



ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

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**COVER SHEET FOR TELEFAX DOCUMENTS**

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From: Brad Frost, Air Permit Section

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## United States Department of the Interior

OFFICE OF THE SECRETARY  
Washington, DC 20240

MAY 14 2004

David J. Kolaz  
Chief, Bureau of Air  
Illinois Environmental Protection Agency  
1021 North Grand Avenue East  
P.O. Box 19276  
Springfield, IL 62794-9276

Dear Mr. Kolaz:

The State of Illinois has provided the U.S. Fish and Wildlife Service (FWS) with a draft permit for construction and operation of a proposed 1,500 megawatt power plant in Washington County, Illinois. The permit applicant is the Prairie State Generating Company, LLC (Prairie State). The draft permit, along with additional relevant data and information, were submitted to FWS as specified by the Clean Air Act's "Prevention of Significant Deterioration" pre-construction requirements – which charge Federal officials with responsibility for designated "Class I" air quality areas to consider – in consultation with permitting agencies – whether a proposed major pollution emitting facility will have an adverse impact on air quality related values in such areas.

The Mingo Wilderness area is a designated Class I area located 140 kilometers southwest of the proposed project. Prairie State submitted modeling data on the impacts of the proposed plant on air quality at the Mingo Wilderness as part of the permit application. On March 19, 2004, FWS submitted a written comment to the Illinois Environmental Protection Agency (IEPA) stating that it was concerned that "construction of the proposed facility as described will cause an adverse impact to the Mingo Wilderness area." On April 6, 2004, representatives of the FWS participated in a teleconference with representatives of IEPA and Prairie State to discuss options to reduce potential air quality impacts at the Mingo Wilderness. At that time, representatives of IEPA stated that "they were not in a position to guarantee" any reductions or offsets beyond those already identified in the draft permit and project summary.

FWS has considered the data and information received thus far, and has concluded – pursuant to section 165(d)(2)(C)(ii) of the Clean Air Act – that emissions from the proposed Prairie State facility will have an adverse impact on air quality related values at the Mingo Wilderness. We are enclosing some information in support of our adverse impact conclusion with this letter. We are also enclosing some additional technical review comments from the FWS Air Quality Branch for your consideration.

Consistent with Secretary Norton's "Four C's" approach to conservation through communication, consultation, and cooperation, we hope to continue to work with you and your staff to resolve our concerns about the air quality impacts of the Prairie State project at the Mingo Wilderness, so we can fulfill our mutual obligations under the Clean Air Act to protect air quality in the special natural areas set aside for the enjoyment of future generations. Please do not hesitate to contact Sandra Silva, of the FWS Air Quality Branch at (303) 969-2814 for further discussions.

Sincerely,



~~Acting~~ Assistant Secretary  
Fish and Wildlife and Parks

Enclosure

cc:

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**Supporting Information for the Department of the Interior  
Adverse Impact Conclusion on Air Quality Related Values in  
The Mingo Wilderness Area from Proposed Emissions by  
The Prairie State Generating Station (PSGS)  
Marissa, Illinois**

**Synopsis**

- the Mingo Wilderness Area Class I area has existing visibility impairment and poor air quality
- the proposed PSGS facility is predicted to cause additional visibility impairment in Mingo
- the proposed PSGS facility is predicted to cause additional atmospheric deposition in Mingo
- PSGS's predicted impacts may be even higher if short-term emission rates were modeled
- emission reductions from current existing emission sources near PSGS could mitigate impacts from PSGS's emissions in the Mingo Wilderness Area

**Overview**

This document outlines the existing air quality conditions in the Mingo Wilderness Area and discusses the emissions proposed by Prairie State Generating Station (PSGS) and their predicted impacts to air quality and air quality related values in the Mingo Wilderness Area.

Background information about the Mingo Wilderness Area is presented along with U.S. Fish and Wildlife Service (FWS) concerns with PSGS's impact analyses and the Illinois Environmental Protection Agency's (IEPA) project summary document. Those concerns include the visibility and deposition impact results.

**Proposed Project**

PSGS is proposing to construct and operate a 1500 MW coal-fired generating station near Marissa, Illinois in Washington County. The mine-mouth facility will consist of two pulverized coal boilers (burning high sulfur coal) and two steam turbines.

The facility would be located approximately 140 km (87 miles) north-northeast of the Mingo Wilderness Area, a Class I air quality area administered by the FWS. This project will result in increases in emissions of nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), particulate matter (PM<sub>10</sub>), Carbon Monoxide (CO), volatile organic compounds (VOC), lead (Pb), and sulfuric acid mist (H<sub>2</sub>SO<sub>4</sub>). These increases are considered significant for triggering preconstruction review under the Clean Air Act's Prevention of Significant Deterioration (PSD) program.

The amounts of emissions in tons per year (TPY) for PSGS are summarized in the table below and represent emissions from the entire facility, as proposed in PSGS's permit application.

<b>PSGS Plant-wide Emissions per PSGS application (11/2002)</b>	
<b>POLLUTANT</b>	<b>EMISSIONS INCREASE (TPY)</b>
Nitrogen Oxides	5,216
Sulfur Dioxide	11,868
Particulate Matter <sub>10</sub>	3,260
Carbon Monoxide	6,520
Volatile Organic Compounds	469
Lead	1.88
Sulfuric Acid Mist	325

In the Project Summary document that the IEPA included with its draft permit package, it lists (see table below) the following emission rates. However, they represent ONLY the two coal-fired boilers at the plant. Not included are emissions from other units including: the auxiliary boiler and the storage, processing and handling of coal, ash, limestone and other materials.

<b>MAIN BOILER (2) EMISSIONS – per IEPA draft permit (2/2004)</b>	
<b>POLLUTANT</b>	<b>EMISSIONS (TPY)</b>
Nitrogen Oxides	5,216
Sulfur Dioxide	11,866
Particulate Matter <sub>10</sub> (Filterable ONLY)	980
Carbon Monoxide	7,824
Volatile Organic Material ("VOM")	260
Lead	0.060
Sulfuric Acid Mist	325

#### **Background Information on the Mingo Wilderness Area**

The Mingo National Wildlife Refuge containing the Mingo Wilderness Area (7,730 acres) is located in southeast Missouri (Figure 1). Established in 1945 as a resting and wintering area for migratory waterfowl, the 21,676-acre refuge is primarily a bottomland hardwood swamp that serves as an important link in the Mississippi Flyway. In 1977 Congress made the Mingo Wilderness Area a mandatory Federal Class I air quality area giving it special protection under the Clean Air Act. The FWS, as the Federal Land Manager for Mingo, has the responsibility to protect the air quality and the air quality related values (AQRVs) of the area from manmade air pollution. AQRVs include vegetation, wildlife, soils, water quality, visibility, odor, and cultural and archeological resources.

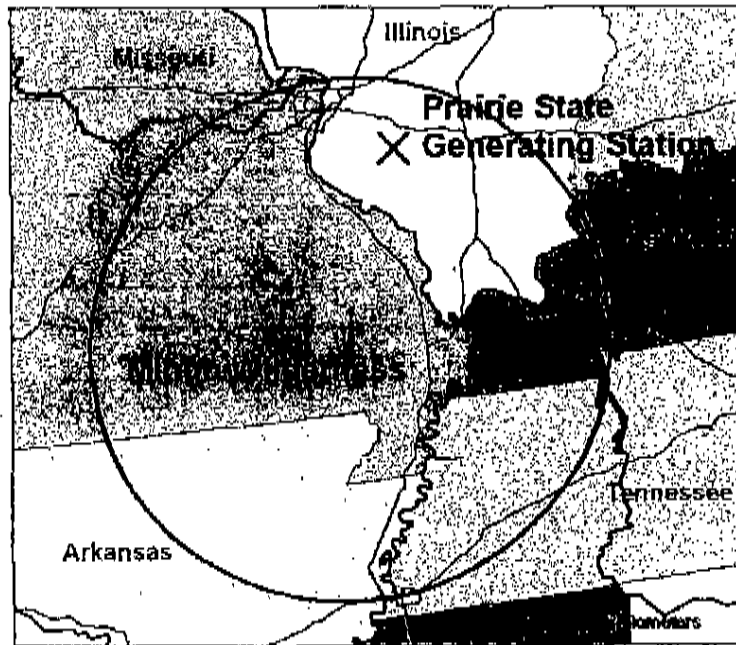


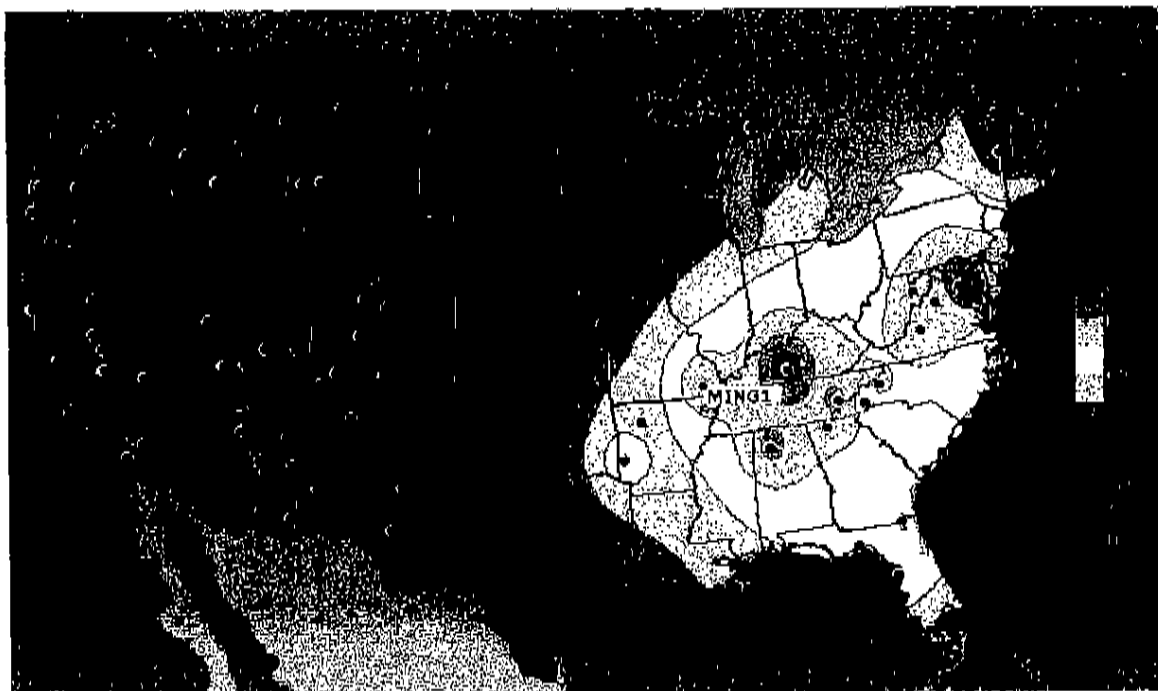
Figure 1: Location of the Mingo Wilderness Area and PSGS

### **Existing Conditions in the Mingo Wilderness Area**

Air quality monitoring in the Mingo Wilderness Area indicates that it is one of the more polluted Class I areas that the FWS manages. Air pollution at Mingo is responsible for the haze that causes visibility impairment and high loadings of sulfate and nitrate from atmospheric deposition.

### **Visibility in Mingo Wilderness Area**

Visibility impairment is defined as any humanly perceptible change in visibility, including visual range, contrast and color, and is often described in terms of light extinction. A low light extinction value indicates better visibility. In 2001, average light extinction at Mingo was estimated at  $83 \text{ Mm}^{-1}$  (Figure 2). This is almost 4 times higher than natural visibility conditions ( $21 \text{ Mm}^{-1}$ ) should be according to the U.S. Environmental Protection Agency's (EPA) *Draft Guidance for Estimating Natural Visibility Conditions Under the Regional Haze Program*.



**Figure 2 2001 Total Annual Light Extinction**

Haze at Mingo consists of fine particles of sulfate, nitrate, organic carbon, elemental carbon, and soil, and coarse particles. Concentrations of each of these types of particles are high at Mingo compared to other areas of the country. Back trajectory analyses are used to determine where pollution originates. Trajectories for the Mingo region show that air pollution is mainly from the north/northwest and the south/southeast. These trajectories suggest that emissions from sources to the north of Mingo, such as those from the PSGS, will have a direct impact on visibility at Mingo.

#### **Atmospheric Deposition in the Mingo Wilderness Area**

Atmospheric deposition (pollutant particles that fall on land and water) is also a concern at the refuge. In particular, the deposition of sulfate and nitrate are crucial because of their ecological effects. Relatively high concentrations of sulfate and nitrate, coupled with high precipitation, results in high wet deposition of sulfate and nitrate at Mingo in 2002 (Figure 3 and 4). Modeling analyses predict that if the PSGS is permitted as proposed, sulfate and nitrate deposition at Mingo will increase.

**Sulfate ion wet deposition, 2002**

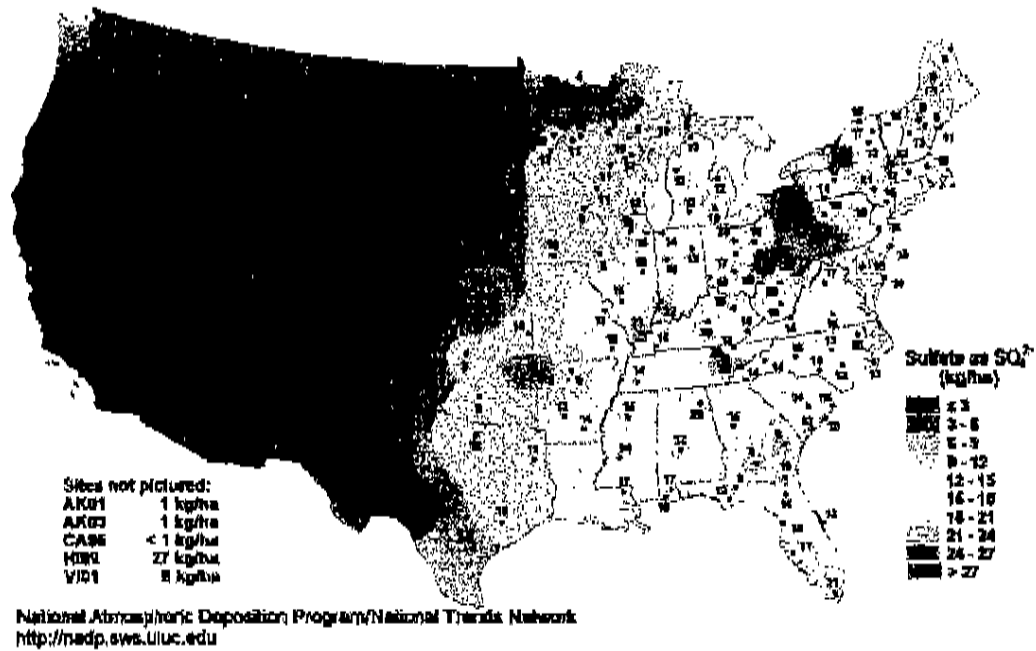


Figure 3 2002 Sulfate Deposition

**Nitrate ion wet deposition, 2002**

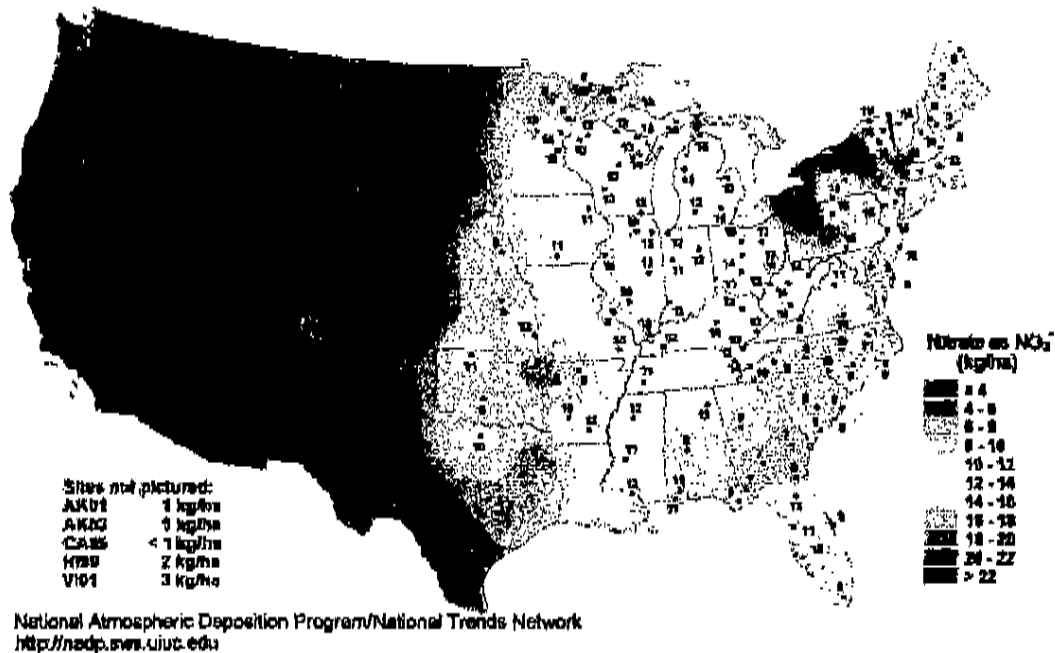


Figure 4. 2002 Nitrate Deposition.

## **PSGS's Predicted Impacts on Mingo Wilderness Area**

### **Visibility Impacts**

In the Clean Air Act (1977), Congress declared the national visibility goal to be "the prevention of *any* future, and the remedying of *any* existing, impairment of visibility in mandatory Class I Federal areas which impairment results from manmade air pollution." (Emphasis added).

The Federal Land Manager agencies (the Fish and Wildlife Service, the National Park Service (NPS) and the U.S. Forest Service) have jointly provided guidance for analyzing visibility impacts in Federal Class I areas in the Federal Land Manager's Air Quality Related Values Workgroup (FLAG) Phase I Report (December 2000). The visibility thresholds (expressed as percent change in extinction) for perceptible change of visibility established in the FLAG guidance are used to indicate if a source may cause an adverse impact on visibility resources in Class I areas.

PSGS's analysis of their proposed emissions indicates that there are potentially adverse impacts on visibility in the Mingo Wilderness Area. The visibility modeling results from PSGS, that most closely followed the FLAG guidance, predict that the emissions from this facility would result in 36 days over the 5% change in extinction threshold and 12 days over the 10% change in extinction threshold. If visibility analyses were done using the correct FLAG guidance (e.g. short-term emission rates, see **FWS Concerns** below) the results would likely be higher.

For comparison sake, the recently proposed Longview Power Plant in West Virginia had 1 day over the 10% change in extinction threshold in Shenandoah National Park. That was deemed an adverse impact by the Assistant Secretary for Fish, Wildlife and Parks who is the Federal Land Manager for both Shenandoah National Park and the Mingo Wilderness Area Class I areas.

PSGS provided a memo from a consultant (Dr. Tombach) suggesting a change in FLAG thresholds for evaluating the impacts of emissions specifically from PSGS. The FWS and NPS technical visibility staff do not agree with Dr. Tombach's hypothesis, which to our knowledge has not been formally peer reviewed. The data used for the memo may be incomplete and therefore conclusions from the data could be flawed. We welcome objective discussion of FLAG thresholds and sound scientific examination of the FLAG methodology, but we believe it should be outside the context of any ongoing PSD permit process so that consistency and fairness to all potential PSD applicants is maintained.

### **Deposition Impacts**

The FLAG guidance also provides thresholds for total atmospheric deposition of sulfates and nitrates. The deposition thresholds are expressed in kilograms per hectare per year (kg/ha/yr) and are set at 0.005 kg/ha/yr for both sulfate and nitrate deposition. A lower deposition number indicates less pollutant deposition into an area. The PSGS proposed facility exceeds both the sulfate and nitrate deposition thresholds for the Mingo Wilderness Area. PSGS predicted that maximum annual deposition from their proposed facility will be 0.046 kg/ha/yr for sulfates and 0.010 kg/ha/yr for nitrates. Both exceed the deposition thresholds set in the FLAG guidance and indicate a level where harmful effects may occur.

## PSGS's Air Quality Analyses

### **Overview**

Under the Clean Air Act PSD program applicants for a PSD permit are required to conduct an air quality analysis of the ambient impacts associated with the construction and operation of the proposed new source or modification. The main purpose of the air quality analysis is to demonstrate that new emissions emitted from a proposed major stationary source will not cause or contribute to a violation of any applicable National Ambient Air Quality Standards (NAAQS) or PSD increment and to insure that air quality related values in Class I areas will not be adversely impacted. Class I PSD increments represent the small amount of additional pollution that Congress thought could be allowed in the Class I area. Increments have currently been established for particulate matter, sulfur dioxide, and nitrogen dioxide. When a full impact analysis (e.g. a cumulative increment analysis) is required for any pollutant, the applicant is responsible for establishing the necessary inventories of existing sources and their emissions that will be used to carry out the required NAAQS, and PSD increment tracking analyses.

### **Averaging Times for Limits and Modeling Inputs**

#### **FWS Concerns**

The emission rates and the averaging time for emission rates influence the outcome of all analyses. It is critical that appropriate emission rates are matched to the appropriate averaging times. PSGS used a 30-day rolling average as input to their visibility modeling analyses. That rate doesn't restrict the facility from producing pollution at a higher rate for short time periods (e.g. 24-hour averages) important for visibility analyses that look at impacts based on 24-hour averages. A 30-day rolling average emission rate smoothes out days with high emissions and therefore may underestimate the predicted visibility impacts. FWS's experience indicates using the appropriate emission rates could increase PSGS's modeled visibility impacts by 25%.

PSGS should propose and utilize best available control technology (BACT) emission limits with averaging times in accordance with the standards, increments, and appropriate visibility thresholds. The PSD permit should include enforceable permit conditions to ensure that emissions are limited to those used as model inputs.

In the draft permit released for public comment, IEPA included separate emission limits using both 24-hour average and 30-day average bases. Those emission rates are summarized in the following table.

	24-hr averaged emission limits <i>(from attachment 1, Table I, as referenced by permit condition 2.1.7 "Emission Limitations")</i>		30-day average emission limits <i>(from permit condition 2.1.2 "Control Technology Determination" &amp; used in PSGS Air Quality Modeling analyses)</i>
	As written in permit	*Calculated Equivalent expressed in lb/mmBtu	
NO <sub>x</sub>	893 lb/hr	0.12 lb/mmBtu	0.08 lb/mmBtu
SO <sub>2</sub>	3126 lb/hr	0.42 lb/mmBtu	0.182 lb/mmBtu

\* {lb/mmBtu rate = lb/hr rate ÷ 14886 mmBtu/hr (the design capacity of the plant)}

For NO<sub>x</sub>, the resulting short-term emission rate allows 50% more emissions in a day than what PSGS used in its modeling of short term impacts; and the 24-hour SO<sub>2</sub> limit allows more than double the daily SO<sub>2</sub> emissions compared to what was modeled.

While IEPA has segregated these 24-hr average limits from the "Control Technology Determination" section of the IEPA permit, we believe that all emission limits employed in a PSD permit represent the enforceable BACT determination. In order to truly represent the potential effects of the facility, the values used in the air quality analyses must be consistent with the permit limits. Thus, either the permit should reflect the long term limit values as also enforceable on a 24-hour basis, or the applicant should reanalyze its potential effects on short-term standards and visibility using the higher, 24-hr limits contained in the permit.

#### **Mitigation of Impacts on Mingo Wilderness Area**

FWS believes the impacts of the proposed PSGS facility could be offset by air pollution reductions from current existing emissions near PSGS. Any proposed reductions should be evaluated to show that the mitigation of impacts in the Mingo Wilderness Area would be measurable in Mingo and should be verified as a Federally enforceable permit condition for participating sources.

**Additional Technical Review Information for the  
Prairie State Generating Station (PSGS)  
Prevention of Significant Deterioration Permit Application  
And the Illinois Environmental Protection Agency Summary Report**

**Prepared By**

**Air Quality Branch, U. S. Fish and Wildlife Service (FWS) – Denver  
May 13, 2004**

**Synopsis**

- the emission inventory for the Class I increment analyses may be incomplete
- PSGS could apply better air pollution controls to reduce emissions

**Overview**

This document outlines technical concerns regarding the Class I increment analysis, and the emissions inventories used in the increment analyses. It also addresses concerns with the best available control technology (BACT) analyses.

**Class I Increment Consumption Analyses**

**FWS Concerns**

The FWS is concerned that the PSD Class I increments in Mingo Wilderness Area have not been accurately analyzed for the proposed PSGS project. An incomplete inventory of PSD increment consuming sources from the State of Missouri (and maybe other nearby states) may have underestimated the total cumulative Class I increment consumption in the Mingo Wilderness Area and also may have underestimated Class II increment consumption.

If incomplete or inaccurate PSD consuming source inventories were used, it is possible that there could be exceedances of the sulfur dioxide Class I increments in the Mingo Wilderness Area that were not analyzed or reported. It is also possible that, if complete and accurate source inventories are used, the Class I area significance criteria might be exceeded for nitrogen dioxides and particulates. That would trigger the requirement for cumulative Class I increment analyses for those pollutants. PSGS's use of the incomplete Missouri PSD increment consuming source inventory in their Class I increment analysis may not provide adequate protection of the Class I increments in the Mingo Wilderness Area. While the source inventory used in PSGS's Class I increment analyses was developed by the respective state air regulatory agencies it is important to note that according to EPA's New Source Review Manual the responsibility for development of the cumulative source inventory ultimately rests with the applicant. (Page C.31 – Chap. C, Part IV.D.4 EPA)

## PSGS's proposed Best Available Control Technology (BACT)

### Overview

The PSD permitting program requires that new or modified sources such as the proposed PSGS facility meet emission limitations that represent the BACT. The FWS reviews BACT provisions in permit applications for the purpose of ensuring that new facilities meet the requirements of the PSD permitting regulations. We also want to ensure that States and permittees analyze options to use the cleanest technology possible to avoid significant impacts from the proposed facility's emissions on resources in FWS administered areas.

The BACT limits for the boiler plant included in the IEPA draft permit (section 2.1.2) are as follows:

Pollutant	Proposed emission limit	Averaging time of limit
PM/ PM <sub>10</sub>	0.015 lb/mmBtu(filterable PM)	3-hour block
SO <sub>2</sub>	0.182 lb/mmBtu	30 day rolling
NO <sub>x</sub>	0.08 lb/mmBtu	30 day rolling
CO	0.12 lb/mmBtu	30 day rolling
VOM	0.004 lb/mmBtu	30 day rolling
H <sub>2</sub> SO <sub>4</sub> mist	0.005 lb/mmBtu	30 day rolling

### FWS Concerns

#### PM/ PM<sub>10</sub> BACT

IEPA determined that employing an electrostatic precipitator (ESP) to limit PM<sub>10</sub> emissions to 0.015 lb/mmBtu (3-hr average, based only upon the filterable PM<sub>10</sub> emissions) would satisfy BACT. This value is reduced from the 0.018 lb/mmBtu limit proposed by PSGS in its permit application. PSGS indicated in that application that if both filterable and condensable emissions are to be counted in the BACT limit, that it would use an emission limitation of 0.05 lb/mmBtu. EPA policy is that PM<sub>10</sub> analyses include both filterable and condensable emissions. While the filterable PM<sub>10</sub> limit in the permit is near the levels allowed in other recent coal-fired utility boiler permits, this permit also needs a reasonable and enforceable limit for total (filterable plus condensable) PM<sub>10</sub>.

PSGS eliminated the use of a baghouse or fabric filter control device, saying it is not technically feasible. IEPA expanded upon this in its project summary document (released for public comment with the draft permit):

"...[PSGS] has identified technical concerns about the use of a baghouse on the boilers due to the characteristic of the emissions stream. The high sulfur content of Illinois coal, compared to either western or eastern coal, accompanied by use of SCR, poses concerns about blinding (clogging) of the filter material with ammonium bisulfate. The sulfur content of Illinois coal would also create highly acidic (corrosive) conditions in a baghouse, which would shorten the life

expectancy of the filter material in the baghouse and impair the reliability of the baghouse.”

FWS believes that engineering solutions exist that would allow the use of a baghouse. Baghouses are often capable of much better performance than electrostatic precipitators. In addition, if SO<sub>2</sub> control technologies were employed that lowered the sulfur content of its feedstock and sulfur compound emissions (such as coal washing, discussed below), then the projected technological problems could be diminished, while also preventing the release of highly corrosive exhaust gases to the ambient air. In conjunction with addressing options for SO<sub>2</sub> BACT requirements, the application of a baghouse should be reassessed.

### SO<sub>2</sub> BACT

PSGS dismissed coal washing as an alternative for reducing emissions of sulfur dioxide and sulfuric acid mist. FWS believes coal cleaning to be a viable alternative for providing reduced SO<sub>2</sub>/ H<sub>2</sub>SO<sub>4</sub> and indirectly PM/ PM<sub>10</sub> emissions from this proposed source.

IEPA discussed coal washing in its project summary document. They expressed concern with water and solid waste impacts resulting from coal washing. While we recognize that there are waste streams that result from coal washing, these wastes can be handled properly. According to an EPA report to Congress, 77% of all eastern coal is cleaned. The fact that a significant majority of eastern coal is washed indicates that the process is technologically available and not contraindicated on the grounds of collateral environmental effects.

IEPA also said: “Coal washing becomes economical when the coal is transported over a distance. Then the savings in transportation costs for the washed coal, which contains 15 to 20 percent more heating value per ton, offsets the costs associated with coal washing.” The transportation cost savings are because the washing process removes non-combustible ash, so not as much inert material needs to be shipped as part of the coal – sometimes this can be as much as a 20-30% reduction in the amount of material that is shipped.

Because the PSGS facility is proposed as a mine-mouth plant, it will not have any such transportation costs to bring its fuel to the boiler. If it is economical to mine coal, wash it, and transport it to a remotely located power plant, it should still be economical to mine, wash, and utilize the coal at an on-site generation facility, thereby avoiding the transportation costs altogether.

Finally, IEPA states that: “... the cost-effectiveness of coal washing is in excess of \$10,000 per ton of SO<sub>2</sub>.” Neither the PSGS permit application nor the IEPA Project Summary explains the basis for this figure. Furthermore, if a procedure is broadly utilized by industry (as coal washing is for over three quarters of coal produced in the eastern United States), then it is inappropriate to eliminate it for any given project based upon economic reasons. PSGS should demonstrate why its project is significantly different in scope or why the costs for washing coal at this facility would be different from the typical costs born by the coal-fired electric utility industry.

While the general industry perspective appears to be that it engages in coal washing only to reduce transportation costs, there may be times where coal washing should be examined for its value in reducing pollution emissions to the environment. PSGS, with extremely high sulfur content in its

native coal supply, is just such an instance. Due to the nature of the coal being utilized for this project, the facility should be held to the strictest standards to protect public health and the environment.