a twelve (12) hour period.

(d) Permittee is also allowed one start up and one shut down per calendar year as follows:

(i) When building a new fire in a boiler, opacity may exceed the 40% opacity limitation established in 326 IAC 5-1-2 for a period not to exceed a total of seven (7) hours (seventy (70) six (6)-minute averaging periods, consecutive or non-consecutive) or until the flue gas temperature reaches two hundred fifty (250) degrees Fahrenheit, whichever occurs first.

(ii) When shutting down a boiler, opacity may exceed the 40% opacity limitation established in 326 IAC 5-1-2 for a period not to exceed a total of five (5) hours (fifty (50) six (6)-minute averaging periods, consecutive or non-consecutive).

D.2.3 Sulfur Dioxide ($SO_2$) [326 IAC 7-4-8] [326 IAC 7-2-1]

Pursuant to 326 IAC 7-4-8 (Vermillion County Sulfur Dioxide Emission Limitations), the $SO_2$ emissions from Boiler No. 2 shall not exceed 4.40 pounds per million Btu (lbs/MMBtu), demonstrated using a thirty (30) day rolling weighted average. This limitation will ensure that $SO_2$ emissions do not exceed the amount assumed in the modeling analysis performed for the Vermillion County $SO_2$ SIP limits.

D.2.4 Reserved

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

A Preventive Maintenance Plan (PMP) is required for this unit and its control device. Section B - Preventive Maintenance Plan contains the Permittee's obligations with regard to the preventive maintenance plan required by this condition.

**Compliance Determination Requirements**

D.2.6 Testing Requirements [326 IAC 2-7-6(1),(6)] [326 IAC 2-1.1-11]

In order to determine compliance with the PM limitation, the Permittee shall perform PM testing for the pulverized coal-fired boiler, identified as Boiler No. 2, utilizing methods as approved by the Commissioner. This test shall be repeated at least once every two (2) calendar years following this valid compliance demonstration. Testing shall be conducted in accordance with the provisions of 326 IAC 3-6 (Source Sampling Procedures). Section C - Performance Testing contains the Permittee's obligations with regard to the performance testing required by this condition.

D.2.7 Operation of Electrostatic Precipitator and Flue Gas Desulfurization (FGD) [326 IAC 2-7-6(6)]

(a) Except as otherwise provided by statute or rule or in this permit, the electrostatic precipitator shall be operated at all times that Boiler No. 2 is in operation and combusting solid fuel or any combination of solid fuels or other fuels.

(b) Except as otherwise provided by statute or rule or in this permit, the flue gas desulfurization (FGD) system shall be operated as needed to maintain compliance with applicable $SO_2$ emission limits.

D.2.8 Maintenance of Continuous Opacity Monitoring Equipment [326 IAC 2-7-5(3)(A)(iii)] [40 CFR 64]

(a) The Permittee shall install, calibrate, maintain, and operate all necessary continuous opacity monitoring systems (COMS) and related equipment. For a boiler, the COMS shall be in operation at all times that the induced draft fan is in operation.

(b) All COMS shall meet the performance specifications of 40 CFR 60, Appendix B, Performance Specification No. 1, and are subject to monitor system certification requirements pursuant to 326 IAC 3-5.

(c) In the event that a breakdown of a COMS occurs, a record shall be made of the times and reasons of the breakdown and efforts made to correct the problem.

(d) Whenever a COMS is malfunctioning or is down for maintenance or repairs for a period of twenty-four (24) hours or more and a backup COMS is not online within twenty-four (24) hours of shutdown or malfunction of the primary COMS, the Permittee shall provide a certified opacity reader, who may be an employee of the Permittee or an independent contractor, to self-monitor the emissions from the emission unit stack.

(1) Visible emission readings shall be performed in accordance with 40 CFR 60, Appendix A, Method 9, for a minimum of five (5) consecutive six (6) minute averaging periods beginning not more than twenty-four (24) hours after the start of the malfunction or down time.

(2) Method 9 opacity readings shall be repeated for a minimum of five (5) consecutive six (6) minute averaging periods at least twice per day during daylight operations, with at least four (4) hours between each set of readings, until a COMS is online.

(3) Method 9 readings may be discontinued once a COMS is online.

(4) Any opacity exceedances determined by Method 9 readings shall be reported with the Quarterly Opacity Exceedances Reports.

(e) Nothing in this permit shall excuse the Permittee from complying with the requirements to operate a continuous opacity monitoring system pursuant to 326 IAC 3-5, (and 40 CFR 60 and/or 40 CFR 63).

D.2.9 Maintenance of Continuous Emission Monitoring Equipment [326 IAC 2-7-5(3)(A)(iii)] [40 CFR 64]

(a) The Permittee shall install, calibrate, maintain, and operate all necessary continuous emission monitoring systems (CEMS) and related equipment as specified in Section D.

(b) All continuous emission monitoring systems shall meet all applicable performance specifications of 40 CFR 60, 40 CFR 75 or any other performance specification, and are subject to monitor system certification requirements pursuant to 326 IAC 3-5-3.

(c) In the event that a breakdown of a continuous emission monitoring system occurs, a record shall be made of the times and reasons of the breakdown and efforts made to correct the problem.

(d) Whenever a continuous emission monitor other than an opacity monitor is malfunctioning or will be down for calibration, maintenance, or repairs, the following shall be used as an alternative to continuous data collection:

(1) If the CEM is required for monitoring NOx or $SO_2$ emissions pursuant to 40 CFR 75 (Title IV Acid Rain program) or 326 IAC 24 ($SO_2$ and $NO_x$ Trading Program), the Permittee shall comply with the relevant requirements of 40 CFR 75 Subpart D- Missing Data Substitution Procedures.

(2) If the CEM is not used to monitor NOx or $SO_2$ emissions pursuant to 40 CFR 75 or 326 IAC 24 ($SO_2$ and NOx Trading Program), then supplemental or intermittent monitoring of the parameter shall be implemented as specified in Section D of this permit until such time as the emission monitor system is back in operation.

(e) Nothing in this permit shall excuse the Permittee from complying with the requirements to operate a continuous emission monitoring system pursuant to 40 CFR 60, Subpart GG 326 IAC 3-5, 40 CFR 60 or 40 CFR 75.

D.2.10 Sulfur Dioxide Emissions and Sulfur Content [326 IAC 2-7-5(A)] [326 IAC 2-7-6] [326 IAC 7-2]

(a) Pursuant to 326 IAC 7-2-1(c), the Permittee shall demonstrate that the sulfur dioxide emissions from Unit 2 do not exceed the equivalents of the limits specified in Conditions D.2.3 (Sulfur Dioxide ($SO_2$)) using a thirty (30) day rolling weighted average.

(b) Pursuant to 326 IAC 7-2-1(e) and 326 IAC 3-7, coal sampling and analysis data shall be collected as follows:

(1) Coal sampling shall be performed using the methods specified in 326 IAC 3-7-2(a), and sample preparation and analysis shall be performed as specified in 326 IAC 3-7-2(c), (d), and (e); or

(2) Pursuant to 326 IAC 3-7-3, manual or other non-ASTM automatic sampling and analysis procedures may be used upon a demonstration, submitted to the department for approval, that such procedures provide sulfur dioxide emission estimates representative either of estimates based on coal sampling and analysis procedures specified in 326 IAC 3-7-2 or of continuous emissions monitoring.

(c) If using CEMS, continuous emission monitoring data collected and reported pursuant to 326 IAC 3-5 shall be used as the means for determining compliance with the emission limitations in 326 IAC 7.

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

D.2.11 Transformer-Rectifier (T-R) Sets [326 IAC 2-7-6(1)] [326 IAC 2-7-5(1)] [40 CFR 64]

(a) The ability of the ESP to control particulate emissions shall be monitored once per day, when the unit is in operation, by measuring and recording the number of T-R sets in service and the primary and secondary voltages and the currents of the T-R sets.

(b) Reasonable response steps shall be taken in accordance with Section C - Response to Exceedances or Excursions whenever the percentage of T-R sets in service falls below ninety percent (90%). T-R set failure resulting in less than ninety percent (90%) availability is not a deviation from this permit. Failure to take response steps in accordance with Section C - Response to Excursions or Exceedances, shall be considered a deviation from this permit.

ESP Parameters

| | Unit 2 ESP |
|---|---|
| Primary Voltage | 215 – 450 V |
| Secondary Voltage | 30 – 175 kV |
| T-R Set Secondary Current | 200 – 1200 mA |

D.2.12 Opacity Readings [326 IAC 2-7-6(1)] [326 IAC 2-7-5(1)]

(a) Appropriate response steps shall be taken in accordance with Section C - Response to Excursions or Exceedances whenever the opacity exceeds twenty-five percent (25%) for three (3) consecutive six (6) minute averaging periods. In the event of opacity exceeding twenty-five percent (25%), response steps will be taken such that the cause(s) of the excursion are identified and corrected and opacity levels are brought back below twenty-five percent (25%). Examples of expected response steps include, but are not limited to,

boiler loads being reduced and ESP T-R sets being returned to service.

(b) Opacity readings in excess of twenty-five percent (25%) but not exceeding the opacity limit for the unit are not a deviation from this permit. Failure to take response steps in accordance with Section C - Response to Excursions or Exceedances, shall be considered a deviation from this permit.

(c) The requirements of (a) and (b), do not apply to Boiler No. 2 during startup and shutdown of Boiler No. 2 and do not apply when Boiler No. 2 is being controlled by the flue gas desulfurization (FGD) system.

D.2.13 $SO_2$ Monitoring System Downtime [326 IAC 2-7-6] [326 IAC 2-7-5(3)]

Whenever the $SO_2$ continuous emission monitoring system (CEMS) is malfunctioning or down for repairs or adjustments for twenty-four (24) hours or more, the Permittee shall monitor and record the boiler load, recirculation pH, slurry feed rate, and number of recirculation pumps in service, to demonstrate that the operation of the scrubber continues in a manner typical for the boiler load and sulfur content of the coal fired. Scrubber parametric monitoring readings shall be recorded at least twice per day until the primary CEMS or a backup CEMS is brought online.

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

D.2.14 Record Keeping Requirements

(a) To document the compliance status with Section C - Opacity and Conditions D.2.1, D.2.2, D.2.9, D.2.11 and D.2.12, the Permittee shall maintain records in accordance with (1) through (4) below. Records shall be complete and sufficient to establish compliance with the limits established in Section C - Opacity and in Conditions D.2.1 and D.2.2.

(1) Data and results from the most recent stack test.

(2) All continuous opacity monitoring data, pursuant to 326 IAC 3-5-6.

(3) The results of Method 9 visible emission readings taken during any periods of COMS downtime.

(4) All ESP parametric monitoring readings.

(b) To document the compliance status with Conditions D.2.3, D.2.10 and D.2.13, the Permittee shall maintain records in accordance with (1) and (2) below. Records shall be complete and sufficient to establish compliance with the $SO_2$ limits as required in Conditions D.2.3 and D.2.10. The Permittee shall maintain records in accordance with (2) and (3) below during $SO_2$ CEM system downtime if a backup CEM is not used.

(1) All $SO_2$ continuous emissions monitoring data pursuant to 326 IAC 3-5-6.

(2) All scrubber parametric monitoring readings taken during any periods of CEMS downtime, in accordance with Condition D.2.13.

(3) Actual fuel usage during each $SO_2$ CEMS downtime.

(c) Section C - General Record Keeping Requirements contains the Permittee's obligations with regard to the record keeping required by this condition.

D.2.15 Reporting Requirements

(a) Pursuant to 326 IAC 3-5-7, A quarterly report of opacity exceedances shall be submitted not later than thirty (30) days following the end of each calendar quarter. The report submitted by the Permittee does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a “responsible official” as defined by 326 IAC 2-7-1(35). Section C - General Reporting Requirements contains the Permittee's obligations with regard to the reporting required by this condition.

(b) Pursuant to 326 IAC 3-5-7, a quarterly report of $SO_2$ exceedances shall be submitted not later than thirty (30) days following the end of each calendar quarter. The report submitted by the Permittee does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a “responsible official” as defined by 326 IAC 2-7-1(35). Section C - General Reporting Requirements contains the Permittee's obligations with regard to the reporting required by this condition.

(c) Pursuant to 326 IAC 3-5-5(e), a quarterly report of the continuous emissions monitoring system performance audits shall be submitted not later than thirty (30) days following the end of each calendar quarter. The report submitted by the Permittee does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a “responsible official” as defined by 326 IAC 2-7-1(35). Section C - General Reporting Requirements contains the Permittee's obligations with regard to the reporting required by this condition.

(d) Pursuant to 326 IAC 3-5-7(5), a quarterly report of the continuous monitoring system instrument downtime shall be submitted not later than thirty (30) days following the end of each calendar quarter. The report submitted by the Permittee does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a “responsible official” as defined by 326 IAC 2-7-1(35). Section C - General Reporting Requirements contains the Permittee's obligations with regard to the reporting required by this condition.

## SECTION D.3 EMISSIONS UNIT OPERATION CONDITIONS

**Emissions Unit Description:**

(c) One (1) no. 2 fuel oil-fired generator, identified as Unit No. 3A, installed in 1972, with a nominal heat input capacity of 30 million Btu per hour (MMBtu/hr), exhausting to stack 3A.

(d) One (1) no. 2 fuel oil-fired generator, identified as Unit No. 3B, installed in 1972, with a nominal heat input capacity of 30 million Btu per hour (MMBtu/hr), exhausting to stack 3B.

(e) One (1) no. 2 fuel oil-fired generator, identified as Unit No. 3C, installed in 1972, with a nominal heat input capacity of 30 million Btu per hour (MMBtu/hr), exhausting to stack 3C.

(f) One (1) no. 2 fuel oil-fired generator, identified as Unit No. 3D, installed in 1972, with a nominal heat input capacity of 30 million Btu per hour (MMBtu/hr), exhausting to stack 3D.

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

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

D.3.1 Sulfur Dioxide ($SO_2$) [326 IAC 7-1.1-1]

Pursuant to 326 IAC 7-1.1 ($SO_2$ Emissions Limitations), the $SO_2$ emissions from each generator shall not exceed five-tenths (0.5) pound per million Btu heat input.

D.3.2 Preventive Maintenance Plan [326 IAC 2-7-5(13)]

A Preventive Maintenance Plan (PMP) is required for this unit and its control device. Section B - Preventive Maintenance Plan contains the Permittee's obligations with regard to the preventive maintenance plan required by this condition.

**Compliance Determination Requirements**

D.3.3 Sulfur Dioxide Emissions and Sulfur Content [326 IAC 3] [326 IAC 7-2] [326 IAC 7-1.1-2]

(a) Pursuant to 326 IAC 7-2-1(c)(3), the Permittee shall demonstrate that the sulfur dioxide emissions do not exceed the equivalent of 0.5 pounds per MMBtu, using a calendar month average.

(b) Pursuant to 326 IAC 7-2-1(e) and 326 IAC 3-7-4, fuel sampling and analysis data shall be collected as follows:

(1) The Permittee may rely upon vendor analysis of fuel delivered, if accompanied by a vendor certification [326 IAC 3-7-4(b)]; or,

(2) The Permittee shall perform sampling and analysis of fuel oil samples in accordance with 326 IAC 3-7-4(a).

(A) Oil samples shall be collected from the tanker truck load prior to transferring fuel to the storage tank; or

(B) Oil samples shall be collected from the storage tank immediately after each addition of fuel to the tank.

(C) As an alternate to (A) and (B) above, samples may be collected prior to combustion (as burned) on each day fuel is combusted.

(c) Upon written notification to IDEM by a facility owner or operator, continuous emission monitoring data collected and reported pursuant to 326 IAC 3-5 may be used as the means for determining compliance with the emission limitations in 326 IAC 7. Upon such notification, the other requirements of 326 IAC 7-2 shall not apply. [326 IAC 7-2-1(g)]

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

D.3.4 Visible Emissions Notations

(a) Visible emission (VE) notations of the generators' stack exhausts shall be performed once per day during normal daylight operations. 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 the generators.

(e) If abnormal emissions are observed at any generators' exhaust, the Permittee shall take reasonable response steps. Observation of abnormal emissions that do not violate an applicable opacity limit is not a deviation from this permit. Failure to take response steps, shall be considered a deviation from this permit. Section C – Response to Excursions or Exceedances contains the Permittee's obligations with regard to responding to the reasonable response steps required by this condition.

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

D.3.5 Record Keeping Requirements

(a) To document the compliance status with Condition D.3.1, the Permittee shall maintain records in accordance with (1) through (6) below.

(1) Calendar dates covered in the compliance determination period;

(2) Actual fuel oil usage since last compliance determination period and equivalent sulfur dioxide emissions;

(3) A certification, signed by the owner or operator, that the records of the fuel supplier certifications, or the records of fuel sampling and analysis, represent all of the fuel combusted during the period; and

If the fuel supplier certification is used to demonstrate compliance the following, as a minimum, shall be maintained:

(4) Fuel supplier certifications;

(5) The name of the fuel supplier; and

(6) A statement from the fuel supplier that certifies the sulfur content of the fuel oil.

The Permittee shall retain records of all recording/monitoring data and support information for a period of five (5) years, or longer if specified elsewhere in this permit, from the date of the monitoring sample, measurement, or report. Support information includes all calibration and maintenance records and all original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by this permit.

(b) To document the compliance status with Condition D.3.4, the Permittee shall maintain records of visible emission notations of the generators' stack exhausts. The Permittee shall include in its daily record when a visible emission notation is not taken and the reason for the lack of visible emission notation (e.g. the unit did not operate that day).

(c) Section C - General Record Keeping Requirements contains the Permittee's obligations with regard to the record keeping required by this condition.

## SECTION D.4 EMISSIONS UNIT OPERATION CONDITIONS

**Emissions Unit Description:**

(g) A dual conveyor coal processing system, with a nominal throughput of 1900 tons of coal per hour (950 tons of coal per hour each side), consisting of the following equipment:

(1) One (1) railcar unloading station, with a drop point to two (2) hoppers identified as DP-1, with the drop point enclosed with emissions uncontrolled, and exhausting to the ambient air.

(2) One (1) storage area, having a nominal storage capacity including the active piles of 982,800 tons, with fugitive emissions controlled as needed by a watering truck.

(3) One (1) enclosed hopper, with a drop point to a conveyor identified as DP-2, with the drop point enclosed with emissions controlled by a water spray dust suppression system as needed, and exhausting to the ambient air.

(4) One (1) enclosed hopper and two (2) reclaim feeders, with an underground drop points identified as DP-11 and DP-12, with emissions controlled by the underground enclosure, and routed to the conveyor system.

(5) An enclosed dual conveyor system, with 6 drop points identified as DP-3 through DP-6, DP-8, and DP-13, with each drop point enclosed with emissions controlled by the enclosure. Drop points DP-3 through DP-5, DP-8, and DP-13 are controlled as needed by a water spray dust suppression system, and DP-6 is controlled by rotoclones.

(6) An enclosed conveyor system with drop point identified as DP-9, controlled by a telescoping chute.

(7) Coal bunker and coal scale exhausts and associated dust collector vents.

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

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

D.4.1 Particulate Emission Limitations for Manufacturing Processes [326 IAC 6-3-2]

Pursuant to 326 IAC 6-3-2 (Particulate Emission Limitations for Manufacturing Processes), the particulate emission rate from the coal processing drop points, coal scale exhausts, and coal bunkers shall not exceed 86.19 pounds per hour when operating at a process weight rate of 1900 tons per hour. This is determined by the following equation:

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 = 950 (process weight rate in tons per hour)

When the process weight exceeds two hundred (200) tons/hour, the maximum allowable emission may exceed 86.19 pounds per hour, provided the concentration of particulate matter in the discharge gases to the atmosphere is less than 0.10 pounds per one thousand (1,000)

pounds of gases.

D.4.2 Preventive Maintenance Plan [326 IAC 2-7-5(13)]

A Preventive Maintenance Plan (PMP) is required for this unit and its control device. Section B - Preventive Maintenance Plan contains the Permittee's obligations with regard to the preventive maintenance plan required by this condition.

**Compliance Determination Requirements**

D.4.3 Particulate Control [326 IAC 2-7-6(6)]

Except as otherwise provided by statute or rule or in this permit, in order to comply with Section C - Opacity and Condition D.4.1, the dust collectors shall be in operation at all times the coal bunker and coal scales are in operation.

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

D.4.4 Visible Emissions Notations [326 IAC 2-7-6(1)] [326 IAC 2-7-5(1)]

(a) Visible emission notations of the coal unloading station, coal bunker, coal scale exhausts and associated dust collector vents exhausts shall be performed once per week during normal daylight operations when transferring coal. 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.

(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) If abnormal emissions are observed from the coal unloading station, coal bunker, coal scale exhausts and associated dust collector vents exhausts, the Permittee shall take reasonable response steps. Observation of abnormal emissions that do not violate 326 IAC 6-4 (Fugitive Dust Emissions) or an applicable opacity limit is not a deviation from this permit. Failure to take response steps, shall be considered a violation of this permit. Section C – Response to Excursions or Exceedances contains the Permittee's obligations with regard to responding to the reasonable response steps required by this condition.

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

D.4.5 Record Keeping Requirements

(a) To document the compliance status with Section C - Opacity, Section C -Fugitive Dust Emissions, and Condition D.4.4, the Permittee shall maintain records of visible emission notations of the coal unloading station, coal bunker, coal scale exhausts and associated dust collector vents exhausts. The Permittee shall include in its records when a visible emission notation is not taken and the reason for the lack of visible emission notation (e.g. the unit did not operate that day).

(b) Section C - General Record Keeping Requirements contains the Permittee's obligations with regard to the record keeping required by this condition.

## SECTION D.5 EMISSIONS UNIT OPERATION CONDITIONS

**Emissions Unit Description:**

(h) One (1) limestone handling and storage system for the flue gas desulfurization system, constructed in 2006, with a maximum throughput rate of 1,000 tons per hour, consisting of the following:

(1) One (1) railcar/truck unloading operation, with a maximum capacity of 1,000 tons per hour, controlled by fog dust suppression, and exhausting to emission point EP-L1.

(2) Two (2) hoppers, each with a maximum capacity of 500 tons per hour, controlled by fog dust suppression, and exhausting to emission point EP-L2.

(3) Two (2) belt feeders, identified as LHBF-1 and LHBF-2, each with a maximum capacity of 500 tons per hour, controlled by fog dust suppression, and exhausting to emission point EP-L2.

(4) One (1) conveyor, identified as LH-1, controlled by a telescopic chute, and exhausting to emission point EP-L3. Under NSPS, Subpart OOO, this unit is considered a belt conveyor.

(5) One (1) active limestone stockout pile, with a maximum capacity of 7,700 tons.

(6) One (1) inactive limestone storage pile, with a maximum capacity of 45,000 tons.

(7) Two (2) reclaim hoppers, each with a maximum capacity of 200 tons per hour, controlled by fog dust suppression, and exhausting to emission point EP-L4.

(8) Two (2) belt feeders, identified as LHBF-3 and LHBF-4, each with a maximum capacity of 200 tons per hour, controlled by fog dust suppression, and exhausting to emission point EP-L4.

(9) One (1) conveyor, identified as LH-2, with a maximum capacity of 400 tons per hour, controlled by fog dust suppression. The emissions exhaust out the general building vents, identified as emission point EP-L18a and EP-L18b. Under NSPS, Subpart OOO, this unit is considered a belt conveyor.

(10) One (1) reversible conveyor, identified as LH-3, with a maximum capacity of 400 tons per hour, controlled by fog dust suppression. The emissions exhaust out the general building vents, identified as emission points EP-L18a and EP-L18b. Under NSPS, Subpart OOO, this unit is considered a belt conveyor.

(11) Two (2) day bins, each with a maximum throughput rate of 400 tons per hour. Each bin is equipped with a Baghouse to control particulate emissions. Baghouses BH-L1 and BH-L2 exhaust to EP-L16 and EP-L17, respectively. Under NSPS, Subpart OOO, these units considered storage bins.

(12) Two (2) wet ball mills, each with a maximum capacity of 51 tons of limestone slurry per hour. Under NSPS, Subpart OOO, these units are considered grinding mills.

(i) One (1) gypsum handling and storage system, constructed in 2006, consisting of the following:

(1) One (1) wet gypsum conveying system, with a maximum throughput rate of 150 tons per hour.

(2) Two (2) gypsum stock out piles. Gypsum can be stocked out to an outside pile or a pile located in the gypsum stock out building. The maximum gypsum storage capacity is 10,400 tons.

(3) One (1) emergency gypsum stockout pile, with a maximum capacity of 2,600 tons.

(4) One (1) dry gypsum transferring operation, transferring gypsum to landfills by trucks on paved roads.

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

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

D.5.1 Prevention of Significant Deterioration (PSD) Minor Limits [326 IAC 2-2]

In order to render the requirements of 326 IAC 2-2 (PSD) not applicable, the Permittee shall comply with the following:

(a) The total limestone received shall not exceed 509,000 tons per twelve (12) consecutive month period with compliance determined at the end of each month.

(b) The PM/$PM_{10}$ emissions from the lime handling operations shall not exceed the emission limits listed in the table below:

| Emission Point | Unit Description | PM Emission Limit (lbs/ton) | $PM_{10}$ Emission Limit (lbs/ton) |
|---|---|---|---|
| EP-L1 | Railcar/Truck Unloading | 2.50E-05 | 2.50E-05 |
| EP-L2 | Hoppers | 7.50E-04 | 2.75E-04 |
| EP-L2 | Belt Feeders | 7.50E-04 | 2.75E-04 |
| EP-L3 | Conveyor LH-1 | 1.50E-03 | 5.50E-04 |
| EP-L4 | Reclaim Hoppers | 7.50E-04 | 2.75E-04 |
| EP-L4 | Belt Feeders | 7.50E-04 | 2.75E-04 |
| EP-L18abc | Conveyor LH-2 | 7.50E-04 | 2.75E-04 |
| EP-L18abc | Conveyor LH-3 | 7.50E-04 | 2.75E-04 |
| EP-L16 | Day Bin Unit 1 | 3.00E-03 | 1.10E-03 |
| EP-L17 | Day Bin Unit 2 | 3.00E-03 | 1.10E-03 |

(c) The emissions from the following units of the limestone handling system shall be controlled by the control method specified in the table below:

| Emission Point | Unit | Control Method |
|---|---|---|
| EP-L1 | Railcar/Truck Unloading Operation | Fog Dust Suppression |
| EP-L2 | Hoppers | Fog Dust Suppression |

| | | |
|---|---|---|
| | Belt Feeders LHBF-1 and LHBF-2 | |
| EP-L3 | Conveyor LH-1 | Telescoping Chute |
| EP-L4 | Reclaim Hoppers<br>Belt Feeders LHBF-3 and LHBF-4 | Fog Dust Suppression |
| EP-L18a, b, c | Conveyors LH-2 and LH-3 | Fog Dust Suppression |

(d) The total gypsum processed shall not exceed 900,528 tons per twelve (12) consecutive month period with compliance determined at the end of each month.

(e) The PM/$PM_{10}$ emissions from the gypsum conveying system shall not exceed the emission limits listed in the table below:

| Unit Description | PM Emission Limit (lbs/ton) | $PM_{10}$ Emission Limit (lbs/ton) |
|---|---|---|
| Gypsum Conveying System | 0.00014 | 0.000046 |

(f) The limestone and gypsum stockpiles shall be controlled by wet suppression. The suppressant shall be applied in a manner and at a frequency sufficient to ensure compliance with 326 IAC 2-2.

Compliance with these limits will limit the potential to emit of PM and $PM_{10}$ from the limestone handling and the gypsum handling systems to less than 25 tons per year for PM and less than 15 tons per year for $PM_{10}$, and render the requirements of 326 IAC 2-2 (PSD) not applicable to these units.

D.5.2 Particulate Emission Limitations for Manufacturing Processes [326 IAC 6-3-2]

(a) Pursuant to 326 IAC 6-3-2 (Particulate Emission Limitations for Manufacturing Processes), particulate emissions from the following emission units at the limestone handling and storage system, and the gypsum conveying system shall not exceed the emission limits listed in the table below while operating at the maximum throughput rate:

| Unit Description | Max. Throughput Rate (tons/hr) | Particulate Emission Limit (lbs/hr) |
|---|---|---|
| Railcar/Truck Unloading Operation | 1,000 | 77.6 |
| Each of the Hoppers | 500 | 69.0 |
| Each of the Belt Feeders (LHBF-1 and LHBF-2) | 500 | 69.0 |
| Each of the Reclaim Hoppers | 200 | 58.5 |
| Each of the Belt Feeders (LHBF-3 and LHBF-4) | 200 | 58.5 |
| Gypsum Conveying System | 150 | 55.4 |

The limitations for these facilities were calculated using the following equations.

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

(b) Pursuant to 326 IAC 6-3-2(e)(3), when the process weight exceeds 200 tons per hour, the maximum allowable emission may exceed that shown in this table, provided the concentration of particulate matter in the gas discharged to the atmosphere is less than

0.10 pounds per 1,000 pounds of gases.

D.5.3 Preventive Maintenance Plan [326 IAC 2-7-5(13)]

A Preventive Maintenance Plan (PMP) is required for this unit and its control device. Section B - Preventive Maintenance Plan contains the Permittee's obligations with regard to the preventive maintenance plan required by this condition.

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

D.5.4 Visible Emissions Notations [326 IAC 2-7-6(1)] [326 IAC 2-7-5(1)]

(a) Visible emission notations of the stack exhausts from the conveyors (EP-L3, EP-L18a through c) of the limestone handling and storage system shall be performed once per week during normal daylight operations when transferring limestone. 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) If abnormal emissions are observed, the Permittee shall take reasonable response steps. Failure to take response steps, shall be considered a deviation of this permit. Section C – Response to Excursions or Exceedances contains the Permittee's obligations with regard to responding to the reasonable response steps required by this condition.

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

D.5.5 Record Keeping Requirements

(a) To document the compliance status with Condition D.5.1(a), the Permittee shall maintain monthly records of the weight of limestone processed.

(b) To document the compliance status with Condition D.5.1(d), the Permittee shall maintain monthly records of the weight of gypsum processed.

(c) To document the compliance status with Condition D.5.4 Visible Emissions Notations, the Permittee shall maintain records of the the weekly visible emission notations of the transfer points, railcar unloading stations and all response steps taken and the outcome for each. The Permittee shall include in its records when a visible emission notation is not taken and the reason for the lack of visible emission notation (e.g., the process did not operate that day).

(d) Section C - General Record Keeping Requirements contains the Permittee's obligations with regard to the record keeping required by this condition.

### D.5.6 Reporting Requirements

A quarterly summary of the information to document compliance with Conditions D.5.1(a) and D.5.1(d) shall be submitted, using the reporting forms located at the end of this permit, or their equivalent, not later than thirty (3) days following the end of each calendar quarter. The report submitted by the Permittee does require a certification that meets the requirements of 326 IAC 2-7-6(1) by a “responsible official” as defined by 326 IAC 2-7-1(35). Section C - General Reporting Requirements contains the Permittee's obligations with regard to the reporting required by this condition.

## SECTION D.6 EMISSIONS UNIT OPERATION CONDITIONS

**Emissions Unit Description:**

(j) Auxiliary Boiler, identified as emission unit Aux, with a maximum heat input capacity of 72.76 MMBtu/hr fired with distillate oil and exhausting out one stack identified as stack Aux-1. The Auxiliary boiler was constructed before 1968.

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

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

D.6.1 Sulfur Dioxide ($SO_2$) [326 IAC 7-1.1-1] [326 IAC 7-2-1]

Pursuant to 326 IAC 7-1.1 ($SO_2$ Emissions Limitations) the $SO_2$ emissions from the Auxiliary Boiler shall not exceed five tenths (0.5) pounds per MMBtu heat input when combusting distillate oil.

D.6.2 Particulate Emission Limitations for Sources of Indirect Heating [326 IAC 6-2-3]

Pursuant to 326 IAC 6-2-3 (Particulate Emission Limitations for Sources of Indirect Heating: Emission limitations for facilities specified in 326 IAC 6-2-1(c), the PM emissions from the Auxiliary Boiler stack shall not exceed 0.233 pound per million Btu heat input (lbs/MMBtu).

D.6.3 Preventive Maintenance Plan [326 IAC 2-7-5(13)]

A Preventive Maintenance Plan (PMP) is required for this unit and its control device. Section B - Preventive Maintenance Plan contains the Permittee's obligations with regard to the preventive maintenance plan required by this condition.

**Compliance Determination Requirements**

D.6.4 Sulfur Dioxide Emissions and Sulfur Content

Compliance shall be determined utilizing one of the following options.

(a) Pursuant to 326 IAC 3-7-4, the Permittee shall demonstrate that the sulfur dioxide emissions do not exceed five-tenths (0.5) pounds per million Btu heat input by:

(1) Providing vendor analysis of fuel delivered, if accompanied by a vendor certification; or

(2) Analyzing the oil sample to determine the sulfur content of the oil via the procedures in 40 CFR 60, Appendix A, Method 19.

(A) Oil samples may be collected from the fuel tank immediately after the fuel tank is filled and before any oil is combusted; and

(B) If a partially empty fuel tank is refilled, a new sample and analysis would be required upon filling.

(b) Compliance may also be determined by conducting a stack test for sulfur dioxide emissions from the Auxiliary Boiler, using 40 CFR 60, Appendix A, Method 6 in accordance with the procedures in 326 IAC 3-6.

(C) As an alternate to (A) and (B) above, samples may be collected prior to combustion (as burned) on each day fuel is combusted.

A determination of noncompliance pursuant to any of the methods specified in (a) or (b) above shall not be refuted by evidence of compliance pursuant to the other method.

**Compliance Monitoring Requirements [326 IAC 2-8-4][326 IAC 2-8-5(a)(1)]**

D.6.5 Visible Emissions Notations

(a) Visible emission notations of the Auxiliary Boiler stack exhaust (Aux-1) shall be performed once per day during normal daylight operations. 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) If abnormal emissions are observed, the Permittee shall take reasonable response steps. Failure to take response steps, shall be considered a deviation from this permit. Section C – Response to Excursions or Exceedances contains the Permittee's obligations with regard to responding to the reasonable response steps required by this condition.

**Record Keeping and Reporting Requirements [326 IAC 2-8-4(3)]**

D.6.6 Record Keeping Requirement

(a) To document the compliance status with Conditions D.6.1, the Permittee shall maintain records in accordance with (1) through (3) below.

(1) Calendar dates covered in the compliance determination period;

(2) Actual fuel usage of each fuel used since last compliance determination period;

(3) If the fuel supplier certification is used to demonstrate compliance the following, as a minimum, shall be maintained:

(i) Fuel supplier certifications.

(ii) The name of the fuel supplier; and

(iii) A statement from the fuel supplier that certifies the sulfur content of the fuel oil.

(b) To document the compliance status with Condition D.6.5, the Permittee shall maintain records of visible emission notations of the boiler stack (Aux-1) exhaust. The Permittee shall include in its records when a visible emission notation is not taken and the reason for the lack of visible emission notation, (e.g. the process did not operate that day).

(c) Section C - General Record Keeping Requirements contains the Permittee's obligations with regard to the record keeping required by this condition.

**SECTION D.7 EMISSIONS UNIT OPERATION CONDITIONS**

**Emissions Unit Description:**

(k) One (1) Arsenic Mitigation System consisting of (1) 700 ton Limestone Storage Silo and (1) 300 ton Limestone Surge Bin, scheduled to be installed by 2015. Limestone is pneumatically conveyed from delivery trucks to the Limestone Storage Silo and from the Limestone Storage Silo to the Limestone Surge Bin. Limestone in the Surge Bin is dropped on to the C-1 and C-2 coal conveyors. PM emissions generated during pneumatic conveying and transfer points to the C-1 and C-2 conveyor will be controlled by the bin vent filters. The Limestone Storage Silo and Limestone Surge Bin are identified as emissions points EP-01(LS) and EP-02(LS).

(l) Two (2) Dry Sorbent Injection (DSI) Systems, one for each Unit. Each DSI system consists of one (1) Sorbent Storage Silo with a storage capacity of 120 tons, three (3) Silo Weight Feeders to regulate sorbent from the silos and a system to inject the sorbent material into the flue gas, scheduled to be installed by 2015. PM emissions generated during loading operations are controlled by a Bin Vent Filter located on the top of each silo and the weight feeders. The two (2) Sorbent Silos are identified as emission points EP-01(DSI), and EP-03(DSI). The weight feeders are identified as EP-05A(DSI), EP-05B(DSI), EP-06A(DSI) and EP-06B(DSI) with spares EP-05C(DSI) and EP-06C(DSI).

(m) Two (2) Activated Carbon Injection (ACI) Systems, one for each Unit. Each ACI system consists of one (1) storage silo with a 120 ton storage capacity, two (2) Silo Weight Feeders to regulate carbon from the silos and a system for injecting the Activated Carbon into the flue gas, scheduled to be installed by 2015. PM emissions during the silo loading operation are controlled by the bin vent filters located on top of the silos. The two (2) Activated Carbon Storage Silos are identified as emission points EP-01(ACI) and EP-02(ACI). The weight feeders are identified as EP-03A(ACI) and EP-04A(ACI) with spares EP-03B(ACI) and EP-04B(ACI).

(n) Two (2) Dry Ash Handling Systems, one for each Unit. The dry ash handling system consists of a pneumatic conveying system, four (4) baghouse separators, one (1) ash silo with a storage capacity of 3,500 and an ash unloading system, scheduled to be installed by 2015.

(i) Baghouse Separators - Fly ash from the ESP Ash Hoppers, Air Heater Ash Hoppers, Economizer Ash Hoppers and SCR Large Particle Screen Ash Hopper will be pneumatically conveyed to one of four (4) baghouse separators. There will be two (2) baghouse separators for each unit. The dry fly ash is separated from the air stream in a baghouse separator. Each baghouse separator are identified as emissions points EP-01(DFA), EP--02(DFA), EP-03(DFA), and EP-04(DFA). The system is equipped with a spare exhauster identified as emissions point EP-05(DFA).

(ii) Ash Silos - Fly ash collected in the baghouse separators is dropped into a feeder and pneumatically conveyed to the ash silo. The ash silo is equipped with a bin vent filter to control particulate matter emissions from pneumatic conveying. The Ash Silo is identified as emission point EP-06(DFA).

(iii) Ash Unloading Operation - Fly ash collected in the silos can be unloaded into trucks or pneumatically conveyed to the ash fixation process. Fly ash unloaded into trucks can be unloaded dry or wet. Fly ash unloaded dry is gravity feed to a chute and unloaded into enclosed trucks. The emissions

generated from unloading the ash dry are vented back to the silo and controlled by the silo bin vent filter. Ash unloaded wet is feed into a pin mixer where the ash is mixed with water and unloaded into open trucks

(o) One (1) Ash Fixation Process consisting of a pneumatic conveying system, one (1) lime silo, conveyors, and two (2) pin mixers, scheduled to be installed by 2015.

(i) Lime Silo – Lime will be delivered by truck and will pneumatically loaded into the silo. The storage capacity of the silo is 300 tons. The emissions generated by the pneumatic conveying will be controlled by a bin vent filter located on top of the lime silo. The Lime Silo is identified as emissions point EP-02(FIX).

(ii) Conveyor and Transfer Points – Fly ash, Lime and Gypsum will be conveyed to one of two (2) pin mixers where this material will be mixed with water to make the fixated ash. The fixated ash will be unloaded to a storage pile, and then loaded into trucks using front end loaders.

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

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

D.7.1 Prevention of Significant Deterioaration (PSD) Minor Limits [326 IAC 2-2]

The Permittee shall comply with the following:

(a) Fly ash unloaded from the fly ash silo shall either be unloaded wet into open trucks with the ash having a moisture content of not less than 15% or unloaded dry into enclosed trucks using the telescoping chute to vent emissions back to the fly ash silo bin vent filter.

(b) The PM, $PM_{10}$ and $PM_{2.5}$ emissions from the Activity on Storage Pile shall be controlled by maintaining the average moisture content of the fixated ash not less than 15% moisture content and applying water to the pile as need to prevent dusting.

(c) The PM, $PM_{10}$ and $PM_{2.5}$ emissions from the limestone, dry sorbent, activated carbon, dry ash and ash fixation systems shall not exceed the emission limits listed in the table below:

| Emission Point | Unit Description | PM Emission Limit (lbs/hr) | PM10 Emission Limit (lbs/hr) | PM2.5 Emission Limit (lbs/hr) |
|---|---|---|---|---|
| EP-01(LS) | Limestone Silo | 0.094 | 0.094 | 0.094 |
| EP-02(LS) | Limestone Surge Bin | 0.097 | 0.097 | 0.097 |
| EP-01(DSI) | Unit 1DSI Silo #1 | 0.043 | 0.043 | 0.043 |
| EP-03(DSI) | Unit 2 DSI Silo #1 | 0.043 | 0.043 | 0.043 |
| EP-05A(DSI) | Sorbent Silo Weight Feeders | 0.0086 | 0.0086 | 0.0086 |
| EP-05B(DSI) | Sorbent Silo Weight Feeders | | | |
| EP-06A(DSI) | Sorbent Silo Weight Feeders | 0.0086 | 0.0086 | 0.0086 |
| EP-06B(DSI) | Sorbent Silo Weight Feeders | | | |
| EP-01(ACI) | Unit 1 ACI Silo | 0.043 | 0.043 | 0.043 |
| EP-02(ACI) | Unit 2 ACI Silo | 0.043 | 0.043 | 0.043 |
| EP-03A(ACI) | Carbon Silo Weight Feeders | 0.0086 | 0.0086 | 0.0086 |
| EP-04A(ACI) | Carbon Silo Weight Feeders | 0.0086 | 0.0086 | 0.0086 |

| Emission Point | Unit Description | PM Emission Limit (lbs/hr) | PM10 Emission Limit (lbs/hr) | PM2.5 Emission Limit (lbs/hr) |
|---|---|---|---|---|
| EP-01(DFA) | Baghouse Separator 1A Exhauster | 0.21 | 0.21 | 0.21 |
| EP-02(DFA) | Baghouse Separator 1B Exhauster | 0.21 | 0.21 | 0.21 |
| EP-03(DFA) | Baghouse Separator 2A Exhauster | 0.21 | 0.21 | 0.21 |
| EP-04(DFA) | Baghouse Separator 2B Exhauster | 0.21 | 0.21 | 0.21 |
| EP-05(DFA) | Spare Baghouse Separator Exhauster | 0.21 | 0.21 | 0.21 |
| EP-06(DFA) | Ash Silo #1 | 0.21 | 0.21 | 0.21 |
| EP-02(FIX) | Lime Silo | 0.103 | 0.103 | 0.103 |

Compliance with these limits in conjunction with the potential fugitive emissions from vehicular traffic, will ensure that the PM emissions are less than 25 tons per year, $PM_{10}$ emissions are less than 15 tons per year and $PM_{2.5}$ emissions are less than 10 tons per year, and render the requirements of 326 IAC 2-2 (PSD) not applicable to the 2013 modification.

D.7.2 Particulate Emission Limitations for Manufacturing Processes [326 IAC 6-3-2]

(a) Pursuant to 326 IAC 6-3-2, the allowable particulate matter (PM) from the (2) Sorbent Silos, (1) Lime Silo (1) Limestone Silo and (2) Activated Carbon Silos shall not exceed 30.5 pounds per hour each when operating at a process weight rate of 20 tons per hour. The pound per hour limitation was calculated with the following equation:

$E = 4.1 P^{0.67}$
Where:
E = rate of emission in pounds per hour and
P = process weight rate in tons per hour

(b) Pursuant to 326 IAC 6-3-2, the particulate matter (PM) from the (1) Limestone Surge Bin shall not exceed 40.0 pounds per hour when operating at a process weight rate of 30 tons per hour each. The pound per hour limitation was calculated with the following equation:

$E = 4.1 P^{0.67}$
Where:
E = rate of emission in pounds per hour and
P = process weight rate in tons per hour

(c) Pursuant to 326 IAC 6-3-2, the particulate matter (PM) from (5) exhausters shall not exceed 45.4 pounds per hour each when operating at a process weight rate of 54.4 tons per hour. The pound per hour limitation was calculated with the following 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) Pursuant to 326 IAC 6-3-2, the particulate matter (PM) from **the** ash silo shall not exceed 47.8 pounds per hour when operating at a process weight rate of 70 tons per hour. The pound per hour limitation was calculated with the following 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.7.3 Preventive Maintenance Plan [326 IAC 2-7-5(13)]

A Preventive Maintenance Plan (PMP) is required for this unit and its control device. Section B - Preventive Maintenance Plan contains the Permittee's obligations with regard to the preventive maintenance plan required by this condition.

**Compliance Determination Requirements**

D.7.4 Particulate Control [326 IAC 2-7-6(6)]

(a) In order to ensure compliance with the particulate matter emissions limits specified in conditions D.7.1(c) and D.7.2 the filter separators, and silo bin vent filters shall in operation and controlling emissions whenever the equipment is in operation and venting to the control device.

(b) In order to ensure compliance with Condition D.7.1(a), the Permittee shall wet the ash when unloading into open trucks. If the weather conditions preclude the use of water, the Permittee shall use additional wet suppression. The Permittee shall perform moisture content analysis, weekly on the ash to ensure it has a moisture content of not less than 15%. Additional wetting of the ash should be applied if visible emissions are observed during the loading process.

D.7.5 Testing Requirements [326 IAC 2-7-6(1),(6)][326 IAC 2-1.1-11]

(a) Within 180 days after the initial startup of the pneumatic fly ash transfer system, In order to determine compliance with Condition D.7.1(c), the Permittee shall perform PM, $PM_{10}$ and $PM_{2.5}$ testing two (2) of the five (5) separator/exhausters, identified as emissions point EP-01 (DFA), EP-02 (DFA), EP-03 (DFA), EP-04 (DFA) and EP-05 (DFA), using methods as approved by the Commissioner. This testing shall be at least once every 5 years from the date of the last valid compliance demonstration. The separator/exhauster tested shall be the unit in which the longest amount of time has elapsed since its previous test. Testing shall be conducted in accordance with the provisions of 326 IAC 3-6 (Source Sampling Procedures). Section C - Performance Testing contains the Permittee's obligations with regard to the performance testing required by this condition.

(b) Within 180 days after the initial startup of the pneumatic fly ash transfer system, In order to determine compliance with Condition D.7.1(c), the Permittee shall perform PM, $PM_{10}$ and $PM_{2.5}$ testing on the one (1) Fly Ash Silo, identified as emission point EP-06 (DFA), using methods as approved by the Commissioner. This testing shall be at least once every 5 years from the date of the last valid compliance demonstration. Testing shall be conducted in accordance with the provisions of 326 IAC 3-6 (Source Sampling Procedures). Section C - Performance Testing contains the Permittee's obligations with regard to the performance testing required by this condition.

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

D.7.6 Visible Emissions Notations [326 IAC 2-7-6(1)] [326 IAC 2-7-5(1)] [40 CFR 64]

(a) Visible emission notations of the stack exhausts for the (1) Limestone Silo (1) Limestone Surge Bin, (2) ACI Silos, (2) DSI Silos, and (1) Lime Silo shall be performed once per week during normal daylight operations when the equipment is in operation. A trained employee shall record whether emissions are normal or abnormal.

(b) Visible emission notations of the stack for the (4) baghouse separator exhausters, and one (1) ash silo shall be performed once per day during normal daylight operations when

the equipment is in operation. A trained employee shall record whether emissions are normal or abnormal.

(c) Visible emission notations of the fixated material storage pile shall be performed once per week during normal daylight operations when the equipment is in operation. A trained employee shall record whether emissions are normal or abnormal.

(d) 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.

(f) 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.

(g) 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.

(h) If abnormal emissions are observed, the Permittee shall take reasonable response steps. Observation of abnormal emissions that do not violate an applicable opacity limit is not a deviation from this permit. Failure to take response steps shall be considered a deviation from this permit. Section C – Response to Excursions or Exceedances contains the Permittee's obligations with regard to responding to the reasonable response steps required by this condition.

D.7.7 Parametric Monitoring [40 CFR 64]

The Permittee shall record the pressure drop across each baghouse filter separator used in conjunction with the dry ash handling system, at least once per day when the dry ash handling system is exhausting to the atmosphere. When, for any one reading, the pressure drop across the baghouse is outside of the normal range, the Permittee shall take a reasonable response. The normal range for this unit is a pressure drop between 1.0 and 6.0 inches of water unless a different upper-bound or lower-bound value for this range is determined during the latest stack test. Section C - Response to Excursions or Exceedances contains the Permittee's obligation with regard to the reasonable response steps required by this condition. A pressure reading that is outside the above mentioned range is not a deviation from this permit. Failure to take response steps shall be considered deviation from the permit.

The instrument used for determining the pressure shall comply with Section C - Instrument Specifications, of this permit, shall be subject to approval by IDEM, OAQ, and shall be calibrated as specified by the manufacturer.

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

D.7.8 Record Keeping Requirements

(a) To document the compliance status with Condition D.7.6(a) - Visible Emission Notation, the Permittee shall maintain weekly records of the visible emission notations of the stack exhausts for the (1) Limestone Silo, (1) Limestone Surge Bin, (2) ACI Silos, (2) DSI Silos and (1) Lime Silo. The Permittee shall include in its weekly record when a visible emission notation is not taken and the reason for the lack of a visible emission notation, (e.g. the process did not operate that week).

(b) To document the compliance status with Condition D.7.6(b) - Visible Emission Notation, the Permittee shall maintain daily records of the visible emission notations of the stack exhaust for (5) Baghouse Filter Separators Exhausters, and Ash Silos when in operation. The Permittee shall include in its daily record when a visible emission notation is not

taken and the reason for the lack of a visible emission notation, (e.g. the process did not operate that day).

(c) To document the compliance status with Condition D.7.6(c) - Visible Emission Notation, the Permittee shall maintain weekly records of the visible emission notations of the fixated material storage pile when in operation. The Permittee shall include in its weekly record when a visible emission notation is not taken and the reason for the lack of a visible emission notation, (e.g. the process did not operate that week).

(d) To document the compliance status with Condition D.7.7 - Parametric Monitoring, the Permittee shall maintain the daily records of the pressure drop across the baghouse filter separator. The Permittee shall include in its daily record when a pressure drop reading is not taken and the reason for the lack of a pressure drop reading, (e.g. the process did not operate that day).

(e) Section C - General Record Keeping Requirements contains the Permittee's obligations with regard to the record keeping required by this condition.

## SECTION D.8 EMISSIONS UNIT OPERATION CONDITIONS

**Emissions Unit Description:**

(a) Degreasing operations that do not exceed 145 gallons per 12 months, except if subject to 326 IAC 20-6. [326 IAC 8-3-2] [326 IAC 8-3-8]

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

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

D.8.1 Volatile Organic Compounds (VOC) [326 IAC 8-3-2]

(a) Pursuant to 326 IAC 8-3-2 (Cold Cleaner Degreaser Control Equipment and Operating Requirements), for cold cleaning degreasers without remote solvent reservoirs constructed after July 1, 1990:

(1) Equip the degreaser with a cover.

(2) Equip the degreaser with a device for draining cleaned parts.

(3) Close the degreaser cover whenever parts are not being handled in the degreaser.

(4) Drain cleaned parts for at least fifteen (15) seconds or until dripping ceases.

(5) Provide a permanent, conspicuous label that lists the operating requirements in (a)(3), (a)(4), (a)(6), and (a)(7) of this condition.

(6) Store waste solvent only in closed containers.

(7) Prohibit the disposal or transfer of waste solvent in such a manner that could allow greater than twenty percent (20%) of the waste solvent (by weight) to evaporate into the atmosphere.

(b) The Permittee shall ensure the following additional control equipment and operating requirements are met:

(1) Equip the degreaser with one (1) of the following control devices if the solvent is heated to a temperature of greater than forty-eight and nine-tenths (48.9) degrees Celsius (one hundred twenty (120) degrees Fahrenheit):

(A) A freeboard that attains a freeboard ratio of seventy-five hundredths (0.75) or greater.

(B) A water cover when solvent used is insoluble in, and heavier than, water.

(C) A refrigerated chiller.

(D) Carbon adsorption.

(E) An alternative system of demonstrated equivalent or better control as those outlined in (b)(1)(A) through (D) of this condition that is approved by the department. An alternative system shall be submitted to the U.S. EPA as a SIP revision.

(2) Ensure the degreaser cover is designed so that it can be easily operated with one (1) hand if the solvent is agitated or heated.

(3) If used, solvent spray:

(A) must be a solid, fluid stream; and

(B) shall be applied at a pressure that does not cause excessive splashing.

D.8.2 Volatile Organic Compounds (VOC) [326 IAC 8-3-8]

Pursuant to 326 IAC 8-3-8 (Material Requirements for Cold Cleaner Degreasers), on or after January 1, 2015, the Permittee shall not operate a cold cleaner degreaser with a solvent that has a VOC composite partial vapor pressure than exceeds one (1) millimeter of mercury (nineteen-thousandths (0.019) pound per square inch) measured at twenty (20) degrees Celsius (sixty-eight (68) degrees Fahrenheit).

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

D.8.3 Record Keeping Requirements

(a) Pursuant to 326 IAC 8-3-8(c)(2), on or after January 1, 2015, the following records shall be maintained for each purchase of cold cleaner degreaser solvent:
(1) The name and address of the solvent supplier.
(2) The date of purchase (or invoice/bill dates of contract servicer indicating service date).
(3) The type of solvent purchased.
(4) The total volume of the solvent purchased.
(5) The true vapor pressure of the solvent measured in millimeters of mercury at twenty (20) degrees Celsius (sixty-eight (68) degrees Fahrenheit).

(b) Section C - General Record Keeping Requirements of this permit contains the Permittee's obligations with regard to the records required by this condition

## SECTION E.1 EMISSIONS UNIT OPERATION CONDITIONS

**Emissions Unit Description:**

(b) One 156.9 HP (100 kW), CI ICE with a displacement 4.4 liters, Diesel Fired Emergency Generator, Manufactured by Caterpillar Model Year 2007, Model D100-6, constructed in 2007, identified as ENG-1. This generator is located in the switch yard and is operated as backup for the black start diesel aux feed.

(c) One 713 Hp (450 kW), CI ICE with a displacement 15.2 liters, Diesel Fired Emergency Engine, Manufactured by Caterpillar, Model Year 2007, Model C15DITA, constructed in 2007, identified as ENG-2. This engine is use to quench the flue gas if the scrubber should fail.

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

**New Source Performance Standards (NSPS) Requirements [40 CFR 60] and National Emission Standards for Hazardous Air Pollutants [40 CFR 63]**

E.1.1 General Provisions Relating to New Source Performance Standards (NSPS) [326 IAC 12-1] [40 CFR 60, Subpart A] [326 IAC 12]

The provisions of 40 CFR 60, Subpart A - General Provisions, which are incorporated by reference in 326 IAC 12-1, apply to ENG-1 and ENG-2 except when otherwise specified in 40 CFR 60, Subpart IIII.

E.1.2 Standard of Performance for Stationary Compression Ignition Internal Combustion Engines [326 IAC 12] [40 CFR 60, Subpart IIII]

Pursuant to 40 CFR 60 Subpart IIII, the Permittee shall comply with the provisions of 40 CFR 60 Subpart IIII, which are incorporated as 326 IAC 12-1 for ENG-1 and ENG-2, as specified as follows:

(1) 40 CFR 60.4202
(2) 40 CFR 60.4205(b)
(3) 40 CFR 60.4207(a) & (b)
(4) 40 CFR 60.4209(a)
(5) 40 CFR 60.4211(a),(c) & (e)
(6) 40 CFR 60.4214(b)

E.1.3 General Provisions Relating to National Emission Standards for Hazardous Air Pollutants (NESHAP) [326 IAC 20-82] [40 CFR 63, Subpart A]

The provisions of 40 CFR 63, Subpart A - General Provisions, which are incorporated by reference in 326 IAC 20-82, apply to ENG-2 except when otherwise specified in 40 CFR 63, Subpart ZZZZ.

E.1.4 Stationary Reciprocating Internal Combustion Engines NESHAP [326 IAC 20-82] [40 CFR 63, Subpart ZZZZ]

Pursuant to 40 CFR 63 Subpart ZZZZ, the Permittee shall comply with the provisions of 40 CFR 63 Subpart ZZZZ, which are incorporated as 326 IAC 20-82 for ENG-2, as specified as follows:

(1) 40 CFR 63.6590(b) & (c)
(2) 40 CFR 63.6645(f)

## SECTION E.2 EMISSIONS UNIT OPERATION CONDITIONS

**Emissions Unit Description:**

(i) One (1) limestone handling and storage system for the flue gas desulfurization system, constructed in 2006, with a maximum throughput rate of 1,000 tons per hour, consisting of the following:

(1) One (1) conveyor, identified as LH-1, controlled by a telescopic chute, and exhausting to emission point EP-L3. Under NSPS, Subpart OOO, this unit is considered a belt conveyor.

(2) One (1) active limestone stockout pile, with a maximum capacity of 7,700 tons.

(3) One (1) conveyor, identified as LH-2, with a maximum capacity of 400 tons per hour, controlled by fog dust suppression, and exhausting to emission point EP-L18b. Under NSPS, Subpart OOO, this unit is considered a belt conveyor.

(4) One (1) reversible conveyor, identified as LH-3, with a maximum capacity of 400 tons per hour, controlled by fog dust suppression, and exhausting to emission points EP-L18a and EP-L18c. Under NSPS, Subpart OOO, this unit is considered a belt conveyor.

(5) Two (2) day bins, each with a maximum throughput rate of 400 tons per hour, and exhausting to EP-L16 and EP-L17, respectively. Under NSPS, Subpart OOO, these units considered storage bins.

(6) Two (2) wet ball mills, each with a maximum capacity of 51 tons of limestone slurry per hour. Under NSPS, Subpart OOO, these units are considered grinding mills.

(7) Two (2) Dry Sorbent Injection (DSI) Systems, one for each Unit. Each DSI system consists of one (1) Sorbent Storage Silo with a storage capacity of 120 tons, three (3) Silo Weight Feeders to regulate sorbent from the silos and a system to inject the sorbent material into the flue gas, scheduled to be installed by 2015. PM emissions generated during loading operations are controlled by a Bin Vent Filter located on the top of each silo and the weight feeders. The two (2) Sorbent Silos are identified as emission points EP-01(DSI), and EP-03(DSI). The weight feeders are identified as EP-05A (DSI), EP-05B(DSI), EP-06A(DSI) and EP-06B(DSI) with spares EP-05C(DSI) and EP-06C(DSI).

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

**New Source Performance Standards (NSPS) Requirements [40 CFR 60]**

E2.1 General Provisions Relating to New Source Performance Standards [326 IAC 12-1] [40 CFR Part 60, Subpart A]

Pursuant to 40 CFR 60.1, the Permittee shall comply with the provisions of 40 CFR Part 60 Subpart A – General Provisions, which are incorporated by reference as 326 IAC 12-1 for the ball mills, conveyors, and storage bins of the limestone handling and storage system, except as otherwise specified in 40 CFR Part 60, Subpart OOO.

E.2.2 Standard of Performance for Nonmetallic Mineral Processing Plants Requirements [40 CFR Part 60, Subpart OOO] [326 IAC 12]

Pursuant to 40 CFR Part 60, Subpart OOO, the Permittee shall comply with the provisions of

Standard of Performance for Nonmetallic Mineral Processing Plants, which are incorporated by reference as 326 IAC 12, for the ball mills, conveyors, and storage bins of the limestone handling and storage system as specified as follows:

(1) 40 CFR 60.670
(2) 40 CFR 60.671
(3) 40 CFR 60.672
(4) 40 CFR 60.673
(5) 40 CFR 60.674
(6) 40 CFR 60.675
(7) 40 CFR 60.676
(8) Table 1 to Subpart OOO
(9) Table 2 to Subpart OOO
(10) Table 3 to Subpart OOO

## SECTION E.3 EMISSIONS UNIT OPERATION CONDITIONS

**Emissions Unit Description:**

(a) One (1) dry bottom, pulverized coal-fired boiler, identified as Boiler No. 1, installed in 1967, with a nominal heat input capacity of 4,802 million Btu per hour (MMBtu/hr), with an electrostatic precipitator (ESP) for control of particulate matter, a flue gas desulfurization (FGD) system for control of $SO_2$, and exhausting to stack 1. Stack 1 has continuous emissions monitors (CEMs) for nitrogen oxides ($NO_X$) and sulfur dioxide ($SO_2$) and a continuous opacity monitor (COM). Boiler No. 1 was configured with a low $NO_X$ burner in 1993. Selective Catalytic Oxidation (SCR) to control NOx, Dry Sorbent Injection System to Control $SO_3$, Activated Carbon Injection System to assist in Control of Hg emissions scheduled to be installed by 2015.

(b) One (1) dry bottom, pulverized coal-fired boiler, identified as Boiler No. 2, installed in 1968, with a nominal heat input capacity of 4,802 million Btu per hour (MMBtu/hr), with an electrostatic precipitator (ESP) for control of particulate matter, a flue gas desulfurization (FGD) system for control of $SO_2$, and exhausting to stack 2. Stack 2 has continuous emissions monitors (CEMs) for nitrogen oxides ($NO_X$) and sulfur dioxide ($SO_2$) and a continuous opacity monitor (COM). Boiler No. 2 was configured with a low $NO_X$ burner in 1993. Selective Catalytic Oxidation (SCR) to control NOx, Dry Sorbent Injection System to Control $SO_3$, Activated Carbon Injection System to assist in Control of Hg emissions scheduled to be installed by 2015.

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

### E.3.1. Statutory and Regulatory Authorities

In accordance with IC 13-17-3-4 and IC 13-17-3-11 as well as Titles IV and V of the Clean Air Act, the Indiana Department of Environmental Management (IDEM), Office of Air Quality (OAQ) issues this permit pursuant to 326 IAC 2 and 326 IAC 21 (incorporates by reference 40 Code of Federal Regulations (CFR) 72 through 78).

### E.3.2. Standard Permit Requirements [326 IAC 21]

(a) The designated representative has submitted a complete acid rain permit application in accordance with 40 CFR 72.30.

(b) The Permittee shall operate Units 1 and 2 in compliance with this permit.

### E.3.3. Monitoring Requirements [326 IAC 21]

(a) The Permittee and, to the extent applicable, the designated representative of Units 1 and 2 shall comply with the monitoring requirements as provided in 40 CFR 75 and 76.

(b) The emissions measurements recorded and reported in accordance with 40 CFR 75 and 76 shall be used to determine compliance by Units 1 and 2 with the acid rain emissions limitations and emissions reduction requirements for sulfur dioxide and nitrogen oxides under the Acid Rain Program.

(c) The requirements of 40 CFR 75 and 76 shall not affect the responsibility of the Permittee to monitor emissions of other pollutants or other emissions characteristics at Units 1 and 2 under other applicable requirements of the Clean Air Act and other provisions of the operating permit for the source.

E.3.4. Sulfur Dioxide Requirements [326 IAC 21]

(a) The Permittee shall:

(1) Hold allowances, as of the allowance transfer deadline (as defined in 40 CFR 72.2), in the compliance subaccount of Units 1 and 2, after deductions under 40 CFR 73.34(c), not less than the total annual emissions of sulfur dioxide for the previous calendar year from Units 1 and 2; and,

(2) Comply with the applicable acid rain emissions limitations for sulfur dioxide.

(b) Each ton of sulfur dioxide emitted in excess of the acid rain emissions limitations for sulfur dioxide shall constitute a separate violation of the Clean Air Act.

(c) Units 1 and 2 shall be subject to the requirements under paragraph 4(a) of the sulfur dioxide requirements as follows:

(1) Starting January 1, 2000, an affected unit under 40 CFR 72.6(a)(2); or,

(2) Starting on the latter of January 1, 2000, or the deadline for monitor certification under 40 CFR 75, an affected unit under 40 CFR 72.6(a)(3).

(d) Allowances shall be held in, deducted from, or transferred among Allowance Tracking System accounts in accordance with the Acid Rain Program.

(e) An allowance shall not be deducted in order to comply with the requirements under paragraph 4(a) of the sulfur dioxide requirements prior to the calendar year for which the allowance was allocated.

(f) An allowance allocated by the U.S. EPA under the Acid Rain Program is a limited authorization to emit sulfur dioxide in accordance with the Acid Rain Program. No provision of the Acid Rain Program, the acid rain permit application, the acid rain permit, the acid rain portion of an operating permit, or the written exemption under 40 CFR 72.7 and 72.8 and 326 IAC 21, and no provision of law shall be construed to limit the authority of the United States to terminate or limit such authorization.

(g) An allowance allocated by U.S. EPA under the Acid Rain Program does not constitute a property right.

(h) No permit revision may be required for increases in emissions that are authorized by allowances acquired pursuant to the Acid Rain Program, provided that the increases do not require a permit revision under any other applicable requirement. [326 IAC 2-7-5(4)(A)]

(i) No limit shall be placed on the number of allowances held by the Permittee. The Permittee may not, however, use allowances as a defense to noncompliance with any applicable requirement other than the requirements of the Acid Rain Program. [326 IAC 2-7-5(4)(B)]

E.3.5. Nitrogen Oxides Requirements [326 IAC 21]

The Permittee shall comply with the applicable acid rain emissions limitation of nitrogen oxides (NOx) for Units 1 and 2.

NOx Emission Averaging Plan for Unit 1:

(1) Pursuant to 40 CFR 76.11, the Indiana Department of Environmental Management, Office of Air Quality approves a NOx emission averaging plan for Unit 1, effective from calendar year 2005 through 2007. Under the plan the NOx emissions from Unit 1 shall not exceed the annual average alternative contemporaneous emission limitation (ACEL) of 0.34 lb/MMBtu. In addition, Unit 1 shall not have an annual heat input less than 36,100,000 MMBtu. Unit 1 shall revert to the $NO_X$ Btu-weighted annual average emission rate in compliance with 40 CFR 76.5, 76.6 or 76.7 on January 1, 2008. If Unit 1 is in compliance with its applicable emission limitation for each year of the plan, then Unit 1 shall not be subject to the applicable emission limitation, under 40 CFR 76.5(a)(1), of 0.45 lb/MMBtu until January 1, 2008.

(2) Under the plan, the actual Btu-weighted annual average NOx emission rate for all the units in the plan shall be less than or equal to the Btu-weighted annual average NOx emission rate for the same units had they each been operated, during the same period of time, in compliance with the applicable emission limitations under 40 CFR 76.5, 76.6, or 76.7, except that for any early election units, the applicable emission limitations shall be under 40 CFR 76.7. If the designated representative demonstrates that the requirement of the prior sentence (as set forth in 40 CFR 76.11(d)(1)(ii)(A)) is met for a year under the plan, then Unit 1 shall be deemed to be in compliance for that year with its annual ACEL and annual heat input limit.

NOx Emission Averaging Plan for Unit 2:

(1) Pursuant to 40 CFR 76.11, the Indiana Department of Environmental Management, Office of Air Quality approves a NOx emission averaging plan for Unit 2, effective from calendar year 2005 through 2007. Under the plan the NOx emissions from Unit 2 shall not exceed the annual average alternative contemporaneous emission limitation (ACEL) of 0.35 lb/MMBtu. In addition, Unit 2 shall not have an annual heat input less than 34,600,000 MMBtu. Unit 2 shall revert to the $NO_X$ Btu-weighted annual average emission rate in compliance with 40 CFR 76.5, 76.6 or 76.7 on January 1, 2008. If Unit 2 is in compliance with its applicable emission limitation for each year of the plan, then Unit 2 shall not be subject to the applicable emission limitation, under 40 CFR 76.5(a)(1), of 0.45 lb/MMBtu until January 1, 2008.

(2) Under the plan, the actual Btu-weighted annual average NOx emission rate for all the units in the plan shall be less than or equal to the Btu-weighted annual average NOx emission rate for the same units had they each been operated, during the same period of time, in compliance with the applicable emission limitations under 40 CFR 76.5, 76.6, or 76.7, except that for any early election units, the applicable emission limitations shall be under 40 CFR 76.7. If the designated representative demonstrates that the requirement of the prior sentence (as set forth in 40 CFR 76.11(d)(1)(ii)(A)) is met for a year under the plan, then Unit 2 shall be deemed to be in compliance for that year with its annual ACEL and annual heat input limit.

In accordance with 40 CFR 72.40(b)(2), approval of the averaging plan shall be final only when the Ohio Environmental Protection Agency, Division of Air Pollution Control; and the Kentucky Department of Environmental Protection, Division of Air Quality have also approved this averaging plan.

In addition to the described NOx compliance plan, Units 1 and 2 shall comply with all other applicable requirements of 40 CFR 76, including the duty to reapply for a NOx compliance plan and requirements covering excess emissions.

Pursuant to 40 CFR 76, Acid Rain Nitrogen Oxides Emission Reduction Program, the natural gas fired turbine, Unit 4 is not subject to the nitrogen oxide limitations set out in 40 CFR 76.

E.3.6 Excess Emissions Requirements [40 CFR 77] [326 IAC 21]

(a) If Unit 1 or 2 has excess emissions of sulfur dioxide in any calendar year, the designated representative shall submit a proposed offset plan to U.S. EPA and IDEM, OAQ as required under 40 CFR 77 and 326 IAC 21.

(b) The designated representative shall submit required information to:

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

and

U.S. Environmental Protection Agency
Clean Air Markets Division
1200 Pennsylvania Avenue, NW
Mail Code (6204N)
Washington, DC 20460

(c) If Unit 1 or 2 has excess emissions, as defined in 40 CFR 72.2, in any calendar year the Permittee shall:

(1) Pay to U.S. EPA without demand the penalty required, and pay to U.S. EPA upon demand the interest on that penalty, as required by 40 CFR 77 and 326 IAC 21; and,

(2) Comply with the terms of an approved sulfur dioxide offset plan, as required by 40 CFR 77 and 326 IAC 21.

E.3.7. Record Keeping and Reporting Requirements [326 IAC 21]

(a) Unless otherwise provided, the Permittee shall keep on site each of the following documents for a period of 5 years, as required by 40 CFR 72.9(f), from the date the document is created. This period may be extended for cause, at any time prior to the end of the 5 years, in writing by U.S. EPA or IDEM, OAQ:

(1) The certificate of representation for the designated representative of Units 1 and 2 and all documents that demonstrate the truth of the statements in the certificate of representation, in accordance with 40 CFR 72.24; provided that the certificate and documents shall be retained on site at the source beyond such 5 year period until such documents are superseded because of the submission of a new certificate of representation changing the designated representative;

(2) All emissions monitoring information collected in accordance with 40 CFR 75 shall be retained on site for 3 years;

(3) Copies of all reports, compliance certifications, and other submissions and all records made or required under the Acid Rain Program; and,

(4) Copies of all documents used to complete an acid rain permit application and any other submission under the Acid Rain Program or to demonstrate compliance with the requirements of the Acid Rain Program.

(b) The designated representative of Units 1 and 2 shall submit the reports and compliance certifications required under the Acid Rain Program, including those under 40 CFR 72.90, Subpart I, 40 CFR 75, and 326 IAC 21. The required information is to be submitted to the appropriate authority(ies) as specified in 40 CFR 72.90, Subpart I, and 40 CFR 75.

E.3.8. Submissions [326 IAC 21]

(a) The designated representative of Units 1 and 2 shall submit a certificate of representation, and any superseding certificate of representation, to U.S. EPA and IDEM, OAQ in accordance with 40 CFR 72 and 326 IAC 21.

(b) The designated representative shall submit required information to:

Indiana Department of Environmental Management
Permit Administration and Support Section, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

and

U.S. Environmental Protection Agency
Clean Air Markets Division
1200 Pennsylvania Avenue, NW
Mail Code (6204N)
Washington, DC 20460

(c) Each such submission under the Acid Rain Program shall be submitted, signed and certified by the designated representative for all sources on behalf of which the submission is made.

(d) In each submission under the Acid Rain Program, the designated representative shall certify, by his or her signature, the following statements which shall be included verbatim in the submission:

(1) “I am authorized to make this submission on behalf of the owners and operators of the affected source or affected units for which the submission is made.”; and,

(2) “I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.”

(e) The designated representative of Units 1 and 2 shall notify the Permittee:

(1) By the date of submission, of any Acid Rain Program submissions by the designated representative;

(2) Within 10 business days of receipt of any written determination by U.S. EPA or IDEM, OAQ; and,

(3) Provided that the submission or determination covers Unit 1 and 2.

(f) The designated representative of Units 1 and 2 shall provide the Permittee a copy of any submission or determination under paragraph 8(e), unless the Permittee expressly waives the right to receive a copy.

E.3.9. Severability [326 IAC 21]

Invalidation of the acid rain portion of an operating permit does not affect the continuing validity of the rest of the operating permit, nor shall invalidation of any other portion of the operating permit affect the continuing validity of the acid rain portion of the permit. [40 CFR 72.72(b), 326 IAC 21, and 326 IAC 2-7-5(5)]

E.3.10. Liability [326 IAC 21]

(a) Any person who knowingly violates any requirement or prohibition of the Acid Rain Program, an acid rain permit, an acid rain portion of an operation permit, or a written exemption under 40 CFR 72.7 or 72.8, including any requirement for the payment of any penalty owed to the United States, shall be subject to enforcement by U.S. EPA pursuant to Section 113(c) of the Clean Air Act and shall be subject to enforcement by IDEM pursuant to 326 IAC 21 and IC 13-30-3.

(b) Any person who knowingly makes a false, material statement in any record, submission, or report under the Acid Rain Program shall be subject to criminal enforcement pursuant to Section 113(c) of the Clean Air Act, 18 U.S.C. 1001 and IDEM pursuant to 326 IAC 21 and IC 13-30-6-2.

(c) No permit revision shall excuse any violation of the requirements of the Acid Rain Program that occurs prior to the date that the revision takes effect.

(d) Units 1 and 2 shall meet the requirements of the Acid Rain Program.

(e) Any provision of the Acid Rain Program that applies to Unit 1 or 2, including a provision applicable to the designated representative of Unit 1 or 2 shall also apply to the Permittee.

(f) Any provision of the Acid Rain Program that applies to Unit 1 or 2 4, including a provision applicable to the designated representative, shall also apply to the Permittee. Except as provided under 40 CFR 72.44 (Phase II repowering extension plans) and 40 CFR 76.11 (NOx averaging plans), and except with regard to the requirements applicable to units with a common stack under 40 CFR 75, including 40 CFR 75.16, 75.17, and 75.18, the Permittee and the designated representative of one affected unit shall not be liable for any violation by any other affected unit of which they are not owners or operators or the designated representative and that is located at a source of which they are not owners or operators or the designated representative.

(g) Each violation of a provision of 40 CFR 72, 73, 75, 76, 77, and 78 by Unit 1 or 2, or by the Permittee or designated representative shall be a separate violation of the Clean Air Act.

E.3.11. Effect on Other Authorities [326 IAC 21]

No provision of the Acid Rain Program, an acid rain permit application, an acid rain permit, an acid rain portion of an operation permit, or a written exemption under 40 CFR 72.7 or 72.8 shall be construed as:

(a) Except as expressly provided in Title IV of the Clean Air Act (42 USC 7651 to 7651(o)), exempting or excluding the Permittee and, to the extent applicable, the designated representative of Unit 1 or 2 from compliance with any other provision of the Clean Air

Act, including the provisions of Title I of the Clean Air Act relating to applicable National Ambient Air Quality Standards or State Implementation Plans;

(b) Limiting the number of allowances a unit can hold; provided, that the number of allowances held by the unit shall not affect the source's obligation to comply with any other provisions of the Clean Air Act;

(c) Requiring a change of any kind in any state law regulating electric utility rates and charges, affecting any state law regarding such state regulation, or limiting such state regulation, including any prudence review requirements under such state law;

(d) Modifying the Federal Power Act (16 USC 791(a) et seq.) or affecting the authority of the Federal Energy Regulatory Commission under the Federal Power Act; or,

(e) Interfering with or impairing any program for competitive bidding for power supply in a state in which such a program is established.

## SECTION F Clean Air Interstate (CAIR) Nitrogen Oxides Annual, Sulfur Dioxide, and Nitrogen Oxides Ozone Season Trading Programs – CAIR Permit for CAIR Units Under 326 IAC 24-1-1(a), 326 IAC 24-2-1(a), and 326 IAC 24-3-1(a)

**ORIS Code**: 1001

**CAIR Permit for CAIR Units Under 326 IAC 24-1-1(a), 326 IAC 24-2-1(a), and 326 IAC 24-3-1(a)**

(a) One (1) dry bottom, pulverized coal-fired boiler, identified as Boiler No. 1, installed in 1967, with a nominal heat input capacity of 4,802 million Btu per hour (MMBtu/hr), with an electrostatic precipitator (ESP) for control of particulate matter, a flue gas desulfurization (FGD) system for control of $SO_2$, and exhausting to stack 1. Stack 1 has continuous emissions monitors (CEMs) for nitrogen oxides ($NO_X$) and sulfur dioxide ($SO_2$) and a continuous opacity monitor (COM). Boiler No. 1 was configured with a low $NO_X$ burner in 1993. Selective Catalytic Oxidation (SCR) to control NOx, Dry Sorbent Injection System to Control $SO_3$, Activated Carbon Injection System to assist in Control of Hg emissions scheduled to be installed by 2015.

(b) One (1) dry bottom, pulverized coal-fired boiler, identified as Boiler No. 2, installed in 1968, with a nominal heat input capacity of 4,802 million Btu per hour (MMBtu/hr), with an electrostatic precipitator (ESP) for control of particulate matter, a flue gas desulfurization (FGD) system for control of $SO_2$, and exhausting to stack 2. Stack 2 has continuous emissions monitors (CEMs) for nitrogen oxides ($NO_X$) and sulfur dioxide ($SO_2$) and a continuous opacity monitor (COM). Boiler No. 2 was configured with a low $NO_X$ burner in 1993. Selective Catalytic Oxidation (SCR) to control NOx, Dry Sorbent Injection System to Control $SO_3$, Activated Carbon Injection System to assist in Control of Hg emissions scheduled to be installed by 2015.

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

F.1 Automatic Incorporation of Definitions [326 IAC 24-1-7(e)] [326 IAC 24-2-7(e)] [326 IAC 24-3-7(e)] [40 CFR 97.123(b)] [40 CFR 97.223(b)] [40 CFR 97.323(b)]

This CAIR permit is deemed to incorporate automatically the definitions of terms under 326 IAC 24-1-2, 326 IAC 24-2-2, and 326 IAC 24-3-2.

F.2 Standard Permit Requirements [326 IAC 24-1-4(a)] [326 IAC 24-2-4(a)] [326 IAC 24-3-4(a)] [40 CFR 97.106(a)] [40 CFR 97.206(a)] [40 CFR 97.306(a)]

(a) The owners and operators of the CAIR NOx source, CAIR $SO_2$ source, and CAIR NOx ozone season source and CAIR NOx units, CAIR $SO_2$ units, and CAIR NOx ozone season units shall operate each unit in compliance with this CAIR permit.

(b) The CAIR NOx units, CAIR $SO_2$ units, and CAIR NOx ozone season units subject to this CAIR permit are Boiler No. 1 and Boiler No. 2.

F.3 Monitoring, Reporting, and Record Keeping Requirements [326 IAC 24-1-4(b)] [326 IAC 24-2-4(b)] [326 IAC 24-3-4(b)] [40 CFR 97.106(b)] [40 CFR 97.206(b)] [40 CFR 97.306(b)]

(a) The owners and operators, and the CAIR designated representative, of each CAIR NOx source, CAIR $SO_2$ source, and CAIR NOx ozone season source and CAIR NOx unit, CAIR $SO_2$ unit, and CAIR NOx ozone season unit at the source shall comply with the monitoring, reporting, and record keeping requirements of 326 IAC 24-1-11, 326 IAC 24-2-10, and 326 IAC 24-3-11.

(b) The emissions measurements recorded and reported in accordance with 326 IAC 24-1-11, 326 IAC 24-2-10, and 326 IAC 24-3-11 shall be used to determine compliance by each CAIR NOx source, CAIR $SO_2$ source, and CAIR NOx ozone season source with the CAIR NOx emissions limitation under 326 IAC 24-1-4(c), CAIR $SO_2$ emissions limitation under 326 IAC 24-2-4(c), and CAIR NOx ozone season emissions limitation under 326 IAC 24-3-4(c) and Condition F.4.1, Nitrogen Oxides Emission Requirements, Condition F.4.2, Sulfur Dioxide Emission Requirements, and Condition F.4.3, Nitrogen Oxides Ozone Season Emission Requirements.

F.4.1 Nitrogen Oxides Emission Requirements [326 IAC 24-1-4(c)] [40 CFR 97.106(c)]

(a) As of the allowance transfer deadline for a control period, the owners and operators of each CAIR $NO_X$ source and each CAIR $NO_X$ unit at the source shall hold, in the source's compliance account, CAIR $NO_X$ allowances available for compliance deductions for the control period under 326 IAC 24-1-9(i) in an amount not less than the tons of total nitrogen oxides emissions for the control period from all CAIR $NO_X$ units at the source, as determined in accordance with 326 IAC 24-1-11.

(b) A CAIR $NO_X$ unit shall be subject to the requirements under 326 IAC 24-1-4(c)(1) for the control period starting on the applicable date, as determined under 326 IAC 24-1-4(c)(2), and for each control period thereafter.

(c) A CAIR $NO_X$ allowance shall not be deducted for compliance with the requirements under 326 IAC 24-1-4(c)(1), for a control period in a calendar year before the year for which the CAIR $NO_X$ allowance was allocated.

(d) CAIR $NO_X$ allowances shall be held in, deducted from, or transferred into or among CAIR $NO_X$ allowance tracking system accounts in accordance with 326 IAC 24-1-9, 326 IAC 24-1-10, and 326 IAC 24-1-12.

(e) A CAIR $NO_X$ allowance is a limited authorization to emit one (1) ton of nitrogen oxides in accordance with the CAIR $NO_X$ annual trading program. No provision of the CAIR $NO_X$ annual trading program, the CAIR permit application, the CAIR permit, or an exemption under 326 IAC 24-1-3 and no provision of law shall be construed to limit the authority of the State of Indiana or the United States to terminate or limit the authorization.

(f) A CAIR $NO_X$ allowance does not constitute a property right.

(g) Upon recordation by the U.S. EPA under 326 IAC 24-1-8, 326 IAC 24-1-9, 326 IAC 24-1-10, or 326 IAC 24-1-12, every allocation, transfer, or deduction of a CAIR $NO_X$ allowance to or from a CAIR $NO_X$ source's compliance account is incorporated automatically in this CAIR permit.

F.4.2 Sulfur Dioxide Emission Requirements [326 IAC 24-2-4(c)] [40 CFR 97.206(c)]

(a) As of the allowance transfer deadline for a control period, the owners and operators of each CAIR $SO_2$ source and each CAIR $SO_2$ unit at the source shall hold, in the source's compliance account, a tonnage equivalent of CAIR $SO_2$ allowances available for compliance deductions for the control period under 326 IAC 24-2-8(j) and 326 IAC 24-2-8(k) not less than the tons of total sulfur dioxide emissions for the control period from all CAIR $SO_2$ units at the source, as determined in accordance with 326 IAC 24-2-10.

(b) A CAIR $SO_2$ unit shall be subject to the requirements under 326 IAC 24-2-4(c)(1) for the control period starting on the applicable date, as determined under 326 IAC 24-2-4(c)(2), and for each control period thereafter.

(c) A CAIR $SO_2$ allowance shall not be deducted for compliance with the requirements under 326 IAC 24-2-4(c)(1), for a control period in a calendar year before the year for which the CAIR $SO_2$ allowance was allocated.

(d) CAIR $SO_2$ allowances shall be held in, deducted from, or transferred into or among CAIR $SO_2$ allowance tracking system accounts in accordance with 326 IAC 24-2-8, 326 IAC 24-2-9, and 326 IAC 24-2-11.

(e) A CAIR $SO_2$ allowance is a limited authorization to emit sulfur dioxide in accordance with the CAIR $SO_2$ trading program. No provision of the CAIR $SO_2$ trading program, the CAIR permit application, the CAIR permit, or an exemption under 326 IAC 24-2-3 and no provision of law shall be construed to limit the authority of the State of Indiana or the United States to terminate or limit the authorization.

(f) A CAIR $SO_2$ allowance does not constitute a property right.

(g) Upon recordation by the U.S. EPA under 326 IAC 24-2-8, 326 IAC 24-2-9, or 326 IAC 24-2-11, every allocation, transfer, or deduction of a CAIR $SO_2$ allowance to or from a CAIR $SO_2$ source's compliance account is incorporated automatically in this CAIR permit.

F.4.3 Nitrogen Oxides Ozone Season Emission Requirements [326 IAC 24-3-4(c)] [40 CFR 97.306(c)]

(a) As of the allowance transfer deadline for a control period, the owners and operators of each CAIR $NO_X$ ozone season source and each CAIR $NO_X$ ozone season unit at the source shall hold, in the source's compliance account, CAIR $NO_X$ ozone season allowances available for compliance deductions for the control period under 326 IAC 24-3-9(i) in an amount not less than the tons of total nitrogen oxides emissions for the control period from all CAIR $NO_X$ ozone season units at the source, as determined in accordance with 326 IAC 24-3-11.

(b) A CAIR $NO_X$ ozone season unit shall be subject to the requirements under 326 IAC 24-3-4(c)(1) for the control period starting on the applicable date, as determined under 326 IAC 24-3-4(c)(2), and for each control period thereafter.

(c) A CAIR $NO_X$ ozone season allowance shall not be deducted for compliance with the requirements under 326 IAC 24-3-4(c)(1), for a control period in a calendar year before the year for which the CAIR $NO_X$ ozone season allowance was allocated.

(d) CAIR $NO_X$ ozone season allowances shall be held in, deducted from, or transferred into or among CAIR $NO_X$ ozone season allowance tracking system accounts in accordance with 326 IAC 24-3-9, 326 IAC 24-3-10, and 326 IAC 24-3-12.

(e) A CAIR $NO_X$ ozone season allowance is a limited authorization to emit one (1) ton of nitrogen oxides in accordance with the CAIR $NO_X$ ozone season trading program. No provision of the CAIR $NO_X$ ozone season trading program, the CAIR permit application, the CAIR permit, or an exemption under 326 IAC 24-3-3 and no provision of law shall be construed to limit the authority of the State of Indiana or the United States to terminate or limit the authorization.

(f) A CAIR $NO_X$ ozone season allowance does not constitute a property right.

(g) Upon recordation by the U.S. EPA under 326 IAC 24-3-8, 326 IAC 24-3-9, 326 IAC 24-3-10, or 326 IAC 24-3-12, every allocation, transfer, or deduction of a CAIR $NO_X$ ozone season allowance to or from a CAIR $NO_X$ ozone season source's compliance account is incorporated automatically in this CAIR permit.

F.5 Excess Emissions Requirements [326 IAC 24-1-4(d)] [326 IAC 24-2-4(d)] [326 IAC 24-3-4(d)] [40 CFR 97.106(d)] [40 CFR 97.206(d)] [40 CFR 97.306(d)]

(a) The owners and operators of a CAIR $NO_X$ source and each CAIR $NO_X$ unit that emits nitrogen oxides during any control period in excess of the CAIR $NO_X$ emissions limitation shall do the following:

(1) Surrender the CAIR $NO_X$ allowances required for deduction under 326 IAC 24-1-9(j)(4).

(2) Pay any fine, penalty, or assessment or comply with any other remedy imposed, for the same violations, the Clean Air Act (CAA) or applicable state law.

Each ton of such excess emissions and each day of such control period shall constitute a separate violation of 326 IAC 24-1-4, the Clean Air Act (CAA), and applicable state law.

(b) The owners and operators of a CAIR $SO_2$ source and each CAIR $SO_2$ unit that emits sulfur dioxide during any control period in excess of the CAIR $SO_2$ emissions limitation shall do the following:

(1) Surrender the CAIR $SO_2$ allowances required for deduction under 326 IAC 24-2-8(k)(4).

(2) Pay any fine, penalty, or assessment or comply with any other remedy imposed, for the same violations, the Clean Air Act (CAA) or applicable state law.

Each ton of such excess emissions and each day of such control period shall constitute a separate violation of 326 IAC 24-2-4, the Clean Air Act (CAA), and applicable state law.

(c) The owners and operators of a CAIR $NO_X$ ozone season source and each CAIR $NO_X$ ozone season unit that emits nitrogen oxides during any control period in excess of the CAIR $NO_X$ ozone season emissions limitation shall do the following:

(1) Surrender the CAIR $NO_X$ ozone season allowances required for deduction under 326 IAC 24-3-9(j)(4).

(2) Pay any fine, penalty, or assessment or comply with any other remedy imposed, for the same violations, the Clean Air Act (CAA) or applicable state law.

Each ton of such excess emissions and each day of such control period shall constitute a separate violation of 326 IAC 24-3-4, the Clean Air Act (CAA), and applicable state law.

F.6 Record Keeping Requirements [326 IAC 24-1-4(e)] [326 IAC 24-2-4(e)] [326 IAC 24-3-4(e)] [326 IAC 2-7-5(3)] [40 CFR 97.106(e)] [40 CFR 97.206(e)] [40 CFR 97.306(e)]

Unless otherwise provided, the owners and operators of the CAIR NOx source, CAIR $SO_2$ source, and CAIR NOx ozone season source and each CAIR NOx unit, CAIR $SO_2$ unit, and CAIR NOx ozone season unit at the source shall keep on site at the source or at a central location within Indiana for those owners or operators with unattended sources, each of the following documents for a period of five (5) years from the date the document was created:

(a) The certificate of representation under 326 IAC 24-1-6(h), 326 IAC 24-2-6(h), 326 IAC 24-3-6(h) for the CAIR designated representative for the source and each CAIR NOx unit, CAIR $SO_2$ unit, and CAIR NOx ozone season unit at the source and all documents that demonstrate the truth of the statements in the certificate of representation. The certificate and documents shall be retained on site at the source or at a central location within Indiana for those owners or operators with unattended sources beyond such five (5) year period until such documents are superseded because of the submission of a new account certificate of representation under 326 IAC 24-1-6(h), 326 IAC 24-2-6(h), 326 IAC 24-3-6(h) changing the CAIR designated representative.

(b) All emissions monitoring information, in accordance with 326 IAC 24-1-11, 326 IAC 24-2-10, and 326 IAC 24-3-11, provided that to the extent that 326 IAC 24-1-11, 326 IAC 24-2-10, and 326 IAC 24-3-11 provides for a three (3) year period for record keeping, the three (3) year period shall apply.

(c) Copies of all reports, compliance certifications, and other submissions and all records made or required under the CAIR NOx annual trading program, CAIR $SO_2$ trading program, and CAIR NOx ozone season trading program.

(d) Copies of all documents used to complete a CAIR permit application and any other submission under the CAIR NOx annual trading program, CAIR $SO_2$ trading program, and CAIR NOx ozone season trading program or to demonstrate compliance with the requirements of the CAIR NOx annual trading program, CAIR $SO_2$ trading program, and CAIR NOx ozone season trading program.

This period may be extended for cause, at any time before the end of five (5) years, in writing by IDEM, OAQ or the U.S. EPA. Unless otherwise provided, all records shall be maintained in accordance with Section C - General Record Keeping Requirements, of this permit.

F.7 Reporting Requirements [326 IAC 24-1-4(e)] [326 IAC 24-2-4(e)] [326 IAC 24-3-4(e)] [40 CFR 97.106(e)] [40 CFR 97.206(e)] [40 CFR 97.306(e)]

(a) The CAIR designated representative of the CAIR NOx source, CAIR $SO_2$ source, and CAIR NOx ozone season source and each CAIR NOx unit, CAIR $SO_2$ unit, and CAIR NOx ozone season unit at the source shall submit the reports required under the CAIR NOx annual trading program, CAIR $SO_2$ trading program, and CAIR NOx ozone season trading program, including those under 326 IAC 24-1-11, 326 IAC 24-2-10, and 326 IAC 24-3-11.

(b) Pursuant to 326 IAC 24-1-4(e), 326 IAC 24-2-4(e), and 326 IAC 24-3-4(e) and 326 IAC 24-1-6(e)(1), 326 IAC 24-2-6(e)(1), and 326 IAC 24-3-6(e)(1), each submission under the CAIR NOx annual trading program, CAIR $SO_2$ trading program, and CAIR NOx ozone season trading program shall include the following certification statement by the CAIR designated representative: “I am authorized to make this submission on behalf of the owners and operators of the source or units for which the submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment."

(c) Where 326 IAC 24-1, 326 IAC 24-2, and 326 IAC 24-3 requires a submission to IDEM, OAQ, the CAIR designated representative shall submit required information to:

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

(d) Where 326 IAC 24-1, 326 IAC 24-2, and 326 IAC 24-3 requires a submission to U.S. EPA, the CAIR designated representative shall submit required information to:

U.S. Environmental Protection Agency
Clean Air Markets Division
1200 Pennsylvania Avenue, NW
Mail Code 6204N
Washington, DC 20460

F.8 Liability [326 IAC 24-1-4(f)] [326 IAC 24-2-4(f)] [326 IAC 24-3-4(f)] [40 CFR 97.106(f)] [40 CFR 97.206(f)] [40 CFR 97.306(f)]

The owners and operators of each CAIR NOx source, CAIR $SO_2$ source, and CAIR NOx ozone season source and each CAIR NOx unit, CAIR $SO_2$ unit, and CAIR NOx ozone season unit shall be liable as follows:

(a) Each CAIR NOx source, CAIR $SO_2$ source, and CAIR NOx ozone season source and each CAIR NOx unit, CAIR $SO_2$ unit, and CAIR NOx ozone season unit shall meet the requirements of the CAIR NOx annual trading program, CAIR $SO_2$ trading program, and CAIR NOx ozone season trading program.

(b) Any provision of the CAIR NOx annual trading program, CAIR $SO_2$ trading program, and CAIR NOa ozone season trading program that applies to a CAIR NOx source, CAIR $SO_2$ source, and CAIR NOx ozone season source or the CAIR designated representative of a CAIR NOx source, CAIR $SO_2$ source, and CAIR NOx ozone season source shall also apply to the owners and operators of such source and of the CAIR NOx units, CAIR $SO_2$ units, and CAIR NOx ozone season units at the source

(c) Any provision of the CAIR NOx annual trading program, CAIR $SO_2$ trading program, and CAIR NOx ozone season trading program that applies to a CAIR NOx unit, CAIR $SO_2$ unit, and CAIR NOx ozone season unit or the CAIR designated representative of a CAIR NOx unit, CAIR $SO_2$ unit, and CAIR NOx ozone season unit shall also apply to the owners and operators of such unit.

F.9 Effect on Other Authorities [326 IAC 24-1-4(g)] [326 IAC 24-2-4(g)] [326 IAC 24-3-4(g)] [40 CFR 97.106(g)] [40 CFR 97.206(g)] [40 CFR 97.306(g)]

No provision of the CAIR NOx annual trading program, CAIR $SO_2$ trading program, and CAIR NOx ozone season trading program, a CAIR permit application, a CAIR permit, or an exemption under 326 IAC 24-1-3, 326 IAC 24-2-3, and 326 IAC 24-3-3 shall be construed as exempting or excluding the owners and operators, and the CAIR designated representative, of a CAIR NOx source, CAIR $SO_2$ source, and CAIR NOx ozone season source or a CAIR NOx unit, CAIR $SO_2$ unit, and CAIR NOx ozone season unit from compliance with any other provision of the applicable, approved state implementation plan, a federally enforceable permit, or the Clean Air Act (CAA).

## F.10 CAIR Designated Representative and Alternate CAIR Designated Representative [326 IAC 24-1-6] [326 IAC 24-2-6] [326 IAC 24-3-6] [40 CFR 97, Subpart BB] [40 CFR 97, Subpart BBB] [40 CFR 97, Subpart BBBB]

Pursuant to 326 IAC 24-1-6, 326 IAC 24-2-6, and 326 IAC 24-3-6:

(a) Except as specified in 326 IAC 24-1-6(f)(3), 326 IAC 24-2-6(f)(3), and 326 IAC 24-3-6(f)(3), each CAIR $NO_X$ source, CAIR $SO_2$ source, and CAIR $NO_X$ ozone season source, including all CAIR $NO_X$ units, CAIR $SO_2$ units, and CAIR $NO_X$ ozone season units at the source, shall have one (1) and only one (1) CAIR designated representative, with regard to all matters under the CAIR $NO_X$ annual trading program, CAIR $SO_2$ trading program, and CAIR $NO_X$ ozone season trading program concerning the source or any CAIR $NO_X$ unit, CAIR $SO_2$ unit, and CAIR $NO_X$ ozone season unit at the source.

(b) The provisions of 326 IAC 24-1-6(f), 326 IAC 24-2-6(f), and 326 IAC 24-3-6(f) shall apply where the owners or operators of a CAIR $NO_X$ source, CAIR $SO_2$ source, and CAIR $NO_X$ ozone season source choose to designate an alternate CAIR designated representative.

Except as specified in 326 IAC 24-1-6(f)(3), 326 IAC 24-2-6(f)(3), and 326 IAC 24-3-6(f)(3), whenever the term "CAIR designated representative" is used, the term shall be construed to include the CAIR designated representative or any alternate CAIR designated representative.

# INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
# OFFICE OF AIR QUALITY
# COMPLIANCE AND ENFORCEMENT BRANCH
# PART 70 OPERATING PERMIT
# CERTIFICATION

Source Name: Duke Energy Indiana, Inc., Cayuga Generating Station
Source Address: State Road 63, Cayuga, Indiana 46168
Part 70 Permit No.: T165-33876-00001

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

Please check what document is being certified:

☐ Annual Compliance Certification Letter

☐ Test Result (specify)

☐ Report (specify)

☐ Notification (specify)

☐ Affidavit (specify)

☐ 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: |
| Phone: |
| Date: |

**INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT**
**OFFICE OF AIR QUALITY**
**COMPLIANCE AND ENFORCEMENT BRANCH**
**100 North Senate Avenue**
**MC 61-53 IGCN 1003**
**Indianapolis, Indiana 46204-2251**
**Phone: (317) 233-0178**
**Fax: (317) 233-6865**

## PART 70 OPERATING PERMIT
## EMERGENCY OCCURRENCE REPORT

Source Name: Duke Energy Indiana, Inc., Cayuga Generating Station
Source Address: State Road 63, Cayuga, Indiana 46168
Part 70 Permit No.: T165-33876-00001

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

☐ 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 317-233-0178, ask for Compliance Section); and
- The Permittee must submit notice in writing or by facsimile within two (**2**) working days (Facsimile Number: 317-233-6865), 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: _____

# INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
# OFFICE OF AIR QUALITY
# COMPLIANCE AND ENFORCEMENT BRANCH

## Part 70 Quarterly Report

Source Name: Duke Energy Indiana, Inc., Cayuga Generating Station
Source Address: State Road 63, Cayuga, Indiana 46168
Part 70 Permit No.: T165-33876-00001
Facility: Limestone Handling System
Parameter: Amount of limestone received
Limit: Less than 509,000 tons per twelve (12) consecutive month period with compliance determined at the end of each month. (Condition D.5.1(a))

QUARTER : YEAR:

| Month | Column 1 | Column 2 | Column 1 + Column 2 |
|---|---|---|---|
| | This Month | Previous 11 Months | 12 Month Total |
| Month 1 | | | |
| Month 2 | | | |
| Month 3 | | | |

☐ No deviation occurred in this quarter.

☐ Deviation/s occurred in this quarter.
Deviation has been reported on:

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

# INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
# OFFICE OF AIR QUALITY
# COMPLIANCE AND ENFORCEMENT BRANCH

## Part 70 Quarterly Report

Source Name: Duke Energy Indiana, Inc., Cayuga Generating Station
Source Address: State Road 63, Cayuga, Indiana 46168
Part 70 Permit No.: T165-33876-00001
Facility: Gypsum Handling System
Parameter: The amount of gypsum received
Limit: Less than 900,528 tons per twelve (12) consecutive month period with compliance determined at the end of each month. (Condition D.5.1(d))

QUARTER : YEAR:

| Month | Column 1 | Column 2 | Column 1 + Column 2 |
|---|---|---|---|
| | This Month | Previous 11 Months | 12 Month Total |
| Month 1 | | | |
| Month 2 | | | |
| Month 3 | | | |

☐ No deviation occurred in this quarter.

☐ Deviation/s occurred in this quarter.
Deviation has been reported on:

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

# INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
# OFFICE OF AIR QUALITY
# COMPLIANCE AND ENFORCEMENT BRANCH
# PART 70 OPERATING PERMIT
# QUARTERLY DEVIATION AND COMPLIANCE MONITORING REPORT

Source Name: Duke Energy Indiana, Inc., Cayuga Generating Station
Source Address: State Road 63, Cayuga, Indiana 46168
Part 70 Permit No.: T165-33876-00001

**Months: _____ to _____ Year: _____**

Page 1 of 2

| | |
|---|---|
| This report shall be submitted quarterly based on a calendar year. Proper notice submittal under Section B –Emergency Provisions satisfies the reporting requirements of paragraph (a) of Section C-General Reporting. Any deviation from the requirements of this permit, the date(s) of each deviation, the probable cause of the deviation, and the response steps taken must be reported. A deviation required to be reported pursuant to an applicable requirement that exists independent of the permit, shall be reported according to the schedule stated in the applicable requirement and does 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". | |
| ☐ NO DEVIATIONS OCCURRED THIS REPORTING PERIOD. | |
| ☐ 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: _____

# Attachment A
# Fugitive Dust Control Plan

| | |
|---|---|
| **Source Name:** | Duke Energy Indiana Inc., Cayuga Generating Station |
| **Source Location:** | State Road 63, Cayuga, IN 46168 |
| **County:** | Vermillion |
| **SIC Code:** | 4911 |
| **Permit Renewal No.:** | T 165-33876-00001 |

This fugitive dust plan is required under 326 IAC 6-1-5. This plan covers only those fugitive dust emitting processes/areas which are covered under the Significant Permit Modification #165-23011-00001 for the installation of a flue gas desulfurization (FGD) system. This plan includes the information required under 3267 IAC 6-5-5. The control measures identified in this plan are consistent with the requirements under 326 IAC 6-5-4.

Tables 1, 2 and 3 below identify each fugitive emissions area/process, the type of material handled, throughput, and control measures.

Table 1 - Limestone handling operations

| Unit ID and Description | Maximum Throughput (units/hr) | Measures used to control fugitive emissions |
|---|---|---|
| *TP-L1***,** transfer into hopper from railcar or truck | 1000 tons/hr limestone | Fogging dust suppression |
| *TP-L2 to L4***,** Truck and railcar unloading transfer points | 1000 tons/hr limestone | Enclosure, Fogging dust suppression |
| *TP-L5***,** transfer from conveyor LH-1 to active limestone pile | 1000 tons/hr limestone | Telescoping chute |
| *TP-L10 to L12***,** transfer points in the limestone reclaim hopper | 400 tons/hr limestone | Enclosure, Fogging dust suppression |
| *TP-L13***,** transfer from conveyor LH-2 to LH-3 within limestone prep. Building | 400 tons/hr limestone | Enclosure, Fogging dust suppression |
| *TP-L14***,** transfer point from conveyor LH-3 to day bin #1 | 400 tons/hr limestone | Enclosure |
| *TP-L15***,** transfer point from conveyor LH-3 to day bin #2 | 400 tons/hr limestone | Enclosure |
| *F-L6 & F-L7,* Active limestone pile , dozer operations | NA | Clean around perimeter of the storage pile, watering as needed |
| *F-L8 & F-L9,* Inactive limestone pile , dozer operations | NA | Clean around perimeter of the storage pile, watering as needed |

Table 2 - Gypsum dewatering process fugitive emissions points

| Unit ID and Description | Maximum Throughput (units/hr) | Measures used to control fugitive emissions |
|---|---|---|
| *TP-G1 to TP-G6*, Gypsum Dewatering Building | 150 | Enclosed Transfer Point |
| *TP-G7*, Transfer Tower B-1 | 150 | Enclosed Transfer Point |
| *TP-G8*, Transfer Tower A-1 | 150 | Enclosed Transfer Point |
| *TP-G9*, Transferring gypsum from radial stacker conveyor GH-A1 to gypsum stock out pile | 150 | Readjust drop point to minimize fugitive PM emissions |
| *TP-G10* , Transferring gypsum from conveyor GH-2B to emergency gypsum stock out pile (TP-G10) | 150 | Telescoping chute |
| *F-G1 & F-G3,* Gypsum Stock out pile and dozer operation | NA | Clean around the perimeter of pile, watering as needed |
| *F-G2 & F-G3,* Emergency Gypsum Stock out pile and dozer operation | NA | Clean around the perimeter of pile, watering as needed |

Table 3 - Transport Gypsum Using Road Legal Trucks

| Unit ID and Description | Maximum rate (units/hr) | Measures used to control fugitive emissions |
|---|---|---|
| *F-4A & F-4B,* Front end loader vehicle traffic and loading Gypsum into Road Legal Trucks at the gypsum pile. | 891,770 tons/yr Gypsum | Minimize transport distance, wet suppression as needed |
| *F-4C.* Paved Road, Road Legal Truck Traffic to and from Landfill [(1)] | NA | Wet suppression as needed |
| *F-4A & F-4F & F-4E,* Landfill, Dozer and Compactor Traffic on the Landfill, Unloading Trucks At Landfill | NA | Wet suppression as needed |

[(1)] Haul road to landfill shall be paved prior to hauling of Gypsum to the Landfill.

The station will keep records to document control measures and activities implemented to control fugitive dust emissions.

# Attachment B
# to a Part 70 Operating Permit

## New Source Performance Standards (NSPS)

## 40 CFR 60, Subpart OOO— Standards of Performance for Nonmetallic Mineral Processing Plants

| | |
|---|---|
| **Source Name:** | **Duke Energy Indiana Inc., Cayuga Generating Station** |
| **Source Location:** | **State Road 63, Cayuga, IN 46168** |
| **County:** | **Vermillion** |
| **SIC Code:** | **4911** |
| **Operation Permit No.:** | **T 165-33876-00001** |
| **Permit Reviewer:** | **Josiah Balogun** |

## Subpart OOO—Standards of Performance for Nonmetallic Mineral Processing Plants

**Source:** 74 FR 19309, Apr. 28, 2009, unless otherwise noted.

### *§ 60.670 Applicability and designation of affected facility.*

(a)(1) Except as provided in paragraphs (a)(2), (b), (c), and (d) of this section, the provisions of this subpart are applicable to the following affected facilities in fixed or portable nonmetallic mineral processing plants: each crusher, grinding mill, screening operation, bucket elevator, belt conveyor, bagging operation, storage bin, enclosed truck or railcar loading station. Also, crushers and grinding mills at hot mix asphalt facilities that reduce the size of nonmetallic minerals embedded in recycled asphalt pavement and subsequent affected facilities up to, but not including, the first storage silo or bin are subject to the provisions of this subpart.

(2) The provisions of this subpart do not apply to the following operations: All facilities located in underground mines; plants without crushers or grinding mills above ground; and wet material processing operations (as defined in §60.671).

(b) An affected facility that is subject to the provisions of subparts F or I of this part or that follows in the plant process any facility subject to the provisions of subparts F or I of this part is not subject to the provisions of this subpart.

(c) Facilities at the following plants are not subject to the provisions of this subpart:

(1) Fixed sand and gravel plants and crushed stone plants with capacities, as defined in §60.671, of 23 megagrams per hour (25 tons per hour) or less;

(2) Portable sand and gravel plants and crushed stone plants with capacities, as defined in §60.671, of 136 megagrams per hour (150 tons per hour) or less; and

(3) Common clay plants and pumice plants with capacities, as defined in §60.671, of 9 megagrams per hour (10 tons per hour) or less.

(d)(1) When an existing facility is replaced by a piece of equipment of equal or smaller size, as defined in §60.671, having the same function as the existing facility, and there is no increase in the amount of emissions, the new facility

is exempt from the provisions of §§60.672, 60.674, and 60.675 except as provided for in paragraph (d)(3) of this section.

(2) An owner or operator complying with paragraph (d)(1) of this section shall submit the information required in §60.676(a).

(3) An owner or operator replacing all existing facilities in a production line with new facilities does not qualify for the exemption described in paragraph (d)(1) of this section and must comply with the provisions of §§60.672, 60.674 and 60.675.

(e) An affected facility under paragraph (a) of this section that commences construction, modification, or reconstruction after August 31, 1983, is subject to the requirements of this part.

(f) Table 1 of this subpart specifies the provisions of subpart A of this part 60 that do not apply to owners and operators of affected facilities subject to this subpart or that apply with certain exceptions.

## *§ 60.671 Definitions.*

All terms used in this subpart, but not specifically defined in this section, shall have the meaning given them in the Act and in subpart A of this part.

*Bagging operation* means the mechanical process by which bags are filled with nonmetallic minerals.

*Belt conveyor* means a conveying device that transports material from one location to another by means of an endless belt that is carried on a series of idlers and routed around a pulley at each end.

*Bucket elevator* means a conveying device of nonmetallic minerals consisting of a head and foot assembly which supports and drives an endless single or double strand chain or belt to which buckets are attached.

*Building* means any frame structure with a roof.

*Capacity* means the cumulative rated capacity of all initial crushers that are part of the plant.

*Capture system* means the equipment (including enclosures, hoods, ducts, fans, dampers, etc.) used to capture and transport particulate matter generated by one or more affected facilities to a control device.

*Control device* means the air pollution control equipment used to reduce particulate matter emissions released to the atmosphere from one or more affected facilities at a nonmetallic mineral processing plant.

*Conveying system* means a device for transporting materials from one piece of equipment or location to another location within a plant. Conveying systems include but are not limited to the following: Feeders, belt conveyors, bucket elevators and pneumatic systems.

*Crush* or *Crushing* means to reduce the size of nonmetallic mineral material by means of physical impaction of the crusher or grinding mill upon the material.

*Crusher* means a machine used to crush any nonmetallic minerals, and includes, but is not limited to, the following types: Jaw, gyratory, cone, roll, rod mill, hammermill, and impactor.

*Enclosed truck or railcar loading station* means that portion of a nonmetallic mineral processing plant where nonmetallic minerals are loaded by an enclosed conveying system into enclosed trucks or railcars.

*Fixed plant* means any nonmetallic mineral processing plant at which the processing equipment specified in §60.670(a) is attached by a cable, chain, turnbuckle, bolt or other means (except electrical connections) to any anchor, slab, or structure including bedrock.

*Fugitive emission* means particulate matter that is not collected by a capture system and is released to the atmosphere at the point of generation.

*Grinding mill* means a machine used for the wet or dry fine crushing of any nonmetallic mineral. Grinding mills include, but are not limited to, the following types: Hammer, roller, rod, pebble and ball, and fluid energy. The grinding mill includes the air conveying system, air separator, or air classifier, where such systems are used.

*Initial crusher* means any crusher into which nonmetallic minerals can be fed without prior crushing in the plant.

*Nonmetallic mineral* means any of the following minerals or any mixture of which the majority is any of the following minerals:

(1) Crushed and Broken Stone, including Limestone, Dolomite, Granite, Traprock, Sandstone, Quartz, Quartzite, Marl, Marble, Slate, Shale, Oil Shale, and Shell.

(2) Sand and Gravel.

(3) Clay including Kaolin, Fireclay, Bentonite, Fuller's Earth, Ball Clay, and Common Clay.

(4) Rock Salt.

(5) Gypsum (natural or synthetic).

(6) Sodium Compounds, including Sodium Carbonate, Sodium Chloride, and Sodium Sulfate.

(7) Pumice.

(8) Gilsonite.

(9) Talc and Pyrophyllite.

(10) Boron, including Borax, Kernite, and Colemanite.

(11) Barite.

(12) Fluorospar.

(13) Feldspar.

(14) Diatomite.

(15) Perlite.

(16) Vermiculite.

(17) Mica.

(18) Kyanite, including Andalusite, Sillimanite, Topaz, and Dumortierite.

*Nonmetallic mineral processing plant* means any combination of equipment that is used to crush or grind any nonmetallic mineral wherever located, including lime plants, power plants, steel mills, asphalt concrete plants, portland cement plants, or any other facility processing nonmetallic minerals except as provided in §60.670 (b) and (c).

*Portable plant* means any nonmetallic mineral processing plant that is mounted on any chassis or skids and may be moved by the application of a lifting or pulling force. In addition, there shall be no cable, chain, turnbuckle, bolt or other means (except electrical connections) by which any piece of equipment is attached or clamped to any anchor, slab, or structure, including bedrock that must be removed prior to the application of a lifting or pulling force for the purpose of transporting the unit.

*Production line* means all affected facilities (crushers, grinding mills, screening operations, bucket elevators, belt conveyors, bagging operations, storage bins, and enclosed truck and railcar loading stations) which are directly connected or are connected together by a conveying system.

*Saturated material* means, for purposes of this subpart, mineral material with sufficient surface moisture such that particulate matter emissions are not generated from processing of the material through screening operations, bucket elevators and belt conveyors. Material that is wetted solely by wet suppression systems is not considered to be "saturated" for purposes of this definition.

*Screening operation* means a device for separating material according to size by passing undersize material through one or more mesh surfaces (screens) in series, and retaining oversize material on the mesh surfaces (screens). Grizzly feeders associated with truck dumping and static (non-moving) grizzlies used anywhere in the nonmetallic mineral processing plant are not considered to be screening operations.

*Seasonal shut down* means shut down of an affected facility for a period of at least 45 consecutive days due to weather or seasonal market conditions.

*Size* means the rated capacity in tons per hour of a crusher, grinding mill, bucket elevator, bagging operation, or enclosed truck or railcar loading station; the total surface area of the top screen of a screening operation; the width of a conveyor belt; and the rated capacity in tons of a storage bin.

*Stack emission* means the particulate matter that is released to the atmosphere from a capture system.

*Storage bin* means a facility for storage (including surge bins) of nonmetallic minerals prior to further processing or loading.

*Transfer point* means a point in a conveying operation where the nonmetallic mineral is transferred to or from a belt conveyor except where the nonmetallic mineral is being transferred to a stockpile.

*Truck dumping* means the unloading of nonmetallic minerals from movable vehicles designed to transport nonmetallic minerals from one location to another. Movable vehicles include but are not limited to: Trucks, front end loaders, skip hoists, and railcars.

*Vent* means an opening through which there is mechanically induced air flow for the purpose of exhausting from a building air carrying particulate matter emissions from one or more affected facilities.

*Wet material processing operation(s)* means any of the following:

(1) Wet screening operations (as defined in this section) and subsequent screening operations, bucket elevators and belt conveyors in the production line that process saturated materials (as defined in this section) up to the first crusher, grinding mill or storage bin in the production line; or

(2) Screening operations, bucket elevators and belt conveyors in the production line downstream of wet mining operations (as defined in this section) that process saturated materials (as defined in this section) up to the first crusher, grinding mill or storage bin in the production line.

*Wet mining operation* means a mining or dredging operation designed and operated to extract any nonmetallic mineral regulated under this subpart from deposits existing at or below the water table, where the nonmetallic mineral is saturated with water.

*Wet screening operation* means a screening operation at a nonmetallic mineral processing plant which removes unwanted material or which separates marketable fines from the product by a washing process which is designed and operated at all times such that the product is saturated with water.

## § 60.672 Standard for particulate matter (PM).

(a) Affected facilities must meet the stack emission limits and compliance requirements in Table 2 of this subpart within 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup as required under §60.8. The requirements in Table 2 of this subpart apply for affected facilities with capture systems used to capture and transport particulate matter to a control device.

(b) Affected facilities must meet the fugitive emission limits and compliance requirements in Table 3 of this subpart within 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup as required under §60.11. The requirements in Table 3 of this subpart apply for fugitive emissions from affected facilities without capture systems and for fugitive emissions escaping capture systems.

(c) [Reserved]

(d) Truck dumping of nonmetallic minerals into any screening operation, feed hopper, or crusher is exempt from the requirements of this section.

(e) If any transfer point on a conveyor belt or any other affected facility is enclosed in a building, then each enclosed affected facility must comply with the emission limits in paragraphs (a) and (b) of this section, or the building enclosing the affected facility or facilities must comply with the following emission limits:

(1) Fugitive emissions from the building openings (except for vents as defined in §60.671) must not exceed 7 percent opacity; and

(2) Vents (as defined in §60.671) in the building must meet the applicable stack emission limits and compliance requirements in Table 2 of this subpart.

(f) Any baghouse that controls emissions from only an individual, enclosed storage bin is exempt from the applicable stack PM concentration limit (and associated performance testing) in Table 2 of this subpart but must meet the applicable stack opacity limit and compliance requirements in Table 2 of this subpart. This exemption from the stack PM concentration limit does not apply for multiple storage bins with combined stack emissions.

## § 60.673 Reconstruction.

(a) The cost of replacement of ore-contact surfaces on processing equipment shall not be considered in calculating either the “fixed capital cost of the new components” or the “fixed capital cost that would be required to construct a comparable new facility” under §60.15. Ore-contact surfaces are crushing surfaces; screen meshes, bars, and plates; conveyor belts; and elevator buckets.

(b) Under §60.15, the “fixed capital cost of the new components” includes the fixed capital cost of all depreciable components (except components specified in paragraph (a) of this section) which are or will be replaced pursuant to all continuous programs of component replacement commenced within any 2-year period following August 31, 1983.

## § 60.674 Monitoring of operations.

(a) The owner or operator of any affected facility subject to the provisions of this subpart which uses a wet scrubber to control emissions shall install, calibrate, maintain and operate the following monitoring devices:

(1) A device for the continuous measurement of the pressure loss of the gas stream through the scrubber. The monitoring device must be certified by the manufacturer to be accurate within ±250 pascals ±1 inch water gauge pressure and must be calibrated on an annual basis in accordance with manufacturer's instructions.

(2) A device for the continuous measurement of the scrubbing liquid flow rate to the wet scrubber. The monitoring device must be certified by the manufacturer to be accurate within ±5 percent of design scrubbing liquid flow rate and must be calibrated on an annual basis in accordance with manufacturer's instructions.

(b) The owner or operator of any affected facility for which construction, modification, or reconstruction commenced on or after April 22, 2008, that uses wet suppression to control emissions from the affected facility must perform monthly periodic inspections to check that water is flowing to discharge spray nozzles in the wet suppression system. The owner or operator must initiate corrective action within 24 hours and complete corrective action as expediently as practical if the owner or operator finds that water is not flowing properly during an inspection of the water spray nozzles. The owner or operator must record each inspection of the water spray nozzles, including the date of each inspection and any corrective actions taken, in the logbook required under §60.676(b).

(1) If an affected facility relies on water carryover from upstream water sprays to control fugitive emissions, then that affected facility is exempt from the 5-year repeat testing requirement specified in Table 3 of this subpart provided that the affected facility meets the criteria in paragraphs (b)(1)(i) and (ii) of this section:

(i) The owner or operator of the affected facility conducts periodic inspections of the upstream water spray(s) that are responsible for controlling fugitive emissions from the affected facility. These inspections are conducted according to paragraph (b) of this section and §60.676(b), and

(ii) The owner or operator of the affected facility designates which upstream water spray(s) will be periodically inspected at the time of the initial performance test required under §60.11 of this part and §60.675 of this subpart.

(2) If an affected facility that routinely uses wet suppression water sprays ceases operation of the water sprays or is using a control mechanism to reduce fugitive emissions other than water sprays during the monthly inspection (for example, water from recent rainfall), the logbook entry required under §60.676(b) must specify the control mechanism being used instead of the water sprays.

(c) Except as specified in paragraph (d) or (e) of this section, the owner or operator of any affected facility for which construction, modification, or reconstruction commenced on or after April 22, 2008, that uses a baghouse to control emissions must conduct quarterly 30-minute visible emissions inspections using EPA Method 22 (40 CFR part 60, Appendix A–7). The Method 22 (40 CFR part 60, Appendix A–7) test shall be conducted while the baghouse is operating. The test is successful if no visible emissions are observed. If any visible emissions are observed, the owner or operator of the affected facility must initiate corrective action within 24 hours to return the baghouse to normal operation. The owner or operator must record each Method 22 (40 CFR part 60, Appendix A–7) test, including the date and any corrective actions taken, in the logbook required under §60.676(b). The owner or operator of the affected facility may establish a different baghouse-specific success level for the visible emissions test (other than no visible emissions) by conducting a PM performance test according to §60.675(b) simultaneously with a Method 22 (40 CFR part 60, Appendix A–7) to determine what constitutes normal visible emissions from that affected facility's baghouse when it is in compliance with the applicable PM concentration limit in Table 2 of this subpart. The revised visible emissions success level must be incorporated into the permit for the affected facility.

(d) As an alternative to the periodic Method 22 (40 CFR part 60, Appendix A–7) visible emissions inspections specified in paragraph (c) of this section, the owner or operator of any affected facility for which construction, modification, or reconstruction commenced on or after April 22, 2008, that uses a baghouse to control emissions may use a bag leak detection system. The owner or operator must install, operate, and maintain the bag leak detection system according to paragraphs (d)(1) through (3) of this section.

(1) Each bag leak detection system must meet the specifications and requirements in paragraphs (d)(1)(i) through (viii) of this section.

(i) The bag leak detection system must be certified by the manufacturer to be capable of detecting PM emissions at concentrations of 1 milligram per dry standard cubic meter (0.00044 grains per actual cubic foot) or less.

(ii) The bag leak detection system sensor must provide output of relative PM loadings. The owner or operator shall continuously record the output from the bag leak detection system using electronic or other means ( *e.g.* , using a strip chart recorder or a data logger).

(iii) The bag leak detection system must be equipped with an alarm system that will sound when the system detects an increase in relative particulate loading over the alarm set point established according to paragraph (d)(1)(iv) of this section, and the alarm must be located such that it can be heard by the appropriate plant personnel.

(iv) In the initial adjustment of the bag leak detection system, the owner or operator must establish, at a minimum, the baseline output by adjusting the sensitivity (range) and the averaging period of the device, the alarm set points, and the alarm delay time.

(v) Following initial adjustment, the owner or operator shall not adjust the averaging period, alarm set point, or alarm delay time without approval from the Administrator or delegated authority except as provided in paragraph (d)(1)(vi) of this section.

(vi) Once per quarter, the owner or operator may adjust the sensitivity of the bag leak detection system to account for seasonal effects, including temperature and humidity, according to the procedures identified in the site-specific monitoring plan required by paragraph (d)(2) of this section.

(vii) The owner or operator must install the bag leak detection sensor downstream of the fabric filter.

(viii) Where multiple detectors are required, the system's instrumentation and alarm may be shared among detectors.

(2) The owner or operator of the affected facility must develop and submit to the Administrator or delegated authority for approval of a site-specific monitoring plan for each bag leak detection system. The owner or operator must operate and maintain the bag leak detection system according to the site-specific monitoring plan at all times. Each monitoring plan must describe the items in paragraphs (d)(2)(i) through (vi) of this section.

(i) Installation of the bag leak detection system;

(ii) Initial and periodic adjustment of the bag leak detection system, including how the alarm set-point will be established;

(iii) Operation of the bag leak detection system, including quality assurance procedures;

(iv) How the bag leak detection system will be maintained, including a routine maintenance schedule and spare parts inventory list;

(v) How the bag leak detection system output will be recorded and stored; and

(vi) Corrective action procedures as specified in paragraph (d)(3) of this section. In approving the site-specific monitoring plan, the Administrator or delegated authority may allow owners and operators more than 3 hours to alleviate a specific condition that causes an alarm if the owner or operator identifies in the monitoring plan this specific condition as one that could lead to an alarm, adequately explains why it is not feasible to alleviate this condition within 3 hours of the time the alarm occurs, and demonstrates that the requested time will ensure alleviation of this condition as expeditiously as practicable.

(3) For each bag leak detection system, the owner or operator must initiate procedures to determine the cause of every alarm within 1 hour of the alarm. Except as provided in paragraph (d)(2)(vi) of this section, the owner or operator must alleviate the cause of the alarm within 3 hours of the alarm by taking whatever corrective action(s) are necessary. Corrective actions may include, but are not limited to the following:

(i) Inspecting the fabric filter for air leaks, torn or broken bags or filter media, or any other condition that may cause an increase in PM emissions;

(ii) Sealing off defective bags or filter media;

(iii) Replacing defective bags or filter media or otherwise repairing the control device;

(iv) Sealing off a defective fabric filter compartment;

(v) Cleaning the bag leak detection system probe or otherwise repairing the bag leak detection system; or

(vi) Shutting down the process producing the PM emissions.

(e) As an alternative to the periodic Method 22 (40 CFR part 60, Appendix A–7) visible emissions inspections specified in paragraph (c) of this section, the owner or operator of any affected facility that is subject to the requirements for processed stone handling operations in the Lime Manufacturing NESHAP (40 CFR part 63, subpart AAAAA) may follow the continuous compliance requirements in row 1 items (i) through (iii) of Table 6 to Subpart AAAAA of 40 CFR part 63.

## *§ 60.675 Test methods and procedures.*

(a) In conducting the performance tests required in §60.8, the owner or operator shall use as reference methods and procedures the test methods in appendices A–1 through A–7 of this part or other methods and procedures as specified in this section, except as provided in §60.8(b). Acceptable alternative methods and procedures are given in paragraph (e) of this section.

(b) The owner or operator shall determine compliance with the PM standards in §60.672(a) as follows:

(1) Except as specified in paragraphs (e)(3) and (4) of this section, Method 5 of Appendix A–3 of this part or Method 17 of Appendix A–6 of this part shall be used to determine the particulate matter concentration. The sample volume shall be at least 1.70 dscm (60 dscf). For Method 5 (40 CFR part 60, Appendix A–3), if the gas stream being sampled is at ambient temperature, the sampling probe and filter may be operated without heaters. If the gas stream is above ambient temperature, the sampling probe and filter may be operated at a temperature high enough, but no higher than 121 °C (250 °F), to prevent water condensation on the filter.

(2) Method 9 of Appendix A–4 of this part and the procedures in §60.11 shall be used to determine opacity.

(c)(1) In determining compliance with the particulate matter standards in §60.672(b) or §60.672(e)(1), the owner or operator shall use Method 9 of Appendix A–4 of this part and the procedures in §60.11, with the following additions:

(i) The minimum distance between the observer and the emission source shall be 4.57 meters (15 feet).

(ii) The observer shall, when possible, select a position that minimizes interference from other fugitive emission sources ( *e.g.,* road dust). The required observer position relative to the sun (Method 9 of Appendix A–4 of this part, Section 2.1) must be followed.

(iii) For affected facilities using wet dust suppression for particulate matter control, a visible mist is sometimes generated by the spray. The water mist must not be confused with particulate matter emissions and is not to be considered a visible emission. When a water mist of this nature is present, the observation of emissions is to be made at a point in the plume where the mist is no longer visible.

(2)(i) In determining compliance with the opacity of stack emissions from any baghouse that controls emissions only from an individual enclosed storage bin under §60.672(f) of this subpart, using Method 9 (40 CFR part 60, Appendix A–4), the duration of the Method 9 (40 CFR part 60, Appendix A–4) observations shall be 1 hour (ten 6-minute averages).

(ii) The duration of the Method 9 (40 CFR part 60, Appendix A–4) observations may be reduced to the duration the affected facility operates (but not less than 30 minutes) for baghouses that control storage bins or enclosed truck or railcar loading stations that operate for less than 1 hour at a time.

(3) When determining compliance with the fugitive emissions standard for any affected facility described under §60.672(b) or §60.672(e)(1) of this subpart, the duration of the Method 9 (40 CFR part 60, Appendix A–4) observations must be 30 minutes (five 6-minute averages). Compliance with the applicable fugitive emission limits in Table 3 of this subpart must be based on the average of the five 6-minute averages.

(d) To demonstrate compliance with the fugitive emission limits for buildings specified in §60.672(e)(1), the owner or operator must complete the testing specified in paragraph (d)(1) and (2) of this section. Performance tests must be conducted while all affected facilities inside the building are operating.

(1) If the building encloses any affected facility that commences construction, modification, or reconstruction on or after April 22, 2008, the owner or operator of the affected facility must conduct an initial Method 9 (40 CFR part 60, Appendix A–4) performance test according to this section and §60.11.

(2) If the building encloses only affected facilities that commenced construction, modification, or reconstruction before April 22, 2008, and the owner or operator has previously conducted an initial Method 22 (40 CFR part 60, Appendix A–7) performance test showing zero visible emissions, then the owner or operator has demonstrated compliance with the opacity limit in §60.672(e)(1). If the owner or operator has not conducted an initial performance test for the building before April 22, 2008, then the owner or operator must conduct an initial Method 9 (40 CFR part 60, Appendix A–4) performance test according to this section and §60.11 to show compliance with the opacity limit in §60.672(e)(1).

(e) The owner or operator may use the following as alternatives to the reference methods and procedures specified in this section:

(1) For the method and procedure of paragraph (c) of this section, if emissions from two or more facilities continuously interfere so that the opacity of fugitive emissions from an individual affected facility cannot be read, either of the following procedures may be used:

(i) Use for the combined emission stream the highest fugitive opacity standard applicable to any of the individual affected facilities contributing to the emissions stream.

(ii) Separate the emissions so that the opacity of emissions from each affected facility can be read.

(2) A single visible emission observer may conduct visible emission observations for up to three fugitive, stack, or vent emission points within a 15-second interval if the following conditions are met:

(i) No more than three emission points may be read concurrently.

(ii) All three emission points must be within a 70 degree viewing sector or angle in front of the observer such that the proper sun position can be maintained for all three points.

(iii) If an opacity reading for any one of the three emission points equals or exceeds the applicable standard, then the observer must stop taking readings for the other two points and continue reading just that single point.

(3) Method 5I of Appendix A–3 of this part may be used to determine the PM concentration as an alternative to the methods specified in paragraph (b)(1) of this section. Method 5I (40 CFR part 60, Appendix A–3) may be useful for affected facilities that operate for less than 1 hour at a time such as (but not limited to) storage bins or enclosed truck or railcar loading stations.

(4) In some cases, velocities of exhaust gases from building vents may be too low to measure accurately with the type S pitot tube specified in EPA Method 2 of Appendix A–1 of this part [ *i.e.,* velocity head <1.3 mm $H_2O$ (0.05 in. $H_2O$)] and referred to in EPA Method 5 of Appendix A–3 of this part. For these conditions, the owner or operator may determine the average gas flow rate produced by the power fans ( *e.g.,* from vendor-supplied fan curves) to the building vent. The owner or operator may calculate the average gas velocity at the building vent measurement site using Equation 1 of this section and use this average velocity in determining and maintaining isokinetic sampling rates.

$$v_e = \frac{Q_f}{A_e} \qquad \text{(Eq. 1)}$$

Where:

$V_e$= average building vent velocity (feet per minute);

$Q_f$= average fan flow rate (cubic feet per minute); and

$A_e$= area of building vent and measurement location (square feet).

(f) To comply with §60.676(d), the owner or operator shall record the measurements as required in §60.676(c) using the monitoring devices in §60.674 (a)(1) and (2) during each particulate matter run and shall determine the averages.

(g) For performance tests involving only Method 9 (40 CFR part 60 Appendix A–4) testing, the owner or operator may reduce the 30-day advance notification of performance test in §60.7(a)(6) and 60.8(d) to a 7-day advance notification.

(h) [Reserved]

(i) If the initial performance test date for an affected facility falls during a seasonal shut down (as defined in §60.671 of this subpart) of the affected facility, then with approval from the permitting authority, the owner or operator may postpone the initial performance test until no later than 60 calendar days after resuming operation of the affected facility.

## *§ 60.676 Reporting and recordkeeping.*

(a) Each owner or operator seeking to comply with §60.670(d) shall submit to the Administrator the following information about the existing facility being replaced and the replacement piece of equipment.

(1) For a crusher, grinding mill, bucket elevator, bagging operation, or enclosed truck or railcar loading station:

(i) The rated capacity in megagrams or tons per hour of the existing facility being replaced and

(ii) The rated capacity in tons per hour of the replacement equipment.

(2) For a screening operation:

(i) The total surface area of the top screen of the existing screening operation being replaced and

(ii) The total surface area of the top screen of the replacement screening operation.

(3) For a conveyor belt:

(i) The width of the existing belt being replaced and

(ii) The width of the replacement conveyor belt.

(4) For a storage bin:

(i) The rated capacity in megagrams or tons of the existing storage bin being replaced and

(ii) The rated capacity in megagrams or tons of replacement storage bins.

(b)(1) Owners or operators of affected facilities (as defined in §§60.670 and 60.671) for which construction, modification, or reconstruction commenced on or after April 22, 2008, must record each periodic inspection required under §60.674(b) or (c), including dates and any corrective actions taken, in a logbook (in written or electronic format). The owner or operator must keep the logbook onsite and make hard or electronic copies (whichever is requested) of the logbook available to the Administrator upon request.

(2) For each bag leak detection system installed and operated according to §60.674(d), the owner or operator must keep the records specified in paragraphs (b)(2)(i) through (iii) of this section.

(i) Records of the bag leak detection system output;

(ii) Records of bag leak detection system adjustments, including the date and time of the adjustment, the initial bag leak detection system settings, and the final bag leak detection system settings; and

(iii) The date and time of all bag leak detection system alarms, the time that procedures to determine the cause of the alarm were initiated, the cause of the alarm, an explanation of the actions taken, the date and time the cause of the alarm was alleviated, and whether the cause of the alarm was alleviated within 3 hours of the alarm.

(3) The owner or operator of each affected facility demonstrating compliance according to §60.674(e) by following the requirements for processed stone handling operations in the Lime Manufacturing NESHAP (40 CFR part 63, subpart AAAAA) must maintain records of visible emissions observations required by §63.7132(a)(3) and (b) of 40 CFR part 63, subpart AAAAA.

(c) During the initial performance test of a wet scrubber, and daily thereafter, the owner or operator shall record the measurements of both the change in pressure of the gas stream across the scrubber and the scrubbing liquid flow rate.

(d) After the initial performance test of a wet scrubber, the owner or operator shall submit semiannual reports to the Administrator of occurrences when the measurements of the scrubber pressure loss and liquid flow rate decrease by more than 30 percent from the average determined during the most recent performance test.

(e) The reports required under paragraph (d) of this section shall be postmarked within 30 days following end of the second and fourth calendar quarters.

(f) The owner or operator of any affected facility shall submit written reports of the results of all performance tests conducted to demonstrate compliance with the standards set forth in §60.672 of this subpart, including reports of opacity observations made using Method 9 (40 CFR part 60, Appendix A–4) to demonstrate compliance with §60.672(b), (e) and (f).

(g) The owner or operator of any wet material processing operation that processes saturated and subsequently processes unsaturated materials, shall submit a report of this change within 30 days following such change. At the time of such change, this screening operation, bucket elevator, or belt conveyor becomes subject to the applicable opacity limit in §60.672(b) and the emission test requirements of §60.11.

(h) The subpart A requirement under §60.7(a)(1) for notification of the date construction or reconstruction commenced is waived for affected facilities under this subpart.

(i) A notification of the actual date of initial startup of each affected facility shall be submitted to the Administrator.

(1) For a combination of affected facilities in a production line that begin actual initial startup on the same day, a single notification of startup may be submitted by the owner or operator to the Administrator. The notification shall be postmarked within 15 days after such date and shall include a description of each affected facility, equipment manufacturer, and serial number of the equipment, if available.

(2) For portable aggregate processing plants, the notification of the actual date of initial startup shall include both the home office and the current address or location of the portable plant.

(j) The requirements of this section remain in force until and unless the Agency, in delegating enforcement authority to a State under section 111(c) of the Act, approves reporting requirements or an alternative means of compliance surveillance adopted by such States. In that event, affected facilities within the State will be relieved of the obligation to comply with the reporting requirements of this section, provided that they comply with requirements established by the State.

(k) Notifications and reports required under this subpart and under subpart A of this part to demonstrate compliance with this subpart need only to be sent to the EPA Region or the State which has been delegated authority according to §60.4(b).

## *Table 1 to Subpart OOO—Exceptions to Applicability of Subpart A to Subpart OOO*

**Table 1 to Subpart OOO—Exceptions to Applicability of Subpart A to Subpart OOO**

| Subpart A reference | Applies to subpart OOO | Explanation |
|---|---|---|
| 60.4, Address | Yes | Except in §60.4(a) and (b) submittals need not be submitted to both the EPA Region and delegated State authority (§60.676(k)). |
| 60.7, Notification and recordkeeping | Yes | Except in (a)(1) notification of the date construction or reconstruction commenced (§60.676(h)). |
| | | Also, except in (a)(6) performance tests involving only Method 9 (40 CFR part 60, Appendix A–4) require a 7-day advance notification instead of 30 days (§60.675(g)). |
| 60.8, Performance tests | Yes | Except in (d) performance tests involving only Method 9 (40 CFR part 60, Appendix A–4) require a 7-day advance notification instead of 30 days (§60.675(g)). |
| 60.11, Compliance with standards and maintenance requirements | Yes | Except in (b) under certain conditions (§§60.675(c)), Method 9 (40 CFR part 60, Appendix A–4) observation is reduced from 3 hours to 30 minutes for fugitive emissions. |
| 60.18, General control device | No | Flares will not be used to comply with the emission limits. |

## *Table 2 to Subpart OOO—Stack Emission Limits for Affected Facilities With Capture Systems*

**Table 2 to Subpart OOO—Stack Emission Limits for Affected Facilities With Capture Systems**

| For * * * | The owner or operator must | And the owner or operator must | The owner or operator must demonstrate |
|---|---|---|---|

| | **meet a PM limit of * * *** | **meet an opacity limit of * * *** | **compliance with these limits by conducting * * *** |
|---|---|---|---|
| Affected facilities (as defined in §§60.670 and 60.671) that commenced construction, modification, or reconstruction after August 31, 1983 but before April 22, 2008 | 0.05 g/dscm (0.022 gr/dscf)[a] | 7 percent for dry control devices[b] | An initial performance test according to §60.8 of this part and §60.675 of this subpart; and Monitoring of wet scrubber parameters according to §60.674(a) and §60.676(c), (d), and (e). |
| Affected facilities (as defined in §§60.670 and 60.671) that commence construction, modification, or reconstruction on or after April 22, 2008 | 0.032 g/dscm (0.014 gr/dscf)[a] | Not applicable (except for individual enclosed storage bins)<br>7 percent for dry control devices on individual enclosed storage bins | An initial performance test according to §60.8 of this part and §60.675 of this subpart; and Monitoring of wet scrubber parameters according to §60.674(a) and §60.676(c), (d), and (e); and |
| | | | Monitoring of baghouses according to §60.674(c), (d), or (e) and §60.676(b). |

[a]Exceptions to the PM limit apply for individual enclosed storage bins and other equipment. See §60.672(d) through (f).

[b]The stack opacity limit and associated opacity testing requirements do not apply for affected facilities using wet scrubbers.

## *Table 3 to Subpart OOO—Fugitive Emission Limits*

**Table 3 to Subpart OOO—Fugitive Emission Limits**

| **For * * *** | **The owner or operator must meet the following fugitive emissions limit for grinding mills, screening operations, bucket elevators, transfer points on belt conveyors,** | **The owner or operator must meet the following fugitive emissions limit for crushers at** | **The owner or operator must demonstrate compliance with these limits by conducting * * *** |
|---|---|---|---|

| | **bagging operations, storage bins, enclosed truck or railcar loading stations or from any other affected facility (as defined in §§60.670 and 60.671) * * *** | **which a capture system is not used * * *** | |
|---|---|---|---|
| Affected facilities (as defined in §§60.670 and 60.671) that commenced construction, modification, or reconstruction after August 31, 1983 but before April 22, 2008 | 10 percent opacity | 15 percent opacity | An initial performance test according to §60.11 of this part and §60.675 of this subpart. |
| Affected facilities (as defined in §§60.670 and 60.671) that commence construction, modification, or reconstruction on or after April 22, 2008 | 7 percent opacity | 12 percent opacity | An initial performance test according to §60.11 of this part and §60.675 of this subpart; and<br>Periodic inspections of water sprays according to §60.674(b) and §60.676(b); and |
| | | | A repeat performance test according to §60.11 of this part and §60.675 of this subpart within 5 years from the previous performance test for fugitive emissions from affected facilities without water sprays. Affected facilities controlled by water carryover from upstream water sprays that are inspected according to the requirements in §60.674(b) and §60.676(b) are exempt from this 5-year repeat testing requirement. |

**Attachment C: Standards of Performance for Stationary Compression Ignition Internal Combustion Engines [40 CFR 60, Subpart IIII]**

| Source Description and Location | |
|---|---|
| **Source Name:** | **Duke Energy Indiana Inc., Cayuga Generating Station** |
| **Source Location:** | **State Road 63, Cayuga, IN 46168** |
| **County:** | **Vermillion** |
| **SIC Code:** | **4911** |
| **Operation Permit No.:** | **T 165-33876-00001** |
| **Permit Reviewer:** | **Josiah Balogun** |

**Subpart IIII—Standards of Performance for Stationary Compression Ignition Internal Combustion Engines**

**Source:** 71 FR 39172, July 11, 2006, unless otherwise noted.

***What This Subpart Covers***

***§ 60.4200 Am I subject to this subpart?***

(a) The provisions of this subpart are applicable to manufacturers, owners, and operators of stationary compression ignition (CI) internal combustion engines (ICE) as specified in paragraphs (a)(1) through (3) of this section. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator.

(1) Manufacturers of stationary CI ICE with a displacement of less than 30 liters per cylinder where the model year is:

(i) 2007 or later, for engines that are not fire pump engines,

(ii) The model year listed in table 3 to this subpart or later model year, for fire pump engines.

(2) Owners and operators of stationary CI ICE that commence construction after July 11, 2005 where the stationary CI ICE are:

(i) Manufactured after April 1, 2006 and are not fire pump engines, or

(ii) Manufactured as a certified National Fire Protection Association (NFPA) fire pump engine after July 1, 2006.

(3) Owners and operators of stationary CI ICE that modify or reconstruct their stationary CI ICE after July 11, 2005.

(b) The provisions of this subpart are not applicable to stationary CI ICE being tested at a stationary CI ICE test cell/stand.

(c) If you are an owner or operator of an area source subject to this subpart, you are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71, provided you are not required to obtain a permit under 40 CFR 70.3(a) or 40 CFR 71.3(a) for a reason other than your status as an area source under this subpart. Notwithstanding the previous sentence, you must continue to comply with the provisions of this subpart applicable to area sources.

(d) Stationary CI ICE may be eligible for exemption from the requirements of this subpart as described in 40 CFR part 1068, subpart C (or the exemptions described in 40 CFR part 89, subpart J and 40 CFR part 94, subpart J, for engines that would need to be certified to standards in those parts), except that owners and operators, as well as manufacturers, may be eligible to request an exemption for national security.

***Emission Standards for Manufacturers***

***§ 60.4201 What emission standards must I meet for non-emergency engines if I am a stationary CI internal combustion engine manufacturer?***

(a) Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later non-emergency stationary CI ICE with a maximum engine power less than or equal to 2,237 kilowatt (KW) (3,000 horsepower (HP)) and a displacement of less than 10 liters per cylinder to the certification emission standards for new nonroad CI engines in 40 CFR 89.112, 40 CFR 89.113, 40 CFR 1039.101, 40 CFR 1039.102, 40 CFR 1039.104, 40 CFR 1039.105, 40 CFR 1039.107, and 40 CFR 1039.115, as applicable, for all pollutants, for the same model year and maximum engine power.

(b) Stationary CI internal combustion engine manufacturers must certify their 2007 through 2010 model year non-emergency stationary CI ICE with a maximum engine power greater than 2,237 KW (3,000 HP) and a displacement of less than 10 liters per cylinder to the emission standards in table 1 to this subpart, for all pollutants, for the same maximum engine power.

(c) Stationary CI internal combustion engine manufacturers must certify their 2011 model year and later non-emergency stationary CI ICE with a maximum engine power greater than 2,237 KW (3,000 HP) and a displacement of less than 10 liters per cylinder to the certification emission standards for new nonroad CI engines in 40 CFR 1039.101, 40 CFR 1039.102, 40 CFR 1039.104, 40 CFR 1039.105, 40 CFR 1039.107, and 40 CFR 1039.115, as applicable, for all pollutants, for the same maximum engine power.

(d) Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later non-emergency stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder to the certification emission standards for new marine CI engines in 40 CFR 94.8, as applicable, for all pollutants, for the same displacement and maximum engine power.

***§ 60.4202 What emission standards must I meet for emergency engines if I am a stationary CI internal combustion engine manufacturer?***

(a) Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later emergency stationary CI ICE with a maximum engine power less than or equal to 2,237 KW (3,000 HP) and a displacement of less than 10 liters per cylinder that are not fire pump engines to the emission standards specified in paragraphs (a)(1) through (2) of this section.

(1) For engines with a maximum engine power less than 37 KW (50 HP):

(i) The certification emission standards for new nonroad CI engines for the same model year and maximum engine power in 40 CFR 89.112 and 40 CFR 89.113 for all pollutants for model year 2007 engines, and

(ii) The certification emission standards for new nonroad CI engines in 40 CFR 1039.104, 40 CFR 1039.105, 40 CFR 1039.107, 40 CFR 1039.115, and table 2 to this subpart, for 2008 model year and later engines.

(2) For engines with a maximum engine power greater than or equal to 37 KW (50 HP), the certification emission standards for new nonroad CI engines for the same model year and maximum engine power in 40 CFR 89.112 and 40 CFR 89.113 for all pollutants beginning in model year 2007.

(b) Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later emergency stationary CI ICE with a maximum engine power greater than 2,237 KW (3,000 HP) and a displacement of less than 10 liters per cylinder that are not fire pump engines to the emission standards specified in paragraphs (b)(1) through (2) of this section.

(1) For 2007 through 2010 model years, the emission standards in table 1 to this subpart, for all pollutants, for the same maximum engine power.

(2) For 2011 model year and later, the certification emission standards for new nonroad CI engines for engines of the same model year and maximum engine power in 40 CFR 89.112 and 40 CFR 89.113 for all pollutants.

(c) Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later emergency stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder that are not fire pump engines to the certification emission standards for new marine CI engines in 40 CFR 94.8, as applicable, for all pollutants, for the same displacement and maximum engine power.

(d) Beginning with the model years in table 3 to this subpart, stationary CI internal combustion engine manufacturers must certify their fire pump stationary CI ICE to the emission standards in table 4 to this subpart, for all pollutants, for the same model year and NFPA nameplate power.

***§ 60.4203 How long must my engines meet the emission standards if I am a stationary CI internal combustion engine manufacturer?***

Engines manufactured by stationary CI internal combustion engine manufacturers must meet the emission standards as required in §§60.4201 and 60.4202 during the useful life of the engines.

***Emission Standards for Owners and Operators***

***§ 60.4204 What emission standards must I meet for non-emergency engines if I am an owner or operator of a stationary CI internal combustion engine?***

(a) Owners and operators of pre-2007 model year non-emergency stationary CI ICE with a displacement of less than 10 liters per cylinder must comply with the emission standards in table 1 to this subpart. Owners and operators of pre-2007 model year non-emergency stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder must comply with the emission standards in 40 CFR 94.8(a)(1).

(b) Owners and operators of 2007 model year and later non-emergency stationary CI ICE with a displacement of less than 30 liters per cylinder must comply with the emission standards for new CI engines in §60.4201 for their 2007 model year and later stationary CI ICE, as applicable.

(c) Owners and operators of non-emergency stationary CI ICE with a displacement of greater than or equal to 30 liters per cylinder must meet the requirements in paragraphs (c)(1) and (2) of this section.

(1) Reduce nitrogen oxides ($NO_X$) emissions by 90 percent or more, or limit the emissions of $NO_X$in the stationary CI internal combustion engine exhaust to 1.6 grams per KW-hour (g/KW-hr) (1.2 grams per HP-hour (g/HP-hr)).

(2) Reduce particulate matter (PM) emissions by 60 percent or more, or limit the emissions of PM in the stationary CI internal combustion engine exhaust to 0.15 g/KW-hr (0.11 g/HP-hr).

***§ 60.4205 What emission standards must I meet for emergency engines if I am an owner or operator of a stationary CI internal combustion engine?***

(a) Owners and operators of pre-2007 model year emergency stationary CI ICE with a displacement of less than 10 liters per cylinder that are not fire pump engines must comply with the emission standards in table 1 to this subpart. Owners and operators of pre-2007 model year non-emergency stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder that are not fire pump engines must comply with the emission standards in 40 CFR 94.8(a)(1).

(b) Owners and operators of 2007 model year and later emergency stationary CI ICE with a displacement of less than 30 liters per cylinder that are not fire pump engines must comply with the emission standards for new nonroad CI engines in §60.4202, for all pollutants, for the same model year and maximum engine power for their 2007 model year and later emergency stationary CI ICE.

(c) Owners and operators of fire pump engines with a displacement of less than 30 liters per cylinder must comply with the emission standards in table 4 to this subpart, for all pollutants.

(d) Owners and operators of emergency stationary CI ICE with a displacement of greater than or equal to 30 liters per cylinder must meet the requirements in paragraphs (d)(1) and (2) of this section.

(1) Reduce $NO_X$emissions by 90 percent or more, or limit the emissions of $NO_X$in the stationary CI internal combustion engine exhaust to 1.6 grams per KW-hour (1.2 grams per HP-hour).

(2) Reduce PM emissions by 60 percent or more, or limit the emissions of PM in the stationary CI internal combustion engine exhaust to 0.15 g/KW-hr (0.11 g/HP-hr).

***§ 60.4206 How long must I meet the emission standards if I am an owner or operator of a stationary CI internal combustion engine?***

Owners and operators of stationary CI ICE must operate and maintain stationary CI ICE that achieve the emission standards as required in §§60.4204 and 60.4205 according to the manufacturer's written instructions or procedures developed by the owner or operator that are approved by the engine manufacturer, over the entire life of the engine.

***Fuel Requirements for Owners and Operators***

***§ 60.4207 What fuel requirements must I meet if I am an owner or operator of a stationary CI internal combustion engine subject to this subpart?***

(a) Beginning October 1, 2007, owners and operators of stationary CI ICE subject to this subpart that use diesel fuel must use diesel fuel that meets the requirements of 40 CFR 80.510(a).

(b) Beginning October 1, 2010, owners and operators of stationary CI ICE subject to this subpart with a displacement of less than 30 liters per cylinder that use diesel fuel must use diesel fuel that meets the requirements of 40 CFR 80.510(b) for nonroad diesel fuel.

(c) Owners and operators of pre-2011 model year stationary CI ICE subject to this subpart may petition the Administrator for approval to use remaining non-compliant fuel that does not meet the fuel requirements of paragraphs (a) and (b) of this section beyond the dates required for the purpose of using up existing fuel inventories. If approved, the petition will be valid for a period of up to 6 months. If additional time is needed, the owner or operator is required to submit a new petition to the Administrator.

(d) Owners and operators of pre-2011 model year stationary CI ICE subject to this subpart that are located in areas of Alaska not accessible by the Federal Aid Highway System may petition the Administrator for approval to use any fuels mixed with used lubricating oil that do not meet the fuel requirements of paragraphs (a) and (b) of this section. Owners and operators must demonstrate in their petition to the Administrator that there is no other place to use the lubricating oil. If approved, the petition will be valid for a period of up to 6 months. If additional time is needed, the owner or operator is required to submit a new petition to the Administrator.

(e) Stationary CI ICE that have a national security exemption under §60.4200(d) are also exempt from the fuel requirements in this section.

***Other Requirements for Owners and Operators***

***§ 60.4208 What is the deadline for importing or installing stationary CI ICE produced in the previous model year?***

(a) After December 31, 2008, owners and operators may not install stationary CI ICE (excluding fire pump engines) that do not meet the applicable requirements for 2007 model year engines.

(b) After December 31, 2009, owners and operators may not install stationary CI ICE with a maximum engine power of less than 19 KW (25 HP) (excluding fire pump engines) that do not meet the applicable requirements for 2008 model year engines.

(c) After December 31, 2014, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power of greater than or equal to 19 KW (25 HP) and less than 56 KW (75 HP) that do not meet the applicable requirements for 2013 model year non-emergency engines.

(d) After December 31, 2013, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power of greater than or equal to 56 KW (75 HP) and less than 130 KW (175 HP) that do not meet the applicable requirements for 2012 model year non-emergency engines.

(e) After December 31, 2012, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power of greater than or equal to 130 KW (175 HP), including those above 560 KW (750 HP), that do not meet the applicable requirements for 2011 model year non-emergency engines.

(f) After December 31, 2016, owners and operators may not install non-emergency stationary CI ICE with a maximum engine power of greater than or equal to 560 KW (750 HP) that do not meet the applicable requirements for 2015 model year non-emergency engines.

(g) In addition to the requirements specified in §§60.4201, 60.4202, 60.4204, and 60.4205, it is prohibited to import stationary CI ICE with a displacement of less than 30 liters per cylinder that do not meet the applicable requirements specified in paragraphs (a) through (f) of this section after the dates specified in paragraphs (a) through (f) of this section.

(h) The requirements of this section do not apply to owners or operators of stationary CI ICE that have been modified, reconstructed, and do not apply to engines that were removed from one existing location and reinstalled at a new location.

***§ 60.4209 What are the monitoring requirements if I am an owner or operator of a stationary CI internal combustion engine?***

If you are an owner or operator, you must meet the monitoring requirements of this section. In addition, you must also meet the monitoring requirements specified in §60.4211.

(a) If you are an owner or operator of an emergency stationary CI internal combustion engine, you must install a non-resettable hour meter prior to startup of the engine.

(b) If you are an owner or operator of a stationary CI internal combustion engine equipped with a diesel particulate filter to comply with the emission standards in §60.4204, the diesel particulate filter must be installed with a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached.

***Compliance Requirements***

***§ 60.4210 What are my compliance requirements if I am a stationary CI internal combustion engine manufacturer?***

(a) Stationary CI internal combustion engine manufacturers must certify their stationary CI ICE with a displacement of less than 10 liters per cylinder to the emission standards specified in §60.4201(a) through (c) and §60.4202(a), (b) and (d) using the certification procedures required in 40 CFR part 89, subpart B, or 40 CFR part 1039, subpart C, as applicable, and must test their engines as specified in those parts. For the purposes of this subpart, engines certified to the standards in table 1 to this subpart shall be subject to the same requirements as engines certified to the standards in 40 CFR part 89. For the purposes of this subpart, engines certified to the standards in table 4 to this subpart shall be subject to the same requirements as engines certified to the standards in 40 CFR part 89, except that engines with NFPA nameplate power of less than 37 KW (50 HP) certified to model year 2011 or later standards shall be subject to the same requirements as engines certified to the standards in 40 CFR part 1039.

(b) Stationary CI internal combustion engine manufacturers must certify their stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder to the emission standards specified in §60.4201(d) and §60.4202(c) using the certification procedures required in 40 CFR part 94 subpart C, and must test their engines as specified in 40 CFR part 94.

(c) Stationary CI internal combustion engine manufacturers must meet the requirements of 40 CFR 1039.120, 40 CFR 1039.125, 40 CFR 1039.130, 40 CFR 1039.135, and 40 CFR part 1068 for engines that are certified to the emission standards in 40 CFR part 1039. Stationary CI internal combustion engine manufacturers must meet the corresponding provisions of 40 CFR part 89 or 40 CFR part 94 for engines that would be covered by that part if they were nonroad (including marine) engines. Labels on such engines must refer to stationary engines, rather than or in addition to nonroad or marine engines, as appropriate. Stationary CI internal combustion engine manufacturers must label their engines according to paragraphs (c)(1) through (3) of this section.

(1) Stationary CI internal combustion engines manufactured from January 1, 2006 to March 31, 2006 (January 1, 2006 to June 30, 2006 for fire pump engines), other than those that are part of certified engine families under the nonroad CI engine regulations, must be labeled according to 40 CFR 1039.20.

(2) Stationary CI internal combustion engines manufactured from April 1, 2006 to December 31, 2006 (or, for fire pump engines, July 1, 2006 to December 31 of the year preceding the year listed in table 3 to this subpart) must be labeled according to paragraphs (c)(2)(i) through (iii) of this section:

(i) Stationary CI internal combustion engines that are part of certified engine families under the nonroad regulations must meet the labeling requirements for nonroad CI engines, but do not have to meet the labeling requirements in 40 CFR 1039.20.

(ii) Stationary CI internal combustion engines that meet Tier 1 requirements (or requirements for fire pumps) under this subpart, but do not meet the requirements applicable to nonroad CI engines must be labeled according to 40 CFR 1039.20. The engine manufacturer may add language to the label clarifying that the engine meets Tier 1 requirements (or requirements for fire pumps) of this subpart.

(iii) Stationary CI internal combustion engines manufactured after April 1, 2006 that do not meet Tier 1 requirements of this subpart, or fire pumps engines manufactured after July 1, 2006 that do not meet the requirements for fire pumps under this subpart, may not be used in the U.S. If any such engines are manufactured in the U.S. after April 1, 2006 (July 1, 2006 for fire pump engines), they must be exported or must be brought into compliance with the appropriate standards prior to initial operation. The export provisions of 40 CFR 1068.230 would apply to engines for export and the manufacturers must label such engines according to 40 CFR 1068.230.

(3) Stationary CI internal combustion engines manufactured after January 1, 2007 (for fire pump engines, after January 1 of the year listed in table 3 to this subpart, as applicable) must be labeled according to paragraphs (c)(3)(i) through (iii) of this section.

(i) Stationary CI internal combustion engines that meet the requirements of this subpart and the corresponding requirements for nonroad (including marine) engines of the same model year and HP must be labeled according to the provisions in part 89, 94 or 1039, as appropriate.

(ii) Stationary CI internal combustion engines that meet the requirements of this subpart, but are not certified to the standards applicable to nonroad (including marine) engines of the same model year and HP must be labeled according to the provisions in part 89, 94 or 1039, as appropriate, but the words “stationary” must be included instead of “nonroad” or “marine” on the label. In addition, such engines must be labeled according to 40 CFR 1039.20.

(iii) Stationary CI internal combustion engines that do not meet the requirements of this subpart must be labeled according to 40 CFR 1068.230 and must be exported under the provisions of 40 CFR 1068.230.

(d) An engine manufacturer certifying an engine family or families to standards under this subpart that are identical to standards applicable under parts 89, 94, or 1039 for that model year may certify any such family that contains both nonroad (including marine) and stationary engines as a single engine family and/or may include any such family containing stationary engines in the averaging, banking and trading provisions applicable for such engines under those parts.

(e) Manufacturers of engine families discussed in paragraph (d) of this section may meet the labeling requirements referred to in paragraph (c) of this section for stationary CI ICE by either adding a separate label containing the information required in paragraph (c) of this section or by adding the words “and stationary” after the word “nonroad” or “marine,” as appropriate, to the label.

(f) Starting with the model years shown in table 5 to this subpart, stationary CI internal combustion engine manufacturers must add a permanent label stating that the engine is for stationary emergency use only to each new emergency stationary CI internal combustion engine greater than or equal to 19 KW (25 HP) that meets all the emission standards for emergency engines in §60.4202 but does not meet all the emission standards for non-emergency engines in §60.4201. The label must be added according to the labeling requirements specified in 40 CFR 1039.135(b). Engine manufacturers must specify in the owner's manual that operation of emergency engines is limited to emergency operations and required maintenance and testing.

(g) Manufacturers of fire pump engines may use the test cycle in table 6 to this subpart for testing fire pump engines and may test at the NFPA certified nameplate HP, provided that the engine is labeled as “Fire Pump Applications Only”.

(h) Engine manufacturers, including importers, may introduce into commerce uncertified engines or engines certified to earlier standards that were manufactured before the new or changed standards took effect until inventories are depleted, as long as such engines are part of normal inventory. For example, if the engine manufacturers' normal industry practice is to keep on hand a one-month supply of engines based on its projected sales, and a new tier of standards starts to apply for the 2009 model year, the engine manufacturer may manufacture engines based on the normal inventory requirements late in the 2008 model year, and sell those engines for installation. The engine manufacturer may not circumvent the provisions of §§60.4201 or 60.4202 by stockpiling engines that are built before new or changed standards take effect. Stockpiling of such engines beyond normal industry practice is a violation of this subpart.

(i) The replacement engine provisions of 40 CFR 89.1003(b)(7), 40 CFR 94.1103(b)(3), 40 CFR 94.1103(b)(4) and 40 CFR 1068.240 are applicable to stationary CI engines replacing existing equipment that is less than 15 years old.

***§ 60.4211 What are my compliance requirements if I am an owner or operator of a stationary CI internal combustion engine?***

(a) If you are an owner or operator and must comply with the emission standards specified in this subpart, you must operate and maintain the stationary CI internal combustion engine and control device according to the manufacturer's written instructions or procedures developed by the owner or operator that are approved by the engine manufacturer. In addition, owners and operators may only change those settings that are permitted by the manufacturer. You must also meet the requirements of 40 CFR parts 89, 94 and/or 1068, as they apply to you.

(b) If you are an owner or operator of a pre-2007 model year stationary CI internal combustion engine and must comply with the emission standards specified in §§60.4204(a) or 60.4205(a), or if you are an owner or operator of a CI fire pump engine that is manufactured prior to the model years in table 3 to this subpart and must comply with the emission standards specified in §60.4205(c), you must demonstrate compliance according to one of the methods specified in paragraphs (b)(1) through (5) of this section.

(1) Purchasing an engine certified according to 40 CFR part 89 or 40 CFR part 94, as applicable, for the same model year and maximum engine power. The engine must be installed and configured according to the manufacturer's specifications.

(2) Keeping records of performance test results for each pollutant for a test conducted on a similar engine. The test must have been conducted using the same methods specified in this subpart and these methods must have been followed correctly.

(3) Keeping records of engine manufacturer data indicating compliance with the standards.

(4) Keeping records of control device vendor data indicating compliance with the standards.

(5) Conducting an initial performance test to demonstrate compliance with the emission standards according to the requirements specified in §60.4212, as applicable.

(c) If you are an owner or operator of a 2007 model year and later stationary CI internal combustion engine and must comply with the emission standards specified in §60.4204(b) or §60.4205(b), or if you are an owner or operator of a CI fire pump engine that is manufactured during or after the model year that applies to your fire pump engine power rating in table 3 to this subpart and must comply with the emission standards specified in §60.4205(c), you must comply by purchasing an engine certified to the emission standards in §60.4204(b), or §60.4205(b) or (c), as applicable, for the same model year and maximum (or in the case of fire pumps, NFPA nameplate) engine power. The engine must be installed and configured according to the manufacturer's specifications.

(d) If you are an owner or operator and must comply with the emission standards specified in §60.4204(c) or §60.4205(d), you must demonstrate compliance according to the requirements specified in paragraphs (d)(1) through (3) of this section.

(1) Conducting an initial performance test to demonstrate initial compliance with the emission standards as specified in §60.4213.

(2) Establishing operating parameters to be monitored continuously to ensure the stationary internal combustion engine continues to meet the emission standards. The owner or operator must petition the Administrator for approval of operating parameters to be monitored continuously. The petition must include the information described in paragraphs (d)(2)(i) through (v) of this section.

(i) Identification of the specific parameters you propose to monitor continuously;

(ii) A discussion of the relationship between these parameters and $NO_X$and PM emissions, identifying how the emissions of these pollutants change with changes in these parameters, and how limitations on these parameters will serve to limit $NO_X$and PM emissions;

(iii) A discussion of how you will establish the upper and/or lower values for these parameters which will establish the limits on these parameters in the operating limitations;

(iv) A discussion identifying the methods and the instruments you will use to monitor these parameters, as well as the relative accuracy and precision of these methods and instruments; and

(v) A discussion identifying the frequency and methods for recalibrating the instruments you will use for monitoring these parameters.

(3) For non-emergency engines with a displacement of greater than or equal to 30 liters per cylinder, conducting annual performance tests to demonstrate continuous compliance with the emission standards as specified in §60.4213.

(e) Emergency stationary ICE may be operated for the purpose of maintenance checks and readiness testing, provided that the tests are recommended by Federal, State, or local government, the manufacturer, the vendor, or the insurance company associated with the engine. Maintenance checks and readiness testing of such units is limited to 100 hours per year. There is no time limit on the use of emergency stationary ICE in emergency situations. Anyone may petition the Administrator for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the owner or operator maintains records indicating that Federal, State, or local standards require maintenance and testing of emergency ICE beyond 100 hours per year. For owners and operators of emergency engines meeting standards under §60.4205 but not §60.4204, any operation other than emergency operation, and maintenance and testing as permitted in this section, is prohibited.

***Testing Requirements for Owners and Operators***

***§ 60.4212 What test methods and other procedures must I use if I am an owner or operator of a stationary CI internal combustion engine with a displacement of less than 30 liters per cylinder?***

Owners and operators of stationary CI ICE with a displacement of less than 30 liters per cylinder who conduct performance tests pursuant to this subpart must do so according to paragraphs (a) through (d) of this section.

(a) The performance test must be conducted according to the in-use testing procedures in 40 CFR part 1039, subpart F.

(b) Exhaust emissions from stationary CI ICE that are complying with the emission standards for new CI engines in 40 CFR part 1039 must not exceed the not-to-exceed (NTE) standards for the same model year and maximum engine power as required in 40 CFR 1039.101(e) and 40 CFR 1039.102(g)(1), except as specified in 40 CFR 1039.104(d). This requirement starts when NTE requirements take effect for nonroad diesel engines under 40 CFR part 1039.

(c) Exhaust emissions from stationary CI ICE that are complying with the emission standards for new CI engines in 40 CFR 89.112 or 40 CFR 94.8, as applicable, must not exceed the NTE numerical requirements, rounded to the same number of decimal places as the applicable standard in 40 CFR 89.112 or 40 CFR 94.8, as applicable, determined from the following equation:

$$\text{NTE requirement for each pollutant} = (1.25) \times (\text{STD}) \qquad \text{(Eq. 1)}$$

Where:

STD = The standard specified for that pollutant in 40 CFR 89.112 or 40 CFR 94.8, as applicable.

Alternatively, stationary CI ICE that are complying with the emission standards for new CI engines in 40 CFR 89.112 or 40 CFR 94.8 may follow the testing procedures specified in §60.4213 of this subpart, as appropriate.

(d) Exhaust emissions from stationary CI ICE that are complying with the emission standards for pre-2007 model year engines in §60.4204(a), §60.4205(a), or §60.4205(c) must not exceed the NTE numerical requirements, rounded to the same number of decimal places as the applicable standard in §60.4204(a), §60.4205(a), or §60.4205(c), determined from the equation in paragraph (c) of this section.

Where:

STD = The standard specified for that pollutant in §60.4204(a), §60.4205(a), or §60.4205(c).

Alternatively, stationary CI ICE that are complying with the emission standards for pre-2007 model year engines in §60.4204(a), §60.4205(a), or §60.4205(c) may follow the testing procedures specified in §60.4213, as appropriate.

***§ 60.4213 What test methods and other procedures must I use if I am an owner or operator of a stationary CI internal combustion engine with a displacement of greater than or equal to 30 liters per cylinder?***

Owners and operators of stationary CI ICE with a displacement of greater than or equal to 30 liters per cylinder must conduct performance tests according to paragraphs (a) through (d) of this section.

(a) Each performance test must be conducted according to the requirements in §60.8 and under the specific conditions that this subpart specifies in table 7. The test must be conducted within 10 percent of 100 percent peak (or the highest achievable) load.

(b) You may not conduct performance tests during periods of startup, shutdown, or malfunction, as specified in §60.8(c).

(c) You must conduct three separate test runs for each performance test required in this section, as specified in §60.8(f). Each test run must last at least 1 hour.

(d) To determine compliance with the percent reduction requirement, you must follow the requirements as specified in paragraphs (d)(1) through (3) of this section.

(1) You must use Equation 2 of this section to determine compliance with the percent reduction requirement:

$$\frac{C_i - C_o}{C_i} \times 100 = R \qquad \text{(Eq. 2)}$$

Where:

$C_i$= concentration of $NO_X$or PM at the control device inlet,

$C_o$= concentration of $NO_X$or PM at the control device outlet, and

R = percent reduction of $NO_X$or PM emissions.

(2) You must normalize the $NO_X$or PM concentrations at the inlet and outlet of the control device to a dry basis and to 15 percent oxygen ($O_2$) using Equation 3 of this section, or an equivalent percent carbon dioxide ($CO_2$) using the procedures described in paragraph (d)(3) of this section.

$$C_{adj} = C_d \frac{5.9}{20.9 - \% O_2} \qquad \text{(Eq. 3)}$$

Where:

$C_{adj}$= Calculated $NO_X$or PM concentration adjusted to 15 percent $O_2$.

$C_d$= Measured concentration of $NO_X$or PM, uncorrected.

5.9 = 20.9 percent $O_2$−15 percent $O_2$, the defined $O_2$correction value, percent.

$\%O_2$= Measured $O_2$concentration, dry basis, percent.

(3) If pollutant concentrations are to be corrected to 15 percent $O_2$and $CO_2$concentration is measured in lieu of $O_2$concentration measurement, a $CO_2$correction factor is needed. Calculate the $CO_2$correction factor as described in paragraphs (d)(3)(i) through (iii) of this section.

(i) Calculate the fuel-specific $F_o$value for the fuel burned during the test using values obtained from Method 19, Section 5.2, and the following equation:

$$F_o = \frac{0.209 F_d}{F_c} \qquad \text{(Eq. 4)}$$

Where:

$F_o$= Fuel factor based on the ratio of $O_2$volume to the ultimate $CO_2$volume produced by the fuel at zero percent excess air.

0.209 = Fraction of air that is $O_2$, percent/100.

$F_d$= Ratio of the volume of dry effluent gas to the gross calorific value of the fuel from Method 19, $dsm^3$ /J (dscf/$10^6$ Btu).

$F_c$= Ratio of the volume of $CO_2$produced to the gross calorific value of the fuel from Method 19, $dsm^3$ /J (dscf/$10^6$ Btu).

(ii) Calculate the $CO_2$correction factor for correcting measurement data to 15 percent $O_2$, as follows:

$$X_{CO_2} = \frac{5.9}{F_o} \qquad \text{(Eq. 5)}$$

Where:

$X_{CO2}$= $CO_2$correction factor, percent.

5.9 = 20.9 percent $O_2$−15 percent $O_2$, the defined $O_2$correction value, percent.

(iii) Calculate the $NO_X$and PM gas concentrations adjusted to 15 percent $O_2$using $CO_2$as follows:

$$C_{adj} = C_d \frac{X_{CO_2}}{\%CO_2} \qquad \text{(Eq. 6)}$$

Where:

$C_{adj}$= Calculated $NO_X$or PM concentration adjusted to 15 percent $O_2$.

$C_d$= Measured concentration of $NO_X$or PM, uncorrected.

$\%CO_2$= Measured $CO_2$concentration, dry basis, percent.

(e) To determine compliance with the $NO_X$mass per unit output emission limitation, convert the concentration of $NO_X$in the engine exhaust using Equation 7 of this section:

$$ER = \frac{C_d \times 1.912 \times 10^{-3} \times Q \times T}{\text{KW-hour}} \qquad \text{(Eq. 7)}$$

Where:

ER = Emission rate in grams per KW-hour.

$C_d$= Measured $NO_X$concentration in ppm.

$1.912 \times 10^{-3}$= Conversion constant for ppm $NO_X$to grams per standard cubic meter at 25 degrees Celsius.

Q = Stack gas volumetric flow rate, in standard cubic meter per hour.

T = Time of test run, in hours.

KW-hour = Brake work of the engine, in KW-hour.

(f) To determine compliance with the PM mass per unit output emission limitation, convert the concentration of PM in the engine exhaust using Equation 8 of this section:

$$ER = \frac{C_{adj} \times Q \times T}{\text{KW-hour}} \qquad \text{(Eq. 8)}$$

Where:

ER = Emission rate in grams per KW-hour.

$C_{adj}$= Calculated PM concentration in grams per standard cubic meter.

Q = Stack gas volumetric flow rate, in standard cubic meter per hour.

T = Time of test run, in hours.

KW-hour = Energy output of the engine, in KW.

***Notification, Reports, and Records for Owners and Operators***

***§ 60.4214 What are my notification, reporting, and recordkeeping requirements if I am an owner or operator of a stationary CI internal combustion engine?***

(a) Owners and operators of non-emergency stationary CI ICE that are greater than 2,237 KW (3,000 HP), or have a displacement of greater than or equal to 10 liters per cylinder, or are pre-2007 model year engines that are greater than 130 KW (175 HP) and not certified, must meet the requirements of paragraphs (a)(1) and (2) of this section.

(1) Submit an initial notification as required in §60.7(a)(1). The notification must include the information in paragraphs (a)(1)(i) through (v) of this section.

(i) Name and address of the owner or operator;

(ii) The address of the affected source;

(iii) Engine information including make, model, engine family, serial number, model year, maximum engine power, and engine displacement;

(iv) Emission control equipment; and

(v) Fuel used.

(2) Keep records of the information in paragraphs (a)(2)(i) through (iv) of this section.

(i) All notifications submitted to comply with this subpart and all documentation supporting any notification.

(ii) Maintenance conducted on the engine.

(iii) If the stationary CI internal combustion is a certified engine, documentation from the manufacturer that the engine is certified to meet the emission standards.

(iv) If the stationary CI internal combustion is not a certified engine, documentation that the engine meets the emission standards.

(b) If the stationary CI internal combustion engine is an emergency stationary internal combustion engine, the owner or operator is not required to submit an initial notification. Starting with the model years in table 5 to this subpart, if the emergency engine does not meet the standards applicable to non-emergency engines in the applicable model year, the owner or operator must keep records of the operation of the engine in emergency and non-emergency service that are recorded through the non-resettable hour meter. The owner must record the time of operation of the engine and the reason the engine was in operation during that time.

(c) If the stationary CI internal combustion engine is equipped with a diesel particulate filter, the owner or operator must keep records of any corrective action taken after the backpressure monitor has notified the owner or operator that the high backpressure limit of the engine is approached.

***Special Requirements***

***§ 60.4215 What requirements must I meet for engines used in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands?***

(a) Stationary CI ICE that are used in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands are required to meet the applicable emission standards in §60.4205. Non-emergency stationary CI ICE with a displacement of greater than or equal to 30 liters per cylinder, must meet the applicable emission standards in §60.4204(c).

(b) Stationary CI ICE that are used in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands are not required to meet the fuel requirements in §60.4207.

***§ 60.4216 What requirements must I meet for engines used in Alaska?***

(a) Prior to December 1, 2010, owners and operators of stationary CI engines located in areas of Alaska not accessible by the Federal Aid Highway System should refer to 40 CFR part 69 to determine the diesel fuel requirements applicable to such engines.

(b) The Governor of Alaska may submit for EPA approval, by no later than January 11, 2008, an alternative plan for implementing the requirements of 40 CFR part 60, subpart IIII, for public-sector electrical utilities located in rural areas of Alaska not accessible by the Federal Aid Highway System. This alternative plan must be based on the requirements of section 111 of the Clean Air Act including any increased risks to human health and the environment and must also be based on the unique circumstances related to remote power generation, climatic conditions, and serious economic impacts resulting from implementation of 40 CFR part 60, subpart IIII. If EPA approves by rulemaking process an alternative plan, the provisions as approved by EPA under that plan shall apply to the diesel engines used in new stationary internal combustion engines subject to this paragraph.

***§ 60.4217 What emission standards must I meet if I am an owner or operator of a stationary internal combustion engine using special fuels?***

(a) Owners and operators of stationary CI ICE that do not use diesel fuel, or who have been given authority by the Administrator under §60.4207(d) of this subpart to use fuels that do not meet the fuel requirements of paragraphs (a) and (b) of §60.4207, may petition the Administrator for approval of alternative emission standards, if they can demonstrate that they use a fuel that is not the fuel on which the manufacturer of the engine certified the engine and that the engine cannot meet the applicable standards required in §60.4202 or §60.4203 using such fuels.

(b) [Reserved]

***General Provisions***

***§ 60.4218 What parts of the General Provisions apply to me?***

Table 8 to this subpart shows which parts of the General Provisions in §§60.1 through 60.19 apply to you.

Definitions

### *§ 60.4219 What definitions apply to this subpart?*

As used in this subpart, all terms not defined herein shall have the meaning given them in the CAA and in subpart A of this part.

*Combustion turbine* means all equipment, including but not limited to the turbine, the fuel, air, lubrication and exhaust gas systems, control systems (except emissions control equipment), and any ancillary components and sub-components comprising any simple cycle combustion turbine, any regenerative/recuperative cycle combustion turbine, the combustion turbine portion of any cogeneration cycle combustion system, or the combustion turbine portion of any combined cycle steam/electric generating system.

*Compression ignition* means relating to a type of stationary internal combustion engine that is not a spark ignition engine.

*Diesel fuel* means any liquid obtained from the distillation of petroleum with a boiling point of approximately 150 to 360 degrees Celsius. One commonly used form is number 2 distillate oil.

*Diesel particulate filter* means an emission control technology that reduces PM emissions by trapping the particles in a flow filter substrate and periodically removes the collected particles by either physical action or by oxidizing (burning off) the particles in a process called regeneration.

*Emergency stationary internal combustion engine* means any stationary internal combustion engine whose operation is limited to emergency situations and required testing and maintenance. Examples include stationary ICE used to produce power for critical networks or equipment (including power supplied to portions of a facility) when electric power from the local utility (or the normal power source, if the facility runs on its own power production) is interrupted, or stationary ICE used to pump water in the case of fire or flood, etc. Stationary CI ICE used to supply power to an electric grid or that supply power as part of a financial arrangement with another entity are not considered to be emergency engines.

*Engine manufacturer* means the manufacturer of the engine. See the definition of “manufacturer” in this section.

*Fire pump engine* means an emergency stationary internal combustion engine certified to NFPA requirements that is used to provide power to pump water for fire suppression or protection.

*Manufacturer* has the meaning given in section 216(1) of the Act. In general, this term includes any person who manufactures a stationary engine for sale in the United States or otherwise introduces a new stationary engine into commerce in the United States. This includes importers who import stationary engines for sale or resale.

*Maximum engine power* means maximum engine power as defined in 40 CFR 1039.801.

*Model year* means either:

(1) The calendar year in which the engine was originally produced, or

(2) The annual new model production period of the engine manufacturer if it is different than the calendar year. This must include January 1 of the calendar year for which the model year is named. It may not begin before January 2 of the previous calendar year and it must end by December 31 of the named calendar year. For an engine that is converted to a stationary engine after being placed into service as a nonroad or other non-stationary engine, model year means the calendar year or new model production period in which the engine was originally produced.

*Other internal combustion engine* means any internal combustion engine, except combustion turbines, which is not a reciprocating internal combustion engine or rotary internal combustion engine.

*Reciprocating internal combustion engine* means any internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work.

*Rotary internal combustion engine* means any internal combustion engine which uses rotary motion to convert heat energy into mechanical work.

*Spark ignition* means relating to a gasoline, natural gas, or liquefied petroleum gas fueled engine or any other type of engine with a spark plug (or other sparking device) and with operating characteristics significantly similar to the theoretical Otto combustion cycle. Spark ignition engines usually use a throttle to regulate intake air flow to control power during normal operation. Dual-fuel engines in which a liquid fuel (typically diesel fuel) is used for CI and gaseous fuel (typically natural gas) is used as the primary fuel at an annual average ratio of less than 2 parts diesel fuel to 100 parts total fuel on an energy equivalent basis are spark ignition engines.

*Stationary internal combustion engine* means any internal combustion engine, except combustion turbines, that converts heat energy into mechanical work and is not mobile. Stationary ICE differ from mobile ICE in that a stationary internal combustion engine is not a nonroad engine as defined at 40 CFR 1068.30 (excluding paragraph (2)(ii) of that definition), and is not used to propel a motor vehicle or a vehicle used solely for competition. Stationary ICE include reciprocating ICE, rotary ICE, and other ICE, except combustion turbines.

*Subpart* means 40 CFR part 60, subpart IIII.

*Useful life* means the period during which the engine is designed to properly function in terms of reliability and fuel consumption, without being remanufactured, specified as a number of hours of operation or calendar years, whichever comes first. The values for useful life for stationary CI ICE with a displacement of less than 10 liters per cylinder are given in 40 CFR 1039.101(g). The values for useful life for stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder are given in 40 CFR 94.9(a).

***Table 1 to Subpart IIII of Part 60—Emission Standards for Stationary Pre-2007 Model Year Engines With a Displacement of <10 Liters per Cylinder and 2007–2010 Model Year Engines >2,237 KW (3,000 HP) and With a Displacement of <10 Liters per Cylinder***

[As stated in §§60.4201(b), 60.4202(b), 60.4204(a), and 60.4205(a), you must comply with the following emission standards]

| **Maximum engine power** | **Emission standards for stationary pre-2007 model year engines with a displacement of <10 liters per cylinder and 2007–2010 model year engines >2,237 KW (3,000 HP) and with a displacement of <10 liters per cylinder in g/KW-hr (g/HP-hr)** | | | | |
|---|---|---|---|---|---|
| | **NMHC + $NO_X$** | **HC** | **$NO_X$** | **CO** | **PM** |
| KW<8 (HP<11) | 10.5 (7.8) | | | 8.0 (6.0) | 1.0 (0.75) |
| 8≤KW<19 (11≤HP<25) | 9.5 (7.1) | | | 6.6 (4.9) | 0.80 (0.60) |
| 19≤KW<37 (25≤HP<50) | 9.5 (7.1) | | | 5.5 (4.1) | 0.80 (0.60) |
| 37≤KW<56 (50≤HP<75) | | | 9.2 (6.9) | | |
| 56≤KW<75 (75≤HP<100) | | | 9.2 (6.9) | | |
| 75≤KW<130 (100≤HP<175) | | | 9.2 (6.9) | | |
| 130≤KW<225 (175≤HP<300) | | 1.3 (1.0) | 9.2 (6.9) | 11.4 (8.5) | 0.54 (0.40) |

| Maximum engine power | Emission standards for stationary pre-2007 model year engines with a displacement of <10 liters per cylinder and 2007–2010 model year engines >2,237 KW (3,000 HP) and with a displacement of <10 liters per cylinder in g/KW-hr (g/HP-hr) | | | | |
|---|---|---|---|---|---|
| | NMHC + $NO_X$ | HC | $NO_X$ | CO | PM |
| 225≤KW<450 (300≤HP<600) | | 1.3 (1.0) | 9.2 (6.9) | 11.4 (8.5) | 0.54 (0.40) |
| 450≤KW≤560 (600≤HP≤750) | | 1.3 (1.0) | 9.2 (6.9) | 11.4 (8.5) | 0.54 (0.40) |
| KW>560 (HP>750) | | 1.3 (1.0) | 9.2 (6.9) | 11.4 (8.5) | 0.54 (0.40) |

***Table 2 to Subpart IIII of Part 60—Emission Standards for 2008 Model Year and Later Emergency Stationary CI ICE <37 KW (50 HP) With a Displacement of <10 Liters per Cylinder***

[As stated in §60.4202(a)(1), you must comply with the following emission standards]

| Engine power | Emission standards for 2008 model year and later emergency stationary CI ICE <37 KW (50 HP) with a displacement of <10 liters per cylinder in g/KW-hr (g/HP-hr) | | | |
|---|---|---|---|---|
| | Model year(s) | $NO_X$+ NMHC | CO | PM |
| KW<8 (HP<11) | 2008+ | 7.5 (5.6) | 8.0 (6.0) | 0.40 (0.30) |
| 8≤KW<19 (11≤HP<25) | 2008+ | 7.5 (5.6) | 6.6 (4.9) | 0.40 (0.30) |
| 19≤KW<37 (25≤HP<50) | 2008+ | 7.5 (5.6) | 5.5 (4.1) | 0.30 (0.22) |

***Table 3 to Subpart IIII of Part 60—Certification Requirements for Stationary Fire Pump Engines***

[As stated in §60.4202(d), you must certify new stationary fire pump engines beginning with the following model years:]

| Engine power | Starting model year engine manufacturers must certify new stationary fire pump engines according to §60.4202(d) |
|---|---|
| KW<75 (HP<100) | 2011 |
| 75≤KW<130 (100≤HP<175) | 2010 |
| 130≤KW≤560 (175≤HP≤750) | 2009 |
| KW>560 (HP>750) | 2008 |

***Table 4 to Subpart IIII of Part 60—Emission Standards for Stationary Fire Pump Engines***

[As stated in §§60.4202(d) and 60.4205(c), you must comply with the following emission standards for stationary fire pump engines]

| Maximum engine power | Model year(s) | NMHC + $NO_X$ | CO | PM |
|---|---|---|---|---|
| KW<8 (HP<11) | 2010 and earlier | 10.5 (7.8) | 8.0 (6.0) | 1.0 (0.75) |
| | 2011+ | 7.5 (5.6) | | 0.40 (0.30) |
| 8≤KW<19 (11≤HP<25) | 2010 and earlier | 9.5 (7.1) | 6.6 (4.9) | 0.80 (0.60) |
| | 2011+ | 7.5 (5.6) | | 0.40 (0.30) |
| 19≤KW<37 (25≤HP<50) | 2010 and earlier | 9.5 (7.1) | 5.5 (4.1) | 0.80 (0.60) |
| | 2011+ | 7.5 (5.6) | | 0.30 (0.22) |
| 37≤KW<56 (50≤HP<75) | 2010 and earlier | 10.5 (7.8) | 5.0 (3.7) | 0.80 (0.60) |
| | 2011+[1] | 4.7 (3.5) | | 0.40 (0.30) |
| 56≤KW<75 (75≤HP<100) | 2010 and earlier | 10.5 (7.8) | 5.0 (3.7) | 0.80 (0.60) |
| | 2011+[1] | 4.7 (3.5) | | 0.40 (0.30) |
| 75≤KW<130 (100≤HP<175) | 2009 and earlier | 10.5 (7.8) | 5.0 (3.7) | 0.80 (0.60) |
| | 2010+[2] | 4.0 (3.0) | | 0.30 (0.22) |
| 130≤KW<225 (175≤HP<300) | 2008 and earlier | 10.5 (7.8) | 3.5 (2.6) | 0.54 (0.40) |
| | 2009+[3] | 4.0 (3.0) | | 0.20 (0.15) |
| 225≤KW<450 (300≤HP<600) | 2008 and earlier | 10.5 (7.8) | 3.5 (2.6) | 0.54 (0.40) |
| | 2009+[3] | 4.0 (3.0) | | 0.20 (0.15) |
| 450≤KW≤560 (600≤HP≤750) | 2008 and earlier | 10.5 (7.8) | 3.5 (2.6) | 0.54 (0.40) |
| | 2009+ | 4.0 (3.0) | | 0.20 (0.15) |
| KW>560 (HP>750) | 2007 and earlier | 10.5 (7.8) | 3.5 (2.6) | 0.54 (0.40) |
| | 2008+ | 6.4 (4.8) | | 0.20 (0.15) |

[1]For model years 2011–2013, manufacturers, owners and operators of fire pump stationary CI ICE in this engine power category with a rated speed of greater than 2,650 revolutions per minute (rpm) may comply with the emission limitations for 2010 model year engines.
[2]For model years 2010–2012, manufacturers, owners and operators of fire pump stationary CI ICE in this engine power category with a rated speed of greater than 2,650 rpm may comply with the emission limitations for 2009 model year engines.
[3]In model years 2009–2011, manufacturers of fire pump stationary CI ICE in this engine power category with a rated speed of greater than 2,650 rpm may comply with the emission limitations for 2008 model year engines.

***Table 5 to Subpart IIII of Part 60—Labeling and Recordkeeping Requirements for New Stationary Emergency Engines***

[You must comply with the labeling requirements in §60.4210(f) and the recordkeeping requirements in §60.4214(b) for new emergency stationary CI ICE beginning in the following model years:]

| Engine power | Starting model year |
|---|---|
| 19≤KW<56 (25≤HP<75) | 2013 |
| 56≤KW<130 (75≤HP<175) | 2012 |
| KW≥130 (HP≥175) | 2011 |

***Table 6 to Subpart IIII of Part 60—Optional 3-Mode Test Cycle for Stationary Fire Pump Engines***

[As stated in §60.4210(g), manufacturers of fire pump engines may use the following test cycle for testing fire pump engines:]

| Mode No. | Engine speed[1] | Torque (percent)[2] | Weighting factors |
|---|---|---|---|
| 1 | Rated | 100 | 0.30 |
| 2 | Rated | 75 | 0.50 |
| 3 | Rated | 50 | 0.20 |

[1]Engine speed: ±2 percent of point.
[2]Torque: NFPA certified nameplate HP for 100 percent point. All points should be ±2 percent of engine percent load value.

***Table 7 to Subpart IIII of Part 60—Requirements for Performance Tests for Stationary CI ICE With a Displacement of ≥30 Liters per Cylinder***

[As stated in §60.4213, you must comply with the following requirements for performance tests for stationary CI ICE with a displacement of ≥30 liters per cylinder:]

| For each | Complying with the requirement to | You must | Using | According to the following requirements |
|---|---|---|---|---|
| 1. Stationary CI internal combustion engine with a displacement of ≥30 liters per cylinder | a. Reduce $NO_X$emissions by 90 percent or more | i. Select the sampling port location and the number of traverse points; | (1) Method 1 or 1A of 40 CFR part 60, appendix A | (a) Sampling sites must be located at the inlet and outlet of the control device. |
| | | ii. Measure $O_2$at the inlet and outlet of the control device; | (2) Method 3, 3A, or 3B of 40 CFR part 60, appendix A | (b) Measurements to determine $O_2$concentration must be made at the same time as the measurements for $NO_X$concentration. |

| For each | Complying with the requirement to | You must | Using | According to the following requirements |
|---|---|---|---|---|
| | | iii. If necessary, measure moisture content at the inlet and outlet of the control device; and, | (3) Method 4 of 40 CFR part 60, appendix A, Method 320 of 40 CFR part 63, appendix A, or ASTM D 6348–03 (incorporated by reference, see §60.17) | (c) Measurements to determine moisture content must be made at the same time as the measurements for $NO_X$concentration. |
| | | iv. Measure $NO_X$at the inlet and outlet of the control device | (4) Method 7E of 40 CFR part 60, appendix A, Method 320 of 40 CFR part 63, appendix A, or ASTM D 6348–03 (incorporated by reference, see §60.17) | (d) $NO_X$concentration must be at 15 percent $O_2$, dry basis. Results of this test consist of the average of the three 1-hour or longer runs. |
| | b. Limit the concentration of $NO_X$in the stationary CI internal combustion engine exhaust. | i. Select the sampling port location and the number of traverse points; | (1) Method 1 or 1A of 40 CFR part 60, appendix A | (a) If using a control device, the sampling site must be located at the outlet of the control device. |
| | | ii. Determine the $O_2$concentration of the stationary internal combustion engine exhaust at the sampling port location; and, | (2) Method 3, 3A, or 3B of 40 CFR part 60, appendix A | (b) Measurements to determine $O_2$concentration must be made at the same time as the measurement for $NO_X$concentration. |
| | | iii. If necessary, measure moisture content of the stationary internal combustion engine exhaust at the sampling port location; and, | (3) Method 4 of 40 CFR part 60, appendix A, Method 320 of 40 CFR part 63, appendix A, or ASTM D 6348–03 (incorporated by reference, see §60.17) | (c) Measurements to determine moisture content must be made at the same time as the measurement for $NO_X$concentration. |
| | | iv. Measure $NO_X$at the exhaust of the stationary internal combustion engine | (4) Method 7E of 40 CFR part 60, appendix A, Method 320 of 40 CFR part 63, appendix A, or ASTM D 6348–03 (incorporated by | (d) $NO_X$concentration must be at 15 percent $O_2$, dry basis. Results of this test consist of the average of the three 1-hour or longer runs. |

| For each | Complying with the requirement to | You must | Using | According to the following requirements |
|---|---|---|---|---|
| | | | reference, see §60.17) | |
| | c. Reduce PM emissions by 60 percent or more | i. Select the sampling port location and the number of traverse points; | (1) Method 1 or 1A of 40 CFR part 60, appendix A | (a) Sampling sites must be located at the inlet and outlet of the control device. |
| | | ii. Measure $O_2$at the inlet and outlet of the control device; | (2) Method 3, 3A, or 3B of 40 CFR part 60, appendix A | (b) Measurements to determine $O_2$concentration must be made at the same time as the measurements for PM concentration. |
| | | iii. If necessary, measure moisture content at the inlet and outlet of the control device; and | (3) Method 4 of 40 CFR part 60, appendix A | (c) Measurements to determine and moisture content must be made at the same time as the measurements for PM concentration. |
| | | iv. Measure PM at the inlet and outlet of the control device | (4) Method 5 of 40 CFR part 60, appendix A | (d) PM concentration must be at 15 percent $O_2$, dry basis. Results of this test consist of the average of the three 1-hour or longer runs. |
| | d. Limit the concentration of PM in the stationary CI internal combustion engine exhaust | i. Select the sampling port location and the number of traverse points; | (1) Method 1 or 1A of 40 CFR part 60, appendix A | (a) If using a control device, the sampling site must be located at the outlet of the control device. |
| | | ii. Determine the $O_2$concentration of the stationary internal combustion engine exhaust at the sampling port location; and | (2) Method 3, 3A, or 3B of 40 CFR part 60, appendix A | (b) Measurements to determine $O_2$concentration must be made at the same time as the measurements for PM concentration. |
| | | iii. If necessary, measure moisture content of the stationary internal combustion engine exhaust at the sampling port location; and | (3) Method 4 of 40 CFR part 60, appendix A | (c) Measurements to determine moisture content must be made at the same time as the measurements for PM concentration. |

| For each | Complying with the requirement to | You must | Using | According to the following requirements |
|---|---|---|---|---|
| | | iv. Measure PM at the exhaust of the stationary internal combustion engine | (4) Method 5 of 40 CFR part 60, appendix A | (d) PM concentration must be at 15 percent $O_2$, dry basis. Results of this test consist of the average of the three 1-hour or longer runs. |

***Table 8 to Subpart IIII of Part 60—Applicability of General Provisions to Subpart IIII***

[As stated in §60.4218, you must comply with the following applicable General Provisions:]

| General Provisions citation | Subject of citation | Applies to subpart | Explanation |
|---|---|---|---|
| §60.1 | General applicability of the General Provisions | Yes | |
| §60.2 | Definitions | Yes | Additional terms defined in §60.4219. |
| §60.3 | Units and abbreviations | Yes | |
| §60.4 | Address | Yes | |
| §60.5 | Determination of construction or modification | Yes | |
| §60.6 | Review of plans | Yes | |
| §60.7 | Notification and Recordkeeping | Yes | Except that §60.7 only applies as specified in §60.4214(a). |
| §60.8 | Performance tests | Yes | Except that §60.8 only applies to stationary CI ICE with a displacement of (≥30 liters per cylinder and engines that are not certified. |
| §60.9 | Availability of information | Yes | |
| §60.10 | State Authority | Yes | |
| §60.11 | Compliance with standards and maintenance requirements | No | Requirements are specified in subpart IIII. |
| §60.12 | Circumvention | Yes | |
| §60.13 | Monitoring requirements | Yes | Except that §60.13 only applies to stationary CI ICE with a displacement of (≥30 liters per cylinder. |
| §60.14 | Modification | Yes | |

| General Provisions citation | Subject of citation | Applies to subpart | Explanation |
|---|---|---|---|
| §60.15 | Reconstruction | Yes | |
| §60.16 | Priority list | Yes | |
| §60.17 | Incorporations by reference | Yes | |
| §60.18 | General control device requirements | No | |
| §60.19 | General notification and reporting requirements | Yes | |

Attachment D to a Part 70 Operating Permit

# 40 CFR 63, Subpart ZZZZ—National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines:

| | |
|---|---|
| **Source Name:** | **Duke Energy Indiana Inc., Cayuga Generating Station** |
| **Source Location:** | **State Road 63, Cayuga, IN 46168** |
| **County:** | **Vermillion** |
| **SIC Code:** | **4911** |
| **Operation Permit No.:** | **T 165-33876-00001** |
| **Permit Reviewer:** | **Josiah Balogun** |

## *Subpart ZZZZ—National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*

SOURCE: 69 FR 33506, June 15, 2004, unless otherwise noted.

## *What This Subpart Covers*

### *§ 63.6580 What is the purpose of subpart ZZZZ?*

Subpart ZZZZ establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations.

[73 FR 3603, Jan. 18, 2008]

### *§ 63.6585 Am I subject to this subpart?*

You are subject to this subpart if you own or operate a stationary RICE at a major or area source of HAP emissions, except if the stationary RICE is being tested at a stationary RICE test cell/stand.

(a) A stationary RICE is any internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile. Stationary RICE differ from mobile RICE in that a stationary RICE is not a non-road engine as defined at 40 CFR 1068.30, and is not used to propel a motor vehicle or a vehicle used solely for competition.

(b) A major source of HAP emissions is a plant site that emits or has the potential to emit any single HAP at a rate of 10 tons (9.07 megagrams) or more per year or any combination of HAP at a rate of 25 tons (22.68 megagrams) or more per year, except that for oil and gas production facilities, a major source of HAP emissions is determined for each surface site.

(c) An area source of HAP emissions is a source that is not a major source.

(d) If you are an owner or operator of an area source subject to this subpart, your status as an entity subject to a standard or other requirements under this subpart does not subject you to the obligation to obtain a permit under 40 CFR part 70 or 71, provided you are not required to obtain a permit under 40

CFR 70.3(a) or 40 CFR 71.3(a) for a reason other than your status as an area source under this subpart. Notwithstanding the previous sentence, you must continue to comply with the provisions of this subpart as applicable.

(e) If you are an owner or operator of a stationary RICE used for national security purposes, you may be eligible to request an exemption from the requirements of this subpart as described in 40 CFR part 1068, subpart C.

(f) The emergency stationary RICE listed in paragraphs (f)(1) through (3) of this section are not subject to this subpart. The stationary RICE must meet the definition of an emergency stationary RICE in § 63.6675, which includes operating according to the provisions specified in § 63.6640(f).

(1) Existing residential emergency stationary RICE located at an area source of HAP emissions that do not operate or are not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in § 63.6640(f)(2)(ii) and (iii) and that do not operate for the purpose specified in § 63.6640(f)(4)(ii).

(2) Existing commercial emergency stationary RICE located at an area source of HAP emissions that do not operate or are not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in § 63.6640(f)(2)(ii) and (iii) and that do not operate for the purpose specified in § 63.6640(f)(4)(ii).

(3) Existing institutional emergency stationary RICE located at an area source of HAP emissions that do not operate or are not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in § 63.6640(f)(2)(ii) and (iii) and that do not operate for the purpose specified in § 63.6640(f)(4)(ii).

[69 FR 33506, June 15, 2004, as amended at 73 FR 3603, Jan. 18, 2008; 78 FR 6700, Jan. 30, 2013]

## *§ 63.6590 What parts of my plant does this subpart cover?*

This subpart applies to each affected source.

(a) *Affected source.* An affected source is any existing, new, or reconstructed stationary RICE located at a major or area source of HAP emissions, excluding stationary RICE being tested at a stationary RICE test cell/stand.

(1) *Existing stationary RICE.*

(i) For stationary RICE with a site rating of more than 500 brake horsepower (HP) located at a major source of HAP emissions, a stationary RICE is existing if you commenced construction or reconstruction of the stationary RICE before December 19, 2002.

(ii) For stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions, a stationary RICE is existing if you commenced construction or reconstruction of the stationary RICE before June 12, 2006.

(iii) For stationary RICE located at an area source of HAP emissions, a stationary RICE is existing if you commenced construction or reconstruction of the stationary RICE before June 12, 2006.

(iv) A change in ownership of an existing stationary RICE does not make that stationary RICE a new or reconstructed stationary RICE.

(2) *New stationary RICE.* (i) A stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions is new if you commenced construction of the stationary RICE on or after December 19, 2002.

(ii) A stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions is new if you commenced construction of the stationary RICE on or after June 12, 2006.

(iii) A stationary RICE located at an area source of HAP emissions is new if you commenced construction of the stationary RICE on or after June 12, 2006.

(3) *Reconstructed stationary RICE.* (i) A stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions is reconstructed if you meet the definition of reconstruction in § 63.2 and reconstruction is commenced on or after December 19, 2002.

(ii) A stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions is reconstructed if you meet the definition of reconstruction in § 63.2 and reconstruction is commenced on or after June 12, 2006.

(iii) A stationary RICE located at an area source of HAP emissions is reconstructed if you meet the definition of reconstruction in § 63.2 and reconstruction is commenced on or after June 12, 2006.

(b) *Stationary RICE subject to limited requirements.* (1) An affected source which meets either of the criteria in paragraphs (b)(1)(i) through (ii) of this section does not have to meet the requirements of this subpart and of subpart A of this part except for the initial notification requirements of § 63.6645(f).

(i) The stationary RICE is a new or reconstructed emergency stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions that does not operate or is not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in § 63.6640(f)(2)(ii) and (iii).

(ii) The stationary RICE is a new or reconstructed limited use stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions.

(2) A new or reconstructed stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis must meet the initial notification requirements of § 63.6645(f) and the requirements of §§ 63.6625(c), 63.6650(g), and 63.6655(c). These stationary RICE do not have to meet the emission limitations and operating limitations of this subpart.

(3) The following stationary RICE do not have to meet the requirements of this subpart and of subpart A of this part, including initial notification requirements:

(i) Existing spark ignition 2 stroke lean burn (2SLB) stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions;

(ii) Existing spark ignition 4 stroke lean burn (4SLB) stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions;

(iii) Existing emergency stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions that does not operate or is not contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in § 63.6640(f)(2)(ii) and (iii).

(iv) Existing limited use stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions;

(v) Existing stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions that combusts landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis;

(c) *Stationary RICE subject to Regulations under 40 CFR Part 60.* An affected source that meets any of the criteria in paragraphs (c)(1) through (7) of this section must meet the requirements of this part by meeting the requirements of 40 CFR part 60 subpart IIII, for compression ignition engines or 40 CFR part 60 subpart JJJJ, for spark ignition engines. No further requirements apply for such engines under this part.

(1) A new or reconstructed stationary RICE located at an area source;

(2) A new or reconstructed 2SLB stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions;

(3) A new or reconstructed 4SLB stationary RICE with a site rating of less than 250 brake HP located at a major source of HAP emissions;

(4) A new or reconstructed spark ignition 4 stroke rich burn (4SRB) stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions;

(5) A new or reconstructed stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis;

(6) A new or reconstructed emergency or limited use stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions;

(7) A new or reconstructed compression ignition (CI) stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions.

[69 FR 33506, June 15, 2004, as amended at 73 FR 3604, Jan. 18, 2008; 75 FR 9674, Mar. 3, 2010; 75 FR 37733, June 30, 2010; 75 FR 51588, Aug. 20, 2010; 78 FR 6700, Jan. 30, 2013]

## *§ 63.6595 When do I have to comply with this subpart?*

(a) *Affected sources.* (1) If you have an existing stationary RICE, excluding existing non-emergency CI stationary RICE, with a site rating of more than 500 brake HP located at a major source of HAP emissions, you must comply with the applicable emission limitations, operating limitations and other requirements no later than June 15, 2007. If you have an existing non-emergency CI stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, an existing stationary CI RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions, or an existing stationary CI RICE located at an area source of HAP emissions, you must comply with the applicable emission limitations, operating limitations, and other requirements no later than May 3, 2013. If you have an existing stationary SI RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions, or an existing stationary SI RICE located at an area source of HAP emissions, you must comply with the applicable emission limitations, operating limitations, and other requirements no later than October 19, 2013.

(2) If you start up your new or reconstructed stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions before August 16, 2004, you must comply with the applicable emission limitations and operating limitations in this subpart no later than August 16, 2004.

(3) If you start up your new or reconstructed stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions after August 16, 2004, you must comply with the applicable emission limitations and operating limitations in this subpart upon startup of your affected source.

(4) If you start up your new or reconstructed stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions before January 18, 2008, you must comply with the applicable emission limitations and operating limitations in this subpart no later than January 18, 2008.

(5) If you start up your new or reconstructed stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions after January 18, 2008, you must comply with the applicable emission limitations and operating limitations in this subpart upon startup of your affected source.

(6) If you start up your new or reconstructed stationary RICE located at an area source of HAP emissions before January 18, 2008, you must comply with the applicable emission limitations and operating limitations in this subpart no later than January 18, 2008.

(7) If you start up your new or reconstructed stationary RICE located at an area source of HAP emissions after January 18, 2008, you must comply with the applicable emission limitations and operating limitations in this subpart upon startup of your affected source.

(b) *Area sources that become major sources.* If you have an area source that increases its emissions or its potential to emit such that it becomes a major source of HAP, the compliance dates in paragraphs (b)(1) and (2) of this section apply to you.

(1) Any stationary RICE for which construction or reconstruction is commenced after the date when your area source becomes a major source of HAP must be in compliance with this subpart upon startup of your affected source.

(2) Any stationary RICE for which construction or reconstruction is commenced before your area source becomes a major source of HAP must be in compliance with the provisions of this subpart that are applicable to RICE located at major sources within 3 years after your area source becomes a major source of HAP.

(c) If you own or operate an affected source, you must meet the applicable notification requirements in § 63.6645 and in 40 CFR part 63, subpart A.

[69 FR 33506, June 15, 2004, as amended at 73 FR 3604, Jan. 18, 2008; 75 FR 9675, Mar. 3, 2010; 75 FR 51589, Aug. 20, 2010; 78 FR 6701, Jan. 30, 2013]

## *Emission and Operating Limitations*

## *§ 63.6600 What emission limitations and operating limitations must I meet if I own or operate a stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions?*

Compliance with the numerical emission limitations established in this subpart is based on the results of testing the average of three 1-hour runs using the testing requirements and procedures in § 63.6620 and Table 4 to this subpart.

(a) If you own or operate an existing, new, or reconstructed spark ignition 4SRB stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you must comply with the emission limitations in Table 1a to this subpart and the operating limitations in Table 1b to this subpart which apply to you.

(b) If you own or operate a new or reconstructed 2SLB stationary RICE with a site rating of more than 500 brake HP located at major source of HAP emissions, a new or reconstructed 4SLB stationary RICE with a site rating of more than 500 brake HP located at major source of HAP emissions, or a new or reconstructed CI stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you must comply with the emission limitations in Table 2a to this subpart and the operating limitations in Table 2b to this subpart which apply to you.

(c) If you own or operate any of the following stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you do not need to comply with the emission limitations in Tables 1a, 2a, 2c, and 2d to this subpart or operating limitations in Tables 1b and 2b to this subpart: an existing 2SLB stationary RICE; an existing 4SLB stationary RICE; a stationary RICE that combusts landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis; an emergency stationary RICE; or a limited use stationary RICE.

(d) If you own or operate an existing non-emergency stationary CI RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you must comply with the emission limitations in Table 2c to this subpart and the operating limitations in Table 2b to this subpart which apply to you.

[73 FR 3605, Jan. 18, 2008, as amended at 75 FR 9675, Mar. 3, 2010]

## *§ 63.6601 What emission limitations must I meet if I own or operate a new or reconstructed 4SLB stationary RICE with a site rating of greater than or equal to 250 brake HP and less than or equal to 500 brake HP located at a major source of HAP emissions?*

Compliance with the numerical emission limitations established in this subpart is based on the results of testing the average of three 1-hour runs using the testing requirements and procedures in § 63.6620 and Table 4 to this subpart. If you own or operate a new or reconstructed 4SLB stationary RICE with a site rating of greater than or equal to 250 and less than or equal to 500 brake HP located at major source of HAP emissions manufactured on or after January 1, 2008, you must comply with the emission limitations in Table 2a to this subpart and the operating limitations in Table 2b to this subpart which apply to you.

[73 FR 3605, Jan. 18, 2008, as amended at 75 FR 9675, Mar. 3, 2010; 75 FR 51589, Aug. 20, 2010]

## *§ 63.6602 What emission limitations and other requirements must I meet*

## *if I own or operate an existing stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions?*

If you own or operate an existing stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions, you must comply with the emission limitations and other requirements in Table 2c to this subpart which apply to you. Compliance with the numerical emission limitations established in this subpart is based on the results of testing the average of three 1-hour runs using the testing requirements and procedures in § 63.6620 and Table 4 to this subpart.

[78 FR 6701, Jan. 30, 2013]

## *§ 63.6603 What emission limitations, operating limitations, and other requirements must I meet if I own or operate an existing stationary RICE located at an area source of HAP emissions?*

Compliance with the numerical emission limitations established in this subpart is based on the results of testing the average of three 1-hour runs using the testing requirements and procedures in § 63.6620 and Table 4 to this subpart.

(a) If you own or operate an existing stationary RICE located at an area source of HAP emissions, you must comply with the requirements in Table 2d to this subpart and the operating limitations in Table 2b to this subpart that apply to you.

(b) If you own or operate an existing stationary non-emergency CI RICE with a site rating of more than 300 HP located at an area source of HAP that meets either paragraph (b)(1) or (2) of this section, you do not have to meet the numerical CO emission limitations specified in Table 2d of this subpart. Existing stationary non-emergency CI RICE with a site rating of more than 300 HP located at an area source of HAP that meet either paragraph (b)(1) or (2) of this section must meet the management practices that are shown for stationary non-emergency CI RICE with a site rating of less than or equal to 300 HP in Table 2d of this subpart.

(1) The area source is located in an area of Alaska that is not accessible by the Federal Aid Highway System (FAHS).

(2) The stationary RICE is located at an area source that meets paragraphs (b)(2)(i), (ii), and (iii) of this section.

(i) The only connection to the FAHS is through the Alaska Marine Highway System (AMHS), or the stationary RICE operation is within an isolated grid in Alaska that is not connected to the statewide electrical grid referred to as the Alaska Railbelt Grid.

(ii) At least 10 percent of the power generated by the stationary RICE on an annual basis is used for residential purposes.

(iii) The generating capacity of the area source is less than 12 megawatts, or the stationary RICE is used exclusively for backup power for renewable energy.

(c) If you own or operate an existing stationary non-emergency CI RICE with a site rating of more than 300 HP located on an offshore vessel that is an area source of HAP and is a nonroad vehicle that is an Outer Continental Shelf (OCS) source as defined in 40 CFR 55.2, you do not have to meet the numerical

CO emission limitations specified in Table 2d of this subpart. You must meet all of the following management practices:

(1) Change oil every 1,000 hours of operation or annually, whichever comes first. Sources have the option to utilize an oil analysis program as described in § 63.6625(i) in order to extend the specified oil change requirement.

(2) Inspect and clean air filters every 750 hours of operation or annually, whichever comes first, and replace as necessary.

(3) Inspect fuel filters and belts, if installed, every 750 hours of operation or annually, whichever comes first, and replace as necessary.

(4) Inspect all flexible hoses every 1,000 hours of operation or annually, whichever comes first, and replace as necessary.

(d) If you own or operate an existing non-emergency CI RICE with a site rating of more than 300 HP located at an area source of HAP emissions that is certified to the Tier 1 or Tier 2 emission standards in Table 1 of 40 CFR 89.112 and that is subject to an enforceable state or local standard that requires the engine to be replaced no later than June 1, 2018, you may until January 1, 2015, or 12 years after the installation date of the engine (whichever is later), but not later than June 1, 2018, choose to comply with the management practices that are shown for stationary non-emergency CI RICE with a site rating of less than or equal to 300 HP in Table 2d of this subpart instead of the applicable emission limitations in Table 2d, operating limitations in Table 2b, and crankcase ventilation system requirements in § 63.6625(g). You must comply with the emission limitations in Table 2d and operating limitations in Table 2b that apply for non-emergency CI RICE with a site rating of more than 300 HP located at an area source of HAP emissions by January 1, 2015, or 12 years after the installation date of the engine (whichever is later), but not later than June 1, 2018. You must also comply with the crankcase ventilation system requirements in § 63.6625(g) by January 1, 2015, or 12 years after the installation date of the engine (whichever is later), but not later than June 1, 2018.

(e) If you own or operate an existing non-emergency CI RICE with a site rating of more than 300 HP located at an area source of HAP emissions that is certified to the Tier 3 (Tier 2 for engines above 560 kilowatt (kW)) emission standards in Table 1 of 40 CFR 89.112, you may comply with the requirements under this part by meeting the requirements for Tier 3 engines (Tier 2 for engines above 560 kW) in 40 CFR part 60 subpart IIII instead of the emission limitations and other requirements that would otherwise apply under this part for existing non-emergency CI RICE with a site rating of more than 300 HP located at an area source of HAP emissions.

(f) An existing non-emergency SI 4SLB and 4SRB stationary RICE with a site rating of more than 500 HP located at area sources of HAP must meet the definition of remote stationary RICE in § 63.6675 on the initial compliance date for the engine, October 19, 2013, in order to be considered a remote stationary RICE under this subpart. Owners and operators of existing non-emergency SI 4SLB and 4SRB stationary RICE with a site rating of more than 500 HP located at area sources of HAP that meet the definition of remote stationary RICE in § 63.6675 of this subpart as of October 19, 2013 must evaluate the status of their stationary RICE every 12 months. Owners and operators must keep records of the initial and annual evaluation of the status of the engine. If the evaluation indicates that the stationary RICE no longer meets the definition of remote stationary RICE in § 63.6675 of this subpart, the owner or operator must comply with all of the requirements for existing non-emergency SI 4SLB and 4SRB stationary RICE with a site rating of more than 500 HP located at area sources of HAP that are not remote stationary RICE within 1 year of the evaluation.

[75 FR 9675, Mar. 3, 2010, as amended at 75 FR 51589, Aug. 20, 2010; 76 FR 12866, Mar. 9, 2011; 78 FR 6701, Jan. 30, 2013]

## § 63.6604 What fuel requirements must I meet if I own or operate a stationary CI RICE?

(a) If you own or operate an existing non-emergency, non-black start CI stationary RICE with a site rating of more than 300 brake HP with a displacement of less than 30 liters per cylinder that uses diesel fuel, you must use diesel fuel that meets the requirements in 40 CFR 80.510(b) for nonroad diesel fuel.

(b) Beginning January 1, 2015, if you own or operate an existing emergency CI stationary RICE with a site rating of more than 100 brake HP and a displacement of less than 30 liters per cylinder that uses diesel fuel and operates or is contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in § 63.6640(f)(2)(ii) and (iii) or that operates for the purpose specified in § 63.6640(f)(4)(ii), you must use diesel fuel that meets the requirements in 40 CFR 80.510(b) for nonroad diesel fuel, except that any existing diesel fuel purchased (or otherwise obtained) prior to January 1, 2015, may be used until depleted.

(c) Beginning January 1, 2015, if you own or operate a new emergency CI stationary RICE with a site rating of more than 500 brake HP and a displacement of less than 30 liters per cylinder located at a major source of HAP that uses diesel fuel and operates or is contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in § 63.6640(f)(2)(ii) and (iii), you must use diesel fuel that meets the requirements in 40 CFR 80.510(b) for nonroad diesel fuel, except that any existing diesel fuel purchased (or otherwise obtained) prior to January 1, 2015, may be used until depleted.

(d) Existing CI stationary RICE located in Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, at area sources in areas of Alaska that meet either § 63.6603(b)(1) or § 63.6603(b)(2), or are on offshore vessels that meet § 63.6603(c) are exempt from the requirements of this section.

[78 FR 6702, Jan. 30, 2013]

## General Compliance Requirements

## § 63.6605 What are my general requirements for complying with this subpart?

(a) You must be in compliance with the emission limitations, operating limitations, and other requirements in this subpart that apply to you at all times.

(b) At all times you must operate and maintain any affected source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions. The general duty to minimize emissions does not require you to make any further efforts to reduce emissions if levels required by this standard have been achieved. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Administrator which may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the source.

[75 FR 9675, Mar. 3, 2010, as amended at 78 FR 6702, Jan. 30, 2013]

## Testing and Initial Compliance Requirements

## § 63.6610 By what date must I conduct the initial performance tests or

## *other initial compliance demonstrations if I own or operate a stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions?*

If you own or operate a stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions you are subject to the requirements of this section.

(a) You must conduct the initial performance test or other initial compliance demonstrations in Table 4 to this subpart that apply to you within 180 days after the compliance date that is specified for your stationary RICE in § 63.6595 and according to the provisions in § 63.7(a)(2).

(b) If you commenced construction or reconstruction between December 19, 2002 and June 15, 2004 and own or operate stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you must demonstrate initial compliance with either the proposed emission limitations or the promulgated emission limitations no later than February 10, 2005 or no later than 180 days after startup of the source, whichever is later, according to § 63.7(a)(2)(ix).

(c) If you commenced construction or reconstruction between December 19, 2002 and June 15, 2004 and own or operate stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, and you chose to comply with the proposed emission limitations when demonstrating initial compliance, you must conduct a second performance test to demonstrate compliance with the promulgated emission limitations by December 13, 2007 or after startup of the source, whichever is later, according to § 63.7(a)(2)(ix).

(d) An owner or operator is not required to conduct an initial performance test on units for which a performance test has been previously conducted, but the test must meet all of the conditions described in paragraphs (d)(1) through (5) of this section.

(1) The test must have been conducted using the same methods specified in this subpart, and these methods must have been followed correctly.

(2) The test must not be older than 2 years.

(3) The test must be reviewed and accepted by the Administrator.

(4) Either no process or equipment changes must have been made since the test was performed, or the owner or operator must be able to demonstrate that the results of the performance test, with or without adjustments, reliably demonstrate compliance despite process or equipment changes.

(5) The test must be conducted at any load condition within plus or minus 10 percent of 100 percent load.

[69 FR 33506, June 15, 2004, as amended at 73 FR 3605, Jan. 18, 2008]

## *§ 63.6611 By what date must I conduct the initial performance tests or other initial compliance demonstrations if I own or operate a new or reconstructed 4SLB SI stationary RICE with a site rating of greater than or*

## *equal to 250 and less than or equal to 500 brake HP located at a major source of HAP emissions?*

If you own or operate a new or reconstructed 4SLB stationary RICE with a site rating of greater than or equal to 250 and less than or equal to 500 brake HP located at a major source of HAP emissions, you must conduct an initial performance test within 240 days after the compliance date that is specified for your stationary RICE in § 63.6595 and according to the provisions specified in Table 4 to this subpart, as appropriate.

[73 FR 3605, Jan. 18, 2008, as amended at 75 FR 51589, Aug. 20, 2010]

## *§ 63.6612 By what date must I conduct the initial performance tests or other initial compliance demonstrations if I own or operate an existing stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions or an existing stationary RICE located at an area source of HAP emissions?*

If you own or operate an existing stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions or an existing stationary RICE located at an area source of HAP emissions you are subject to the requirements of this section.

(a) You must conduct any initial performance test or other initial compliance demonstration according to Tables 4 and 5 to this subpart that apply to you within 180 days after the compliance date that is specified for your stationary RICE in § 63.6595 and according to the provisions in § 63.7(a)(2).

(b) An owner or operator is not required to conduct an initial performance test on a unit for which a performance test has been previously conducted, but the test must meet all of the conditions described in paragraphs (b)(1) through (4) of this section.

(1) The test must have been conducted using the same methods specified in this subpart, and these methods must have been followed correctly.

(2) The test must not be older than 2 years.

(3) The test must be reviewed and accepted by the Administrator.

(4) Either no process or equipment changes must have been made since the test was performed, or the owner or operator must be able to demonstrate that the results of the performance test, with or without adjustments, reliably demonstrate compliance despite process or equipment changes.

[75 FR 9676, Mar. 3, 2010, as amended at 75 FR 51589, Aug. 20, 2010]

## *§ 63.6615 When must I conduct subsequent performance tests?*

If you must comply with the emission limitations and operating limitations, you must conduct subsequent performance tests as specified in Table 3 of this subpart.

## *§ 63.6620 What performance tests and other procedures must I use?*

(a) You must conduct each performance test in Tables 3 and 4 of this subpart that applies to you.

(b) Each performance test must be conducted according to the requirements that this subpart specifies in Table 4 to this subpart. If you own or operate a non-operational stationary RICE that is subject to performance testing, you do not need to start up the engine solely to conduct the performance test. Owners and operators of a non-operational engine can conduct the performance test when the engine is started up again. The test must be conducted at any load condition within plus or minus 10 percent of 100 percent load for the stationary RICE listed in paragraphs (b)(1) through (4) of this section.

(1) Non-emergency 4SRB stationary RICE with a site rating of greater than 500 brake HP located at a major source of HAP emissions.

(2) New non-emergency 4SLB stationary RICE with a site rating of greater than or equal to 250 brake HP located at a major source of HAP emissions.

(3) New non-emergency 2SLB stationary RICE with a site rating of greater than 500 brake HP located at a major source of HAP emissions.

(4) New non-emergency CI stationary RICE with a site rating of greater than 500 brake HP located at a major source of HAP emissions.

(c) [Reserved]

(d) You must conduct three separate test runs for each performance test required in this section, as specified in § 63.7(e)(3). Each test run must last at least 1 hour, unless otherwise specified in this subpart.

(e)(1) You must use Equation 1 of this section to determine compliance with the percent reduction requirement:

$$\frac{C_i - C_o}{C_i} \times 100 = R \quad (Eq.\ 1)$$

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Where:

$C_i$ = concentration of carbon monoxide (CO), total hydrocarbons (THC), or formaldehyde at the control device inlet,

$C_o$ = concentration of CO, THC, or formaldehyde at the control device outlet, and

R = percent reduction of CO, THC, or formaldehyde emissions.

(2) You must normalize the CO, THC, or formaldehyde concentrations at the inlet and outlet of the control device to a dry basis and to 15 percent oxygen, or an equivalent percent carbon dioxide ($CO_2$ ). If pollutant concentrations are to be corrected to 15 percent oxygen and $CO_2$ concentration is measured in lieu of oxygen concentration measurement, a $CO_2$ correction factor is needed. Calculate the $CO_2$ correction factor as described in paragraphs (e)(2)(i) through (iii) of this section.

(i) Calculate the fuel-specific $F_o$ value for the fuel burned during the test using values obtained from Method 19, Section 5.2, and the following equation:

$$F_o = \frac{0.209\ F_d}{F_c} \quad (Eq.\ 2)$$

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Where:

$F_o$ = Fuel factor based on the ratio of oxygen volume to the ultimate $CO_2$ volume produced by the fuel at zero percent excess air.

0.209 = Fraction of air that is oxygen, percent/100.

$F_d$ = Ratio of the volume of dry effluent gas to the gross calorific value of the fuel from Method 19, $dsm^3$ /J (dscf/$10^6$ Btu).

$F_c$ = Ratio of the volume of $CO_2$ produced to the gross calorific value of the fuel from Method 19, $dsm^3$ /J (dscf/$10^6$ Btu)

(ii) Calculate the $CO_2$ correction factor for correcting measurement data to 15 percent $O_2$ , as follows:

$$X_{CO2} = \frac{5.9}{F_o} \quad (Eq.\ 3)$$

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Where:

$X_{CO2}$ = $CO_2$ correction factor, percent.

5.9 = 20.9 percent $O_2$ —15 percent $O_2$ , the defined $O_2$ correction value, percent.

(iii) Calculate the CO, THC, and formaldehyde gas concentrations adjusted to 15 percent $O_2$ using $CO_2$ as follows:

$$C_{adj} = C_d \frac{X_{CO2}}{\%CO_2} \quad (Eq.\ 4)$$

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Where:

$C_{adj}$ = Calculated concentration of CO, THC, or formaldehyde adjusted to 15 percent $O_2$.

$C_d$ = Measured concentration of CO, THC, or formaldehyde, uncorrected.

$X_{CO2}$ = $CO_2$ correction factor, percent.

$\%CO_2$ = Measured $CO_2$ concentration measured, dry basis, percent.

(f) If you comply with the emission limitation to reduce CO and you are not using an oxidation catalyst, if you comply with the emission limitation to reduce formaldehyde and you are not using NSCR, or if you comply with the emission limitation to limit the concentration of formaldehyde in the stationary RICE

exhaust and you are not using an oxidation catalyst or NSCR, you must petition the Administrator for operating limitations to be established during the initial performance test and continuously monitored thereafter; or for approval of no operating limitations. You must not conduct the initial performance test until after the petition has been approved by the Administrator.

(g) If you petition the Administrator for approval of operating limitations, your petition must include the information described in paragraphs (g)(1) through (5) of this section.

(1) Identification of the specific parameters you propose to use as operating limitations;

(2) A discussion of the relationship between these parameters and HAP emissions, identifying how HAP emissions change with changes in these parameters, and how limitations on these parameters will serve to limit HAP emissions;

(3) A discussion of how you will establish the upper and/or lower values for these parameters which will establish the limits on these parameters in the operating limitations;

(4) A discussion identifying the methods you will use to measure and the instruments you will use to monitor these parameters, as well as the relative accuracy and precision of these methods and instruments; and

(5) A discussion identifying the frequency and methods for recalibrating the instruments you will use for monitoring these parameters.

(h) If you petition the Administrator for approval of no operating limitations, your petition must include the information described in paragraphs (h)(1) through (7) of this section.

(1) Identification of the parameters associated with operation of the stationary RICE and any emission control device which could change intentionally ( *e.g.,* operator adjustment, automatic controller adjustment, etc.) or unintentionally ( *e.g.,* wear and tear, error, etc.) on a routine basis or over time;

(2) A discussion of the relationship, if any, between changes in the parameters and changes in HAP emissions;

(3) For the parameters which could change in such a way as to increase HAP emissions, a discussion of whether establishing limitations on the parameters would serve to limit HAP emissions;

(4) For the parameters which could change in such a way as to increase HAP emissions, a discussion of how you could establish upper and/or lower values for the parameters which would establish limits on the parameters in operating limitations;

(5) For the parameters, a discussion identifying the methods you could use to measure them and the instruments you could use to monitor them, as well as the relative accuracy and precision of the methods and instruments;

(6) For the parameters, a discussion identifying the frequency and methods for recalibrating the instruments you could use to monitor them; and

(7) A discussion of why, from your point of view, it is infeasible or unreasonable to adopt the parameters as operating limitations.

(i) The engine percent load during a performance test must be determined by documenting the calculations, assumptions, and measurement devices used to measure or estimate the percent load in a

specific application. A written report of the average percent load determination must be included in the notification of compliance status. The following information must be included in the written report: the engine model number, the engine manufacturer, the year of purchase, the manufacturer's site-rated brake horsepower, the ambient temperature, pressure, and humidity during the performance test, and all assumptions that were made to estimate or calculate percent load during the performance test must be clearly explained. If measurement devices such as flow meters, kilowatt meters, beta analyzers, stain gauges, etc. are used, the model number of the measurement device, and an estimate of its accurate in percentage of true value must be provided.

[69 FR 33506, June 15, 2004, as amended at 75 FR 9676, Mar. 3, 2010; 78 FR 6702, Jan. 30, 2013]

## *§ 63.6625 What are my monitoring, installation, collection, operation, and maintenance requirements?*

(a) If you elect to install a CEMS as specified in Table 5 of this subpart, you must install, operate, and maintain a CEMS to monitor CO and either $O_2$ or $CO_2$ according to the requirements in paragraphs (a)(1) through (4) of this section. If you are meeting a requirement to reduce CO emissions, the CEMS must be installed at both the inlet and outlet of the control device. If you are meeting a requirement to limit the concentration of CO, the CEMS must be installed at the outlet of the control device.

(1) Each CEMS must be installed, operated, and maintained according to the applicable performance specifications of 40 CFR part 60, appendix B.

(2) You must conduct an initial performance evaluation and an annual relative accuracy test audit (RATA) of each CEMS according to the requirements in § 63.8 and according to the applicable performance specifications of 40 CFR part 60, appendix B as well as daily and periodic data quality checks in accordance with 40 CFR part 60, appendix F, procedure 1.

(3) As specified in § 63.8(c)(4)(ii), each CEMS must complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period. You must have at least two data points, with each representing a different 15-minute period, to have a valid hour of data.

(4) The CEMS data must be reduced as specified in § 63.8(g)(2) and recorded in parts per million or parts per billion (as appropriate for the applicable limitation) at 15 percent oxygen or the equivalent $CO_2$ concentration.

(b) If you are required to install a continuous parameter monitoring system (CPMS) as specified in Table 5 of this subpart, you must install, operate, and maintain each CPMS according to the requirements in paragraphs (b)(1) through (6) of this section. For an affected source that is complying with the emission limitations and operating limitations on March 9, 2011, the requirements in paragraph (b) of this section are applicable September 6, 2011.

(1) You must prepare a site-specific monitoring plan that addresses the monitoring system design, data collection, and the quality assurance and quality control elements outlined in paragraphs (b)(1)(i) through (v) of this section and in § 63.8(d). As specified in § 63.8(f)(4), you may request approval of monitoring system quality assurance and quality control procedures alternative to those specified in paragraphs (b)(1) through (5) of this section in your site-specific monitoring plan.

(i) The performance criteria and design specifications for the monitoring system equipment, including the sample interface, detector signal analyzer, and data acquisition and calculations;

(ii) Sampling interface ( *e.g.,* thermocouple) location such that the monitoring system will provide representative measurements;

(iii) Equipment performance evaluations, system accuracy audits, or other audit procedures;

(iv) Ongoing operation and maintenance procedures in accordance with provisions in § 63.8(c)(1)(ii) and (c)(3); and

(v) Ongoing reporting and recordkeeping procedures in accordance with provisions in § 63.10(c), (e)(1), and (e)(2)(i).

(2) You must install, operate, and maintain each CPMS in continuous operation according to the procedures in your site-specific monitoring plan.

(3) The CPMS must collect data at least once every 15 minutes (see also § 63.6635).

(4) For a CPMS for measuring temperature range, the temperature sensor must have a minimum tolerance of 2.8 degrees Celsius (5 degrees Fahrenheit) or 1 percent of the measurement range, whichever is larger.

(5) You must conduct the CPMS equipment performance evaluation, system accuracy audits, or other audit procedures specified in your site-specific monitoring plan at least annually.

(6) You must conduct a performance evaluation of each CPMS in accordance with your site-specific monitoring plan.

(c) If you are operating a new or reconstructed stationary RICE which fires landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, you must monitor and record your fuel usage daily with separate fuel meters to measure the volumetric flow rate of each fuel. In addition, you must operate your stationary RICE in a manner which reasonably minimizes HAP emissions.

(d) If you are operating a new or reconstructed emergency 4SLB stationary RICE with a site rating of greater than or equal to 250 and less than or equal to 500 brake HP located at a major source of HAP emissions, you must install a non-resettable hour meter prior to the startup of the engine.

(e) If you own or operate any of the following stationary RICE, you must operate and maintain the stationary RICE and after-treatment control device (if any) according to the manufacturer's emission-related written instructions or develop your own maintenance plan which must provide to the extent practicable for the maintenance and operation of the engine in a manner consistent with good air pollution control practice for minimizing emissions:

(1) An existing stationary RICE with a site rating of less than 100 HP located at a major source of HAP emissions;

(2) An existing emergency or black start stationary RICE with a site rating of less than or equal to 500 HP located at a major source of HAP emissions;

(3) An existing emergency or black start stationary RICE located at an area source of HAP emissions;

(4) An existing non-emergency, non-black start stationary CI RICE with a site rating less than or equal to 300 HP located at an area source of HAP emissions;

(5) An existing non-emergency, non-black start 2SLB stationary RICE located at an area source of HAP emissions;

(6) An existing non-emergency, non-black start stationary RICE located at an area source of HAP emissions which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis.

(7) An existing non-emergency, non-black start 4SLB stationary RICE with a site rating less than or equal to 500 HP located at an area source of HAP emissions;

(8) An existing non-emergency, non-black start 4SRB stationary RICE with a site rating less than or equal to 500 HP located at an area source of HAP emissions;

(9) An existing, non-emergency, non-black start 4SLB stationary RICE with a site rating greater than 500 HP located at an area source of HAP emissions that is operated 24 hours or less per calendar year; and

(10) An existing, non-emergency, non-black start 4SRB stationary RICE with a site rating greater than 500 HP located at an area source of HAP emissions that is operated 24 hours or less per calendar year.

(f) If you own or operate an existing emergency stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions or an existing emergency stationary RICE located at an area source of HAP emissions, you must install a non-resettable hour meter if one is not already installed.

(g) If you own or operate an existing non-emergency, non-black start CI engine greater than or equal to 300 HP that is not equipped with a closed crankcase ventilation system, you must comply with either paragraph (g)(1) or paragraph (2) of this section. Owners and operators must follow the manufacturer's specified maintenance requirements for operating and maintaining the open or closed crankcase ventilation systems and replacing the crankcase filters, or can request the Administrator to approve different maintenance requirements that are as protective as manufacturer requirements. Existing CI engines located at area sources in areas of Alaska that meet either § 63.6603(b)(1) or § 63.6603(b)(2) do not have to meet the requirements of this paragraph (g). Existing CI engines located on offshore vessels that meet § 63.6603(c) do not have to meet the requirements of this paragraph (g).

(1) Install a closed crankcase ventilation system that prevents crankcase emissions from being emitted to the atmosphere, or

(2) Install an open crankcase filtration emission control system that reduces emissions from the crankcase by filtering the exhaust stream to remove oil mist, particulates and metals.

(h) If you operate a new, reconstructed, or existing stationary engine, you must minimize the engine's time spent at idle during startup and minimize the engine's startup time to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the emission standards applicable to all times other than startup in Tables 1a, 2a, 2c, and 2d to this subpart apply.

(i) If you own or operate a stationary CI engine that is subject to the work, operation or management practices in items 1 or 2 of Table 2c to this subpart or in items 1 or 4 of Table 2d to this subpart, you have the option of utilizing an oil analysis program in order to extend the specified oil change requirement in Tables 2c and 2d to this subpart. The oil analysis must be performed at the same frequency specified for changing the oil in Table 2c or 2d to this subpart. The analysis program must at a minimum analyze the following three parameters: Total Base Number, viscosity, and percent water content. The condemning limits for these parameters are as follows: Total Base Number is less than 30 percent of the Total Base Number of the oil when new; viscosity of the oil has changed by more than 20 percent from the viscosity of the oil when new; or percent water content (by volume) is greater than 0.5. If all of these condemning limits are not exceeded, the engine owner or operator is not required to change the oil. If any of the limits are exceeded, the engine owner or operator must change the oil within 2 business days of receiving the results of the analysis; if the engine is not in operation when the results of the analysis are received, the

engine owner or operator must change the oil within 2 business days or before commencing operation, whichever is later. The owner or operator must keep records of the parameters that are analyzed as part of the program, the results of the analysis, and the oil changes for the engine. The analysis program must be part of the maintenance plan for the engine.

(j) If you own or operate a stationary SI engine that is subject to the work, operation or management practices in items 6, 7, or 8 of Table 2c to this subpart or in items 5, 6, 7, 9, or 11 of Table 2d to this subpart, you have the option of utilizing an oil analysis program in order to extend the specified oil change requirement in Tables 2c and 2d to this subpart. The oil analysis must be performed at the same frequency specified for changing the oil in Table 2c or 2d to this subpart. The analysis program must at a minimum analyze the following three parameters: Total Acid Number, viscosity, and percent water content. The condemning limits for these parameters are as follows: Total Acid Number increases by more than 3.0 milligrams of potassium hydroxide (KOH) per gram from Total Acid Number of the oil when new; viscosity of the oil has changed by more than 20 percent from the viscosity of the oil when new; or percent water content (by volume) is greater than 0.5. If all of these condemning limits are not exceeded, the engine owner or operator is not required to change the oil. If any of the limits are exceeded, the engine owner or operator must change the oil within 2 business days of receiving the results of the analysis; if the engine is not in operation when the results of the analysis are received, the engine owner or operator must change the oil within 2 business days or before commencing operation, whichever is later. The owner or operator must keep records of the parameters that are analyzed as part of the program, the results of the analysis, and the oil changes for the engine. The analysis program must be part of the maintenance plan for the engine.

[69 FR 33506, June 15, 2004, as amended at 73 FR 3606, Jan. 18, 2008; 75 FR 9676, Mar. 3, 2010; 75 FR 51589, Aug. 20, 2010; 76 FR 12866, Mar. 9, 2011; 78 FR 6703, Jan. 30, 2013]

## *§ 63.6630 How do I demonstrate initial compliance with the emission limitations, operating limitations, and other requirements?*

(a) You must demonstrate initial compliance with each emission limitation, operating limitation, and other requirement that applies to you according to Table 5 of this subpart.

(b) During the initial performance test, you must establish each operating limitation in Tables 1b and 2b of this subpart that applies to you.

(c) You must submit the Notification of Compliance Status containing the results of the initial compliance demonstration according to the requirements in § 63.6645.

(d) Non-emergency 4SRB stationary RICE complying with the requirement to reduce formaldehyde emissions by 76 percent or more can demonstrate initial compliance with the formaldehyde emission limit by testing for THC instead of formaldehyde. The testing must be conducted according to the requirements in Table 4 of this subpart. The average reduction of emissions of THC determined from the performance test must be equal to or greater than 30 percent.

(e) The initial compliance demonstration required for existing non-emergency 4SLB and 4SRB stationary RICE with a site rating of more than 500 HP located at an area source of HAP that are not remote stationary RICE and that are operated more than 24 hours per calendar year must be conducted according to the following requirements:

(1) The compliance demonstration must consist of at least three test runs.

(2) Each test run must be of at least 15 minute duration, except that each test conducted using the method in appendix A to this subpart must consist of at least one measurement cycle and include at least 2 minutes of test data phase measurement.

(3) If you are demonstrating compliance with the CO concentration or CO percent reduction requirement, you must measure CO emissions using one of the CO measurement methods specified in Table 4 of this subpart, or using appendix A to this subpart.

(4) If you are demonstrating compliance with the THC percent reduction requirement, you must measure THC emissions using Method 25A, reported as propane, of 40 CFR part 60, appendix A.

(5) You must measure $O_2$ using one of the $O_2$ measurement methods specified in Table 4 of this subpart. Measurements to determine $O_2$ concentration must be made at the same time as the measurements for CO or THC concentration.

(6) If you are demonstrating compliance with the CO or THC percent reduction requirement, you must measure CO or THC emissions and $O_2$ emissions simultaneously at the inlet and outlet of the control device.

[69 FR 33506, June 15, 2004, as amended at 78 FR 6704, Jan. 30, 2013]

## *Continuous Compliance Requirements*

## *§ 63.6635 How do I monitor and collect data to demonstrate continuous compliance?*

(a) If you must comply with emission and operating limitations, you must monitor and collect data according to this section.

(b) Except for monitor malfunctions, associated repairs, required performance evaluations, and required quality assurance or control activities, you must monitor continuously at all times that the stationary RICE is operating. A monitoring malfunction is any sudden, infrequent, not reasonably preventable failure of the monitoring to provide valid data. Monitoring failures that are caused in part by poor maintenance or careless operation are not malfunctions.

(c) You may not use data recorded during monitoring malfunctions, associated repairs, and required quality assurance or control activities in data averages and calculations used to report emission or operating levels. You must, however, use all the valid data collected during all other periods.

[69 FR 33506, June 15, 2004, as amended at 76 FR 12867, Mar. 9, 2011]

## *§ 63.6640 How do I demonstrate continuous compliance with the emission limitations, operating limitations, and other requirements?*

(a) You must demonstrate continuous compliance with each emission limitation, operating limitation, and other requirements in Tables 1a and 1b, Tables 2a and 2b, Table 2c, and Table 2d to this subpart that apply to you according to methods specified in Table 6 to this subpart.

(b) You must report each instance in which you did not meet each emission limitation or operating limitation in Tables 1a and 1b, Tables 2a and 2b, Table 2c, and Table 2d to this subpart that apply to you. These instances are deviations from the emission and operating limitations in this subpart. These

deviations must be reported according to the requirements in § 63.6650. If you change your catalyst, you must reestablish the values of the operating parameters measured during the initial performance test. When you reestablish the values of your operating parameters, you must also conduct a performance test to demonstrate that you are meeting the required emission limitation applicable to your stationary RICE.

(c) The annual compliance demonstration required for existing non-emergency 4SLB and 4SRB stationary RICE with a site rating of more than 500 HP located at an area source of HAP that are not remote stationary RICE and that are operated more than 24 hours per calendar year must be conducted according to the following requirements:

(1) The compliance demonstration must consist of at least one test run.

(2) Each test run must be of at least 15 minute duration, except that each test conducted using the method in appendix A to this subpart must consist of at least one measurement cycle and include at least 2 minutes of test data phase measurement.

(3) If you are demonstrating compliance with the CO concentration or CO percent reduction requirement, you must measure CO emissions using one of the CO measurement methods specified in Table 4 of this subpart, or using appendix A to this subpart.

(4) If you are demonstrating compliance with the THC percent reduction requirement, you must measure THC emissions using Method 25A, reported as propane, of 40 CFR part 60, appendix A.

(5) You must measure $O_2$ using one of the $O_2$ measurement methods specified in Table 4 of this subpart. Measurements to determine $O_2$ concentration must be made at the same time as the measurements for CO or THC concentration.

(6) If you are demonstrating compliance with the CO or THC percent reduction requirement, you must measure CO or THC emissions and $O_2$ emissions simultaneously at the inlet and outlet of the control device.

(7) If the results of the annual compliance demonstration show that the emissions exceed the levels specified in Table 6 of this subpart, the stationary RICE must be shut down as soon as safely possible, and appropriate corrective action must be taken (e.g., repairs, catalyst cleaning, catalyst replacement). The stationary RICE must be retested within 7 days of being restarted and the emissions must meet the levels specified in Table 6 of this subpart. If the retest shows that the emissions continue to exceed the specified levels, the stationary RICE must again be shut down as soon as safely possible, and the stationary RICE may not operate, except for purposes of startup and testing, until the owner/operator demonstrates through testing that the emissions do not exceed the levels specified in Table 6 of this subpart.

(d) For new, reconstructed, and rebuilt stationary RICE, deviations from the emission or operating limitations that occur during the first 200 hours of operation from engine startup (engine burn-in period) are not violations. Rebuilt stationary RICE means a stationary RICE that has been rebuilt as that term is defined in 40 CFR 94.11(a).

(e) You must also report each instance in which you did not meet the requirements in Table 8 to this subpart that apply to you. If you own or operate a new or reconstructed stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions (except new or reconstructed 4SLB engines greater than or equal to 250 and less than or equal to 500 brake HP), a new or reconstructed stationary RICE located at an area source of HAP emissions, or any of the following RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you do not need to comply with the requirements in Table 8 to this subpart: An existing 2SLB stationary RICE, an existing 4SLB stationary RICE, an existing emergency stationary RICE, an existing limited use stationary

RICE, or an existing stationary RICE which fires landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis. If you own or operate any of the following RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you do not need to comply with the requirements in Table 8 to this subpart, except for the initial notification requirements: a new or reconstructed stationary RICE that combusts landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, a new or reconstructed emergency stationary RICE, or a new or reconstructed limited use stationary RICE.

(f) If you own or operate an emergency stationary RICE, you must operate the emergency stationary RICE according to the requirements in paragraphs (f)(1) through (4) of this section. In order for the engine to be considered an emergency stationary RICE under this subpart, any operation other than emergency operation, maintenance and testing, emergency demand response, and operation in non-emergency situations for 50 hours per year, as described in paragraphs (f)(1) through (4) of this section, is prohibited. If you do not operate the engine according to the requirements in paragraphs (f)(1) through (4) of this section, the engine will not be considered an emergency engine under this subpart and must meet all requirements for non-emergency engines.

(1) There is no time limit on the use of emergency stationary RICE in emergency situations.

(2) You may operate your emergency stationary RICE for any combination of the purposes specified in paragraphs (f)(2)(i) through (iii) of this section for a maximum of 100 hours per calendar year. Any operation for non-emergency situations as allowed by paragraphs (f)(3) and (4) of this section counts as part of the 100 hours per calendar year allowed by this paragraph (f)(2).

(i) Emergency stationary RICE may be operated for maintenance checks and readiness testing, provided that the tests are recommended by federal, state or local government, the manufacturer, the vendor, the regional transmission organization or equivalent balancing authority and transmission operator, or the insurance company associated with the engine. The owner or operator may petition the Administrator for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the owner or operator maintains records indicating that federal, state, or local standards require maintenance and testing of emergency RICE beyond 100 hours per calendar year.

(ii) Emergency stationary RICE may be operated for emergency demand response for periods in which the Reliability Coordinator under the North American Electric Reliability Corporation (NERC) Reliability Standard EOP-002-3, Capacity and Energy Emergencies (incorporated by reference, see § 63.14), or other authorized entity as determined by the Reliability Coordinator, has declared an Energy Emergency Alert Level 2 as defined in the NERC Reliability Standard EOP-002-3.

(iii) Emergency stationary RICE may be operated for periods where there is a deviation of voltage or frequency of 5 percent or greater below standard voltage or frequency.

(3) Emergency stationary RICE located at major sources of HAP may be operated for up to 50 hours per calendar year in non-emergency situations. The 50 hours of operation in non-emergency situations are counted as part of the 100 hours per calendar year for maintenance and testing and emergency demand response provided in paragraph (f)(2) of this section. The 50 hours per year for non-emergency situations cannot be used for peak shaving or non-emergency demand response, or to generate income for a facility to supply power to an electric grid or otherwise supply power as part of a financial arrangement with another entity.

(4) Emergency stationary RICE located at area sources of HAP may be operated for up to 50 hours per calendar year in non-emergency situations. The 50 hours of operation in non-emergency situations are counted as part of the 100 hours per calendar year for maintenance and testing and emergency demand response provided in paragraph (f)(2) of this section. Except as provided in paragraphs (f)(4)(i) and (ii) of this section, the 50 hours per year for non-emergency situations cannot be used for peak shaving or non-

emergency demand response, or to generate income for a facility to an electric grid or otherwise supply power as part of a financial arrangement with another entity.

(i) Prior to May 3, 2014, the 50 hours per year for non-emergency situations can be used for peak shaving or non-emergency demand response to generate income for a facility, or to otherwise supply power as part of a financial arrangement with another entity if the engine is operated as part of a peak shaving (load management program) with the local distribution system operator and the power is provided only to the facility itself or to support the local distribution system.

(ii) The 50 hours per year for non-emergency situations can be used to supply power as part of a financial arrangement with another entity if all of the following conditions are met:

(A) The engine is dispatched by the local balancing authority or local transmission and distribution system operator.

(B) The dispatch is intended to mitigate local transmission and/or distribution limitations so as to avert potential voltage collapse or line overloads that could lead to the interruption of power supply in a local area or region.

(C) The dispatch follows reliability, emergency operation or similar protocols that follow specific NERC, regional, state, public utility commission or local standards or guidelines.

(D) The power is provided only to the facility itself or to support the local transmission and distribution system.

(E) The owner or operator identifies and records the entity that dispatches the engine and the specific NERC, regional, state, public utility commission or local standards or guidelines that are being followed for dispatching the engine. The local balancing authority or local transmission and distribution system operator may keep these records on behalf of the engine owner or operator.

[69 FR 33506, June 15, 2004, as amended at 71 FR 20467, Apr. 20, 2006; 73 FR 3606, Jan. 18, 2008; 75 FR 9676, Mar. 3, 2010; 75 FR 51591, Aug. 20, 2010; 78 FR 6704, Jan. 30, 2013]

## *Notifications, Reports, and Records*

## *§ 63.6645 What notifications must I submit and when?*

(a) You must submit all of the notifications in §§ 63.7(b) and (c), 63.8(e), (f)(4) and (f)(6), 63.9(b) through (e), and (g) and (h) that apply to you by the dates specified if you own or operate any of the following;

(1) An existing stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions.

(2) An existing stationary RICE located at an area source of HAP emissions.

(3) A stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions.

(4) A new or reconstructed 4SLB stationary RICE with a site rating of greater than or equal to 250 HP located at a major source of HAP emissions.

(5) This requirement does not apply if you own or operate an existing stationary RICE less than 100 HP, an existing stationary emergency RICE, or an existing stationary RICE that is not subject to any numerical emission standards.

(b) As specified in § 63.9(b)(2), if you start up your stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions before the effective date of this subpart, you must submit an Initial Notification not later than December 13, 2004.

(c) If you start up your new or reconstructed stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions on or after August 16, 2004, you must submit an Initial Notification not later than 120 days after you become subject to this subpart.

(d) As specified in § 63.9(b)(2), if you start up your stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions before the effective date of this subpart and you are required to submit an initial notification, you must submit an Initial Notification not later than July 16, 2008.

(e) If you start up your new or reconstructed stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions on or after March 18, 2008 and you are required to submit an initial notification, you must submit an Initial Notification not later than 120 days after you become subject to this subpart.

(f) If you are required to submit an Initial Notification but are otherwise not affected by the requirements of this subpart, in accordance with § 63.6590(b), your notification should include the information in § 63.9(b)(2)(i) through (v), and a statement that your stationary RICE has no additional requirements and explain the basis of the exclusion (for example, that it operates exclusively as an emergency stationary RICE if it has a site rating of more than 500 brake HP located at a major source of HAP emissions).

(g) If you are required to conduct a performance test, you must submit a Notification of Intent to conduct a performance test at least 60 days before the performance test is scheduled to begin as required in § 63.7(b)(1).

(h) If you are required to conduct a performance test or other initial compliance demonstration as specified in Tables 4 and 5 to this subpart, you must submit a Notification of Compliance Status according to § 63.9(h)(2)(ii).

(1) For each initial compliance demonstration required in Table 5 to this subpart that does not include a performance test, you must submit the Notification of Compliance Status before the close of business on the 30th day following the completion of the initial compliance demonstration.

(2) For each initial compliance demonstration required in Table 5 to this subpart that includes a performance test conducted according to the requirements in Table 3 to this subpart, you must submit the Notification of Compliance Status, including the performance test results, before the close of business on the 60th day following the completion of the performance test according to § 63.10(d)(2).

(i) If you own or operate an existing non-emergency CI RICE with a site rating of more than 300 HP located at an area source of HAP emissions that is certified to the Tier 1 or Tier 2 emission standards in Table 1 of 40 CFR 89.112 and subject to an enforceable state or local standard requiring engine replacement and you intend to meet management practices rather than emission limits, as specified in § 63.6603(d), you must submit a notification by March 3, 2013, stating that you intend to use the provision in § 63.6603(d) and identifying the state or local regulation that the engine is subject to.

[73 FR 3606, Jan. 18, 2008, as amended at 75 FR 9677, Mar. 3, 2010; 75 FR 51591, Aug. 20, 2010; 78 FR 6705, Jan. 30, 2013]

## *§ 63.6650 What reports must I submit and when?*

(a) You must submit each report in Table 7 of this subpart that applies to you.

(b) Unless the Administrator has approved a different schedule for submission of reports under § 63.10(a), you must submit each report by the date in Table 7 of this subpart and according to the requirements in paragraphs (b)(1) through (b)(9) of this section.

(1) For semiannual Compliance reports, the first Compliance report must cover the period beginning on the compliance date that is specified for your affected source in § 63.6595 and ending on June 30 or December 31, whichever date is the first date following the end of the first calendar half after the compliance date that is specified for your source in § 63.6595.

(2) For semiannual Compliance reports, the first Compliance report must be postmarked or delivered no later than July 31 or January 31, whichever date follows the end of the first calendar half after the compliance date that is specified for your affected source in § 63.6595.

(3) For semiannual Compliance reports, each subsequent Compliance report must cover the semiannual reporting period from January 1 through June 30 or the semiannual reporting period from July 1 through December 31.

(4) For semiannual Compliance reports, each subsequent Compliance report must be postmarked or delivered no later than July 31 or January 31, whichever date is the first date following the end of the semiannual reporting period.

(5) For each stationary RICE that is subject to permitting regulations pursuant to 40 CFR part 70 or 71, and if the permitting authority has established dates for submitting semiannual reports pursuant to 40 CFR 70.6(a)(3)(iii)(A) or 40 CFR 71.6 (a)(3)(iii)(A), you may submit the first and subsequent Compliance reports according to the dates the permitting authority has established instead of according to the dates in paragraphs (b)(1) through (b)(4) of this section.

(6) For annual Compliance reports, the first Compliance report must cover the period beginning on the compliance date that is specified for your affected source in § 63.6595 and ending on December 31.

(7) For annual Compliance reports, the first Compliance report must be postmarked or delivered no later than January 31 following the end of the first calendar year after the compliance date that is specified for your affected source in § 63.6595.

(8) For annual Compliance reports, each subsequent Compliance report must cover the annual reporting period from January 1 through December 31.

(9) For annual Compliance reports, each subsequent Compliance report must be postmarked or delivered no later than January 31.

(c) The Compliance report must contain the information in paragraphs (c)(1) through (6) of this section.

(1) Company name and address.

(2) Statement by a responsible official, with that official's name, title, and signature, certifying the accuracy of the content of the report.

(3) Date of report and beginning and ending dates of the reporting period.

(4) If you had a malfunction during the reporting period, the compliance report must include the number, duration, and a brief description for each type of malfunction which occurred during the reporting period and which caused or may have caused any applicable emission limitation to be exceeded. The report must also include a description of actions taken by an owner or operator during a malfunction of an affected source to minimize emissions in accordance with § 63.6605(b), including actions taken to correct a malfunction.

(5) If there are no deviations from any emission or operating limitations that apply to you, a statement that there were no deviations from the emission or operating limitations during the reporting period.

(6) If there were no periods during which the continuous monitoring system (CMS), including CEMS and CPMS, was out-of-control, as specified in § 63.8(c)(7), a statement that there were no periods during which the CMS was out-of-control during the reporting period.

(d) For each deviation from an emission or operating limitation that occurs for a stationary RICE where you are not using a CMS to comply with the emission or operating limitations in this subpart, the Compliance report must contain the information in paragraphs (c)(1) through (4) of this section and the information in paragraphs (d)(1) and (2) of this section.

(1) The total operating time of the stationary RICE at which the deviation occurred during the reporting period.

(2) Information on the number, duration, and cause of deviations (including unknown cause, if applicable), as applicable, and the corrective action taken.

(e) For each deviation from an emission or operating limitation occurring for a stationary RICE where you are using a CMS to comply with the emission and operating limitations in this subpart, you must include information in paragraphs (c)(1) through (4) and (e)(1) through (12) of this section.

(1) The date and time that each malfunction started and stopped.

(2) The date, time, and duration that each CMS was inoperative, except for zero (low-level) and high-level checks.

(3) The date, time, and duration that each CMS was out-of-control, including the information in § 63.8(c)(8).

(4) The date and time that each deviation started and stopped, and whether each deviation occurred during a period of malfunction or during another period.

(5) A summary of the total duration of the deviation during the reporting period, and the total duration as a percent of the total source operating time during that reporting period.

(6) A breakdown of the total duration of the deviations during the reporting period into those that are due to control equipment problems, process problems, other known causes, and other unknown causes.

(7) A summary of the total duration of CMS downtime during the reporting period, and the total duration of CMS downtime as a percent of the total operating time of the stationary RICE at which the CMS downtime occurred during that reporting period.

(8) An identification of each parameter and pollutant (CO or formaldehyde) that was monitored at the stationary RICE.

(9) A brief description of the stationary RICE.

(10) A brief description of the CMS.

(11) The date of the latest CMS certification or audit.

(12) A description of any changes in CMS, processes, or controls since the last reporting period.

(f) Each affected source that has obtained a title V operating permit pursuant to 40 CFR part 70 or 71 must report all deviations as defined in this subpart in the semiannual monitoring report required by 40 CFR 70.6 (a)(3)(iii)(A) or 40 CFR 71.6(a)(3)(iii)(A). If an affected source submits a Compliance report pursuant to Table 7 of this subpart along with, or as part of, the semiannual monitoring report required by 40 CFR 70.6(a)(3)(iii)(A) or 40 CFR 71.6(a)(3)(iii)(A), and the Compliance report includes all required information concerning deviations from any emission or operating limitation in this subpart, submission of the Compliance report shall be deemed to satisfy any obligation to report the same deviations in the semiannual monitoring report. However, submission of a Compliance report shall not otherwise affect any obligation the affected source may have to report deviations from permit requirements to the permit authority.

(g) If you are operating as a new or reconstructed stationary RICE which fires landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, you must submit an annual report according to Table 7 of this subpart by the date specified unless the Administrator has approved a different schedule, according to the information described in paragraphs (b)(1) through (b)(5) of this section. You must report the data specified in (g)(1) through (g)(3) of this section.

(1) Fuel flow rate of each fuel and the heating values that were used in your calculations. You must also demonstrate that the percentage of heat input provided by landfill gas or digester gas is equivalent to 10 percent or more of the total fuel consumption on an annual basis.

(2) The operating limits provided in your federally enforceable permit, and any deviations from these limits.

(3) Any problems or errors suspected with the meters.

(h) If you own or operate an emergency stationary RICE with a site rating of more than 100 brake HP that operates or is contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in § 63.6640(f)(2)(ii) and (iii) or that operates for the purpose specified in § 63.6640(f)(4)(ii), you must submit an annual report according to the requirements in paragraphs (h)(1) through (3) of this section.

(1) The report must contain the following information:

(i) Company name and address where the engine is located.

(ii) Date of the report and beginning and ending dates of the reporting period.

(iii) Engine site rating and model year.

(iv) Latitude and longitude of the engine in decimal degrees reported to the fifth decimal place.

(v) Hours operated for the purposes specified in § 63.6640(f)(2)(ii) and (iii), including the date, start time, and end time for engine operation for the purposes specified in § 63.6640(f)(2)(ii) and (iii).

(vi) Number of hours the engine is contractually obligated to be available for the purposes specified in § 63.6640(f)(2)(ii) and (iii).

(vii) Hours spent for operation for the purpose specified in § 63.6640(f)(4)(ii), including the date, start time, and end time for engine operation for the purposes specified in § 63.6640(f)(4)(ii). The report must also identify the entity that dispatched the engine and the situation that necessitated the dispatch of the engine.

(viii) If there were no deviations from the fuel requirements in § 63.6604 that apply to the engine (if any), a statement that there were no deviations from the fuel requirements during the reporting period.

(ix) If there were deviations from the fuel requirements in § 63.6604 that apply to the engine (if any), information on the number, duration, and cause of deviations, and the corrective action taken.

(2) The first annual report must cover the calendar year 2015 and must be submitted no later than March 31, 2016. Subsequent annual reports for each calendar year must be submitted no later than March 31 of the following calendar year.

(3) The annual report must be submitted electronically using the subpart specific reporting form in the Compliance and Emissions Data Reporting Interface (CEDRI) that is accessed through EPA's Central Data Exchange (CDX) ( *www.epa.gov/cdx* ). However, if the reporting form specific to this subpart is not available in CEDRI at the time that the report is due, the written report must be submitted to the Administrator at the appropriate address listed in § 63.13.

[69 FR 33506, June 15, 2004, as amended at 75 FR 9677, Mar. 3, 2010; 78 FR 6705, Jan. 30, 2013]

## *§ 63.6655 What records must I keep?*

(a) If you must comply with the emission and operating limitations, you must keep the records described in paragraphs (a)(1) through (a)(5), (b)(1) through (b)(3) and (c) of this section.

(1) A copy of each notification and report that you submitted to comply with this subpart, including all documentation supporting any Initial Notification or Notification of Compliance Status that you submitted, according to the requirement in § 63.10(b)(2)(xiv).

(2) Records of the occurrence and duration of each malfunction of operation ( *i.e.,* process equipment) or the air pollution control and monitoring equipment.

(3) Records of performance tests and performance evaluations as required in § 63.10(b)(2)(viii).

(4) Records of all required maintenance performed on the air pollution control and monitoring equipment.

(5) Records of actions taken during periods of malfunction to minimize emissions in accordance with § 63.6605(b), including corrective actions to restore malfunctioning process and air pollution control and monitoring equipment to its normal or usual manner of operation.

(b) For each CEMS or CPMS, you must keep the records listed in paragraphs (b)(1) through (3) of this section.

(1) Records described in § 63.10(b)(2)(vi) through (xi).

(2) Previous ( *i.e.,* superseded) versions of the performance evaluation plan as required in § 63.8(d)(3).

(3) Requests for alternatives to the relative accuracy test for CEMS or CPMS as required in § 63.8(f)(6)(i), if applicable.

(c) If you are operating a new or reconstructed stationary RICE which fires landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, you must keep the records of your daily fuel usage monitors.

(d) You must keep the records required in Table 6 of this subpart to show continuous compliance with each emission or operating limitation that applies to you.

(e) You must keep records of the maintenance conducted on the stationary RICE in order to demonstrate that you operated and maintained the stationary RICE and after-treatment control device (if any) according to your own maintenance plan if you own or operate any of the following stationary RICE;

(1) An existing stationary RICE with a site rating of less than 100 brake HP located at a major source of HAP emissions.

(2) An existing stationary emergency RICE.

(3) An existing stationary RICE located at an area source of HAP emissions subject to management practices as shown in Table 2d to this subpart.

(f) If you own or operate any of the stationary RICE in paragraphs (f)(1) through (2) of this section, you must keep records of the hours of operation of the engine that is recorded through the non-resettable hour meter. The owner or operator must document how many hours are spent for emergency operation, including what classified the operation as emergency and how many hours are spent for non-emergency operation. If the engine is used for the purposes specified in § 63.6640(f)(2)(ii) or (iii) or § 63.6640(f)(4)(ii), the owner or operator must keep records of the notification of the emergency situation, and the date, start time, and end time of engine operation for these purposes.

(1) An existing emergency stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions that does not meet the standards applicable to non-emergency engines.

(2) An existing emergency stationary RICE located at an area source of HAP emissions that does not meet the standards applicable to non-emergency engines.

[69 FR 33506, June 15, 2004, as amended at 75 FR 9678, Mar. 3, 2010; 75 FR 51592, Aug. 20, 2010; 78 FR 6706, Jan. 30, 2013]

## *§ 63.6660 In what form and how long must I keep my records?*

(a) Your records must be in a form suitable and readily available for expeditious review according to § 63.10(b)(1).

(b) As specified in § 63.10(b)(1), you must keep each record for 5 years following the date of each occurrence, measurement, maintenance, corrective action, report, or record.

(c) You must keep each record readily accessible in hard copy or electronic form for at least 5 years after the date of each occurrence, measurement, maintenance, corrective action, report, or record, according to § 63.10(b)(1).

[69 FR 33506, June 15, 2004, as amended at 75 FR 9678, Mar. 3, 2010]

## *Other Requirements and Information*

## *§ 63.6665 What parts of the General Provisions apply to me?*

Table 8 to this subpart shows which parts of the General Provisions in §§ 63.1 through 63.15 apply to you. If you own or operate a new or reconstructed stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions (except new or reconstructed 4SLB engines greater than or equal to 250 and less than or equal to 500 brake HP), a new or reconstructed stationary RICE located at an area source of HAP emissions, or any of the following RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you do not need to comply with any of the requirements of the General Provisions specified in Table 8: An existing 2SLB stationary RICE, an existing 4SLB stationary RICE, an existing stationary RICE that combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, an existing emergency stationary RICE, or an existing limited use stationary RICE. If you own or operate any of the following RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, you do not need to comply with the requirements in the General Provisions specified in Table 8 except for the initial notification requirements: A new stationary RICE that combusts landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, a new emergency stationary RICE, or a new limited use stationary RICE.

[75 FR 9678, Mar. 3, 2010]

## *§ 63.6670 Who implements and enforces this subpart?*

(a) This subpart is implemented and enforced by the U.S. EPA, or a delegated authority such as your State, local, or tribal agency. If the U.S. EPA Administrator has delegated authority to your State, local, or tribal agency, then that agency (as well as the U.S. EPA) has the authority to implement and enforce this subpart. You should contact your U.S. EPA Regional Office to find out whether this subpart is delegated to your State, local, or tribal agency.

(b) In delegating implementation and enforcement authority of this subpart to a State, local, or tribal agency under 40 CFR part 63, subpart E, the authorities contained in paragraph (c) of this section are retained by the Administrator of the U.S. EPA and are not transferred to the State, local, or tribal agency.

(c) The authorities that will not be delegated to State, local, or tribal agencies are:

(1) Approval of alternatives to the non-opacity emission limitations and operating limitations in § 63.6600 under § 63.6(g).

(2) Approval of major alternatives to test methods under § 63.7(e)(2)(ii) and (f) and as defined in § 63.90.

(3) Approval of major alternatives to monitoring under § 63.8(f) and as defined in § 63.90.

(4) Approval of major alternatives to recordkeeping and reporting under § 63.10(f) and as defined in § 63.90.

(5) Approval of a performance test which was conducted prior to the effective date of the rule, as specified in § 63.6610(b).

## *§ 63.6675 What definitions apply to this subpart?*

Terms used in this subpart are defined in the Clean Air Act (CAA); in 40 CFR 63.2, the General Provisions of this part; and in this section as follows:

*Alaska Railbelt Grid* means the service areas of the six regulated public utilities that extend from Fairbanks to Anchorage and the Kenai Peninsula. These utilities are Golden Valley Electric Association; Chugach Electric Association; Matanuska Electric Association; Homer Electric Association; Anchorage Municipal Light & Power; and the City of Seward Electric System.

*Area source* means any stationary source of HAP that is not a major source as defined in part 63.

*Associated equipment* as used in this subpart and as referred to in section 112(n)(4) of the CAA, means equipment associated with an oil or natural gas exploration or production well, and includes all equipment from the well bore to the point of custody transfer, except glycol dehydration units, storage vessels with potential for flash emissions, combustion turbines, and stationary RICE.

*Backup power for renewable energy* means an engine that provides backup power to a facility that generates electricity from renewable energy resources, as that term is defined in Alaska Statute 42.45.045(l)(5) (incorporated by reference, see § 63.14).

*Black start engine* means an engine whose only purpose is to start up a combustion turbine.

*CAA* means the Clean Air Act (42 U.S.C. 7401 *et seq.,* as amended by Public Law 101-549, 104 Stat. 2399).

*Commercial emergency stationary RICE* means an emergency stationary RICE used in commercial establishments such as office buildings, hotels, stores, telecommunications facilities, restaurants, financial institutions such as banks, doctor's offices, and sports and performing arts facilities.

*Compression ignition* means relating to a type of stationary internal combustion engine that is not a spark ignition engine.

*Custody transfer* means the transfer of hydrocarbon liquids or natural gas: After processing and/or treatment in the producing operations, or from storage vessels or automatic transfer facilities or other such equipment, including product loading racks, to pipelines or any other forms of transportation. For the purposes of this subpart, the point at which such liquids or natural gas enters a natural gas processing plant is a point of custody transfer.

*Deviation* means any instance in which an affected source subject to this subpart, or an owner or operator of such a source:

(1) Fails to meet any requirement or obligation established by this subpart, including but not limited to any emission limitation or operating limitation;

(2) Fails to meet any term or condition that is adopted to implement an applicable requirement in this subpart and that is included in the operating permit for any affected source required to obtain such a permit; or

(3) Fails to meet any emission limitation or operating limitation in this subpart during malfunction, regardless or whether or not such failure is permitted by this subpart.

(4) Fails to satisfy the general duty to minimize emissions established by § 63.6(e)(1)(i).

*Diesel engine* means any stationary RICE in which a high boiling point liquid fuel injected into the combustion chamber ignites when the air charge has been compressed to a temperature sufficiently high for auto-ignition. This process is also known as compression ignition.

*Diesel fuel* means any liquid obtained from the distillation of petroleum with a boiling point of approximately 150 to 360 degrees Celsius. One commonly used form is fuel oil number 2. Diesel fuel also includes any non-distillate fuel with comparable physical and chemical properties ( *e.g.* biodiesel) that is suitable for use in compression ignition engines.

*Digester gas* means any gaseous by-product of wastewater treatment typically formed through the anaerobic decomposition of organic waste materials and composed principally of methane and $CO_2$ .

*Dual-fuel engine* means any stationary RICE in which a liquid fuel (typically diesel fuel) is used for compression ignition and gaseous fuel (typically natural gas) is used as the primary fuel.

*Emergency stationary RICE* means any stationary reciprocating internal combustion engine that meets all of the criteria in paragraphs (1) through (3) of this definition. All emergency stationary RICE must comply with the requirements specified in § 63.6640(f) in order to be considered emergency stationary RICE. If the engine does not comply with the requirements specified in § 63.6640(f), then it is not considered to be an emergency stationary RICE under this subpart.

(1) The stationary RICE is operated to provide electrical power or mechanical work during an emergency situation. Examples include stationary RICE used to produce power for critical networks or equipment (including power supplied to portions of a facility) when electric power from the local utility (or the normal power source, if the facility runs on its own power production) is interrupted, or stationary RICE used to pump water in the case of fire or flood, etc.

(2) The stationary RICE is operated under limited circumstances for situations not included in paragraph (1) of this definition, as specified in § 63.6640(f).

(3) The stationary RICE operates as part of a financial arrangement with another entity in situations not included in paragraph (1) of this definition only as allowed in § 63.6640(f)(2)(ii) or (iii) and § 63.6640(f)(4)(i) or (ii).

*Engine startup* means the time from initial start until applied load and engine and associated equipment reaches steady state or normal operation. For stationary engine with catalytic controls, engine startup means the time from initial start until applied load and engine and associated equipment, including the catalyst, reaches steady state or normal operation.

*Four-stroke engine* means any type of engine which completes the power cycle in two crankshaft revolutions, with intake and compression strokes in the first revolution and power and exhaust strokes in the second revolution.

*Gaseous fuel* means a material used for combustion which is in the gaseous state at standard atmospheric temperature and pressure conditions.

*Gasoline* means any fuel sold in any State for use in motor vehicles and motor vehicle engines, or nonroad or stationary engines, and commonly or commercially known or sold as gasoline.

*Glycol dehydration unit* means a device in which a liquid glycol (including, but not limited to, ethylene glycol, diethylene glycol, or triethylene glycol) absorbent directly contacts a natural gas stream and absorbs water in a contact tower or absorption column (absorber). The glycol contacts and absorbs water vapor and other gas stream constituents from the natural gas and becomes “rich” glycol. This glycol is then regenerated in the glycol dehydration unit reboiler. The “lean” glycol is then recycled.

*Hazardous air pollutants (HAP)* means any air pollutants listed in or pursuant to section 112(b) of the CAA.

*Institutional emergency stationary RICE* means an emergency stationary RICE used in institutional establishments such as medical centers, nursing homes, research centers, institutions of higher education, correctional facilities, elementary and secondary schools, libraries, religious establishments, police stations, and fire stations.

*ISO standard day conditions* means 288 degrees Kelvin (15 degrees Celsius), 60 percent relative humidity and 101.3 kilopascals pressure.

*Landfill gas* means a gaseous by-product of the land application of municipal refuse typically formed through the anaerobic decomposition of waste materials and composed principally of methane and $CO_2$ .

*Lean burn engine* means any two-stroke or four-stroke spark ignited engine that does not meet the definition of a rich burn engine.

*Limited use stationary RICE* means any stationary RICE that operates less than 100 hours per year.

*Liquefied petroleum gas* means any liquefied hydrocarbon gas obtained as a by-product in petroleum refining of natural gas production.

*Liquid fuel* means any fuel in liquid form at standard temperature and pressure, including but not limited to diesel, residual/crude oil, kerosene/naphtha (jet fuel), and gasoline.

*Major Source,* as used in this subpart, shall have the same meaning as in § 63.2, except that:

(1) Emissions from any oil or gas exploration or production well (with its associated equipment (as defined in this section)) and emissions from any pipeline compressor station or pump station shall not be aggregated with emissions from other similar units, to determine whether such emission points or stations are major sources, even when emission points are in a contiguous area or under common control;

(2) For oil and gas production facilities, emissions from processes, operations, or equipment that are not part of the same oil and gas production facility, as defined in § 63.1271 of subpart HHH of this part, shall not be aggregated;

(3) For production field facilities, only HAP emissions from glycol dehydration units, storage vessel with the potential for flash emissions, combustion turbines and reciprocating internal combustion engines shall be aggregated for a major source determination; and

(4) Emissions from processes, operations, and equipment that are not part of the same natural gas transmission and storage facility, as defined in § 63.1271 of subpart HHH of this part, shall not be aggregated.

*Malfunction* means any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner which causes, or has the potential to cause, the emission limitations in an applicable standard to be exceeded. Failures that are caused in part by poor maintenance or careless operation are not malfunctions.

*Natural gas* means a naturally occurring mixture of hydrocarbon and non-hydrocarbon gases found in geologic formations beneath the Earth's surface, of which the principal constituent is methane. Natural gas may be field or pipeline quality.

*Non-selective catalytic reduction (NSCR)* means an add-on catalytic nitrogen oxides ($NO_X$ ) control device for rich burn engines that, in a two-step reaction, promotes the conversion of excess oxygen, $NO_X$ , CO, and volatile organic compounds (VOC) into $CO_2$ , nitrogen, and water.

*Oil and gas production facility* as used in this subpart means any grouping of equipment where hydrocarbon liquids are processed, upgraded ( *i.e.,* remove impurities or other constituents to meet contract specifications), or stored prior to the point of custody transfer; or where natural gas is processed, upgraded, or stored prior to entering the natural gas transmission and storage source category. For purposes of a major source determination, facility (including a building, structure, or installation) means oil and natural gas production and processing equipment that is located within the boundaries of an individual surface site as defined in this section. Equipment that is part of a facility will typically be located within close proximity to other equipment located at the same facility. Pieces of production equipment or groupings of equipment located on different oil and gas leases, mineral fee tracts, lease tracts, subsurface or surface unit areas, surface fee tracts, surface lease tracts, or separate surface sites, whether or not connected by a road, waterway, power line or pipeline, shall not be considered part of the same facility. Examples of facilities in the oil and natural gas production source category include, but are not limited to, well sites, satellite tank batteries, central tank batteries, a compressor station that transports natural gas to a natural gas processing plant, and natural gas processing plants.

*Oxidation catalyst* means an add-on catalytic control device that controls CO and VOC by oxidation.

*Peaking unit or engine* means any standby engine intended for use during periods of high demand that are not emergencies.

*Percent load* means the fractional power of an engine compared to its maximum manufacturer's design capacity at engine site conditions. Percent load may range between 0 percent to above 100 percent.

*Potential to emit* means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the stationary source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable. For oil and natural gas production facilities subject to subpart HH of this part, the potential to emit provisions in § 63.760(a) may be used. For natural gas transmission and storage facilities subject to subpart HHH of this part, the maximum annual facility gas throughput for storage facilities may be determined according to § 63.1270(a)(1) and the maximum annual throughput for transmission facilities may be determined according to § 63.1270(a)(2).

*Production field facility* means those oil and gas production facilities located prior to the point of custody transfer.

*Production well* means any hole drilled in the earth from which crude oil, condensate, or field natural gas is extracted.

*Propane* means a colorless gas derived from petroleum and natural gas, with the molecular structure $C_3H_8$ .

*Remote stationary RICE* means stationary RICE meeting any of the following criteria:

(1) Stationary RICE located in an offshore area that is beyond the line of ordinary low water along that portion of the coast of the United States that is in direct contact with the open seas and beyond the line marking the seaward limit of inland waters.

(2) Stationary RICE located on a pipeline segment that meets both of the criteria in paragraphs (2)(i) and (ii) of this definition.

(i) A pipeline segment with 10 or fewer buildings intended for human occupancy and no buildings with four or more stories within 220 yards (200 meters) on either side of the centerline of any continuous 1-mile (1.6 kilometers) length of pipeline. Each separate dwelling unit in a multiple dwelling unit building is counted as a separate building intended for human occupancy.

(ii) The pipeline segment does not lie within 100 yards (91 meters) of either a building or a small, well-defined outside area (such as a playground, recreation area, outdoor theater, or other place of public assembly) that is occupied by 20 or more persons on at least 5 days a week for 10 weeks in any 12-month period. The days and weeks need not be consecutive. The building or area is considered occupied for a full day if it is occupied for any portion of the day.

(iii) For purposes of this paragraph (2), the term pipeline segment means all parts of those physical facilities through which gas moves in transportation, including but not limited to pipe, valves, and other appurtenance attached to pipe, compressor units, metering stations, regulator stations, delivery stations, holders, and fabricated assemblies. Stationary RICE located within 50 yards (46 meters) of the pipeline segment providing power for equipment on a pipeline segment are part of the pipeline segment. Transportation of gas means the gathering, transmission, or distribution of gas by pipeline, or the storage of gas. A building is intended for human occupancy if its primary use is for a purpose involving the presence of humans.

(3) Stationary RICE that are not located on gas pipelines and that have 5 or fewer buildings intended for human occupancy and no buildings with four or more stories within a 0.25 mile radius around the engine. A building is intended for human occupancy if its primary use is for a purpose involving the presence of humans.

*Residential emergency stationary RICE* means an emergency stationary RICE used in residential establishments such as homes or apartment buildings.

*Responsible official* means responsible official as defined in 40 CFR 70.2.

*Rich burn engine* means any four-stroke spark ignited engine where the manufacturer's recommended operating air/fuel ratio divided by the stoichiometric air/fuel ratio at full load conditions is less than or equal to 1.1. Engines originally manufactured as rich burn engines, but modified prior to December 19, 2002 with passive emission control technology for $NO_X$ (such as pre-combustion chambers) will be considered lean burn engines. Also, existing engines where there are no manufacturer's recommendations regarding air/fuel ratio will be considered a rich burn engine if the excess oxygen content of the exhaust at full load conditions is less than or equal to 2 percent.

*Site-rated HP* means the maximum manufacturer's design capacity at engine site conditions.

*Spark ignition* means relating to either: A gasoline-fueled engine; or any other type of engine with a spark plug (or other sparking device) and with operating characteristics significantly similar to the theoretical Otto combustion cycle. Spark ignition engines usually use a throttle to regulate intake air flow to control power during normal operation. Dual-fuel engines in which a liquid fuel (typically diesel fuel) is used for CI and gaseous fuel (typically natural gas) is used as the primary fuel at an annual average ratio of less than 2 parts diesel fuel to 100 parts total fuel on an energy equivalent basis are spark ignition engines.

*Stationary reciprocating internal combustion engine (RICE)* means any reciprocating internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile. Stationary RICE differ from mobile RICE in that a stationary RICE is not a non-road engine as defined at 40 CFR 1068.30, and is not used to propel a motor vehicle or a vehicle used solely for competition.

*Stationary RICE test cell/stand* means an engine test cell/stand, as defined in subpart PPPPP of this part, that tests stationary RICE.

*Stoichiometric* means the theoretical air-to-fuel ratio required for complete combustion.

*Storage vessel with the potential for flash emissions* means any storage vessel that contains a hydrocarbon liquid with a stock tank gas-to-oil ratio equal to or greater than 0.31 cubic meters per liter and an American Petroleum Institute gravity equal to or greater than 40 degrees and an actual annual average hydrocarbon liquid throughput equal to or greater than 79,500 liters per day. Flash emissions occur when dissolved hydrocarbons in the fluid evolve from solution when the fluid pressure is reduced.

*Subpart* means 40 CFR part 63, subpart ZZZZ.

*Surface site* means any combination of one or more graded pad sites, gravel pad sites, foundations, platforms, or the immediate physical location upon which equipment is physically affixed.

*Two-stroke engine* means a type of engine which completes the power cycle in single crankshaft revolution by combining the intake and compression operations into one stroke and the power and exhaust operations into a second stroke. This system requires auxiliary scavenging and inherently runs lean of stoichiometric.

[69 FR 33506, June 15, 2004, as amended at 71 FR 20467, Apr. 20, 2006; 73 FR 3607, Jan. 18, 2008; 75 FR 9679, Mar. 3, 2010; 75 FR 51592, Aug. 20, 2010; 76 FR 12867, Mar. 9, 2011; 78 FR 6706, Jan. 30, 2013]

## *Table 1 a to Subpart ZZZZ of Part 63—Emission Limitations for Existing, New, and Reconstructed Spark Ignition, 4SRB Stationary RICE > 500 HP Located at a Major Source of HAP Emissions*

As stated in §§ 63.6600 and 63.6640, you must comply with the following emission limitations at 100 percent load plus or minus 10 percent for existing, new and reconstructed 4SRB stationary RICE >500 HP located at a major source of HAP emissions:

| For each . . . | You must meet the following emission limitation, except during periods of startup . . . | During periods of startup you must . . . |
|---|---|---|
| 1. 4SRB | a. Reduce formaldehyde emissions by 76 percent or | Minimize the engine's time spent at idle and |

| | | |
|---|---|---|
| stationary RICE | more. If you commenced construction or reconstruction between December 19, 2002 and June 15, 2004, you may reduce formaldehyde emissions by 75 percent or more until June 15, 2007 or | minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply.[1] |
| | b. Limit the concentration of formaldehyde in the stationary RICE exhaust to 350 ppbvd or less at 15 percent $O_2$ | |

[1]Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.6(g) for alternative work practices.

[75 FR 9679, Mar. 3, 2010, as amended at 75 FR 51592, Aug. 20, 2010]

## *Table 1 b to Subpart ZZZZ of Part 63—Operating Limitations for Existing, New, and Reconstructed SI 4SRB Stationary RICE >500 HP Located at a Major Source of HAP Emissions*

As stated in §§ 63.6600, 63.6603, 63.6630 and 63.6640, you must comply with the following operating limitations for existing, new and reconstructed 4SRB stationary RICE >500 HP located at a major source of HAP emissions:

TABLE 1B TO SUBPART ZZZZ OF PART 63—OPERATING LIMITATIONS FOR EXISTING, NEW, AND RECONSTRUCTED SI 4SRB STATIONARY RICE >500 HP LOCATED AT A MAJOR SOURCE OF HAP EMISSIONS

| For each . . . | You must meet the following operating limitation, except during periods of startup . . . |
|---|---|
| 1. existing, new and reconstructed 4SRB stationary RICE >500 HP located at a major source of HAP emissions complying with the requirement to reduce formaldehyde emissions by 76 percent or more (or by 75 percent or more, if applicable) and using NSCR; or<br>existing, new and reconstructed 4SRB stationary RICE >500 HP located at a major source of HAP emissions complying with the requirement to limit the concentration of formaldehyde in the stationary RICE exhaust to 350 ppbvd or less at 15 percent $O_2$and using NSCR; | a. maintain your catalyst so that the pressure drop across the catalyst does not change by more than 2 inches of water at 100 percent load plus or minus 10 percent from the pressure drop across the catalyst measured during the initial performance test; and<br>b. maintain the temperature of your stationary RICE exhaust so that the catalyst inlet temperature is greater than or equal to 750 °F and less than or equal to 1250 °F.[1] |
| 2. existing, new and reconstructed 4SRB stationary RICE >500 HP located at a major source of HAP emissions complying with the requirement to reduce formaldehyde emissions by 76 percent or more (or by 75 percent or more, if applicable) and not using NSCR; or | Comply with any operating limitations approved by the Administrator. |
| existing, new and reconstructed 4SRB stationary RICE >500 HP located at a major source of HAP emissions complying with the requirement to limit the concentration of formaldehyde in the stationary RICE exhaust to 350 ppbvd or less at 15 percent $O_2$and not using NSCR. | |

[1] Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.8(f) for a different temperature range.

[78 FR 6706, Jan. 30, 2013]

## *Table 2 a to Subpart ZZZZ of Part 63—Emission Limitations for New and Reconstructed 2SLB and Compression Ignition Stationary RICE >500 HP and New and Reconstructed 4SLB Stationary RICE ≥250 HP Located at a Major Source of HAP Emissions*

As stated in §§ 63.6600 and 63.6640, you must comply with the following emission limitations for new and reconstructed lean burn and new and reconstructed compression ignition stationary RICE at 100 percent load plus or minus 10 percent:

| For each . . . | You must meet the following emission limitation, except during periods of startup . . . | During periods of startup you must . . . |
|---|---|---|
| 1. 2SLB stationary RICE | a. Reduce CO emissions by 58 percent or more; or<br>b. Limit concentration of formaldehyde in the stationary RICE exhaust to 12 ppmvd or less at 15 percent $O_2$. If you commenced construction or reconstruction between December 19, 2002 and June 15, 2004, you may limit concentration of formaldehyde to 17 ppmvd or less at 15 percent $O_2$until June 15, 2007 | Minimize the engine's time spent at idle and minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply.[1] |
| 2. 4SLB stationary RICE | a. Reduce CO emissions by 93 percent or more; or | |
| | b. Limit concentration of formaldehyde in the stationary RICE exhaust to 14 ppmvd or less at 15 percent $O_2$ | |
| 3. CI stationary RICE | a. Reduce CO emissions by 70 percent or more; or | |
| | b. Limit concentration of formaldehyde in the stationary RICE exhaust to 580 ppbvd or less at 15 percent $O_2$ | |

[1] Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.6(g) for alternative work practices.

[75 FR 9680, Mar. 3, 2010]

## *Table 2 b to Subpart ZZZZ of Part 63—Operating Limitations for New and Reconstructed 2SLB and CI Stationary RICE >500 HP Located at a Major Source of HAP Emissions, New and Reconstructed 4SLB Stationary RICE ≥250 HP Located at a Major Source of HAP Emissions, Existing CI Stationary RICE >500 HP*

As stated in §§ 63.6600, 63.6601, 63.6603, 63.6630, and 63.6640, you must comply with the following operating limitations for new and reconstructed 2SLB and CI stationary RICE >500 HP located at a major source of HAP emissions; new and reconstructed 4SLB stationary RICE ≥250 HP located at a major source of HAP emissions; and existing CI stationary RICE >500 HP:

TABLE 2B TO SUBPART ZZZZ OF PART 63—OPERATING LIMITATIONS FOR NEW AND RECONSTRUCTED 2SLB AND CI STATIONARY RICE >500 HP LOCATED AT A MAJOR SOURCE OF HAP EMISSIONS, NEW AND RECONSTRUCTED 4SLB STATIONARY RICE ≥250 HP LOCATED AT A MAJOR SOURCE OF HAP EMISSIONS, EXISTING CI STATIONARY RICE >500 HP

| For each . . . | You must meet the following operating limitation, except during periods of startup . . . |
|---|---|
| 1. New and reconstructed 2SLB and CI stationary RICE >500 HP located at a major source of HAP emissions and new and reconstructed 4SLB stationary RICE ≥250 HP located at a major source of HAP emissions complying with the requirement to reduce CO emissions and using an oxidation catalyst; and New and reconstructed 2SLB and CI stationary RICE >500 HP located at a major source of HAP emissions and new and reconstructed 4SLB stationary RICE ≥250 HP located at a major source of HAP emissions complying with the requirement to limit the concentration of formaldehyde in the stationary RICE exhaust and using an oxidation catalyst. | a. maintain your catalyst so that the pressure drop across the catalyst does not change by more than 2 inches of water at 100 percent load plus or minus 10 percent from the pressure drop across the catalyst that was measured during the initial performance test; and<br>b. maintain the temperature of your stationary RICE exhaust so that the catalyst inlet temperature is greater than or equal to 450 °F and less than or equal to 1350 °F.[1] |
| 2. Existing CI stationary RICE >500 HP complying with the requirement to limit or reduce the concentration of CO in the stationary RICE exhaust and using an oxidation catalyst | a. maintain your catalyst so that the pressure drop across the catalyst does not change by more than 2 inches of water from the pressure drop across the catalyst that was measured during the initial performance test; and |
| | b. maintain the temperature of your stationary RICE exhaust so that the catalyst inlet temperature is greater than or equal to 450 °F and less than or equal to 1350 °F.[1] |
| 3. New and reconstructed 2SLB and CI stationary RICE >500 HP located at a major source of HAP emissions and new and reconstructed 4SLB stationary RICE ≥250 HP located at a major source of HAP emissions complying with the requirement to reduce CO emissions and not using an oxidation catalyst; and | Comply with any operating limitations approved by the Administrator. |
| New and reconstructed 2SLB and CI stationary RICE >500 HP located at a major source of HAP emissions and new and reconstructed 4SLB stationary RICE ≥250 HP located at a major source of HAP emissions complying with the requirement to limit the concentration of formaldehyde in the stationary RICE exhaust and not using an oxidation catalyst; and | |
| existing CI stationary RICE >500 HP complying with the requirement to limit or reduce the concentration of CO in the stationary RICE exhaust and not using an oxidation catalyst. | |

[1] Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.8(f) for a different temperature range.

[78 FR 6707, Jan. 30, 2013]

## *Requirements for Existing Compression Ignition Stationary RICE Located at a Major Source of HAP Emissions and Existing Spark Ignition Stationary RICE*

## *≤500 HP Located at a Major Source of HAP Emissions*

As stated in §§ 63.6600, 63.6602, and 63.6640, you must comply with the following requirements for existing compression ignition stationary RICE located at a major source of HAP emissions and existing spark ignition stationary RICE ≤500 HP located at a major source of HAP emissions:

TABLE 2C TO SUBPART ZZZZ OF PART 63—REQUIREMENTS FOR EXISTING COMPRESSION IGNITION STATIONARY RICE LOCATED AT A MAJOR SOURCE OF HAP EMISSIONS AND EXISTING SPARK IGNITION STATIONARY RICE ≤500 HP LOCATED AT A MAJOR SOURCE OF HAP EMISSIONS

| For each . . . | You must meet the following requirement, except during periods of startup . . . | During periods of startup you must . . . |
|---|---|---|
| 1. Emergency stationary CI RICE and black start stationary CI RICE [1] | a. Change oil and filter every 500 hours of operation or annually, whichever comes first.[2]<br>b. Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first, and replace as necessary;<br>c. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary.[3] | Minimize the engine's time spent at idle and minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply.[3] |
| 2. Non-Emergency, non-black start stationary CI RICE <100 HP | a. Change oil and filter every 1,000 hours of operation or annually, whichever comes first.[2]<br>b. Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first, and replace as necessary;<br>c. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary.[3] | |
| 3. Non-Emergency, non-black start CI stationary RICE 100≤HP≤300 HP | Limit concentration of CO in the stationary RICE exhaust to 230 ppmvd or less at 15 percent $O_2$. | |
| 4. Non-Emergency, non-black start CI stationary RICE 300>HP≤500.” is corrected to read “4. Non-Emergency, non-black start CI stationary RICE 300<HP≤500. | a. Limit concentration of CO in the stationary RICE exhaust to 49 ppmvd or less at 15 percent $O_2$; or<br>b. Reduce CO emissions by 70 percent or more. | |

| | | |
|---|---|---|
| 5. Non-Emergency, non-black start stationary CI RICE >500 HP | a. Limit concentration of CO in the stationary RICE exhaust to 23 ppmvd or less at 15 percent $O_2$; or<br>b. Reduce CO emissions by 70 percent or more. | |
| 6. Emergency stationary SI RICE and black start stationary SI RICE.[1] | a. Change oil and filter every 500 hours of operation or annually, whichever comes first;[2]<br>b. Inspect spark plugs every 1,000 hours of operation or annually, whichever comes first, and replace as necessary;<br>c. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary.[3] | |
| 7. Non-Emergency, non-black start stationary SI RICE <100 HP that are not 2SLB stationary RICE | a. Change oil and filter every 1,440 hours of operation or annually, whichever comes first;[2]<br>b. Inspect spark plugs every 1,440 hours of operation or annually, whichever comes first, and replace as necessary; | |
| | c. Inspect all hoses and belts every 1,440 hours of operation or annually, whichever comes first, and replace as necessary.[3] | |
| 8. Non-Emergency, non-black start 2SLB stationary SI RICE <100 HP | a. Change oil and filter every 4,320 hours of operation or annually, whichever comes first;[2]<br>b. Inspect spark plugs every 4,320 hours of operation or annually, whichever comes first, and replace as necessary; | |
| | c. Inspect all hoses and belts every 4,320 hours of operation or annually, whichever comes first, and replace as necessary.[3] | |
| 9. Non-emergency, non-black start 2SLB stationary RICE 100≤HP≤500 | Limit concentration of CO in the stationary RICE exhaust to 225 ppmvd or less at 15 | |

| | | |
|---|---|---|
| | percent $O_2$. | |
| 10. Non-emergency, non-black start 4SLB stationary RICE 100≤HP≤500 | Limit concentration of CO in the stationary RICE exhaust to 47 ppmvd or less at 15 percent $O_2$. | |
| 11. Non-emergency, non-black start 4SRB stationary RICE 100≤HP≤500 | Limit concentration of formaldehyde in the stationary RICE exhaust to 10.3 ppmvd or less at 15 percent $O_2$. | |
| 12. Non-emergency, non-black start stationary RICE 100≤HP≤500 which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis | Limit concentration of CO in the stationary RICE exhaust to 177 ppmvd or less at 15 percent $O_2$. | |

[1] If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the work practice requirements on the schedule required in Table 2c of this subpart, or if performing the work practice on the required schedule would otherwise pose an unacceptable risk under federal, state, or local law, the work practice can be delayed until the emergency is over or the unacceptable risk under federal, state, or local law has abated. The work practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under federal, state, or local law has abated. Sources must report any failure to perform the work practice on the schedule required and the federal, state or local law under which the risk was deemed unacceptable.

[2] Sources have the option to utilize an oil analysis program as described in § 63.6625(i) or (j) in order to extend the specified oil change requirement in Table 2c of this subpart.

[3] Sources can petition the Administrator pursuant to the requirements of 40 CFR 63.6(g) for alternative work practices.

[78 FR 6708, Jan. 30, 2013, as amended at 78 FR 14457, Mar. 6, 2013]

## *Requirements for Existing Stationary RICE Located at Area Sources of HAP Emissions*

As stated in §§ 63.6603 and 63.6640, you must comply with the following requirements for existing stationary RICE located at area sources of HAP emissions:

TABLE 2D TO SUBPART ZZZZ OF PART 63—REQUIREMENTS FOR EXISTING STATIONARY RICE LOCATED AT AREA SOURCES OF HAP EMISSIONS

| For each . . . | You must meet the following requirement, except during periods of startup . . . | During periods of startup you must . . . |
|---|---|---|
| 1. Non-Emergency, non-black start CI | a. Change oil and filter | Minimize the engine's time spent at idle |

| | | |
|---|---|---|
| stationary RICE ≤300 HP | every 1,000 hours of operation or annually, whichever comes first;[1]<br>b. Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first, and replace as necessary;<br>c. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary. | and minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply. |
| 2. Non-Emergency, non-black start CI stationary RICE 300<HP≤500 | a. Limit concentration of CO in the stationary RICE exhaust to 49 ppmvd at 15 percent $O_2$; or | |
| | b. Reduce CO emissions by 70 percent or more. | |
| 3. Non-Emergency, non-black start CI stationary RICE >500 HP | a. Limit concentration of CO in the stationary RICE exhaust to 23 ppmvd at 15 percent $O_2$; or | |
| | b. Reduce CO emissions by 70 percent or more. | |
| 4. Emergency stationary CI RICE and black start stationary CI RICE.[2] | a. Change oil and filter every 500 hours of operation or annually, whichever comes first;[1] | |
| | b. Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first, and replace as necessary; and | |
| | c. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary. | |
| 5. Emergency stationary SI RICE; black start stationary SI RICE; non-emergency, non-black start 4SLB stationary RICE >500 HP that operate 24 hours or less per calendar year; non-emergency, non-black start 4SRB stationary RICE >500 HP that operate 24 hours or less per calendar year.[2] | a. Change oil and filter every 500 hours of operation or annually, whichever comes first;[1];<br>b. Inspect spark plugs every 1,000 hours of operation or annually, whichever comes first, and replace as necessary; and<br>c. Inspect all hoses and belts every 500 hours of | |

| | | |
|---|---|---|
| | operation or annually, whichever comes first, and replace as necessary. | |
| 6. Non-emergency, non-black start 2SLB stationary RICE | a. Change oil and filter every 4,320 hours of operation or annually, whichever comes first;[1] | |
| | b. Inspect spark plugs every 4,320 hours of operation or annually, whichever comes first, and replace as necessary; and | |
| | c. Inspect all hoses and belts every 4,320 hours of operation or annually, whichever comes first, and replace as necessary. | |
| 7. Non-emergency, non-black start 4SLB stationary RICE ≤500 HP | a. Change oil and filter every 1,440 hours of operation or annually, whichever comes first;[1] | |
| | b. Inspect spark plugs every 1,440 hours of operation or annually, whichever comes first, and replace as necessary; and | |
| | c. Inspect all hoses and belts every 1,440 hours of operation or annually, whichever comes first, and replace as necessary. | |
| 8. Non-emergency, non-black start 4SLB remote stationary RICE >500 HP | a. Change oil and filter every 2,160 hours of operation or annually, whichever comes first;[1] | |
| | b. Inspect spark plugs every 2,160 hours of operation or annually, whichever comes first, and replace as necessary; and | |
| | c. Inspect all hoses and belts every 2,160 hours of operation or annually, whichever comes first, and replace as necessary. | |
| 9. Non-emergency, non-black start 4SLB stationary RICE >500 HP that are not remote stationary RICE and that operate more than 24 hours per calendar year | Install an oxidation catalyst to reduce HAP emissions from the stationary RICE. | |

| | | |
|---|---|---|
| 10. Non-emergency, non-black start 4SRB stationary RICE ≤500 HP | a. Change oil and filter every 1,440 hours of operation or annually, whichever comes first;[1] | |
| | b. Inspect spark plugs every 1,440 hours of operation or annually, whichever comes first, and replace as necessary; and | |
| | c. Inspect all hoses and belts every 1,440 hours of operation or annually, whichever comes first, and replace as necessary. | |
| 11. Non-emergency, non-black start 4SRB remote stationary RICE >500 HP | a. Change oil and filter every 2,160 hours of operation or annually, whichever comes first;[1] | |
| | b. Inspect spark plugs every 2,160 hours of operation or annually, whichever comes first, and replace as necessary; and | |
| | c. Inspect all hoses and belts every 2,160 hours of operation or annually, whichever comes first, and replace as necessary. | |
| 12. Non-emergency, non-black start 4SRB stationary RICE >500 HP that are not remote stationary RICE and that operate more than 24 hours per calendar year | Install NSCR to reduce HAP emissions from the stationary RICE. | |
| 13. Non-emergency, non-black start stationary RICE which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis | a. Change oil and filter every 1,440 hours of operation or annually, whichever comes first;[1]<br>b. Inspect spark plugs every 1,440 hours of operation or annually, whichever comes first, and replace as necessary; and | |
| | c. Inspect all hoses and belts every 1,440 hours of operation or annually, whichever comes first, and replace as necessary. | |

[1] Sources have the option to utilize an oil analysis program as described in § 63.6625(i) or (j) in order to extend the specified oil change requirement in Table 2d of this subpart.

[2] If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the management practice requirements on the schedule required in Table 2d of this subpart, or if performing the management practice on the required schedule would otherwise pose an unacceptable risk under federal, state, or local law, the management practice can be delayed until the emergency is over or the unacceptable risk under federal, state, or local law has abated. The management practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under federal, state, or local law has abated. Sources must report any failure to perform the management practice on the schedule required and the federal, state or local law under which the risk was deemed unacceptable.

[78 FR 6709, Jan. 30, 2013]

## *Subsequent Performance Tests*

As stated in §§ 63.6615 and 63.6620, you must comply with the following subsequent performance test requirements:

TABLE 3 TO SUBPART ZZZZ OF PART 63—SUBSEQUENT PERFORMANCE TESTS

| For each . . . | Complying with the requirement to . . . | You must . . . |
|---|---|---|
| 1. New or reconstructed 2SLB stationary RICE >500 HP located at major sources; new or reconstructed 4SLB stationary RICE ≥250 HP located at major sources; and new or reconstructed CI stationary RICE >500 HP located at major sources | Reduce CO emissions and not using a CEMS | Conduct subsequent performance tests semiannually.[1] |
| 2. 4SRB stationary RICE ≥5,000 HP located at major sources | Reduce formaldehyde emissions | Conduct subsequent performance tests semiannually.[1] |
| 3. Stationary RICE >500 HP located at major sources and new or reconstructed 4SLB stationary RICE 250≤HP≤500 located at major sources | Limit the concentration of formaldehyde in the stationary RICE exhaust | Conduct subsequent performance tests semiannually.[1] |
| 4. Existing non-emergency, non-black start CI stationary RICE >500 HP that are not limited use stationary RICE | Limit or reduce CO emissions and not using a CEMS | Conduct subsequent performance tests every 8,760 hours or 3 years, whichever comes first. |
| 5. Existing non-emergency, non-black start CI stationary RICE >500 HP that are limited use stationary RICE | Limit or reduce CO emissions and not using a CEMS | Conduct subsequent performance tests every 8,760 hours or 5 years, whichever comes first. |

[1] After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.

[78 FR 6711, Jan. 30, 2013]

## *Table 4 to Subpart ZZZZ of Part 63—Requirements for Performance Tests*

As stated in §§ 63.6610, 63.6611, 63.6612, 63.6620, and 63.6640, you must comply with the following requirements for performance tests for stationary RICE:

TABLE 4 TO SUBPART ZZZZ OF PART 63. REQUIREMENTS FOR PERFORMANCE TESTS

| For each . . . | Complying with the requirement to . . . | You must . . . | Using . . . | According to the following requirements . . . |
|---|---|---|---|---|
| 1. 2SLB, 4SLB, and CI stationary RICE | a. reduce CO emissions | i. Measure the $O_2$at the inlet and outlet of the control device; and | (1) Method 3 or 3A or 3B of 40 CFR part 60, appendix A, or ASTM Method D6522-00 (Reapproved 2005).[a c] | (a) Measurements to determine $O_2$must be made at the same time as the measurements for CO concentration. |
| | | ii. Measure the CO at the inlet and the outlet of the control device | (1) ASTM D6522-00 (Reapproved 2005) [a b c]or Method 10 of 40 CFR part 60, appendix A | (a) The CO concentration must be at 15 percent $O_2$, dry basis. |
| 2. 4SRB stationary RICE | a. reduce formaldehyde emissions | i. Select the sampling port location and the number of traverse points; and | (1) Method 1 or 1A of 40 CFR part 60, appendix A § 63.7(d)(1)(i) | (a) sampling sites must be located at the inlet and outlet of the control device. |
| | | ii. Measure $O_2$at the inlet and outlet of the control device; and | (1) Method 3 or 3A or 3B of 40 CFR part 60, appendix A, or ASTM Method D6522-00 (Reapproved 2005).[a] | (a) measurements to determine $O_2$concentration must be made at the same time as the measurements for formaldehyde or THC concentration. |
| | | iii. Measure moisture content at the inlet and outlet of the control device; and | (1) Method 4 of 40 CFR part 60, appendix A, or Test Method 320 of 40 CFR part 63, appendix A, or ASTM D 6348-03.[a] | (a) measurements to determine moisture content must be made at the same time and location as the measurements for formaldehyde or THC concentration. |
| | | iv. If demonstrating compliance with the formaldehyde percent reduction requirement, measure formaldehyde at the inlet and the outlet of the control device | (1) Method 320 or 323 of 40 CFR part 63, appendix A; or ASTM D6348-03,[a]provided in ASTM D6348-03 Annex A5 (Analyte Spiking Technique), the percent R must be greater than or equal to 70 and less than or equal to 130 | (a) formaldehyde concentration must be at 15 percent $O_2$, dry basis. Results of this test consist of the average of the three 1-hour or longer runs. |
| | | v. If demonstrating compliance with the THC percent reduction | (1) Method 25A, reported as propane, of 40 CFR part 60, appendix A | (a) THC concentration must be at 15 percent $O_2$, dry basis. Results of this |

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| | | requirement, measure THC at the inlet and the outlet of the control device | | test consist of the average of the three 1-hour or longer runs. |
| 3. Stationary RICE | a. limit the concentration of formaldehyde or CO in the stationary RICE exhaust | i. Select the sampling port location and the number of traverse points; and | (1) Method 1 or 1A of 40 CFR part 60, appendix A § 63.7(d)(1)(i) | (a) if using a control device, the sampling site must be located at the outlet of the control device. |
| | | ii. Determine the $O_2$concentration of the stationary RICE exhaust at the sampling port location; and | (1) Method 3 or 3A or 3B of 40 CFR part 60, appendix A, or ASTM Method D6522-00 (Reapproved 2005).[a] | (a) measurements to determine $O_2$concentration must be made at the same time and location as the measurements for formaldehyde or CO concentration. |
| | | iii. Measure moisture content of the stationary RICE exhaust at the sampling port location; and | (1) Method 4 of 40 CFR part 60, appendix A, or Test Method 320 of 40 CFR part 63, appendix A, or ASTM D 6348-03.[a] | (a) measurements to determine moisture content must be made at the same time and location as the measurements for formaldehyde or CO concentration. |
| | | iv. Measure formaldehyde at the exhaust of the stationary RICE; or | (1) Method 320 or 323 of 40 CFR part 63, appendix A; or ASTM D6348-03,[a]provided in ASTM D6348-03 Annex A5 (Analyte Spiking Technique), the percent R must be greater than or equal to 70 and less than or equal to 130 | (a) Formaldehyde concentration must be at 15 percent $O_2$, dry basis. Results of this test consist of the average of the three 1-hour or longer runs. |
| | | v. measure CO at the exhaust of the stationary RICE. | (1) Method 10 of 40 CFR part 60, appendix A, ASTM Method D6522-00 (2005),[a] [c]Method 320 of 40 CFR part 63, appendix A, or ASTM D6348-03.[a] | (a) CO concentration must be at 15 percent $O_2$, dry basis. Results of this test consist of the average of the three 1-hour or longer runs. |

[a] Incorporated by reference, see 40 CFR 63.14. You may also obtain copies from University Microfilms International, 300 North Zeeb Road, Ann Arbor, MI 48106.

[b] You may also use Method 320 of 40 CFR part 63, appendix A, or ASTM D6348-03.

[c] ASTM-D6522-00 (2005) may be used to test both CI and SI stationary RICE.

[78 FR 6711, Jan. 30, 2013]

## *Table 5 to Subpart ZZZZ of Part 63—Initial Compliance With Emission Limitations, Operating Limitations, and Other Requirements*

As stated in §§ 63.6612, 63.6625 and 63.6630, you must initially comply with the emission and operating limitations as required by the following:

TABLE 5 TO SUBPART ZZZZ OF PART 63—INITIAL COMPLIANCE WITH EMISSION LIMITATIONS, OPERATING LIMITATIONS, AND OTHER REQUIREMENTS

| For each . . . | Complying with the requirement to . . . | You have demonstrated initial compliance if . . . |
|---|---|---|
| 1. New or reconstructed non-emergency 2SLB stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 HP located at a major source of HAP, non-emergency stationary CI RICE >500 HP located at a major source of HAP, and existing non-emergency stationary CI RICE >500 HP located at an area source of HAP | a. Reduce CO emissions and using oxidation catalyst, and using a CPMS | i. The average reduction of emissions of CO determined from the initial performance test achieves the required CO percent reduction; and<br>ii. You have installed a CPMS to continuously monitor catalyst inlet temperature according to the requirements in § 63.6625(b); and<br>iii. You have recorded the catalyst pressure drop and catalyst inlet temperature during the initial performance test. |
| 2. Non-emergency stationary CI RICE >500 HP located at a major source of HAP, and existing non-emergency stationary CI RICE >500 HP located at an area source of HAP | a. Limit the concentration of CO, using oxidation catalyst, and using a CPMS | i. The average CO concentration determined from the initial performance test is less than or equal to the CO emission limitation; and |
| | | ii. You have installed a CPMS to continuously monitor catalyst inlet temperature according to the requirements in § 63.6625(b); and |
| | | iii. You have recorded the catalyst pressure drop and catalyst inlet temperature during the initial performance test. |
| 3. New or reconstructed non-emergency 2SLB stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 HP located at a major source of HAP, non-emergency stationary CI RICE >500 HP located at a major source of HAP, and existing non-emergency stationary CI RICE >500 HP located at an area source of HAP | a. Reduce CO emissions and not using oxidation catalyst | i. The average reduction of emissions of CO determined from the initial performance test achieves the required CO percent reduction; and<br>ii. You have installed a CPMS to continuously monitor operating parameters approved by the Administrator (if any) according to the requirements in § 63.6625(b); and<br>iii. You have recorded the approved operating parameters (if any) during the initial performance test. |
| 4. Non-emergency stationary CI RICE >500 HP located at a major source of HAP, and existing non-emergency stationary CI RICE >500 HP located at an area source of HAP | a. Limit the concentration of CO, and not using oxidation catalyst | i. The average CO concentration determined from the initial performance test is less than or equal to the CO emission limitation; and |

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| | | ii. You have installed a CPMS to continuously monitor operating parameters approved by the Administrator (if any) according to the requirements in § 63.6625(b); and |
| | | iii. You have recorded the approved operating parameters (if any) during the initial performance test. |
| 5. New or reconstructed non-emergency 2SLB stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 HP located at a major source of HAP, non-emergency stationary CI RICE >500 HP located at a major source of HAP, and existing non-emergency stationary CI RICE >500 HP located at an area source of HAP | a. Reduce CO emissions, and using a CEMS | i. You have installed a CEMS to continuously monitor CO and either $O_2$or $CO_2$at both the inlet and outlet of the oxidation catalyst according to the requirements in § 63.6625(a); and<br>ii. You have conducted a performance evaluation of your CEMS using PS 3 and 4A of 40 CFR part 60, appendix B; and |
| | | iii. The average reduction of CO calculated using § 63.6620 equals or exceeds the required percent reduction. The initial test comprises the first 4-hour period after successful validation of the CEMS. Compliance is based on the average percent reduction achieved during the 4-hour period. |
| 6. Non-emergency stationary CI RICE >500 HP located at a major source of HAP, and existing non-emergency stationary CI RICE >500 HP located at an area source of HAP | a. Limit the concentration of CO, and using a CEMS | i. You have installed a CEMS to continuously monitor CO and either $O_2$or $CO_2$at the outlet of the oxidation catalyst according to the requirements in § 63.6625(a); and |
| | | ii. You have conducted a performance evaluation of your CEMS using PS 3 and 4A of 40 CFR part 60, appendix B; and |
| | | iii. The average concentration of CO calculated using § 63.6620 is less than or equal to the CO emission limitation. The initial test comprises the first 4-hour period after successful validation of the CEMS. Compliance is based on the average concentration measured during the 4-hour period. |
| 7. Non-emergency 4SRB stationary RICE >500 HP located at a major source of HAP | a. Reduce formaldehyde emissions and using NSCR | i. The average reduction of emissions of formaldehyde determined from the initial performance test is equal to or greater than the required formaldehyde percent reduction, or the average reduction of emissions of THC determined from the initial performance test is equal to or greater than 30 percent; and |
| | | ii. You have installed a CPMS to |

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| | | continuously monitor catalyst inlet temperature according to the requirements in § 63.6625(b); and |
| | | iii. You have recorded the catalyst pressure drop and catalyst inlet temperature during the initial performance test. |
| 8. Non-emergency 4SRB stationary RICE >500 HP located at a major source of HAP | a. Reduce formaldehyde emissions and not using NSCR | i. The average reduction of emissions of formaldehyde determined from the initial performance test is equal to or greater than the required formaldehyde percent reduction or the average reduction of emissions of THC determined from the initial performance test is equal to or greater than 30 percent; and |
| | | ii. You have installed a CPMS to continuously monitor operating parameters approved by the Administrator (if any) according to the requirements in § 63.6625(b); and |
| | | iii. You have recorded the approved operating parameters (if any) during the initial performance test. |
| 9. New or reconstructed non-emergency stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE 250≤HP≤500 located at a major source of HAP, and existing non-emergency 4SRB stationary RICE >500 HP located at a major source of HAP | a. Limit the concentration of formaldehyde in the stationary RICE exhaust and using oxidation catalyst or NSCR | i. The average formaldehyde concentration, corrected to 15 percent $O_2$, dry basis, from the three test runs is less than or equal to the formaldehyde emission limitation; and<br>ii. You have installed a CPMS to continuously monitor catalyst inlet temperature according to the requirements in § 63.6625(b); and |
| | | iii. You have recorded the catalyst pressure drop and catalyst inlet temperature during the initial performance test. |
| 10. New or reconstructed non-emergency stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE 250≤HP≤500 located at a major source of HAP, and existing non-emergency 4SRB stationary RICE >500 HP located at a major source of HAP | a. Limit the concentration of formaldehyde in the stationary RICE exhaust and not using oxidation catalyst or NSCR | i. The average formaldehyde concentration, corrected to 15 percent $O_2$, dry basis, from the three test runs is less than or equal to the formaldehyde emission limitation; and<br>ii. You have installed a CPMS to continuously monitor operating parameters approved by the Administrator (if any) according to the requirements in § 63.6625(b); and |
| | | iii. You have recorded the approved operating parameters (if any) during the initial performance test. |
| 11. Existing non-emergency stationary RICE 100≤HP≤500 located at a major source of HAP, | a. Reduce CO emissions | i. The average reduction of emissions of CO or formaldehyde, as applicable |

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| and existing non-emergency stationary CI RICE 300<HP≤500 located at an area source of HAP | | determined from the initial performance test is equal to or greater than the required CO or formaldehyde, as applicable, percent reduction. |
| 12. Existing non-emergency stationary RICE 100≤HP≤500 located at a major source of HAP, and existing non-emergency stationary CI RICE 300<HP≤500 located at an area source of HAP | a. Limit the concentration of formaldehyde or CO in the stationary RICE exhaust | i. The average formaldehyde or CO concentration, as applicable, corrected to 15 percent $O_2$, dry basis, from the three test runs is less than or equal to the formaldehyde or CO emission limitation, as applicable. |
| 13. Existing non-emergency 4SLB stationary RICE >500 HP located at an area source of HAP that are not remote stationary RICE and that are operated more than 24 hours per calendar year | a. Install an oxidation catalyst | i. You have conducted an initial compliance demonstration as specified in § 63.6630(e) to show that the average reduction of emissions of CO is 93 percent or more, or the average CO concentration is less than or equal to 47 ppmvd at 15 percent $O_2$; |
| | | ii. You have installed a CPMS to continuously monitor catalyst inlet temperature according to the requirements in § 63.6625(b), or you have installed equipment to automatically shut down the engine if the catalyst inlet temperature exceeds 1350 °F. |
| 14. Existing non-emergency 4SRB stationary RICE >500 HP located at an area source of HAP that are not remote stationary RICE and that are operated more than 24 hours per calendar year | a. Install NSCR | i. You have conducted an initial compliance demonstration as specified in § 63.6630(e) to show that the average reduction of emissions of CO is 75 percent or more, the average CO concentration is less than or equal to 270 ppmvd at 15 percent $O_2$, or the average reduction of emissions of THC is 30 percent or more; |
| | | ii. You have installed a CPMS to continuously monitor catalyst inlet temperature according to the requirements in § 63.6625(b), or you have installed equipment to automatically shut down the engine if the catalyst inlet temperature exceeds 1250 °F. |

[78 FR 6712, Jan. 30, 2013]

## *Table 6 to Subpart ZZZZ of Part 63—Continuous Compliance With Emission Limitations, and Other Requirements*

As stated in § 63.6640, you must continuously comply with the emissions and operating limitations and work or management practices as required by the following:

TABLE 6 TO SUBPART ZZZZ OF PART 63—CONTINUOUS COMPLIANCE WITH EMISSION LIMITATIONS, AND OTHER REQUIREMENTS

| For each . . . | Complying with the requirement to . . . | You must demonstrate continuous compliance by . . . |
|---|---|---|
| 1. New or reconstructed non-emergency 2SLB stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 HP located at a major source of HAP, and new or reconstructed non-emergency CI stationary RICE >500 HP located at a major source of HAP | a. Reduce CO emissions and using an oxidation catalyst, and using a CPMS | i. Conducting semiannual performance tests for CO to demonstrate that the required CO percent reduction is achieved [a]; and<br>ii. Collecting the catalyst inlet temperature data according to § 63.6625(b); and<br>iii. Reducing these data to 4-hour rolling averages; and |
| | | iv. Maintaining the 4-hour rolling averages within the operating limitations for the catalyst inlet temperature; and |
| | | v. Measuring the pressure drop across the catalyst once per month and demonstrating that the pressure drop across the catalyst is within the operating limitation established during the performance test. |
| 2. New or reconstructed non-emergency 2SLB stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 HP located at a major source of HAP, and new or reconstructed non-emergency CI stationary RICE >500 HP located at a major source of HAP | a. Reduce CO emissions and not using an oxidation catalyst, and using a CPMS | i. Conducting semiannual performance tests for CO to demonstrate that the required CO percent reduction is achieved [a]; and<br>ii. Collecting the approved operating parameter (if any) data according to § 63.6625(b); and<br>iii. Reducing these data to 4-hour rolling averages; and |
| | | iv. Maintaining the 4-hour rolling averages within the operating limitations for the operating parameters established during the performance test. |
| 3. New or reconstructed non-emergency 2SLB stationary RICE >500 HP located at a major source of HAP, new or reconstructed non-emergency 4SLB stationary RICE ≥250 HP located at a major source of HAP, new or reconstructed non-emergency stationary CI RICE >500 HP located at a major source of HAP, and existing non-emergency stationary CI RICE >500 HP | a. Reduce CO emissions or limit the concentration of CO in the stationary RICE exhaust, and using a CEMS | i. Collecting the monitoring data according to § 63.6625(a), reducing the measurements to 1-hour averages, calculating the percent reduction or concentration of CO emissions according to § 63.6620; and<br>ii. Demonstrating that the catalyst achieves the required percent reduction of CO emissions over the 4-hour averaging period, or that the emission remain at or below the CO concentration limit; and |
| | | iii. Conducting an annual RATA of your CEMS using PS 3 and 4A of 40 CFR part 60, appendix B, as well as daily and periodic data quality checks in accordance with 40 CFR part 60, appendix F, procedure 1. |
| 4. Non-emergency 4SRB stationary RICE >500 HP located at a major source of HAP | a. Reduce formaldehyde | i. Collecting the catalyst inlet temperature data according to § 63.6625(b); and |

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| | emissions and using NSCR | |
| | | ii. Reducing these data to 4-hour rolling averages; and |
| | | iii. Maintaining the 4-hour rolling averages within the operating limitations for the catalyst inlet temperature; and |
| | | iv. Measuring the pressure drop across the catalyst once per month and demonstrating that the pressure drop across the catalyst is within the operating limitation established during the performance test. |
| 5. Non-emergency 4SRB stationary RICE >500 HP located at a major source of HAP | a. Reduce formaldehyde emissions and not using NSCR | i. Collecting the approved operating parameter (if any) data according to § 63.6625(b); and |
| | | ii. Reducing these data to 4-hour rolling averages; and |
| | | iii. Maintaining the 4-hour rolling averages within the operating limitations for the operating parameters established during the performance test. |
| 6. Non-emergency 4SRB stationary RICE with a brake HP ≥5,000 located at a major source of HAP | a. Reduce formaldehyde emissions | Conducting semiannual performance tests for formaldehyde to demonstrate that the required formaldehyde percent reduction is achieved, or to demonstrate that the average reduction of emissions of THC determined from the performance test is equal to or greater than 30 percent.[a] |
| 7. New or reconstructed non-emergency stationary RICE >500 HP located at a major source of HAP and new or reconstructed non-emergency 4SLB stationary RICE 250≤HP≤500 located at a major source of HAP | a. Limit the concentration of formaldehyde in the stationary RICE exhaust and using oxidation catalyst or NSCR | i. Conducting semiannual performance tests for formaldehyde to demonstrate that your emissions remain at or below the formaldehyde concentration limit [a]; and<br>ii. Collecting the catalyst inlet temperature data according to § 63.6625(b); and |
| | | iii. Reducing these data to 4-hour rolling averages; and |
| | | iv. Maintaining the 4-hour rolling averages within the operating limitations for the catalyst inlet temperature; and |
| | | v. Measuring the pressure drop across the catalyst once per month and demonstrating that the pressure drop across the catalyst is within the operating limitation established during the performance test. |
| 8. New or reconstructed non-emergency | a. Limit the | i. Conducting semiannual performance |

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| stationary RICE >500 HP located at a major source of HAP and new or reconstructed non-emergency 4SLB stationary RICE 250≤HP≤500 located at a major source of HAP | concentration of formaldehyde in the stationary RICE exhaust and not using oxidation catalyst or NSCR | tests for formaldehyde to demonstrate that your emissions remain at or below the formaldehyde concentration limit [a]; and<br>ii. Collecting the approved operating parameter (if any) data according to § 63.6625(b); and |
| | | iii. Reducing these data to 4-hour rolling averages; and |
| | | iv. Maintaining the 4-hour rolling averages within the operating limitations for the operating parameters established during the performance test. |
| 9. Existing emergency and black start stationary RICE ≤500 HP located at a major source of HAP, existing non-emergency stationary RICE <100 HP located at a major source of HAP, existing emergency and black start stationary RICE located at an area source of HAP, existing non-emergency stationary CI RICE ≤300 HP located at an area source of HAP, existing non-emergency 2SLB stationary RICE located at an area source of HAP, existing non-emergency stationary SI RICE located at an area source of HAP which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, existing non-emergency 4SLB and 4SRB stationary RICE ≤500 HP located at an area source of HAP, existing non-emergency 4SLB and 4SRB stationary RICE >500 HP located at an area source of HAP that operate 24 hours or less per calendar year, and existing non-emergency 4SLB and 4SRB stationary RICE >500 HP located at an area source of HAP that are remote stationary RICE | a. Work or Management practices | i. Operating and maintaining the stationary RICE according to the manufacturer's emission-related operation and maintenance instructions; or<br>ii. Develop and follow your own maintenance plan which must provide to the extent practicable for the maintenance and operation of the engine in a manner consistent with good air pollution control practice for minimizing emissions. |
| 10. Existing stationary CI RICE >500 HP that are not limited use stationary RICE | a. Reduce CO emissions, or limit the concentration of CO in the stationary RICE exhaust, and using oxidation catalyst | i. Conducting performance tests every 8,760 hours or 3 years, whichever comes first, for CO or formaldehyde, as appropriate, to demonstrate that the required CO or formaldehyde, as appropriate, percent reduction is achieved or that your emissions remain at or below the CO or formaldehyde concentration limit; and |
| | | ii. Collecting the catalyst inlet temperature data according to § 63.6625(b); and |
| | | iii. Reducing these data to 4-hour rolling averages; and |
| | | iv. Maintaining the 4-hour rolling averages within the operating limitations for the catalyst inlet temperature; and |

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|---|---|---|
| | | v. Measuring the pressure drop across the catalyst once per month and demonstrating that the pressure drop across the catalyst is within the operating limitation established during the performance test. |
| 11. Existing stationary CI RICE >500 HP that are not limited use stationary RICE | a. Reduce CO emissions, or limit the concentration of CO in the stationary RICE exhaust, and not using oxidation catalyst | i. Conducting performance tests every 8,760 hours or 3 years, whichever comes first, for CO or formaldehyde, as appropriate, to demonstrate that the required CO or formaldehyde, as appropriate, percent reduction is achieved or that your emissions remain at or below the CO or formaldehyde concentration limit; and |
| | | ii. Collecting the approved operating parameter (if any) data according to § 63.6625(b); and |
| | | iii. Reducing these data to 4-hour rolling averages; and |
| | | iv. Maintaining the 4-hour rolling averages within the operating limitations for the operating parameters established during the performance test. |
| 12. Existing limited use CI stationary RICE >500 HP | a. Reduce CO emissions or limit the concentration of CO in the stationary RICE exhaust, and using an oxidation catalyst | i. Conducting performance tests every 8,760 hours or 5 years, whichever comes first, for CO or formaldehyde, as appropriate, to demonstrate that the required CO or formaldehyde, as appropriate, percent reduction is achieved or that your emissions remain at or below the CO or formaldehyde concentration limit; and |
| | | ii. Collecting the catalyst inlet temperature data according to § 63.6625(b); and |
| | | iii. Reducing these data to 4-hour rolling averages; and |
| | | iv. Maintaining the 4-hour rolling averages within the operating limitations for the catalyst inlet temperature; and |
| | | v. Measuring the pressure drop across the catalyst once per month and demonstrating that the pressure drop across the catalyst is within the operating limitation established during the performance test. |
| 13. Existing limited use CI stationary RICE >500 HP | a. Reduce CO emissions or limit the concentration of CO in the stationary RICE exhaust, and not using | i. Conducting performance tests every 8,760 hours or 5 years, whichever comes first, for CO or formaldehyde, as appropriate, to demonstrate that the required CO or formaldehyde, as |

| | | |
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| | an oxidation catalyst | appropriate, percent reduction is achieved or that your emissions remain at or below the CO or formaldehyde concentration limit; and |
| | | ii. Collecting the approved operating parameter (if any) data according to § 63.6625(b); and |
| | | iii. Reducing these data to 4-hour rolling averages; and |
| | | iv. Maintaining the 4-hour rolling averages within the operating limitations for the operating parameters established during the performance test. |
| 14. Existing non-emergency 4SLB stationary RICE >500 HP located at an area source of HAP that are not remote stationary RICE and that are operated more than 24 hours per calendar year | a. Install an oxidation catalyst | i. Conducting annual compliance demonstrations as specified in § 63.6640(c) to show that the average reduction of emissions of CO is 93 percent or more, or the average CO concentration is less than or equal to 47 ppmvd at 15 percent $O_2$; and either<br>ii. Collecting the catalyst inlet temperature data according to § 63.6625(b), reducing these data to 4-hour rolling averages; and maintaining the 4-hour rolling averages within the limitation of greater than 450 °F and less than or equal to 1350 °F for the catalyst inlet temperature; or<br>iii. Immediately shutting down the engine if the catalyst inlet temperature exceeds 1350 °F. |
| 15. Existing non-emergency 4SRB stationary RICE >500 HP located at an area source of HAP that are not remote stationary RICE and that are operated more than 24 hours per calendar year | a. Install NSCR | i. Conducting annual compliance demonstrations as specified in § 63.6640(c) to show that the average reduction of emissions of CO is 75 percent or more, the average CO concentration is less than or equal to 270 ppmvd at 15 percent $O_2$, or the average reduction of emissions of THC is 30 percent or more; and either<br>ii. Collecting the catalyst inlet temperature data according to § 63.6625(b), reducing these data to 4-hour rolling averages; and maintaining the 4-hour rolling averages within the limitation of greater than or equal to 750 °F and less than or equal to 1250 °F for the catalyst inlet temperature; or<br>iii. Immediately shutting down the engine if the catalyst inlet temperature exceeds 1250 °F. |

[a] After you have demonstrated compliance for two consecutive tests, you may reduce the frequency of subsequent performance tests to annually. If the results of any subsequent annual performance test indicate the stationary RICE is not in compliance with the CO or formaldehyde emission limitation, or you deviate from any of your operating limitations, you must resume semiannual performance tests.

[78 FR 6715, Jan. 30, 2013]

## *Table 7 to Subpart ZZZZ of Part 63—Requirements for Reports*

As stated in § 63.6650, you must comply with the following requirements for reports:

TABLE 7 TO SUBPART ZZZZ OF PART 63—REQUIREMENTS FOR REPORTS

| For each . . . | You must submit a . . . | The report must contain . . . | You must submit the report . . . |
|---|---|---|---|
| 1. Existing non-emergency, non-black start stationary RICE 100≤HP≤500 located at a major source of HAP; existing non-emergency, non-black start stationary CI RICE >500 HP located at a major source of HAP; existing non-emergency 4SRB stationary RICE >500 HP located at a major source of HAP; existing non-emergency, non-black start stationary CI RICE >300 HP located at an area source of HAP; new or reconstructed non-emergency stationary RICE >500 HP located at a major source of HAP; and new or reconstructed non-emergency 4SLB stationary RICE 250≤HP≤500 located at a major source of HAP | Compliance report | a. If there are no deviations from any emission limitations or operating limitations that apply to you, a statement that there were no deviations from the emission limitations or operating limitations during the reporting period. If there were no periods during which the CMS, including CEMS and CPMS, was out-of-control, as specified in § 63.8(c)(7), a statement that there were not periods during which the CMS was out-of-control during the reporting period; or | i. Semiannually according to the requirements in § 63.6650(b)(1)-(5) for engines that are not limited use stationary RICE subject to numerical emission limitations; and<br>ii. Annually according to the requirements in § 63.6650(b)(6)-(9) for engines that are limited use stationary RICE subject to numerical emission limitations. |
| | | b. If you had a deviation from any emission limitation or operating limitation during the reporting period, the information in § 63.6650(d). If there were periods during which the CMS, including CEMS and CPMS, was out-of-control, as specified in § 63.8(c)(7), the information in § 63.6650(e); or | i. Semiannually according to the requirements in § 63.6650(b). |
| | | c. If you had a malfunction during the reporting period, the information in § 63.6650(c)(4). | i. Semiannually according to the requirements in § 63.6650(b). |
| 2. New or reconstructed non-emergency stationary RICE that combusts landfill gas or digester gas equivalent to 10 percent or more of the | Report | a. The fuel flow rate of each fuel and the heating values that were used in your calculations, and you must demonstrate that the percentage of | i. Annually, according to the requirements in § 63.6650. |

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| gross heat input on an annual basis | | heat input provided by landfill gas or digester gas, is equivalent to 10 percent or more of the gross heat input on an annual basis; and | |
| | | b. The operating limits provided in your federally enforceable permit, and any deviations from these limits; and | i. See item 2.a.i. |
| | | c. Any problems or errors suspected with the meters. | i. See item 2.a.i. |
| 3. Existing non-emergency, non-black start 4SLB and 4SRB stationary RICE >500 HP located at an area source of HAP that are not remote stationary RICE and that operate more than 24 hours per calendar year | Compliance report | a. The results of the annual compliance demonstration, if conducted during the reporting period. | i. Semiannually according to the requirements in § 63.6650(b)(1)-(5). |
| 4. Emergency stationary RICE that operate or are contractually obligated to be available for more than 15 hours per year for the purposes specified in § 63.6640(f)(2)(ii) and (iii) or that operate for the purposes specified in § 63.6640(f)(4)( ii) | Report | a. The information in § 63.6650(h)(1) | i. annually according to the requirements in § 63.6650(h)(2)-(3). |

[78 FR 6719, Jan. 30, 2013]

## *Table 8 to Subpart ZZZZ of Part 63—Applicability of General Provisions to Subpart ZZZZ.*

As stated in § 63.6665, you must comply with the following applicable general provisions.

| General provisions citation | Subject of citation | Applies to subpart | Explanation |
|---|---|---|---|
| § 63.1 | General applicability of the General Provisions | Yes. | |
| § 63.2 | Definitions | Yes | Additional terms defined in § 63.6675. |
| § 63.3 | Units and abbreviations | Yes. | |
| § 63.4 | Prohibited activities and | Yes. | |

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| | circumvention | | |
| § 63.5 | Construction and reconstruction | Yes. | |
| § 63.6(a) | Applicability | Yes. | |
| § 63.6(b)(1)-(4) | Compliance dates for new and reconstructed sources | Yes. | |
| § 63.6(b)(5) | Notification | Yes. | |
| § 63.6(b)(6) | [Reserved] | | |
| § 63.6(b)(7) | Compliance dates for new and reconstructed area sources that become major sources | Yes. | |
| § 63.6(c)(1)-(2) | Compliance dates for existing sources | Yes. | |
| § 63.6(c)(3)-(4) | [Reserved] | | |
| § 63.6(c)(5) | Compliance dates for existing area sources that become major sources | Yes. | |
| § 63.6(d) | [Reserved] | | |
| § 63.6(e) | Operation and maintenance | No. | |
| § 63.6(f)(1) | Applicability of standards | No. | |
| § 63.6(f)(2) | Methods for determining compliance | Yes. | |
| § 63.6(f)(3) | Finding of compliance | Yes. | |
| § 63.6(g)(1)-(3) | Use of alternate standard | Yes. | |
| § 63.6(h) | Opacity and visible emission standards | No | Subpart ZZZZ does not contain opacity or visible emission standards. |
| § 63.6(i) | Compliance extension procedures and criteria | Yes. | |
| § 63.6(j) | Presidential compliance exemption | Yes. | |
| § 63.7(a)(1)-(2) | Performance test dates | Yes | Subpart ZZZZ contains performance test dates at §§ 63.6610, 63.6611, and 63.6612. |
| § 63.7(a)(3) | CAA section 114 authority | Yes. | |
| § 63.7(b)(1) | Notification of performance test | Yes | Except that § 63.7(b)(1) only applies as specified in § 63.6645. |
| § 63.7(b)(2) | Notification of rescheduling | Yes | Except that § 63.7(b)(2) only applies as specified in § 63.6645. |
| § 63.7(c) | Quality assurance/test plan | Yes | Except that § 63.7(c) only applies as specified in § 63.6645. |
| § 63.7(d) | Testing facilities | Yes. | |
| § 63.7(e)(1) | Conditions for conducting | No. | Subpart ZZZZ specifies conditions for |

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| | performance tests | | conducting performance tests at § 63.6620. |
| § 63.7(e)(2) | Conduct of performance tests and reduction of data | Yes | Subpart ZZZZ specifies test methods at § 63.6620. |
| § 63.7(e)(3) | Test run duration | Yes. | |
| § 63.7(e)(4) | Administrator may require other testing under section 114 of the CAA | Yes. | |
| § 63.7(f) | Alternative test method provisions | Yes. | |
| § 63.7(g) | Performance test data analysis, recordkeeping, and reporting | Yes. | |
| § 63.7(h) | Waiver of tests | Yes. | |
| § 63.8(a)(1) | Applicability of monitoring requirements | Yes | Subpart ZZZZ contains specific requirements for monitoring at § 63.6625. |
| § 63.8(a)(2) | Performance specifications | Yes. | |
| § 63.8(a)(3) | [Reserved] | | |
| § 63.8(a)(4) | Monitoring for control devices | No. | |
| § 63.8(b)(1) | Monitoring | Yes. | |
| § 63.8(b)(2)-(3) | Multiple effluents and multiple monitoring systems | Yes. | |
| § 63.8(c)(1) | Monitoring system operation and maintenance | Yes. | |
| § 63.8(c)(1)(i) | Routine and predictable SSM | No | |
| § 63.8(c)(1)(ii) | SSM not in Startup Shutdown Malfunction Plan | Yes. | |
| § 63.8(c)(1)(iii) | Compliance with operation and maintenance requirements | No | |
| § 63.8(c)(2)-(3) | Monitoring system installation | Yes. | |
| § 63.8(c)(4) | Continuous monitoring system (CMS) requirements | Yes | Except that subpart ZZZZ does not require Continuous Opacity Monitoring System (COMS). |
| § 63.8(c)(5) | COMS minimum procedures | No | Subpart ZZZZ does not require COMS. |
| § 63.8(c)(6)-(8) | CMS requirements | Yes | Except that subpart ZZZZ does not require COMS. |
| § 63.8(d) | CMS quality control | Yes. | |
| § 63.8(e) | CMS performance evaluation | Yes | Except for § 63.8(e)(5)(ii), which applies to COMS. |
| | | Except that § 63.8(e) only | |

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| | | applies as specified in § 63.6645. | |
| § 63.8(f)(1)-(5) | Alternative monitoring method | Yes | Except that § 63.8(f)(4) only applies as specified in § 63.6645. |
| § 63.8(f)(6) | Alternative to relative accuracy test | Yes | Except that § 63.8(f)(6) only applies as specified in § 63.6645. |
| § 63.8(g) | Data reduction | Yes | Except that provisions for COMS are not applicable. Averaging periods for demonstrating compliance are specified at §§ 63.6635 and 63.6640. |
| § 63.9(a) | Applicability and State delegation of notification requirements | Yes. | |
| § 63.9(b)(1)-(5) | Initial notifications | Yes | Except that § 63.9(b)(3) is reserved. |
| | | Except that § 63.9(b) only applies as specified in § 63.6645. | |
| § 63.9(c) | Request for compliance extension | Yes | Except that § 63.9(c) only applies as specified in § 63.6645. |
| § 63.9(d) | Notification of special compliance requirements for new sources | Yes | Except that § 63.9(d) only applies as specified in § 63.6645. |
| § 63.9(e) | Notification of performance test | Yes | Except that § 63.9(e) only applies as specified in § 63.6645. |
| § 63.9(f) | Notification of visible emission (VE)/opacity test | No | Subpart ZZZZ does not contain opacity or VE standards. |
| § 63.9(g)(1) | Notification of performance evaluation | Yes | Except that § 63.9(g) only applies as specified in § 63.6645. |
| § 63.9(g)(2) | Notification of use of COMS data | No | Subpart ZZZZ does not contain opacity or VE standards. |
| § 63.9(g)(3) | Notification that criterion for alternative to RATA is exceeded | Yes | If alternative is in use. |
| | | Except that § 63.9(g) only applies as specified in § 63.6645. | |
| § 63.9(h)(1)-(6) | Notification of compliance status | Yes | Except that notifications for sources using a CEMS are due 30 days after completion of performance evaluations. § 63.9(h)(4) is reserved. |
| | | | Except that § 63.9(h) only applies as specified in § 63.6645. |
| § 63.9(i) | Adjustment of submittal deadlines | Yes. | |
| § 63.9(j) | Change in previous information | Yes. | |

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| § 63.10(a) | Administrative provisions for recordkeeping/reporting | Yes. | |
| § 63.10(b)(1) | Record retention | Yes | Except that the most recent 2 years of data do not have to be retained on site. |
| § 63.10(b)(2)(i)-(v) | Records related to SSM | No. | |
| § 63.10(b)(2)(vi)-(xi) | Records | Yes. | |
| § 63.10(b)(2)(xii) | Record when under waiver | Yes. | |
| § 63.10(b)(2)(xiii) | Records when using alternative to RATA | Yes | For CO standard if using RATA alternative. |
| § 63.10(b)(2)(xiv) | Records of supporting documentation | Yes. | |
| § 63.10(b)(3) | Records of applicability determination | Yes. | |
| § 63.10(c) | Additional records for sources using CEMS | Yes | Except that § 63.10(c)(2)-(4) and (9) are reserved. |
| § 63.10(d)(1) | General reporting requirements | Yes. | |
| § 63.10(d)(2) | Report of performance test results | Yes. | |
| § 63.10(d)(3) | Reporting opacity or VE observations | No | Subpart ZZZZ does not contain opacity or VE standards. |
| § 63.10(d)(4) | Progress reports | Yes. | |
| § 63.10(d)(5) | Startup, shutdown, and malfunction reports | No. | |
| § 63.10(e)(1) and (2)(i) | Additional CMS Reports | Yes. | |
| § 63.10(e)(2)(ii) | COMS-related report | No | Subpart ZZZZ does not require COMS. |
| § 63.10(e)(3) | Excess emission and parameter exceedances reports | Yes. | Except that § 63.10(e)(3)(i) (C) is reserved. |
| § 63.10(e)(4) | Reporting COMS data | No | Subpart ZZZZ does not require COMS. |
| § 63.10(f) | Waiver for recordkeeping/reporting | Yes. | |
| § 63.11 | Flares | No. | |
| § 63.12 | State authority and delegations | Yes. | |
| § 63.13 | Addresses | Yes. | |
| § 63.14 | Incorporation by reference | Yes. | |
| § 63.15 | Availability of information | Yes. | |

[75 FR 9688, Mar. 3, 2010, as amended at 78 FR 6720, Jan. 30, 2013]

## *Appendix A—Protocol for Using an Electrochemical Analyzer to Determine*

# *Oxygen and Carbon Monoxide Concentrations From Certain Engines*

1.0 SCOPE AND APPLICATION. WHAT IS THIS PROTOCOL?

This protocol is a procedure for using portable electrochemical (EC) cells for measuring carbon monoxide (CO) and oxygen ($O_2$ ) concentrations in controlled and uncontrolled emissions from existing stationary 4-stroke lean burn and 4-stroke rich burn reciprocating internal combustion engines as specified in the applicable rule.

## 1.1 Analytes. What does this protocol determine?

This protocol measures the engine exhaust gas concentrations of carbon monoxide (CO) and oxygen ($O_2$ ).

| Analyte | CAS No. | Sensitivity |
|---|---|---|
| Carbon monoxide (CO) | 630-08-0 | Minimum detectable limit should be 2 percent of the nominal range or 1 ppm, whichever is less restrictive. |
| Oxygen ($O_2$) | *7782-44-7* | |

## 1.2 Applicability. When is this protocol acceptable?

This protocol is applicable to 40 CFR part 63, subpart ZZZZ. Because of inherent cross sensitivities of EC cells, you must not apply this protocol to other emissions sources without specific instruction to that effect.

## 1.3 Data Quality Objectives. How good must my collected data be?

Refer to Section 13 to verify and document acceptable analyzer performance.

## 1.4 Range. What is the targeted analytical range for this protocol?

The measurement system and EC cell design(s) conforming to this protocol will determine the analytical range for each gas component. The nominal ranges are defined by choosing up-scale calibration gas concentrations near the maximum anticipated flue gas concentrations for CO and $O_2$ , or no more than twice the permitted CO level.

## 1.5 Sensitivity. What minimum detectable limit will this protocol yield for a particular gas component?

The minimum detectable limit depends on the nominal range and resolution of the specific EC cell used, and the signal to noise ratio of the measurement system. The minimum detectable limit should be 2 percent of the nominal range or 1 ppm, whichever is less restrictive.

2.0 SUMMARY OF PROTOCOL

In this protocol, a gas sample is extracted from an engine exhaust system and then conveyed to a portable EC analyzer for measurement of CO and $O_2$ gas concentrations. This method provides measurement system performance specifications and sampling protocols to ensure reliable data. You may use additions to, or modifications of vendor supplied measurement systems (e.g., heated or

unheated sample lines, thermocouples, flow meters, selective gas scrubbers, etc.) to meet the design specifications of this protocol. Do not make changes to the measurement system from the as-verified configuration (Section 3.12).

## 3.0 DEFINITIONS

*3.1 Measurement System.* The total equipment required for the measurement of CO and $O_2$ concentrations. The measurement system consists of the following major subsystems:

*3.1.1 Data Recorder.* A strip chart recorder, computer or digital recorder for logging measurement data from the analyzer output. You may record measurement data from the digital data display manually or electronically.

*3.1.2 Electrochemical (EC) Cell.* A device, similar to a fuel cell, used to sense the presence of a specific analyte and generate an electrical current output proportional to the analyte concentration.

*3.1.3 Interference Gas Scrubber.* A device used to remove or neutralize chemical compounds that may interfere with the selective operation of an EC cell.

*3.1.4 Moisture Removal System.* Any device used to reduce the concentration of moisture in the sample stream so as to protect the EC cells from the damaging effects of condensation and to minimize errors in measurements caused by the scrubbing of soluble gases.

*3.1.5 Sample Interface.* The portion of the system used for one or more of the following: sample acquisition; sample transport; sample conditioning or protection of the EC cell from any degrading effects of the engine exhaust effluent; removal of particulate matter and condensed moisture.

*3.2 Nominal Range.* The range of analyte concentrations over which each EC cell is operated (normally 25 percent to 150 percent of up-scale calibration gas value). Several nominal ranges can be used for any given cell so long as the calibration and repeatability checks for that range remain within specifications.

*3.3 Calibration Gas.* A vendor certified concentration of a specific analyte in an appropriate balance gas.

*3.4 Zero Calibration Error.* The analyte concentration output exhibited by the EC cell in response to zero-level calibration gas.

*3.5 Up-Scale Calibration Error.* The mean of the difference between the analyte concentration exhibited by the EC cell and the certified concentration of the up-scale calibration gas.

*3.6 Interference Check.* A procedure for quantifying analytical interference from components in the engine exhaust gas other than the targeted analytes.

*3.7 Repeatability Check.* A protocol for demonstrating that an EC cell operated over a given nominal analyte concentration range provides a stable and consistent response and is not significantly affected by repeated exposure to that gas.

*3.8 Sample Flow Rate.* The flow rate of the gas sample as it passes through the EC cell. In some situations, EC cells can experience drift with changes in flow rate. The flow rate must be monitored and documented during all phases of a sampling run.

*3.9 Sampling Run.* A timed three-phase event whereby an EC cell's response rises and plateaus in a sample conditioning phase, remains relatively constant during a measurement data phase, then declines during a refresh phase. The sample conditioning phase exposes the EC cell to the gas sample for a

length of time sufficient to reach a constant response. The measurement data phase is the time interval during which gas sample measurements can be made that meet the acceptance criteria of this protocol. The refresh phase then purges the EC cells with CO-free air. The refresh phase replenishes requisite $O_2$ and moisture in the electrolyte reserve and provides a mechanism to de-gas or desorb any interference gas scrubbers or filters so as to enable a stable CO EC cell response. There are four primary types of sampling runs: pre- sampling calibrations; stack gas sampling; post-sampling calibration checks; and measurement system repeatability checks. Stack gas sampling runs can be chained together for extended evaluations, providing all other procedural specifications are met.

*3.10 Sampling Day.* A time not to exceed twelve hours from the time of the pre-sampling calibration to the post-sampling calibration check. During this time, stack gas sampling runs can be repeated without repeated recalibrations, providing all other sampling specifications have been met.

*3.11 Pre-Sampling Calibration/Post-Sampling Calibration Check.* The protocols executed at the beginning and end of each sampling day to bracket measurement readings with controlled performance checks.

*3.12 Performance-Established Configuration.* The EC cell and sampling system configuration that existed at the time that it initially met the performance requirements of this protocol.

4.0 INTERFERENCES.

When present in sufficient concentrations, NO and $NO_2$ are two gas species that have been reported to interfere with CO concentration measurements. In the likelihood of this occurrence, it is the protocol user's responsibility to employ and properly maintain an appropriate CO EC cell filter or scrubber for removal of these gases, as described in Section 6.2.12.

5.0 SAFETY. [RESERVED]
6.0 EQUIPMENT AND SUPPLIES.

## 6.1 What equipment do I need for the measurement system?

The system must maintain the gas sample at conditions that will prevent moisture condensation in the sample transport lines, both before and as the sample gas contacts the EC cells. The essential components of the measurement system are described below.

## 6.2 Measurement System Components.

*6.2.1 Sample Probe.* A single extraction-point probe constructed of glass, stainless steel or other non-reactive material, and of length sufficient to reach any designated sampling point. The sample probe must be designed to prevent plugging due to condensation or particulate matter.

*6.2.2 Sample Line.* Non-reactive tubing to transport the effluent from the sample probe to the EC cell.

*6.2.3 Calibration Assembly (optional).* A three-way valve assembly or equivalent to introduce calibration gases at ambient pressure at the exit end of the sample probe during calibration checks. The assembly must be designed such that only stack gas or calibration gas flows in the sample line and all gases flow through any gas path filters.

*6.2.4 Particulate Filter (optional).* Filters before the inlet of the EC cell to prevent accumulation of particulate material in the measurement system and extend the useful life of the components. All filters must be fabricated of materials that are non-reactive to the gas mixtures being sampled.

*6.2.5 Sample Pump.* A leak-free pump to provide undiluted sample gas to the system at a flow rate sufficient to minimize the response time of the measurement system. If located upstream of the EC cells, the pump must be constructed of a material that is non-reactive to the gas mixtures being sampled.

*6.2.8 Sample Flow Rate Monitoring.* An adjustable rotameter or equivalent device used to adjust and maintain the sample flow rate through the analyzer as prescribed.

*6.2.9 Sample Gas Manifold (optional).* A manifold to divert a portion of the sample gas stream to the analyzer and the remainder to a by-pass discharge vent. The sample gas manifold may also include provisions for introducing calibration gases directly to the analyzer. The manifold must be constructed of a material that is non-reactive to the gas mixtures being sampled.

*6.2.10 EC cell.* A device containing one or more EC cells to determine the CO and $O_2$ concentrations in the sample gas stream. The EC cell(s) must meet the applicable performance specifications of Section 13 of this protocol.

*6.2.11 Data Recorder.* A strip chart recorder, computer or digital recorder to make a record of analyzer output data. The data recorder resolution (i.e., readability) must be no greater than 1 ppm for CO; 0.1 percent for $O_2$ ; and one degree (either °C or °F) for temperature. Alternatively, you may use a digital or analog meter having the same resolution to observe and manually record the analyzer responses.

*6.2.12 Interference Gas Filter or Scrubber.* A device to remove interfering compounds upstream of the CO EC cell. Specific interference gas filters or scrubbers used in the performance-established configuration of the analyzer must continue to be used. Such a filter or scrubber must have a means to determine when the removal agent is exhausted. Periodically replace or replenish it in accordance with the manufacturer's recommendations.

7.0 REAGENTS AND STANDARDS. WHAT CALIBRATION GASES ARE NEEDED?

*7.1 Calibration Gases.* CO calibration gases for the EC cell must be CO in nitrogen or CO in a mixture of nitrogen and $O_2$. Use CO calibration gases with labeled concentration values certified by the manufacturer to be within ± 5 percent of the label value. Dry ambient air (20.9 percent $O_2$ ) is acceptable for calibration of the $O_2$ cell. If needed, any lower percentage $O_2$ calibration gas must be a mixture of $O_2$ in nitrogen.

*7.1.1 Up-Scale CO Calibration Gas Concentration.* Choose one or more up-scale gas concentrations such that the average of the stack gas measurements for each stack gas sampling run are between 25 and 150 percent of those concentrations. Alternatively, choose an up-scale gas that does not exceed twice the concentration of the applicable outlet standard. If a measured gas value exceeds 150 percent of the up-scale CO calibration gas value at any time during the stack gas sampling run, the run must be discarded and repeated.

*7.1.2 Up-Scale $O_2$ Calibration Gas Concentration.*

Select an $O_2$ gas concentration such that the difference between the gas concentration and the average stack gas measurement or reading for each sample run is less than 15 percent $O_2$ . When the average exhaust gas $O_2$ readings are above 6 percent, you may use dry ambient air (20.9 percent $O_2$ ) for the up-scale $O_2$ calibration gas.

*7.1.3 Zero Gas.* Use an inert gas that contains less than 0.25 percent of the up-scale CO calibration gas concentration. You may use dry air that is free from ambient CO and other combustion gas products (e.g., $CO_2$ ).

## 8.0 Sample Collection and Analysis

*8.1 Selection of Sampling Sites.*

*8.1.1 Control Device Inlet.* Select a sampling site sufficiently downstream of the engine so that the combustion gases should be well mixed. Use a single sampling extraction point near the center of the duct (e.g., within the 10 percent centroidal area), unless instructed otherwise.

*8.1.2 Exhaust Gas Outlet.* Select a sampling site located at least two stack diameters downstream of any disturbance (e.g., turbocharger exhaust, crossover junction or recirculation take-off) and at least one-half stack diameter upstream of the gas discharge to the atmosphere. Use a single sampling extraction point near the center of the duct (e.g., within the 10 percent centroidal area), unless instructed otherwise.

*8.2 Stack Gas Collection and Analysis.* Prior to the first stack gas sampling run, conduct that the pre-sampling calibration in accordance with Section 10.1. Use Figure 1 to record all data. Zero the analyzer with zero gas. Confirm and record that the scrubber media color is correct and not exhausted. Then position the probe at the sampling point and begin the sampling run at the same flow rate used during the up-scale calibration. Record the start time. Record all EC cell output responses and the flow rate during the “sample conditioning phase” once per minute until constant readings are obtained. Then begin the “measurement data phase” and record readings every 15 seconds for at least two minutes (or eight readings), or as otherwise required to achieve two continuous minutes of data that meet the specification given in Section 13.1. Finally, perform the “refresh phase” by introducing dry air, free from CO and other combustion gases, until several minute-to-minute readings of consistent value have been obtained. For each run use the “measurement data phase” readings to calculate the average stack gas CO and $O_2$ concentrations.

*8.3 EC Cell Rate.* Maintain the EC cell sample flow rate so that it does not vary by more than ± 10 percent throughout the pre-sampling calibration, stack gas sampling and post-sampling calibration check. Alternatively, the EC cell sample flow rate can be maintained within a tolerance range that does not affect the gas concentration readings by more than ± 3 percent, as instructed by the EC cell manufacturer.

## 9.0 Quality Control (Reserved)

## 10.0 Calibration and Standardization

*10.1 Pre-Sampling Calibration.* Conduct the following protocol once for each nominal range to be used on each EC cell before performing a stack gas sampling run on each field sampling day. Repeat the calibration if you replace an EC cell before completing all of the sampling runs. There is no prescribed order for calibration of the EC cells; however, each cell must complete the measurement data phase during calibration. Assemble the measurement system by following the manufacturer's recommended protocols including for preparing and preconditioning the EC cell. Assure the measurement system has no leaks and verify the gas scrubbing agent is not depleted. Use Figure 1 to record all data.

*10.1.1 Zero Calibration.* For both the $O_2$ and CO cells, introduce zero gas to the measurement system (e.g., at the calibration assembly) and record the concentration reading every minute until readings are constant for at least two consecutive minutes. Include the time and sample flow rate. Repeat the steps in this section at least once to verify the zero calibration for each component gas.

*10.1.2 Zero Calibration Tolerance.* For each zero gas introduction, the zero level output must be less than or equal to ± 3 percent of the up-scale gas value or ± 1 ppm, whichever is less restrictive, for the CO channel and less than or equal to ± 0.3 percent $O_2$ for the $O_2$ channel.

*10.1.3 Up-Scale Calibration.* Individually introduce each calibration gas to the measurement system (e.g., at the calibration assembly) and record the start time. Record all EC cell output responses and the flow rate during this “sample conditioning phase” once per minute until readings are constant for at least two

minutes. Then begin the "measurement data phase" and record readings every 15 seconds for a total of two minutes, or as otherwise required. Finally, perform the "refresh phase" by introducing dry air, free from CO and other combustion gases, until readings are constant for at least two consecutive minutes. Then repeat the steps in this section at least once to verify the calibration for each component gas. Introduce all gases to flow through the entire sample handling system (i.e., at the exit end of the sampling probe or the calibration assembly).

*10.1.4 Up-Scale Calibration Error.* The mean of the difference of the "measurement data phase" readings from the reported standard gas value must be less than or equal to ± 5 percent or ± 1 ppm for CO or ± 0.5 percent $O_2$ , whichever is less restrictive, respectively. The maximum allowable deviation from the mean measured value of any single "measurement data phase" reading must be less than or equal to ± 2 percent or ± 1 ppm for CO or ± 0.5 percent $O_2$ , whichever is less restrictive, respectively.

*10.2 Post-Sampling Calibration Check.* Conduct a stack gas post-sampling calibration check after the stack gas sampling run or set of runs and within 12 hours of the initial calibration. Conduct up-scale and zero calibration checks using the protocol in Section 10.1. Make no changes to the sampling system or EC cell calibration until all post-sampling calibration checks have been recorded. If either the zero or up-scale calibration error exceeds the respective specification in Sections 10.1.2 and 10.1.4 then all measurement data collected since the previous successful calibrations are invalid and re-calibration and re-sampling are required. If the sampling system is disassembled or the EC cell calibration is adjusted, repeat the calibration check before conducting the next analyzer sampling run.

## 11.0 Analytical Procedure

The analytical procedure is fully discussed in Section 8.

## 12.0 Calculations and Data Analysis

Determine the CO and $O_2$ concentrations for each stack gas sampling run by calculating the mean gas concentrations of the data recorded during the "measurement data phase".

## 13.0 Protocol Performance

Use the following protocols to verify consistent analyzer performance during each field sampling day.

*13.1 Measurement Data Phase Performance Check.* Calculate the mean of the readings from the "measurement data phase". The maximum allowable deviation from the mean for each of the individual readings is ± 2 percent, or ± 1 ppm, whichever is less restrictive. Record the mean value and maximum deviation for each gas monitored. Data must conform to Section 10.1.4. The EC cell flow rate must conform to the specification in Section 8.3.

*Example: A measurement data phase is invalid if the maximum deviation of any single reading comprising that mean is greater than* ± 2 percent *or ± 1 ppm (the default criteria). For example, if the mean = 30 ppm, single readings of below 29 ppm and above 31 ppm are disallowed* ).

*13.2 Interference Check.* Before the initial use of the EC cell and interference gas scrubber in the field, and semi-annually thereafter, challenge the interference gas scrubber with NO and $NO_2$ gas standards that are generally recognized as representative of diesel-fueled engine NO and $NO_2$ emission values. Record the responses displayed by the CO EC cell and other pertinent data on Figure 1 or a similar form.

*13.2.1 Interference Response.* The combined NO and $NO_2$ interference response should be less than or equal to ± 5 percent of the up-scale CO calibration gas concentration.

*13.3 Repeatability Check.* Conduct the following check once for each nominal range that is to be used on the CO EC cell within 5 days prior to each field sampling program. If a field sampling program lasts longer than 5 days, repeat this check every 5 days. Immediately repeat the check if the EC cell is replaced or if the EC cell is exposed to gas concentrations greater than 150 percent of the highest up-scale gas concentration.

*13.3.1 Repeatability Check Procedure.* Perform a complete EC cell sampling run (all three phases) by introducing the CO calibration gas to the measurement system and record the response. Follow Section 10.1.3. Use Figure 1 to record all data. Repeat the run three times for a total of four complete runs. During the four repeatability check runs, do not adjust the system except where necessary to achieve the correct calibration gas flow rate at the analyzer.

*13.3.2 Repeatability Check Calculations.* Determine the highest and lowest average "measurement data phase" CO concentrations from the four repeatability check runs and record the results on Figure 1 or a similar form. The absolute value of the difference between the maximum and minimum average values recorded must not vary more than ± 3 percent or ± 1 ppm of the up-scale gas value, whichever is less restrictive.

14.0 POLLUTION PREVENTION (RESERVED)
15.0 WASTE MANAGEMENT (RESERVED)
16.0 ALTERNATIVE PROCEDURES (RESERVED)
17.0 REFERENCES

(1) "Development of an Electrochemical Cell Emission Analyzer Test Protocol", Topical Report, Phil Juneau, Emission Monitoring, Inc., July 1997.

(2) "Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Emissions from Natural Gas-Fired Engines, Boilers, and Process Heaters Using Portable Analyzers", EMC Conditional Test Protocol 30 (CTM-30), Gas Research Institute Protocol GRI-96/0008, Revision 7, October 13, 1997.

(3) "ICAC Test Protocol for Periodic Monitoring", EMC Conditional Test Protocol 34 (CTM-034), The Institute of Clean Air Companies, September 8, 1999.

(4) "Code of Federal Regulations", Protection of Environment, 40 CFR, Part 60, Appendix A, Methods 1-4; 10.

TABLE 1: APPENDIX A—SAMPLING RUN DATA.

| | | | | |
|---|---|---|---|---|
| Facility_____ Engine I.D._____ Date_____ | | | | |
| Run Type: | (_) | (_) | (_) | (_) |
| (X) | Pre-Sample Calibration | Stack Gas Sample | Post-Sample Cal. Check | Repeatability Check |

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| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Run # | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | Time | Scrub. OK | Flow- Rate |
| Gas | $O_2$ | CO | $O_2$ | CO | $O_2$ | CO | $O_2$ | CO | | | |
| | | | | | | | | | | | |

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| Sample Cond. Phase | | | | | | | | | | | |
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[78 FR 6721, Jan. 30, 2013]

# Indiana Department of Environmental Management
# Office of Air Quality

# Addendum to the Technical Support Document (ATSD) for a Part 70 Operating Permit Renewal (TITLE V)

## Source Background and Description

| | |
|---|---|
| **Source Name:** | **Duke Energy Indiana Inc., Cayuga Generating Station** |
| **Source Location:** | **State Road 63, Cayuga, IN 46168** |
| **County:** | **Vermillion** |
| **SIC Code:** | **4911** |
| **Permit Renewal No.:** | **T165-33876-00001** |
| **Permit Reviewer:** | **Josiah Balogun** |

On March 11, 2012, the Office of Air Quality (OAQ) had a notice published in the Daily Clintonian in Clinton, Indiana, stating that Duke Energy Indiana Inc., Cayuga Generating Station had applied for a Part 70 Operating Permit (TITLE V) to continue to operate a stationary electric utility generating station. The notice also stated that OAQ proposed to issue a Title V permit for this operation and provided information on how the public could review the proposed Title V and other documentation. Finally, the notice informed interested parties that there was a period of thirty (30) days to provide comments on whether or not this Title V permit should be issued as proposed.

## Comments from the Source

On April 10, 2014, Michael Langman of Environmental Protection Agency, Region 5, Air Permit Section submitted comments on the proposed Title V Operating Permit. The comments are summarized in the subsequent pages, with IDEM's corresponding responses.

No changes have been made to the TSD because the OAQ prefers that the Technical Support Document reflects the permit that was on public notice. Changes that occur after the public notice are documented in this Addendum to the Technical Support Document. This accomplishes the desired result, ensuring that these types of concerns are documented and part of the record regarding this permit decision.

The summary of the comments and IDEM, OAQ responses, including changes to the permit No. T165-33876-00001 (language deleted is shown in ~~strikeout~~ and language added is shown in **bold**) are as follows:

**Comment 1:** In Conditions D.1.11 and D.2.11 of the draft permit establish parametric monitoring requirements for the Electrostatic Precipitator (ESP). On page 24 of the technical support document, the parameters being measured for the ESP are numbers of transformer-Rectifier (T-R) sets in service, T-R primary and secondary voltages, and T-R current. In both the Technical Support Document and the draft permit, the number of T-R sets in service is the only indicator range specified while indicators for voltage and current are not. Please specify indicator ranges for T-R voltage and current in the permit or explain why measuring and recording the number of T-R voltage and current in the permit or explain why measuring and recording the number of T-R sets in service is sufficient to ensure proper operation of ESP.

**Response 1:** The parameters to be measured by the ESP which are indicator ranges for T-R voltage and current have been specified in the permit conditions accordingly.

D.1.11 Transformer-Rectifier (T-R) Sets [326 IAC 2-7-6(1)] [326 IAC 2-7-5(1)] [40 CFR 64]

(a) The ability of the ESP to control particulate emissions shall be monitored once per day, when the unit is in operation, by measuring and recording the number of T-R sets in service and the primary and secondary voltages and the currents of the T-R sets.

(b) Reasonable response steps shall be taken in accordance with Section C - Response to Excursions or Exceedances whenever the percentage of T-R sets in service falls below ninety percent (90%). T-R set failure resulting in less than ninety percent (90%) availability is not a deviation from this permit. Failure to take response steps in accordance with Section C - Response to Excursions or Exceedances, shall be considered a deviation from this permit.

**ESP Parameters**

| | **Unit 1 ESP** |
|---|---|
| **Primary Voltage** | **215 – 450 V** |
| **Secondary Voltage** | **30 – 175 kV** |
| **T-R Set Secondary Current** | **200 – 1200 mA** |

**********

D.2.11 Transformer-Rectifier (T-R) Sets [326 IAC 2-7-6(1)] [326 IAC 2-7-5(1)] [40 CFR 64]

(a) The ability of the ESP to control particulate emissions shall be monitored once per day, when the unit is in operation, by measuring and recording the number of T-R sets in service and the primary and secondary voltages and the currents of the T-R sets.

(b) Reasonable response steps shall be taken in accordance with Section C - Response to Exceedances or Excursions whenever the percentage of T-R sets in service falls below ninety percent (90%). T-R set failure resulting in less than ninety percent (90%) availability is not a deviation from this permit. Failure to take response steps in accordance with Section C - Response to Excursions or Exceedances, shall be considered a deviation from this permit.

**ESP Parameters**

| | **Unit 2 ESP** |
|---|---|
| **Primary Voltage** | **215 – 450 V** |
| **Secondary Voltage** | **30 – 175 kV** |
| **T-R Set Secondary Current** | **200 – 1200 mA** |

**********

# Indiana Department of Environmental Management
Office of Air Quality

# Technical Support Document (TSD) for a Part 70 Operating Permit Renewal

## Source Background and Description

| | |
|---|---|
| **Source Name:** | **Duke Energy Indiana Inc., Cayuga Generating Station** |
| **Source Location:** | **State Road 63, Cayuga, IN 46168** |
| **County:** | **Vermillion** |
| **SIC Code:** | **4911** |
| **Permit Renewal No.:** | **T165-33876-00001** |
| **Permit Reviewer:** | **Josiah Balogun** |

The Office of Air Quality (OAQ) has reviewed the operating permit renewal application from Duke Energy Indiana Inc., Cayuga Generating Station relating to the operation of a stationary electric utility generating station. On November 13, 2013, Duke Energy Indiana Inc., Cayuga Generating Station submitted an application to the OAQ requesting to renew its operating permit. Duke Energy Indiana Inc., Cayuga Generating Station was issued its first Part 70 Operating Permit Renewal T165-33876-00001 on August 20, 2009.

## Source Definition

Duke Energy Indiana, Inc.'s Cayuga Generating Station, identified as 165-00001, is located on the same property as Duke Energy Indiana, Inc.'s Unit 4 combustion turbine plant identified as 165-00086. IDEM, OAQ has examined whether the Cayuga Generating Station plant and the combustion turbine plant are part of the same major source. The term "major source" is defined at 326 IAC 2-7-1(22). In order for these two plants to be considered one major source, they must meet all three of the following criteria:

(1) the plants must be under common ownership or common control;

(2) the plants must belong to a single major industrial grouping or one must serve as a support facility for the other; and,

(3) the plants must be located on contiguous or adjacent properties.

The two plants are owned by Duke Energy Indiana, Inc. Since there is a common owner, the first element of the definition of major source is met.

The SIC Code Manual of 1987 sets out how to determine the proper SIC Code for each type of business, called establishments. The SIC Codes are divided up into eleven divisions, lettered A through K. Each division is broken down into separate major groups. Each major group has a distinct two-digit SIC Code. The two plants have the same two-digit SIC Code, 49, for Electric, Gas and Sanitary Services. Therefore the second element of the definition is met.

The two plants are located on the same piece of property in separate buildings. Since the plants are located on the same piece of property, they the third element of the definition. IDEM, OAQ finds that the two plants are part of the same major source. IDEM, OAQ will issue separate Part 70 permits to each plant solely for administrative purposes.

## Permitted Emission Units and Pollution Control Equipment

The source consists of the following permitted emission units:

(a) One (1) dry bottom, pulverized coal-fired boiler, identified as Boiler No. 1, installed in 1967, with a nominal heat input capacity of 4,802 million Btu per hour (MMBtu/hr), with an electrostatic precipitator (ESP) for control of particulate matter, a flue gas desulfurization (FGD) system for control of $SO_2$, and exhausting to stack 1. Stack 1 has continuous emissions monitors (CEMs) for nitrogen oxides ($NO_X$) and sulfur dioxide ($SO_2$) and a continuous opacity monitor (COM). Boiler No. 1 was configured with a low $NO_X$ burner in 1993. Selective Catalytic Oxidation (SCR) to control NOx, Dry Sorbent Injection System to Control $SO_3$, Activated Carbon Injection System to assist in Control of Hg emissions scheduled to be installed by 2015.

(b) One (1) dry bottom, pulverized coal-fired boiler, identified as Boiler No. 2, installed in 1968, with a nominal heat input capacity of 4,802 million Btu per hour (MMBtu/hr), with an electrostatic precipitator (ESP) for control of particulate matter, a flue gas desulfurization (FGD) system for control of $SO_2$, and exhausting to stack 2. Stack 2 has continuous emissions monitors (CEMs) for nitrogen oxides ($NO_X$) and sulfur dioxide ($SO_2$) and a continuous opacity monitor (COM). Boiler No. 2 was configured with a low $NO_X$ burner in 1993. Selective Catalytic Oxidation (SCR) to control NOx, Dry Sorbent Injection System to Control $SO_3$, Activated Carbon Injection System to assist in Control of Hg emissions scheduled to be installed by 2015.

(c) One (1) no. 2 fuel oil-fired generator, identified as Unit No. 3A, installed in 1972, with a nominal heat input capacity of 30 million Btu per hour (MMBtu/hr), exhausting to stack 3A.

(d) One (1) no. 2 fuel oil-fired generator, identified as Unit No. 3B, installed in 1972, with a nominal heat input capacity of 30 million Btu per hour (MMBtu/hr), exhausting to stack 3B.

(e) One (1) no. 2 fuel oil-fired generator, identified as Unit No. 3C, installed in 1972, with a nominal heat input capacity of 30 million Btu per hour (MMBtu/hr), exhausting to stack 3C.

(f) One (1) no. 2 fuel oil-fired generator, identified as Unit No. 3D, installed in 1972, with a nominal heat input capacity of 30 million Btu per hour (MMBtu/hr), exhausting to stack 3D.

(g) A dual conveyor coal processing system, with a nominal throughput of 1900 tons of coal per hour (950 tons of coal per hour each side), consisting of the following equipment:

(1) One (1) railcar unloading station, with a drop point to two (2) hoppers identified as DP-1, with the drop point enclosed with emissions uncontrolled, and exhausting to the ambient air.

(2) One (1) storage area, having a nominal storage capacity including the active piles of 982,800 tons, with fugitive emissions controlled as needed by a watering truck.

(3) One (1) enclosed hopper, with a drop point to a conveyor identified as DP-2, with the drop point enclosed with emissions controlled by a water spray dust suppression system as needed, and exhausting to the ambient air.

(4) One (1) enclosed hopper and two (2) reclaim feeders, with an underground drop points identified as DP-11 and DP-12, with emissions controlled by the underground enclosure, and routed to the conveyor system.

(5) An enclosed dual conveyor system, with 6 drop points identified as DP-3 through DP-6, DP-8, and DP-13, with each drop point enclosed with emissions controlled by the enclosure. Drop points DP-3 through DP-5, DP-8, and DP-13 are controlled as needed by a water spray dust suppression system, and DP-6 is controlled by rotoclones.

(6) An enclosed conveyor system with drop point identified as DP-9, controlled by a telescoping chute.

(7) Coal bunker and coal scale exhausts and associated dust collector vents.

(h) One (1) limestone handling and storage system for the flue gas desulfurization system, constructed in 2006, with a maximum throughput rate of 1,000 tons per hour, consisting of the following:

(1) One (1) railcar/truck unloading operation, with a maximum capacity of 1,000 tons per hour, controlled by fog dust suppression, and exhausting to emission point EP-L1.

(2) Two (2) hoppers, each with a maximum capacity of 500 tons per hour, controlled by fog dust suppression, and exhausting to emission point EP-L2.

(3) Two (2) belt feeders, identified as LHBF-1 and LHBF-2, each with a maximum capacity of 500 tons per hour, controlled by fog dust suppression, and exhausting to emission point EP-L2.

(4) One (1) conveyor, identified as LH-1, controlled by a telescopic chute, and exhausting to emission point EP-L3. Under NSPS, Subpart OOO, this unit is considered a belt conveyor.

(5) One (1) active limestone stockout pile, with a maximum capacity of 7,700 tons.

(6) One (1) inactive limestone storage pile, with a maximum capacity of 45,000 tons.

(7) Two (2) reclaim hoppers, each with a maximum capacity of 200 tons per hour, controlled by fog dust suppression, and exhausting to emission point EP-L4.

(8) Two (2) belt feeders, identified as LHBF-3 and LHBF-4, each with a maximum capacity of 200 tons per hour, controlled by fog dust suppression, and exhausting to emission point EP-L4.

(9) One (1) conveyor, identified as LH-2, with a maximum capacity of 400 tons per hour, controlled by fog dust suppression. The emissions exhaust out the general building vents, identified as emission point EP-L18a and EP-L18b. Under NSPS, Subpart OOO, this unit is considered a belt conveyor.

(10) One (1) reversible conveyor, identified as LH-3, with a maximum capacity of 400 tons per hour, controlled by fog dust suppression. The emissions exhaust out the general building vents, identified as emission points EP-L18a and EP-L18b. Under NSPS, Subpart OOO, this unit is considered a belt conveyor.

(11) Two (2) day bins, each with a maximum throughput rate of 400 tons per hour. Each bin is equipped with a Baghouse to control particulate emissions. Baghouses BH-L1 and BH-L2 exhaust to EP-L16 and EP-L17, respectively. Under NSPS, Subpart OOO, these units considered storage bins.

(12) Two (2) wet ball mills, each with a maximum capacity of 51 tons of limestone slurry per hour. Under NSPS, Subpart OOO, these units are considered grinding mills.

(i) One (1) gypsum handling and storage system, constructed in 2006, consisting of the following:

(1) One (1) wet gypsum conveying system, with a maximum throughput rate of 150 tons per hour.

(2) Two (2) gypsum stock out piles. Gypsum can be stocked out to an outside pile or a pile located in the gypsum stock out building. The maximum gypsum storage capacity is 10,400 tons.

(3) One (1) emergency gypsum stockout pile, with a maximum capacity of 2,600 tons.

(4) One (1) dry gypsum transferring operation, transferring gypsum to landfills by trucks on paved roads.

(j) Auxiliary Boiler, identified as emission unit Aux, with a maximum heat input capacity of 72.76 MMBtu/hr fired with distillate oil and exhausting out one stack identified as stack Aux-1. The Auxiliary boiler was constructed before 1968.

(k) One (1) Arsenic Mitigation System consisting of (1) 700 ton Limestone Storage Silo and (1) 300 ton Limestone Surge Bin, scheduled to be installed by 2015. Limestone is pneumatically conveyed from delivery trucks to the Limestone Storage Silo and from the Limestone Storage Silo to the Limestone Surge Bin. Limestone in the Surge Bin is dropped on to the C-1 and C-2 coal conveyors. PM emissions generated during pneumatic conveying and transfer points to the C-1 and C-2 conveyor will be controlled by the bin vent filters. The Limestone Storage Silo and Limestone Surge Bin are identified as emissions points EP-01(LS) and EP-02(LS).

(l) Two (2) Dry Sorbent Injection (DSI) Systems, one for each Unit. Each DSI system consists of one (1) Sorbent Storage Silo with a storage capacity of 120 tons, three (3) Silo Weight Feeders to regulate sorbent from the silos and a system to inject the sorbent material into the flue gas, scheduled to be installed by 2015. PM emissions generated during loading operations are controlled by a Bin Vent Filter located on the top of each silo and the weight feeders. The two (2) Sorbent Silos are identified as emission points EP-01(DSI), and EP-03(DSI). The weight feeders are identified as EP-05A(DSI), EP-05B(DSI), EP-06A(DSI) and EP-06B(DSI) with spares EP-05C(DSI) and EP-06C(DSI).

(m) Two (2) Activated Carbon Injection (ACI) Systems, one for each Unit. Each ACI system consists of one (1) storage silo with a 120 ton storage capacity, two (2) Silo Weight Feeders to regulate carbon from the silos and a system for injecting the Activated Carbon into the flue gas, scheduled to be installed by 2015. PM emissions during the silo loading operation are controlled by the bin vent filters located on top of the silos. The two (2) Activated Carbon Storage Silos are identified as emission points EP-01(ACI) and EP-02(ACI). The weight feeders are identified as EP-03A(ACI) and EP-04A(ACI) with spares EP-03B(ACI) and EP-04B(ACI).

(n) Two (2) Dry Ash Handling Systems, one for each Unit. The dry ash handling system consists of a pneumatic conveying system, four (4) baghouse separators, one (1) ash silo with a storage capacity of 3,500 and an ash unloading system, scheduled to be installed by 2015.

(i) Baghouse Separators - Fly ash from the ESP Ash Hoppers, Air Heater Ash Hoppers, Economizer Ash Hoppers and SCR Large Particle Screen Ash Hopper will be pneumatically conveyed to one of four (4) baghouse separators. There will be two (2) baghouse separators for each unit. The dry fly ash is separated from the air stream in a baghouse separator. Each baghouse separator are identified as emissions points EP-01(DFA), EP--02(DFA), EP-03(DFA), and EP-04(DFA). The system is equipped with a spare exhauster identified as emissions point EP-05(DFA).

(ii) Ash Silos - Fly ash collected in the baghouse separators is dropped into a feeder and pneumatically conveyed to the ash silo. The ash silo is equipped with a bin vent filter to control particulate matter emissions from pneumatic conveying. The Ash Silo is identified as emission point EP-06(DFA).

(iii) Ash Unloading Operation - Fly ash collected in the silos can be unloaded into trucks or pneumatically conveyed to the ash fixation process. Fly ash unloaded into trucks can be unloaded dry or wet. Fly ash unloaded dry is gravity feed to a chute and unloaded into enclosed trucks. The emissions generated from unloading the ash dry are vented back to the silo and controlled by the silo bin vent filter. Ash unloaded wet is feed into a pin mixer where the ash is mixed with water and unloaded into open trucks

(o) One (1) Ash Fixation Process consisting of a pneumatic conveying system, one (1) lime silo, conveyors, and two (2) pin mixers, scheduled to be installed by 2015.

(i) Lime Silo – Lime will be delivered by truck and will pneumatically loaded into the silo. The storage capacity of the silo is 300 tons. The emissions generated by the pneumatic conveying will be controlled by a bin vent filter located on top of the lime silo. The Lime Silo is identified as emissions point EP-02(FIX).

(ii) Conveyor and Transfer Points – Fly ash, Lime and Gypsum will be conveyed to one of two (2) pin mixers where this material will be mixed with water to make the fixated ash. The fixated ash will be unloaded to a storage pile, and then loaded into trucks using front end loaders.

## Emission Units and Pollution Control Equipment Constructed and/or Operated without a Permit

There are no unpermitted emission units operating at this source during this review process.

## Emission Units and Pollution Control Equipment Removed From the Source

No emission units have been removed from this facility through this permitting action.

## Insignificant Activities

This stationary source also includes the following insignificant activities which are, as defined in 326 IAC 2-7-1(21):

(1) Equipment powered by internal combustion engines of capacity equal to or less than 500,000 Btu/hour, except where total capacity of equipment operated by one stationary source exceeds 2,000,000 Btu/hour.

(2) A gasoline fuel transfer and dispensing operation handling less than or equal to 1,300 gallons per day, such as filling of tanks, locomotives, automobiles, having a storage capacity less than or equal to 10,500 gallons.

(3) A petroleum fuel, other than gasoline, dispensing facility having a storage capacity less than or equal to 10,500 gallons, and dispensing less than or equal to 230,000 gallons per month.

(4) The following VOC and HAP storage containers:

(A) Storage tanks with capacity less than or equal to 1,000 gallons and annual throughput less than 12,000 gallons.

(B) Vessels storing lubricating oils, hydraulic oils, machining oils, and machining

(5) Application of oils, greases, lubricants, or other nonvolatile materials applied as temporary protective coatings.

(6) Degreasing operations that do not exceed 145 gallons per 12 months, except if subject to 326 IAC 20-6. [326 IAC 8-3-2] [326 IAC 8-3-8]

(7) Cleaners and solvents characterized as follows:

(A) Having a vapor pressure equal to or less than 2 kPa; 15 mm Hg; or 0.3 psi measured at 38 degrees C (100EF) or;

(B) Having a vapor pressure equal to or less than 0.7 kPA; 5mm Hg; or 0.1 psi measured at 20EC (68EF); the use of which for all cleaners and solvents combined does not exceed 145 gallons per 12 months.

(8) Closed loop heating and cooling systems.

(9) Any of the following structural steel and bridge fabrication activities:

(A) Cutting 200,000 linear feet or less of one inch (10) plate or equivalent.

(B) Using 80 tons or less of welding consumables.

(10) Rolling oil recovery systems.

(11) Activities associated with the treatment of wastewater streams with an oil and grease content less than or equal to 1% by volume.

(12) Activities associated with the transportation and treatment of sanitary sewage, provided discharge to the treatment plant is under the control of the owner/operator, that is, an onsite sewage treatment facility.

(13) Any operation using aqueous solutions containing less than 1% by weight of VOCs, excluding HAPs.

(14) Water based adhesives that are less than or equal to 5% by volume of VOCs, excluding HAPs.

(15) Noncontact cooling tower systems with forced and induced draft cooling tower system not regulated under a NESHAP.

(16) Replacement or repair of electrostatic precipitators, bags in baghouses and filters in other air filtration equipment.

(17) Heat exchanger cleaning and repair.

(18) Process vessel degreasing and cleaning to prepare for internal repairs.

(19) Stockpiled soils from soil remediation activities that are covered and waiting transportation for disposal.

(20) Paved and unpaved roads and parking lots with public access.

(21) Coal bunker and coal scale exhausts and associated dust collector vents.

(22) Asbestos abatement projects regulated by 326 IAC 14-10.

(23) Purging of gas lines and vessels that is related to routing maintenance and repair of buildings, structures, or vehicles at the source where air emissions from those activities would not be associated with any production process.

(24) Flue gas conditioning systems and associated chemicals such as the following: sodium sulfate, ammonia, and sulfur trioxide.

(25) Equipment used to collect any material that might be released during a malfunction, process upset, or spill cleanup, including catch tanks, temporary liquid separators, tanks, and fluid handling equipment.

(26) Blowdown for any of the following: sight glass; boiler; compressors; pumps; and cooling tower.

(27) On-site fire and emergency response training approved by the department.

(28) Emergency generators as follows:

(A) Gasoline generators not exceeding 110 horsepower.

(B) Diesel generators not exceeding 1600 horsepower.

(29) Stationary fire pumps.

(30) Vents from ash transport systems not operated at positive pressure.

(31) A laboratory as defined in 326 IAC 2-7-1(21)(D).

(32) One (1) No. 2 fuel oil storage tank, identified as the Generator Storage Tank, with a capacity of 40,000 gallons, and exhausting to the ambient air.

(33) One (1) fuel oil storage tank, constructed in 1979, with a capacity of 250,000 gallons.

(34) One 156.9 HP (100 kW), CI ICE with a displacement 4.4 liters, Diesel Fired Emergency Generator, Manufactured by Caterpillar Model Year 2007, Model D100-6, constructed in 2007, identified as ENG-1. This generator is located in the switch yard and is operated as backup for the black start diesel aux feed.

(35) One 713 Hp (450 kW), CI ICE with a displacement 15.2 liters, Diesel Fired Emergency Engine, Manufactured by Caterpillar, Model Year 2007, Model C15DITA, constructed in 2007, identified as ENG-2. This engine is use to quench the fuel gas if the scrubber should fail.

## Existing Approvals

Since the issuance of the Part 70 Operating Permit 165-27260-00001 on August 20, 2009, the source has constructed or has been operating under the following additional approvals:

(a) Administrative Amendment No. 165-28471-00001, issued on October 20, 2009;

(b) Acid Rain Permit No. 165-29750-00001, issued on January 4, 2011;

(c) Temporary Operation No. 165-31135-00001, issued on November 28, 2011;

(d) Temporary Operation No. 165-31235-00001, issued on December 19, 2011;

(e) Temporary Operation No. 165-31882-00001, issued on June 14, 2012;

(f) Significant Source Modification No. 165-32045-00001, issued on September 5, 2012;

(g) Significant Permit Modification No. 165-32048-00001, issued on September 27, 2012.

(h) Significant Source Modification No. 165-33709-00001, issued on November 27, 2013; and

(i) Significant Permit Modification No. 165-33744-00001, issued on December 19, 2013.

## Enforcement Issue

There are no enforcement actions pending.

## Emission Calculations

See Appendix A of this document for detailed emission calculations.

## County Attainment Status

The source is located in Vermillion County.

| Pollutant | Designation |
|---|---|
| $SO_2$ | Better than national standards. |
| CO | Unclassifiable or attainment effective November 15, 1990. |
| $O_3$ | Unclassifiable or attainment effective July 20, 2012, for the 2008 8-hour ozone standard.[1] |
| $PM_{2.5}$ | Unclassifiable or attainment effective April 5, 2005, for the annual $PM_{2.5}$ standard. |

| Pollutant | Designation |
|---|---|
| $PM_{2.5}$ | Unclassifiable or attainment effective December 13, 2009, for the 24-hour $PM_{2.5}$ standard. |
| $PM_{10}$ | Attainment effective October 27, 1997, for the part of Clinton Township that includes sections 15, 16, 21, 22, 27, 28, 33, and 34. Unclassifiable effective November 15, 1990, for the remainder of Vermillion County. |
| $NO_2$ | Cannot be classified or better than national standards. |
| Pb | Unclassifiable or attainment effective December 31, 2011. |
| [1]Unclassifiable or attainment effective October 18, 2000, for the 1-hour ozone standard which was revoked effective June 15, 2005. | |

(a) Ozone Standards
Volatile organic compounds (VOC) and Nitrogen Oxides ($NO_x$) are regulated under the Clean Air Act (CAA) for the purposes of attaining and maintaining the National Ambient Air Quality Standards (NAAQS) for ozone. Therefore, VOC and $NO_x$ emissions are considered when evaluating the rule applicability relating to ozone. Vermillion County has been designated as attainment or unclassifiable for ozone. Therefore, VOC and $NO_x$ emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2.

(b) $PM_{2.5}$
Vermillion County has been classified as attainment for $PM_{2.5}$. On May 8, 2008, U.S. EPA promulgated the requirements for Prevention of Significant Deterioration (PSD) for $PM_{2.5}$ emissions. These rules became effective on July 15, 2008. On May 4, 2011, the air pollution control board issued an emergency rule establishing the direct $PM_{2.5}$ significant level at ten (10) tons per year. This rule became effective June 28, 2011. Therefore, direct $PM_{2.5}$, $SO_2$, and NOx emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2.

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

## Fugitive Emissions

Since this source is classified as a utility boiler totaling more than 250 MMBtu/hr, it is considered one of the twenty-eight (28) listed source categories, as specified in 326 IAC 2-2, 326 IAC 2-3, or 326 IAC 2-7. Therefore, fugitive emissions are counted toward the determination of PSD, Emission Offset, and Part 70 Permit applicability.

## Unrestricted Potential Emissions

This table reflects the unrestricted potential emissions of the source.

| Unrestricted Potential Emissions | |
|---|---|
| Pollutant | Tons/year |
| PM | 199,179 |
| $PM_{10}$ | 46,914 |
| $PM_{2.5}$ | 46,803 |
| $SO_2$ | 248,100 |

| Unrestricted Potential Emissions | |
|---|---|
| Pollutant | Tons/year |
| VOC | 120 |
| CO | 1,019 |
| $NO_x$ | 21,857 |
| GHGs as $CO_2e$* | 9,678,771 |
| GHGs as $CO_2e$** | 9,680,364 |

Note:* CO2e based on 11/29/2013 federal GWPs
** CO2e based on 10/30/2009 federal GWPs

| HAPs | tons/year |
|---|---|
| Single HAP | > 10 |
| Total HAP | > 25 |

Appendix A of this TSD reflects the unrestricted potential emissions of the source.

(a) The potential to emit (as defined in 326 IAC 2-7-1(29)) of PM10, PM2.5, SO2, CO, VOC and NOx are equal to or greater than 100 tons per year. Therefore, the source is subject to the provisions of 326 IAC 2-7 and will be issued a Part 70 Operating Permit Renewal.

(b) The potential to emit (as defined in 326 IAC 2-7-1(29)) of GHGs is equal to or greater than one hundred thousand (100,000) tons of $CO_2$ equivalent emissions ($CO_2e$) per year. Therefore, the source is subject to the provisions of 326 IAC 2-7 and will be issued a Part 70 Operating Permit Renewal.

(c) The potential to emit (as defined in 326 IAC 2-7-1(29)) of any single HAP is equal to or greater than ten (10) tons per year and/or the potential to emit (as defined in 326 IAC 2-7-1(29)) of a combination of HAPs is equal to or greater than twenty-five (25) tons per year. Therefore, the source is subject to the provisions of 326 IAC 2-7.

**Actual Emissions**

The following table shows the actual emissions as reported by the source. This information reflects the 2012 OAQ emission data.

| Pollutant | Actual Emissions (tons/year) |
|---|---|
| PM | --- |
| $PM_{10}$ | 288 |
| $PM_{2.5}$ | 80 |
| $SO_2$ | 3,223 |
| VOC | 67 |
| CO | 576 |
| $NO_x$ | 7,583 |
| Lead | 0.46 |
| Ammonia | 3 |

## Part 70 Permit Conditions

This source is subject to the requirements of 326 IAC 2-7, because the source met the following:

(a) Emission limitations and standards, including those operational requirements and limitations that assure compliance with all applicable requirements at the time of issuance of Part 70 permits.

(b) Monitoring and related record keeping requirements which assume that all reasonable information is provided to evaluate continuous compliance with the applicable requirements.

## Potential to Emit After Issuance

The table below summarizes the potential to emit, reflecting all limits, of the emission units. Any new control equipment is considered federally enforceable only after issuance of this Part 70 permit renewal, and only to the extent that the effect of the control equipment is made practically enforceable in the permit.

| | Potential to Emit (ton/yr) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Process / Emission Unit** | **PM** | **$PM_{10}$** | **$PM_{2.5}$*** | **$SO_2$** | **VOC** | **CO** | **$NO_X$** | **GHGs as CO2e*/ GHG as CO2e**** | **HAPs** |
| Boiler 1 | 987 | 227 | 227 | 61913 | 59 | 494 | 5431 | 4774180/ 4774970 | 1340 |
| Boiler 2 | 987 | 227 | 227 | 61913 | 59 | 494 | 5431 | 4774180/ 4774970 | 1340 |
| Generator Unit 3A | 1.9 | 2.2 | 2 | 67 | 0.3 | 4.7 | 19 | 20257/ 20259 | 0.003 |
| Generator Unit 3B | 1.9 | 2.2 | 2 | 67 | 0.3 | 4.7 | 19 | 20257/ 20259 | 0.003 |
| Generator Unit 3C | 1.9 | 2.2 | 2 | 67 | 0.3 | 4.7 | 19 | 20257/ 20259 | 0.003 |
| Generator Unit 3D | 1.9 | 2.2 | 2 | 67 | 0.3 | 4.7 | 19 | 20257/ 20259 | 0.003 |
| Lime Handling | 3.82 | 1.41 | 1.41 | 0 | 0 | 0 | 0 | 0 | 0 |
| Traffic on Limestone piles | 0.85 | 0.24 | 0.24 | 0 | 0 | 0 | 0 | 0 | 0 |
| Limestone piles | 0.2 | 0.09 | 0.09 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gypsum Conveying System | 0.06 | 0.02 | 0.02 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gypsum Piles | 0.13 | 0.06 | 0.06 | 0 | 0 | 0 | 0 | 0 | 0 |

| | Potential to Emit (ton/yr) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Process / Emission Unit** | **PM** | **$PM_{10}$** | **$PM_{2.5}$*** | **$SO_2$** | **VOC** | **CO** | **$NO_X$** | **GHGs as CO2e*/ GHG as CO2e**** | **HAPs** |
| Traffic on Gypsum Piles | 0.83 | 0.21 | 0.21 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gypsum Transfer Truck Traffic | 18.4 | 3.6 | 3.6 | 0 | 0 | 0 | 0 | 0 | 0 |
| Auxiliary Boiler | 4.6 | 5.2 | 3.5 | 179 | 0.5 | 11.4 | 55 | 49130/ 49135 | 0.011 |
| Emergency Gen ENG - 1 | 0.09 | 0.09 | 0.09 | 0.08 | 0.1 | 0.26 | 1.22 | 45.3/45.3 | 0.001 |
| Emergency Gen ENG - 2 | 0.12 | 0.07 | 0.07 | 0.72 | 0.13 | 0.98 | 4.3 | 208/208 | 0.002 |
| **SCR System (Ammonia)** | | | | | | | | | |
| Roadway Emissions - NH3 delivery F- 01 | 0.010 | 0.020 | 0.005 | 0 | 0 | 0 | 0 | 0 | 0 |
| **SCR System (Includes DSI Lime Silos)** | | | | | | | | | |
| Sorbent Silo #1 for Unit #1 EP01 | 0.19 | 0.19 | 0.19 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sorbent Silo #1 for Unit #2 EP03 | 0.19 | 0.19 | 0.19 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sorbent Silo Weight Feeders EP-05A(DSI) | 0.04 | 0.04 | 0.04 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sorbent Silo Weight Feeders EP-05B(DSI) | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Sorbent Silo Weight Feeders EP-06A(DSI) | 0.04 | 0.04 | 0.04 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sorbent Silo Weight Feeders EP-06A(DSI) | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Roadway Emissions - sorbent delivery F- 01 | 0.37 | 0.007 | 0.018 | 0 | 0 | 0 | 0 | 0 | 0 |
| **SCR System (Limestone)** | | | | | | | | | |
| Limestone Silo EP01 (LS) | 0.41 | 0.41 | 0.41 | 0 | 0 | 0 | 0 | 0 | 0 |
| Limestone Surge Bin EP02 (LS) | 0.41 | 0.41 | 0.41 | 0 | 0 | 0 | 0 | 0 | 0 |

| | Potential to Emit (ton/yr) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Process / Emission Unit** | **PM** | **$PM_{10}$** | **$PM_{2.5}$*** | **$SO_2$** | **VOC** | **CO** | **$NO_X$** | **GHGs as CO2e*/ GHG as CO2e**** | **HAPs** |
| Transfer Point to C1 Conveyor F01 | 0.004 | 0.001 | 0.001 | 0 | 0 | 0 | 0 | 0 | 0 |
| Transfer Point to C1 Conveyor F02 | 0.004 | 0.001 | 0.001 | 0 | 0 | 0 | 0 | 0 | 0 |
| Roadway Emissions - limestone delivery F03 | 0.42 | 0.08 | 0.021 | 0 | 0 | 0 | 0 | 0 | 0 |
| **ACI System** | | | | | | | | | |
| Activated Carbon Silo #1 EP01 | 0.19 | 0.19 | 0.19 | 0 | 0 | 0 | 0 | 0 | 0 |
| Activated Carbon Silo #2 EP02 | 0.19 | 0.19 | 0.19 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carbon Silo Weight Feeders EP-03A(ACI) | 0.04 | 0.04 | 0.04 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carbon Silo Weight Feeders EP-04A(ACI) | 0.04 | 0.04 | 0.04 | 0 | 0 | 0 | 0 | 0 | 0 |
| Roadway Emissions - Carbon delivery F01 | 0.06 | 0.012 | 0.003 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Dry Fly Ash System** | | | | | | | | | |
| Exhauster for 1A Baghouse Seprator EP01 | 0.92 | 0.92 | 0.92 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exhauster for 1B Baghouse Seprator EP02 | 0.92 | 0.92 | 0.92 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exhauster for 2A Baghouse Seprator EP03 | 0.92 | 0.92 | 0.92 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exhauster for 2B Baghouse Seprator EP04 | 0.92 | 0.92 | 0.92 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spare Exhauster | -- | -- | -- | 0 | 0 | 0 | 0 | 0 | 0 |
| Fly Ash Silo #1 | 0.92 | 0.92 | 0.92 | 0 | 0 | 0 | 0 | 0 | 0 |

| | Potential to Emit (ton/yr) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Process / Emission Unit** | **PM** | **$PM_{10}$** | **$PM_{2.5}$*** | **$SO_2$** | **VOC** | **CO** | **$NO_X$** | **GHGs as CO2e*/ GHG as CO2e**** | **HAPs** |
| Flyash Silo #1 Truck Loadout | 0.037 | 0.017 | 0.003 | 0 | 0 | 0 | 0 | 0 | 0 |
| Flyash Silo #2 Truck Loadout | 0.037 | 0.017 | 0.003 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Fixation System** | | | | | | | | | |
| Roadway Emissions - Lime delivery | 0.2 | 0.04 | 0.01 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lime Silo EP-02 (FIX) | 0.45 | 0.45 | 0.45 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gypsum Transfer Point | 0.079 | 0.037 | 0.006 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fixation Building Transfer Point | 0.125 | 0.059 | 0.009 | 0 | 0 | 0 | 0 | 0 | 0 |
| Radial Stacker Conveyor Transfer Point | 0.125 | 0.059 | 0.009 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Pile Transfer Point | 0.125 | 0.059 | 0.009 | 0 | 0 | 0 | 0 | 0 | 0 |
| Activity on Storage Pile | 3.22 | 0.87 | 0.087 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fixation Material loaded into trucks | 0.125 | 0.059 | 0.009 | 0 | 0 | 0 | 0 | 0 | 0 |
| Waste pile wind erosion | 0.354 | 0.18 | 0.03 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total Emissions** | 2023 | 482 | 478 | 124272 | 120 | 1019 | 10997 | 9678771/ 9680364 | 2680 |
| Title V Major Source Thresholds | NA | 100 | 100 | 100 | 100 | 100 | 100 | 100,000 $CO_2e$ | 10/25 |
| PSD Major Source Thresholds | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100,000 $CO_2e$ | NA |

Note:* CO2e based on 11/29/2013 federal GWPs
** CO2e based on 10/30/2009 federal GWPs

(a) This existing stationary source is major for PSD because the emissions of at least one regulated criteria pollutant are greater than one hundred (>100) tons per year, and it is in one of the twenty-eight (28) listed source categories.

(b) GHG emissions are equal to or greater than one hundred thousand (>100,000) tons of $CO_2$ equivalent ($CO_2e$) emissions per year.

## Federal Rule Applicability

(a) Pursuant to 40 CFR 64.2, Compliance Assurance Monitoring (CAM) is applicable to each existing pollutant-specific emission unit that meets the following criteria:

(1) has a potential to emit before controls equal to or greater than the major source threshold for the pollutant involved;

(2) is subject to an emission limitation or standard for that pollutant; and

(3) uses a control device, as defined in 40 CFR 64.1, to comply with that emission limitation or standard.

The following table is used to identify the applicability of each of the criteria, under 40 CFR 64.1, to each existing emission unit and specified pollutant subject to CAM:

| CAM Applicability Analysis | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Emission Unit** | **Control Device Used** | **Emission Limitation** (Y/N) | **Uncontrolled PTE** (ton/yr) | **Controlled PTE** (ton/yr) | **Part 70 Major Source Threshold** (ton/yr) | **CAM Applicable** (Y/N) | **Large Unit** (Y/N) |
| Boiler No. 1 (PM) | Y | Y | 98745 | 987 | 100 | Y | Y |
| Boiler No. 1 (PM10) | N | N | 22711 | 227 | 100 | N | N |
| Boiler No. 1 (SO2) | Y | Y | 123827 | 61913 | 100 | Y | Y |
| Boiler No. 1 (NOx) | Y | N | 10861 | 5431 | 100 | N | N |
| Boiler No. 2 (PM) | Y | Y | 98745 | 987 | 100 | Y | Y |
| Boiler No. 2 (PM10) | N | N | 22711 | 227 | 100 | N | N |
| Boiler No. 2 (SO2) | Y | Y | 123827 | 61913 | 100 | Y | Y |
| Boiler No. 2 (NOx) | Y | N | 10861 | 5431 | 100 | N | N |
| Conveyor Coal Processing System (DP-1, DP-3, DP-4, DP-5, DP-6, DP-7, DP-8, DP-13) | N | Y | < 100 | < 100 | 100 | N | N |
| Limestone Handling and Storage System (EP-L1, EP-L2, EP-L16, EP-L17, EP-L18a,b,c) | N | Y | < 100 | < 100 | 100 | N | N |
| Baghouse Separator EP-01 PM | Y | Y | 112.6 | 1.14 | 100 | Y | N |
| Baghouse Separator EP-01 PM10 | Y | Y | 112.6 | 0.79 | 100 | Y | N |
| Baghouse Separator EP-01 PM2.5 | Y | Y | 112.6 | 0.57 | 100 | Y | N |
| Baghouse Separator EP-02 PM | Y | Y | 112.6 | 1.14 | 100 | Y | N |
| Baghouse | | | 112.6 | 0.79 | 100 | Y | N |

| CAM Applicability Analysis | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Emission Unit** | **Control Device Used** | **Emission Limitation** (Y/N) | **Uncontrolled PTE** (ton/yr) | **Controlled PTE** (ton/yr) | **Part 70 Major Source Threshold** (ton/yr) | **CAM Applicable** (Y/N) | **Large Unit** (Y/N) |
| Separator EP-02 PM10 | Y | Y | | | | | |
| Baghouse Separator EP-02 PM2.5 | Y | Y | 112.6 | 0.57 | 100 | Y | N |
| Baghouse Separator EP-03 PM | Y | Y | 112.6 | 1.14 | 100 | Y | N |
| Baghouse Separator EP-03 PM10 | Y | Y | 112.6 | 0.79 | 100 | Y | N |
| Baghouse Separator EP-03 PM2.5 | Y | Y | 112.6 | 0.57 | 100 | Y | N |
| Baghouse Separator EP-04 PM | Y | Y | 112.6 | 1.14 | 100 | Y | N |
| Baghouse Separator EP-04 PM10 | Y | Y | 112.6 | 0.79 | 100 | Y | N |
| Baghouse Separator EP-04 PM2.5 | Y | Y | 112.6 | 0.57 | 100 | Y | N |
| Spare Exhauster EP-05 PM | Y | Y | 112.6 | 1.14 | 100 | Y | N |
| Spare Exhauster EP-05 PM10 | Y | Y | 112.6 | 0.79 | 100 | Y | N |
| Spare Exhauster EP-05 PM2.5 | Y | Y | 112.6 | 0.57 | 100 | Y | N |
| Fly Ash Silo#1 EP-06 PM | Y | Y | 262.8 | 2.63 | 100 | Y | N |
| Fly Ash Silo#1 EP-06 PM10 | Y | Y | 262.8 | 1.84 | 100 | Y | N |
| Fly Ash Silo#1 EP-06 PM2.5 | Y | Y | 262.8 | 1.31 | 100 | Y | N |
| Fly Ash Silo#2 EP-07 PM | Y | Y | 262.8 | 2.63 | 100 | Y | N |
| Fly Ash Silo#2 EP-07 PM10 | Y | Y | 262.8 | 1.84 | 100 | Y | N |
| Fly Ash Silo#2 EP-07 PM2.5 | Y | Y | 262.8 | 1.31 | 100 | Y | N |

Based on this evaluation, the requirements of 40 CFR Part 64, CAM are applicable to Boiler 1 and Boiler 2 for PM and $SO_2$. A CAM plan has been submitted and the Compliance Determination and

Monitoring Requirements section includes a detailed description of the CAM requirements. Pursuant to 40 CFR 64.2(b)(1)(vi), the requirements of 40 CFR Part 64 (CAM) shall not apply to emission limitations or standards for which a Part 70 permit specifies a continuous compliance determination method. Since compliance with the $SO_2$ emission limitations in the Part 70 permit is specified to be determined by continuous emissions monitoring systems (CEMS), CAM is not applicable to Boilers 1 and 2 for $SO_2$ emissions.

Based on this evaluation, the requirements of 40 CFR Part 64, CAM are applicable to Baghouse Separator EP-01, EP-02, EP-03, EP-04, EP-05 Fly Ash Silo#1 EP-06 and Fly Ash Silo#2 EP-07 for PM, $PM_{10}$, and $PM_{2.5}$ upon issuance of this renewal. A CAM plan has been incorporated into this Part 70 operating permit.

The other emission units have the potential to emit regulated pollutants (uncontrolled) less than the major source thresholds, therefore are not subject to the requirements of CAM.

(b) Boiler No. 1 and Boiler No. 2 are not subject to the requirements of the New Source Performance Standard, 326 IAC 12, (40 CFR 60.40, Subpart D-Standards of Performance for Fossil-Fuel-Fired Steam Generators for Which Construction is Commenced After August 17, 1971), because construction on these boilers commenced prior to August 17, 1971, as determined by the United States District Court for the Southern District of Indiana in the case of United States of America v. Public Service Company of Indiana, Inc. on September 30, 1977.

(c) The coal processing is not subject to the requirements of the New Source Performance Standard, 326 IAC 12 (40 CFR 60, Subpart Y, Standards of Performance for Coal Preparation Plants) because the coal processing and conveying equipment, storage systems, and transfer and loading systems were all constructed before October 24, 1974, and have not been modified after that date.

(d) The degreasing station is not subject to the National Emission Standards for Hazardous Air Pollutants, 326 IAC 20-6-1 (40 CFR 63, Subpart T) because the solvents listed in 40 CFR 63.460(a) are not used.

(e) The two (2) dry sorbent injection system are subject to the requirements of the New Source Performance Standard, 40 CFR 60, Subpart OOO, Standards of Performance for Nonmetallic Mineral Processing Plants, because the proposed project may involve milling of trona which is considered as a nonmetallic mineral as defined in 40 CFR 60.671. The specific facility subject to this rule includes the following.

(1) Two (2) Dry Sorbent Injection (DSI) Systems, one for each Unit. Each DSI system consists of (2) two Sorbent Storage Silos with a storage capacity of 120 tons and system to inject the sorbent material into the flue gas to be constructed in 2012. PM emissions generated during loading operations are controlled by a Bin Vent Filter located on the top of each silo. The four (4) Sorbent Silos are identified as emission points EP-01(DSI), EP-02(DSI, EP-03(DSI), and EP-04(DSI).

The two (2) Dry Sorbent Injection (DSI) Systems are subject to the following sections of 40 CFR Part 60, Subpart OOO.

(1) 40 CFR 60.670
(2) 40 CFR 60.671
(3) 40 CFR 60.672
(4) 40 CFR 60.673
(5) 40 CFR 60.674
(6) 40 CFR 60.675

(7) 40 CFR 60.676
(8) Table 1 to Subpart OOO
(9) Table 2 to Subpart OOO
(10) Table 3 to Subpart OOO

(f) The Diesel Fired Emergency Generator, ENG-1 and Diesel Fired Emergency Engine, ENG-2 are subject to the New Source Performance Standard, 326 IAC 12, 40 CFR 60, Subpart IIII (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines).

(1) One 156.9 HP (100 kW), CI ICE with a displacement 4.4 liters, Diesel Fired Emergency Generator, Manufactured by Caterpillar Model Year 2007, Model D100-6, constructed in 2007, identified as ENG-1. This generator is located in the switch yard and is operated as backup for the black start diesel aux feed.

(2) One 713 Hp (450 kW), CI ICE with a displacement 15.2 liters, Diesel Fired Emergency Engine, Manufactured by Caterpillar, Model Year 2007, Model C15DITA, constructed in 2007, identified as ENG-2. This engine is use to quench the fuel gas if the scrubber should fail.

The Diesel Fired Emergency Generator, ENG-1 and Diesel Fired Emergency Engine, ENG-2 are subject to the following portions of Subpart IIII:

1. 40 CFR 60.4202
2. 40 CFR 60.4205(b)
3. 40 CFR 60.4207(a) & (b)
4. 40 CFR 60.4209(a)
5. 40 CFR 60.4211(a),(c) & (e)
6. 40 CFR 60.4214(b)

(g) The Diesel Fired Emergency Engine, ENG-2, is subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP), 326 IAC 20-82, 40 CFR 63, Subpart ZZZZ (Stationary Reciprocating Internal Combustion Engines).

(1) One 713 Hp (450 kW), CI ICE with a displacement 15.2 liters, Diesel Fired Emergency Engine, Manufactured by Caterpillar, Model Year 2007, Model C15DITA, constructed in 2007, identified as ENG-2. This engine is use to quench the fuel gas if the scrubber should fail.

The Diesel Fired Emergency Engine, ENG-2 is subject to the following portions of Subpart ZZZZ:

1. 40 CFR 63.6590(b) & (c)
2. 40 CFR 63.6645(f)

(h) Clean Air Interstate Rule (CAIR)
Boiler 1 and Boiler 2 are subject to the Clean Air Interstate Rule (CAIR) Nitrogen Oxides Annual, Sulfur Dioxide, and Nitrogen Oxides Ozone Season Trading Programs – CAIR Permit for CAIR Units Under 40 CFR 97.

On July 11, 2008, the D.C. Circuit Court identified flaws in the federal Clean Air Interstate Rule (CAIR) and remanded the rule to the U.S. EPA. On December 23, 2008, the U.S. Court of Appeals for the D.C. Circuit decided to remand CAIR to the U.S. EPA without vacature, allowing CAIR to remain in effect until it is replaced by a rule that remedies the flaws identified by the Court.

The federal and state provisions of CAIR will be incorporated into this Part 70 Operating Permit Renewal.

(i) Acid Deposition Control
The two coal fired boilers, identified as Boiler 1 and Boiler 2 are subject to the requirement of 326 IAC 21 which is incorporates the provisions of 40 CFR 72 through 40 CFR 78 for the purposes of implementing an acid rain program that meets the requirements of Title IV of the Clean Air Act and to incorporate monitoring, record keeping, and reporting requirements for nitrogen oxide and sulfur dioxide emissions to demonstrate compliance with nitrogen oxides and sulfur dioxide emission reduction requirements.

**State Rule Applicability - Entire Source**

326 IAC 1-6-3 (Preventive Maintenance Plan)
The source is subject to 326 IAC 1-6-3.

326 IAC 1-5-2 (Emergency Reduction Plans)
The source is subject to 326 IAC 1-5-2.

326 IAC 2-2 (Prevention of Significant Deterioration (PSD))
This existing source is subject to the requirements of 326 IAC 2-2 (PSD) because the potential to emit of at least one regulated pollutant is greater than 100 tons per year and it is one of the twenty-eight (28) listed sources. This source is a major source under 326 IAC 2-2 (PSD).

326 IAC 2-6 (Emission Reporting)
This source is subject to 326 IAC 2-6 (Emission Reporting) because it is required to have an operating permit pursuant to 326 IAC 2-7 (Part 70). The potential to emit of PM10 is greater than 250 tons per year, and the potential to emit of NOx and SO2 are greater than 2,500 tons per year. Therefore, pursuant to 326 IAC 2-6-3(a)(1), annual reporting is required. An emission statement shall be submitted by July 1, 2014, and every year thereafter. The emission statement shall contain, at a minimum, the information specified in 326 IAC 2-6-4.

326 IAC 5-1 (Opacity Limitations)
This source is subject to the opacity limitations specified in 326 IAC 5-1-2(1)

326 IAC 6-4 (Fugitive Dust Emissions)
Pursuant to 326 IAC 6-4 (Fugitive Dust Emissions), the Permittee shall be in violation of 326 IAC 6-4 (Fugitive Dust Emissions) if any of the criteria specified in 326 IAC 6-4-2(1) through (4) are violated pursuant to 326 IAC 6-4-5(c). Observations of visible emissions crossing the property line of the source at or near ground level must be made by a qualified representative of IDEM.

326 IAC 6-5 (Fugitive Particulate Matter Emission Limitations)
The source is subject to the requirements of 326 IAC 6-5, because the paved and unpaved roads, coal handling equipment, and slag handling have potential fugitive particulate emissions greater than 25 tons per year. The source has submitted a fugitive dust plan.

326 IAC 6.5 PM Limitations Except Lake County
This source is not subject to 326 IAC 6.5 because it is not located in one of the following counties: Clark, Dearborn, Dubois, Howard, Marion, St. Joseph, Vanderburgh, Vigo or Wayne.

326 IAC 6.8 PM Limitations for Lake County
This source is not subject to 326 IAC 6.5 because it is not located in Lake County.

326 IAC 7-3 (Ambient Monitoring)

(a) The Permittee shall operate continuous ambient sulfur dioxide air quality monitors and a meteorological data acquisition system according to a monitoring plan submitted to the commissioner for approval. The monitoring plan shall include requirements listed in 326 IAC 7-3-2(a)(1), 326 IAC 7-3-2(a)(2) and 326 IAC 7-3-2(a)(3).

(b) The Permittee and other operators subject to the requirements of this rule, located in the same county, may submit a joint monitoring plan to satisfy the requirements of this rule. [326 IAC 7-3-2(c)]

(c) The Permittee may petition the commissioner for an administrative waiver of all or some of the requirements of 326 IAC 7-3 if such owner or operator can demonstrate that ambient monitoring is unnecessary to determine continued maintenance of the sulfur dioxide ambient air quality standards in the vicinity of the source. [326 IAC 7-3-2(d)].

**State Rule Applicability – Individual Facilities**

326 IAC 3-5 (Continuous Monitoring of Emissions)
The natural gas-fired combustion turbine, identified as Unit 4 is subject to the monitoring requirements of 326 IAC 3-5. In order to comply with the NSPS requirements under 40 CFR 60.48b, the source will install a CEMS system on Unit 4 to monitor NOx and either $O_2$ or $CO_2$.

326 IAC 5-1-3 (Temporary Alternative Opacity Limitations)
Pursuant to 326 IAC 5-1-3(e) (Temporary Alternative Opacity Limitations), the following applies:

(a) When building a new fire in a boiler, opacity may exceed the 40% opacity limitation established in 326 IAC 5-1-2 for a period not to exceed a total of four (4) hours (forty (40) six (6)-minute averaging periods, consecutive or non-consecutive) or until the flue gas temperature reaches two hundred fifty (250) degrees Fahrenheit, whichever occurs first. Operation of the electrostatic precipitator is not required during these times.

(b) When shutting down a boiler, opacity may exceed the 40% opacity limitation established in 326 IAC 5-1-2 for a period not to exceed a total of four (4) hours (forty (40) six (6)-minute averaging periods, consecutive or non-consecutive).

(c) Permittee is also allowed one start up and one shut down per calendar year as follows:

(i) When building a new fire in a boiler, opacity may exceed the 40% opacity limitation established in 326 IAC 5-1-2 for a period not to exceed a total of seven (7) hours (seventy (70) six (6)-minute averaging periods, consecutive or non-consecutive) or until the flue gas temperature reaches two hundred fifty (250) degrees Fahrenheit, whichever occurs first.

(ii) When shutting down a boiler, opacity may exceed the 40% opacity limitation established in 326 IAC 5-1-2 for a period not to exceed a total of five (5) hours (fifty (50) six (6)-minute averaging periods, consecutive or non-consecutive).

(d) When removing ashes from the fuel bed or furnace in a boiler or blowing tubes, opacity may exceed the applicable limit established in 326 IAC 5-1-2. However, opacity levels shall not exceed sixty percent (60%) for any six (6)-minute averaging period and opacity in excess of the applicable limit shall not continue for more than one (1) six (6)-minute averaging period in any sixty (60) minute period. The averaging periods shall not be permitted for more than three (3) six (6)-minute averaging periods in a twelve (12) hour period. [326 IAC 5-1-3(b)]

326 IAC 6-2-3 (Particulate Matter Emissions Limitations for Sources of Indirect Heating)

(a) Pursuant to 326 IAC 6-2-3 (Particulate Matter Emissions Limitations for Sources of Indirect Heating), the PM emissions from Boilers No. 1 and 2 shall each be limited to 0.227 pounds per million Btu heat input based on each boiler having a heat input capacity of 4802 million Btu per hour. These limitations will satisfy the requirement to maintain PM emissions below the amounts assumed in the PSD modeling analysis that was performed for the turbines. The limitation was calculated using the following equation:

$$Pt = \frac{(C)\ (a)\ (h)}{76.5\ (Q^{0.75})\ (N^{0.25})}$$

Where:

C = 50 F/m3
Q = 9,604 MMBtu/hr (capacity of Boilers 1-2)
N = 2 (number of stacks)
a = 0.8
h = 500 Feet (average stack height)

(b) Pursuant to 326 IAC 6-2-3 (Particulate Emission Limitations for Sources of Indirect Heating: Emission limitations for facilities specified in 326 IAC 6-2-1(c), the PM emissions from the Auxiliary Boiler stack shall not exceed 0.233 pound per million Btu heat input (lbs/MMBtu). This limitation was calculated using the following equation:

$$Pt = \frac{(C)\ (a)\ (h)}{76.5\ (Q^{0.75})\ (N^{0.25})}$$

Where:

C = 50 $\mu/m^3$
Q = 9,677 MMBtu/hr (capacity of Boilers1-2 and Auxiliary)
N = 3 (number of stacks)
a = 0.8
h = 573.7 feet (average stack height)

326 IAC 6-3-2 (Particulate Emission Limitations for Manufacturing Processes**)**

(a) Pursuant to 326 IAC 6-3-2 (Particulate Emission Limitations for Manufacturing Processes), the particulate emission rate from the coal processing drop points, coal scale exhausts, and coal bunkers shall not exceed 86.19 pounds per hour when operating at a process weight rate of 1900 tons per hour. This is determined by the following equation:

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

When the process weight exceeds two hundred (200) tons/hour, the maximum allowable emission may exceed 86.19 pounds per hour, provided the concentration of particulate matter in the discharge gases to the atmosphere is less than 0.10 pounds per one thousand (1,000) pounds of gases.

(b) Pursuant to 326 IAC 6-3-2 (Particulate Emission Limitations for Manufacturing Processes), particulate emissions from the following emission units at the limestone handling and storage system, and the gypsum conveying system shall not exceed the emission limits listed in the table below while operating at the maximum throughput rate:

| Unit Description | Max. Throughput Rate (tons/hr) | Particulate Emission Limit (lbs/hr) |
|---|---|---|
| Railcar/Truck Unloading Operation | 1,000 | 77.6 |
| Each of the Hoppers | 500 | 69.0 |
| Each of the Belt Feeders (LHBF-1 and LHBF-2) | 500 | 69.0 |
| Each of the Reclaim Hoppers | 200 | 58.5 |
| Each of the Belt Feeders (LHBF-3 and LHBF-4) | 200 | 58.5 |
| Gypsum Conveying System | 150 | 55.4 |

The limitations for these facilities were calculated using the following equations. 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

Pursuant to 326 IAC 6-3-2(e)(3), when the process weight exceeds 200 tons per hour, the maximum allowable emission may exceed that shown in this table, provided the concentration of particulate matter in the gas discharged to the atmosphere is less than 0.10 pounds per 1,000 pounds of gases.

(c) Pursuant to 326 IAC 6-3-2, the allowable particulate matter (PM) from the (2) Sorbent Silos, (1) Lime Silo (1) Limestone Silo and (2) Activated Carbon Silos shall not exceed 30.5 pounds per hour each when operating at a process weight rate of 20 tons per hour. The pound per hour limitation was calculated with the following equation:

$E = 4.1\ P^{0.67}$
Where:
E = rate of emission in pounds per hour and
P = process weight rate in tons per hour

(d) Pursuant to 326 IAC 6-3-2, the particulate matter (PM) from the (1) Limestone Surge Bin shall not exceed 40.0 pounds per hour when operating at a process weight rate of 30 tons per hour each. The pound per hour limitation was calculated with the following equation:

$E = 4.1\ P^{0.67}$
Where:
E = rate of emission in pounds per hour and
P = process weight rate in tons per hour

(e) Pursuant to 326 IAC 6-3-2, the particulate matter (PM) from (5) exhausters shall not exceed 45.4 pounds per hour each when operating at a process weight rate of 54.4 tons per hour. The pound per hour limitation was calculated with the following 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

(f) Pursuant to 326 IAC 6-3-2, the particulate matter (PM) from **the** ash silo shall not exceed 47.8 pounds per hour when operating at a process weight rate of 70 tons per hour. The pound per hour limitation was calculated with the following 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

326 IAC 7-1.1 Sulfur Dioxide Emission Limitations

(a) The generators, identified as 3A, 3B, 3C and 3D are subject to 326 IAC 326 IAC 7-1.1 because its $SO_2$ PTE is equal to or greater than 25 tons per year, each. Therefore, pursuant to 326 IAC 7-1.1 ($SO_2$ Emissions Limitations), the $SO_2$ emissions from each generator shall not exceed five-tenths (0.5) pound per million Btu heat input.

(b) The Auxiliary Boiler is subject to 326 IAC 326 IAC 7-1.1 because its $SO_2$ PTE is equal to or greater than 25 tons per year. Therefore, pursuant to 326 IAC 7-1.1 ($SO_2$ Emissions Limitations) the $SO_2$ emissions from the Auxiliary Boiler shall not exceed five tenths (0.5) pounds per MMBtu heat input when combusting distillate oil.

326 IAC 7-4-8 (Vermillion County Sulfur Dioxide ($SO_2$))
Pursuant to 326 IAC 7-4-8 (Vermillion County Sulfur Dioxide Emission Limitations), the $SO_2$ emissions from Boiler No. 1 and Boiler No. 2 shall not exceed 4.40 pounds per million Btu lbs/MMBtu), demonstrated using a thirty (30) day rolling average. This limitation will ensure that $SO_2$ emissions do not exceed the amount assumed in the modeling analysis performed for the Vermillion County $SO_2$ SIP limits.

326 IAC 8-3-2 (Cold Cleaner Operations)
The cold cleaning operations are subject to 326 IAC 8-3-2 (Cold Cleaner Operations). This rule applies to cold cleaner type degreasing facilities constructed after July 1, 1990.

326 IAC 8-3-8 (Material requirements for cold cleaning degreasers)
This source is subject to the provisions of 326 IAC 8-3-8 (Material requirements for cold cleaning degreasers) because the source is a user of solvents for use in cold cleaning degreasers. The source shall meet the material requirements for cold cleaning degreasers specified in 326 IAC 8-3-8(c) and record keeping requirements specified in 326 IAC 8-3-8(d) of this rule.

326 IAC 9-1 (Carbon Monoxide Emission Limits)
This source is not subject to 326 IAC 9-1 though it is a stationary source of CO emissions that commenced operation after March 21, 1972 but has CO emissions of less than 100 tons per year.

## Compliance Determination and Monitoring Requirements

Permits issued under 326 IAC 2-7 are required to ensure that sources can demonstrate compliance with all applicable state and federal rules on a continuous basis. All state and federal rules contain compliance provisions, however, these provisions do not always fulfill the requirement for a 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 Determination Requirements are included in the permit. The Compliance Determination Requirements in Section D of the permit are those conditions that are found directly within state and federal rules and the violation of which serves as grounds for enforcement action.

If the Compliance Determination Requirements are not sufficient to demonstrate continuous compliance, they will be supplemented with Compliance Monitoring Requirements, also in 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 source are as follows:

**Testing Requirements**

(a) PM, $PM_{10}$ and $PM_{2.5}$ Testing

| Emission Units | Control Device | Next Test date | Pollutants | Frequency of testing | Limits or requirements |
|---|---|---|---|---|---|
| Boilers 1 and 2 | ESP | NA | PM | Every two (2) years | 326 IAC 6-2-3 |
| Five (5) separator/exhausters, identified as emissions point EP-01(DFA), EP-02(DFA), EP-03(DFA), EP-04(DFA) and EP-05 (DFA), | Baghouse | Within 60 days of reaching maximum capacity but not later than 180 days after the startup | PM, $PM_{10}$ and $PM_{2.5}$ | Every five years | 326 IAC 2-2 |
| Three (3) Fly Ash Silos/Day Bin, identified as emission point EP-06(DFA), EP-07(DFA) and EP-01 (FIX) | Bin Vent Filter | Within 60 days of reaching maximum capacity but not later than 180 days after the startup | PM, $PM_{10}$ and $PM_{2.5}$ | Every five years | 326 IAC 2-2 |

(b) The compliance monitoring requirements applicable to this source are as follows

| Facilities | Control | Parameter | Frequency | Range/ Value | Excursions and Exceedances | Limits or requirements |
|---|---|---|---|---|---|---|
| Boilers 1 and 2 | Electrostatic Precipitator (ESP) | T-R sets in service and T-R electrical values of Primary and secondary voltages and Current. | Daily | > 90% T-R sets in service | Response Steps | 326 IAC 6-2-3 |
| Boilers 1 and 2 | Flue Gas Desulfurization (FGD) | Boiler load, recirculation pH, Slurry feed rate and number of recirculation pumps | Continuous | 4.40 lb/mmBtu for 30 day rolling weighted average | Response Steps | 326 IAC 7-4-8 |
| | | $SO_2$ CEMS | | | | |

| **Facilities** | **Control** | **Parameter** | **Frequency** | **Range/ Value** | **Excursions and Exceedances** | **Limits or requirements** |
|---|---|---|---|---|---|---|
| Boilers 1 and 2 | NA | Opacity COM | Continuous | < 25% for 3 consecutive 6 minute intervals | Response Steps | 326 IAC 5-1-3 |
| Auxiliary Boiler | NA | Visible Emissions | Daily | Normal / Abnormal | Response Steps | 326 IAC 6-2-3 |
| Transfer points and Coal unloading station(s) doorways and drop points | NA | Visible Emissions | Once per week | Normal / Abnormal | Response Steps | 326 IAC 6-3-2 |
| Transfer points and ball mill and partially enclosed railcar limestone unloading station | | | | | | |
| Ash storage pond area(s) | | | | | | |
| Limestone transfer points | | | | | | |
| Gypsum transfer points | | | | | | |
| One (1) Limestone Silo, One (1) Limestone Surge Bin, Two (2) ACI Silos, Four (4) DSI Silos, and One (1) Lime Silo | Bin Vent Filter | Visible Emissions | Weekly | Normal-Abnormal | Response Steps | 326 IAC 2-2 and 40 CFR 64 |
| Four (4) baghouse separator exhausters | Baghouse | Water Pressure Drop | Daily | 1.0 to 6.0 inches | | |
| | | Visible Emissions | | Normal-Abnormal | | |
| Two (2) ash silo | Bin Vent Filter | Visible Emissions | Daily | Normal-Abnormal | | |
| Fixated Material Storage Pile | Wetting | Visible Emissions | weekly | Normal-Abnormal | | |

## Recommendation

The staff recommends to the Commissioner that the Part 70 Operating Permit Renewal 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 November 13, 2013.

## Conclusion

The operation of this stationary electric utility generating station shall be subject to the conditions of the attached Part 70 Operating Permit Renewal No. 165-33876-00001.

## IDEM Contact

(a) Questions regarding this proposed permit can be directed to Josiah Balogun at the Indiana Department Environmental Management, Office of Air Quality, Permits Branch, 100 North Senate Avenue, MC 61-53 IGCN 1003, Indianapolis, Indiana 46204-2251 or by telephone at (317) 234-5257 or toll free at 1-800-451-6027 extension 4-5257.

(b) A copy of the findings is available on the Internet at: http://www.in.gov/ai/appfiles/idem-caats/

(c) For additional information about air permits and how the public and interested parties can participate, refer to the IDEM's Guide for Citizen Participation and Permit Guide on the Internet at: www.idem.in.gov

**Appendix A: Emissions Calculations**
**Emission Summary**
**Source Name:** Duke Energy Indiana - Cayuga Generating Station
**Source Location:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Permit Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

**Uncontrolled Potential to Emit**

| Point ID | Emission Unit | PM (tons/yr) | $PM_{10}$ (tons/yr) | $PM_{2.5}$ (tons/yr) | $SO_2$ (tons/yr) | VOC (tons/yr) | CO (tons/yr) | NOx (tons/yr) | GHGs as CO2e (tons/yr) | HAPs (tons/yr) |
|---|---|---|---|---|---|---|---|---|---|---|
| **SCR System (Ammonia)** | | | | | | | | | | |
| F-01 | Roadway emissions - NH3 delivery | 0.01 | 0.02 | 0.005 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **SCR System (Includes DSI Lime Silos)** | | | | | | | | | |
| EP01 | Sorbent Silo #1 for Unit #1 | 61.00 | 61.00 | 61.00 | 0 | 0 | 0 | 0 | 0 | 0 |
| EP03 | Sorbent Silo #1 for Unit #2 | 61.00 | 61.00 | 61.00 | 0 | 0 | 0 | 0 | 0 | 0 |
| **EP-05A** | **Sorbent Silo Weight Feeders** | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| **EP-05B** | **Sorbent Silo Weight Feeders** | 96.36 | 48.18 | 24.09 | 0 | 0 | 0 | 0 | 0 | 0 |
| **EP-05C** | **Sorbent Silo Weight Feeders (Spare)** | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| **EP-06A** | **Sorbent Silo Weight Feeders** | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| **EP-06B** | **Sorbent Silo Weight Feeders** | 96.36 | 48.18 | 24.09 | 0 | 0 | 0 | 0 | 0 | 0 |
| **EP-06C** | **Sorbent Silo Weight Feeders (Spare)** | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| F-01 | Roadway emissions - sorbent delivery | 0.368 | 0.074 | 0.018 | 0 | 0 | 0 | 0 | 0 | 0 |
| **SCR System (Limestone)** | | | | | | | | | | |
| EP-01 | Limestone Silo | 241.00 | 241.00 | 241.00 | 0 | 0 | 0 | 0 | 0 | 0 |
| EP-02 | Limestone Surge Bin | 118.00 | 118.00 | 118.00 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-01 | Transfer Point to C1 Conveyor | 0.004 | 0.001 | 0.001 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-02 | Transfer Point to C2 Conveyor | 0.004 | 0.001 | 0.001 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-03 | Roadway emissions - Limestone Delivery | 0.42 | 0.084 | 0.021 | 0 | 0 | 0 | 0 | 0 | 0 |
| **ACI System** | | | | | | | | | | |
| EP-01 | Activated Carbon Silo #1 | 30.03 | 30.03 | 30.03 | 0 | 0 | 0 | 0 | 0 | 0 |
| EP-02 | Acticated Carbon Silo #2 | 30.03 | 30.03 | 30.03 | 0 | 0 | 0 | 0 | 0 | 0 |
| **EP-03A** | **Carbon Silo Weight Feeders** | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| **EP-03B** | **Carbon Silo Weight Feeders (Spare)** | 26.28 | 26.28 | 0.263 | 0 | 0 | 0 | 0 | 0 | 0 |
| **EP-04A** | **Carbon Silo Weight Feeders** | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| **EP-04B** | **Carbon Silo Weight Feeders (Spare)** | 26.28 | 26.28 | 0.263 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Roadway emissions - Carbon Delivery | 0.06 | 0.012 | 0.003 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Dry Fly Ash System** | | | | | | | | | | |
| EP-01 | Exhauster for 1A Baghouse Seprator | 112.63 | 112.63 | 112.63 | 0 | 0 | 0 | 0 | 0 | 0 |
| EP-02 | Exhauster for 1B Baghouse Seprator | 112.63 | 112.63 | 112.63 | 0 | 0 | 0 | 0 | 0 | 0 |
| EP-03 | Exhauster for 2A Baghouse Seprator | 112.63 | 112.63 | 112.63 | 0 | 0 | 0 | 0 | 0 | 0 |
| EP-04 | Exhauster for 2B Baghouse Seprator | 112.63 | 112.63 | 112.63 | 0 | 0 | 0 | 0 | 0 | 0 |
| EP-05 | Spare Exhauster | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EP-06 | Fly Ash Silo#1 | 262.8 | 262.8 | 262.8 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-01 | Flyash Silo#1 Truck Loadout | 0.037 | 0.017 | 0.003 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-02 | Flyash Silo#2 Truck Loadout | 0.037 | 0.017 | 0.003 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Fixation System** | | | | | | | | | | |
| F-01 | Roadway emissions - Lime Delivery | 0.2 | 0.04 | 0.01 | 0 | 0 | 0 | 0 | 0 | 0 |
| EP-02 | Lime Silo | 30.03 | 30.03 | 30.03 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-02 | Gypsum Transfer Point | 0.079 | 0.037 | 0.006 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-03 | Fixation Building Transfer Point | 0.125 | 0.059 | 0.009 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-04 | Radial Stacker Conveyor Transfer Point | 0.125 | 0.059 | 0.009 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-05 | Storage Pile Transfer Point | 0.125 | 0.059 | 0.009 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-06 | Activity on Storage Pile | 32.205 | 8.69 | 0.869 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-07 | Fixated material loaded into trucks | 0.125 | 0.059 | 0.009 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-08 | Waste pile wind erosion | 0.354 | 0.177 | 0.027 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **Sub - Total Emissions** | 1563.97 | 1442.74 | 1334.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Appendix A: Emissions Calculations**
**Emission Summary**
**Source Name:** Duke Energy Indiana - Cayuga Generating Station
**Source Location:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Permit Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

**Uncontrolled Potential to Emit**

| Point ID | Emission Unit | PM (tons/yr) | $PM_{10}$ (tons/yr) | $PM_{2.5}$ (tons/yr) | $SO_2$ (tons/yr) | VOC (tons/yr) | CO (tons/yr) | NOx (tons/yr) | GHGs as CO2e* (tons/yr) | GHGs as CO2e** (tons/yr) | HAPs (tons/yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stack 1 | Boiler 1 | 98745 | 22711 | 22711 | 123827 | 59 | 494 | 10861 | 4774180 | 4774970 | 1340 |
| Stack 2 | Boiler 2 | 98745 | 22711 | 22711 | 123827 | 59 | 494 | 10861 | 4774180 | 4774970 | 1340 |
| Stack 3A | Generator Unit 3A | 1.9 | 2.2 | 2 | 66.6 | 0.3 | 4.7 | 18.8 | 20257 | 20259 | 0.003 |
| Stack 3B | Generator Unit 3B | 1.9 | 2.2 | 2 | 66.6 | 0.3 | 4.7 | 18.8 | 20257 | 20259 | 0.003 |
| Stack 3C | Generator Unit 3C | 1.9 | 2.2 | 2 | 66.6 | 0.3 | 4.7 | 18.8 | 20257 | 20259 | 0.003 |
| Stack 3D | Generator Unit 3D | 1.9 | 2.2 | 2 | 66.6 | 0.3 | 4.7 | 18.8 | 20257 | 20259 | 0.003 |
| | Lime Handling | 71.4 | 26.5 | 26.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Traffic on Lime stone Piles | 1.7 | 0.48 | 0.48 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Limestone piles | 0.4 | 0.19 | 0.19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Gypsum Conveying System | 0.09 | 0.03 | 0.03 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **Gypsum Piles** | 0.27 | 0.27 | 0.27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **Traffic on Gypsum Piles** | 1.67 | 0.43 | 0.43 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Gypsum Transfer - Truck Traffic | 36.9 | 7.16 | 7.16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Aux -1 | Auxiliary Boiler | 4.6 | 5.2 | 3.5 | 179 | 0.5 | 11.4 | 54.6 | 49130 | 49135 | 0.011 |
| | Emergency Generator ENG-1 | 0.09 | 0.09 | 0.09 | 0.08 | 0.1 | 0.26 | 1.22 | 45.3 | 45.3 | 0.001 |
| | Emergency Generator ENG-2 | 0.12 | 0.07 | 0.07 | 0.72 | 0.13 | 0.98 | 4.28 | 208 | 208 | 0.002 |
| | **Sub - Total Emissions** | 197614.84 | 45471.22 | 45468.72 | 248100.20 | 119.93 | 1019.44 | 21857.30 | 9678771.30 | 9680364.30 | 2680.03 |
| | **Total Emissions** | 199179 | 46914 | 46803 | 248100 | 120 | 1019 | 21857 | 9678771 | 9680364 | 2680 |

Note: * CO2e based on 11/29/2013 federal GWPs
Note: ** CO2e based on 10/30/2009 federal GWPs

**Appendix A: Emissions Calculations**
**Emission Summary**
**Source Name:** Duke Energy Indiana - Cayuga Generating Station
**Source Location:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Permit Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

**Limited Potential to Emit**

| Point ID | Emission Unit | PM (tons/yr) | $PM_{10}$ (tons/yr) | $PM_{2.5}$ (tons/yr) | $SO_2$ (tons/yr) | VOC (tons/yr) | CO (tons/yr) | NOx (tons/yr) | GHGs as CO2e (tons/yr) | HAPs (tons/yr) |
|---|---|---|---|---|---|---|---|---|---|---|
| **SCR System (Ammonia)** | | | | | | | | | | |
| F-01 | Roadway emissions - NH3 delivery | 0.01 | 0.02 | 0.005 | 0 | 0 | 0 | 0 | 0 | 0 |
| **SCR System (Includes DSI Lime Silos)** | | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| EP01 | Sorbent Silo #1 for Unit #1 | 0.19 | 0.19 | 0.19 | 0 | 0 | 0 | 0 | 0 | 0 |
| EP03 | Sorbent Silo #1 for Unit #2 | 0.19 | 0.19 | 0.19 | 0 | 0 | 0 | 0 | 0 | 0 |
| **EP-05A** | **Sorbent Silo Weight Feeders** | 0.04 | 0.04 | 0.04 | 0 | 0 | 0 | 0 | 0 | 0 |
| **EP-05B** | **Sorbent Silo Weight Feeders** | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| **EP-06A** | **Sorbent Silo Weight Feeders** | 0.04 | 0.04 | 0.04 | 0 | 0 | 0 | 0 | 0 | 0 |
| **EP-06B** | **Sorbent Silo Weight Feeders** | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| F-01 | Roadway emissions - sorbent delivery | 0.37 | 0.07 | 0.018 | 0 | 0 | 0 | 0 | 0 | 0 |
| **SCR System (Limestone)** | | | | | | | | | | |
| EP-01 | Limestone Silo | 0.41 | 0.41 | 0.41 | 0 | 0 | 0 | 0 | 0 | 0 |
| EP-02 | Limestone Surge Bin | 0.41 | 0.41 | 0.41 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-01 | Transfer Point to C1 Conveyor | 0.004 | 0.001 | 0.001 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-02 | Transfer Point to C2 Conveyor | 0.004 | 0.001 | 0.001 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-03 | Roadway emissions - Limestone Delivery | 0.42 | 0.08 | 0.02 | 0 | 0 | 0 | 0 | 0 | 0 |
| **ACI System** | | | | | | | | | | |
| EP-01 | Activated Carbon Silo #1 | 0.19 | 0.19 | 0.19 | 0 | 0 | 0 | 0 | 0 | 0 |
| EP-02 | Acticated Carbon Silo #2 | 0.19 | 0.19 | 0.19 | 0 | 0 | 0 | 0 | 0 | 0 |
| **EP-03A** | **Carbon Silo Weight Feeders** | 0.04 | 0.04 | 0.04 | 0 | 0 | 0 | 0 | 0 | 0 |
| **EP-04A** | **Carbon Silo Weight Feeders** | 0.04 | 0.04 | 0.04 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-01 | Roadway emissions - Carbon Delivery | 0.06 | 0.012 | 0.003 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Dry Fly Ash System** | | | | | | | | | | |
| EP-01 | Exhauster for 1A Baghouse Seprator | 0.92 | 0.92 | 0.92 | 0 | 0 | 0 | 0 | 0 | 0 |
| EP-02 | Exhauster for 1B Baghouse Seprator | 0.92 | 0.92 | 0.92 | 0 | 0 | 0 | 0 | 0 | 0 |
| EP-03 | Exhauster for 2A Baghouse Seprator | 0.92 | 0.92 | 0.92 | 0 | 0 | 0 | 0 | 0 | 0 |
| EP-04 | Exhauster for 2B Baghouse Seprator | 0.92 | 0.92 | 0.92 | 0 | 0 | 0 | 0 | 0 | 0 |
| EP-05 | Spare Exhauster | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EP-06 | Fly Ash Silo#1 | 0.92 | 0.92 | 0.92 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-01 | Flyash Silo#1 Truck Loadout | 0.037 | 0.017 | 0.003 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-02 | Flyash Silo#2 Truck Loadout | 0.037 | 0.017 | 0.003 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Fixation System** | | | | | | | | | | |
| F-01 | Roadway emissions - Lime Delivery | 0.2 | 0.04 | 0.01 | 0 | 0 | 0 | 0 | 0 | 0 |
| EP-02 | Lime Silo | 0.45 | 0.45 | 0.45 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-02 | Gypsum Transfer Point | 0.079 | 0.037 | 0.006 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-03 | Fixation Building Transfer Point | 0.125 | 0.059 | 0.009 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-04 | Radial Stacker Conveyor Transfer Point | 0.125 | 0.059 | 0.009 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-05 | Storage Pile Transfer Point | 0.125 | 0.059 | 0.009 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-06 | Activity on Storage Pile | 3.22 | 0.87 | 0.087 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-07 | Fixated material loaded into trucks | 0.125 | 0.059 | 0.009 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-08 | Waste pile wind erosion | 0.35 | 0.18 | 0.03 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **Sub - Total Emissions** | 12.08 | 8.37 | 7.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Appendix A: Emissions Calculations**
**Emission Summary**
**Source Name:** Duke Energy Indiana - Cayuga Generating Station
**Source Location:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Permit Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

**Limited Potential to Emit**

| Point ID | Emission Unit | PM (tons/yr) | $PM_{10}$ (tons/yr) | $PM_{2.5}$ (tons/yr) | $SO_2$ (tons/yr) | VOC (tons/yr) | CO (tons/yr) | NOx (tons/yr) | GHGs as CO2e* (tons/yr) | GHGs as CO2e** (tons/yr) | HAPs (tons/yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stack 1 | Boiler 1 | 987 | 227 | 227 | 61913 | 59 | 494 | 5431 | 4774180 | 4774970 | 1340 |
| Stack 2 | Boiler 2 | 987 | 227 | 227 | 61913 | 59 | 494 | 5431 | 4774180 | 4774970 | 1340 |
| Stack 3A | Generator Unit 3A | 1.9 | 2.2 | 2 | 66.6 | 0.3 | 4.7 | 18.8 | 20257 | 20259 | 0.003 |
| Stack 3B | Generator Unit 3B | 1.9 | 2.2 | 2 | 66.6 | 0.3 | 4.7 | 18.8 | 20257 | 20259 | 0.003 |
| Stack 3C | Generator Unit 3C | 1.9 | 2.2 | 2 | 66.6 | 0.3 | 4.7 | 18.8 | 20257 | 20259 | 0.003 |
| Stack 3D | Generator Unit 3D | 1.9 | 2.2 | 2 | 66.6 | 0.3 | 4.7 | 18.8 | 20257 | 20259 | 0.003 |
| | Lime Handling | 3.82 | 1.41 | 1.41 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Traffic on Lime stone Piles | 0.85 | 0.24 | 0.24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Limestone piles | 0.2 | 0.09 | 0.09 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Gypsum Conveying System | 0.06 | 0.02 | 0.02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **Gypsum Piles** | 0.13 | 0.06 | 0.06 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **Traffic on Gypsum Piles** | 0.83 | 0.21 | 0.21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Gypsum Transfer - Truck Traffic | 18.4 | 3.58 | 3.58 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Aux -1 | Auxiliary Boiler | 4.6 | 5.2 | 3.5 | 179 | 0.5 | 11.4 | 54.6 | 49130 | 49135 | 0.011 |
| | Emergency Generator ENG-1 | 0.09 | 0.09 | 0.09 | 0.08 | 0.1 | 0.26 | 1.22 | 45.3 | 45.3 | 0.001 |
| | Emergency Generator ENG-2 | 0.12 | 0.07 | 0.07 | 0.72 | 0.13 | 0.98 | 4.28 | 208 | 208 | 0.002 |
| | **Sub - Total Emissions** | 2010.70 | 473.77 | 471.27 | 124272.20 | 119.93 | 1019.44 | 10997.30 | 9678771.30 | 9680364.30 | 2680.03 |
| | **Total Emissions** | 2023 | 482 | 478 | 124272 | 120 | 1019 | 10997 | 9678771 | 9680364 | 2680 |

Note: * CO2e based on 11/29/2013 federal GWPs
Note: ** CO2e based on 10/30/2009 federal GWPs

**Appendix A: Emission Calculations**
**Coal Combustion: Dry bottom, Pulverized Bituminous Boilers**
**Boiler No. 1**

Company Name: Duke Energy Indiana - Cayuga Generating Station
Address City IN Zip: State Road 63, Cayuga, Indiana 47928
Permit Number: T165-33876-00001
Permit Reviewer: Josiah Balogun
Date: 10-Feb-2014

| Heat Input Capacity MMBtu/hr | Heat Content of Coal Btu/lb of Coal | Potential Throughput tons/year |
|---|---|---|
| 4802 | 10650 | 1974907.04 |

| Weight % Sulfur in Fuel | | |
|---|---|---|
| S = | 3.3 | % |
| A = | 10 | % |

| ESP Control Efficiency | | |
|---|---|---|
| | 0.99 | % |
| | 0.5 | % |
| | 0.5 | % |

| | Pollutant | | | | | |
|---|---|---|---|---|---|---|
| | PM* | PM10* | SO2 | NOx | VOC | CO |
| Emission Factor in lb/ton | 100.0 (10A) | 23.00 (2.3A) | 125.4 (38S) | 11.0 | 0.06 | 0.5 |
| Potential Emission in tons/yr #1 | 98745.35 | 22711.43 | 123826.67 | 10861.99 | 59.25 | 493.73 |
| **Potential Emission in tons/yr** | **98745.35** | **22711.43** | **123826.67** | **10861.99** | **59.25** | **493.73** |
| Controlled Emission in tons per year | **987.45** | **227.11** | **61913.34** | **5430.99** | | |
| Equivalent Controlled Emissions in lb/mmBtu | 0.05 | | | | | |

**Methodology**

Emission Factors : The Source submitted an EPA emission factor of 0.06 lbs/ton for VOC emissions
Emission Factors are from AP 42 (Update 9/98), Tables 1.1-4 and 1.1-3 (SCC 1-01-002-02/22, 1-02-002-02/22-06/2.

Potential Throughput (tons/year) = Heat Input Capacity (MMBtu/hr) x 10^6 Btu/MMBtu / Heat Content of Coal (Btu/lb) / 2,000 lb/ton x 8,760 hrs/yr.

Heat Content of theCoal is taken from the application.
Additional emission factors for commerical/institutional and electric generation boilers are available in AP-42, Chapter 1.1.
Several HAPS emission factors are also available in AP-42, Chapter 1.1, depending on the type of boiler.
Emission (tons/yr) = Throughput tons per year x Emission Factor (lb/ton) / 2,000 lb/ton.
Emissions (lb/MMBtu) = 10^6 Btu/MMBtu / Heat Content of Coal (Btu/lb) / 2,000 lb/ton x Emission Factor (lb/ton).

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address City IN Zip:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

HAPs - Organics

| | HCl | HF | Benzene | Cyanide | PCDD/ PCDF |
|---|---|---|---|---|---|
| Emission Factor in lb/ton of coal | 1.2 | 0.15 | 0.0013 | 0.0025 | 1.76E-09 |
| Potential to Emit in tons/yr | 1185 | 148 | 1 | 2 | 0 |

HAPs - Metals

| | Selenium | Cadmium | Chromium | Manganese | Nickel | Beryllium | Arsenic | Lead |
|---|---|---|---|---|---|---|---|---|
| Emission Factor in lb/ton of coal | 1.3E-03 | 5.1E-05 | 2.6E-04 | 4.9E-04 | 2.8E-04 | 2.10E-05 | 4.10E-04 | 4.20E-04 |
| Potential Emission in tons/yr | 1.3 | 5.0E-02 | 0.3 | 0.5 | 0.3 | 0.0 | 0.4 | 0.4 |

Total HAPs: 1340

Emission Factors from AP-42, Chapter 1.1
HAPs emission factors are available in AP-42, Chapter 1.1.
Emission (tons/yr) = Throughput tons per year x Emission Factor (lb/ton) / 2,000 lb/ton

**Appendix A: Emission Calculations**
**Coal Combustion: Dry bottom Pulverized Bituminous Tangentially-fired Boiler**
**Boiler No. 2**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address, City, IN, Zip:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

| Heat Input Capacity MMBtu/hr | Heat Content of Coal Btu/lb of Coal | Potential Throughput tons/year |
|---|---|---|
| 4802 | 10650 | 1974907.04 |

| | Weight % Sulfur in Fuel | |
|---|---|---|
| S = | 3.3 | % |
| A = | 10 | % |
| ESP Control Efficiency | 0.99 | % |
| | 0.5 | % |
| | 0.5 | % |

| | Pollutant | | | | | |
|---|---|---|---|---|---|---|
| | PM* | PM10* | SO2 | NOx | VOC | CO |
| Emission Factor in lb/ton | 100.0 (10A) | 23.00 (2.3A) | 125.4 (38S) | 11.0 | 0.06 | 0.5 |
| Potential Emission in tons/yr #1 | 98745.35 | 22711.43 | 123826.67 | 10861.99 | 59.25 | 493.73 |
| **Potential Emission in tons/yr** | **98745.35** | **22711.43** | **123826.67** | **10861.99** | **59.25** | **493.73** |
| Controlled Emission in tons per year | **987.45** | **227.11** | **61913.34** | **5430.99** | | |
| Equivalent Controlled Emissions in lb/mmBtu | 0.05 | | | | | |

**Methodology**
Emission Factors : The Source submitted an EPA emission factor of 0.06 lbs/ton for VOC emissions
Emission Factors are from AP 42 (Update 9/98), Tables 1.1-4 and 1.1-3 (SCC 1-01-002-02/22, 1-02-002-02/22-06/2.

Potential Throughput (tons/year) = Heat Input Capacity (MMBtu/hr) x 10^6 Btu/MMBtu / Heat Content of Coal (Btu/lb) / 2,000 lb/ton x 8,760 hrs/yr.

Heat Content of theCoal is taken from the application.
Additional emission factors for commerical/institutional and electric generation boilers are available in AP-42, Chapter 1.1.
Several HAPS emission factors are also available in AP-42, Chapter 1.1, depending on the type of boiler.
Emission (tons/yr) = Throughput tons per year x Emission Factor (lb/ton) / 2,000 lb/ton.
Emissions (lb/MMBtu) = 10^6 Btu/MMBtu / Heat Content of Coal (Btu/lb) / 2,000 lb/ton x Emission Factor (lb/ton).

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address City IN Zip:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

HAPs - Organics

| | HCl | HF | Benzene | Cyanide | PCDD/ PCDF |
|---|---|---|---|---|---|
| Emission Factor in lb/ton of coal | 1.2 | 0.15 | 0.0013 | 0.0025 | 1.76E-09 |
| Potential to Emit in tons/yr | 1185 | 148 | 1 | 2 | 0 |

HAPs - Metals

| | Selenium | Cadmium | Chromium | Manganese | Nickel | Beryllium | Arsenic | Lead |
|---|---|---|---|---|---|---|---|---|
| Emission Factor in lb/ton of coal | 1.3E-03 | 5.1E-05 | 2.6E-04 | 4.9E-04 | 2.8E-04 | 2.10E-05 | 4.10E-04 | 4.20E-04 |
| Potential Emission in tons/yr | 1.3 | 5.0E-02 | 0.3 | 0.5 | 0.3 | 0.0 | 0.4 | 0.4 |

Total HAPs: 1340

Emission Factors from AP-42, Chapter 1.1
HAPs emission factors are available in AP-42, Chapter 1.1.
Emission (tons/yr) = Throughput tons per year x Emission Factor (lb/ton) / 2,000 lb/ton

**Appendix A: Emissions Calculations**
**Emission Summary**
**Source Name:** Duke Energy Indiana - Cayuga Generating Station
**Source Location:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Permit Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

| Coal Combustion | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Emission Unit** | **Coal Throughput (ton/yr)** | **$CO_2$ Emission Factor (lb/ton)** | **$CH_4$ Emission Factor (lb/ton)** | **$N_2O$ Emission Factor (lb/ton)** | **$CO_2$ Emissions (ton/yr)** | **$CH_4$ Emissions (ton/yr)** | **$N_2O$ Emissions (ton/yr)** |
| Boiler Unit 1 | 1,974,907 | 4,810 | 0.04 | 0.08 | 4,749,651 | 39 | 79 |
| Boiler Unit 2 | 1,974,907 | 4,810 | 0.04 | 0.08 | 4,749,651 | 39 | 79 |

| Greenhouse Gas Emissions - $CO_2e$ Calculation | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Worst Case Emissions | | | Global Warming Potential | | | $CO_2e$ (TPY) |
| | **$CO_2$ Emissions (ton/yr)** | **$CH_4$ Emissions (ton/yr)** | **$N_2O$ Emissions (ton/yr)** | **$CO_2$ (Unitless)** | **$CH_4$ (Unitless)** | **$N_2O$ Emissions (Unitless)** | |
| Boiler Unit 1 | 4,749,651 | 39 | 79 | 1 | 21 | 310 | 4,774,970 |
| Boiler Unit 2 | 4,749,651 | 39 | 79 | 1 | 21 | 310 | 4,774,970 |

**Emission Factors are from AP 42 (Update 9/98), Tables 1.1-19 and 1.1-20.**
**CO2e Total in Tons per year based on 10/30/2009 fedreal GWPs**

| Greenhouse Gas Emissions - $CO_2e$ Calculation | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Worst Case Emissions | | | Global Warming Potential | | | $CO_2e$ (TPY) |
| | **$CO_2$ Emissions (ton/yr)** | **$CH_4$ Emissions (ton/yr)** | **$N_2O$ Emissions (ton/yr)** | **$CO_2$ (Unitless)** | **$CH_4$ (Unitless)** | **$N_2O$ Emissions (Unitless)** | |
| Boiler Unit 1 | 4,749,651 | 39 | 79 | 1 | 25 | 298 | 4,774,180 |
| Boiler Unit 2 | 4,749,651 | 39 | 79 | 1 | 25 | 298 | 4,774,180 |

**Emission Factors are from AP 42 (Update 9/98), Tables 1.1-19 and 1.1-20.**
**CO2e Total in Tons per year based on 11/29/2013 fedreal GWPs**

**Appendix A: Emissions Calculations**
**Commercial/Institutional/Residential Combustors (< 100 mmBtu/hr)**
**#1 and #2 Fuel Oil**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address, City IN Zip:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

| Heat Input Capacity MMBtu/hr | Potential Throughput kgals/year | S = Weight % Sulfur |
|---|---|---|
| 30 | 1877.14286 | 0.5 |

| | Pollutant | | | | | | |
|---|---|---|---|---|---|---|---|
| | PM* | PM10 | direct PM2.5 | SO2 | NOx | VOC | CO |
| Emission Factor in lb/k | 2.0 | 2.4 | 2.1 | 71 *(142.0S)* | 20.0 | 0.34 | 5.0 |
| Potential Emission in tons/yr | 1.9 | 2.2 | 2.0 | 66.6 | 18.8 | 0.3 | 4.7 |

**Methodology**

1.3

1 gallon of No. 2 Fuel Oil has a heating value of 140,000 Btu

Potential Throughput (kgals/year) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1kgal per 1000 gallon x 1 gal per

Emission Factors are from AP 42, Tables 1.3-1, 1.3-2, and 1.3-3 (SCC 1-03-005-01/02/03) Supplement E 9/98 (see erata file)
*PM emission factor is filterable PM only. Condensable PM emission factor is 1.3 lb/kgal.
Emission (tons/yr) = Throughput (kgals/ yr) x Emission Factor (lb/kgal)/2,000 lb/ton
Note to Reviewer: Check the applicable rules and test methods for PM and PM10 when using the above emission
See page 2 for HAPs emission calculations.

**Appendix A: Emissions Calculations**
**Commercial/Institutional/Residential Combustors (< 100 mmBtu/hr)**
**#1 and #2 Fuel Oil**
**HAPs Emissions**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address, City IN Zip:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

| | HAPs - Metals | | | | |
|---|---|---|---|---|---|
| | Arsenic | Beryllium | Cadmium | Chromium | Lead |
| Emission Factor in lb/mmBtu | 4.0E-06 | 3.0E-06 | 3.0E-06 | 3.0E-06 | 9.0E-06 |
| Potential Emission in tons/yr | 5.26E-04 | 3.94E-04 | 3.94E-04 | 3.94E-04 | 1.18E-03 |

| | HAPs - Metals (continued) | | | |
|---|---|---|---|---|
| | Mercury | Manganese | Nickel | Selenium |
| Emission Factor in lb/mmBtu | 3.0E-06 | 6.0E-06 | 3.0E-06 | 1.5E-05 |
| Potential Emission in tons/yr | 3.94E-04 | 7.88E-04 | 3.94E-04 | 1.97E-03 |

**Methodology**

No data was available in AP-42 for organic HAPs.
Potential Emissions (tons/year) = Throughput (mmBtu/hr)*Emission Factor (lb/mmBtu)*8,760 hrs/yr / 2,000 lb/ton

See Page 3 for Greenhouse Gas calculations.

**Appendix A: Emissions Calculations**
**Commercial/Institutional/Residential Combustors (< 100 mmBtu/hr)**
**#1 and #2 Fuel Oil**
**Greenhouse Gas Emissions**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address, City IN Zip:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

| | Greenhouse Gas | | |
|---|---|---|---|
| | CO2 | CH4 | N2O |
| Emission Factor in lb/k | 21,500 | 0.216 | 0.26 |
| Potential Emission in tons/yr | 20,179 | 0.2 | 0.2 |
| Summed Potential Emissions in tons/yr | 20,180 | | |
| CO2e Total in tons/yr based on 11/29/2013 federal GWPs | 20,257 | | |
| CO2e Total in tons/yr based on 10/30/2009 federal GWPs | 20,259 | | |

**Methodology**
The CO2 Emission Factor for #1 Fuel Oil is 21500. The CO2 Emission Factor for #2 Fuel Oil is 22300.
Emission Factors are from AP 42, Tables 1.3-3, 1.3-8, and 1.3-12 (SCC 1-03-005-01/02/03) Supplement E 9/99 (see erata file)
Global Warming Potentials (GWP) from Table A-1 of 40 CFR Part 98 Subpart A.
Emission (tons/yr) = Throughput (kgals/ yr) x Emission Factor (lb/kgal)/2,000 lb/ton
CO2e (tons/yr) based on 11/29/2013 federal GWPs= CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential
CO2e (tons/yr) based on 10/30/2009 federal GWPs = CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential

**Appendix A: Emissions Calculations**
**Commercial/Institutional/Residential Combustors (< 100 mmBtu/hr)**
**#1 and #2 Fuel Oil**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address, City IN Zip:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

| Heat Input Capacity MMBtu/hr | Potential Throughput kgals/year | S = Weight % Sulfur |
|---|---|---|
| 30 | 1877.143 | 0.5 |

| | Pollutant | | | | | | |
|---|---|---|---|---|---|---|---|
| | PM* | PM10 | direct PM2.5 | SO2 | NOx | VOC | CO |
| Emission Factor in lb/k | 2.0 | 2.4 | 2.1 | 71 *(142.0S)* | 20.0 | 0.34 | 5.0 |
| Potential Emission in tons/yr | 1.9 | 2.2 | 2.0 | 66.6 | 18.8 | 0.3 | 4.7 |

**Methodology**

1.3

1 gallon of No. 2 Fuel Oil has a heating value of 140,000 Btu

Potential Throughput (kgals/year) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1kgal per 1000 gallon x 1

Emission Factors are from AP 42, Tables 1.3-1, 1.3-2, and 1.3-3 (SCC 1-03-005-01/02/03) Supplement E 9/98 (see erata
*PM emission factor is filterable PM only. Condensable PM emission factor is 1.3 lb/kgal.
Emission (tons/yr) = Throughput (kgals/ yr) x Emission Factor (lb/kgal)/2,000 lb/ton
Note to Reviewer: Check the applicable rules and test methods for PM and PM10 when using the above
See page 2 for HAPs emission calculations.

**Appendix A: Emissions Calculations**
**Commercial/Institutional/Residential Combustors (< 100 mmBtu/hr)**
**#1 and #2 Fuel Oil**
**HAPs Emissions**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address, City IN Zip:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

| | HAPs - Metals | | | | |
|---|---|---|---|---|---|
| | Arsenic | Beryllium | Cadmium | Chromium | Lead |
| Emission Factor in lb/mmBtu | 4.0E-06 | 3.0E-06 | 3.0E-06 | 3.0E-06 | 9.0E-06 |
| Potential Emission in tons/yr | 5.26E-04 | 3.94E-04 | 3.94E-04 | 3.94E-04 | 1.18E-03 |

| | HAPs - Metals (continued) | | | |
|---|---|---|---|---|
| | Mercury | Manganese | Nickel | Selenium |
| Emission Factor in lb/mmBtu | 3.0E-06 | 6.0E-06 | 3.0E-06 | 1.5E-05 |
| Potential Emission in tons/yr | 3.94E-04 | 7.88E-04 | 3.94E-04 | 1.97E-03 |

**Methodology**

No data was available in AP-42 for organic HAPs.
Potential Emissions (tons/year) = Throughput (mmBtu/hr)*Emission Factor (lb/mmBtu)*8,760 hrs/yr / 2,000 lb/ton

See Page 3 for Greenhouse Gas calculations.

**Appendix A: Emissions Calculations**
**Commercial/Institutional/Residential Combustors (< 100 mmBtu/hr)**
**#1 and #2 Fuel Oil**
**Greenhouse Gas Emissions**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address, City IN Zip:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

| | Greenhouse Gas | | |
|---|---|---|---|
| | CO2 | CH4 | N2O |
| Emission Factor in lb/k | 21,500 | 0.216 | 0.26 |
| Potential Emission in tons/yr | 20,179 | 0.2 | 0.2 |
| Summed Potential Emissions in tons/yr | 20,180 | | |
| CO2e Total in tons/yr based on 11/29/2013 federal GWPs | 20,257 | | |
| CO2e Total in tons/yr based on 10/30/2009 federal GWPs | 20,259 | | |

**Methodology**
The CO2 Emission Factor for #1 Fuel Oil is 21500. The CO2 Emission Factor for #2 Fuel Oil is 22300.
Emission Factors are from AP 42, Tables 1.3-3, 1.3-8, and 1.3-12 (SCC 1-03-005-01/02/03) Supplement E 9/99 (see erata
Global Warming Potentials (GWP) from Table A-1 of 40 CFR Part 98 Subpart A.
Emission (tons/yr) = Throughput (kgals/ yr) x Emission Factor (lb/kgal)/2,000 lb/ton
CO2e (tons/yr) based on 11/29/2013 federal GWPs= CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4
CO2e (tons/yr) based on 10/30/2009 federal GWPs = CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4

**Appendix A: Emissions Calculations**
**Commercial/Institutional/Residential Combustors (< 100 mmBtu/hr)**
**#1 and #2 Fuel Oil**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address, City IN Zip:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

| Heat Input Capacity MMBtu/hr | Potential Throughput kgals/year | S = Weight % Sulfur |
|---|---|---|
| | | 0.5 |
| 30 | 1877.143 | |

| | Pollutant | | | | | | |
|---|---|---|---|---|---|---|---|
| | PM* | PM10 | direct PM2.5 | SO2 | NOx | VOC | CO |
| Emission Factor in lb/k | 2.0 | 2.4 | 2.1 | 71 *(142.0S)* | 20.0 | 0.34 | 5.0 |
| Potential Emission in tons/yr | 1.9 | 2.2 | 2.0 | 66.6 | 18.8 | 0.3 | 4.7 |

**Methodology**

1.3

1 gallon of No. 2 Fuel Oil has a heating value of 140,000 Btu

Potential Throughput (kgals/year) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1kgal per 1000 gallon x 1

Emission Factors are from AP 42, Tables 1.3-1, 1.3-2, and 1.3-3 (SCC 1-03-005-01/02/03) Supplement E 9/98 (see
*PM emission factor is filterable PM only. Condensable PM emission factor is 1.3 lb/kgal.
Emission (tons/yr) = Throughput (kgals/ yr) x Emission Factor (lb/kgal)/2,000 lb/ton
Note to Reviewer: Check the applicable rules and test methods for PM and PM10 when using the above
See page 2 for HAPs emission calculations.

**Appendix A: Emissions Calculations**
**Commercial/Institutional/Residential Combustors (< 100 mmBtu/hr)**
**#1 and #2 Fuel Oil**
**HAPs Emissions**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address, City IN Zip:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

| | HAPs - Metals | | | | |
|---|---|---|---|---|---|
| | Arsenic | Beryllium | Cadmium | Chromium | Lead |
| Emission Factor in lb/mmBtu | 4.0E-06 | 3.0E-06 | 3.0E-06 | 3.0E-06 | 9.0E-06 |
| Potential Emission in tons/yr | 5.26E-04 | 3.94E-04 | 3.94E-04 | 3.94E-04 | 1.18E-03 |

| | HAPs - Metals (continued) | | | |
|---|---|---|---|---|
| | Mercury | Manganese | Nickel | Selenium |
| Emission Factor in lb/mmBtu | 3.0E-06 | 6.0E-06 | 3.0E-06 | 1.5E-05 |
| Potential Emission in tons/yr | 3.94E-04 | 7.88E-04 | 3.94E-04 | 1.97E-03 |

**Methodology**

No data was available in AP-42 for organic HAPs.
Potential Emissions (tons/year) = Throughput (mmBtu/hr)*Emission Factor (lb/mmBtu)*8,760 hrs/yr / 2,000 lb/ton

See Page 3 for Greenhouse Gas calculations.

**Appendix A: Emissions Calculations**
**Commercial/Institutional/Residential Combustors (< 100 mmBtu/hr)**
**#1 and #2 Fuel Oil**
**Greenhouse Gas Emissions**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address, City IN Zip:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

| | Greenhouse Gas | | |
|---|---|---|---|
| | CO2 | CH4 | N2O |
| Emission Factor in lb/k | 21,500 | 0.216 | 0.26 |
| Potential Emission in tons/yr | 20,179 | 0.2 | 0.2 |
| Summed Potential Emissions in tons/yr | 20,180 | | |
| CO2e Total in tons/yr based on 11/29/2013 federal GWPs | 20,257 | | |
| CO2e Total in tons/yr based on 10/30/2009 federal GWPs | 20,259 | | |

**Methodology**
The CO2 Emission Factor for #1 Fuel Oil is 21500. The CO2 Emission Factor for #2 Fuel Oil is 22300.
Emission Factors are from AP 42, Tables 1.3-3, 1.3-8, and 1.3-12 (SCC 1-03-005-01/02/03) Supplement E 9/99 (see
Global Warming Potentials (GWP) from Table A-1 of 40 CFR Part 98 Subpart A.
Emission (tons/yr) = Throughput (kgals/ yr) x Emission Factor (lb/kgal)/2,000 lb/ton
CO2e (tons/yr) based on 11/29/2013 federal GWPs= CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4
CO2e (tons/yr) based on 10/30/2009 federal GWPs = CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4

**Appendix A: Emissions Calculations**
**Commercial/Institutional/Residential Combustors (< 100 mmBtu/hr)**
**#1 and #2 Fuel Oil**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address, City IN Zip:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

| Heat Input Capacity MMBtu/hr | Potential Throughput kgals/year | S = Weight % Sulfur |
|---|---|---|
| 30 | 1877.142857 | 0.5 |

| | Pollutant | | | | | | |
|---|---|---|---|---|---|---|---|
| | PM* | PM10 | direct PM2.5 | SO2 | NOx | VOC | CO |
| Emission Factor in lb/k | 2.0 | 2.4 | 2.1 | 71 *(142.0S)* | 20.0 | 0.34 | 5.0 |
| Potential Emission in tons/yr | 1.9 | 2.2 | 2.0 | 66.6 | 18.8 | 0.3 | 4.7 |

**Methodology**

1.3

1 gallon of No. 2 Fuel Oil has a heating value of 140,000 Btu

Potential Throughput (kgals/year) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1kgal per 1000 gallon x 1 gal per

Emission Factors are from AP 42, Tables 1.3-1, 1.3-2, and 1.3-3 (SCC 1-03-005-01/02/03) Supplement E 9/98 (see erata file)
*PM emission factor is filterable PM only. Condensable PM emission factor is 1.3 lb/kgal.
Emission (tons/yr) = Throughput (kgals/ yr) x Emission Factor (lb/kgal)/2,000 lb/ton
Note to Reviewer: Check the applicable rules and test methods for PM and PM10 when using the above emission
See page 2 for HAPs emission calculations.

**Appendix A: Emissions Calculations**
**Commercial/Institutional/Residential Combustors (< 100 mmBtu/hr)**
**#1 and #2 Fuel Oil**
**HAPs Emissions**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address, City IN Zip:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

| | HAPs - Metals | | | | |
|---|---|---|---|---|---|
| | Arsenic | Beryllium | Cadmium | Chromium | Lead |
| Emission Factor in lb/mmBtu | 4.0E-06 | 3.0E-06 | 3.0E-06 | 3.0E-06 | 9.0E-06 |
| Potential Emission in tons/yr | 5.26E-04 | 3.94E-04 | 3.94E-04 | 3.94E-04 | 1.18E-03 |

| | HAPs - Metals (continued) | | | |
|---|---|---|---|---|
| | Mercury | Manganese | Nickel | Selenium |
| Emission Factor in lb/mmBtu | 3.0E-06 | 6.0E-06 | 3.0E-06 | 1.5E-05 |
| Potential Emission in tons/yr | 3.94E-04 | 7.88E-04 | 3.94E-04 | 1.97E-03 |

**Methodology**

No data was available in AP-42 for organic HAPs.
Potential Emissions (tons/year) = Throughput (mmBtu/hr)*Emission Factor (lb/mmBtu)*8,760 hrs/yr / 2,000 lb/ton

See Page 3 for Greenhouse Gas calculations.

**Appendix A: Emissions Calculations**
**Commercial/Institutional/Residential Combustors (< 100 mmBtu/hr)**
**#1 and #2 Fuel Oil**
**Greenhouse Gas Emissions**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address, City IN Zip:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

| | Greenhouse Gas | | |
|---|---|---|---|
| | CO2 | CH4 | N2O |
| Emission Factor in lb/k | 21,500 | 0.216 | 0.26 |
| Potential Emission in tons/yr | 20,179 | 0.2 | 0.2 |
| Summed Potential Emissions in tons/yr | 20,180 | | |
| CO2e Total in tons/yr based on 11/29/2013 federal GWPs | 20,257 | | |
| CO2e Total in tons/yr based on 10/30/2009 federal GWPs | 20,259 | | |

**Methodology**
The CO2 Emission Factor for #1 Fuel Oil is 21500. The CO2 Emission Factor for #2 Fuel Oil is 22300.
Emission Factors are from AP 42, Tables 1.3-3, 1.3-8, and 1.3-12 (SCC 1-03-005-01/02/03) Supplement E 9/99 (see erata file)
Global Warming Potentials (GWP) from Table A-1 of 40 CFR Part 98 Subpart A.
Emission (tons/yr) = Throughput (kgals/ yr) x Emission Factor (lb/kgal)/2,000 lb/ton
CO2e (tons/yr) based on 11/29/2013 federal GWPs= CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential
CO2e (tons/yr) based on 10/30/2009 federal GWPs = CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential

**Appendix A: Emission Calculations**
**Reciprocating Internal Combustion Engines - Diesel Fuel**
**Output Rating (<=600 HP)**
**Maximum Input Rate (<=4.2 MMBtu/hr)**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address City IN Zip:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

**B. Emissions calculated based on output rating (hp)**

| | |
|---|---|
| Output Horsepower Rating (hp) | 156.9 |
| aximum Hours Operated per Year | 500 |
| Potential Throughput (hp-hr/yr) | 78,450 |

| | Pollutant | | | | | | |
|---|---|---|---|---|---|---|---|
| | PM* | PM10* | direct PM2.5* | SO2 | NOx | VOC | CO |
| Emission Factor in lb/h | 0.0022 | 0.0022 | 0.0022 | 0.0021 | 0.0310 | 0.0025 | 0.0067 |
| Potential Emission in t | 0.09 | 0.09 | 0.09 | 0.08 | 1.22 | 0.10 | 0.26 |

*PM and PM2.5 emission factors are assumed to be equivalent to PM10 emission factors. No information was given regarding which method was used to determine the factor or the fraction of PM10 which is condensable.

**Hazardous Air Pollutants (HAPs)**

| | Pollutant | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Benzene | Toluene | Xylene | 1,3-Butadiene | Formaldehyde | Acetaldehyde | Acrolein | Total PAH HAPs*** |
| Emission Factor in lb/h | 6.53E-06 | 2.86E-06 | 2.00E-06 | 2.74E-07 | 8.26E-06 | 5.37E-06 | 6.48E-07 | 1.18E-06 |
| Potential Emission in t | 2.56E-04 | 1.12E-04 | 7.83E-05 | 1.07E-05 | 3.24E-04 | 2.11E-04 | 2.54E-05 | 4.61E-05 |

***PAH = Polyaromatic Hydrocarbon (PAHs are considered HAPs, since they are considered Polycyclic Organic Matter)
****Emission factors in lb/hp-hr were calculated using emission factors in lb/MMBtu and a brake specific fuel consumption of 7,000 Btu / hp-hr (AP-42 Table 3.3-1).

| | |
|---|---|
| **Potential Emission of Total HAPs (tons/yr)** | **1.06E-03** |

**Green House Gas Emissions (GHG)**

| | Pollutant | | |
|---|---|---|---|
| | CO2 | CH4 | N2O |
| Emission Factor in lb/h | 1.15E+00 | 4.63E-05 | 9.26E-06 |
| Potential Emission in t | 4.51E+01 | 1.82E-03 | 3.63E-04 |

| | |
|---|---|
| **Summed Potential Emissions in tons/yr** | **4.51E+01** |
| **CO2e Total in tons/yr based on 11/29/2013 federal GWPs** | **4.53E+01** |
| **CO2e Total in tons/yr based on 10/30/2009 federal GWPs** | **4.53E+01** |

**Methodology**
Emission Factors are from AP42 (Supplement B 10/96), Tables 3.3-1 and 3.3-2
CH4 and N2O Emission Factor from 40 CFR 98 Subpart C Table C-2.
Global Warming Potentials (GWP) from Table A-1 of 40 CFR Part 98 Subpart A.
**Option B Methodology**
Potential Throughput (hp-hr/yr) = [Output Horsepower Rating (hp)] * [Maximum Hours Operated per Year]
Potential Emission (tons/yr) = [Potential Throughput (hp-hr/yr)] * [Emission Factor (lb/hp-hr)] / [2,000 lb/ton]
CO2e (tons/yr) based on 11/29/2013 federal GWPs= CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4
CO2e (tons/yr) based on 10/30/2009 federal GWPs = CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4

**Appendix A: Emission Calculations**
**Large Reciprocating Internal Combustion Engines - Diesel Fuel**
**Output Rating (>600 HP)**
**Maximum Input Rate (>4.2 MMBtu/hr)**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address City IN Zip:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

**B. Emissions calculated based on output rating (hp)**

| | |
|---|---|
| Output Horsepower Rating (hp) | 713.0 |
| aximum Hours Operated per Year | 500 |
| Potential Throughput (hp-hr/yr) | 356,500 |
| Content (S) of Fuel (% by weight) | 0.500 |

| | Pollutant | | | | | | |
|---|---|---|---|---|---|---|---|
| | PM* | PM10* | direct PM2.5* | SO2 | NOx | VOC | CO |
| Emission Factor in lb/h | 7.00E-04 | 4.01E-04 | 4.01E-04 | 4.05E-03 *(.00809S)* | 2.40E-02 **see below | 7.05E-04 | 5.50E-03 |
| Potential Emission in t | 0.12 | 0.07 | 0.07 | 0.72 | 4.28 | 0.13 | 0.98 |

*PM10 emission factor in lb/hp-hr was calculated using the emission factor in lb/MMBtu and
a brake specific fuel consumption of 7,000 Btu / hp-hr (AP-42 Table 3.3-1).
**NOx emission factor: uncontrolled = 0.024 lb/hp-hr, controlled by ignition timing retard = 0.013 lb/hp-hr

**Hazardous Air Pollutants (HAPs)**

| | Pollutant | | | | | | |
|---|---|---|---|---|---|---|---|
| | Benzene | Toluene | Xylene | Formaldehyde | Acetaldehyde | Acrolein | Total PAH HAPs*** |
| Emission Factor in lb/h | 5.43E-06 | 1.97E-06 | 1.35E-06 | 5.52E-07 | 1.76E-07 | 5.52E-08 | 1.48E-06 |
| Potential Emission in t | 9.68E-04 | 3.51E-04 | 2.41E-04 | 9.84E-05 | 3.14E-05 | 9.83E-06 | 2.65E-04 |

***PAH = Polyaromatic Hydrocarbon (PAHs are considered HAPs, since they are considered Polycyclic Organic Matter)
****Emission factors in lb/hp-hr were calculated using emission factors in lb/MMBtu and a
brake specific fuel consumption of 7,000 Btu / hp-hr (AP-42 Table 3.3-1).

| | |
|---|---|
| **Potential Emission of Total HAPs (tons/yr)** | **1.96E-03** |

**Green House Gas Emissions (GHG)**

| | Pollutant | | |
|---|---|---|---|
| | CO2 | CH4 | N2O |
| Emission Factor in lb/h | 1.16E+00 | 6.35E-05 | 9.30E-06 |
| Potential Emission in t | 2.07E+02 | 1.13E-02 | 1.66E-03 |

| | |
|---|---|
| **Summed Potential Emissions in tons/yr** | **2.07E+02** |
| **CO2e Total in tons/yr based on 11/29/2013 federal GWPs** | **2.08E+02** |
| **CO2e Total in tons/yr based on 10/30/2009 federal GWPs** | **2.08E+02** |

**Methodology**
Emission Factors are from AP 42 (Supplement B 10/96) Tables 3.4-1 , 3.4-2, 3.4-3, and 3.4-4.
CH4 and N2O Emission Factor from 40 CFR 98 Subpart C Table C-2.
Global Warming Potentials (GWP) from Table A-1 of 40 CFR Part 98 Subpart A.
**Option B Methodology**
Potential Throughput (hp-hr/yr) = [Output Horsepower Rating (hp)] * [Maximum Hours Operated per Year]
Potential Emission (tons/yr) = [Potential Throughput (hp-hr/yr)] * [Emission Factor (lb/hp-hr)] / [2,000 lb/ton]
CO2e (tons/yr) based on 11/29/2013 federal GWPs= CO2 Potential Emission ton/yr x CO2 GWP (1) +
CO2e (tons/yr) based on 10/30/2009 federal GWPs = CO2 Potential Emission ton/yr x CO2 GWP (1) +

**Appendix A: Emissions Calculations**
**Industrial Boilers (> 100 mmBtu/hr)**
**#1 and #2 Fuel Oil**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address, City IN Zip:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

| Heat Input Capacity MMBtu/hr | Potential Throughput kgals/year | S = Weight % Sulfur |
|---|---|---|
| 72.76 | 4552.697143 | 0.5 |

| | Pollutant | | | | | | |
|---|---|---|---|---|---|---|---|
| | PM* | PM10 | direct PM2.5 | SO2 | NOx | VOC | CO |
| Emission Factor in lb/kgal | 2.0 | 2.3 | 1.6 | 78.5 *(157S)* | 24.0 | 0.20 | 5.0 |
| Potential Emission in tons/yr | 4.6 | 5.2 | 3.5 | 178.7 | 54.6 | 0.5 | 11.4 |

**Methodology**

1 gallon of No. 2 Fuel Oil has a heating value of 140,000 Btu

Potential Throughput (kgals/year) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1kgal per 1000 gallon x 1 gal per 0.140 MM Btu

Emission Factors are from AP 42, Tables 1.3-1, 1.3-2, and 1.3-3 (SCC 1-02-005-01/02/03) Supplement E 9/98
*PM emission factor is filterable PM only. Condensable PM emission factor is 1.3 lb/kgal.
Emission (tons/yr) = Throughput (kgals/ yr) x Emission Factor (lb/kgal)/2,000 lb/ton

**Appendix A: Emissions Calculations**
**Industrial Boilers (> 100 mmBtu/hr)**
**#1 and #2 Fuel Oil**
**HAPs Emissions**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address, City IN Zip:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

| | HAPs - Metals | | | | |
|---|---|---|---|---|---|
| | Arsenic | Beryllium | Cadmium | Chromium | Lead |
| Emission Factor in lb/mmBtu | 4.0E-06 | 3.0E-06 | 3.0E-06 | 3.0E-06 | 9.0E-06 |
| Potential Emission in tons/yr | 1.27E-03 | 9.56E-04 | 9.56E-04 | 9.56E-04 | 2.87E-03 |

| | HAPs - Metals (continued) | | | |
|---|---|---|---|---|
| | Mercury | Manganese | Nickel | Selenium |
| Emission Factor in lb/mmBtu | 3.0E-06 | 6.0E-06 | 3.0E-06 | 1.5E-05 |
| Potential Emission in tons/yr | 9.56E-04 | 1.91E-03 | 9.56E-04 | 4.78E-03 |

**Methodology**

No data was available in AP-42 for organic HAPs.

Potential Emissions (tons/year) = Throughput (mmBtu/hr)*Emission Factor (lb/mmBtu)*8,760 hrs/yr / 2,000 lb/ton

See Page 3 for Greenhouse Gas calculations.

**Appendix A: Emissions Calculations**
**Industrial Boilers (> 100 mmBtu/hr)**
**#1 and #2 Fuel Oil**
**Greenhouse Gas Emissions**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address, City IN Zip:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

| | Greenhouse Gas | | |
|---|---|---|---|
| | CO2 | CH4 | N2O |
| Emission Factor in lb/kgal | 21,500 | 0.216 | 0.26 |
| Potential Emission in tons/yr | 48,941 | 0.5 | 0.6 |
| Summed Potential Emissions in tons/yr | 48,943 | | |
| CO2e Total in tons/yr based on 11/29/2013 federal GWPs | 49,130 | | |
| CO2e Total in tons/yr based on 10/30/2009 federal GWPs | 49,135 | | |

**Methodology**
The CO2 Emission Factor for #1 Fuel Oil is 21500. The CO2 Emission Factor for #2 Fuel Oil is 22300.
Emission Factors are from AP 42, Tables 1.3-3, 1.3-8, and 1.3-12 (SCC 1-03-005-01/02/03) Supplement E 9/99 (see erata file)
Global Warming Potentials (GWP) from Table A-1 of 40 CFR Part 98 Subpart A.
Emission (tons/yr) = Throughput (kgals/ yr) x Emission Factor (lb/kgal)/2,000 lb/ton
CO2e (tons/yr) based on 11/29/2013 federal GWPs= CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential Emission
CO2e (tons/yr) based on 10/30/2009 federal GWPs = CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential Emission

**Appendix A: Emission Calculations**
**PM and PM10 Emissions**
**From the Limestone Handling Operations**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

### 1. Unlimited PTE of PM/PM10:

| Emission Point | Unit Description | Number of Units | Max. Capacity (tons/hr) | PM Emission Factor* (lbs/ton) | Uncontrolled PM Emissions (lbs/hr/unit) | Uncontrolled PM Emissions (tons/yr) | PM10 Emission Factor* (lbs/ton) | Uncontrolled PM10 Emissions (lbs/hr/unit) | Uncontrolled PM10 Emissions (tons/yr) |
|---|---|---|---|---|---|---|---|---|---|
| EP-L1 | Railcar/Truck Unloading | 1 | 1,000 | 0.0001 | 0.10 | 0.44 | 0.0001 | 0.10 | 0.44 |
| EP-L2 | Hoppers | 2 | 500 | 0.0030 | 1.50 | 13.1 | 0.0011 | 0.55 | 4.82 |
| EP-L2 | Belt Feeders | 2 | 500 | 0.0030 | 1.50 | 13.1 | 0.0011 | 0.55 | 4.82 |
| EP-L3 | Conveyor LH-1 | 1 | 1,000 | 0.0030 | 3.00 | 13.1 | 0.0011 | 1.10 | 4.82 |
| EP-L4 | Reclaim Hoppers | 2 | 200 | 0.0030 | 0.60 | 5.26 | 0.0011 | 0.22 | 1.93 |
| EP-L4 | Belt Feeders | 2 | 200 | 0.0030 | 0.60 | 5.26 | 0.0011 | 0.22 | 1.93 |
| EP-L18b | Conveyor LH-2 | 1 | 400 | 0.0030 | 1.20 | 5.26 | 0.0011 | 0.44 | 1.93 |
| EP-L18a & c | Conveyor LH-3 | 1 | 400 | 0.0030 | 1.20 | 5.26 | 0.0011 | 0.44 | 1.93 |
| EP-L16 | Day Bin Unit 1 | 1 | 400 | 0.0030 | 1.20 | 5.26 | 0.0011 | 0.44 | 1.93 |
| EP-L17 | Day Bin Unit 2 | 1 | 400 | 0.0030 | 1.20 | 5.26 | 0.0011 | 0.44 | 1.93 |
| **Total** | | | | | | **71.4** | | | **26.5** |

* These emission factors are from AP-42, Table 11.19.2-2 (08/04).

**Methodology**

Uncontrolled PTE (lbs/hr/unit) = Max. Capacity (tons/hr) x Emission Factor (lbs/ton)

Uncontrolled PTE (tons/yr) = Number of Units x Max. Capacity (tons/hr) x Emission Factor (lbs/ton) x 8760 hrs/yr x 1 ton/2000 lbs

### 2. Limited PTE of PM/PM10 after Control:

**Throughput Limit: 509,000 tons/yr**

| Emission Point | Unit | Number of Units | PM Emission Factor* (lb/ton) | PM10 Emission Factor* (lb/ton) | Control Method | Control Efficiency** (%) | Controlled PM Emissions (lbs/ton) | Controlled PM10 Emissions (lbs/ton) | Controlled PM Emissions (tons/yr) | Controlled PM10 Emissions (tons/yr) |
|---|---|---|---|---|---|---|---|---|---|---|
| EP-L1 | Railcar/Truck Unloading | 1 | 0.0001 | 0.0001 | Fog Dust Suppression | 75.0% | 2.50E-05 | 2.50E-05 | 6.36E-03 | 6.36E-03 |
| EP-L2 | Hoppers | 2 | 0.0030 | 0.0011 | Fog Dust Suppression | 75.0% | 7.50E-04 | 2.75E-04 | 0.38 | 0.14 |
| EP-L2 | Belt Feeders | 2 | 0.0030 | 0.0011 | Fog Dust Suppression | 75.0% | 7.50E-04 | 2.75E-04 | 0.38 | 0.14 |
| EP-L3 | Conveyor LH-1 | 1 | 0.0030 | 0.0011 | Telescoping Chute | 50.0% | 1.50E-03 | 5.50E-04 | 0.38 | 0.14 |
| EP-L4 | Reclaim Hoppers | 2 | 0.0030 | 0.0011 | Fog Dust Suppression | 75.0% | 7.50E-04 | 2.75E-04 | 0.38 | 0.14 |
| EP-L4 | Belt Feeders | 2 | 0.0030 | 0.0011 | Fog Dust Suppression | 75.0% | 7.50E-04 | 2.75E-04 | 0.38 | 0.14 |
| EP-L18abc | Conveyor LH-2 | 1 | 0.0030 | 0.0011 | Fog Dust Suppression | 75.0% | 7.50E-04 | 2.75E-04 | 0.19 | 0.07 |
| EP-L18abc | Conveyor LH-3 | 1 | 0.0030 | 0.0011 | Fog Dust Suppression | 75.0% | 7.50E-04 | 2.75E-04 | 0.19 | 0.07 |
| EP-L16 | Day Bin Unit 1 | 1 | 0.0030 | 0.0011 | N/A | 0.0% | 3.00E-03 | 1.10E-03 | 0.76 | 0.28 |
| EP-L17 | Day Bin Unit 2 | 1 | 0.0030 | 0.0011 | N/A | 0.0% | 3.00E-03 | 1.10E-03 | 0.76 | 0.28 |
| **Total** | | | | | | | | | **3.82** | **1.41** |

* These emissions factors are from AP-42, Table 11.19.2-2 (08/04) and Table 11.12-2 (10/01)

** Control efficiencies were provided by the equipment vendor and were based on engineering judgment.

**Methodology**

Controlled PM/PM10 Emissions (lbs/ton) = Emission Factor (lbs/ton) x (1-Control Efficiency)

Controlled PM/PM10 Emissions (tons/yr) = Throughput Limit (tons/yr) x Emission Factor (lbs/ton) x (1-Control Efficiency) x 1 ton/2000 lbs x Number of Units

**Appendix A: Emission Calculations**
**Potential PM and PM10 Emissions**
**From the Traffic on Limestone Piles (Fugitive Emissions)**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address:** State Road 63, Cayuga, Indiana 47928
**SSM:** T165-33876-00001
**Permit Number:** Josiah Balogun
**Date:** 10-Feb-2014

**1. Emission Factors:**

The limestone will be transferred by front-end loaders between stockout pile and the storage pile. The emissions from the front-end loader traffic can be estimated by calculating the emissions from the unpaved roads.

According to AP-42, Chapter 13.2.2 - Unpaved Roads (11/06), the PM/PM10 emission factors from the traffic on unpaved roads can be estimated from the following equation:

$$E = \frac{k \times (s/12)^a \times (w/3)^b \times (365-P)}{365}$$

where:

| | | | |
|---|---|---|---|
| E = | emission factor (lb/vehicle mile traveled) | | |
| s = | surface material silt content (%) = | 8.4 | % (provided by the source) |
| w = | mean vehicle weight (tons) | 53.8 | tons (provided by the source) |
| k = | empirical constants = | 4.9 for PM and 1.5 for PM10 | |
| a = | empirical constants = | 0.7 for PM and 0.9 for PM10 | |
| b = | empirical constants = | 0.45 for both PM and PM10 | |
| P = | number of precipitation days = | 120 | days/yr |

**2. Potential to Emit (PTE) PM/PM10 before Control:**

Annual Traveled Mileage (estimated by the source) = 362 miles/yr

PM Emission Factor = $\frac{4.9 \times (8.4/12)^{0.7} \times (53.8/3)^{0.45} \times (365-120)}{365}$ = 9.39 lbs/mile

PM10 Emission Factor = $\frac{1.5 \times (8.4/12)^{0.9} \times (53.8/3)^{0.45} \times (365-120)}{365}$ = 2.68 lbs/mile

PTE of PM before Control (tons/yr) = 362 miles/yr x 9.39 lbs/mile x 1 ton/2000 lbs = **1.70 tons/yr**
PTE of PM10 before Control (tons/yr) = 362 miles/yr x 2.68 lbs/mile x 1 ton/2000 lbs = **0.48 tons/yr**

**3. Potential to Emit (PTE) PM/PM10 after Control:**

The source also proposed to use wet suppression to control fugitive dust emissions.
The control efficiency from wet supression is 50%.

PTE of PM after Control (tons/yr) = 1.70 tons/yr x (1-50%) = **0.85 tons/yr**
PTE of PM10 after Control (tons/yr) = 0.48 tons/yr x (1-50%) = **0.24 tons/yr**

**Appendix A: Emission Calculations**
**Potential PM and PM10 Emissions**
**From the Limestone Stock Pile and the Storage Pile (Fugitive Emissions)**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

**1. Emission Factors:**

According to AP42, Chapter 13.2.4 - Aggregate Handling and Storage Piles (11/06), the PM/PM10 emission factors for storage piles can be estimated from the following equation:

$$Ef = \frac{k \times 0.0032 \times (U/5)^{1.3}}{(M/2)^{1.4}}$$

where:

| | | |
|---|---|---|
| Ef = | Emission Factor (lbs/ton) | |
| k = | Particle size multiplers = | 0.74 for PM and 0.35 for PM10 |
| U = | Mean wind speed (mph) = | 9.8 mph (provided by the source) |
| M = | Moisture content (%) = | 5 % (provided by the source) |

Therefore,

| | | |
|---|---|---|
| PM Emission Factor = | 0.0016 | lbs/ton process |
| PM10 Emission Factor = | 0.0007 | lbs/ton process |

**2. Potential to Emit PM/PM10 before Control:**

Max. Throughput Limit: 509,000 tons/yr (2 piles total)

**PTE of PM (tons/yr) =** 509,000 tons/yr x 0.0016 lbs/ton x 1 ton/2000 lbs = **0.40 tons/yr**

**PTE of PM10 (tons/yr) =** 509,000 ton/hr x 0.0007 lbs/ton x 1 ton/2000 lbs = **0.19 tons/yr**

**3. Potential to Emit PM/PM10 after Control:**

The source also proposed to use wet suppression to control fugitive dust emissions.
The control efficiency from wet supression is 50%.

PTE of PM after Control (tons/yr) = 0.40 tons/yr x (1-50%) = **0.20 tons/yr**
PTE of PM10 after Control (tons/yr) = 0.19 tons/yr x (1-50%) = **0.09 tons/yr**

**Appendix A: Emission Calculations**
**PM and PM10 Emissions**
**From the Gypsum Conveying System**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

## 1. Unlimited PTE of PM/PM10:

| Unit Description | Number of Units | Max. Capacity (tons/hr) | PM Emission Factor* (lbs/ton) | Unlimited PTE of PM (lbs/hr/unit) | Unlimited PTE of PM (tons/yr) | PM10 Emission Factor* (lbs/ton) | Unlimited PTE of PM10 (lbs/hr/unit) | Unlimited PTE of PM10 (tons/yr) |
|---|---|---|---|---|---|---|---|---|
| Gypsum Conveying System | 1 | 150 | 0.00014 | 0.02 | 0.09 | 4.60E-05 | 0.01 | 0.03 |
| **Total** | | | | | **0.09** | | | **0.03** |

* These emission factors are from AP-42, Table 11.19.2-2 (08/04). Since the gypsum is handled in a wet form, the controlled emission factors in Table 11.19.2-2 are applied for this unit.

**Methodology**

Unlimited PTE of PM/PM10 (lbs/hr/unit) = Max. Capacity (tons/hr) x Emission Factor (lbs/ton)

Unlimited PTE of PM/PM10 (tons/yr) = Number of Units x Max. Capacity (tons/hr) x Emission Factor (lbs/ton) x 8760 hrs/yr x 1 ton/2000 lbs

## 2. Limited PTE of PM/PM10:

**Throughput Limit: 900,528 tons/yr**

| Unit | Number of Units | PM Emission Factor* (lb/ton) | PM10 Emission Factor* (lb/ton) | Limited PTE of PM (tons/yr) | Limited PTE of PM10 (tons/yr) |
|---|---|---|---|---|---|
| Gypsum Conveying System | 1 | 0.00014 | 4.60E-05 | 0.06 | 0.02 |
| **Total** | | | | **0.06** | **0.02** |

* These emission factors are from AP-42, Table 11.19.2-2 (08/04). Since the gypsum is handled in a wet form, the controlled emission factors in Table 11.19.2-2 are applied for this unit.

**Methodology**

Limited PTE of PM/PM10 (tons/yr) = Throughput Limit (tons/yr) x Emission Factor (lbs/ton) x 1 ton/2000 lbs x Number of Units

**Appendix A: Emission Calculations**
**Potential PM and PM10 Emissions**
**From the Gypsum Stock Piles (Fugitive Emissions)**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

**1. Emission Factors:**

According to AP-42, Chapter 13.2.4 - Aggregate Handling and Storage Piles (11/06), the PM/PM10 emission factors for storage piles can be estimated from the following equation:

$$Ef = \frac{k \times 0.0032 \times (U/5)^{1.3}}{(M/2)^{1.4}}$$

where:

| | | |
|---|---|---|
| Ef = | Emission Factor (lbs/ton) | |
| k = | Particle size multiplers = | 0.74 for PM and 0.35 for PM10 |
| U = | Mean wind speed (mph) = | 9.8 mph (provided by the source) |
| M = | Moisture content (%) = | 10 % (provided by the source) |

Therefore,

| | | |
|---|---|---|
| PM Emission Factor = | 0.0006 | lbs/ton process |
| PM10 Emission Factor = | 0.0003 | lbs/ton process |

**2. Potential to Emit PM/PM10 before Control:**

Max. Throughput Limit: 900,528 tons/yr (2 piles total)

**PTE of PM (tons/yr) =** 900,528 tons/yr x 0.0006 lbs/ton x 1 ton/2000 lbs = **0.27 tons/yr**

**PTE of PM10 (tons/yr) =** 900,528 ton/hr x 0.0003 lbs/ton x 1 ton/2000 lbs = **0.13 tons/yr**

**3. Potential to Emit PM/PM10 after Control:**

The source also proposed to use wet suppression to control fugitive dust emissions.
The control efficiency from wet supression is 50%.

PTE of PM after Control (tons/yr) = 0.27 tons/yr x (1-50%) = **0.13 tons/yr**
PTE of PM10 after Control (tons/yr) = 0.13 tons/yr x (1-50%) = **0.06 tons/yr**

**Appendix A: Emission Calculations**
**Potential PM and PM10 Emissions**
**From the Front-End Loaders Traffice on Gypsum Stock Piles (Fugitive Emissions)**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

**1. Emission Factors:**

The gypsum in the stock piles will be loaded into trucks by front-end loaders. The emissions from the front-end loader traffic can be estimated by calculating the emissions from the unpaved roads.

According to AP-42, Chapter 13.2.2 - Unpaved Roads (11/06), the PM/PM10 emission factors from the traffic on unpaved roads can be estimated from the following equation:

$$E = \frac{k \times (s/12)^a \times (w/3)^b \times (365-P)}{365}$$

where:

| | | | |
|---|---|---|---|
| E = | emission factor (lb/vehicle mile traveled) | | |
| s = | surface material silt content (%) = | 5 | % (provided by the source) |
| w = | mean vehicle weight (tons) | 25 | tons (provided by the source) |
| k = | empirical constants = | 4.9 for PM and 1.5 for PM10 | |
| a = | empirical constants = | 0.7 for PM and 0.9 for PM10 | |
| b = | empirical constants = | 0.45 for both PM and PM10 | |
| P = | number of precipitation days = | 120 | days/yr |

**2. Potential to Emit (PTE) PM/PM10 before Control:**

Annual Traveled Mileage (estimated by the source for 2 piles) = 720 miles/yr

PM Emission Factor = $\frac{4.9 \times (5/12)^{0.7} \times (25/3)^{0.45} \times (365-120)}{365}$ = 4.63 lbs/mile

PM10 Emission Factor = $\frac{1.5 \times (5/12)^{0.9} \times (25/3)^{0.45} \times (365-120)}{365}$ = 1.19 lbs/mile

PTE of PM before Control (tons/yr) = 720 miles/yr x 4.63 lbs/mile x 1 ton/2000 lbs = **1.67 tons/yr**
PTE of PM10 before Control (tons/yr) = 720 miles/yr x 1.19 lbs/mile x 1 ton/2000 lbs = **0.43 tons/yr**

**3. Potential to Emit (PTE) PM/PM10 after Control:**

The source also proposed to use wet suppression to control fugitive dust emissions.
The control efficiency from wet supression is 50%.

PTE of PM after Control (tons/yr) = 1.67 tons/yr x (1-50%) = **0.83 tons/yr**
PTE of PM10 after Control (tons/yr) = 0.43 tons/yr x (1-50%) = **0.21 tons/yr**

**Appendix A: Emission Calculations**
**Potential PM and PM10 Emissions**
**From the Truck Traffic on Paved Roads (Fugitive Emissions)**

**Company Name:** Duke Energy Indiana - Cayuga Generating Station
**Address:** State Road 63, Cayuga, Indiana 47928
**Permit Number:** T165-33876-00001
**Reviewer:** Josiah Balogun
**Date:** 10-Feb-2014

**1. Emission Factors: AP-42**

The dried gypsum in the gypsum storage piles will be tranferred to landfills by trucks on paved roads. According to AP-42, Chapter 13.2.1 - Paved Roads (11/06), the PM/PM10 emission factors for paved roads can be estimated from the following equation:

$$E = (k \times (sL/2)^a \times (w/3)^b - C) \times (1 - p/(4 \times 365))$$

where:

| | | | |
|---|---|---|---|
| E = | emission factor (lb/vehicle mile traveled) | | |
| sL = | road surface silt loading ($g/m^2$) = | 0.6 | ($g/m^2$) (AP-42, Table 13.2.1-3) |
| w = | mean vehicle weight (tons) = | 16.0 | tons |
| k = | empirical constant = | 0.082 for PM and 0.016 for PM10 | |
| a = | empirical constant = | 0.65 | |
| b = | empirical constant = | 1.5 | |
| C = | emission factor for exhaust, brake and tire wear | 0.00047 for PM and PM10 | |
| p = | number of days per year with 0.01 inches precipitation | 120 | |

PM Emission Factor = $(0.082 \times (0.6/2)^{0.65} \times (16/3)^{1.5} - 0.00047) \times (1 - 120/1460)$ = **0.42** lbs/mile

PM10 Emission Factor = $(0.016 \times (0.6/2)^{0.65} \times (16/3)^{1.5} - 0.00047) \times (1 - 120/1460)$ = **0.08** lbs/mile

**2. Potential to Emit (PTE) of PM/PM10 Before Control from Paved Roads:**

Annual Traveled Mileage (estimated by the source) = 174,101 miles/yr

PTE of PM before Control (tons/yr) = 174,101 miles/yr x 0.42 lbs/mile x 1 ton/2000 lbs = **36.9 tons/yr**
PTE of PM10 before Control (tons/yr) = 174,101 miles/yr x 0.08 lbs/mile x 1 ton/2000 lbs = **7.16 tons/yr**

**3. Potential to Emit (PTE) of PM/PM10 after Control from Paved Roads:**

The source also proposed to use wet suppression to control fugitive dust emissions.
The control efficiency from wet supression is 50%.

| | | |
|---|---|---|
| PTE of PM after Control = | 36.9 tons/yr x (1-50%) = | **18.4 tons/yr** |
| PTE of PM10 after Control = | 7.16 tons/yr x (1-50%) = | **3.58 tons/yr** |

**DUKE - CAYUGA UNITS 1 & 2 SCR PROJECT (INCLUDES DSI, ACI, DRY FLY ASH, FIXATION, AND LIMESTONE INJECTION)**
**SCR SYSTEM PM EMISSIONS SUMMARY**



| PROJECTED MATERIAL HANDLING EMISSIONS | | PM Emissions | | PM10 Emissions | | PM2.5 Emissions | | Exhaust Parameters | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Emission Point ID | Description | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | Exhaust Flow Rate (cfm) | Exhaust Temperature (deg F) | Height Above Grade (ft) | Exhaust Point Diameter (ft) | Exhaust Velocity (ft/s) |
| **SCR SYSTEM (AMMONIA)** | | | | | | | | | | | | |
| F-01 | Roadway emissions - NH3 delivery | --- | 0.10 | --- | 0.021 | --- | 0.0051 | --- | ambient | --- | --- | --- |
| | **SUBTOTAL - SCR SYSTEM (AMMONIA)** | | **0.10** | | **0.021** | | **0.0051** | | | | | |
| **SCR SYSTEM (DSI)** | | | | | | | | | | | | |
| EP-01 | Bin vent at top of sorbent silo 1 for Unit 1 DSI system | 0.043 | 0.036 | 0.043 | 0.036 | 0.043 | 0.036 | 50 - 1,000 | ambient | 100 | 1.2 | 0.8 - 15.6 |
| EP-02 | **Removed** | | | | | | | | | | | |
| EP-03 | Bin vent at top of sorbent silo 1 for Unit 2 DSI system | 0.043 | 0.036 | 0.043 | 0.036 | 0.043 | 0.036 | 50 - 1,000 | ambient | 100 | 1.2 | 0.8 - 15.6 |
| EP-04 | **Removed** | | | | | | | | | | | |
| **EP-05A (New)** | Unit 1 DSI Sorbent Silo Weight Feeders -- Silo Skirt Ventilation Fan | 0.0086 | 0.038 | 0.0086 | 0.038 | 0.0086 | 0.038 | 5,105 | ambient | 25 | 2.5 | 17.3 |
| **EP-05B (New)** | Unit 1 DSI Sorbent Silo Weight Feeders -- Silo Skirt Ventilation Fan | | | | | | | 452 | ambient | 11.5 | 0.8 | 17.1 |
| **EP-05C (New)** | Unit 1 DSI Sorbent Silo Weight Feeders -- Silo Skirt Ventilation Fan (spare) | --- | --- | --- | --- | --- | --- | 5,105 | ambient | 25 | 2.5 | 17.3 |
| **EP-06A (New)** | Unit 2 DSI Sorbent Silo Weight Feeders -- Silo Skirt Ventilation Fan | 0.0086 | 0.038 | 0.0086 | 0.038 | 0.0086 | 0.038 | 5,105 | ambient | 25 | 2.5 | 17.3 |
| **EP-06B (New)** | Unit 2 DSI Sorbent Silo Weight Feeders -- Silo Skirt Ventilation Fan | | | | | | | 452 | ambient | 11.5 | 0.8 | 17.1 |
| **EP-06C (New)** | Unit 2 DSI Sorbent Silo Weight Feeders -- Silo Skirt Ventilation Fan (spare) | --- | --- | --- | --- | --- | --- | 5,105 | ambient | 25 | 2.5 | 17.3 |
| F-01 | Roadway emissions - sorbent delivery for DSI system | --- | 0.31 | --- | 0.062 | --- | 0.015 | --- | ambient | --- | --- | --- |
| | **SUBTOTAL - SCR SYSTEM (DSI)** | | **0.46** | | **0.21** | | **0.16** | | | | | |
| **SCR SYSTEM (LIMESTONE)** | | | | | | | | | | | | |
| EP-01 | Bin vent at top of limestone silo | 0.094 | 0.095 | 0.094 | 0.095 | 0.094 | 0.095 | 100 - 2,200 | ambient | 66 | 1.7 | 0.8 - 16.8 |
| EP-02 | Bin vent at top of surge bin | 0.097 | 0.42 | 0.097 | 0.42 | 0.097 | 0.42 | 2,262 | ambient | 25 | 1.7 | 17.3 |
| F-01 | Transfer of limestone surge bin to coal reclaim conveyor C-1 | 0.00062 | 0.0027 | 0.000023 | 0.00099 | 0.000023 | 0.00099 | --- | ambient | --- | --- | --- |
| F-02 | Transfer of limestone surge bin to coal reclaim conveyor C-2 | 0.00062 | 0.0027 | 0.000023 | 0.00099 | 0.000023 | 0.00099 | --- | ambient | --- | --- | --- |
| F-03 | Roadway emissions - limestone delivery | --- | 0.30 | --- | 0.060 | --- | 0.015 | --- | ambient | --- | --- | --- |
| | **SUBTOTAL - SCR SYSTEM (LIMESTONE)** | | **0.82** | | **0.58** | | **0.54** | | | | | |
| **ACI SYSTEM** | | | | | | | | | | | | |
| EP-01 | Bin vent at top of activated carbon silo 1 | 0.043 | 0.19 | 0.043 | 0.19 | 0.043 | 0.19 | 1,000 | ambient | 90 | 1.2 | 15.6 |
| EP-02 | Bin vent at top of activated carbon silo 2 | 0.043 | 0.19 | 0.043 | 0.19 | 0.043 | 0.19 | 1,000 | ambient | 90 | 1.2 | 15.6 |
| **EP-03A (New)** | Unit 1 Carbon Silo Weight Feeders -- Silo Skirt Ventilation Fan | 0.0086 | 0.038 | 0.0086 | 0.038 | 0.0086 | 0.038 | 1,400 | ambient | 18 | 1.3 | 16.7 |
| **EP-03B (New)** | Unit 1 Carbon Silo Weight Feeders -- Silo Skirt Ventilation Fan (spare) | --- | --- | --- | --- | --- | --- | 1,400 | ambient | 18 | 1.3 | 16.7 |
| **EP-04A (New)** | Unit 2 Carbon Silo Weight Feeders -- Silo Skirt Ventilation Fan | 0.0086 | 0.038 | 0.0086 | 0.038 | 0.0086 | 0.038 | 1,400 | ambient | 18 | 1.3 | 16.7 |
| **EP-04B (New)** | Unit 2 Carbon Silo Weight Feeders -- Silo Skirt Ventilation Fan (spare) | --- | --- | --- | --- | --- | --- | 1,400 | ambient | 18 | 1.3 | 16.7 |
| F-01 | Roadway emissions - carbon delivery | --- | 0.15 | --- | 0.031 | --- | 0.0076 | --- | ambient | --- | --- | --- |
| | **SUBTOTAL - ACI SYSTEM** | | **0.60** | | **0.48** | | **0.46** | | | | | |
| **DRY FLY ASH SYSTEM** | | | | | | | | | | | | |
| EP-01 | Unit 1 Vacuum exhauster emissions | 0.21 | 0.94 | 0.21 | 0.94 | 0.21 | 0.94 | 5,000 | ambient | 8 | 2.5 | 17.0 |
| EP-02 | Unit 1 Vacuum exhauster emissions | 0.21 | 0.94 | 0.21 | 0.94 | 0.21 | 0.94 | 5,000 | ambient | 8 | 2.5 | 17.0 |
| EP-03 | Unit 2 Vacuum exhauster emissions | 0.21 | 0.94 | 0.21 | 0.94 | 0.21 | 0.94 | 5,000 | ambient | 8 | 2.5 | 17.0 |

**DUKE - CAYUGA UNITS 1 & 2 SCR PROJECT (INCLUDES DSI, ACI, DRY FLY ASH, FIXATION, AND LIMESTONE INJECTION)**
**SCR SYSTEM PM EMISSION SUMMARY (Cont.)**



| PROJECTED MATERIAL HANDLING EMISSIONS | | PM Emissions | | PM10 Emissions | | PM2.5 Emissions | | Exhaust Parameters | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Emission Point ID | Description | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | Exhaust Flow Rate (cfm) | Exhaust Temperature (deg F) | Height Above Grade (ft) | Exhaust Point Diameter (ft) | Exhaust Velocity (ft/s) |
| EP-04 | Unit 2 Vacuum exhauster emissions | 0.21 | 0.94 | 0.21 | 0.94 | 0.21 | 0.94 | 5,000 | ambient | 8 | 2.5 | 17.0 |
| EP-05 | Vacuum exhauster (Spare) | --- | --- | --- | --- | --- | --- | 5,000 | ambient | 8 | 2.5 | 17.0 |
| EP-06 | Fly ash silo #1 bin vent filter | 0.21 | 0.94 | 0.21 | 0.94 | 0.21 | 0.94 | 5,000 | ambient | 110 | 2.5 | 17.0 |
| EP-07 | **Removed** | | | | | | | | | | | |
| F-01 | Pin mixer discharge at silo #1 | 0.046 | 0.087 | 0.022 | 0.041 | 0.0033 | 0.0062 | --- | ambient | --- | --- | --- |
| F-02 | **Removed** | | | | | | | | | | | |
| F-03 | Roadway emissions - ash delivery to landfill | --- | 3.29 | --- | 0.84 | --- | 0.10 | --- | ambient | --- | --- | --- |
| F-04 | Fly ash unloaded from trucks | --- | 0.087 | --- | 0.041 | --- | 0.0062 | --- | ambient | --- | --- | --- |
| F-05 | Bulldozer activity at landfill | --- | 0.34 | --- | 0.091 | --- | 0.0091 | --- | ambient | --- | --- | --- |
| F-06 | Landfill wind erosion | --- | 1.29 | --- | 0.64 | --- | 0.096 | --- | ambient | --- | --- | --- |
| | **SUBTOTAL - DRY FLY ASH SYSTEM** | | **9.78** | | **6.35** | | **4.92** | | | | | |
| **FIXATION SYSTEM** | | | | | | | | | | | | |
| EP-01 | **Removed** | | | | | | | | | | | |
| F-01 | Roadway emissions - lime delivery to lime bin | --- | 0.028 | --- | 0.0055 | --- | 0.0014 | --- | ambient | --- | --- | --- |
| EP-02 | Lime bin, bin vent filter | 0.103 | 0.084 | 0.103 | 0.084 | 0.103 | 0.084 | 200 - 2,200 | ambient | 73 | 1.7 | 1.5 - 16.8 |
| F-02 | Transfer of gypsum to new belt feeder inside fixation building | 0.236 | 0.48 | 0.11 | 0.228 | 0.017 | 0.0346 | --- | ambient | --- | --- | --- |
| F-03 | Pin mixer discharge to conveyor inside fixation building | 0.047 | 0.096 | 0.022 | 0.045 | 0.0034 | 0.0069 | --- | ambient | --- | --- | --- |
| F-04 | Transfer of fixated material to new radial stacker conveyor | 0.047 | 0.096 | 0.022 | 0.045 | 0.0034 | 0.0069 | --- | ambient | --- | --- | --- |
| F-05 | Transfer of fixated material to waste pile | 0.047 | 0.096 | 0.022 | 0.045 | 0.0034 | 0.0069 | --- | ambient | --- | --- | --- |
| F-06 | Front-end loader activity at waste storage pile | --- | 4.37 | --- | 1.18 | --- | 0.12 | --- | ambient | --- | --- | --- |
| F-07 | Fixated material loaded into trucks | --- | 0.057 | --- | 0.027 | --- | 0.0041 | --- | ambient | --- | --- | --- |
| F-08 | Waste pile wind erosion | --- | 0.35 | --- | 0.17 | --- | 0.026 | --- | ambient | --- | --- | --- |
| F-09A | Roadway emissions: Case 1 - waste delivery trucks to landfill | --- | 5.74 | --- | 1.46 | --- | 0.18 | --- | ambient | --- | --- | --- |
| **F-09B (New)** | Roadway emissions: Case 2 - waste delivery trucks to onsite ash ponds | --- | 8.69 | --- | 2.33 | --- | 0.24 | --- | ambient | --- | --- | --- |
| F-10 | Fixated material unloaded from trucks | --- | 0.057 | --- | 0.027 | --- | 0.0041 | --- | ambient | --- | --- | --- |
| F-11 | Bulldozer activity at disposal site | --- | 0.59 | --- | 0.16 | --- | 0.016 | --- | ambient | --- | --- | --- |
| F-12 | Landfill wind erosion | --- | 1.29 | --- | 0.64 | --- | 0.10 | --- | ambient | --- | --- | --- |
| | **SUBTOTAL - FIXATION SYSTEM (Case 1: Waste Delivery to Landfill)** | | **13.3** | | **4.12** | | **0.59** | | | | | |
| | **SUBTOTAL - FIXATION SYSTEM (Case 2: Waste Delivery to Ash Ponds)** | | **16.3** | | **5.00** | | **0.64** | | | | | |
| **TOTAL PROJECT EMISSIONS** | **Case 1: 100% Fixation, Waste Delivered to Landfill Total emissions exclude Dry Fly Ash System emission points: F-01 through F-06** | **---** | **20.0** | **---** | **10.1** | **---** | **6.44** | **---** | **---** | **---** | **---** | **---** |
| | **Case 2: 100% Fixation, Waste Delivered to Ash Pond Total emissions exclude Dry Fly Ash System emission points: F-01 through F-06** | **---** | **23.0** | **---** | **11.0** | **---** | **6.51** | **---** | **---** | **---** | **---** | **---** |
| | **Case 3: 100% Dry Fly Ash (No Fixation) Total emissions exclude Fixation System emission points** | **---** | **11.8** | **---** | **7.64** | **---** | **6.08** | **---** | **---** | **---** | **---** | **---** |
| ***PSD Signficant Emission Rates*** | | | ***25*** | | ***15*** | | ***10*** | | | | | |

**DUKE - CAYUGA UNITS 1 & 2 SCR PROJECT (INCLUDES DSI, ACI, DRY FLY ASH, FIXATION, AND LIMESTONE INJECTION)**
**SCR SYSTEM PM EMISSION CALCULATIONS**
**AMMONIA DELIVERY**



Ammonia is delivered to the ammonia storage tanks by truck. Ammonia delivery truck travel will result in fugitive particulate emissions.

**EMISSION FACTORS[1]**

| | | |
|---|---|---|
| Paved Roadway Emissions: | 0.15 | lb PM/VMT |
| *Ammonia Trucks* | 0.030 | lb PM10/VMT |
| | 0.0073 | lb PM2.5/VMT |

[1] Basis for emission factors provided below emissions table.

**AMMONIA REQUIREMENT**

| | | |
|---|---|---|
| Maximum Hourly Ammonia Requirement: | 2,842 | lb NH3/hr (both units, anhydrous NH3 (per Riley Mass Balance)) |
| Maximum Annual Ammonia Requirement | 12,448 | tons/year (based on 100% capacity factor, both units) |

| | | | | | Emission Factors | | | PM Emissions | | PM10 Emissions | | PM2.5 Emissions | | Exhaust Parameters | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | Project | Description | Emission Controls | Emissions Exhausted at Emission Point: | PM Control at Emission Point | Emission Rate | Units | Maximum Emissions lb/hr | Maximum Emissions tpy | Maximum Emissions lb/hr | Maximum Emissions tpy | Maximum Emissions lb/hr | Maximum Emissions tpy | Exhaust Flow Rate (if applicable) (acfm) | Exhaust Temperature (oF) | Height Above Grade (feet) | Exhaust Point Diameter (feet) | Exhaust Velocity (feet/sec) |
| F-01 | SCR (NH3) | Roadway emissions - NH3 delivery | Paved roads | F-02 | **Paved Roads** | 0.15 | lb/VMT (PM) | --- | 0.10 | --- | 0.021 | --- | 0.0051 | --- | ambient | --- | --- | --- |
| **Total Ammonia Handling Emissions** | | | | | | | | | **0.10** | | **0.021** | | **0.0051** | | | | | |

**Emission Factor Calculation -- Paved Roads (Ammonia Trucks)**

Eext = [k (sL)0.91 x (W)1.02 ] (1 – P/4N) (AP42 Section 13.2.1, Eqn 2)

**where:**

| | | | |
|---|---|---|---|
| k (PM) = | 0.011 | | AP42 Table 13.2.1-1 |
| k (PM10) = | 0.0022 | | AP42 Table 13.2.1-1 |
| k (PM2.5) = | 0.00054 | | AP42 Table 13.2.1-1 |
| sL = | 0.6 | g/m2 | AP42 Table 13.2.1-2, Ubiquitous baseline |
| W = | 22 | tons | Assume: Truck Tare Weight = 12 tons, Truck Capacity = 20 tons |
| P = | 115 | days/yr | AP42 Figure 13.2.1-2 |
| N = | 365 | days/yr | |
| Control Efficiency = | 0% | | |
| Eext (PM) = | 0.15 | lb/VMT | |
| Eext (PM10) = | 0.030 | lb/VMT | |
| Eext (PM2.5) = | 0.0073 | lb/VMT | |
| Maximum Annual Ammonia Requirement: | 12,448 | Based on 100% capacity factor for both units | |
| Number of Ammonia Deliveries: | 622 | (assumes 20 ton truck capacity) | |
| Length of Road: | 1.1 | miles (one way) | |
| Annual VMT: | 1385.4 | miles per year | |

**DUKE - CAYUGA UNITS 1 & 2 SCR PROJECT (INCLUDES DSI, ACI, DRY FLY ASH, FIXATION, AND LIMESTONE INJECTION)**
**SCR SYSTEM PM EMISSION CALCULATIONS**
**DRY SORBENT INJECTION SYSTEM**



Sorbent (lime) is transferred pnumatically from delivery trucks to the lime storage silos. Except for material transfers from the delivery trucks to the storage silos, there are no transfer points associated with the pneumatic system.

**EMISSION FACTORS[1]**

| | | |
|---|---|---|
| Bin Vent Filter: | 0.005 | grains (PM,PM10,PM2.5)/dscf |
| Paved Roadway Emissions: | 0.15 | lb PM/VMT |
| *Sorbent Trucks* | 0.030 | lb PM10/VMT |
| | 0.0073 | lb PM2.5/VMT |

[1] Basis for emission factors provided below emissions table.

**SORBENT REQUIREMENT**

| | | |
|---|---|---|
| Maximum Hourly Sorbent Consumption: | 8,000 | lb lime/hr (both units) (S&L "FGD-Byproduct Fixation Design Basis," Draft, 4/24/13) |
| Maximum Annual Sorbent Consumption: | 35,040 | tons/year (based on 100% capacity factor, both units) |
| Sorbent Loading Hours: | 2,628 | hr/yr (based on 20 ton trucks, assumes 1.5 hour to load truck) |

| | | | | | Emission Factors | | | PM Emissions | | PM10 Emissions | | PM2.5 Emissions | | Exhaust Parameters | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | Project | Description | Emission Controls | Emissions Exhausted at Emission Point: | PM Control at Emission Point | Emission Rate | Units | Maximum Emissions lb/hr | Maximum Emissions tpy | Maximum Emissions lb/hr | Maximum Emissions tpy | Maximum Emissions lb/hr | Maximum Emissions tpy | Exhaust Flow Rate (if applicable) (acfm) | Exhaust Temperature (oF) | Height Above Grade (feet) | Exhaust Point Diameter (feet) | Exhaust Velocity (feet/sec) |
| TP-01 | SCR (DSI) | Emissions from Unit 1 DSI Sorbent Storage Silo when actively loading | The DSI Sorbent Storage Silo for Unit 1 includes one bin vent filter. Annual emissions assume that EP-01 will operate for 1,314 hr/yr @ 1,000 cfm when actively filling the storage silo, and 7,446 hrs/yr @ 50 cfm with recycling air. | EP-01 | Bin Vent Filter | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.043 | 0.028 | 0.043 | 0.028 | 0.043 | 0.028 | 1,000 | | | | |
| | | Emissions from Unit 1 DSI Sorbent Storage Silo during normal operations (recycling air) | | EP-01 | Bin Vent Filter | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.0021 | 0.0080 | 0.0021 | 0.0080 | 0.0021 | 0.0080 | 50 | | | | |
| EP-01 | SCR (DSI) | Bin vent at top of sorbent silo 1 for Unit 1 DSI system | Emissions associated with TP-01 vented through bin vent filter. | EP-01 | **Bin Vent Filter** | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.043 | 0.036 | 0.043 | 0.036 | 0.043 | 0.036 | 50 - 1,000 | ambient | 100 | 1.17 | 0.8 - 15.6 |
| TP-03 | SCR (DSI) | Emissions from Unit 2 DSI Sorbent Storage Silo when actively loading | The DSI Sorbent Storage Silo for Unit 2 includes one bin vent filter. Annual emissions assume that EP-01 will operate for 1,314 hr/yr @ 1,000 cfm when actively filling the storage silo, and 7,446 hrs/yr @ 50 cfm with recycling air. | EP-03 | Bin Vent Filter | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.043 | 0.028 | 0.043 | 0.028 | 0.043 | 0.028 | 1,000 | | | | |
| | | Emissions from Unit 2 DSI Sorbent Storage Silo during normal operations (recycling air) | | EP-03 | Bin Vent Filter | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.0021 | 0.0080 | 0.0021 | 0.0080 | 0.0021 | 0.0080 | 50 | | | | |
| EP-03 | SCR (DSI) | Bin vent at top of sorbent silo 1 for Unit 2 DSI system | Emissions associated with TP-03 vented through bin vent filter. | EP-03 | **Bin Vent Filter** | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.043 | 0.036 | 0.043 | 0.036 | 0.043 | 0.036 | 50 - 1,000 | ambient | 100 | 1.17 | 0.8 - 15.6 |
| TP-04 | SCR (DSI) | Emissions from Unit 1 DSI Sorbent Storage Silo Weight Feeders | Unit 1 DSI Sorbent Storage Silo Weight Feeder exhaust points include dust filters. Emission calculations conservatively assume that TP-04 and TP-05 will operate for 24 hrs/day @ 100 cfm each. | EP-05A, EP-05B EP-05C | Filter | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.0043 | 0.019 | 0.0043 | 0.019 | 0.0043 | 0.019 | 100 | | | | |
| TP-05 | SCR (DSI) | Emissions from Unit 1 DSI Sorbent Storage Silo Weight Feeders | | EP-05A, EP-05B EP-05C | Filter | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.0043 | 0.019 | 0.0043 | 0.019 | 0.0043 | 0.019 | 100 | | | | |
| EP-05A (New) | SCR (DSI) | Unit 1 DSI Sorbent Silo Weight Feeders - - Silo Skirt Ventilation Fan | Emissions associated with TP-04 and TP-05. | EP-05A | | | | 0.0086 | 0.038 | 0.0086 | 0.038 | 0.0086 | 0.038 | 5,105 | ambient | 25 | 2.50 | 17.3 |
| EP-05B (New) | SCR (DSI) | Unit 1 DSI Sorbent Silo Weight Feeders - - Silo Skirt Ventilation Fan | Emissions associated with TP-04 and TP-05. | EP-05B | | | | | | | | | | 452 | ambient | 11.5 | 0.75 | 17.1 |
| EP-05C (New) | SCR (DSI) | Unit 1 DSI Sorbent Silo Weight Feeders - - Silo Skirt Ventilation Fan (spare) | Emissions associated with TP-04 and TP-05. | EP-05C | | | | --- | --- | --- | --- | --- | --- | 5,105 | ambient | 25 | 2.50 | 17.3 |
| TP-06 | SCR (DSI) | Emissions from Unit 2 DSI Sorbent Storage Silo Weight Feeders | Unit 2 DSI Sorbent Storage Silo Weight Feeder exhaust points include dust filters. Emission calculations conservatively assume that TP-06 and TP-07 will operate for 24 hrs/day @ 100 cfm each. | EP-06A, EP-06B EP-06C | Filter | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.0043 | 0.019 | 0.0043 | 0.019 | 0.0043 | 0.019 | 100 | | | | |
| TP-07 | SCR (DSI) | Emissions from Unit 2 DSI Sorbent Storage Silo Weight Feeders | | EP-06A, EP-06B EP-06C | Filter | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.0043 | 0.019 | 0.0043 | 0.019 | 0.0043 | 0.019 | 100 | | | | |
| EP-06A (New) | SCR (DSI) | Unit 2 DSI Sorbent Silo Weight Feeders - - Silo Skirt Ventilation Fan | Emissions associated with TP-06 and TP-07. | EP-06A | | | | 0.0086 | 0.038 | 0.0086 | 0.038 | 0.0086 | 0.038 | 5,105 | ambient | 25 | 2.50 | 17.3 |
| EP-06B (New) | SCR (DSI) | Unit 2 DSI Sorbent Silo Weight Feeders - - Silo Skirt Ventilation Fan | Emissions associated with TP-06 and TP-07. | EP-06B | | | | | | | | | | 452 | ambient | 11.5 | 0.75 | 17.1 |
| EP-06C (New) | SCR (DSI) | Unit 2 DSI Sorbent Silo Weight Feeders - - Silo Skirt Ventilation Fan (spare) | Emissions associated with TP-06 and TP-07. | EP-06C | | | | --- | --- | --- | --- | --- | --- | 5,105 | ambient | 25 | 2.50 | 17.3 |
| F-01 | SCR (DSI) | Roadway emissions - sorbent delivery for DSI system | Paved roads | F-01 | **Paved Roads** | 0.149 | lb/VMT (PM) | --- | 0.31 | --- | 0.062 | --- | 0.015 | --- | ambient | --- | --- | --- |
| **Total Lime Handling Emissions** | | | | | | | | | **0.46** | | **0.21** | | **0.16** | | | | | |

**Emission Factor Calculation -- Paved Roads (Sorbent Trucks)**

Eext = [k (sL)0.91 x (W)1.02 ] (1 – P/4N) (AP42 Section 13.2.1, Eqn 2)

where:

| | | | |
|---|---|---|---|
| k (PM) = | 0.011 | | AP42 Table 13.2.1-1 |
| k (PM10) = | 0.0022 | | AP42 Table 13.2.1-1 |
| k (PM2.5) = | 0.00054 | | AP42 Table 13.2.1-1 |
| sL = | 0.6 | g/m2 | AP42 Table 13.2.1-2, Ubiquitous baseline |
| W = | 22 | tons | Assume: Truck Tare Weight = 12 tons, Truck Capacity = 20 tons |
| P = | 115 | days/yr | AP42 Figure 13.2.1-2 |
| N = | 365 | days/yr | |
| Control Efficiency = | 0% | | |
| Eext (PM) = | 0.15 | lb/VMT | |
| Eext (PM10) = | 0.030 | lb/VMT | |
| Eext (PM2.5) = | 0.0073 | lb/VMT | |
| Maximum Annual Sorbent Requirement: | 35,040 | Based on 100% capacity factor for both units | |
| Number of Sorbent Deliveries: | 1752 | (assumes 20 ton truck capacity) | |
| Length of Road: | 1.18 | miles (one way) | |
| Annual VMT: | 4141.1 | miles per year | |

**DUKE - CAYUGA UNITS 1 & 2 SCR PROJECT (INCLUDES DSI, ACI, DRY FLY ASH, FIXATION, AND LIMESTONE INJECTION)**
**SCR SYSTEM PM EMISSION CALCULATIONS**
**LIMESTONE SYSTEM FOR ARSENIC MITIGATION**



Limestone may be injected to mitigate potential arsenic emissions which can result in degradation of the SCR catalyst. Crushed or powdered limestone is pneumatically transfered from delivery trucks to the limestone storage silos (via unloading hopper w/crushed limestone).

**EMISSION FACTORS[1]**

| | | |
|---|---|---|
| Bin Vent Filter: | 0.005 | grains (PM,PM10,PM2.5)/dscf |
| Paved Roadway Emissions: | 0.15 | lb PM/VMT |
| *Limestone Trucks* | 0.030 | lb PM10/VMT |
| | 0.0073 | lb PM2.5/VMT |
| Limestone transfer points: | 0.0003 | lb PM/ton (AP-42 Table 11.19.2-2) |
| | 0.0001 | lb PM10/ton (AP-42 Table 11.19.2-2) |
| | 0.0001 | lb PM2.5/ton (AP-42 Table 11.19.2-2) |

[1] Basis for emission factors provided below emissions table.

**LIMESTONE REQUIREMENT**

| | | |
|---|---|---|
| Maximum Hourly Limestone Consumption: | 8,200 | lb limestone/hr (both units) (S&L "FGD-Byproduct Fixation Design Basis," Draft, 4/24/13) |
| Maximum Annual Limestone Consumption: | 35,916 | tons/year (based on 100% capacity factor for both units) |
| Limestone Loading Hours: | 2,694 | hr/yr (based on 20 ton trucks, assumes 1.5 hour to unload truck) |

| | | | | | Emission Factors | | | PM Emissions | | PM10 Emissions | | PM2.5 Emissions | | Exhaust Parameters | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | Project | Description | Emission Controls | Emissions Exhausted at Emission Point: | PM Control at Emission Point | Controlled Emission Rate | Units | Maximum Emissions lb/hr | Maximum Emissions tpy | Maximum Emissions lb/hr | Maximum Emissions tpy | Maximum Emissions lb/hr | Maximum Emissions tpy | Exhaust Flow Rate (if applicable) (acfm) | Exhaust Temperature (oF) | Height Above Grade (feet) | Exhaust Point Diameter (feet) | Exhaust Velocity (feet/sec) |
| TP-01, TP-02 | SCR (LIMESTONE) | Emissions from Limestone Storage Silo when actively loading. | The Limestone Storage Silo includes one bin vent filter. Short-term emissions assume two (2) trucks unloading simulateously @ 2,200 cfm (total). Annual emissions assume that EP-01 will operate for 2,694 hr/yr @ 1,200 cfm when actively filling the storage silo, and 6,066 hrs/yr @ 200 cfm. | EP-01 | Bin Vent Filter | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.094 | 0.069 | 0.094 | 0.069 | 0.094 | 0.069 | 2,200 | | | | |
| | | Emissions from Limestone Storage Silo during normal operations (recycling air) | | EP-01 | Bin Vent Filter | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.0086 | 0.026 | 0.0086 | 0.026 | 0.0086 | 0.026 | 200 | | | | |
| EP-01 | SCR (LIMESTONE) | Bin vent at top of limestone silo | Emissions associated with TP-01 and TP-02 | EP-01 | **Bin Vent Filter** | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.094 | 0.095 | 0.094 | 0.095 | 0.094 | 0.095 | 100 - 2,200 | ambient | 66 | 1.7 | 0.8 - 16.8 |
| TP-03 | SCR (LIMESTONE) | Transfer of limestone from silo to surge bin | Air discharged from limestone surge bins is filtered through a bin vent filter. Annual emissions conservatively assume TP-03 will operate 24 hr/day. | EP-02 | | | | | | | | | | | | | | |
| EP-02 | SCR (LIMESTONE) | Bin vent at top of surge bin | Emissions associated with TP-03 | EP-02 | **Bin Vent Filter** | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.097 | 0.42 | 0.097 | 0.42 | 0.097 | 0.42 | 2,262 | ambient | 25 | 1.7 | 17.3 |
| TP-04 | SCR (LIMESTONE) | Transfer of limestone surge bin to coal reclaim conveyor C-1 | Enclosed transfer and enclosed chutes | F-01 | | | | | | | | | | | | | | |
| F-01 | SCR (LIMESTONE) | Transfer of limestone surge bin to coal reclaim conveyor C-1 | Emissions associated with TP-04 | F-01 | **Enclosed Transfer** | 0.00030 | lb/ton (PM) | 0.00062 | 0.0027 | 0.000023 | 0.00099 | 0.000023 | 0.00099 | --- | ambient | --- | --- | --- |
| TP-05 | SCR (LIMESTONE) | Transfer of limestone surge bin to coal reclaim conveyor C-2 | Enclosed transfer and enclosed chutes | F-02 | | | | | | | | | | | | | | |
| F-02 | SCR (LIMESTONE) | Transfer of limestone surge bin to coal reclaim conveyor C-2 | Emissions associated with TP-05 | F-02 | **Enclosed Transfer** | 0.00030 | lb/ton (PM) | 0.00062 | 0.0027 | 0.000023 | 0.00099 | 0.000023 | 0.00099 | --- | ambient | --- | --- | --- |
| F-03 | SCR (LIMESTONE) | Roadway emissions - limestone delivery | Paved roads | F-03 | **Paved Roads** | 0.15 | lb/VMT (PM) | --- | 0.30 | --- | 0.060 | --- | 0.015 | --- | ambient | --- | --- | --- |
| **Total Limestone Handling Emissions** | | | | | | | | | **0.82** | | **0.58** | | **0.54** | | | | | |

**Emission Factor Calculation -- Paved Roads (Limestone Trucks)**

Eext = [k (sL)0.91 x (W)1.02 ] (1 – P/4N) (AP42 Section 13.2.1, Eqn 2)

where:

| | | | |
|---|---|---|---|
| k (PM) = | 0.011 | | AP42 Table 13.2.1-1 |
| k (PM10) = | 0.0022 | | AP42 Table 13.2.1-1 |
| k (PM2.5) = | 0.00054 | | AP42 Table 13.2.1-1 |
| sL = | 0.6 | g/m2 | AP42 Table 13.2.1-2, Ubiquitous baseline |
| W = | 22 | tons | Assume: Truck Tare Weight = 12 tons, Truck Capacity = 20 tons |
| P = | 115 | days/yr | AP42 Figure 13.2.1-2 |
| N = | 365 | days/yr | |
| Control Efficiency = | 0% | | |
| Eext (PM) = | 0.15 | lb/VMT | |
| Eext (PM10) = | 0.030 | lb/VMT | |
| Eext (PM2.5) = | 0.0073 | lb/VMT | |
| Maximum Annual Limestone Requirement: | 35,916 | Based on 100% capacity factor for both units | |
| Number of Limestone Deliveries: | 1,796 | (assumes 20 ton truck capacity) | |
| Length of Road: | 1.11 | miles (one way) | |
| Annual VMT: | 4,000 | miles per year | |

**Emission Factor Calculation -- Limestone Transfer Points**

***Uncontrolled Emission Factor***

| | | |
|---|---|---|
| E (PM) = | 0.0030 | lb PM/ton (AP-42 Table 11.19.2-2) |
| E (PM10) = | 0.0011 | lb PM10/ton (AP-42 Table 11.19.2-2) |
| E (PM2.5) = | 0.0011 | lb PM2.5/ton (AP-42 Table 11.19.2-2) |
| Control Efficiency | 90% | Assumed for enclosed limestone transfer point: |

***Cntrolled Emission Factor***

| | | |
|---|---|---|
| E (PM) = | 0.00030 | lb PM/ton |
| E (PM10) = | 0.00011 | lb PM10/ton |
| E (PM2.5) = | 0.00011 | lb PM2.5/ton |

**DUKE - CAYUGA UNITS 1 & 2 SCR PROJECT (INCLUDES DSI, ACI, DRY FLY ASH, FIXATION, AND LIMESTONE INJECTION)**
**ACTIVATED CARBON INJECTION SYSTEM PM EMISSION CALCULATIONS**

Activated carbon is transferred pnumatically from delivery trucks to the activated carbon storage silos. Except for material transfers from the delivery trucks to the storage silos, there are no transfer points associated with the pneumatic system.

**EMISSION FACTORS[1]**

| | | |
|---|---|---|
| Bin Vent Filter: | 0.005 | grains (PM,PM10,PM2.5)/dscf |
| Paved Roadway Emissions: | 0.15 | lb PM/VMT |
| *Carbon Delivery* | 0.030 | lb PM10/VMT |
| | 0.0073 | lb PM2.5/VMT |

[1] Basis for emission factors provided below emissions table.

**CARBON REQUIREMENT**

| | | |
|---|---|---|
| Maximum Hourly Carbon Requirement: | 4,000 | lb carbon/hr (both units) (S&L "FGD-Byproduct Fixation Design Basis," Draft, 4/24/13) |
| Maximum Annual Carbon Requirement: | 17,520 | tons/year (based on 100% capacity factor, both units) |
| Carbon Loading Hours: | 1,314 | hr/yr (based on 20 ton trucks, assumes 1.5 hour to unload truck) |

| | | | | | Emission Factors | | | PM Emissions | | PM10 Emissions | | PM2.5 Emissions | | Exhaust Parameters | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ID** | **Project** | **Description** | **Emission Controls** | **Emissions Exhausted at Emission Point:** | **PM Control at Emission Point** | **Emission Rate** | **Units** | **Maximum Emissions lb/hr** | **Maximum Emissions tpy** | **Maximum Emissions lb/hr** | **Maximum Emissions tpy** | **Maximum Emissions lb/hr** | **Maximum Emissions tpy** | **Exhaust Flow Rate (if applicable) (acfm)** | **Exhaust Temperature (oF)** | **Height Above Grade (feet)** | **Exhaust Point Diameter (feet)** | **Exhaust Velocity (feet/sec)** |
| TP-01 | ACI | Emissions from the Unit 1 Carbon Storage Silo when actively loading | The Carbon Storage Silo for Unit 1 includes one bin vent filter. Emission calculations conservatively assume that EP-01 will operate for 24 hrs/day. | EP-01 | Bin Vent Filter | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.043 | 0.19 | 0.043 | 0.19 | 0.043 | 0.19 | 1,000 | | | | |
| EP-01 | ACI | Bin vent at top of activated carbon silo 1 | Emissions associated with TP-01 | EP-01 | **Bin Vent Filter** | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.043 | 0.19 | 0.043 | 0.19 | 0.043 | 0.19 | 1,000 | ambient | 90 | 1.2 | 15.6 |
| TP-02 | ACI | Emissions from the Unit 2 Carbon Storage Silo. | The Carbon Storage Silo for Unit 2 includes one bin vent filter. Emission calculations conservatively assume that EP-02 will operate for 24 hrs/day. | EP-02 | Bin Vent Filter | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.043 | 0.19 | 0.043 | 0.19 | 0.043 | 0.19 | 1,000 | | | | |
| EP-02 | ACI | Bin vent at top of activated carbon silo 2 | Emissions associated with TP-01 | EP-02 | **Bin Vent Filter** | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.043 | 0.19 | 0.043 | 0.19 | 0.043 | 0.19 | 1,000 | ambient | 90 | 1.2 | 15.6 |
| TP-03 | SCR (DSI) | Emissions from Unit 1 Carbon Storage Silo Weight Feeders. TP-01 and TP-02 emissions vented inside silo skirt enclosure and exhausted to atmosphere through vent fans (1 operating, 1 spare) | Unit 1 Carbon Storage Silo Weight Feeder exhaust points include dust filters. Emission calculations conservatively assume that TP-03 and TP-04 will operate for 24 hrs/day @ 100 cfm each. | EP-03A, EP-03B | Filter | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.0043 | 0.019 | 0.0043 | 0.019 | 0.0043 | 0.019 | 100 | | | | |
| TP-04 | SCR (DSI) | | | EP-03A, EP-03B | Filter | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.0043 | 0.019 | 0.0043 | 0.019 | 0.0043 | 0.019 | 100 | | | | |
| EP-03A (New) | SCR (DSI) | Unit 1 Carbon Silo Weight Feeders -- Silo Skirt Ventilation Fan | Emissions associated with TP-03 and TP-04 | EP-03A | | | | 0.0086 | 0.038 | 0.0086 | 0.038 | 0.0086 | 0.038 | 1,400 | ambient | 18 | 1.3 | 16.7 |
| EP-03B (New) | SCR (DSI) | Unit 1 Carbon Silo Weight Feeders -- Silo Skirt Ventilation Fan (spare) | Emissions associated with TP-03 and TP-04 | EP-03B | | | | --- | --- | --- | --- | --- | --- | 1,400 | ambient | 18 | 1.3 | 16.7 |
| TP-05 | SCR (DSI) | Emissions from Unit 2 Carbon Storage Silo Weight Feeders | Unit 2 Carbon Storage Silo Weight Feeder exhaust points include dust filters. Emission calculations conservatively assume that TP-05 and TP-06 will operate for 24 hrs/day @ 100 cfm each. | EP-04A, EP-04B | Filter | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.0043 | 0.019 | 0.0043 | 0.019 | 0.0043 | 0.019 | 100 | | | | |
| TP-06 | SCR (DSI) | Emissions from Unit 2 Carbon Storage Silo Weight Feeders | | EP-04A, EP-04B | Filter | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.0043 | 0.019 | 0.0043 | 0.019 | 0.0043 | 0.019 | 100 | | | | |
| EP-04A (New) | SCR (DSI) | Unit 2 Carbon Silo Weight Feeders -- Silo Skirt Ventilation Fan | Emissions associated with TP-05 and TP-06 | EP-04A | | | | 0.0086 | 0.038 | 0.0086 | 0.038 | 0.0086 | 0.038 | 1,400 | ambient | 18 | 1.3 | 16.7 |
| EP-04B (New) | SCR (DSI) | Unit 2 Carbon Silo Weight Feeders -- Silo Skirt Ventilation Fan (spare) | Emissions associated with TP-05 and TP-06 | EP-04B | | | | --- | --- | --- | --- | --- | --- | 1,400 | ambient | 18 | 1.3 | 16.7 |
| F-01 | ACI | Roadway emissions - carbon delivery | Paved roads | F-01 | **Paved Roads** | 0.15 | lb/VMT (PM) | --- | 0.15 | --- | 0.031 | --- | 0.0076 | --- | ambient | --- | --- | --- |
| **Total Carbon Handling Emissions** | | | | | | | | | **0.60** | | **0.48** | | **0.46** | | | | | |

**Emission Factor Calculation -- Paved Roads (Carbon Trucks)**

Eext = [k (sL)0.91 x (W)1.02 ] (1 – P/4N) (AP42 Section 13.2.1, Eqn 2)

where:

| | | | |
|---|---|---|---|
| k (PM) = | 0.011 | | AP42 Table 13.2.1-1 |
| k (PM10) = | 0.0022 | | AP42 Table 13.2.1-1 |
| k (PM2.5) = | 0.00054 | | AP42 Table 13.2.1-1 |
| sL = | 0.6 | g/m2 | AP42 Table 13.2.1-2, Ubiquitous baseline |
| W = | 22 | tons | Assume: Truck Tare Weight = 12 tons, Truck Capacity = 20 tons |
| P = | 115 | days/yr | AP42 Figure 13.2.1-2 |
| N = | 365 | days/yr | |
| Control Efficiency = | 0% | | |
| Eext (PM) = | 0.149 | lb/VMT | |
| Eext (PM10) = | 0.030 | lb/VMT | |
| Eext (PM2.5) = | 0.0073 | lb/VMT | |
| Maximum Annual Carbon Requirement: | 17,520 | Based on 100% capacity factor for both units | |
| Number of Carbon Deliveries: | 876 | (assumes 20 ton truck capacity) | |
| Length of Road: | 1.2 | miles (one way) | |
| Annual VMT: | 2070.5 | miles per year | |

**DUKE - CAYUGA UNITS 1 & 2 SCR PROJECT (INCLUDES DSI, ACI, DRY FLY ASH, FIXATION, AND LIMESTONE INJECTION)**
**DRY FLY ASH SYSTEM PM EMISSION CALCULATIONS**



Dry fly ash is transferred pnumatically to the fly ash storage silos. Except for material transfers from the storage silo to trucks or trains for off-site shipment there are no transfer points associated with the pneumatic system.

**EMISSION FACTORS[1]**

| | | |
|---|---|---|
| Bin Vent Filter: | 0.005 | grains (PM,PM10,PM2.5)/dscf |
| Paved Roadway Emissions: | 0.015 | lb PM/VMT |
| *Ash Trucks* | 0.0030 | lb PM10/VMT |
| | 0.00073 | lb PM2.5/VMT |
| Unpaved Roadway Emissions: | 1.06 | lb PM/VMT |
| *Ash Trucks* | 0.29 | lb PM10/VMT |
| | 0.029 | lb PM2.5/VMT |
| Conditioned fly ash transfer points: | 0.00034 | lb PM/ton |
| | 0.00016 | lb PM10/ton |
| | 0.000024 | lb PM2.5/ton |
| Bulldozer Activity: | 0.77 | lb PM/VMT |
| *Landfill* | 0.21 | lb PM10/VMT |
| | 0.02 | lb PM2.5/VMT |

[1] Basis for emission factors provided below emissions table.

**ASH REMOVED FROM SITE**

| | | |
|---|---|---|
| Maximum Hourly Ash Loadout Rate (from pug mill) | 135 | ton/hr (theoretical truck loadout rate based on 33 tons discharge in 15 minutes) |
| Maximum Ash Collection Rate: | 99,755 | lb ash (dry)/hr (both units) (S&L "FGD-Byproduct Fixation Design Basis," Draft, 4/24/13) |
| Maximum Annual Ash Removed From Site: | 514,031 | tons/year (based on 100% capacity factor for both units, 15% moisture content) |

| | | | | | Emission Factors | | | PM Emissions | | PM10 Emissions | | PM2.5 Emissions | | Exhaust Parameters | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | Project | Description | Emission Controls | Emissions Exhausted at Emission Point: | PM Control at Emission Point | Emission Rate | Units | Maximum Emissions lb/hr | Maximum Emissions tpy | Maximum Emissions lb/hr | Maximum Emissions tpy | Maximum Emissions lb/hr | Maximum Emissions tpy | Exhaust Flow Rate (if applicable) (acfm) | Exhaust Temperature (oF) | Height Above Grade (feet) | Exhaust Point Diameter (feet) | Exhaust Velocity (feet/sec) |
| TP-01 | DFA | Transfer of fly ash from Unit 1 ESP collection hoppers to transfer filter separator | Emissions exhausted through vacuum exhauster filter separator. Annual emissions conservativley assume TP-01 will operate 24 hr/day. | EP-01 | | | | | | | | | | | | | | |
| EP-01 | DFA | Unit 1 Vacuum exhauster emissions | Emissions associated with TP-01 | EP-01 | **Filter Separator** | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.21 | 0.94 | 0.21 | 0.94 | 0.21 | 0.94 | 5,000 | ambient | 8 | 2.5 | 17.0 |
| TP-02 | DFA | Transfer of fly ash from Unit 1 ESP collection hoppers to transfer filter separator | Emissions exhausted through vacuum exhauster filter separator. Annual emissions conservativley assume TP-02 will operate 24 hr/day. | EP-02 | | | | | | | | | | | | | | |
| EP-02 | DFA | Unit 1 Vacuum exhauster emissions | Emissions associated with TP-02 | EP-02 | **Filter Separator** | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.21 | 0.94 | 0.21 | 0.94 | 0.21 | 0.94 | 5,000 | ambient | 8 | 2.5 | 17.0 |
| TP-03 | DFA | Transfer of fly ash from Unit 2 ESP collection hoppers to transfer filter separator | Emissions exhausted through vacuum exhauster filter separator. Annual emissions conservativley assume TP-03 will operate 24 hr/day. | EP-03 | | | | | | | | | | | | | | |
| EP-03 | DFA | Unit 2 Vacuum exhauster emissions | Emissions associated with TP-03 | EP-03 | **Filter Separator** | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.21 | 0.94 | 0.21 | 0.94 | 0.21 | 0.94 | 5,000 | ambient | 8 | 2.5 | 17.0 |
| TP-04 | DFA | Transfer of fly ash from Unit 2 ESP collection hoppers to transfer filter separator | Emissions exhausted through vacuum exhauster filter separator. Annual emissions conservativley assume TP-04 will operate 24 hr/day. | EP-04 | | | | | | | | | | | | | | |
| EP-04 | DFA | Unit 2 Vacuum exhauster emissions | Emissions associated with TP-06 | EP-04 | **Filter Separator** | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.21 | 0.94 | 0.21 | 0.94 | 0.21 | 0.94 | 5,000 | ambient | 8 | 2.5 | 17.0 |
| EP-05 | DFA | Vacuum exhauster (Spare) | Spare vaccum exhauster | EP-05 | **Filter Separator** | 0.005 | gr/scf (PM/PM10/PM2.5) | --- | --- | --- | --- | --- | --- | 5,000 | ambient | 8 | 2.5 | 17.0 |
| TP-05 - TP-08 | DFA | Transfer of fly ash from Unit 1 or 2 transfer filter separators to fly ash silo | Air discharged from ash silo is filtered through a bin vent filter. Annual emissions conservatively assume TP-05 - TP-08 operate 24 hr/day. | EP-06 | | | | | | | | | | | | | | |
| TP-10 | DFA | Truck loading spout at fly ash silo | Emissions routed back to ash silo, and filtered through bin vent filter | EP-06 | | | | | | | | | | | | | | |
| EP-06 | DFA | Fly ash silo #1 bin vent filter | Emissions associated with TP-05 thru TP-08, TP-10 | EP-06 | **Bin Vent Filter** | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.21 | 0.94 | 0.21 | 0.94 | 0.21 | 0.94 | 5,000 | ambient | 110 | 2.5 | 17.0 |

**DUKE - CAYUGA UNITS 1 & 2 SCR PROJECT (INCLUDES DSI, ACI, DRY FLY ASH, FIXATION, AND LIMESTONE INJECTION)**
**DRY FLY ASH SYSTEM PM EMISSION CALCULATIONS (Cont.)**



| | | | | | Emission Factors | | | PM Emissions | | PM10 Emissions | | PM2.5 Emissions | | Exhaust Parameters | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ID** | **Project** | **Description** | **Emission Controls** | **Emissions Exhausted at Emission Point:** | **PM Control at Emission Point** | **Emission Rate** | **Units** | **Maximum Emissions lb/hr** | **Maximum Emissions tpy** | **Maximum Emissions lb/hr** | **Maximum Emissions tpy** | **Maximum Emissions lb/hr** | **Maximum Emissions tpy** | **Fan Capacity (if applicable) (acfm)** | **Exhaust Temperature (oF)** | **Height Above Grade (feet)** | **Exhaust Point Diameter (feet)** | **Exhaust Velocity (feet/sec)** |
| TP-09 | DFA | Transfer of conditioned fly ash from pin mixer to haul truck | Ash is conditioned with water. Ash moisture content of approximately 20% | F-01 | | | | | | | | | | | | | | |
| F-01 | DFA | Pin mixer discharge at silo #1 | Emissions associated with TP-09 | F-01 | **15% Moisture Content** | 0.00034 | lb/ton PM | 0.046 | 0.087 | 0.022 | 0.041 | 0.003 | 0.0062 | --- | ambient | --- | --- | --- |
| F-03A | DFA | Roadway emissions - ash delivery to landfill (paved roads) | Paved roads with dust suppression | F-03 | **Paved Roads** | 0.015 | lb/VMT (PM) | --- | 0.72 | --- | 0.143 | --- | 0.035 | --- | ambient | --- | --- | --- |
| F-03B | DFA | Roadway emissions - ash delivery at landfill | Unpaved roads at landfill with dust suppression | F-03 | **Unpaved Roads** | 1.06 | lb/VMT (PM) | --- | 2.58 | --- | 0.70 | --- | 0.07 | --- | ambient | --- | --- | --- |
| F-03 | DFA | Roadway emissions - ash delivery to landfill | Paved and unpaved roads with dust suppression | F-03 | **Paved and Unpaved Roads** | | | --- | 3.29 | --- | 0.84 | --- | 0.10 | --- | ambient | --- | --- | --- |
| TP-11 | DFA | Transfer of fly ash from trucks to landfill | Fly ash moisture content of approximately 15% | F-04 | | | | | | | | | | | | | | |
| F-04 | DFA | Fly ash unloaded from trucks | Emissions associated with TP-11 | F-04 | **15% Moisture Content** | 0.00034 | lb/ton PM | --- | 0.087 | --- | 0.041 | --- | 0.0062 | --- | ambient | --- | --- | --- |
| F-05 | DFA | Bulldozer activity at landfill | Fly ash moisture content of approximately 15%. | F-05 | **15% Moisture Content** | 0.77 | lb/VMT (PM) | --- | 0.34 | --- | 0.091 | --- | 0.009 | --- | ambient | --- | --- | --- |
| F-06 | DFA | Landfill wind erosion | Fixated material moisture content of approximately 15%. | F-06 | **15% Moisture Content** | 1180.7 | lb/acre-yr (PM) | --- | 1.29 | --- | 0.64 | --- | 0.096 | --- | ambient | --- | --- | --- |
| **Total Dry Fly Ash Handling Emissions** | | | | | | | | | **9.78** | | **6.35** | | **4.92** | | | | | |

**Emission Factor Calculations**

***Conditioned Fly Ash Transfer***

E = k (0.0032) (U/5)1.3 / [(M/2)1.4 (AP42 Section 13.2.4, Eqn 1)

| where: | | |
|---|---|---|
| k = | 0.74 | [particles < 30um] |
| k = | 0.35 | [particles < 10um] |
| k = | 0.053 | [particles < 2.5um] |
| Uexposed = | 9.8 | [mph, mean wind speed, Indianapolis International Airport, 2005] |
| MCond.Ash = | 15.0% | Assumed moisture content of Conditioned Ash |
| E (PM) = | 0.00034 | lb / ton material transferred |
| E (PM10) = | 0.00016 | lb / ton material transferred |
| E (PM2.5) = | 0.000024 | lb / ton material transferred |

***Paved Roads (Fly Ash Trucks)***

Eext = [k (sL)0.91 x (W)1.02 ] (1 – P/4N) (AP42 Section 13.2.1, Eqn 2)

| where: | | | Source |
|---|---|---|---|
| k (PM) = | 0.011 | | AP42 Table 13.2.1-1 |
| k (PM10) = | 0.0022 | | AP42 Table 13.2.1-1 |
| k (PM2.5) = | 0.00054 | | AP42 Table 13.2.1-1 |
| sL = | 0.6 | g/m2 | AP42 Table 13.2.1-2, Ubiquitous baseline |
| W = | 22 | tons | Assume: Truck Tare Weight = 12 tons, Truck Capacity = 20 tons |
| P = | 115 | days/yr | AP42 Figure 13.2.1-2 |
| N = | 365 | days/yr | |
| Control Efficiency = | 90% | | Assumed control with water sprays |
| Eext (PM) = | 0.015 | lb/VMT | |
| Eext (PM10) = | 0.003 | lb/VMT | |
| Eext (PM2.5) = | 0.001 | lb/VMT | |
| Maximum Annual Ash Collected: | 514,031 | Based on 100% capacity factor for both units | |
| Number of Ash Trucks: | 25,702 | Assumes 20 ton truck capacity | |
| Length of Road: | 1.87 | Based on one-way travel length | |
| Annual VMT: | 96,089 | miles per year | |

***Unpaved Roads (Fly Ash Trucks)***

Eext (lb/VMT) = k (s/12)a / (W/3)b ((365-P)/365) (AP42 Section 13.2.2, Eqns 1a and 2)

| where: | | | Source |
|---|---|---|---|
| k = | 4.9 | PM-30 | per AP-42 Table 13.2.2-2 |
| k = | 1.5 | PM-10 | per AP-42 Table 13.2.2-2 |
| k = | 0.15 | PM-2.5 | per AP-42 Table 13.2.2-2 |
| a = | 0.7 | constant a (PM) | per AP-42 Table 13.2.2-2 |
| a = | 0.90 | constant a (PM10/PM2.5) | per AP-42 Table 13.2.2-2 |
| b = | 0.45 | contant b (PM) | per AP-42 Table 13.2.2-2 |
| b = | 0.45 | constant b (PM10/PM2.5) | per AP-42 Table 13.2.2-2 |
| s = | 6.4 | surface silt content (%) | per AP-42 Table 13.2.2-1 |
| W = | 22 | mean vehicle weight (tons) | estimated average front-end loader weight |
| P = | 115 | days/yr | AP42 Figure 13.2.2-1 |
| Control Efficiency = | 80% | | Assumed control with water sprays |
| E (PM) = | 1.06 | lb/VMT (controlled) | |
| E (PM10) = | 0.29 | lb/VMT (controlled) | |
| E (PM2.5) = | 0.029 | lb/VMT (controlled) | |
| Maximum Annual Ash Collected: | 514,031 | tons/year | Based on 100% capacity factor for both units, 15% moisture content. |
| Number of Ash Trucks: | 25,702 | per year | Assumes 20 ton truck capacity |
| Length of Road (Landfill): | 0.095 | miles (one way) | |
| Annual VMT (Landfill): | 4,868 | miles per year | |

***Landfill - Bulldozer Activity Emissions***

Eext (lb/VMT) = k (s/12)a / (W/3)b ((365-P)/365) (AP42 Section 13.2.2, Eqns 1a and 2)

| where: | | | |
|---|---|---|---|
| k = | 4.9 | PM-30 | per AP-42 Table 13.2.2-2 |
| k = | 1.5 | PM-10 | per AP-42 Table 13.2.2-2 |
| k = | 0.15 | PM-2.5 | per AP-42 Table 13.2.2-2 |
| a = | 0.7 | constant a (PM) | per AP-42 Table 13.2.2-2 |
| a = | 0.9 | constant a (PM10/PM2.5) | per AP-42 Table 13.2.2-2 |
| b = | 0.45 | contant b (PM) | per AP-42 Table 13.2.2-2 |
| b = | 0.45 | constant b (PM10/PM2.5) | per AP-42 Table 13.2.2-2 |
| s = | 6.4 | surface silt content (%) | per AP-42 Table 13.2.2-1 |
| W = | 50.6 | mean vehicle weight (tons) | estimated average front-end loader weight |
| P = | 115 | days/yr | AP42 Figure 13.2.2-1 |
| Control Efficiency = | 90% | for moisture content of material | |
| E (PM) = | 0.77 | lb/VMT (controlled) | |
| E (PM10) = | 0.21 | lb/VMT (controlled) | |
| E (PM2.5) = | 0.021 | lb/VMT (controlled) | |
| VMT = | 876 | vehicle miles travele based on front-end loader activity | |

**DUKE - CAYUGA UNITS 1 & 2 SCR PROJECT (INCLUDES DSI, ACI, DRY FLY ASH, FIXATION, AND LIMESTONE INJECTION)**
**FIXATION SYSTEM PM EMISSIONS CALCULATIONS**



Gypsum, fly ash, and lime as transferred to the fixation building by conveyor (gypsum) and screw conveyor (fly ash, lime). Inside the fixation building, the solid materials are mixed and water is added in pin mixers. The fixated material is transferred by truck to the landfill for disposal.

**EMISSION FACTORS[1]**

| | | |
|---|---|---|
| Bin Vent Filter: | 0.005 | grains (PM,PM10,PM2.5)/dscf |
| Paved Roadway Emissions: | 0.015 | lb PM/VMT |
| *Lime Trucks* | 0.0030 | lb PM10/VMT |
| | 0.00073 | lb PM2.5/VMT |
| Paved Roadway Emissions: | 0.015 | lb PM/VMT |
| *Waste Trucks to Landfill or Ash Pond* | 0.0030 | lb PM10/VMT |
| | 0.00073 | lb PM2.5/VMT |
| Unpaved Roadway Emissions: | 1.06 | lb PM/VMT |
| *Waste Trucks to Landfill or Ash Pond* | 0.29 | lb PM10/VMT |
| | 0.029 | lb PM2.5/VMT |
| Gypsum Transfer Points: | 0.0016 | lb PM/ton |
| | 0.00074 | lb PM10/ton |
| | 0.00011 | lb PM2.5/ton |
| Fixated Material Transfer Points: | 0.00013 | lb PM/ton |
| | 0.00006 | lb PM10/ton |
| | 0.00001 | lb PM2.5/ton |
| Front-End Loader Activity: | 1.13 | lb PM/VMT |
| *Gypsum Storage Building* | 0.30 | lb PM10/VMT |
| | 0.030 | lb PM2.5/VMT |
| Bulldozer Activity: | 0.77 | lb PM/VMT |
| *Landfill* | 0.21 | lb PM10/VMT |
| | 0.02 | lb PM2.5/VMT |

[1] Basis for emission factors provided below emissions table.

**LIME REQUIREMENT**

| | | |
|---|---|---|
| Design Lime Requirement: | 6,983 | lb lime/hr (both units) (S&L "FGD-Byproduct Fixation Design Basis," Draft, 4/24/13) |
| Maximum Annual Lime Requirement: | 30,585 | tons/year (based on 100% capacity factor for both units) |
| Lime Unloading Hours: | 2190 | hr/yr per unit (assumes 20 ton delivery trucks, 1.5 hour to unload each truck) |

**GYPSUM THROUGHPUT (FOR FIXATION)**

| | | |
|---|---|---|
| Maximum Hourly Gypsum Throughput | 150 | ton/hr (maximum gypsum convey rate) |
| Design Hourly Gypsum Requirement: | 133,006 | lb gypsum (dry)/hr (both units) (S&L "FGD-Byproduct Fixation Design Basis," Draft, 4/24/13) |
| Design Hourly Gypsum Requirement: | 140,007 | lb gypsum (wet)/hr (both units), based on 5% moisture content |
| Design Annual Gypsum Requirement: | 613,230 | ton gypsum (wet)/yr (assume 100% capacity factor, 5% moisture content) |

**FIXATED MATERIAL THROUGHPUT**

| | | |
|---|---|---|
| Maximum Hourly Fixated Materail Throughput | 370 | ton/hr (maximum fixated material convey rate) |
| Design Material Collection Rate: | 239,744 | lb fixated mat'l (dry)/hr (both units) (S&L "FGD-Byproduct Fixation Design Basis," Draft, 4/24/13) |
| Design Material Collection Rate: | 342,492 | lb fixated mat'l wet/hr (both units), based on 30% moisture content |
| Maximum Annual Fixated Material Throughput: | 1,500,114 | tons/year (based on 100% capacity factor for both units, 30% moisture content) |

**FIXATED MATERIAL THROUGHPUT (EXCLUDING GYPSUM)**

| | | |
|---|---|---|
| Design Material Collection Rate: | 202,485 | lb fixated mat'l wet/hr (both units), based on 30% moisture content |
| Maximum Annual Fixated Material Throughput: | 886,884 | tons/year (based on 100% capacity factor for both units, 30% moisture content) |

| | | | | | Emission Factors | | | PM Emissions | | PM10 Emissions | | PM2.5 Emissions | | Exhaust Parameters | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | Project | Description | Emission Controls | Emissions Exhausted at Emission Point: | PM Control at Emission Point | Emission Rate | Units | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | Exhaust Flow Rate (if applicable) (acfm) | Exhaust Temperature (oF) | Height Above Grade (feet) | Exhaust Point Diameter (feet) | Exhaust Velocity (feet/sec) |
| F-01 | FIX | Roadway emissions - lime delivery to lime bin | Paved roads | F-01 | **Paved Roads** | 0.015 | lb/VMT (PM) | --- | 0.028 | --- | 0.0055 | --- | 0.0014 | --- | ambient | --- | --- | --- |
| TP-01, TP-02 | FIX | Emissions from Lime Bin when actively loading | The Lime Bin includes one bin vent filter. Short-term emissions assume two (2) trucks unloading simultaneously @ 2,200 cfm (total). Annual emissions assume that EP-02 will operate for 2,190 hr/yr @ 1,200 cfm when actively filling the storage silo, and 6,570 hrs/yr @ 200 cfm with recycling air. | EP-02 | Bin Vent Filter | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.094 | 0.052 | 0.094 | 0.052 | 0.094 | 0.052 | 2,200 | | | | |
| | | Emissions from Lime Bin during normal operations (recycling air) | | EP-02 | Bin Vent Filter | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.0086 | 0.033 | 0.0086 | 0.033 | 0.0086 | 0.033 | 200 | | | | |
| EP-02 | FIX | Lime bin, bin vent filter | Emissions associated with TP-01, TP-02 | EP-02 | **Bin Vent Filter** | 0.005 | gr/scf (PM/PM10/PM2.5) | 0.10 | 0.084 | 0.10 | 0.084 | 0.10 | 0.084 | 200 - 2,200 | ambient | 73 | 1.7 | 1.5 - 16.8 |
| TP-03 | FIX | Transfer of gypsum to new belt feeder 5A | Gypsum moisture content of approximately 5% | F-02 | | | | | | | | | | | | | | |
| F-02 | FIX | Transfer of gypsum to new belt feeder inside fixation building | Emissions associated with TP-03 | F-02 | **5% Moisture Content** | 0.00157 | lb/ton PM | 0.24 | 0.48 | 0.11 | 0.23 | 0.017 | 0.035 | --- | ambient | --- | --- | --- |
| TP-04, TP-05 | FIX | Transfer of fixated material from pin mixers to new fixated gypsum conveyor 6A | Gypsum, ash, and lime are mixed and conditioned with water. Fixated material moisture content of approximately 30% | F-03 | | | | | | | | | | | | | | |
| F-03 | FIX | Pin mixer discharge to conveyor inside fixation building | Emissions associated with TP-04, TP-05 | F-03 | **30% Moisture Content** | 0.00013 | lb/ton PM | 0.047 | 0.096 | 0.022 | 0.045 | 0.0034 | 0.0069 | --- | ambient | --- | --- | --- |

**DUKE - CAYUGA UNITS 1 & 2 SCR PROJECT (INCLUDES DSI, ACI, DRY FLY ASH, FIXATION, AND LIMESTONE INJECTION)**
**FIXATION SYSTEM PM EMISSIONS CALCULATIONS (Cont.)**

| | | | | | Emission Factors | | | PM Emissions | | PM10 Emissions | | PM2.5 Emissions | | Exhaust Parameters | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | Project | Description | Emission Controls | Emissions Exhausted at Emission Point: | PM Control at Emission Point | Emission Rate | Units | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | Fan Capacity (if applicable) (acfm) | Exhaust Temperature (oF) | Height Above Grade (feet) | Exhaust Point Diameter (feet) | Exhaust Velocity (feet/sec) |
| TP-06 | FIX | Transfer of fixated material from new fixated gypsum conveyor 6A to new radial stacker conveyor | Fixated material moisture content of approximately 30% | F-04 | | | | | | | | | | | | | | |
| F-04 | FIX | Transfer of fixated material to new radial stacker conveyor | Emissions associated with TP-06 | F-04 | **30% Moisture Content** | 0.00013 | lb/ton PM | 0.047 | 0.096 | 0.022 | 0.045 | 0.0034 | 0.0069 | --- | ambient | --- | --- | --- |
| TP-07 | FIX | Transfer of fixated material from new radial stack conveyor 7A to storage pile | Fixated material moisture content of approximately 30% | F-05 | | | | | | | | | | | | | | |
| F-05 | FIX | Transfer of fixated material to waste pile | Emissions associated with TP-07 | F-05 | **30% Moisture Content** | 0.00013 | lb/ton PM | 0.047 | 0.096 | 0.022 | 0.045 | 0.0034 | 0.0069 | --- | ambient | --- | --- | --- |
| F-06 | FIX | Front-end loader activity at waste storage pile | Fixated material moisture content of approximately 30%. | F-06 | **30% Moisture Content** | 1.13 | lb/VMT (PM) | --- | 4.37 | --- | 1.18 | --- | 0.12 | --- | ambient | --- | --- | --- |
| TP-08 | FIX | Transfer of fixated material from front-end loader to truck | Fixated material moisture content of approximately 30% | F-07 | | | | | | | | | | | | | | |
| F-07 | FIX | Fixated material loaded into trucks | Emissions associated with TP-08 | F-07 | **30% Moisture Content** | 0.00013 | lb/ton PM | --- | 0.057 | --- | 0.027 | --- | 0.0041 | --- | ambient | --- | --- | --- |
| F-08 | FIX | Waste pile wind erosion | Fixated material moisture content of approximately 30%. | F-08 | **30% Moisture Content** | 1180.7 | lb/acre-yr (PM) | --- | 0.35 | --- | 0.17 | --- | 0.026 | --- | ambient | --- | --- | --- |
| F-09A_1 | FIX | Roadway emissions - waste delivery to landfill (paved roads) | Paved roads with dust suppression (water) | F-09A | **Paved Roads + Water** | 0.015 | lb/VMT (PM) | --- | 1.30 | --- | 0.26 | --- | 0.06 | --- | ambient | --- | --- | --- |
| F-09A_2 | FIX | Roadway emissions - waste delivery at landfill (unpaved roads) | Unpaved roads at landfill with dust suppression (water) | F-09A | **Unpaved Roads + Water** | 1.06 | lb/VMT (PM) | --- | 4.4 | --- | 1.2 | --- | 0.12 | --- | ambient | --- | --- | --- |
| F-09A | FIX | Roadway emissions: Case 1 - waste delivery trucks to landfill | Paved and unpaved roads with dust suppression (water) | F-09A | **Paved and Unpaved Roads** | | | --- | 5.74 | --- | 1.46 | --- | 0.18 | --- | ambient | --- | --- | --- |
| F-09B_1 | FIX | Roadway emissions - waste delivery to onsite ash ponds (paved roads) | Paved roads with dust suppression (water) | F-09 | **Paved Roads + Water** | 0.015 | lb/VMT (PM) | --- | 0.18 | --- | 0.036 | --- | 0.0088 | --- | ambient | --- | --- | --- |
| F-09B_2 | FIX | Roadway emissions - waste delivery at onsite ash ponds (unpaved roads) | Unpaved roads at landfill with dust suppression (water) | F-09 | **Unpaved Roads + Water** | 1.06 | lb/VMT (PM) | --- | 8.51 | --- | 2.30 | --- | 0.23 | --- | ambient | --- | --- | --- |
| F-09B (New) | FIX | Roadway emissions: Case 2 - waste delivery trucks to onsite ash ponds | Paved and unpaved roads with dust suppression (water) | F-09 | **Paved and Unpaved Roads** | | | --- | 8.69 | --- | 2.33 | --- | 0.24 | --- | ambient | --- | --- | --- |
| TP-09 | FIX | Transfer of fixated material from trucks to disposal site | Fixated material moisture content of approximately 30% | F-10 | | | | | | | | | | | | | | |
| F-10 | FIX | Fixated material unloaded from trucks | Emissions associated with TP-09 | F-10 | **30% Moisture Content** | 0.00013 | lb/ton PM | --- | 0.057 | --- | 0.027 | --- | 0.0041 | --- | ambient | --- | --- | --- |
| F-11 | FIX | Bulldozer activity at disposal site | Fixated material moisture content of approximately 30%. | F-11 | **30% Moisture Content** | 0.77 | lb/VMT (PM) | --- | 0.59 | --- | 0.16 | --- | 0.016 | --- | ambient | --- | --- | --- |
| F-12 | FIX | Landfill wind erosion | Fixated material moisture content of approximately 30%. | F-12 | **30% Moisture Content** | 1180.7 | lb/acre-yr (PM) | --- | 1.29 | --- | 0.64 | --- | 0.096 | --- | ambient | --- | --- | --- |
| **Case 1: Total Fixation System Material Handling Emissions w/ Disposal at Landfill** | | | | | | | | | **13.32** | | **4.12** | | **0.59** | | | | | |
| **Case 2: Total Fixation System Material Handling Emissions w/ Disposal at Onsite Ash Ponds** | | | | | | | | | **16.27** | | **5.00** | | **0.64** | | | | | |

**DUKE - CAYUGA UNITS 1 & 2 SCR PROJECT (INCLUDES DSI, ACI, DRY FLY ASH, FIXATION, AND LIMESTONE INJECTION)**
**FIXATION SYSTEM PM EMISSIONS CALCULATIONS (Cont.)**



**Emission Factor Calculations**

***Paved Roads (Lime Delivery Trucks)***

Eext (lb/VMT) = [k (sL)0.91 x (W)1.02 ] (1 – P/4N) (AP42 Section 13.2.1, Eqn 2)

| where: | | | Source |
|---|---|---|---|
| k (PM) = | 0.011 | | AP42 Table 13.2.1-1 |
| k (PM10) = | 0.0022 | | AP42 Table 13.2.1-1 |
| k (PM2.5) = | 0.00054 | | AP42 Table 13.2.1-1 |
| sL = | 0.6 | g/m2 | AP42 Table 13.2.1-2, Ubiquitous baseline |
| W = | 22 | tons | Assume: Truck Tare Weight = 12 tons, Truck Capacity = 20 tons |
| P = | 115 | days/yr | AP42 Figure 13.2.1-2 |
| N = | 365 | days/yr | |
| Control Efficiency = | 90% | | Assumed control with water sprays |
| Eext (PM) = | 0.015 | lb/VMT | |
| Eext (PM10) = | 0.0030 | lb/VMT | |
| Eext (PM2.5) = | 0.0007 | lb/VMT | |
| Maximum Annual Lime Requirement: | 30,585 | tons/year | Based on 100% capacity factor for both units |
| Number of Lime Trucks: | 1460 | per year | Assumes 20 ton truck capacity |
| Length of Road: | 1.27 | miles | Based on one-way travel length |
| Annual VMT: | 3,716 | miles per year | |

***Paved Roads (Waste Haul Trucks to Landfill)***

Eext (lb/VMT) = [k (sL)0.91 x (W)1.02 ] (1 – P/4N) (AP42 Section 13.2.1, Eqn 2)

| where: | | | Source |
|---|---|---|---|
| k (PM) = | 0.011 | | AP42 Table 13.2.1-1 |
| k (PM10) = | 0.0022 | | AP42 Table 13.2.1-1 |
| k (PM2.5) = | 0.00054 | | AP42 Table 13.2.1-1 |
| sL = | 0.6 | g/m2 | AP42 Table 13.2.1-2, Ubiquitous baseline |
| W = | 22 | tons | Assume: Truck Tare Weight = 12 tons, Truck Capacity = 20 tons |
| P = | 115 | days/yr | AP42 Figure 13.2.1-2 |
| N = | 365 | days/yr | |
| Control Efficiency = | 90% | | Assumed control with water sprays |
| Eext (PM) = | 0.015 | lb/VMT | |
| Eext (PM10) = | 0.0030 | lb/VMT | |
| Eext (PM2.5) = | 0.00073 | lb/VMT | |
| Maximum Annual Fixated Material Throughput: | 886,884 | tons/year | Based on 100% capacity factor for both units, 30% moisture content (excludes gypsum). |
| Number of Haul Trucks: | 44165 | | Assumes 20 ton truck capacity |
| Length of Road (Main Plant Property+Landfill): | 1.98 | miles | Based on one-way travel length |
| Annual VMT (Main Plant Property+Landfill): | 175,154 | miles per year | |

***Unpaved Roads (Waste Haul Trucks to Landfill)***

Eext (lb/VMT) = k (s/12)a / (W/3)b ((365-P)/365) (AP42 Section 13.2.2, Eqns 1a and 2)

| where: | | | |
|---|---|---|---|
| k = | 4.9 | PM-30 | per AP-42 Table 13.2.2-2 |
| k = | 1.5 | PM-10 | per AP-42 Table 13.2.2-2 |
| k = | 0.15 | PM-2.5 | per AP-42 Table 13.2.2-2 |
| a = | 0.7 | constant a (PM) | per AP-42 Table 13.2.2-2 |
| a = | 0.90 | constant a (PM10/PM2.5) | per AP-42 Table 13.2.2-2 |
| b = | 0.45 | contant b (PM) | per AP-42 Table 13.2.2-2 |
| b = | 0.45 | constant b (PM10/PM2.5) | per AP-42 Table 13.2.2-2 |
| s = | 6.4 | surface silt content (%) | per AP-42 Table 13.2.2-1 |
| W = | 22 | mean vehicle weight (tons) | estimated average front-end loader weight |
| P = | 115 | days/yr | AP42 Figure 13.2.2-1 |
| Control Efficiency = | 80% | | Assumed control with water sprays |
| E (PM) = | 1.06 | lb/VMT (controlled) | |
| E (PM10) = | 0.29 | lb/VMT (controlled) | |
| E (PM2.5) = | 0.029 | lb/VMT (controlled) | |
| Maximum Annual Fixated Material Throughput: | 886,884 | tons/year | Based on 100% capacity factor for both units, 30% moisture content (excludes gypsum). |
| Number of Haul Trucks: | 44165 | trucks/year | Assumes 20 ton truck capacity |
| Length of Road (Landfill): | 0.095 | miles (one way) | |
| Annual VMT (Landfill): | 8,365 | miles per year | |

***Paved Roads (Waste Haul Trucks to Onsite Ash Ponds)***

Eext (lb/VMT) = [k (sL)0.91 x (W)1.02 ] (1 – P/4N) (AP42 Section 13.2.1, Eqn 2)

| where: | | | Source |
|---|---|---|---|
| k (PM) = | 0.011 | | AP42 Table 13.2.1-1 |
| k (PM10) = | 0.0022 | | AP42 Table 13.2.1-1 |
| k (PM2.5) = | 0.00054 | | AP42 Table 13.2.1-1 |
| sL = | 0.6 | g/m2 | AP42 Table 13.2.1-2, Ubiquitous baseline |
| W = | 22 | tons | Assume: Truck Tare Weight = 12 tons, Truck Capacity = 20 tons |
| P = | 115 | days/yr | AP42 Figure 13.2.1-2 |
| N = | 365 | days/yr | |
| Control Efficiency = | 90% | | Assumed control with water sprays |
| Eext (PM) = | 0.015 | lb/VMT | |
| Eext (PM10) = | 0.0030 | lb/VMT | |
| Eext (PM2.5) = | 0.00073 | lb/VMT | |
| Maximum Annual Fixated Material Throughput: | 886,884 | tons/year | Based on 100% capacity factor for both units, 30% moisture content (excludes gypsum). |
| Number of Haul Trucks: | 44165 | trucks/year | Assumes 20 ton truck capacity |
| Length of Road: | 0.27 | miles | Based on one-way travel length |
| Annual VMT: | 24,090 | miles per year | |

***Unpaved Roads (Waste Haul Trucks to Onsite Ash Ponds)***

Eext (lb/VMT) = k (s/12)a / (W/3)b ((365-P)/365) (AP42 Section 13.2.2, Eqns 1a and 2)

| where: | | | |
|---|---|---|---|
| k = | 4.9 | PM-30 | per AP-42 Table 13.2.2-2 |
| k = | 1.5 | PM-10 | per AP-42 Table 13.2.2-2 |
| k = | 0.15 | PM-2.5 | per AP-42 Table 13.2.2-2 |
| a = | 0.7 | constant a (PM) | per AP-42 Table 13.2.2-2 |
| a = | 0.90 | constant a (PM10/PM2.5) | per AP-42 Table 13.2.2-2 |
| b = | 0.45 | contant b (PM) | per AP-42 Table 13.2.2-2 |
| b = | 0.45 | constant b (PM10/PM2.5) | per AP-42 Table 13.2.2-2 |
| s = | 6.4 | surface silt content (%) | per AP-42 Table 13.2.2-1 |
| W = | 22 | mean vehicle weight (tons) | estimated average front-end loader weight |
| P = | 115 | days/yr | AP42 Figure 13.2.2-1 |
| Control Efficiency = | 80% | | Assumed control with water sprays |
| E (PM) = | 1.06 | lb/VMT (controlled) | |
| E (PM10) = | 0.29 | lb/VMT (controlled) | |
| E (PM2.5) = | 0.029 | lb/VMT (controlled) | |
| Maximum Annual Fixated Material Throughput: | 886,884 | tons/year | Based on 100% capacity factor for both units, 30% moisture content (excludes gypsum). |
| Number of Haul Trucks: | 44165 | trucks/year | Assumes 20 ton truck capacity |
| Length of Road: | 0.18 | miles (one way) | |
| Annual VMT: | 16,060 | miles per year | |

***Gypsum Transfer Points***

E (lb/ton) = k (0.0032) (U/5)1.3 / (M/2)1.4 (AP42 Section 13.2.4, Eqn 1)

| where: | | | Source |
|---|---|---|---|
| k = | 0.74 | PM < 30um | AP42 Section 13.2.4, page 4 |
| k = | 0.35 | PM < 10um | AP42 Section 13.2.4, page 5 |
| k = | 0.053 | PM < 2.5um | AP42 Section 13.2.4, page 6 |
| Uexposed = | 9.8 | mph | mean wind speed, Indianapolis International Airport, 2005] |
| Mfix Matl = | 5.0% | | Assumed moisture content of fixated material |
| E (PM) = | 0.00157 | lb/ton | |
| E (PM10) = | 0.00074 | lb/ton | |
| E (PM2.5) = | 0.000113 | lb/ton | |

***Fixated Material Transfer Points***

E (lb/ton) = k (0.0032) (U/5)1.3 / (M/2)1.4 (AP42 Section 13.2.4, Eqn 1)

| where: | | | Source |
|---|---|---|---|
| k = | 0.74 | PM < 30um | AP42 Section 13.2.4, page 4 |
| k = | 0.35 | PM < 10um | AP42 Section 13.2.4, page 5 |
| k = | 0.053 | PM < 2.5um | AP42 Section 13.2.4, page 6 |
| Uexposed = | 9.8 | mph | mean wind speed, Indianapolis International Airport, 2005] |
| Mfix Matl = | 30.0% | | Assumed moisture content of fixated material |
| E (PM) = | 0.00013 | lb/ton | |
| E (PM10) = | 0.00006 | lb/ton | |
| E (PM2.5) = | 0.000009 | lb/ton | |

***Waste Pile - Front End Loader Activity Emissions***

Eext (lb/VMT) = k (s/12)a / (W/3)b ((365-P)/365) (AP42 Section 13.2.2, Eqns 1a and 2)

where:

| | | | |
|---|---|---|---|
| k = | 4.9 | PM-30 | per AP-42 Table 13.2.2-2 |
| k = | 1.5 | PM-10 | per AP-42 Table 13.2.2-2 |
| k = | 0.15 | PM-2.5 | per AP-42 Table 13.2.2-2 |
| a = | 0.7 | constant a (PM) | per AP-42 Table 13.2.2-2 |
| a = | 0.9 | constant a (PM10/PM2.5) | per AP-42 Table 13.2.2-2 |
| b = | 0.45 | contant b (PM) | per AP-42 Table 13.2.2-2 |
| b = | 0.45 | constant b (PM10/PM2.5) | per AP-42 Table 13.2.2-2 |
| s = | 6.4 | surface silt content (%) | per AP-42 Table 13.2.2-1 |
| W = | 50.6 | mean vehicle weight (tons) | estimated average front-end loader weight |
| P = | 0 | days/yr | Assumed to be zero due to roof over waste pile |
| Control Efficiency = | 90% | for moisture content of fixated material | |
| E (PM) = | 1.13 | lb/VMT (controlled) | |
| E (PM10) = | 0.30 | lb/VMT (controlled) | |
| E (PM2.5) = | 0.030 | lb/VMT (controlled) | |
| Maximum Annual Fixated Material Throughput: | 886,884 | tons/year | Based on 100% capacity factor for both units, 30% moisture content (excludes gypsum). |
| Number of Trucks per day: | 122 | | Assume 20 ton truck capacity |
| VMT = | 7759 | vehicle miles traveled per year | based on front-end loader activity |

***Landfill - Bulldozer Activity Emissions***

Eext (lb/VMT) = k (s/12)a / (W/3)b ((365-P)/365) (AP42 Section 13.2.2, Eqns 1a and 2)

where:

| | | | |
|---|---|---|---|
| k = | 4.9 | PM-30 | per AP-42 Table 13.2.2-2 |
| k = | 1.5 | PM-10 | per AP-42 Table 13.2.2-2 |
| k = | 0.15 | PM-2.5 | per AP-42 Table 13.2.2-2 |
| a = | 0.7 | constant a (PM) | per AP-42 Table 13.2.2-2 |
| a = | 0.9 | constant a (PM10/PM2.5) | per AP-42 Table 13.2.2-2 |
| b = | 0.45 | contant b (PM) | per AP-42 Table 13.2.2-2 |
| b = | 0.45 | constant b (PM10/PM2.5) | per AP-42 Table 13.2.2-2 |
| s = | 6.4 | surface silt content (%) | per AP-42 Table 13.2.2-1 |
| W = | 50.6 | mean vehicle weight (tons) | estimated average front-end loader weight |
| P = | 115 | days/yr | AP42 Figure 13.2.2-1 |
| Control Efficiency = | 90% | for moisture content of fixated material | |
| E (PM) = | 0.77 | lb/VMT (controlled) | |
| E (PM10) = | 0.21 | lb/VMT (controlled) | |
| E (PM2.5) = | 0.021 | lb/VMT (controlled) | |
| Maximum Annual Fixated Material Throughput: | 886,884 | tons/year | Based on 100% capacity factor for both units, 30% moisture content (excludes gypsum). |
| Number of Trucks per day: | 122 | trucks/day | Assume 20 ton truck capacity |
| VMT = | 1518 | vehicle miles traveled per year | based on front-end loader activity |

***Fixated Material Storage Pile - Wind Erosion Emissions***

| Estimate for TSP | | Estimate for PM10 | | Estimate for PM2.5 | |
|---|---|---|---|---|---|
| **Sum of all P values =** | 132.34 | **Sum of all P values =** | 132.34 | **Sum of all P values =** | 132.34 |
| **TSP particle size multiplier =** | 1.00 | **PM10 particle size multiplier =** | 0.50 | **PM2.5 particle size multiplier =** | 0.075 |
| **Emission factor (g/m2) =** | 132.34 | **Emission factor (g/m2) =** | 66.17 | **Emission factor (g/m2) =** | 9.93 |
| **Pile surface area (m2) =** | 2,387.61 | **Pile surface area (m2) =** | 2,387.61 | **Pile surface area (m2) =** | 2,387.61 |
| **Total uncontrolled emissions (g/year) =** | 315,969 | **Total uncontrolled emissions (g/year) =** | 157,984 | **Total uncontrolled emissions (g/year) =** | 23,698 |
| **Total uncontrolled emissions (lb/year) =** | 697 | **Total uncontrolled emissions (lb/year) =** | 348 | **Total uncontrolled emissions (lb/year) =** | 52 |
| **Total uncontrolled emissions (tons/year) =** | 0.35 | **Total uncontrolled emissions (tons/year) =** | 0.17 | **Total uncontrolled emissions (tons/year) =** | 0.03 |
| **Emission control efficiency (%) =** | 0 | **Emission control efficiency (%) =** | 0 | **Emission control efficiency (%) =** | 0 |
| **Total controlled emissions (tons/year) =** | **0.348** | **Total controlled emissions (tons/year) =** | **0.174** | **Total controlled emissions (tons/year) =** | **0.0261** |

***Landfill - Wind Erosion Emissions (Applies to Fixation System or Dry Fly Ash)***

| Estimate for PM | | Estimate for PM10 | | Estimate for PM2.5 | |
|---|---|---|---|---|---|
| **Sum of all P values =** | 132.34 | **Sum of all P values =** | 132.34 | **Sum of all P values =** | 132.34 |
| **TSP particle size multiplier =** | 1.00 | **PM10 particle size multiplier =** | 0.50 | **PM2.5 particle size multiplier =** | 0.075 |
| **Emission factor (g/m2) =** | 132.34 | **Emission factor (g/m2) =** | 66.17 | **Emission factor (g/m2) =** | 9.93 |
| **Pile surface area (m2) =** | 8,813.15 | **Pile surface area (m2) =** | 8,813.15 | **Pile surface area (m2) =** | 8,813.15 |
| **Total uncontrolled emissions (g/year) =** | 1,166,305 | **Total uncontrolled emissions (g/year) =** | 583,153 | **Total uncontrolled emissions (g/year) =** | 87,473 |
| **Total uncontrolled emissions (lb/year) =** | 2,571 | **Total uncontrolled emissions (lb/year) =** | 1,286 | **Total uncontrolled emissions (lb/year) =** | 193 |
| **Total uncontrolled emissions (tons/year) =** | 1.29 | **Total uncontrolled emissions (tons/year) =** | 0.64 | **Total uncontrolled emissions (tons/year) =** | 0.10 |
| **Emission control efficiency (%) =** | 0 | **Emission control efficiency (%) =** | 0 | **Emission control efficiency (%) =** | 0 |
| **Total controlled emissions (tons/year) =** | **1.29** | **Total controlled emissions (tons/year) =** | **0.643** | **Total controlled emissions (tons/year) =** | **0.096** |

**Notes:**

(1) Emissions estimates based on AP42 Section 13.2.5 emission factors, assume height-to-base ratio > 0.2.

(2) Wind speed data obtained from National Climatic Data Center (NCDC) "2010 Local Climatological Data, Indianapolis, Indiana (KIND)" (monthly summaries for Jan. through Dec.)

**Threshold friction velocity (ut*) (meters/second) =** 1.02 per Table 13.2.5-2 value for overburden

| Month and Year | Day | Max 2-min u6.1+ (mph) | Max 2-min u6.1+ (m/sec) | Max 2-min u10+ (m/sec) | Us/Ur Ratio for Us/Ur Regime Code No.s 0.2a, 0.2b for Pile | Us/Ur Regime Code No.'s 0.2a or 0.2b Adjusted Pile Surface us+ (m/sec) | Combined Us/Ur Code No.'s 0.2a and 0.2b Portion of Pile Surface (percent) | Combined Us/Ur Regime Code No.'s 0.2a or 0.2b Equivalent Friction Velocity u* (m/sec) | u* - ut* (m/sec) | Erosion Potential Function P | Us/Ur Ratio for Us/Ur Regime Code No.'s 0.6a, o.6b for Pile | Us/Ur Regime Code No.'s 0.6a or 0.6b Adjusted Pile Surface us+ (m/sec) | Combined Us/Ur Regime Code No.'s 0.6a and 0.6b Portion of Pile Surface (percent) | Combined Us/Ur Regime Code No.'s 0.6a or 0.6b Equivalent Friction Velocity u* (m/sec) | u* - ut* (m/sec) | Erosion Potential Function P | Us/Ur Ratio for Us/Ur Regime Code No. 0.9 for Pile | Us/Ur Code No. 0.90 Adjusted Pile Surface us+ (m/sec) | Us/Ur Regime Code No. 0.9 Portion of Pile Surface (percent) | Us/Ur Regime Code No. 0.9 Equivalent Friction u* (m/sec) | u* - ut* (m/sec) | Erosion Potential Function P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Jan** | **1** | 21 | 9.39 | 10.04 | 0.2 | 2.01 | 40 | 0.20 | 0.00 | 0.00 | 0.6 | 6.02 | 48 | 0.60 | 0.00 | 0.00 | 0.9 | 9.04 | 12 | 0.90 | 0.00 | 0.00 |
| **2010** | **2** | 20 | 8.94 | 9.56 | 0.2 | 1.91 | 40 | 0.19 | 0.00 | 0.00 | 0.6 | 5.74 | 48 | 0.57 | 0.00 | 0.00 | 0.9 | 8.61 | 12 | 0.86 | 0.00 | 0.00 |
| | **3** | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | **4** | 20 | 8.94 | 9.56 | 0.2 | 1.91 | 40 | 0.19 | 0.00 | 0.00 | 0.6 | 5.74 | 48 | 0.57 | 0.00 | 0.00 | 0.9 | 8.61 | 12 | 0.86 | 0.00 | 0.00 |
| | **5** | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | **6** | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | **7** | 25 | 11.18 | 11.95 | 0.2 | 2.39 | 40 | 0.24 | 0.00 | 0.00 | 0.6 | 7.17 | 48 | 0.72 | 0.00 | 0.00 | 0.9 | 10.76 | 12 | 1.08 | 0.06 | 1.57 |
| | **8** | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | **9** | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | **10** | 20 | 8.94 | 9.56 | 0.2 | 1.91 | 40 | 0.19 | 0.00 | 0.00 | 0.6 | 5.74 | 48 | 0.57 | 0.00 | 0.00 | 0.9 | 8.61 | 12 | 0.86 | 0.00 | 0.00 |
| | **11** | 20 | 8.94 | 9.56 | 0.2 | 1.91 | 40 | 0.19 | 0.00 | 0.00 | 0.6 | 5.74 | 48 | 0.57 | 0.00 | 0.00 | 0.9 | 8.61 | 12 | 0.86 | 0.00 | 0.00 |
| | **12** | 12 | 5.36 | 5.74 | 0.2 | 1.15 | 40 | 0.11 | 0.00 | 0.00 | 0.6 | 3.44 | 48 | 0.34 | 0.00 | 0.00 | 0.9 | 5.16 | 12 | 0.52 | 0.00 | 0.00 |
| | **13** | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | **14** | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | **15** | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | **16** | 10 | 4.47 | 4.78 | 0.2 | 0.96 | 40 | 0.10 | 0.00 | 0.00 | 0.6 | 2.87 | 48 | 0.29 | 0.00 | 0.00 | 0.9 | 4.30 | 12 | 0.43 | 0.00 | 0.00 |
| | **17** | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | **18** | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | **19** | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | **20** | 22 | 9.83 | 10.52 | 0.2 | 2.10 | 40 | 0.21 | 0.00 | 0.00 | 0.6 | 6.31 | 48 | 0.63 | 0.00 | 0.00 | 0.9 | 9.47 | 12 | 0.95 | 0.00 | 0.00 |
| | **21** | 21 | 9.39 | 10.04 | 0.2 | 2.01 | 40 | 0.20 | 0.00 | 0.00 | 0.6 | 6.02 | 48 | 0.60 | 0.00 | 0.00 | 0.9 | 9.04 | 12 | 0.90 | 0.00 | 0.00 |
| | **22** | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | **23** | 21 | 9.39 | 10.04 | 0.2 | 2.01 | 40 | 0.20 | 0.00 | 0.00 | 0.6 | 6.02 | 48 | 0.60 | 0.00 | 0.00 | 0.9 | 9.04 | 12 | 0.90 | 0.00 | 0.00 |
| | **24** | 26 | 11.62 | 12.43 | 0.2 | 2.49 | 40 | 0.25 | 0.00 | 0.00 | 0.6 | 7.46 | 48 | 0.75 | 0.00 | 0.00 | 0.9 | 11.19 | 12 | 1.12 | 0.10 | 3.04 |
| | **25** | 31 | 13.86 | 14.82 | 0.2 | 2.96 | 40 | 0.30 | 0.00 | 0.00 | 0.6 | 8.89 | 48 | 0.89 | 0.00 | 0.00 | 0.9 | 13.34 | 12 | 1.33 | 0.31 | 13.57 |
| | **26** | 25 | 11.18 | 11.95 | 0.2 | 2.39 | 40 | 0.24 | 0.00 | 0.00 | 0.6 | 7.17 | 48 | 0.72 | 0.00 | 0.00 | 0.9 | 10.76 | 12 | 1.08 | 0.06 | 1.57 |
| | **27** | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | **28** | 25 | 11.18 | 11.95 | 0.2 | 2.39 | 40 | 0.24 | 0.00 | 0.00 | 0.6 | 7.17 | 48 | 0.72 | 0.00 | 0.00 | 0.9 | 10.76 | 12 | 1.08 | 0.06 | 1.57 |
| | **29** | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | **30** | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | **31** | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| **Feb** | **1** | 7 | 3.13 | 3.35 | 0.2 | 0.67 | 40 | 0.07 | 0.00 | 0.00 | 0.6 | 2.01 | 48 | 0.20 | 0.00 | 0.00 | 0.9 | 3.01 | 12 | 0.30 | 0.00 | 0.00 |
| **2010** | **2** | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | **3** | 20 | 8.94 | 9.56 | 0.2 | 1.91 | 40 | 0.19 | 0.00 | 0.00 | 0.6 | 5.74 | 48 | 0.57 | 0.00 | 0.00 | 0.9 | 8.61 | 12 | 0.86 | 0.00 | 0.00 |
| | **4** | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | **5** | 31 | 13.86 | 14.82 | 0.2 | 2.96 | 40 | 0.30 | 0.00 | 0.00 | 0.6 | 8.89 | 48 | 0.89 | 0.00 | 0.00 | 0.9 | 13.34 | 12 | 1.33 | 0.31 | 13.57 |
| | **6** | 32 | 14.30 | 15.30 | 0.2 | 3.06 | 40 | 0.31 | 0.00 | 0.00 | 0.6 | 9.18 | 48 | 0.92 | 0.00 | 0.00 | 0.9 | 13.77 | 12 | 1.38 | 0.36 | 16.32 |
| | **7** | 10 | 4.47 | 4.78 | 0.2 | 0.96 | 40 | 0.10 | 0.00 | 0.00 | 0.6 | 2.87 | 48 | 0.29 | 0.00 | 0.00 | 0.9 | 4.30 | 12 | 0.43 | 0.00 | 0.00 |
| | **8** | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | **9** | 31 | 13.86 | 14.82 | 0.2 | 2.96 | 40 | 0.30 | 0.00 | 0.00 | 0.6 | 8.89 | 48 | 0.89 | 0.00 | 0.00 | 0.9 | 13.34 | 12 | 1.33 | 0.31 | 13.57 |
| | **10** | 29 | 12.96 | 13.87 | 0.2 | 2.77 | 40 | 0.28 | 0.00 | 0.00 | 0.6 | 8.32 | 48 | 0.83 | 0.00 | 0.00 | 0.9 | 12.48 | 12 | 1.25 | 0.23 | 8.71 |

| Month and Year | Day | Max 2-min u6.1+ (mph) | Max 2-min u6.1+ (m/sec) | Max 2-min u10+ (m/sec) | Us/Ur Ratio for Us/Ur Regime Code No.s 0.2a, 0.2b for Pile | Us/Ur Regime Code No.'s 0.2a or 0.2b Adjusted Pile Surface us+ (m/sec) | Combined Us/Ur Code No.'s 0.2a and 0.2b Portion of Pile Surface (percent) | Combined Us/Ur Regime Code No.'s 0.2a or 0.2b Equivalent Friction Velocity u* (m/sec) | u* - ut* (m/sec) | Erosion Potential Function P | Us/Ur Ratio for Us/Ur Regime Code No.'s 0.6a, o.6b for Pile | Us/Ur Regime Code No.'s 0.6a or 0.6b Adjusted Pile Surface us+ (m/sec) | Combined Us/Ur Regime Code No.'s 0.6a and 0.6b Portion of Pile Surface (percent) | Combined Us/Ur Regime Code No.'s 0.6a or 0.6b Equivalent Friction Velocity u* (m/sec) | u* - ut* (m/sec) | Erosion Potential Function P | Us/Ur Ratio for Us/Ur Regime Code No. 0.9 for Pile | Us/Ur Code No. 0.90 Adjusted Pile Surface us+ (m/sec) | Us/Ur Regime Code No. 0.9 Portion of Pile Surface (percent) | Us/Ur Regime Code No. 0.9 Equivalent Friction u* (m/sec) | u* - ut* (m/sec) | Erosion Potential Function P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Feb | 11 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| 2010 | 12 | 9 | 4.02 | 4.30 | 0.2 | 0.86 | 40 | 0.09 | 0.00 | 0.00 | 0.6 | 2.58 | 48 | 0.26 | 0.00 | 0.00 | 0.9 | 3.87 | 12 | 0.39 | 0.00 | 0.00 |
| | 13 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 14 | 12 | 5.36 | 5.74 | 0.2 | 1.15 | 40 | 0.11 | 0.00 | 0.00 | 0.6 | 3.44 | 48 | 0.34 | 0.00 | 0.00 | 0.9 | 5.16 | 12 | 0.52 | 0.00 | 0.00 |
| | 15 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 16 | 21 | 9.39 | 10.04 | 0.2 | 2.01 | 40 | 0.20 | 0.00 | 0.00 | 0.6 | 6.02 | 48 | 0.60 | 0.00 | 0.00 | 0.9 | 9.04 | 12 | 0.90 | 0.00 | 0.00 |
| | 17 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | 18 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | 19 | 9 | 4.02 | 4.30 | 0.2 | 0.86 | 40 | 0.09 | 0.00 | 0.00 | 0.6 | 2.58 | 48 | 0.26 | 0.00 | 0.00 | 0.9 | 3.87 | 12 | 0.39 | 0.00 | 0.00 |
| | 20 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 21 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 22 | 20 | 8.94 | 9.56 | 0.2 | 1.91 | 40 | 0.19 | 0.00 | 0.00 | 0.6 | 5.74 | 48 | 0.57 | 0.00 | 0.00 | 0.9 | 8.61 | 12 | 0.86 | 0.00 | 0.00 |
| | 23 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 24 | 20 | 8.94 | 9.56 | 0.2 | 1.91 | 40 | 0.19 | 0.00 | 0.00 | 0.6 | 5.74 | 48 | 0.57 | 0.00 | 0.00 | 0.9 | 8.61 | 12 | 0.86 | 0.00 | 0.00 |
| | 25 | 24 | 10.73 | 11.47 | 0.2 | 2.29 | 40 | 0.23 | 0.00 | 0.00 | 0.6 | 6.88 | 48 | 0.69 | 0.00 | 0.00 | 0.9 | 10.33 | 12 | 1.03 | 0.01 | 0.33 |
| | 26 | 28 | 12.52 | 13.39 | 0.2 | 2.68 | 40 | 0.27 | 0.00 | 0.00 | 0.6 | 8.03 | 48 | 0.80 | 0.00 | 0.00 | 0.9 | 12.05 | 12 | 1.20 | 0.18 | 6.60 |
| | 27 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 28 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| Mar | 1 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| 2010 | 2 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |
| | 3 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | 4 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 5 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 6 | 9 | 4.02 | 4.30 | 0.2 | 0.86 | 40 | 0.09 | 0.00 | 0.00 | 0.6 | 2.58 | 48 | 0.26 | 0.00 | 0.00 | 0.9 | 3.87 | 12 | 0.39 | 0.00 | 0.00 |
| | 7 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 8 | 9 | 4.02 | 4.30 | 0.2 | 0.86 | 40 | 0.09 | 0.00 | 0.00 | 0.6 | 2.58 | 48 | 0.26 | 0.00 | 0.00 | 0.9 | 3.87 | 12 | 0.39 | 0.00 | 0.00 |
| | 9 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |
| | 10 | 21 | 9.39 | 10.04 | 0.2 | 2.01 | 40 | 0.20 | 0.00 | 0.00 | 0.6 | 6.02 | 48 | 0.60 | 0.00 | 0.00 | 0.9 | 9.04 | 12 | 0.90 | 0.00 | 0.00 |
| | 11 | 23 | 10.28 | 11.00 | 0.2 | 2.20 | 40 | 0.22 | 0.00 | 0.00 | 0.6 | 6.60 | 48 | 0.66 | 0.00 | 0.00 | 0.9 | 9.90 | 12 | 0.99 | 0.00 | 0.00 |
| | 12 | 22 | 9.83 | 10.52 | 0.2 | 2.10 | 40 | 0.21 | 0.00 | 0.00 | 0.6 | 6.31 | 48 | 0.63 | 0.00 | 0.00 | 0.9 | 9.47 | 12 | 0.95 | 0.00 | 0.00 |
| | 13 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 14 | 22 | 9.83 | 10.52 | 0.2 | 2.10 | 40 | 0.21 | 0.00 | 0.00 | 0.6 | 6.31 | 48 | 0.63 | 0.00 | 0.00 | 0.9 | 9.47 | 12 | 0.95 | 0.00 | 0.00 |
| | 15 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | 16 | 12 | 5.36 | 5.74 | 0.2 | 1.15 | 40 | 0.11 | 0.00 | 0.00 | 0.6 | 3.44 | 48 | 0.34 | 0.00 | 0.00 | 0.9 | 5.16 | 12 | 0.52 | 0.00 | 0.00 |
| | 17 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 18 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 19 | 23 | 10.28 | 11.00 | 0.2 | 2.20 | 40 | 0.22 | 0.00 | 0.00 | 0.6 | 6.60 | 48 | 0.66 | 0.00 | 0.00 | 0.9 | 9.90 | 12 | 0.99 | 0.00 | 0.00 |
| | 20 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 21 | 29 | 12.96 | 13.87 | 0.2 | 2.77 | 40 | 0.28 | 0.00 | 0.00 | 0.6 | 8.32 | 48 | 0.83 | 0.00 | 0.00 | 0.9 | 12.48 | 12 | 1.25 | 0.23 | 8.71 |
| | 22 | 23 | 10.28 | 11.00 | 0.2 | 2.20 | 40 | 0.22 | 0.00 | 0.00 | 0.6 | 6.60 | 48 | 0.66 | 0.00 | 0.00 | 0.9 | 9.90 | 12 | 0.99 | 0.00 | 0.00 |
| | 23 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 24 | 12 | 5.36 | 5.74 | 0.2 | 1.15 | 40 | 0.11 | 0.00 | 0.00 | 0.6 | 3.44 | 48 | 0.34 | 0.00 | 0.00 | 0.9 | 5.16 | 12 | 0.52 | 0.00 | 0.00 |
| | 25 | 35 | 15.65 | 16.73 | 0.2 | 3.35 | 40 | 0.33 | 0.00 | 0.00 | 0.6 | 10.04 | 48 | 1.00 | 0.00 | 0.00 | 0.9 | 15.06 | 12 | 1.51 | 0.49 | 25.86 |
| | 26 | 23 | 10.28 | 11.00 | 0.2 | 2.20 | 40 | 0.22 | 0.00 | 0.00 | 0.6 | 6.60 | 48 | 0.66 | 0.00 | 0.00 | 0.9 | 9.90 | 12 | 0.99 | 0.00 | 0.00 |
| | 27 | 21 | 9.39 | 10.04 | 0.2 | 2.01 | 40 | 0.20 | 0.00 | 0.00 | 0.6 | 6.02 | 48 | 0.60 | 0.00 | 0.00 | 0.9 | 9.04 | 12 | 0.90 | 0.00 | 0.00 |
| | 28 | 23 | 10.28 | 11.00 | 0.2 | 2.20 | 40 | 0.22 | 0.00 | 0.00 | 0.6 | 6.60 | 48 | 0.66 | 0.00 | 0.00 | 0.9 | 9.90 | 12 | 0.99 | 0.00 | 0.00 |
| | 29 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |
| | 30 | 12 | 5.36 | 5.74 | 0.2 | 1.15 | 40 | 0.11 | 0.00 | 0.00 | 0.6 | 3.44 | 48 | 0.34 | 0.00 | 0.00 | 0.9 | 5.16 | 12 | 0.52 | 0.00 | 0.00 |
| | 31 | 26 | 11.62 | 12.43 | 0.2 | 2.49 | 40 | 0.25 | 0.00 | 0.00 | 0.6 | 7.46 | 48 | 0.75 | 0.00 | 0.00 | 0.9 | 11.19 | 12 | 1.12 | 0.10 | 3.04 |
| Apr | 1 | 23 | 10.28 | 11.00 | 0.2 | 2.20 | 40 | 0.22 | 0.00 | 0.00 | 0.6 | 6.60 | 48 | 0.66 | 0.00 | 0.00 | 0.9 | 9.90 | 12 | 0.99 | 0.00 | 0.00 |
| 2010 | 2 | 24 | 10.73 | 11.47 | 0.2 | 2.29 | 40 | 0.23 | 0.00 | 0.00 | 0.6 | 6.88 | 48 | 0.69 | 0.00 | 0.00 | 0.9 | 10.33 | 12 | 1.03 | 0.01 | 0.33 |
| | 3 | 29 | 12.96 | 13.87 | 0.2 | 2.77 | 40 | 0.28 | 0.00 | 0.00 | 0.6 | 8.32 | 48 | 0.83 | 0.00 | 0.00 | 0.9 | 12.48 | 12 | 1.25 | 0.23 | 8.71 |
| | 4 | 22 | 9.83 | 10.52 | 0.2 | 2.10 | 40 | 0.21 | 0.00 | 0.00 | 0.6 | 6.31 | 48 | 0.63 | 0.00 | 0.00 | 0.9 | 9.47 | 12 | 0.95 | 0.00 | 0.00 |
| | 5 | 31 | 13.86 | 14.82 | 0.2 | 2.96 | 40 | 0.30 | 0.00 | 0.00 | 0.6 | 8.89 | 48 | 0.89 | 0.00 | 0.00 | 0.9 | 13.34 | 12 | 1.33 | 0.31 | 13.57 |
| | 6 | 33 | 14.75 | 15.78 | 0.2 | 3.16 | 40 | 0.32 | 0.00 | 0.00 | 0.6 | 9.47 | 48 | 0.95 | 0.00 | 0.00 | 0.9 | 14.20 | 12 | 1.42 | 0.40 | 19.28 |
| | 7 | 26 | 11.62 | 12.43 | 0.2 | 2.49 | 40 | 0.25 | 0.00 | 0.00 | 0.6 | 7.46 | 48 | 0.75 | 0.00 | 0.00 | 0.9 | 11.19 | 12 | 1.12 | 0.10 | 3.04 |
| | 8 | 25 | 11.18 | 11.95 | 0.2 | 2.39 | 40 | 0.24 | 0.00 | 0.00 | 0.6 | 7.17 | 48 | 0.72 | 0.00 | 0.00 | 0.9 | 10.76 | 12 | 1.08 | 0.06 | 1.57 |
| | 9 | 21 | 9.39 | 10.04 | 0.2 | 2.01 | 40 | 0.20 | 0.00 | 0.00 | 0.6 | 6.02 | 48 | 0.60 | 0.00 | 0.00 | 0.9 | 9.04 | 12 | 0.90 | 0.00 | 0.00 |
| | 10 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 11 | 12 | 5.36 | 5.74 | 0.2 | 1.15 | 40 | 0.11 | 0.00 | 0.00 | 0.6 | 3.44 | 48 | 0.34 | 0.00 | 0.00 | 0.9 | 5.16 | 12 | 0.52 | 0.00 | 0.00 |
| | 12 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |

| Month and Year | Day | Max 2-min u6.1+ (mph) | Max 2-min u6.1+ (m/sec) | Max 2-min u10+ (m/sec) | Us/Ur Ratio for Us/Ur Regime Code No.s 0.2a, 0.2b for Pile | Us/Ur Regime Code No.'s 0.2a or 0.2b Adjusted Pile Surface us+ (m/sec) | Combined Us/Ur Code No.'s 0.2a and 0.2b Portion of Pile Surface (percent) | Combined Us/Ur Regime Code No.'s 0.2a or 0.2b Equivalent Friction Velocity u* (m/sec) | u* - ut* (m/sec) | Erosion Potential Function P | Us/Ur Ratio for Us/Ur Regime Code No.'s 0.6a, o.6b for Pile | Us/Ur Regime Code No.'s 0.6a or 0.6b Adjusted Pile Surface us+ (m/sec) | Combined Us/Ur Regime Code No.'s 0.6a and 0.6b Portion of Pile Surface (percent) | Combined Us/Ur Regime Code No.'s 0.6a or 0.6b Equivalent Friction Velocity u* (m/sec) | u* - ut* (m/sec) | Erosion Potential Function P | Us/Ur Ratio for Us/Ur Regime Code No. 0.9 for Pile | Us/Ur Code No. 0.90 Adjusted Pile Surface us+ (m/sec) | Us/Ur Regime Code No. 0.9 Portion of Pile Surface (percent) | Us/Ur Regime Code No. 0.9 Equivalent Friction u* (m/sec) | u* - ut* (m/sec) | Erosion Potential Function P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apr | 13 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| 2010 | 14 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 15 | 22 | 9.83 | 10.52 | 0.2 | 2.10 | 40 | 0.21 | 0.00 | 0.00 | 0.6 | 6.31 | 48 | 0.63 | 0.00 | 0.00 | 0.9 | 9.47 | 12 | 0.95 | 0.00 | 0.00 |
| | 16 | 25 | 11.18 | 11.95 | 0.2 | 2.39 | 40 | 0.24 | 0.00 | 0.00 | 0.6 | 7.17 | 48 | 0.72 | 0.00 | 0.00 | 0.9 | 10.76 | 12 | 1.08 | 0.06 | 1.57 |
| | 17 | 25 | 11.18 | 11.95 | 0.2 | 2.39 | 40 | 0.24 | 0.00 | 0.00 | 0.6 | 7.17 | 48 | 0.72 | 0.00 | 0.00 | 0.9 | 10.76 | 12 | 1.08 | 0.06 | 1.57 |
| | 18 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 19 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | 20 | 10 | 4.47 | 4.78 | 0.2 | 0.96 | 40 | 0.10 | 0.00 | 0.00 | 0.6 | 2.87 | 48 | 0.29 | 0.00 | 0.00 | 0.9 | 4.30 | 12 | 0.43 | 0.00 | 0.00 |
| | 21 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 22 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 23 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 24 | 32 | 14.30 | 15.30 | 0.2 | 3.06 | 40 | 0.31 | 0.00 | 0.00 | 0.6 | 9.18 | 48 | 0.92 | 0.00 | 0.00 | 0.9 | 13.77 | 12 | 1.38 | 0.36 | 16.32 |
| | 25 | 24 | 10.73 | 11.47 | 0.2 | 2.29 | 40 | 0.23 | 0.00 | 0.00 | 0.6 | 6.88 | 48 | 0.69 | 0.00 | 0.00 | 0.9 | 10.33 | 12 | 1.03 | 0.01 | 0.33 |
| | 26 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 27 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |
| | 28 | 9 | 4.02 | 4.30 | 0.2 | 0.86 | 40 | 0.09 | 0.00 | 0.00 | 0.6 | 2.58 | 48 | 0.26 | 0.00 | 0.00 | 0.9 | 3.87 | 12 | 0.39 | 0.00 | 0.00 |
| | 29 | 28 | 12.52 | 13.39 | 0.2 | 2.68 | 40 | 0.27 | 0.00 | 0.00 | 0.6 | 8.03 | 48 | 0.80 | 0.00 | 0.00 | 0.9 | 12.05 | 12 | 1.20 | 0.18 | 6.60 |
| | 30 | 25 | 11.18 | 11.95 | 0.2 | 2.39 | 40 | 0.24 | 0.00 | 0.00 | 0.6 | 7.17 | 48 | 0.72 | 0.00 | 0.00 | 0.9 | 10.76 | 12 | 1.08 | 0.06 | 1.57 |
| May | 1 | 28 | 12.52 | 13.39 | 0.2 | 2.68 | 40 | 0.27 | 0.00 | 0.00 | 0.6 | 8.03 | 48 | 0.80 | 0.00 | 0.00 | 0.9 | 12.05 | 12 | 1.20 | 0.18 | 6.60 |
| 2010 | 2 | 24 | 10.73 | 11.47 | 0.2 | 2.29 | 40 | 0.23 | 0.00 | 0.00 | 0.6 | 6.88 | 48 | 0.69 | 0.00 | 0.00 | 0.9 | 10.33 | 12 | 1.03 | 0.01 | 0.33 |
| | 3 | 33 | 14.75 | 15.78 | 0.2 | 3.16 | 40 | 0.32 | 0.00 | 0.00 | 0.6 | 9.47 | 48 | 0.95 | 0.00 | 0.00 | 0.9 | 14.20 | 12 | 1.42 | 0.40 | 19.28 |
| | 4 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | 5 | 26 | 11.62 | 12.43 | 0.2 | 2.49 | 40 | 0.25 | 0.00 | 0.00 | 0.6 | 7.46 | 48 | 0.75 | 0.00 | 0.00 | 0.9 | 11.19 | 12 | 1.12 | 0.10 | 3.04 |
| | 6 | 10 | 4.47 | 4.78 | 0.2 | 0.96 | 40 | 0.10 | 0.00 | 0.00 | 0.6 | 2.87 | 48 | 0.29 | 0.00 | 0.00 | 0.9 | 4.30 | 12 | 0.43 | 0.00 | 0.00 |
| | 7 | 35 | 15.65 | 16.73 | 0.2 | 3.35 | 40 | 0.33 | 0.00 | 0.00 | 0.6 | 10.04 | 48 | 1.00 | 0.00 | 0.00 | 0.9 | 15.06 | 12 | 1.51 | 0.49 | 25.86 |
| | 8 | 33 | 14.75 | 15.78 | 0.2 | 3.16 | 40 | 0.32 | 0.00 | 0.00 | 0.6 | 9.47 | 48 | 0.95 | 0.00 | 0.00 | 0.9 | 14.20 | 12 | 1.42 | 0.40 | 19.28 |
| | 9 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 10 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 11 | 29 | 12.96 | 13.87 | 0.2 | 2.77 | 40 | 0.28 | 0.00 | 0.00 | 0.6 | 8.32 | 48 | 0.83 | 0.00 | 0.00 | 0.9 | 12.48 | 12 | 1.25 | 0.23 | 8.71 |
| | 12 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |
| | 13 | 29 | 12.96 | 13.87 | 0.2 | 2.77 | 40 | 0.28 | 0.00 | 0.00 | 0.6 | 8.32 | 48 | 0.83 | 0.00 | 0.00 | 0.9 | 12.48 | 12 | 1.25 | 0.23 | 8.71 |
| | 14 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |
| | 15 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 16 | 20 | 8.94 | 9.56 | 0.2 | 1.91 | 40 | 0.19 | 0.00 | 0.00 | 0.6 | 5.74 | 48 | 0.57 | 0.00 | 0.00 | 0.9 | 8.61 | 12 | 0.86 | 0.00 | 0.00 |
| | 17 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 18 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 19 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 20 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 21 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 22 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 23 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 24 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 25 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 26 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 27 | 20 | 8.94 | 9.56 | 0.2 | 1.91 | 40 | 0.19 | 0.00 | 0.00 | 0.6 | 5.74 | 48 | 0.57 | 0.00 | 0.00 | 0.9 | 8.61 | 12 | 0.86 | 0.00 | 0.00 |
| | 28 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 29 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 30 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 31 | 30 | 13.41 | 14.34 | 0.2 | 2.87 | 40 | 0.29 | 0.00 | 0.00 | 0.6 | 8.61 | 48 | 0.86 | 0.00 | 0.00 | 0.9 | 12.91 | 12 | 1.29 | 0.27 | 11.03 |
| Jun | 1 | 12 | 5.36 | 5.74 | 0.2 | 1.15 | 40 | 0.11 | 0.00 | 0.00 | 0.6 | 3.44 | 48 | 0.34 | 0.00 | 0.00 | 0.9 | 5.16 | 12 | 0.52 | 0.00 | 0.00 |
| 2010 | 2 | 26 | 11.62 | 12.43 | 0.2 | 2.49 | 40 | 0.25 | 0.00 | 0.00 | 0.6 | 7.46 | 48 | 0.75 | 0.00 | 0.00 | 0.9 | 11.19 | 12 | 1.12 | 0.10 | 3.04 |
| | 3 | 31 | 13.86 | 14.82 | 0.2 | 2.96 | 40 | 0.30 | 0.00 | 0.00 | 0.6 | 8.89 | 48 | 0.89 | 0.00 | 0.00 | 0.9 | 13.34 | 12 | 1.33 | 0.31 | 13.57 |
| | 4 | 22 | 9.83 | 10.52 | 0.2 | 2.10 | 40 | 0.21 | 0.00 | 0.00 | 0.6 | 6.31 | 48 | 0.63 | 0.00 | 0.00 | 0.9 | 9.47 | 12 | 0.95 | 0.00 | 0.00 |
| | 5 | 24 | 10.73 | 11.47 | 0.2 | 2.29 | 40 | 0.23 | 0.00 | 0.00 | 0.6 | 6.88 | 48 | 0.69 | 0.00 | 0.00 | 0.9 | 10.33 | 12 | 1.03 | 0.01 | 0.33 |
| | 6 | 29 | 12.96 | 13.87 | 0.2 | 2.77 | 40 | 0.28 | 0.00 | 0.00 | 0.6 | 8.32 | 48 | 0.83 | 0.00 | 0.00 | 0.9 | 12.48 | 12 | 1.25 | 0.23 | 8.71 |
| | 7 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 8 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 9 | 20 | 8.94 | 9.56 | 0.2 | 1.91 | 40 | 0.19 | 0.00 | 0.00 | 0.6 | 5.74 | 48 | 0.57 | 0.00 | 0.00 | 0.9 | 8.61 | 12 | 0.86 | 0.00 | 0.00 |
| | 10 | 12 | 5.36 | 5.74 | 0.2 | 1.15 | 40 | 0.11 | 0.00 | 0.00 | 0.6 | 3.44 | 48 | 0.34 | 0.00 | 0.00 | 0.9 | 5.16 | 12 | 0.52 | 0.00 | 0.00 |
| | 11 | 35 | 15.65 | 16.73 | 0.2 | 3.35 | 40 | 0.33 | 0.00 | 0.00 | 0.6 | 10.04 | 48 | 1.00 | 0.00 | 0.00 | 0.9 | 15.06 | 12 | 1.51 | 0.49 | 25.86 |
| | 12 | 30 | 13.41 | 14.34 | 0.2 | 2.87 | 40 | 0.29 | 0.00 | 0.00 | 0.6 | 8.61 | 48 | 0.86 | 0.00 | 0.00 | 0.9 | 12.91 | 12 | 1.29 | 0.27 | 11.03 |

| Month and Year | Day | Max 2-min u6.1+ (mph) | Max 2-min u6.1+ (m/sec) | Max 2-min u10+ (m/sec) | Us/Ur Ratio for Us/Ur Regime Code No.s 0.2a, 0.2b for Pile | Us/Ur Regime Code No.'s 0.2a or 0.2b Adjusted Pile Surface us+ (m/sec) | Combined Us/Ur Code No.'s 0.2a and 0.2b Portion of Pile Surface (percent) | Combined Us/Ur Regime Code No.'s 0.2a or 0.2b Equivalent Friction Velocity u* (m/sec) | u* - ut* (m/sec) | Erosion Potential Function P | Us/Ur Ratio for Us/Ur Regime Code No.'s 0.6a, o.6b for Pile | Us/Ur Regime Code No.'s 0.6a or 0.6b Adjusted Pile Surface us+ (m/sec) | Combined Us/Ur Regime Code No.'s 0.6a and 0.6b Portion of Pile Surface (percent) | Combined Us/Ur Regime Code No.'s 0.6a or 0.6b Equivalent Friction Velocity u* (m/sec) | u* - ut* (m/sec) | Erosion Potential Function P | Us/Ur Ratio for Us/Ur Regime Code No. 0.9 for Pile | Us/Ur Code No. 0.90 Adjusted Pile Surface us+ (m/sec) | Us/Ur Regime Code No. 0.9 Portion of Pile Surface (percent) | Us/Ur Regime Code No. 0.9 Equivalent Friction u* (m/sec) | u* - ut* (m/sec) | Erosion Potential Function P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jun | 13 | 32 | 14.30 | 15.30 | 0.2 | 3.06 | 40 | 0.31 | 0.00 | 0.00 | 0.6 | 9.18 | 48 | 0.92 | 0.00 | 0.00 | 0.9 | 13.77 | 12 | 1.38 | 0.36 | 16.32 |
| 2010 | 14 | 30 | 13.41 | 14.34 | 0.2 | 2.87 | 40 | 0.29 | 0.00 | 0.00 | 0.6 | 8.61 | 48 | 0.86 | 0.00 | 0.00 | 0.9 | 12.91 | 12 | 1.29 | 0.27 | 11.03 |
| | 15 | 40 | 17.88 | 19.12 | 0.2 | 3.82 | 40 | 0.38 | 0.00 | 0.00 | 0.6 | 11.47 | 48 | 1.15 | 0.13 | 4.13 | 0.9 | 17.21 | 12 | 1.72 | 0.70 | 46.05 |
| | 16 | 22 | 9.83 | 10.52 | 0.2 | 2.10 | 40 | 0.21 | 0.00 | 0.00 | 0.6 | 6.31 | 48 | 0.63 | 0.00 | 0.00 | 0.9 | 9.47 | 12 | 0.95 | 0.00 | 0.00 |
| | 17 | 12 | 5.36 | 5.74 | 0.2 | 1.15 | 40 | 0.11 | 0.00 | 0.00 | 0.6 | 3.44 | 48 | 0.34 | 0.00 | 0.00 | 0.9 | 5.16 | 12 | 0.52 | 0.00 | 0.00 |
| | 18 | 35 | 15.65 | 16.73 | 0.2 | 3.35 | 40 | 0.33 | 0.00 | 0.00 | 0.6 | 10.04 | 48 | 1.00 | 0.00 | 0.00 | 0.9 | 15.06 | 12 | 1.51 | 0.49 | 25.86 |
| | 19 | 29 | 12.96 | 13.87 | 0.2 | 2.77 | 40 | 0.28 | 0.00 | 0.00 | 0.6 | 8.32 | 48 | 0.83 | 0.00 | 0.00 | 0.9 | 12.48 | 12 | 1.25 | 0.23 | 8.71 |
| | 20 | 12 | 5.36 | 5.74 | 0.2 | 1.15 | 40 | 0.11 | 0.00 | 0.00 | 0.6 | 3.44 | 48 | 0.34 | 0.00 | 0.00 | 0.9 | 5.16 | 12 | 0.52 | 0.00 | 0.00 |
| | 21 | 43 | 19.22 | 20.56 | 0.2 | 4.11 | 40 | 0.41 | 0.00 | 0.00 | 0.6 | 12.34 | 48 | 1.23 | 0.21 | 7.98 | 0.9 | 18.50 | 12 | 1.85 | 0.83 | 60.75 |
| | 22 | 30 | 13.41 | 14.34 | 0.2 | 2.87 | 40 | 0.29 | 0.00 | 0.00 | 0.6 | 8.61 | 48 | 0.86 | 0.00 | 0.00 | 0.9 | 12.91 | 12 | 1.29 | 0.27 | 11.03 |
| | 23 | 32 | 14.30 | 15.30 | 0.2 | 3.06 | 40 | 0.31 | 0.00 | 0.00 | 0.6 | 9.18 | 48 | 0.92 | 0.00 | 0.00 | 0.9 | 13.77 | 12 | 1.38 | 0.36 | 16.32 |
| | 24 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |
| | 25 | 10 | 4.47 | 4.78 | 0.2 | 0.96 | 40 | 0.10 | 0.00 | 0.00 | 0.6 | 2.87 | 48 | 0.29 | 0.00 | 0.00 | 0.9 | 4.30 | 12 | 0.43 | 0.00 | 0.00 |
| | 26 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 27 | 40 | 17.88 | 19.12 | 0.2 | 3.82 | 40 | 0.38 | 0.00 | 0.00 | 0.6 | 11.47 | 48 | 1.15 | 0.13 | 4.13 | 0.9 | 17.21 | 12 | 1.72 | 0.70 | 46.05 |
| | 28 | 22 | 9.83 | 10.52 | 0.2 | 2.10 | 40 | 0.21 | 0.00 | 0.00 | 0.6 | 6.31 | 48 | 0.63 | 0.00 | 0.00 | 0.9 | 9.47 | 12 | 0.95 | 0.00 | 0.00 |
| | 29 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | 30 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| Jul | 1 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| 2010 | 2 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 3 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 4 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |
| | 5 | 20 | 8.94 | 9.56 | 0.2 | 1.91 | 40 | 0.19 | 0.00 | 0.00 | 0.6 | 5.74 | 48 | 0.57 | 0.00 | 0.00 | 0.9 | 8.61 | 12 | 0.86 | 0.00 | 0.00 |
| | 6 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 7 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 8 | 22 | 9.83 | 10.52 | 0.2 | 2.10 | 40 | 0.21 | 0.00 | 0.00 | 0.6 | 6.31 | 48 | 0.63 | 0.00 | 0.00 | 0.9 | 9.47 | 12 | 0.95 | 0.00 | 0.00 |
| | 9 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | 10 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 11 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 12 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | 13 | 25 | 11.18 | 11.95 | 0.2 | 2.39 | 40 | 0.24 | 0.00 | 0.00 | 0.6 | 7.17 | 48 | 0.72 | 0.00 | 0.00 | 0.9 | 10.76 | 12 | 1.08 | 0.06 | 1.57 |
| | 14 | 12 | 5.36 | 5.74 | 0.2 | 1.15 | 40 | 0.11 | 0.00 | 0.00 | 0.6 | 3.44 | 48 | 0.34 | 0.00 | 0.00 | 0.9 | 5.16 | 12 | 0.52 | 0.00 | 0.00 |
| | 15 | 25 | 11.18 | 11.95 | 0.2 | 2.39 | 40 | 0.24 | 0.00 | 0.00 | 0.6 | 7.17 | 48 | 0.72 | 0.00 | 0.00 | 0.9 | 10.76 | 12 | 1.08 | 0.06 | 1.57 |
| | 16 | 9 | 4.02 | 4.30 | 0.2 | 0.86 | 40 | 0.09 | 0.00 | 0.00 | 0.6 | 2.58 | 48 | 0.26 | 0.00 | 0.00 | 0.9 | 3.87 | 12 | 0.39 | 0.00 | 0.00 |
| | 17 | 22 | 9.83 | 10.52 | 0.2 | 2.10 | 40 | 0.21 | 0.00 | 0.00 | 0.6 | 6.31 | 48 | 0.63 | 0.00 | 0.00 | 0.9 | 9.47 | 12 | 0.95 | 0.00 | 0.00 |
| | 18 | 21 | 9.39 | 10.04 | 0.2 | 2.01 | 40 | 0.20 | 0.00 | 0.00 | 0.6 | 6.02 | 48 | 0.60 | 0.00 | 0.00 | 0.9 | 9.04 | 12 | 0.90 | 0.00 | 0.00 |
| | 19 | 20 | 8.94 | 9.56 | 0.2 | 1.91 | 40 | 0.19 | 0.00 | 0.00 | 0.6 | 5.74 | 48 | 0.57 | 0.00 | 0.00 | 0.9 | 8.61 | 12 | 0.86 | 0.00 | 0.00 |
| | 20 | 29 | 12.96 | 13.87 | 0.2 | 2.77 | 40 | 0.28 | 0.00 | 0.00 | 0.6 | 8.32 | 48 | 0.83 | 0.00 | 0.00 | 0.9 | 12.48 | 12 | 1.25 | 0.23 | 8.71 |
| | 21 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 22 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | 23 | 22 | 9.83 | 10.52 | 0.2 | 2.10 | 40 | 0.21 | 0.00 | 0.00 | 0.6 | 6.31 | 48 | 0.63 | 0.00 | 0.00 | 0.9 | 9.47 | 12 | 0.95 | 0.00 | 0.00 |
| | 24 | 22 | 9.83 | 10.52 | 0.2 | 2.10 | 40 | 0.21 | 0.00 | 0.00 | 0.6 | 6.31 | 48 | 0.63 | 0.00 | 0.00 | 0.9 | 9.47 | 12 | 0.95 | 0.00 | 0.00 |
| | 25 | 20 | 8.94 | 9.56 | 0.2 | 1.91 | 40 | 0.19 | 0.00 | 0.00 | 0.6 | 5.74 | 48 | 0.57 | 0.00 | 0.00 | 0.9 | 8.61 | 12 | 0.86 | 0.00 | 0.00 |
| | 26 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 27 | 10 | 4.47 | 4.78 | 0.2 | 0.96 | 40 | 0.10 | 0.00 | 0.00 | 0.6 | 2.87 | 48 | 0.29 | 0.00 | 0.00 | 0.9 | 4.30 | 12 | 0.43 | 0.00 | 0.00 |
| | 28 | 22 | 9.83 | 10.52 | 0.2 | 2.10 | 40 | 0.21 | 0.00 | 0.00 | 0.6 | 6.31 | 48 | 0.63 | 0.00 | 0.00 | 0.9 | 9.47 | 12 | 0.95 | 0.00 | 0.00 |
| | 29 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | 30 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 31 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| Aug | 1 | 10 | 4.47 | 4.78 | 0.2 | 0.96 | 40 | 0.10 | 0.00 | 0.00 | 0.6 | 2.87 | 48 | 0.29 | 0.00 | 0.00 | 0.9 | 4.30 | 12 | 0.43 | 0.00 | 0.00 |
| 2010 | 2 | 12 | 5.36 | 5.74 | 0.2 | 1.15 | 40 | 0.11 | 0.00 | 0.00 | 0.6 | 3.44 | 48 | 0.34 | 0.00 | 0.00 | 0.9 | 5.16 | 12 | 0.52 | 0.00 | 0.00 |
| | 3 | 23 | 10.28 | 11.00 | 0.2 | 2.20 | 40 | 0.22 | 0.00 | 0.00 | 0.6 | 6.60 | 48 | 0.66 | 0.00 | 0.00 | 0.9 | 9.90 | 12 | 0.99 | 0.00 | 0.00 |
| | 4 | 30 | 13.41 | 14.34 | 0.2 | 2.87 | 40 | 0.29 | 0.00 | 0.00 | 0.6 | 8.61 | 48 | 0.86 | 0.00 | 0.00 | 0.9 | 12.91 | 12 | 1.29 | 0.27 | 11.03 |
| | 5 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |
| | 6 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | 7 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 8 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 9 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 10 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 11 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 12 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |

| Month and Year | Day | Max 2-min u6.1+ (mph) | Max 2-min u6.1+ (m/sec) | Max 2-min u10+ (m/sec) | Us/Ur Ratio for Us/Ur Regime Code No.s 0.2a, 0.2b for Pile | Us/Ur Regime Code No.'s 0.2a or 0.2b Adjusted Pile Surface us+ (m/sec) | Combined Us/Ur Code No.'s 0.2a and 0.2b Portion of Pile Surface (percent) | Combined Us/Ur Regime Code No.'s 0.2a or 0.2b Equivalent Friction Velocity u* (m/sec) | u* - ut* (m/sec) | Erosion Potential Function P | Us/Ur Ratio for Us/Ur Regime Code No.'s 0.6a, o.6b for Pile | Us/Ur Regime Code No.'s 0.6a or 0.6b Adjusted Pile Surface us+ (m/sec) | Combined Us/Ur Regime Code No.'s 0.6a and 0.6b Portion of Pile Surface (percent) | Combined Us/Ur Regime Code No.'s 0.6a or 0.6b Equivalent Friction Velocity u* (m/sec) | u* - ut* (m/sec) | Erosion Potential Function P | Us/Ur Ratio for Us/Ur Regime Code No. 0.9 for Pile | Us/Ur Code No. 0.90 Adjusted Pile Surface us+ (m/sec) | Us/Ur Regime Code No. 0.9 Portion of Pile Surface (percent) | Us/Ur Regime Code No. 0.9 Equivalent Friction u* (m/sec) | u* - ut* (m/sec) | Erosion Potential Function P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug | 13 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| 2010 | 14 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 15 | 20 | 8.94 | 9.56 | 0.2 | 1.91 | 40 | 0.19 | 0.00 | 0.00 | 0.6 | 5.74 | 48 | 0.57 | 0.00 | 0.00 | 0.9 | 8.61 | 12 | 0.86 | 0.00 | 0.00 |
| | 16 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 17 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 18 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 19 | 9 | 4.02 | 4.30 | 0.2 | 0.86 | 40 | 0.09 | 0.00 | 0.00 | 0.6 | 2.58 | 48 | 0.26 | 0.00 | 0.00 | 0.9 | 3.87 | 12 | 0.39 | 0.00 | 0.00 |
| | 20 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |
| | 21 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 22 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 23 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 24 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | 25 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |
| | 26 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |
| | 27 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 28 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 29 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |
| | 30 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 31 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| Sep | 1 | 25 | 11.18 | 11.95 | 0.2 | 2.39 | 40 | 0.24 | 0.00 | 0.00 | 0.6 | 7.17 | 48 | 0.72 | 0.00 | 0.00 | 0.9 | 10.76 | 12 | 1.08 | 0.06 | 1.57 |
| 2010 | 2 | 25 | 11.18 | 11.95 | 0.2 | 2.39 | 40 | 0.24 | 0.00 | 0.00 | 0.6 | 7.17 | 48 | 0.72 | 0.00 | 0.00 | 0.9 | 10.76 | 12 | 1.08 | 0.06 | 1.57 |
| | 3 | 32 | 14.30 | 15.30 | 0.2 | 3.06 | 40 | 0.31 | 0.00 | 0.00 | 0.6 | 9.18 | 48 | 0.92 | 0.00 | 0.00 | 0.9 | 13.77 | 12 | 1.38 | 0.36 | 16.32 |
| | 4 | 24 | 10.73 | 11.47 | 0.2 | 2.29 | 40 | 0.23 | 0.00 | 0.00 | 0.6 | 6.88 | 48 | 0.69 | 0.00 | 0.00 | 0.9 | 10.33 | 12 | 1.03 | 0.01 | 0.33 |
| | 5 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 6 | 24 | 10.73 | 11.47 | 0.2 | 2.29 | 40 | 0.23 | 0.00 | 0.00 | 0.6 | 6.88 | 48 | 0.69 | 0.00 | 0.00 | 0.9 | 10.33 | 12 | 1.03 | 0.01 | 0.33 |
| | 7 | 30 | 13.41 | 14.34 | 0.2 | 2.87 | 40 | 0.29 | 0.00 | 0.00 | 0.6 | 8.61 | 48 | 0.86 | 0.00 | 0.00 | 0.9 | 12.91 | 12 | 1.29 | 0.27 | 11.03 |
| | 8 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |
| | 9 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 10 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 11 | 24 | 10.73 | 11.47 | 0.2 | 2.29 | 40 | 0.23 | 0.00 | 0.00 | 0.6 | 6.88 | 48 | 0.69 | 0.00 | 0.00 | 0.9 | 10.33 | 12 | 1.03 | 0.01 | 0.33 |
| | 12 | 22 | 9.83 | 10.52 | 0.2 | 2.10 | 40 | 0.21 | 0.00 | 0.00 | 0.6 | 6.31 | 48 | 0.63 | 0.00 | 0.00 | 0.9 | 9.47 | 12 | 0.95 | 0.00 | 0.00 |
| | 13 | 24 | 10.73 | 11.47 | 0.2 | 2.29 | 40 | 0.23 | 0.00 | 0.00 | 0.6 | 6.88 | 48 | 0.69 | 0.00 | 0.00 | 0.9 | 10.33 | 12 | 1.03 | 0.01 | 0.33 |
| | 14 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 15 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 16 | 31 | 13.86 | 14.82 | 0.2 | 2.96 | 40 | 0.30 | 0.00 | 0.00 | 0.6 | 8.89 | 48 | 0.89 | 0.00 | 0.00 | 0.9 | 13.34 | 12 | 1.33 | 0.31 | 13.57 |
| | 17 | 9 | 4.02 | 4.30 | 0.2 | 0.86 | 40 | 0.09 | 0.00 | 0.00 | 0.6 | 2.58 | 48 | 0.26 | 0.00 | 0.00 | 0.9 | 3.87 | 12 | 0.39 | 0.00 | 0.00 |
| | 18 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 19 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |
| | 20 | 12 | 5.36 | 5.74 | 0.2 | 1.15 | 40 | 0.11 | 0.00 | 0.00 | 0.6 | 3.44 | 48 | 0.34 | 0.00 | 0.00 | 0.9 | 5.16 | 12 | 0.52 | 0.00 | 0.00 |
| | 21 | 22 | 9.83 | 10.52 | 0.2 | 2.10 | 40 | 0.21 | 0.00 | 0.00 | 0.6 | 6.31 | 48 | 0.63 | 0.00 | 0.00 | 0.9 | 9.47 | 12 | 0.95 | 0.00 | 0.00 |
| | 22 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 23 | 26 | 11.62 | 12.43 | 0.2 | 2.49 | 40 | 0.25 | 0.00 | 0.00 | 0.6 | 7.46 | 48 | 0.75 | 0.00 | 0.00 | 0.9 | 11.19 | 12 | 1.12 | 0.10 | 3.04 |
| | 24 | 32 | 14.30 | 15.30 | 0.2 | 3.06 | 40 | 0.31 | 0.00 | 0.00 | 0.6 | 9.18 | 48 | 0.92 | 0.00 | 0.00 | 0.9 | 13.77 | 12 | 1.38 | 0.36 | 16.32 |
| | 25 | 21 | 9.39 | 10.04 | 0.2 | 2.01 | 40 | 0.20 | 0.00 | 0.00 | 0.6 | 6.02 | 48 | 0.60 | 0.00 | 0.00 | 0.9 | 9.04 | 12 | 0.90 | 0.00 | 0.00 |
| | 26 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |
| | 27 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |
| | 28 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 29 | 9 | 4.02 | 4.30 | 0.2 | 0.86 | 40 | 0.09 | 0.00 | 0.00 | 0.6 | 2.58 | 48 | 0.26 | 0.00 | 0.00 | 0.9 | 3.87 | 12 | 0.39 | 0.00 | 0.00 |
| | 30 | 26 | 11.62 | 12.43 | 0.2 | 2.49 | 40 | 0.25 | 0.00 | 0.00 | 0.6 | 7.46 | 48 | 0.75 | 0.00 | 0.00 | 0.9 | 11.19 | 12 | 1.12 | 0.10 | 3.04 |
| Oct | 1 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| 2010 | 2 | 20 | 8.94 | 9.56 | 0.2 | 1.91 | 40 | 0.19 | 0.00 | 0.00 | 0.6 | 5.74 | 48 | 0.57 | 0.00 | 0.00 | 0.9 | 8.61 | 12 | 0.86 | 0.00 | 0.00 |
| | 3 | 22 | 9.83 | 10.52 | 0.2 | 2.10 | 40 | 0.21 | 0.00 | 0.00 | 0.6 | 6.31 | 48 | 0.63 | 0.00 | 0.00 | 0.9 | 9.47 | 12 | 0.95 | 0.00 | 0.00 |
| | 4 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | 5 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | 6 | 20 | 8.94 | 9.56 | 0.2 | 1.91 | 40 | 0.19 | 0.00 | 0.00 | 0.6 | 5.74 | 48 | 0.57 | 0.00 | 0.00 | 0.9 | 8.61 | 12 | 0.86 | 0.00 | 0.00 |
| | 7 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 8 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 9 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 10 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 11 | 24 | 10.73 | 11.47 | 0.2 | 2.29 | 40 | 0.23 | 0.00 | 0.00 | 0.6 | 6.88 | 48 | 0.69 | 0.00 | 0.00 | 0.9 | 10.33 | 12 | 1.03 | 0.01 | 0.33 |
| | 12 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |

| Month and Year | Day | Max 2-min u6.1+ (mph) | Max 2-min u6.1+ (m/sec) | Max 2-min u10+ (m/sec) | Us/Ur Ratio for Us/Ur Regime Code No.s 0.2a, 0.2b for Pile | Us/Ur Regime Code No.'s 0.2a or 0.2b Adjusted Pile Surface us+ (m/sec) | Combined Us/Ur Code No.'s 0.2a and 0.2b Portion of Pile Surface (percent) | Combined Us/Ur Regime Code No.'s 0.2a or 0.2b Equivalent Friction Velocity u* (m/sec) | u* - ut* (m/sec) | Erosion Potential Function P | Us/Ur Ratio for Us/Ur Regime Code No.'s 0.6a, o.6b for Pile | Us/Ur Regime Code No.'s 0.6a or 0.6b Adjusted Pile Surface us+ (m/sec) | Combined Us/Ur Regime Code No.'s 0.6a and 0.6b Portion of Pile Surface (percent) | Combined Us/Ur Regime Code No.'s 0.6a or 0.6b Equivalent Friction Velocity u* (m/sec) | u* - ut* (m/sec) | Erosion Potential Function P | Us/Ur Ratio for Us/Ur Regime Code No. 0.9 for Pile | Us/Ur Regime Code No. 0.90 Adjusted Pile Surface us+ (m/sec) | Us/Ur Regime Code No. 0.9 Portion of Pile Surface (percent) | Us/Ur Regime Code No. 0.9 Equivalent Friction u* (m/sec) | u* - ut* (m/sec) | Erosion Potential Function P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Oct | 13 | 28 | 12.52 | 13.39 | 0.2 | 2.68 | 40 | 0.27 | 0.00 | 0.00 | 0.6 | 8.03 | 48 | 0.80 | 0.00 | 0.00 | 0.9 | 12.05 | 12 | 1.20 | 0.18 | 6.60 |
| 2010 | 14 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 15 | 24 | 10.73 | 11.47 | 0.2 | 2.29 | 40 | 0.23 | 0.00 | 0.00 | 0.6 | 6.88 | 48 | 0.69 | 0.00 | 0.00 | 0.9 | 10.33 | 12 | 1.03 | 0.01 | 0.33 |
| | 16 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | 17 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 18 | 20 | 8.94 | 9.56 | 0.2 | 1.91 | 40 | 0.19 | 0.00 | 0.00 | 0.6 | 5.74 | 48 | 0.57 | 0.00 | 0.00 | 0.9 | 8.61 | 12 | 0.86 | 0.00 | 0.00 |
| | 19 | 14 | 6.26 | 6.69 | 0.2 | 1.34 | 40 | 0.13 | 0.00 | 0.00 | 0.6 | 4.02 | 48 | 0.40 | 0.00 | 0.00 | 0.9 | 6.02 | 12 | 0.60 | 0.00 | 0.00 |
| | 20 | 26 | 11.62 | 12.43 | 0.2 | 2.49 | 40 | 0.25 | 0.00 | 0.00 | 0.6 | 7.46 | 48 | 0.75 | 0.00 | 0.00 | 0.9 | 11.19 | 12 | 1.12 | 0.10 | 3.04 |
| | 21 | 24 | 10.73 | 11.47 | 0.2 | 2.29 | 40 | 0.23 | 0.00 | 0.00 | 0.6 | 6.88 | 48 | 0.69 | 0.00 | 0.00 | 0.9 | 10.33 | 12 | 1.03 | 0.01 | 0.33 |
| | 22 | 12 | 5.36 | 5.74 | 0.2 | 1.15 | 40 | 0.11 | 0.00 | 0.00 | 0.6 | 3.44 | 48 | 0.34 | 0.00 | 0.00 | 0.9 | 5.16 | 12 | 0.52 | 0.00 | 0.00 |
| | 23 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 24 | 26 | 11.62 | 12.43 | 0.2 | 2.49 | 40 | 0.25 | 0.00 | 0.00 | 0.6 | 7.46 | 48 | 0.75 | 0.00 | 0.00 | 0.9 | 11.19 | 12 | 1.12 | 0.10 | 3.04 |
| | 25 | 21 | 9.39 | 10.04 | 0.2 | 2.01 | 40 | 0.20 | 0.00 | 0.00 | 0.6 | 6.02 | 48 | 0.60 | 0.00 | 0.00 | 0.9 | 9.04 | 12 | 0.90 | 0.00 | 0.00 |
| | 26 | 43 | 19.22 | 20.56 | 0.2 | 4.11 | 40 | 0.41 | 0.00 | 0.00 | 0.6 | 12.34 | 48 | 1.23 | 0.21 | 7.98 | 0.9 | 18.50 | 12 | 1.85 | 0.83 | 60.75 |
| | 27 | 36 | 16.09 | 17.21 | 0.2 | 3.44 | 40 | 0.34 | 0.00 | 0.00 | 0.6 | 10.33 | 48 | 1.03 | 0.01 | 0.33 | 0.9 | 15.49 | 12 | 1.55 | 0.53 | 29.47 |
| | 28 | 28 | 12.52 | 13.39 | 0.2 | 2.68 | 40 | 0.27 | 0.00 | 0.00 | 0.6 | 8.03 | 48 | 0.80 | 0.00 | 0.00 | 0.9 | 12.05 | 12 | 1.20 | 0.18 | 6.60 |
| | 29 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 30 | 25 | 11.18 | 11.95 | 0.2 | 2.39 | 40 | 0.24 | 0.00 | 0.00 | 0.6 | 7.17 | 48 | 0.72 | 0.00 | 0.00 | 0.9 | 10.76 | 12 | 1.08 | 0.06 | 1.57 |
| | 31 | 20 | 8.94 | 9.56 | 0.2 | 1.91 | 40 | 0.19 | 0.00 | 0.00 | 0.6 | 5.74 | 48 | 0.57 | 0.00 | 0.00 | 0.9 | 8.61 | 12 | 0.86 | 0.00 | 0.00 |
| Nov | 1 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |
| 2010 | 2 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | 3 | 9 | 4.02 | 4.30 | 0.2 | 0.86 | 40 | 0.09 | 0.00 | 0.00 | 0.6 | 2.58 | 48 | 0.26 | 0.00 | 0.00 | 0.9 | 3.87 | 12 | 0.39 | 0.00 | 0.00 |
| | 4 | 29 | 12.96 | 13.87 | 0.2 | 2.77 | 40 | 0.28 | 0.00 | 0.00 | 0.6 | 8.32 | 48 | 0.83 | 0.00 | 0.00 | 0.9 | 12.48 | 12 | 1.25 | 0.23 | 8.71 |
| | 5 | 21 | 9.39 | 10.04 | 0.2 | 2.01 | 40 | 0.20 | 0.00 | 0.00 | 0.6 | 6.02 | 48 | 0.60 | 0.00 | 0.00 | 0.9 | 9.04 | 12 | 0.90 | 0.00 | 0.00 |
| | 6 | 10 | 4.47 | 4.78 | 0.2 | 0.96 | 40 | 0.10 | 0.00 | 0.00 | 0.6 | 2.87 | 48 | 0.29 | 0.00 | 0.00 | 0.9 | 4.30 | 12 | 0.43 | 0.00 | 0.00 |
| | 7 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 8 | 12 | 5.36 | 5.74 | 0.2 | 1.15 | 40 | 0.11 | 0.00 | 0.00 | 0.6 | 3.44 | 48 | 0.34 | 0.00 | 0.00 | 0.9 | 5.16 | 12 | 0.52 | 0.00 | 0.00 |
| | 9 | 10 | 4.47 | 4.78 | 0.2 | 0.96 | 40 | 0.10 | 0.00 | 0.00 | 0.6 | 2.87 | 48 | 0.29 | 0.00 | 0.00 | 0.9 | 4.30 | 12 | 0.43 | 0.00 | 0.00 |
| | 10 | 10 | 4.47 | 4.78 | 0.2 | 0.96 | 40 | 0.10 | 0.00 | 0.00 | 0.6 | 2.87 | 48 | 0.29 | 0.00 | 0.00 | 0.9 | 4.30 | 12 | 0.43 | 0.00 | 0.00 |
| | 11 | 7 | 3.13 | 3.35 | 0.2 | 0.67 | 40 | 0.07 | 0.00 | 0.00 | 0.6 | 2.01 | 48 | 0.20 | 0.00 | 0.00 | 0.9 | 3.01 | 12 | 0.30 | 0.00 | 0.00 |
| | 12 | 10 | 4.47 | 4.78 | 0.2 | 0.96 | 40 | 0.10 | 0.00 | 0.00 | 0.6 | 2.87 | 48 | 0.29 | 0.00 | 0.00 | 0.9 | 4.30 | 12 | 0.43 | 0.00 | 0.00 |
| | 13 | 28 | 12.52 | 13.39 | 0.2 | 2.68 | 40 | 0.27 | 0.00 | 0.00 | 0.6 | 8.03 | 48 | 0.80 | 0.00 | 0.00 | 0.9 | 12.05 | 12 | 1.20 | 0.18 | 6.60 |
| | 14 | 21 | 9.39 | 10.04 | 0.2 | 2.01 | 40 | 0.20 | 0.00 | 0.00 | 0.6 | 6.02 | 48 | 0.60 | 0.00 | 0.00 | 0.9 | 9.04 | 12 | 0.90 | 0.00 | 0.00 |
| | 15 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 16 | 21 | 9.39 | 10.04 | 0.2 | 2.01 | 40 | 0.20 | 0.00 | 0.00 | 0.6 | 6.02 | 48 | 0.60 | 0.00 | 0.00 | 0.9 | 9.04 | 12 | 0.90 | 0.00 | 0.00 |
| | 17 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |
| | 18 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 19 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 20 | 10 | 4.47 | 4.78 | 0.2 | 0.96 | 40 | 0.10 | 0.00 | 0.00 | 0.6 | 2.87 | 48 | 0.29 | 0.00 | 0.00 | 0.9 | 4.30 | 12 | 0.43 | 0.00 | 0.00 |
| | 21 | 26 | 11.62 | 12.43 | 0.2 | 2.49 | 40 | 0.25 | 0.00 | 0.00 | 0.6 | 7.46 | 48 | 0.75 | 0.00 | 0.00 | 0.9 | 11.19 | 12 | 1.12 | 0.10 | 3.04 |
| | 22 | 41 | 18.33 | 19.60 | 0.2 | 3.92 | 40 | 0.39 | 0.00 | 0.00 | 0.6 | 11.76 | 48 | 1.18 | 0.16 | 5.32 | 0.9 | 17.64 | 12 | 1.76 | 0.74 | 50.73 |
| | 23 | 41 | 18.33 | 19.60 | 0.2 | 3.92 | 40 | 0.39 | 0.00 | 0.00 | 0.6 | 11.76 | 48 | 1.18 | 0.16 | 5.32 | 0.9 | 17.64 | 12 | 1.76 | 0.74 | 50.73 |
| | 24 | 24 | 10.73 | 11.47 | 0.2 | 2.29 | 40 | 0.23 | 0.00 | 0.00 | 0.6 | 6.88 | 48 | 0.69 | 0.00 | 0.00 | 0.9 | 10.33 | 12 | 1.03 | 0.01 | 0.33 |
| | 25 | 25 | 11.18 | 11.95 | 0.2 | 2.39 | 40 | 0.24 | 0.00 | 0.00 | 0.6 | 7.17 | 48 | 0.72 | 0.00 | 0.00 | 0.9 | 10.76 | 12 | 1.08 | 0.06 | 1.57 |
| | 26 | 25 | 11.18 | 11.95 | 0.2 | 2.39 | 40 | 0.24 | 0.00 | 0.00 | 0.6 | 7.17 | 48 | 0.72 | 0.00 | 0.00 | 0.9 | 10.76 | 12 | 1.08 | 0.06 | 1.57 |
| | 27 | 24 | 10.73 | 11.47 | 0.2 | 2.29 | 40 | 0.23 | 0.00 | 0.00 | 0.6 | 6.88 | 48 | 0.69 | 0.00 | 0.00 | 0.9 | 10.33 | 12 | 1.03 | 0.01 | 0.33 |
| | 28 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 29 | 20 | 8.94 | 9.56 | 0.2 | 1.91 | 40 | 0.19 | 0.00 | 0.00 | 0.6 | 5.74 | 48 | 0.57 | 0.00 | 0.00 | 0.9 | 8.61 | 12 | 0.86 | 0.00 | 0.00 |
| | 30 | 23 | 10.28 | 11.00 | 0.2 | 2.20 | 40 | 0.22 | 0.00 | 0.00 | 0.6 | 6.60 | 48 | 0.66 | 0.00 | 0.00 | 0.9 | 9.90 | 12 | 0.99 | 0.00 | 0.00 |
| Dec | 1 | 25 | 11.18 | 11.95 | 0.2 | 2.39 | 40 | 0.24 | 0.00 | 0.00 | 0.6 | 7.17 | 48 | 0.72 | 0.00 | 0.00 | 0.9 | 10.76 | 12 | 1.08 | 0.06 | 1.57 |
| 2010 | 2 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 3 | 9 | 4.02 | 4.30 | 0.2 | 0.86 | 40 | 0.09 | 0.00 | 0.00 | 0.6 | 2.58 | 48 | 0.26 | 0.00 | 0.00 | 0.9 | 3.87 | 12 | 0.39 | 0.00 | 0.00 |
| | 4 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | 5 | 26 | 11.62 | 12.43 | 0.2 | 2.49 | 40 | 0.25 | 0.00 | 0.00 | 0.6 | 7.46 | 48 | 0.75 | 0.00 | 0.00 | 0.9 | 11.19 | 12 | 1.12 | 0.10 | 3.04 |
| | 6 | 24 | 10.73 | 11.47 | 0.2 | 2.29 | 40 | 0.23 | 0.00 | 0.00 | 0.6 | 6.88 | 48 | 0.69 | 0.00 | 0.00 | 0.9 | 10.33 | 12 | 1.03 | 0.01 | 0.33 |
| | 7 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | 8 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 9 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 10 | 20 | 8.94 | 9.56 | 0.2 | 1.91 | 40 | 0.19 | 0.00 | 0.00 | 0.6 | 5.74 | 48 | 0.57 | 0.00 | 0.00 | 0.9 | 8.61 | 12 | 0.86 | 0.00 | 0.00 |
| | 11 | 24 | 10.73 | 11.47 | 0.2 | 2.29 | 40 | 0.23 | 0.00 | 0.00 | 0.6 | 6.88 | 48 | 0.69 | 0.00 | 0.00 | 0.9 | 10.33 | 12 | 1.03 | 0.01 | 0.33 |
| | 12 | 30 | 13.41 | 14.34 | 0.2 | 2.87 | 40 | 0.29 | 0.00 | 0.00 | 0.6 | 8.61 | 48 | 0.86 | 0.00 | 0.00 | 0.9 | 12.91 | 12 | 1.29 | 0.27 | 11.03 |

**DUKE - CAYUGA UNITS 1 & 2 SCR PROJECT (INCLUDES DSI, ACI, DRY FLY ASH, FIXATION, AND LIMESTONE INJECTION)**
**DRY FLY ASH / FIXATION SYSTEM PM EMISSION CALCULATIONS**

| Month and Year | Day | Max 2-min u6.1+ (mph) | Max 2-min u6.1+ (m/sec) | Max 2-min u10+ (m/sec) | Us/Ur Ratio for Us/Ur Regime Code No.s 0.2a, 0.2b for Pile | Us/Ur Regime Code No.'s 0.2a or 0.2b Adjusted Pile Surface us+ (m/sec) | Combined Us/Ur Code No.'s 0.2a and 0.2b Portion of Pile Surface (percent) | Combined Us/Ur Regime Code No.'s 0.2a or 0.2b Equivalent Friction Velocity u* (m/sec) | u* - ut* (m/sec) | Erosion Potential Function P | Us/Ur Ratio for Us/Ur Regime Code No.'s 0.6a, o.6b for Pile | Us/Ur Regime Code No.'s 0.6a or 0.6b Adjusted Pile Surface us+ (m/sec) | Combined Us/Ur Regime Code No.'s 0.6a and 0.6b Portion of Pile Surface (percent) | Combined Us/Ur Regime Code No.'s 0.6a or 0.6b Equivalent Friction Velocity u* (m/sec) | u* - ut* (m/sec) | Erosion Potential Function P | Us/Ur Ratio for Us/Ur Regime Code No. 0.9 for Pile | Us/Ur Regime Code No. 0.90 Adjusted Pile Surface us+ (m/sec) | Us/Ur Regime Code No. 0.9 Portion of Pile Surface (percent) | Us/Ur Regime Code No. 0.9 Equivalent Friction u* (m/sec) | u* - ut* (m/sec) | Erosion Potential Function P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dec | 13 | 32 | 14.30 | 15.30 | 0.2 | 3.06 | 40 | 0.31 | 0.00 | 0.00 | 0.6 | 9.18 | 48 | 0.92 | 0.00 | 0.00 | 0.9 | 13.77 | 12 | 1.38 | 0.36 | 16.32 |
| 2010 | 14 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 15 | 12 | 5.36 | 5.74 | 0.2 | 1.15 | 40 | 0.11 | 0.00 | 0.00 | 0.6 | 3.44 | 48 | 0.34 | 0.00 | 0.00 | 0.9 | 5.16 | 12 | 0.52 | 0.00 | 0.00 |
| | 16 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 17 | 20 | 8.94 | 9.56 | 0.2 | 1.91 | 40 | 0.19 | 0.00 | 0.00 | 0.6 | 5.74 | 48 | 0.57 | 0.00 | 0.00 | 0.9 | 8.61 | 12 | 0.86 | 0.00 | 0.00 |
| | 18 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 19 | 10 | 4.47 | 4.78 | 0.2 | 0.96 | 40 | 0.10 | 0.00 | 0.00 | 0.6 | 2.87 | 48 | 0.29 | 0.00 | 0.00 | 0.9 | 4.30 | 12 | 0.43 | 0.00 | 0.00 |
| | 20 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 21 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |
| | 22 | 25 | 11.18 | 11.95 | 0.2 | 2.39 | 40 | 0.24 | 0.00 | 0.00 | 0.6 | 7.17 | 48 | 0.72 | 0.00 | 0.00 | 0.9 | 10.76 | 12 | 1.08 | 0.06 | 1.57 |
| | 23 | 13 | 5.81 | 6.22 | 0.2 | 1.24 | 40 | 0.12 | 0.00 | 0.00 | 0.6 | 3.73 | 48 | 0.37 | 0.00 | 0.00 | 0.9 | 5.59 | 12 | 0.56 | 0.00 | 0.00 |
| | 24 | 9 | 4.02 | 4.30 | 0.2 | 0.86 | 40 | 0.09 | 0.00 | 0.00 | 0.6 | 2.58 | 48 | 0.26 | 0.00 | 0.00 | 0.9 | 3.87 | 12 | 0.39 | 0.00 | 0.00 |
| | 25 | 15 | 6.71 | 7.17 | 0.2 | 1.43 | 40 | 0.14 | 0.00 | 0.00 | 0.6 | 4.30 | 48 | 0.43 | 0.00 | 0.00 | 0.9 | 6.45 | 12 | 0.65 | 0.00 | 0.00 |
| | 26 | 18 | 8.05 | 8.61 | 0.2 | 1.72 | 40 | 0.17 | 0.00 | 0.00 | 0.6 | 5.16 | 48 | 0.52 | 0.00 | 0.00 | 0.9 | 7.75 | 12 | 0.77 | 0.00 | 0.00 |
| | 27 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | 28 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | 29 | 16 | 7.15 | 7.65 | 0.2 | 1.53 | 40 | 0.15 | 0.00 | 0.00 | 0.6 | 4.59 | 48 | 0.46 | 0.00 | 0.00 | 0.9 | 6.88 | 12 | 0.69 | 0.00 | 0.00 |
| | 30 | 17 | 7.60 | 8.13 | 0.2 | 1.63 | 40 | 0.16 | 0.00 | 0.00 | 0.6 | 4.88 | 48 | 0.49 | 0.00 | 0.00 | 0.9 | 7.32 | 12 | 0.73 | 0.00 | 0.00 |
| | 31 | 25 | 11.18 | 11.95 | 0.2 | 2.39 | 40 | 0.24 | 0.00 | 0.00 | 0.6 | 7.17 | 48 | 0.72 | 0.00 | 0.00 | 0.9 | 10.76 | 12 | 1.08 | 0.06 | 1.57 |
| | | | | | | | | | Total P | 0.00 | | | | | Total P | 35.19 | | | | | Total P | 962.03 |

**INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT**
*We Protect Hoosiers and Our Environment.*
100 N. Senate Avenue • Indianapolis, IN 46204
(800) 451-6027 • (317) 232-8603 • www.idem.IN.gov

**Michael R. Pence**
*Governor*

**Thomas W. Easterly**
*Commissioner*

**SENT VIA U.S. MAIL: CONFIRMED DELIVERY AND SIGNATURE REQUESTED**

TO: Mack Sims
Duke Energy Indiana, Inc. – Cayuga Generating Station
1000 East Main Street
Plainfield, IN 46168

DATE: May 8, 2014

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

SUBJECT: Final Decision
Title V Operating Permit Renewal
165-33876-00001

Enclosed is the final decision and supporting materials for the air permit application referenced above. Please note that this packet contains the original, signed, permit documents.

The final decision is being sent to you because our records indicate that you are the contact person for this application. However, if you are not the appropriate person within your company to receive this document, please forward it to the correct person.

A copy of the final decision and supporting materials has also been sent via standard mail to:
Michael S Wertz, Manager
OAQ Permits Branch Interested Parties List

If you have technical questions regarding the enclosed documents, please contact the Office of Air Quality, Permits Branch at (317) 233-0178, or toll-free at 1-800-451-6027 (ext. 3-0178), and ask to speak to the permit reviewer who prepared the permit. If you think you have received this document in error, please contact Joanne Smiddie-Brush of my staff at 1-800-451-6027 (ext 3-0185), or via e-mail at jbrush@idem.IN.gov.

Final Applicant Cover letter.dot 6/13/2013

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**Michael R. Pence**
*Governor*

**Thomas W. Easterly**
*Commissioner*

May 8, 2014

TO: Newport – Vermillion County Public Library

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

Subject: **Important Information for Display Regarding a Final Determination**

**Applicant Name: Duke Energy Indiana, Inc., Cayuga Generating Station**
**Permit Number: 165-33876-00001**

You previously received information to make available to the public during the public comment period of a draft permit. Enclosed is a copy of the final decision and supporting materials for the same project. Please place the enclosed information along with the information you previously received. To ensure that your patrons have ample opportunity to review the enclosed permit, **we ask that you retain this document for at least 60 days.**

The applicant is responsible for placing a copy of the application in your library. If the permit application is not on file, or if you have any questions concerning this public review process, please contact Joanne Smiddie-Brush, OAQ Permits Administration Section at 1-800-451-6027, extension 3-0185.

Enclosures
Final Library.dot 6/13/2013

# Mail Code 61-53

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|---|---|---|---|---|
| IDEM Staff | VHAUN 5/8/2014<br>Duke Energy Indiana, Inc. - Cayuga Generating Station | | FINAL<br>165-33876-00001 | AFFIX STAMP HERE IF USED AS CERTIFICATE OF MAILING |
| Name and address of Sender | ▶ | Indiana Department of Environmental Management<br>Office of Air Quality – Permits Branch<br>100 N. Senate<br>Indianapolis, IN 46204 | Type of Mail:<br>**CERTIFICATE OF MAILING ONLY** | |

| Line | Article Number | Name, Address, Street and Post Office Address | Postage | Handing Charges | Act. Value (If Registered) | Insured Value | Due Send if COD | R.R. Fee | S.D. Fee | S.H. Fee | Rest. Del. Fee<br>Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | Mack Sims Duke Energy Indiana, Inc. - Cayuga Generating Stat 1000 East Main Street Plainfield IN 46168 (Source CAATS) CONFIRMED DELIVERY | | | | | | | | | |
| 2 | | Michael S Wertz Manager of Cayuga Generating Station Duke Energy Indiana, Inc. - Cayuga Generating Stat c/o Mack Sims, 1000 E Main St Plainfield IN 46168 *(RO CAATS)* | | | | | | | | | |
| 3 | | Cayuga Town Council PO Box 33 Cayuga IN 47928 *(Local Official)* | | | | | | | | | |
| 4 | | Vermillion County Health Department 257 Walnut Street Clinton IN 47842-2342 *(Health Department)* | | | | | | | | | |
| 5 | | Newport Vermillion County Library P.O.Box 100, 385 E. Market St Newport IN 47966-0100 *(Library)* | | | | | | | | | |
| 6 | | Vermillion County Commissioners P.O. Box 190 Newport IN 47966 *(Local Official)* | | | | | | | | | |
| 7 | | J.P. Roehm PO Box 303 Clinton IN 47842 *(Affected Party)* | | | | | | | | | |
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