

**Appendix 10 - IDEM Responses to US Forest Service Comments**

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## **IDEM Responses to US Forest Service Comments**

Our interest in the Indiana Regional Haze SIP is due to the fact that sources in your State cause or contribute to visibility impairment in many of our Class I Wilderness areas including the Boundary Waters Canoe Area Wilderness in Minnesota, Hercules Glades Wilderness Area in Missouri, Sipsey Wilderness Area in Alabama, Caney Creek Wilderness Area and Upper Buffalo Wilderness Area in Arkansas, Great Gulf Wilderness Area in New Hampshire, Lye Brook Wilderness Area in Vermont, James River Face Wilderness Area in Virginia, and Dolly Sods and Otter Creek Wilderness Areas in West Virginia.

### **BART analyses**

#### **Comment:**

##### **RPO coordination**

On page 35 the quote “The Uniform Rate is achieved and exceeded at all MANE-VU Class I sites” from “Recent MANE-VU Projections of Visibility for 2018.” Do these projections include the latest predictions in emissions from Indiana sources? It appears that with some sources modeling out of being subject-to-BART the 2018 emissions from Indiana may be greater than what was predicted by MANE-VU in 2008. The possibility that the RPOs assumed greater emission reductions in their Class I area analysis (Section 7.0) are highlighted on page 69 (Section 9.2) – “The analyses show no reductions from Indiana sources, **beyond the BART rule**, are necessary to meet the reasonable progress goals of the areas analyzed at this time.” (emphasis added). It is not clear what reductions from Indiana other States considered part of the BART rule and how these could differ from the reductions proposed in this Regional Haze SIP.

#### **IDEM Response:**

IDEM has added the megawatt capacities for the Indiana coal fired units listed in Table 10 to demonstrate the size of these units. This table highlights the BART-eligible units and notes which units were included in the MANEVU “ask” list, described in Section 7.9. IDEM has added a more detailed description of the data presented in Table 10 and an explanation of the assumptions made for each column in the table. A discussion of the implications of the various modeling scenarios and the best current information available regarding Indiana electric generating units controls and the legal enforceability of these controls has been added. In addition, two tables in Appendix 10a show a comparison between IDEM's projected controls and EPA and LADCO's modeling scenarios for SO<sub>2</sub> and NO<sub>x</sub> controls.

#### **Cumulative Haze impacts**

On page 49 – Table 15 - it appears that when considered cumulatively (the sum of modeled days over the 0.5 dv threshold for all the Class I areas modeled – 15 (Seney) + 6 (Mammoth Cave) + 4 (Mingo) + 4 (Isle Royale) = 29 days) Burns Harbor would still be subject to BART. As the facility impacts haze at so many Class I areas we feel Indiana should address the cumulative impact of the facility and consider ArcelorMittal Burns Harbor subject to BART.

#### **IDEM Response:**

IDEM appreciates the USFS's comment and position on this issue. However, a consistence approach is preferred. Representatives from EPA Region 5, the EPA Headquarters and the states of Ohio, Michigan, Wisconsin and Minnesota favor the approach of summing up days for each

individual Class 1 area instead of counting all modeled receptors at all the Class 1 areas modeled. A summary of responses from these respondents on the question of using cumulative or individual Class 1 area days above the BART threshold for BART determinations is attached in Appendix 10b.

**Comment:**

**Please adjust permitted emissions to the highest actual emissions when there is a significant difference for facilities not subject to BART.**

Page 53 – Table 18 is an example of our concern when revised modeling results in facilities no longer being considered subject to BART done by the three facilities (Burns Harbor, ESSROC and SABIC) in Indiana. When the “highest actual” emission rates are significantly lower than the “potential” emission rates and the lower rates are used as justification to avoid subject to BART designation, the lower rates need to be incorporated into a federally enforceable permit condition. The NO<sub>x</sub> emissions for the highest emitting day and potential emissions in Table 18 are similar but the SO<sub>2</sub> differences are significant. Reduction in permitted, potential emissions to the actual highest emissions would ensure that the facility’s (ESSROC) emissions remain consistent with the “not subject to BART” determination. Most importantly, it will ensure that the facility has a minimal impact on regional haze in Class I areas.

**IDEM Response:**

IDEM appreciates the USFS's comment and position on this issue. However, average 24-hour actual emission rates from the highest emitting day are permitted according to the BART Rule and have been accepted by U.S. EPA and IDEM for use in the CALPUFF model.

**Comment:**

**SABIC**

We recommend that IDEM accepts the permit modification from SABIC to remove the oil burning provision from Part 70 Operating Permit. This will ensure long-term visibility improvements from this current status at the plant.

**IDEM Response:**

IDEM has accepted the permit modification request from SABIC to remove the oil burning provisions from its Part 70 Operating Permit. The all references to fuel oil were removed from the emission unit description of the boiler, identified as BW-Boiler with ID No. 09-0001, on 08/2008 through Minor Source/Significant Permit Modification Nos. 129-26621-00002/129-26650-00002.

**Alcoa**

**Comment:**

Emission reductions from Boiler 1, a not-subject-to-BART unit, could be achieved through Reasonable Progress as part of the Regional Haze Rule, and as such are not necessarily better than what would be achieved under the rule.

**IDEM Response:**

IDEM's approach to BART reductions has been to follow guidance from various parts of the regional haze program. In the 1999 Regional Haze Regulations, Subpart P – Protection of Visibility, it states that reductions must be surplus to required emission reductions up to the baseline date. The established baseline date is 2002. The year 2002 has been used by various states, RPOs, and the EPA regional haze modeling guidance. It is also specified by the Lydia Wegman November 18, 2002 memo, "2002 Base Year Emission Inventory SIP Planning: 8-hr Ozone, PM<sub>2.5</sub> and Regional Haze Programs."

The BART Rule, 70 FR 128, 39143, states that "(2) The EPA does not believe that anything in the CAA or relevant case law prohibits a State from considering emissions reductions required to meet other CAA requirements when determining whether source by source BART controls are necessary to make reasonable progress." and "(3)...in lieu of BART programs be based on emissions reductions 'surplus to reductions resulting from measures adopted to meet requirements as of the baseline date of the SIP.' The baseline date for regional haze SIPs is 2002..." This is extracted from a discussion justifying the use of CAIR, a program used for other purposes, to substitute for BART. Therefore, it is our belief that emission reductions from Boiler 1 as part of the BART alternative proposed by Alcoa is acceptable under the rule.

**Comment:**

There is no apparent reason why the SO<sub>2</sub> controls on Boilers 2 and 3 cannot achieve 92 percent or greater efficiency with wet FGD. Please explain and justify the need to operate this control equipment at 90 percent. Include this as part of the five-factor analysis.

**IDEM Response:**

Alcoa used the 92% reduction level for the BART control analysis for Boilers 2 and 3. The alternative to BART proposal was to control Boiler 1 at 91% and Boiler 2 and 3 at 90%, which still results in an overall improvement in visibility degradation. The actual modifications performed to the boilers were not extensive enough to trigger the 92% removal efficiency level requirements, as required in the re-construction criteria set forth in the NSPS for industrial boilers.

**Comment:**

The need to allow for increased sulfur content in coke above 3 percent has not been seen in previous BART determinations. Additional information about the need to use higher sulfur coke is needed. An analysis including cost comparisons and dollar per deciview comparisons between the proposed and alternative BART are needed as part of the five-factor analysis for the BART determination.

**IDEM Response:**

Sulfates are the main contributors, at approximately 0.188 dv. Contributions due to other species are less than 0.01 dv. Therefore, any add-on controls for these pollutants will result in insignificant improvements in visibility. Due to insignificant impact from vents (0.013 dv), Alcoa did not perform the 5-step analysis for these sources. Further, these sources are subject to 40 CFR 63, Subpart LL, Maximum Achievable Control Technology (MACT). In order to comply with these standards, Alcoa follows work practices which minimize emissions escaping roof vents.

Sulfur dioxide from potlines can be controlled by lowering sulfur content in the anode grade coke and/or by installing wet scrubbers. Alcoa presently limits sulfur at  $\leq 2\%$ . From a market study, Alcoa has concluded that a supply of coke below 3% sulfur cannot be ensured beyond 2013, the year when the BART controls will be needed. Therefore it proposes  $\leq 3\%$  sulfur coke as BART and  $\leq 3.5\%$  sulfur coke as alternative BART. The 3.5% sulfur limit in the coke translates into 2.919% sulfur in the baked anode composite, the practice Alcoa follows to measure the sulfur content.

The installed and annual costs of wet scrubbers on potlines are estimated at \$300 million and \$55 million respectively. Modeling shows that SO<sub>2</sub> scrubbers on potlines can improve visibility by 0.138 dv. This improvement will be achieved at a cost/benefit ratio equal to \$398 million/dv. Also, there are severe space and access limitations at the facility that would complicate the installation.

**Comment:**

A five factor analysis is needed for the Alcoa facility to accurately determine if SNCR or SCR technology for NO<sub>x</sub> control is feasible. Stating the costs and the assumption that these controls would not be cost effective without information, or data, to support the statement does not meet the needs, or intent, of a five factor analysis. Similar analysis is needed for PM controls on Boilers 2-4.

**IDEM Response:**

The NO<sub>x</sub> controls are significantly tighter than NSPS limits (0.38 lb/MMBtu vs. 0.70 lb/MMBtu), which are the “required” controls referenced. In regard to PM, Alcoa provided information regarding the cost of adding a baghouse on each unit, at IDEM’s request.

Alcoa evaluated fabric filtration for Boiler 4 , the installation cost on a \$ / dv basis was shown to be unreasonable. PM emissions from Boiler 4 would be higher than the BART level of control of 0.015 lb./mm Btu, which is the NSPS for a new utility boiler. However, the alternative to BART emission reductions provided by Boiler #1 offsets the PM emissions that would exceed the BART alone level from Boiler 4, and would therefore meet the regional haze rule requirements.

Impact of Adding Baghouses for Units 2, 3, and 4

Based on information provided by another utility where baghouse control was installed, the capital cost for a baghouse on a 2830 mm Btu/hr. boiler was \$49.7 mm. Assuming baghouse capital costs are proportional to heat input, the capital cost for the baseline heat inputs for the BART eligible boilers is estimated to be:

Boiler 2: 1364.41 mm Btu/hr. Estimated baghouse capital cost would be

$$(1364.41/2830) \times \$49.7 \text{ mm} = \$23.96 \text{ mm}$$

Boiler 3: 1323.51 mm Btu/hr. Estimated baghouse capital cost would be

$$(1323.51/2830) \times \$49.7 \text{ mm} = \$23.24 \text{ mm}$$

Boiler 4: 2845.79 mm Btu/hr. Estimated baghouse capital cost would be

$(2845.79/2830) \times \$49.7 \text{ mm} = \$49.98 \text{ mm}$

Airflow for boiler 2: 347,149 scfm

Airflow for boiler 3: 335,372 scfm

Airflow for boiler 4: 796,416 scfm

Assuming the lowest emission rate a baghouse vendor will guarantee is 0.005 grains /scf, filterable PM emissions would be:

Boiler 2:  $(0.005 \text{ grains/scf}) \times (347,149 \text{ scf/min}) \times (60 \text{ min. /hr.}) \times (1 \text{ lb. /7000 grains}) = 14.88 \text{ lbs./hr.}$

Boiler 3:  $(0.005 \text{ grains/scf}) \times (335,149 \text{ scf/min}) \times (60 \text{ min. /hr.}) \times (1 \text{ lb. /7000 grains}) = 14.36 \text{ lbs./hr.}$

Boiler 4:  $(0.005 \text{ grains/scf}) \times (796,416 \text{ scf/min}) \times (60 \text{ min. /hr.}) \times (1 \text{ lb. /7000 grains}) = 34.13 \text{ lbs./hr.}$

On an annualized basis, the filterable PM emissions would be 128.07 tons from boilers 2 and 3 combined, and 149.49 tons/yr. from boiler 4.

Because the baghouses will be upstream of wet scrubbers, the assumed baghouse vendor guarantee emissions is conservative because it does not take into account the added filterable PM from the scrubbers.

BART for filterable PM for all 3 boilers was electrostatic precipitators and SO<sub>2</sub> scrubbers.

BART was proposed at 0.03 lb./mm Btu for boilers 1 and 2, and 0.015 lb./mm Btu for boiler #4.

BART annual filterable PM emissions would thus be:

Boiler 2:  $(0.03 \text{ lb./mm Btu}) \times (1364.41 \text{ mm Btu/hr.}) \times (8760 \text{ hrs/yr.}) \times (1 \text{ ton/2000 lbs.}) = 179.28 \text{ tons/yr.}$

Boiler 3:  $(0.03 \text{ lb./mm Btu}) \times (1323.51 \text{ mm Btu/hr.}) \times (8760 \text{ hrs/yr.}) \times (1 \text{ ton/2000 lbs.}) = 173.91 \text{ tons/yr.}$

Boiler 4:  $(0.015 \text{ lb./mm Btu}) \times (2845.79 \text{ mm Btu/hr.}) \times (8760 \text{ hrs/yr.}) \times (1 \text{ ton/2000 lbs.}) = 186.97 \text{ tons/yr.}$

Detailed engineering would have to take into consideration the available real estate for installation of baghouses, removal of the precipitators or routing the exhaust gases in series through the precipitators, baghouses then downstream pollution removal equipment, present boiler and pollution control equipment configurations, ash handling from the ash removed by the baghouses, etc. Those factors would increase the capital cost assumptions used above.

For the \$/ton and \$/dv improvement derived below, and the present prevailing economic conditions, Alcoa Power Generating Inc. – Warrick Power Plant does not understand the usefulness of performance of such a study.

Assuming an annualized cost of 11% of the assumed capital costs, the annualized cost on a \$/ton difference between the alternative to BART proposal and baghouses would be:

Boilers 2 and 3: 11% of \$47.2 mm = \$5,192,000 / yr.

BART emissions: 353.19 tons/yr.

Baghouse: 128.07 tons/yr.

Baghouse additional removal: (353.19 – 128.07) tons/yr. = 225.12 tons/yr.

\$ / ton impact: \$5,192,000 / 225.12 tons/yr. = \$23,063.26 / ton

Boiler 4: 11% of \$49.98 mm = \$5,497,800 / yr.

BART emissions: 186.97 tons/yr.

Baghouse: 149.49 tons/yr.

Baghouse additional removal: (186.97 – 149.49) tons/yr. = 37.48 tons/yr.

\$ / ton impact: \$5,497,800 / 37.48 tons/yr. = \$146,686.23 / ton

Baseline visibility impact, filterable PM, boilers 2 and 3: 0.027 dv, based on 2003 (See revised table 5-2 in the BART determination report).

The assumed baghouse outlet emissions would result in a filterable PM reduction of:

Baseline: 635.02 lbs/hr.

Baghouse: 63.37 lbs./hr.

Reduction: [(635.02 – 63.37)/635.02] X 100 = 90.02%

A reduction of 90.02% in the visibility impact would represent a dv impact reduction of:

0.027 dv X (90.02/100) = 0.024 dv

The annualized cost for baghouses on a \$/dv basis would thus be:

\$(5,192,000 + 5,497,800) / 0.024 dv = \$445 mm / dv

The above 11% of capital assumption does not consider such operating costs as increased pressure drop represented by the baghouse, possible de-rating of the boiler, and the baghouse being upstream of a wet scrubber. The above cost estimates are thus low, but still show that the extra cost represented by baghouses is unreasonable both from a \$/ton and \$/dv basis.

## **Long-term Strategy**

### **Comment:**

Necessary smoke management regulations and techniques for prescribed burning on National Forest land appear to be covered in IC 13-17-9 and 326 IAC 4-1 and the associated information in Appendix 6. However, it may be beneficial to formalize these regulations in an Indiana Smoke Management Plan/Program per EPA's Interim Air Quality Policy on Wildland and Prescribed Fires (April 23, 1998). The Forest Service will work with the State to help develop this SMP in the future.

We request that Indiana provide language in your SIP linking the Regional Haze and New Source Review programs, including continued FLM coordination for these programs. Currently, there is no mechanism in the SIP to ensure that the emissions from new stationary sources or major modifications of existing sources will make reasonable progress toward the national visibility goal (40 CFR 51.307). This could be especially important for emissions from new sources that were not anticipated in 2018 emission inventories. Please describe how new and expanded sources of air emissions will be reviewed to ensure they don't jeopardize reasonable progress goals set by Class I Areas owner states.

### **IDEM Response:**

Please see the IDEM Response to National Parks Service Comments in Appendix A for IDEM's response regarding the Long Term Strategy comment related to linking the Regional Haze and New Source Review programs in the SIP and the mechanism in the SIP to ensure that the emissions from new stationary sources or major modifications of existing sources will make reasonable progress toward the national visibility goal (40 CFR 51.307).

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**Appendix 10 - IDEM Responses to US Forest Service Comments Cover Letter**

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**File Code:** 2580

**Date:** December 22, 2010

Ken Ritter  
Air Programs Branch  
IDEM Office of Air Quality  
100 North Senate Avenue  
Indianapolis, IN 46204-2251

Dear Mr. Ritter,

On November 6, 2010 the State of Indiana submitted a draft State Implementation Plan (SIP) describing your proposal to improve regional haze impacts at mandatory Class I areas across your region. We appreciate the opportunity to work closely with your State through the initial evaluation, development, and now, subsequent review of this plan. Cooperative efforts such as these ensure that, together, we will continue to make progress toward the Clean Air Act's goal of natural visibility conditions at our Class I Wilderness areas.

The Forest Service provided informal comments on IDEM's BART analyses to Mark Derf on September 22, 2009 to which IDEM provided responses on February 9, 2010. We will not reiterate those comments again in this letter. This letter acknowledges that the U.S. Forest Service has received and conducted a substantive review of your proposed Regional Haze SIP including the Best Available Retrofit Technology (BART) designations. Please note that only the U.S. Environmental Protection Agency (EPA) can make a final determination about the document's completeness, and therefore, only the EPA has the ability to approve the document. The Forest Service's participation in Indiana's administrative process does not waive any legal defenses or sovereignty rights it may have under the laws of the United States, including the Clean Air Act and its implementing regulations.

I have attached comments to this letter from the perspective of a Federal Land Manager. I look forward to your response required by 40 CFR 51.308(i)(3). For further information, please contact air resources management specialist Edward Huffman ([elhuffman@fs.fed.us](mailto:elhuffman@fs.fed.us), (304) 636-1800 ext. 192).

Again, we appreciate the opportunity to work closely with the State of Indiana. The Forest Service compliments you on your hard work and dedication to significant improvement in our nation's air quality values and visibility.

Sincerely,

*/s/ Debra J. Tenney (for):*  
CLYDE N. THOMPSON  
Forest Supervisor

cc: John Summerhays - R5 E



## US Forest Service comments on the Indiana Regional Haze SIP (December 2010)

Our interest in the Indiana Regional Haze SIP is due to the fact that sources in your State cause or contribute to visibility impairment in many of our Class I Wilderness areas including the Boundary Waters Canoe Area Wilderness in Minnesota, Hercules Glades Wilderness Area in Missouri, Sipsey Wilderness Area in Alabama, Caney Creek Wilderness Area and Upper Buffalo Wilderness Area in Arkansas, Great Gulf Wilderness Area in New Hampshire, Lye Brook Wilderness Area in Vermont, James River Face Wilderness Area in Virginia, and Dolly Sods and Otter Creek Wilderness Areas in West Virginia.

### BART analyses

#### **RPO coordination**

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#### **Cumulative Haze impacts**

On page 49 – Table 15 - it appears that when considered cumulatively (the sum of modeled days over the 0.5 dv threshold for all the Class I areas modeled – 15 (Seney) + 6 (Mammoth Cave) + 4 (Mingo) + 4 (Isle Royale) = 29 days) Burns Harbor would still be subject to BART. As the facility impacts haze at so many Class I areas we feel Indiana should address the cumulative impact of the facility and consider ArcelorMittal Burns Harbor subject to BART

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**SABIC**

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**Long-term Strategy**

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