



# INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

*We Protect Hoosiers and Our Environment.*

*Mitchell E. Daniels Jr.*  
Governor

*Thomas W. Easterly*  
Commissioner

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

Patrick Coughlin  
Duke Energy, Inc. - Cayuga Generating Station  
1000 E. Main St.  
Plainfield, IN 46168

December 19, 2011

Re: Approval for a Temporary Operation No.  
E 165-31235-00001 to Part 70 operating  
No. T 165-27260-00001

Dear Mr. Coughlin:

On November 21, 2011, Duke Energy, Inc. - Cayuga Generating Station submitted a letter informing the Office of Air Quality (OAQ) of their intention to conduct a temporary operation.

Duke Energy, Inc. - Cayuga Generating Station plans to evaluate combusting refined coal in their boilers. The refined coal includes two additives designed to reduce emissions of Hg and NO<sub>x</sub>. In order to accommodate this temporary operation, a Cement Kiln Dust handling system (receiving silo, active silo and feed conveyor with three transfer points) and a calcium bromide handling system consisting of an 11,000 gallon tank and a spray system have been constructed.

The uncontrolled emissions from this temporary operation are less than the PSD significant levels of 25 tons per year for PM, 15 tons per year for PM<sub>10</sub>, 10 tons per year for PM<sub>2.5</sub>, 100 tons per year for CO, and 40 tons per year, each, for NO<sub>x</sub> and SO<sub>2</sub>.

### Temporary Operations General Information

Units	Two (2) pulverized coal boilers and ancillary equipment
Location of the Operation:	3300 North State Road 63, Cayuga, IN 47928
County:	Vermillion
County Status:	Attainment for all criteria pollutants
Starting Date of the Operation:	November 10, 2011
Duration of the Operation:	Less than 30 days of total operating time
Activity:	Research and Development

### Applicable Requirements

Pursuant to 326 IAC 2-1.1-3(h) (Exemption for Temporary Operations), the above mentioned temporary operations shall satisfy the following requirements:

1. The potential emissions from the operation are less than 25 tons per year for the duration of the operation. [326 IAC 2-1.1-3(h)(3)(A)]
2. The operation is not a major source or modification as defined under 326 IAC 2-2, or 326 IAC 2-7. [326 IAC 2-1.1-3(h)(3)(B)]
3. The purpose of the temporary operation is to:



- (a) temporarily conduct an operation not considered as part of the normal operation or production of the facility or source. [326 IAC 2-1.1-3(h)(3)(C)(ii)]
4. The duration of the temporary operations is less than 30 days of total operating time. [326 IAC 2-1.1-3(h)(3)(D)]
5. The Permittee shall submit a report containing the following information, at most seven (7) days after the conclusion of the temporary operations: [326 IAC 2-1.1-3(h)(3)(G)]
  - (a) The actual dates of the construction and operation.
  - (b) The duration of the operation.
  - (c) The actual emissions occurring during the operation.
6. The report shall be submitted to:  
Indiana Department of Environmental Management  
Office of Air Quality, Permits Branch  
100 North Senate Avenue  
MC 61-53 IGCN 1003  
Indianapolis, Indiana 46204-2251

Expiration Date

The approval for the Temporary Operations expires after 30 days of total operating time.

IDEM Contact

If you have any questions regarding this approval, please contact Heath Hartley of my staff at the Indiana Department Environmental Management, Office of Air Quality, 100 North Senate Avenue, MC 61-53 IGCN 1003, Indianapolis, Indiana 46204-2251 or by telephone at (317) 232-8217 or toll free at 1-800-451-6027 extension 2-8217.

Sincerely,



Matt Stuckey, Branch Chief  
Permits Branch  
Office of Air Quality

Enclosure: Temporary Operations Report

cc: File - Vermillion County  
Vermillion County Health Department  
Compliance and Enforcement Branch

Mr. Barry Pulskamp  
Duke Energy, Inc. - Cayuga Generating Station  
1000 E. Main St.  
Plainfield, IN 46168

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

**Temporary operations Report**

Source Name: Duke Energy, Inc. - Cayuga Generating Station Schahfer  
Source Location: 3300 North State Road 63, Cayuga, IN 47928  
County Location: Vermillion  
Experimental Operation: 165-31235-00001

Temporary Operation	
Type of unit/operation:	
Actual starting date of the construction:	
Actual ending date of the construction:	
Actual starting date of the operation:	
Actual ending date of the operation:	
Actual number of days of the operation:	
Calculated emissions during the duration of the operation:	
Additional Comments:	

<p>I certify under penalty of law that this report was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.</p>
Signature:
Printed Name:
Title/Position:
Date:

Cayuga Generating Station

165-31235-00001

Heath Hartley

Total Estimated Emissions During the 30 Day Experimental Trial

Uncontrolled PTE (ton/yr)			
Emissions Unit	PM	PM10	PM2.5
Receiving Silo	1.22	0.43	0.43
Active Silo	1.22	0.43	0.43
Conveyor Transfer Po	0.12	0.06	0.01
Road Hauling	0.02	0.00	0.00
<b>Total</b>	<b>2.58</b>	<b>0.92</b>	<b>0.86</b>

Controlled PTE (ton/yr)			
Emissions Unit	PM	PM10	PM2.5
Receiving Silo	0.30	0.30	0.30
Active Silo	0.18	0.18	0.18
Conveyor Transfe	0.06	0.03	0.00
Road Hauling	0.01	0.00	0.00

Estimated Maxium Coal Usage During 30-Day Experimental Trail

Est Heat Input for Boiler #1	4,802 MMBtu/hr
Est Heat Content	11140 Btu/lb
Est Max Firing Rate	216 tons/hr
Est Max Coal Usage	155,181 Tons

Estimated MER-SORB Usage During 30 Day Experimental Trial

MER-SORB Specific Density	14.16 lbs/gal
Application Rate MER-SORB	0.15% (3 lbs/ton of coal)
Max Usage MER-SORB	0.65 tons/hr
Max Usage MER-SORB	232.77 tons
Max Usage MER-SORB	91.3 gal/hr
Max Usage MER-SORB	32875.07843 gal

Estimated S-SORB Usage During 30 Day Experimental Trial

Normal S-SORB App Rate	10 lbs/ton (0.5% coal by weight)
Max Usage S-SORB	1.08 tons/hr
Max Usage S-SORB	775.91 tons

Emissions form Receiving Silo Vent

S-SORB volume per truck load	25 tons/truck		
Loading Time Minimum	30 min/truck	Loading Time Maximum	45 min/truck
Maximum Loading Rate	50 tons/hr, assumes two trucks can be unloading in one hour.		
Normal Loading Rate	33 tons/hr, assumes it takes 45 minutes to unload on truck.		
Operating Hours	23 hr, maximum operating hours based on 45 min/truck, 25 tons/truck and 775 tons of S-SORB.		
Process Weight Limit	56 Based maximum throughput of 50 tons/hr the Process weight rate limit is calculated using the following equation E = 4.10		
Design Emissions Rate	0.01 gr/dscf		
Max Flow Rate During Loading	800 cfm, fan capacity		

Pollutant	Emissoins Factor (lbs/ton) <sup>(a)</sup>	Uncontrolled PTE (ton/yr)	Controlled Potential to Emit (ton/yr)	Process Weight Rate Limit (lbs/hr)
PM	3.14	1.22	0.30	56
PM10	1.1	0.43	0.30	
PM2.5	<sup>(b)</sup>	0.43	0.30	

(a) PM and PM10 emissions factors were obtained from AP-42 section 11.12 for pneumatic conveying of cement supplement material to an elevated silo.

(b) No emissions factor for PM2.5, assume PM2.5 is equivalent to PM10

**Appendix A - Emissions Calculations**

**Cayuga Generating Station**

**165-31235-00001**

**Heath Hartley**

**Emissions from Active Silo Vent**

Maximum transfer rate 25 tons/hr  
 Process Weight Limit 38 Process Weight Rate PM Limit based  $E = 55.0 P^{0.11} - 40$   
 Design Emissions Rate 0.01 gr/dscf  
 Operating Hours 720.00 hr , assumed continuous hours of operation for 30 days.  
 Max Flow Rate During Loading 470.00 cfm, fan capacity  
 Actual Emissions Rate 0.04 lbs/hr based on 0.01 gr/scf and flow rate of 470 scfm.

Pollutant	Emissions Factor (lbs/ton) <sup>(a)</sup>	Uncontrolled Potential to Emit (ton/yr)	Controlled Potential to Emit (ton/yr)	Process Weight Rate Limit (lbs/hr)
PM	3.14	1.22	0.18	38
PM10	1.1	0.43	0.18	
PM2.5	<sup>(b)</sup>	0.43	0.18	

(a) PM and PM10 emissions factors were obtained from AP-42 section 11.12 for pneumatic conveying of cement supplement material to an elevated silo.

(b) No emissions factor for PM2.5, assume PM2.5 is equivalent to PM10

**Fugitive Emissions From Transfer of Material to Conveyors**

Maximum Application rate of S-SORB 775.91 tons  
 Potential emissions from transfer of the S-Sorb material from the storage silo to the delivery conveyor and coal conveyor are based on AP-42 Emission Factors from Chapter 13.2.4 for Aggregate Handling and Storage Piles (refer to emission factor equation below).

$E \text{ (lb/ton)} = k \times (0.0032) \times [(U/5)^{1.3} / (M/2)^{1.4}]$  where:

- E = PM emission factor (lb/ton)
- k = particle size multiplier (dimensionless):
- U = mean wind speed (mph)
- M = material moisture content (%)

Pollutant	Particle Size Multiplier	Mean Wind Speed	Material Moisture Content	Control Efficiency from Enclosure	Emissions Factor (lbs/ton)	# of Transfer Point	Uncontrolled Potential to Emit (ton/yr)	Controlled Potential to Emit (ton/yr)
PM	0.74	10	25.00%	50.00%	0.0536	3	0.12	0.06
PM10	0.35	10	25.00%	50.00%	0.0253	3	0.06	0.03
PM2.5	0.053	10	25.00%	50.00%	0.0038	3	0.01	0.00

Cayuga Generating Station

165-31235-00001

Heath Hartley

Section 5 - Fugitive Emissions From Vehicle Traffic

S-SORB Usage	775.91 tons	Number of M-SORB Truck Deliveries	9 trucks
MER-SORB Usage	232.77 tons/hr	Total number of Trucks	40 trucks
Amount Delivered per truck	25 tons/truck	Estimated Truck Weight Loaded	39.025 tons
Number of S-SORB Truck Deliveries	31 trucks	Tare weight	25 tons
		Truck Weight Unloaded	14.025 tons

Pollutant	Mean Vehicle Weight (W)	Vehicle Traffic <sup>(1)</sup>			Emission Factor	Uncontrolled ton/yr	Controlled ton/yr
		miles	Trucks Trips	Miles/Truck			
PM	26.53	40	40	1.00	1.18	0.02	0.01
PM10					0.24	0.00	0.00
PM2.5					0.06	0.00	0.00

Constants for Use in Emission Factor Calculation

sL, Silt content of Road <sup>(3)</sup>	4.8
k, Particle Size Multiplier (k) dimensionless (for PM 2.5)	0.00054
k, Particle Size Multiplier (k) dimensionless (for PM10)	0.0022
k, Particle Size Multiplier (k) dimensionless (for PM30)	0.011
P, Number of "wet" days with at least 0.01 in of precip <sup>(4)</sup>	130
N, Number of days during averaging period	365
Control Efficiency from watering roads <sup>(5)</sup>	0.50

$E$  (total emissions) =  $e \cdot VMT \cdot R$

VMT = Vehicle Miles Traveled (# of vehicles \* miles traveled)

Where:

$e$  = emission factor in lbs/VMT       $E_{ext} = [k (sL)^{0.91} \times (W)^{1.02}] \times (1 - P/4N)$

Pollutant	Emission Factor <sup>(2)</sup>
PM	1.18 lbs/VMT
PM10	0.24 lbs/VMT
PM2.5	0.06 lbs/VMT

(1) Vehicle traffic based on hauling an additional 775 tons of S-SORB, 237 tons of MER-SORB and truck capacity of 25 tons/truck.

(2) Emission factor calculation based on AP-42, Chapter 13.2.1.

(3) Surface moisture content and silt content of coal obtained from Table 13.2.1-4

(4) Days with at least 0.01 inches of precipitation extrapolated from Figure 13.2.2-1 in AP-42, Chapter 13.2.2, December 2003.

(5) Control efficiency due to use of watering trucks.



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## SENT VIA U.S. MAIL: CONFIRMED DELIVERY AND SIGNATURE REQUESTED

TO: Patrick Coughlin  
Duke Energy  
1000 E Main St  
Plainfield, IN 46168

DATE: December 19, 2011

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

SUBJECT: Final Decision  
Temporary Operations  
165-31235-00001

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:  
Barry E Pulskamp, Sr VP

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](mailto:jbrush@idem.IN.gov).

Final Applicant Cover letter.dot 11/30/07

# Mail Code 61-53

IDEM Staff	DPABST 12/19/2011 Duke Energy Indiana, Inc. - Cayuga Generating Station 165-31235-00001(Final)		AFFIX STAMP HERE IF USED AS CERTIFICATE OF MAILING
Name and address of Sender	 Indiana Department of Environmental Management Office of Air Quality – Permits Branch 100 N. Senate Indianapolis, IN 46204	Type of Mail:  <b>CERTIFICATE OF MAILING ONLY</b>	

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2		Barry E Pulskamp Sr VP - Regulated Fleet Ops Duke Energy Indiana, Inc. - Cayuga Generating Stat c/o P Coughlin, 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		Vermillion County Commissioners P.O. Box 190 Newport IN 47966 (Local Official)									
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