Illinois Environmental Protection Agency
1021 North Grand Avenue East
Springfield, Illinois

# Project Summary for an Application from the City of Springfield, City Water Light and Power for a Federally Enforceable Permit for Three Existing Electrical Generating Units to Address Best Available Retrofit Technology (BART)

Site Identification No.: 167120AAO
Application No.: 09090046
Date Received: May 12, 2009

Schedule:
Public Comment Period Begins: December 14, 2010
Public Comment Period Closes: January 13, 2011

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## I. INTRODUCTION

The City of Springfield, City Water Light and Power (the City) has applied to the Illinois EPA for a permit that would address the City's obligation to use Best Available Retrofit Technology (BART) for Lakeside Unit 8 and existing Dallman Units 1 and 2 at its coal-fired power plant on Lake Springfield. Under Section 169A of the federal Clean Air Act, BART must be used on these generating units for control of emissions of sulfur dioxide ($SO_2$) and nitrogen oxides (NOx) to address the role of these units in visibility impairment and regional haze.

The Illinois EPA has reviewed the City's application and made a preliminary determination that the application meets applicable requirements for a permit to be issued. Accordingly, the Illinois EPA has prepared a draft of the permit that it would propose to issue. Before issuing this permit, Illinois EPA is holding a public comment period to receive comments on the proposed issuance of this permit and the terms and conditions of the draft permit. It is intended that this permit would be federally enforceable, permanently binding the City to new emission limits and requirements that reflect BART in a manner that would be enforceable under both state and federal law.

## II. BACKGROUND ON VISIBILITY IMPAIRMENT AND REGIONAL HAZE

In an effort to restore scenic vistas or "visibility" in certain national parks and large federal wilderness areas, Section 169A of the federal Clean Air Act, Visibility Protection for Federal Class I Areas, requires certain actions be taken to remedy existing visibility impairment and to prevent future impairment of visibility due to man-made air pollution. The particular areas addressed by these requirements are areas that were designated as Class I Areas by Section 162 of the Clean Air Act, under the federal program for Prevention of Significant Deterioration of Air Quality. For Illinois, the areas of particular concern are located in neighboring states, namely Mammoth Cave National Park in west central Kentucky, the Mingo Wilderness Area in southeastern Missouri, and Isle Royale National Park in the far northwest of Michigan. Degradation of scenic vistas or visibility impairment in the subject areas is to be remedied by various measures, including application of Best Available Retrofit Technology (BART) [1] to certain existing major sources that began operation between August 7, 1962, and August 7, 1977, to control their emissions of pollutants that significantly contribute to visibility impairment in the subject areas. Section 169A of the Clean Air Act is implemented through rules adopted by USEPA , 40 CFR Part 51, Subpart P, Visibility Protection (the Regional Haze Rule). BART is

[1] As defined by 40 CFR 51.3010, "Best Available Retrofit Technology (BART) means an emission limitation based on the degree of reduction achievable through the application of the best system of continuous emission reduction for each pollutant which is emitted by an existing stationary facility. The emission limitation must be established, on a case-by-case basis, taking into consideration the technology available, the costs of compliance, the energy and nonair quality environmental impacts of compliance, any pollution control equipment in use or in existence at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology."

further addressed by USEPA in 40 CFR Part 51, Appendix Y "Guidelines for BART Determinations Under the Regional Haze Rule," (BART Guidelines).

The Illinois EPA has developed a plan for Illinois to comply with Section 169A of the Clean Air Act and the Regional Haze Rule. Under the Regional Haze Rule, 40 CFR 51.308, the core requirements for this plan include reasonable progress goals for reductions in emissions, calculations of baseline and natural visibility conditions, long-term strategy to address visibility impairment, and BART requirements for the sources whose emissions must be controlled with BART. The Illinois EPA has developed the proposed plan for Illinois to address regional haze and visibility impairment working in consultation with the States of Indiana, Michigan, Ohio, and Wisconsin as these states must also develop plans to comply with the Regional Haze Rule. The Regional Haze Rule requires consultation between the states, tribes, and the Federal Land Managers (FLMs) responsible for managing Class I areas. This multi-state and multi-agency consultation process has been facilitated by Regional Planning Organizations (RPOs) established specifically for this purpose. Illinois fully participated in the planning and technical development efforts of the Midwest Regional Planning Organization (MRPO), which was formed by Illinois, Indiana, Michigan, Ohio, and Wisconsin. Illinois has also participated in consultations with other RPOs and other states that have requested its participation in their planning process.

As part of the development of this plan, visibility modeling was conducted as needed to determine current impacts of on visibility in Class I areas of sources in Illinois that are potentially subject to BART and the improvements in visibility that would accompany use of BART. The modeling approach was developed in consultation with the MRPO, the MRPO states themselves, the USEPA, and participating FLMs. The modeling has shown that the emissions of NOx and $SO_2$[2] of certain BART-eligible sources in Illinois are causing or contributing to visibility impairment in certain Class I areas, particularly the Mammoth Cave National Park in Kentucky, the Mingo Wilderness Area in Missouri, Isle Royale National Park in Michigan, and others. The Illinois EPA is therefore required to develop a Regional Haze Plan for Illinois that addresses those sources, requiring them to apply BART for emissions of NOx and $SO_2$ or provide equivalent or greater emission reductions.

The plan that has been developed by the Illinois EPA is currently the subject of a public comment period. This plan and underlying analysis is described by the Illinois EPA in "Draft Technical Support Document: Regional Haze State Implementation Plan for Illinois," AQPSTR 10-08, October 7, 2010. After considering all comments that are submitted on the proposed plan, the Illinois EPA must submit a final Regional Haze Plan to the USEPA for its approval as a revision to Illinois' State Implementation Plan (SIP).

[2] The visibility modeling showed that the impacts on all Class I areas from particulate matter emissions from only the BART-eligible sources in the MRPO states were not significant, being much less than 0.5 deci-views. Since the particulate matter emissions from just the BART-eligible sources represent a fraction of the total particulate matter emissions from all stationary sources, the Illinois EPA did not include emissions of particulate matter in the BART review process for sources in Illinois.

The proposed determinations of BART for the various subject sources in Illinois that must be addressed by Illinois' Regional Haze Plan are generally discussed by the Illinois EPA in its "Draft Technical Support Document for Best Available Control Technology under the Regional Haze Rule," AQPSTR 09-06, September 30, 2010 (Draft TSD for BART). Control requirements are already in place for most of the subject sources that provide greater reductions in emissions than would be provided with BART. For example, a number of sources are subject to stringent provisions in federal consent decrees that require greater emission reductions than would be achieved with BART.[3] However, the necessary BART control requirements pursuant to the Regional Haze Rule are not in place for certain subject sources in Illinois, including three electrical generating units that are or were operated by the City of Springfield (the City).

The BART control requirements for the City's electrical generating units are addressed in a Memorandum of Understanding between the City and the Illinois EPA (Agreement).[4] The requirements that were agreed to would provide significant reductions in the NOx and $SO_2$ emissions of the City's subject units. The new emission limits and requirements for these units will provide reduction in emissions that will be greater than if the units complied with the presumptive requirements for BART established by USEPA in its BART Guidelines. The purpose of the proposed permit would be to "memorialize" the emission limits and requirements in the agreement so that they are permanent and can be enforced under both state and federal law.

## III. BEST AVAILABLE CONTROL TECHNOLOGY (BART) FOR THE CITY OF SPRINGFIELD

The City of Springfield (the City) currently operates two generating units that are subject to BART, Dallman 1 and Dallman 2,[5] both located at the City's coal-fired power plant on Lake Springfield.[6] Until recently, the City also had another generating unit, Lakeside 8, at this power plant that would have been subject to BART. However, the City shut down this unit in 2009. The proposed permit would require that the shut down of Lakeside 8 is permanent.

A case-by-case determination of BART must be made for Dallman 1 and 2. These generating units each have a nominal capacity of 76 MW. They are currently fired with bituminous coal that is mined locally and transported to the power plant by truck. Both units are cyclone-fired, with the coal being burned in cyclone-type burners. The emission control train for these units includes selective catalytic reduction (SCR) for control of NOx emissions, electrostatic precipitators for control of particulate emissions and a scrubber for control of $SO_2$ emissions.

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[3] The Illinois EPA has addressed the individual determinations of BART for the various subject sources in Illinois in "Draft Technical Support Document for Best Available Retrofit Technology under the Regional Haze Rule," AQPSTR 09-06, September 30, 2010.

[4] "Memorandum of Understanding on NOx and SO2 Emission Reductions Reflective of Best Available Retrofit Technology for City Water, Light & Power Dallman Units 31 and 32 and the Shutdown of Lakeside Unit 8 between the Illinois Environmental Protection Agency and City of Springfield, Office of Public Utilities," August 11, 2009

[5] In certain documents, Dallman 1 and 2 may also be referred to as Dallman Units 31 and 32.

[6] The City of Springfield's power plant on Lake Springfield now includes two other coal-fired generating units, Dallman 3 and Dallman 4. Dallman 3 is a few years newer than Dallman 2. Dallman 4 is "very new," having begun operation with the last two years. The capacities of Dallman 3 and 4 are both over twice those of Dallman 1 and 2.

The original control train for the units did not include the SCR systems and the scrubber, which are only about ten years old.

To provide BART for emissions of NOx, the City has agreed, beginning in 2010, to operate the existing SCR systems on Dallman 1 and 2 to comply with an annual average NOx emissions rate of 0.14 lb/mmBtu. Beginning in 2015, the NOx emission rate would become 0.12 lb/mmBtu. The final limit, beginning in 2017, would be 0.11 lb/mmBtu. The SCR systems on these units will have to be operated on a year-round basis to comply with these emission rates, rather than on a seasonal basis. Annual use of SCR systems is consistent with the BART Guidelines, in which USEPA establishes SCR technology as the presumptive control technology for NOx emissions from cyclone-fired generating units. The BART Guidelines do not establish a presumptive BART limit for NOx that would be applicable to units that are as small as Dallman 1 and 2.[7] However, 0.11 lb/mmBtu, the final NOx rate that would be set for Dallman 1 and 2, would be consistent with the presumptive NOx limit recommended by the BART Guidelines for larger cyclone-fired generating units with a capacity of more than 200 MW. In particular, Dallman 1 and 2 are less than half the size of the cyclone-fired units for which the BART Guidelines recommend a NOx limit of 0.10 lb/mmBtu. The BART limits for NOx for Dallman 1 and 2 would also be phased in on a reasonable schedule. Changes to the operational procedures for the existing SCR systems will be needed to meet the new limits. Physical changes to the SCR systems may also be needed.

To provide BART for emissions of $SO_2$, the City has agreed, beginning in 2012, to operate the shared scrubber on Dallman 1 and 2 to begin meeting an annual average $SO_2$ emissions rate of 0.29 lb/mmBtu in 2012. In 2015, the $SO_2$ emission rate would become 0.25 lb/mmBtu. In 2017, the $SO_2$ emission rate would become 0.23 lb/mmBtu. scrubber on these units will be required to achieve greater than 95 percent control. The BART Guidelines also do not recommend a presumptive BART limit for $SO_2$ that would be applicable to units that are as small as Dallman 1 and 2.[8] However, 0.25 lb/mmBtu, the final $SO_2$ rate that would be set for Dallman 1 and 2, would be consistent with the presumptive $SO_2$ limit recommended by the BART Guidelines for larger units with a capacity of more than 200 MW. In particular, the BART Guidelines recommend either 95 percent control for $SO_2$ or an SO2 emission rate of 0.15 lb/mmBtu. An $SO_2$ limit of 0.25 lb/mmBtu represents 95 percent control for Dallman 1 and 2 as they are fired with coal that contains more than 2.5 pounds of sulfur per million Btu.[9]

The reductions in NOx and $SO_2$ emissions expected from application of the BART limits that would be set for Dallman 1 and 2 were evaluated in the Illinois EPA's Draft TSD for BART. The evaluation, as summarized in the attached Tables 1 and 2, showed that the reductions in NOx and $SO_2$ emission would meet or exceed the reductions that would be achieved with presumptive BART control requirements.

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[7]For cyclone-fired generating units, the BART Guidelines recommend a presumptive NOx limit of 0.10 lb/mmBtu for units with a capacity of more than 200 MW.

[8]For generating units, the BART Guidelines recommend a presumptive control level for $SO_2$ emissions of either 95 percent control or 0.15 lb/mmBtu for units with a capacity of more than 200 MW.

[9]An emission rate of 0.25 lb $SO_2$/mmBtu is equivalent to 95 percent control when burning fuels that contains 2.5 pounds of sulfur per million Btu. (2.5 lb sulfur/mmBtu x 2 lb $SO_2$/lb sulfur x (100 – 95)/100 = 0.25 lb $SO_2$/mmBtu.)

## X. PERMIT CONDITIONS

The proposed permit would set forth the air pollution control requirements that the City must meet to satisfy its obligation to use BART on subject units. This includes the new limits for Dallman 1 and 2 for emission of NOx and $SO_2$, with schedule. The permit would also provide that continuous emissions monitoring data, as collected under applicable federal regulations that apply to Dallman 1 and 2, would be used to determine compliance with the new limits. The permit would also require periodic reporting for these new limits. The proposed permit would not address other existing air pollution control requirements that apply to Dallman 1 or 2, which are either in effect as a matter of rule or addressed in other permits.

It is intended that this permit would be federally enforceable, permanently binding the City to the new requirements for BART in a manner that would be enforceable under both state and federal law. As the existing power plant is a major source under Illinois' Clean Air Act Permit Program (CAAPP),[10] the new requirements established in the permit for Dallman 1 and 2 would become applicable Clean Air Act requirements that would have to be included in future CAAPP permits that cover these units.

## XI. REQUEST FOR COMMENTS

It is the Illinois EPA's preliminary determination that the application for the requested permit meets applicable regulatory requirements. The Illinois EPA is therefore proposing to issue a permit to the City to address BART. Comments are requested on this proposed action by Illinois EPA and the conditions of the draft permit.

[10] The Clean Air Act Permit Program (CAAPP) is Illinois federal operating permit program for major sources of emissions pursuant to Title V of the federal Clean Air Act.

## Table 1: Comparison of NOx Reductions from Presumptive BART and the Agreement

**Note: As the Agreement provides a limit for Dallman Units 1 and 2, combined, the limits shown below for the NOx emission rates do not represent unit-specific limits.**

| Generating Unit | Base Year 2002 | | | Presumptive BART | | Agreement in 2015 | | Agreement Final | |
|---|---|---|---|---|---|---|---|---|---|
| | Heat Input | Actual NOx Rate | NOx Emissions | NOx Limit | NOx Reduction | NOx Limit | NOx Reduction | NOx Limit | NOx Reduction |
| | 1000 mmBtu | lb/mmBtu | Tons | lb/mmBtu | Tons/Yr | lbs/mmBtu | Tons/Yr | lb/mmBtu | Tons/Yr |
| Dallman 31 | 4,528 | 1.10 | 2,484 | 0.12 | 2,212 | 0.12 | 2,212 | 0.11 | 2,235 |
| Dallman 32 | 4,787 | 1.11 | 2,654 | 0.12 | 2,366 | 0.12 | 2,366 | 0.11 | 2,391 |
| Lakeside 8 | 1,593 | 0.94 | 749 | 0.12 | 653 | 0 | 749 | 0 | 749 |
| Totals | | | 5,887 | | **5,231** | | **5,327** | | **5,375** |

## Table 2: Comparison of $SO_2$ Reductions from Presumptive BART and the Agreement

**Note: As the Agreement provides a limit for Dallman Units 1 and 2, combined, the limits shown below for the $SO_2$ emission rates do not represent unit-specific limits. .**

| Generating Unit | Base Year 2002 | | | Presumptive BART | | Agreement in 2015 | | Agreement Final | |
|---|---|---|---|---|---|---|---|---|---|
| | Heat Input | Actual $SO_2$ Rate | $SO_2$ Emissions | $SO_2$ Limit | $SO_2$ Reduction | $SO_2$ Limit | $SO_2$ Reduction | $SO_2$ Limit | $SO_2$ Reduction |
| | 1000 mmBtu | lb/mmBtu | Tons | lb/mmBtu | Tons/Yr | lbs/mmBtu | Tons/Yr | lb/mmBtu | Tons/Yr |
| Dallman 31 | 4,528 | 0.33* | 753 | 0.30** | 74 | 0.25 | 187 | 0.23 | 232 |
| Dallman 32 | 4,787 | 0.35* | 835 | 0.30** | 117 | 0.25 | 236 | 0.23 | 284 |
| Lakeside 8 | 1,593 | 5.47 | 4,358 | 0.30** | 4,119 | 0 | 4,358 | 0 | 4,358 |
| Totals | | | 5,946 | | **4,310** | | **4,781** | | **4,875** |

* Actual $SO_2$ emission rate reflecting level of control with the scrubber in 2002.

** Presumptive BACT limit based on 95 percent control for coal with a nominal sulfur content of 3 pounds per million Btu.