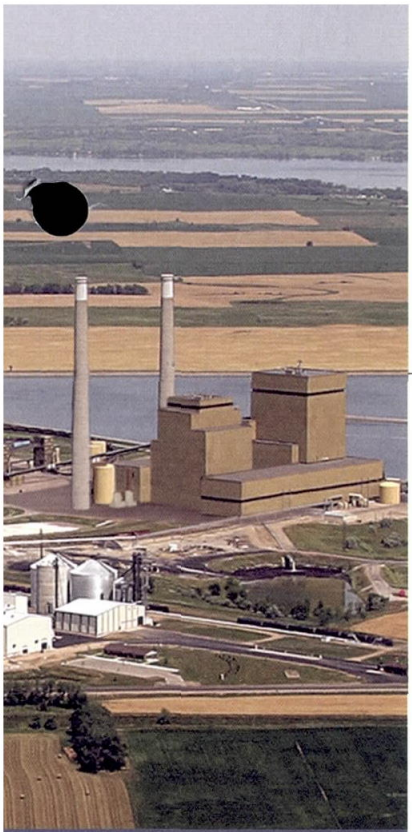

BIG STONE *II*

PO Box 496
215 South Cascade Street
Fergus Falls MN 56537
www.BigStoneII.com

RECEIVED
JUN 20 2006
AIR QUALITY
PROGRAM

June 19, 2006

Mr. Kyrik Rombough
Air Quality Program
South Dakota Department of Environment
and Natural Resources
Joe Foss Building
523 East Capitol
Pierre, SD 57501-3181

Dear Kyrik:

Subject: Prevention of Significant Deterioration Permit Application Updated June 2006

As we have discussed, further progress on the engineering design of the Big Stone II plant has identified a few minor additional emission points that are necessary or appropriate to ensure safe and effective operation. These include two additional diesel fire pumps, additional limestone processing equipment and a few adjustments to the coal handling facilities to improve operation and allow for better dust control. As reflected in the attached spreadsheet, the only pollutants affected by these minor changes are carbon monoxide and particulate from the fire pumps and particulate from the material handling equipment. The spreadsheet also reflects changes we are requesting to the draft permit to reflect the more stringent New Source Performance Standards for carbon monoxide applicable to the diesel-fueled equipment at the plant.

Taking into account the reductions in carbon monoxide due to the more stringent NSPS and the reductions in particulate from the sweeping/wetting of roads mandated by the department, the total carbon monoxide and particulate emissions projected in the revised application is lower than that in the original application.

Otter Tail Power Company, lead developer
[illegible]al Minnesota Municipal Power Agency
[illegible] River Energy
Heartland Consumers Power District
Missouri River Energy Services
Montana-Dakota Utilities Co.
Southern Minnesota Municipal Power Agency

As described in my May 31, 2006 letter to you, we have also added to the application the Big Stone II co-owner's voluntary commitment to a site-wide cap of 189 lbs/year provided the facilities are allowed a period of three years after commercial operation date to test and implement commercially available, technically feasible mercury emissions control measures. This agreement is significant because it allows the Big Stone facility to increase electrical emissions by 230% without increasing mercury emissions above 2004 emission levels.

To effectuate these changes, on behalf of the co-owners of the Big Stone II project, Otter Tail Power Company is enclosing an updated permit application with the minor changes highlighted. As reflected in Section 5 of the updated application, the additional equipment will meet Best Available Control Technology requirements. In addition, air quality modeling results provided in Section 6 demonstrates that Big Stone II (including these new emission units) will meet the applicable air quality requirements.

Please call me if you have any questions.

Sincerely,

Terry Graumann
Manager, Environmental Services

Enclosures

Old #	New #	Description	Revised		Original		Notes
			PM10 tpy	CO tpy	PM10 tpy	CO tpy	
24	13	Unit II only normal flow max load	788.40	3,942.00	788.40	4,204.80	Revised BACT value
25	14	Emergency Fire Water Pump - BSP II	0.03	0.60	0.29	0.88	Changed to NSPS values
26	15	Emergency Diesel Generator - BSP II	0.18	3.18	7.50	55.74	Changed to NSPS values
27	16	Cooling Tower	20.55		20.55		
13	17	Emergency Coal Reclaim System	5.07		5.07		
14	18	Yard Coal Silo Fill System	13.52		13.52		
15	19	Yard Coal Silo Loadout System	8.45		8.45		
16	20	Limestone Reclaim System	4.51		4.51		
17	21	Limestone Receiving System	3.75		3.75		
18	22	Coal Tripper/Silo Fill System	26.66		26.66		
19	23ab	Fly ash silo bin vent	3.38		3.38		
20,21	24	Limestone Day Bins Vent	1.49		0.26		Modified source
NA	25	Diesel FW Booster Pump (Boiler)	0.02	0.32			New Source
22	26	Coal Plant Transfer System	3.38		-		New Source
23	27	Coal Crusher Building - BSP II	11.26		11.26		
NA	29	Limestone Precrusher Building	0.80				New Source
NA	30	Emergency Coal Stockout System	7.76		-		New Source
NA	32	Coal Yard Transfer System	2.41		3.38		Modified source
NA	33	Diesel FW Booster Pump (Silos)	0.03	0.49			New Source
Roads	Roads	Roads	14.31		28.63		
Piles	Piles	Piles	6.73		7.08		
29	28	Limestone stackout conveyor - fugitive	0.02		0.13		Modified source
28	NA	Unit 2 fly ash loading to trucks (dry)	0.00		0.10		Deleted Source
Total			**922.71**	**3,946.59**	**932.91**	**4,261.41**	

Big Stone II

Prevention of Significant Deterioration Construction Permit Application

UPDATED

Prepared for
Big Stone II Co-owners

Big Stone City, South Dakota
June 2006

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Pursuant to the requirements of Administrative Rules of South Dakota (ARSD) Chapter 74:36:09 and 40 Code of Federal Regulations (CFR) Part 52.21, the Big Stone II Co-owners are submitting this Prevention of Significant Deterioration (PSD) permit application for the installation of one (1) nominal 600 megawatt (MW) net baseload super-critical pulverized coal-fired unit and ancillary equipment (Project). The new unit will be located at the existing Big Stone Plant site located in Grant County, South Dakota, an attainment area for all criteria pollutants.

This application is being made by Otter Tail Power Company on behalf of the Project Co-Owners:

- Central Minnesota Municipal Power Agency (CMMPA);
- Great River Energy (GRE);
- Heartland Consumers Power District (HCPD);
- Montana-Dakota Utilities Co., a Division of MDU Resources Group, Inc. (MDU);
- Otter Tail Corporation dba Otter Tail Power Company (OTP);
- Southern Minnesota Municipal Power Agency (SMMPA); and
- Western Minnesota Municipal Power Agency (WMMPA).

The Project will consist of a new pulverized coal-fired boiler to power a steam turbine generator, associated pollution control equipment, auxiliary equipment, cooling tower, and materials handling equipment. The boiler will be fired by Powder River Basin subbituminous coal delivered by rail to the site. Potential emissions from the boiler and associated equipment are given in Table ES-1. The emissions in Table ES-1 are based on the Emissions Estimates in Section 3 of this application and the Best Available Control Technology (BACT) analysis in Section 5 of this application. These emissions represent the combustion of coal in the new boiler, proposed emissions reductions from the Big Stone Plant unit I boiler, other emissions associated with the boiler addition, and emissions from the cooling tower. A full description of new equipment being added as well as modifications to existing materials handling equipment and the new requested limits is given in Section 2. Potential emissions are based on a maximum firing rate and continuous operation (8,760 hours per year) except as otherwise indicated.

Table ES-1: Projected Emissions and Significance Levels

Pollutant	Potential Emissions Increase (TPY)	PSD Significance Level (TPY)
CO	3,946.59	**100**
NO_x	0	40
PM_{10}	922.71	**15**
SO_2	0	40
VOC	98.36	**40**
Lead	0.47	0.6
H_2SO_4	131.40	**7**
Fluorides	15.77	**3**

Plant Wide Emissions Cap for SO_2 and NO_x

As part of this project, the existing Big Stone unit I flue gas will be ducted to a wet flue gas desulfurization (WFGD) system to control SO_2 emissions from Big Stone Plant unit I and Big Stone II. Emissions of NO_X from the Big Stone II boiler will be controlled by combustion control (i.e., low-NO_X burners) and a selective catalytic reduction (SCR) system. Additionally, the existing over-fire air system will be used more aggressively on Big Stone Plant unit I for control of NO_x emissions. As a result, there will be no emissions increase in SO_2 or NO_x from the installation of Big Stone II.

Big Stone requests a 12-month rolling plant wide cap of 13,278 tons per year (tpy) of SO_2 and 16,448 tpy of NO_x.

Air Quality Analysis

The existing air quality in the Grant County area is in attainment with the National Ambient Air Quality Standards (NAAQS), or is not classified, for all criteria pollutants. Air dispersion modeling was performed on the pollutants subject to PSD, except VOC, to project the air quality after the new boiler becomes operational. The modeling was performed in accordance with approved EPA modeling guidance and the modeling protocol was submitted to the South Dakota Department of Environment and Natural Resources (SD DENR) on March 25, 2005. The modeling analysis included in Section 6 demonstrates that Big Stone II will not cause or contribute to a violation of the NAAQS or the PSD Increments.

BACT for Coal-Fired Boiler

A "top down" BACT analysis was performed for each of the contaminants in Table ES-2 that were above the PSD significance levels: CO, PM_{10}, VOC, sulfuric acid mist, and fluorides. Pollution control equipment and good combustion practices will ensure that these criteria pollutants meet applicable BACT. A baghouse will control emissions of PM_{10} (including low and semi-volatile metals). Emissions of CO and VOC will be controlled through the use of state-of-the-art boiler equipment and good combustion practices. The use of good combustion practices controls the amount and distribution of excess air in the flue gas to ensure that there is enough oxygen present for complete combustion, thereby minimizing emissions. Optimum boiler maintenance and operating procedures will also be followed. A wet FGD system will be utilized to control sulfuric acid mist emissions and fluoride emissions.

BACT for Other Equipment

A BACT analysis was performed for the diesel generator, fire pump, cooling tower, and materials handling equipment for PM_{10}, CO, VOC, and sulfuric acid mist. BACT for the diesel generator is low-sulfur fuel and good combustion practices. For the emergency diesel fire pumps, BACT is determined to be the use of low-sulfur fuels and good combustion practices. BACT for the cooling tower is high efficiency drift eliminators. BACT for the new materials handling operations varies depending upon the type of operation, and consists of baghouse/fabric filters, enclosures and inherent material moisture content.

Table ES-2: BACT Summary.

	Big Stone II		Other Equipment
Pollutant	**Control**	**Rate**	**Control**
CO	Combustion Controls	0.15 lb/MMBtu	Good combustion practices
PM_{10} (filterable and condensable)	Baghouse	0.03 lb/MMBtu	Enclosure, water/surfactant, fabric filter, good work/combustion practices
VOC	Combustion Controls	0.0036 lb/MMBtu	Good combustion practices
H_2SO_4	Wet FGD System	0.005 lb/MMBtu	NA
Fluorides	Wet FGD System	0.0006 lb/MMBtu	NA

Mercury

EPA published the Clean Air Mercury Rule on May 18, 2005 in the *Federal Register*. The rule establishes Standards of Performance for mercury emissions for new and existing electric utility steam generating units. New coal-fired utility units that commence construction after January 30, 2004 are affected by the rules provision. The rule requires subbituminous fired units that use a wet FGD system to achieve a mercury emission rate of 42 x 10^{-6} lb per megawatt hour or less. As described in the May 31, 2006 letter from Terry Graumann to Kyrik Rombough, the Big Stone II co-owners have voluntarily committed to a site-wide cap (i.e., from both Big Stone I and II combined) of 189 lbs/yr to be achieved three years after the Big Stone II commercial operation date to allow for testing and implementation of commercially available, technically feasible mercury emission control technology. This agreement is significant because it allows the Big Stone facility to increase electrical emissions by 230% without increasing mercury emissions above 2004 emission levels.

The rule has been challenged by a number of entities and its outcome is uncertain at this time. Big Stone II will conform to the final rule once the regulatory requirements have been defined.

Additional Impacts

The impact of Big Stone II on visibility, soils, and vegetation is discussed in Section 7 of this application. The analysis shows that the new boiler and associated equipment will not have a significant impact on the surrounding area.

1. INTRODUCTION

1.0 INTRODUCTION

The Big Stone II Co-owners are proposing to construct a new nominal 600 megawatt (MW) [net] pulverized coal-fired boiler, and other equipment associated with the boiler, to meet the increasing capacity and energy requirements for the Co-owners. The Project would be located at the existing Big Stone Plant site, located in Grant County approximately 7.5 miles northeast of Milbank and 2.5 miles northwest of Big Stone City, South Dakota. The existing Big Stone Plant consists of one cyclone-fired coal unit (450 MW).

This application is being made by Otter Tail Power Company on behalf of the Project Co-Owners:

- Central Minnesota Municipal Power Agency (CMMPA);
- Great River Energy (GRE);
- Heartland Consumers Power District (HCPD);
- Montana-Dakota Utilities Co., a Division of MDU Resources Group, Inc. (MDU);
- Otter Tail Corporation dba Otter Tail Power Company (OTP);
- Southern Minnesota Municipal Power Agency (SMMPA); and
- Western Minnesota Municipal Power Agency (WMMPA).

The new boiler will provide steam for a steam turbine generator with a nominal net power output of 600 MW. Actual unit capacity will be determined during detailed design of the plant. On-site construction of Big Stone II is scheduled to begin in spring of 2007, and commercial operation is scheduled for spring 2011. Big Stone II will be classified as a major modification to an existing major source under the Environmental Protection Agency's Prevention of Significant Deterioration (PSD) program. Since the potential to emit for the boiler and associated equipment is greater than PSD major modification significance levels, a PSD review is required. Table 1-1 shows the potential air emissions increase of the proposed construction.

Table 1-1: Emission Estimates for Big Stone II and Associated Equipment

Pollutant	Potential Emissions Increase (TPY)	PSD Significance Level (TPY)
CO	3,946.59	**100**
NO_x	0	40
PM_{10}	922.71	**15**
SO_2	0	40
VOC	98.36	**40**
Lead	0.47	0.6
H_2SO_4	131.40	**7**
Fluorides	15.77	**3**

As can be seen from above table, this project will have a significant emissions increase for PM_{10}, CO, VOC, H_2SO_4, and fluorides.

The purpose of this document is to address the requirements of the PSD program and request issuance of a permit to install the boiler and all supporting equipment at the Big Stone Plant site. The design parameters of Big Stone II are summarized in Table 1-2.

Table 1-2: Expected Design Parameters

Emission Source	Coal-Fired Boiler
Power Output	600 MW of Electricity (nominal net)
Stack Exhaust Temperature	136°F
Operating Hours	Continuous (8,760 hours per year)
Primary Fuel	Subbituminous Coal
Maximum Heat Input	6,000 MMBtu/hr
Startup/Backup Fuel	Fuel oil

The air quality investigation for Big Stone II is divided into the following general parts:

1. A Best Available Control Technology (BACT) demonstration for each pollutant subject to PSD review.
2. An ambient air quality impact assessment to demonstrate that the facility will not exceed the PSD increments and National Ambient Air Quality Standards (NAAQS).
3. An analysis of how the facility will impact commercial/residential growth, soil, vegetation, and visibility in the surrounding area.

The construction permit application is divided into the following sections:

- Section 2 presents a general description of Big Stone II.
- Section 3 provides potential emission estimates of criteria pollutants subject to PSD review.
- Section 4 summarizes federal and state air regulations applicable to Big Stone II, including the PSD permit regulations.
- Section 5 contains the BACT demonstrations. .
- Section 6 provides model descriptions and data requirements for the air quality impact assessment as well as interpretation, analysis, and comparison of the modeling results with applicable air quality regulations.
- Section 7 addresses other air quality-related impacts (i.e., growth, soil, vegetation, and visibility).

The construction permit application forms, required by the DENR are included in Appendix A.

2. PROJECT DESCRIPTION

2.0 PROJECT DESCRIPTION

The site proposed by the Big Stone II Co-Owners is an existing industrial site adjacent to the existing Big Stone Plant unit I northwest of Big Stone, South Dakota. The site is located in Grant County, which is currently designated as an attainment/ unclassified area for all criteria pollutants in 40 CFR Part 81. Figure 2-1 shows the location of Big Stone II on a United States Geological Survey (USGS) 7.5-minute map. A scaled layout of Big Stone II, its fence line, and its property boundaries are shown in Appendix B.

Big Stone II plans to install a new coal-fired boiler that will utilize pulverized coal technology to generate steam to power a nominal 600 MW net steam turbine generator. The unit will provide baseload power to the electric grid on a continual basis. Depending on energy requirements, the unit will be operated at full load for the majority of its operating hours. The following equipment will also be installed in conjunction with the coal-fired boiler:

- Low-NO_X burners, over-fire air, and selective catalytic reduction (SCR)
- Baghouse
- Wet flue gas desulfurization (FGD)
- Diesel generator and emergency fire pumps
- Coal, limestone and combustion by-product handling and storage facilities
- Cooling tower

Combustion controls (i.e., low-NO_X burners and over-fire air) and SCR will be used to control NO_X emissions. A baghouse will be used to control PM_{10} emissions. To minimize the emission of SO_2, a wet FGD will be installed using limestone as the reagent. Good combustion practices will control CO and VOC. The wet FGD system, in conjunction with the baghouse, will be used for the control of acid gases. The baghouse will also control other inorganic Hazardous Air Pollutants (HAPs) (metals).

Figure 2-2 presents an overall process flow diagram for Big Stone II. Figures 2-3, 2-4, 2-5, and 2-6 present diagrams for the bottom ash, fly ash, limestone, and coal handling, respectively.

The flue gas stream passes through the wet FGD system where limestone is added to the gas stream to remove SO_2. Dewatered waste slurry (FGD sludge) from the FGD process is gypsum ($CaSO_4 \bullet 2H_2O$). At present, it is anticipated the gypsum will be disposed of in the on-site landfill. However, in the future the gypsum could potentially be sold and shipped by truck or rail to customers for use as feedstock in the manufacturing of sheetrock or wallboard for buildings. The gypsum material from the dewatering system (vacuum filters) will be mechanically conveyed to a temporary storage area for loading into trucks for transport to disposal at the on-site landfill.

To provide limestone to the FGD, the plants will have a new limestone receiving system, a reclaim system, an enclosed crusher and a stock out conveyor. All will be equipped with dust suppression and/or control systems.

The facility will be supplied with a new backup diesel generator. The backup generator will be capable of safely shutting down the new unit in the event of a plant trip or blackout conditions. It is expected that it will only be operated as required for loss of power at Big Stone II and to confirm reliability of the emergency electrical power system. During normal operation, the intent is that one of the two coal-fired units at Big Stone will remain in operation and be capable of providing start-up power to the second coal-fired unit via the 13.8 kV bus in the substation. The Co-owners intend to have the backup diesel generator available for energy sales purposes. Consequently, application to EPA will be made under the New Unit Exemption requirements of the Acid Rain Program. This generator is expected to operate only routinely for 500 hours or less per year, and will be permitted for a potential operation of 500 hours per year.

In addition, three diesel-fired internal combustion engine-driven emergency fire water pumps will be installed to serve as a fire-water pump to suppress fires at the site. Big Stone proposes to limit the operation of these units to 500 hours each per year.

With the installation of Big Stone II, the four (4) existing vibrating feeders, 72-inch Conveyor 1, 72-inch Conveyor 2 and 72-inch Tripper Conveyor 3 will be upgraded to increase the coal unloading rate from 3150 tons per hour to 3600 tons per hour. This will allow unit trains to be consistently unloaded in approximately 4 hours. The existing transfer point structure, located adjacent to the existing coal barn storage, will be upgraded to provide the necessary support for the new conveyor upgrades and additions.

The existing emergency stock-out system will feed a new 72-inch Silo Feed Conveyor. The new Silo Feed Conveyor will also be provided with a fixed tripper, fabric filter dust collector and lowering well to form a new emergency stock-out pile. The new emergency stock-out pile formed at this location will contain approximately 75,000 tons, and will provide coal to the existing reclaim hopper, as well as, to a new reclaim hopper. Coal will be transferred to inactive storage from this location by existing mobile equipment. A new dual reclaim hopper with two (2) vibrating feeders will be provided (adjacent to the existing reclaim hopper) which will transfer coal from the emergency stock-out pile to a new Crusher House. The inactive storage pile will contain approximately 697,000 tons of coal for Units 1 and 2. In order to provide 4 days live storage for new Big Stone II, three (3) new concrete yard storage silos will be constructed to provide an additional 36,000 tons of dedicated storage. Each yard silo will be 65 feet diameter by approximately 225 feet tall, with a single conical mass flow hopper. Coal will be withdrawn from each yard storage silo by a variable speed belt feeder, and transferred to the new Crusher House via a new 42 inch belt conveyor rated at 725 tph.

New conveyors for Big Stone II will be provided in enclosed (enclosed with corrugated roofing and siding on both sides of the gallery) walk-thru conveyor trusses.

A new Transfer Building will be installed on the coal conveying system between the coal silos and a new Crusher Building to allow transfer of coal from one conveyor to another. The new Crusher House will receive coal from the Live Storage Silos (or from the reclaim system). The Transfer Building and the Crusher Building will be a totally enclosed structures. The Crusher House will contain a surge bin, two variable speed belt feeders, two ring granulator crushers and motors and all necessary chute work and gates. Each crushing system will be capable of reducing the received coal to the required size at a rate of 725 tph. Coal from the new Crusher House to Big Stone II will be provided by new dual 42-inch belt conveyors.

A new surge bin will be provided with cut-off gates and two variable speed belt feeders which will feed two silo-transfer cascade conveyors. Each silo transfer cascade conveyor will feed dual tripper coal silo fill conveyors at the rate of 725 tph. With these additions, the coal will then be transferred to the boiler via an underground/aboveground conveying system.

A new wet cooling tower will also be added to the site to remove excess heat from the steam cycle. Some particulate matter can become entrained in the plumes exiting the cells of the cooling tower. These emissions will be minimized through the use of high efficiency drift eliminators.

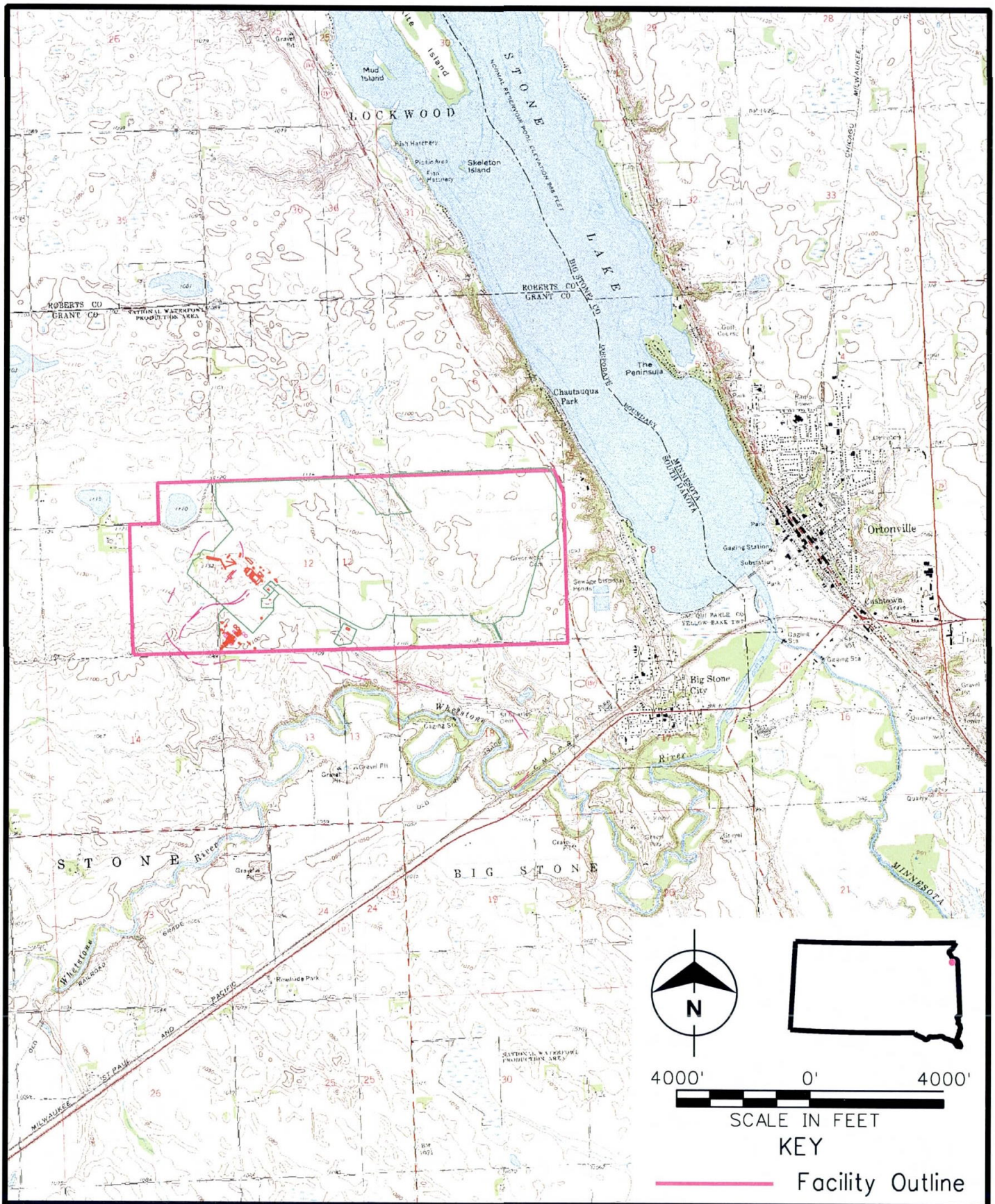

Figure 2-1
Facility Location

USGS Quadrangle Ortonville, MINN 1971
USGS Quadrangle Big Stone Lake SE, S DAK 1971

BIG STONE II
PARTNERS IN GENERATION

Burns & McDonnell

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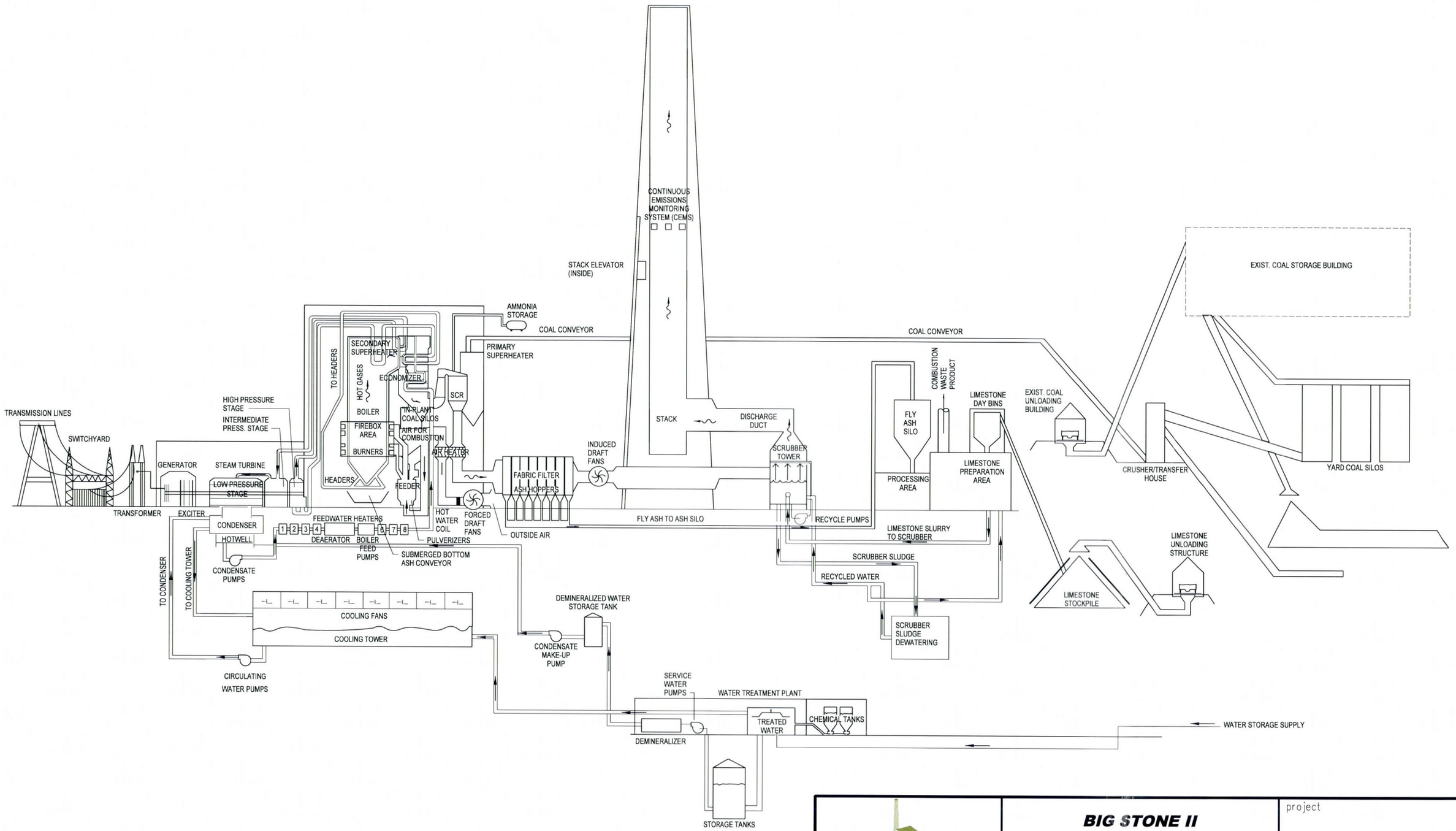

BIG STONE II	**BIG STONE II** **600 MW-PC**	project
date		contract
designed	OVERALL PROCESS FLOW DIAGRAM	

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$FILE$

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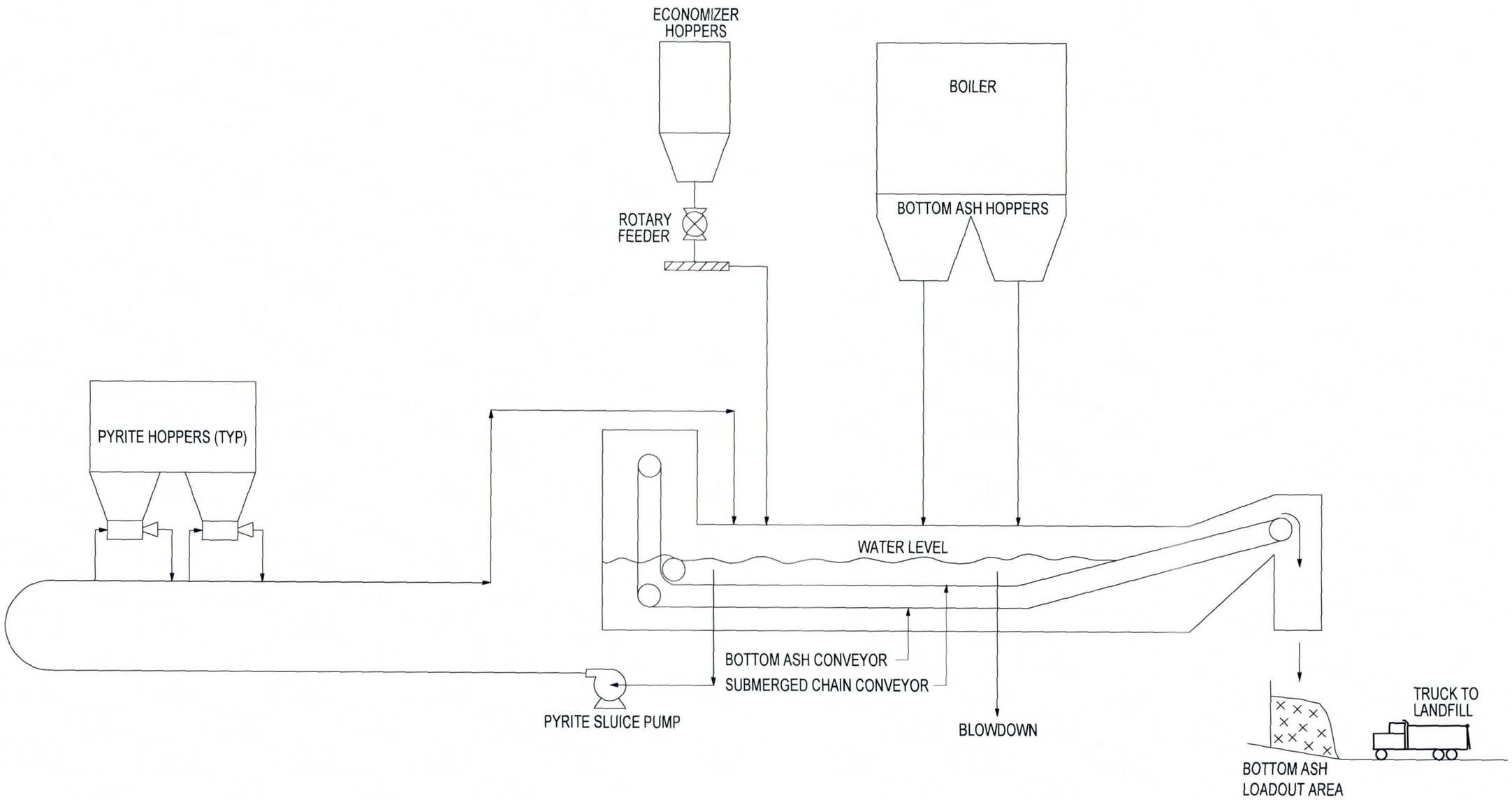

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BIG STONE II

date

designed

BIG STONE II
600 MW-PC

BOTTOM ASH HANDLING FLOW DIAGRAM

project

contract

FIGURE 2-3

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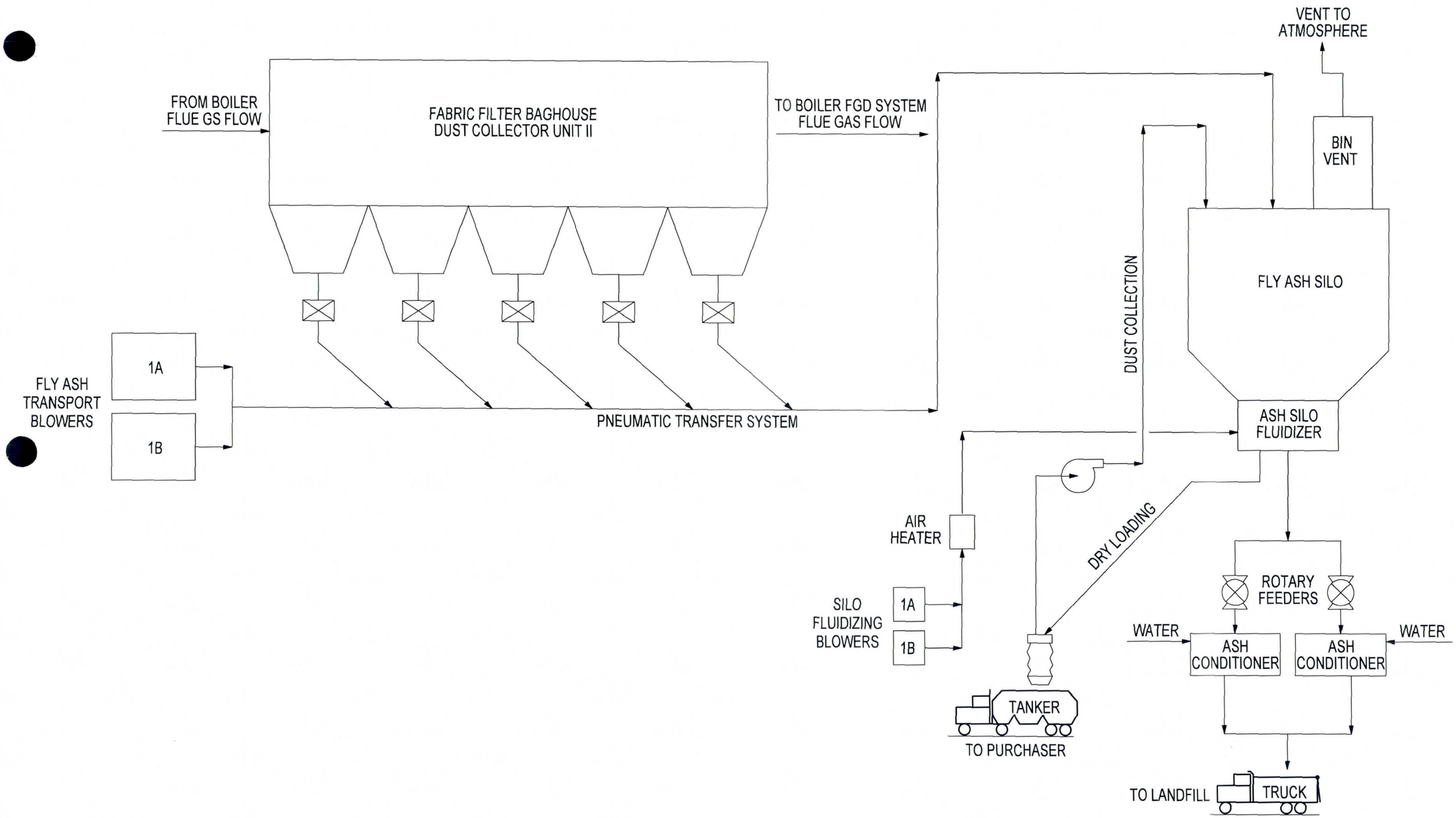
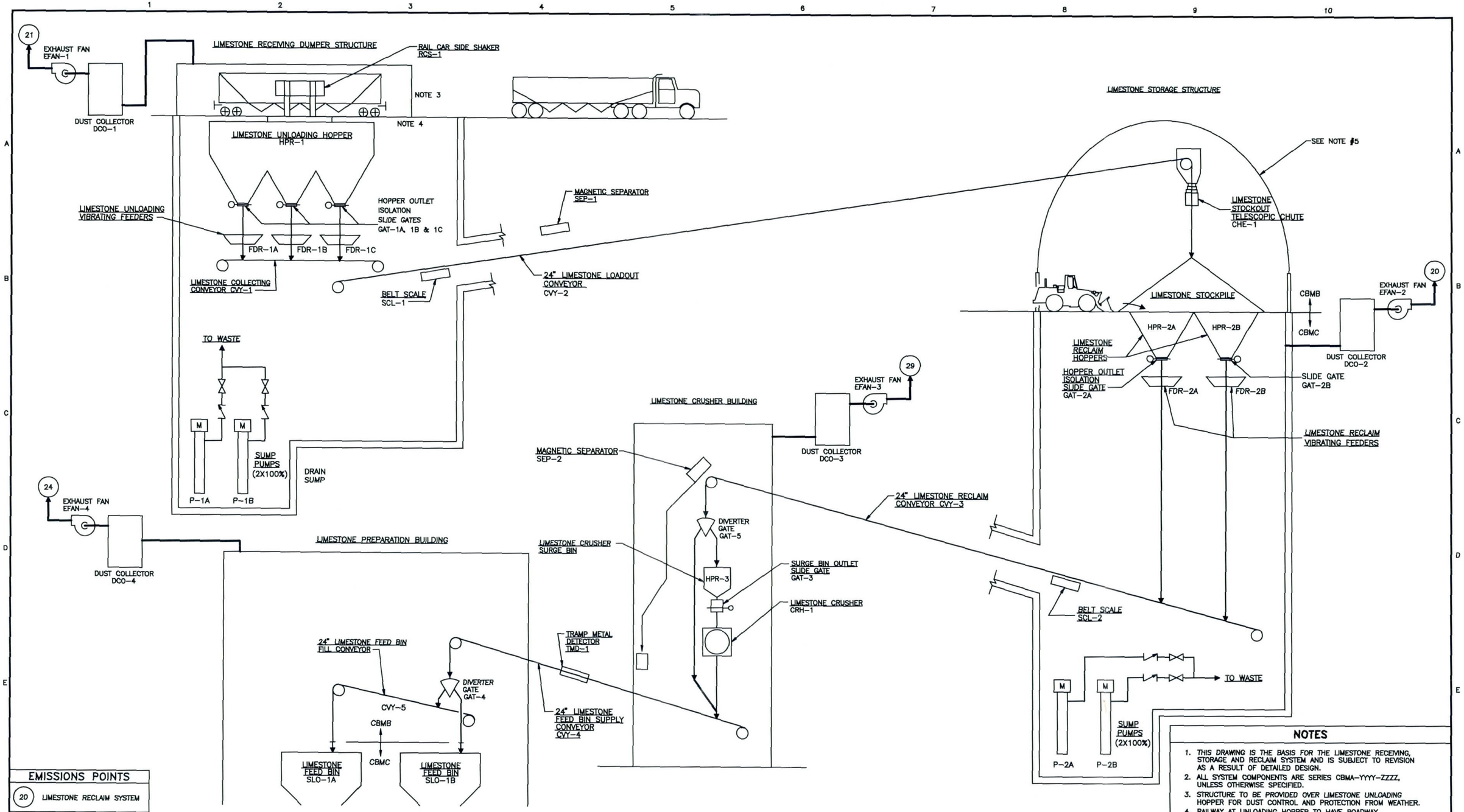


BIG STONE II PARTNERS IN GENERATION	**BIG STONE II** **600 MW-PC**	project
		contract
date	FLY ASH HANDLING FLOW DIAGRAM	FIGURE 2-4
designed		



EMISSIONS POINTS

20	LIMESTONE RECLAIM SYSTEM
21	LIMESTONE RECEIVING SYSTEM
24	LIMESTONE DAY BIN VENT
29	LIMESTONE CRUSHER SYSTEM

NOTES

1. THIS DRAWING IS THE BASIS FOR THE LIMESTONE RECEIVING, STORAGE AND RECLAIM SYSTEM AND IS SUBJECT TO REVISION AS A RESULT OF DETAILED DESIGN.
2. ALL SYSTEM COMPONENTS ARE SERIES CBMA-YYYY-ZZZZ, UNLESS OTHERWISE SPECIFIED.
3. STRUCTURE TO BE PROVIDED OVER LIMESTONE UNLOADING HOPPER FOR DUST CONTROL AND PROTECTION FROM WEATHER.
4. RAILWAY AT UNLOADING HOPPER TO HAVE ROADWAY TREADS TO ALLOW TRUCKS TO DRIVE ON RAILS.
5. STRUCTURE TO BE PROVIDED OVER LIMESTONE STORAGE AND RECLAIM AREA FOR PROTECTION FROM WEATHER.

NOT TO BE USED FOR CONSTRUCTION

NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PDE	APP
0	06/16/2006	INITIAL ISSUE	SJR	VML		MEH	MWM

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF SOUTH DAKOTA

SIGNED _____

DATE _____ REG NO. _____

BLACK & VEATCH CORPORATION

ENGINEER VML DRAWN SJR

CHECKED DATE

BIG STONE II CO-OWNERS
BIG STONE II POWER PLANT

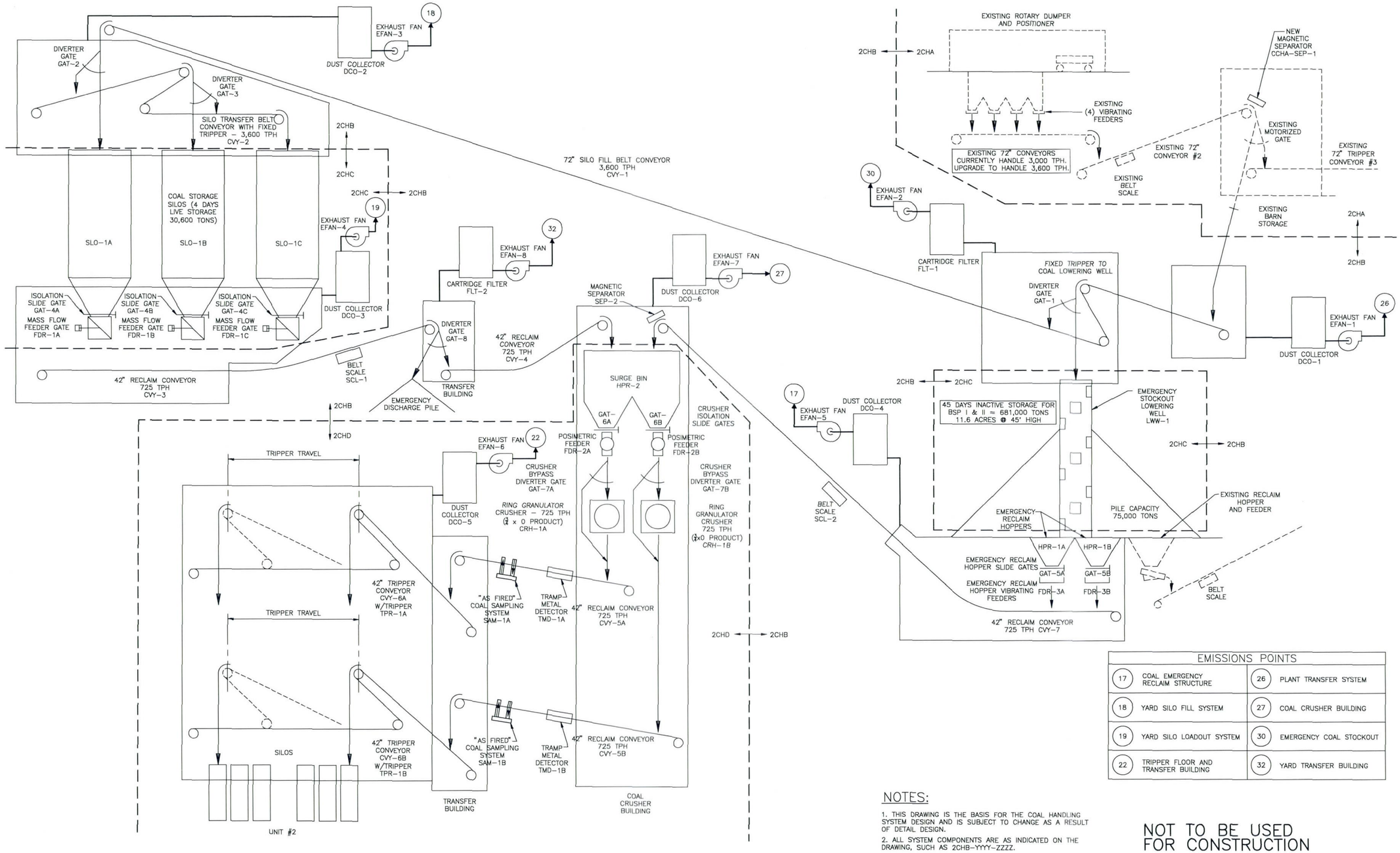
PROCESS FLOW DIAGRAM – PERMITTING
LIMESTONE RECEIVING, STORAGE AND RECLAIM

PROJECT DRAWING NUMBER 142662-SS-060616-01 REV 0

CODE

AREA

RIL46040 A1ASL015 06/16/06 13:21:27 D1 15.05



EMISSIONS POINTS			
17	COAL EMERGENCY RECLAIM STRUCTURE	26	PLANT TRANSFER SYSTEM
18	YARD SILO FILL SYSTEM	27	COAL CRUSHER BUILDING
19	YARD SILO LOADOUT SYSTEM	30	EMERGENCY COAL STOCKOUT
22	TRIPPER FLOOR AND TRANSFER BUILDING	32	YARD TRANSFER BUILDING

NOTES:

1. THIS DRAWING IS THE BASIS FOR THE COAL HANDLING SYSTEM DESIGN AND IS SUBJECT TO CHANGE AS A RESULT OF DETAIL DESIGN.
2. ALL SYSTEM COMPONENTS ARE AS INDICATED ON THE DRAWING, SUCH AS 2CHB–YYYY–ZZZZ.

NOT TO BE USED FOR CONSTRUCTION

NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PDE	APP
0	06/16/06	INITIAL ISSUE	SJR	VML		MEH	MWN

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF SOUTH DAKOTA

SIGNED _____

DATE _____ REG NO. _____

BLACK & VEATCH CORPORATION

ENGINEER VML DRAWN SJR

CHECKED DATE

BIG STONE II CO–OWNERS
BIG STONE II POWER PLANT

PROCESS FLOW DIAGRAM – PERMITTING
COAL HANDLING

PROJECT / DRAWING NUMBER: 142662–SS–060616–00

REV: 0

CODE

AREA

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3. EMISSIONS ESTIMATES

3.0 EMISSIONS ESTIMATES

New emissions of criteria pollutants will accrue from Big Stone II due to the combustion of coal in the boiler, the transfer of coal and combustion wastes, and auxiliary equipment. The Big Stone II boiler and auxiliary combustion equipment have the potential to emit NO_X, SO_2, CO, VOC, PM_{10}, H_2SO_4, lead, and fluorides while the materials handling systems and cooling tower will potentially emit PM_{10}. Emissions from the boiler are dependent on whether both boilers are running or only one. To account for different load scenarios, emissions were analyzed with only Big Stone unit 1, only Big Stone Unit 2, and both boilers operating. Table 3-1 shows the maximum expected potential yearly emission rates from the boiler and the potential yearly emissions from other sources associated with the new boiler.

The following assumptions were used to determine potential annual emissions from the boiler:

- Emissions for the boiler assumed full load for 8,760 hours annually
- CO emissions assumed an emission rate of 0.15 lb/MMBtu
- PM_{10} (filterable and condensable) emissions assumed an emission rate of 0.03 lb/MMBtu
- VOC emissions assumed an emission rate of 0.0036 lb/MMBtu
- H_2SO_4 emissions assumed an emission rate of 0.005 lb/MMBtu
- Lead emissions assumed an emission rate of 1.8×10^{-5} lb/MMBtu
- Fluoride emissions assumed an emission rate of 0.0006 lb/MMBtu

Table 3-1: Potential Emissions from Big Stone II and Ancillary Operation

Pollutant	Potential Emissions Increase (TPY)	PSD Significance Level (TPY)
CO	3,946.59	**100**
NO_x	0	40
PM_{10}	922.71	**15**
SO_2	0	40
VOC	98.36	**40**
Lead	0.47	0.6
H_2SO_4	131.40	**7**
Fluorides	15.77	**3**

3.1 Emission Sources

As previously stated, emissions from Big Stone II will originate from the boiler, the cooling tower, auxiliary combustion equipment, and associated material handling systems. Each new emission point is discussed in more detail in the sections below. Control device descriptions, efficiencies and the procedures for estimating emissions, are also discussed below. Tables showing the emission calculations are included in Appendix C.

3.2 Plant Wide Emissions Cap for SO_2 and NO_x

As part of this project, the existing Big Stone Plant unit I flue gas will be ducted to the WFGD system to control SO_2 emissions from the unit. Additionally, over-fire air will be used more aggressively on Big Stone Plant unit I for control of NO_x emissions. As a result, there will be no significant emissions increase in SO_2 or NO_x from the installation of Big Stone II.

Big Stone requests a 12-month rolling plant wide cap of 13,278 tpy of SO_2 and 16,448 tpy of NO_x. This limit is based on the plant wide average emissions of SO_2 and NO_x from 2003 and 2004. See Table 3-2.

Table 3-2: Plant Wide Emissions Cap (tpy)

	Year						
	2000	**2001**	**2002**	**2003**	**2004**	**Average 2003/2004**	**Requested Limit**
SO_2 tpy	13,529	13,620	11,759	12,261	14,296	13,278	13,278
NO_x tpy	16,900	16,360	14,857	15,863	17,033	16,448	16,448

3.3 Boiler

One new pulverized coal-fired (PC) boiler will be installed. The boiler will be equipped with low-NO_X burners, over-fire air, and SCR to reduce NO_X emissions, wet FGD to control SO_2 and acid gases, and a baghouse to control PM_{10}. Individual pollutant emission estimates are presented below.

3.3.1 Boiler CO Emissions

The emission rate for CO was assumed to be 0.15 lb/MMBtu based on the BACT analysis. The design heat input to the boiler is expected to be 6,000 MMBtu/hr, resulting in CO emissions as follows:

E_{CO} = (6,000 MMBtu/hr heat input) * (0.15 lb/MMBtu)

= 900 lb/hr

= 3,942 tons per year

3.3.2 Boiler PM_{10} Emissions

The emission rate for PM_{10} was assumed to be 0.03 lb/MMBtu (filterable and condensable) based on the BACT analysis. The design heat input to the boiler is expected to be 6,000 MMBtu/hr, resulting in PM_{10} emissions as follows:

E_{PM10} = (6,000 MMBtu/hr heat input) * (0.03 lb/MMBtu)

= 180 lb/hr

= 788.40 tons per year

3.3.3 Boiler VOC Emissions

The emission rate for VOC was assumed to be 0.0036 lb/MMBtu based on the BACT analysis. The design heat input to the boiler is expected to be 6,000 MMBtu/hr, resulting in VOC emissions as follows:

E_{VOC} = (6,000 MMBtu/hr heat input) * (0.0036 lb/MMBtu)

= 21.6 lb/hr

= 94.61 tons per year

3.3.4 Boiler H_2SO_4 Emissions

The emission rate for H_2SO_4 was assumed to be 0.005 lb/MMBtu based on the sulfur content of the coal and the WFGD SO_2 control technology. The design heat input to the boiler is expected to be 6,000 MMBtu/hr, resulting in H_2SO_4 emissions as follows:

E_{H2SO4} = (6,000 MMBtu/hr heat input) * (0.005 lb/MMBtu)

= 30 lb/hr

= 131.4 tons per year[1]

[1] Emissions calculated using *Estimating Sulfuric Acid Aerosol Emissions from Coal-Fired Power Plants* (R. Hardman, R. Stacy, 9/98 Revision). See Appendix C for documentation.

3.3.5 Boiler Lead Emissions

The emission rate for lead was assumed to be 1.8×10^{-5} lb/MMBtu based on the baghouse controls in the BACT analysis. The design heat input to the boiler is expected to be 6,000 MMBtu/hr, resulting in lead emissions as follows:

E_{Pb} = (6,000 MMBtu/hr heat input) * (1.8×10^{-5} lb/MMBtu)

= 0.108 lb/hr

= 0.47 tons per year

3.4 Cooling Tower

A new wet cooling tower is proposed to handle the new steam turbine exhaust heat load. Water from the cooling tower is cycled through the circulating water system to remove heat from the Big Stone II steam turbine exhaust. The makeup water when supplied to the cooling tower contains trace amounts of dissolved minerals. These constituents can become entrained in the cooling tower drift (liquid water droplets carried along with the evaporated water) and be emitted as PM_{10}. The maximum concentration of solids in the water is determined by design limits of the equipment. For purposes of estimating PM_{10} emissions from the cooling tower, a total dissolved solids concentration is assumed to be 6,000 ppm. The high efficiency drift eliminators will control drift to 0.0005 percent, leaving a drift rate of approximately 1.56 gallons of water per minute lost from the cooling tower. An emission rate was calculated as follows:

6,000 ppm = 0.006 pounds of solids per pound of water

(0.006 lb PM / lb water) * (1.56 gpm) * (8.34 lb/gal) = 0.078 pounds per minute PM_{10} emitted

(0.078 lbs/min) * (60 min/hr) = 4.69 pounds per hour of PM_{10} emitted from the new cooling tower

(4.69 lb PM_{10}/hr) * (8,760 hr/yr) / (2000 lbs/ton) = 20.6 tons / year of PM_{10} for new cooling tower

3.5 Auxiliary Combustion Equipment

Emissions from fuel combustion will result from the diesel fire pumps and diesel generator. Diesel fuel will be limited to a sulfur content of ≤0.05 percent sulfur.

Example Fire pump: 420 HP x 0.00205 lb SO_2/hp-hr = 0.86 lb/hr

0.86 lb/hr x 500 hr/yr x ton/2000 lbs = 0.22 tpy

Emissions for the other two fire pumps are calculated in a similar manner (225 hp and 340 hp).

Generator: 2,220 HP x 0.00205 lb SO_2/hp-hr = 4.55 lb/hr

4.55 lb/hr x 8,760 hr/yr x ton/2000 lbs = 19.93 tpy

3.6 Materials Handling Operations

Emissions of PM_{10} result from the transfer and handling of other materials on-site. These materials include the low-sulfur western subbituminous coal, limestone, and ash materials. Additionally, the haul roads on-site as well as the storage piles will generate fugitive emissions.

All of these sources were identified in the "Fugitive Emissions Protocol," submitted to DENR on April 29, 2005 and updated with this submittal. That protocol can be found in Appendix E and lists the emission operations and associated controls, as well as the methodology for calculating the emissions.

4. REGULATORY REVIEW

4.0 REGULATORY REVIEW

Emission sources at Big Stone II are subject to various federal and state air regulations. This part contains a discussion of the applicable requirements of the PSD regulations, applicable New Source Performance Standards (NSPS), and the Administrative Rules of South Dakota (ARSD).

4.1 PSD Regulations

The PSD review is the process of determining whether pre-construction review is required in accordance with 40 CFR 52.21 and ARSD 74:36. The PSD review consists of the following: a case-by-case BACT determination; an ambient air quality analysis to determine if the project will cause or significantly contribute to a violation of the NAAQS or PSD increment; possible ambient air monitoring; an assessment of the effects on visibility, industrial growth, soil, and vegetation; and an opportunity for public comment. Three criteria were evaluated to determine PSD applicability (EPA, 1990):

1) Whether the project is sufficiently large (in terms of its emissions) to be a "major" stationary source or "major" modification.
2) Whether the source is located in a region designated as "attainment" or "unclassified."
3) Whether the pollutants emitted from a major stationary source exceed the significant emission rates defined by 40 CFR 52.21.

Criteria pollutants include NO_X, SO_2, CO, PM_{10}, VOC, and lead. The definition of a major stationary source is given in 40 CFR 52.21. The Big Stone Power Plant is included in the 28 source categories specified in PSD regulations and thus would be considered a major stationary source only if the potential emissions of a PSD pollutant exceed 100 tons per year. The new boiler is expected to emit PSD pollutants in excess of 100 tons per year; thus meeting the first criteria for PSD applicability. The potential increase in emission rates from Big Stone II are specified in the Table 4-1.

Table 4-1: Significant Emission Levels under PSD Regulations.

Pollutant	Potential Emissions Increase (TPY)	PSD Significance Level (TPY)
CO	3,946.59	**100**
NO_x	0	40
PM_{10}	922.71	**15**
SO_2	0	40
VOC	98.36	**40**
Lead	0.47	0.6
H_2SO_4	131.40	**7**
Fluorides	15.77	**3**

At the time of the submittal of this application, no contract has been executed on a specific boiler for Big Stone II. Emissions were estimated using a panel of reference boilers, which have the same physical characteristics as are intended for this project. Detailed calculations of potential emissions are contained in Appendix C. As shown above, Big Stone II is large enough to classify the project as a major stationary source whose emissions are above the PSD significance levels. Therefore, installation of Big Stone II meets the first and third criteria of PSD applicability.

Big Stone II will be located in an attainment/unclassified area for all criteria pollutants and is subject to PSD review rather than non-attainment New Source Review. The project thus meets the second criteria for PSD applicability.

PSD regulations require that the following issues be addressed:

a) The source will meet all emission standards and applicable rules.
b) The source is not expected to cause an exceedance of any NAAQS or PSD increment (see Section 6 for details).
c) The source will not exceed any applicable maximum allowable increase over the PSD baseline concentration in any area.
d) The source will not exceed any emission limits for HAPs.
e) The source has paid any applicable permit fees.

4.2 New Source Performance Standards

Per 40 CFR Part 60 and ARSD 74:36:07:03, Big Stone II will be subject to several New Source Performance Standards (NSPS). The NSPSs are listed below with a description of how Big Stone plans to meet the standards set forth by the regulations.

4.2.1 Subpart Da

Construction and operation of the Big Stone II boiler (S24) is subject to NSPS 40 CFR Part 60 Subpart Da. Subpart Da applies to each electric utility steam generating unit with a heat input of 250 MMBtu/hr or greater. On February 28, 2005, EPA proposed amended emission limits for SO_2, NO_X, and PM. Although the proposal has not been adopted as a final rule, all steam electric generating units that begin construction, modification or reconstruction after February 28, 2005 would be affected by the proposed amendments.

For electric utility steam generating units firing subbituminous coal, the following requirements from amended Subpart Da will apply based on the February 28, 2005 proposal:

1) NO_X performance standards:

- 1.0 pounds of NO_x per megawatt-hour (lb/MWh) of gross energy output over a 30-day rolling average period.

The Big Stone II boiler emission rate will be less than 1.0 pounds of NO_X per megawatt-hour (lb/MWh) of gross energy output averaged over a 30-day rolling average period.

2) SO_2 performance standards, averaged over a 30-day period:

- 2.0 pounds of SO_2 per megawatt hour (lb/MWh) of gross energy output over a 30-day rolling average

The Big Stone II boiler emission rate will be less than 2.0 pounds of SO_2 per megawatt hour (lb/MWh) of gross energy output averaged over a 30-day rolling average.

3) Total particulate performance standards:

- 0.012 lb/MMBtu (filterable particulate only)
- Opacity shall not exceed 20% on a 6-minute average, except for one 6-minute period per hour not greater than 27% opacity (excluding periods of startup, shutdown, and malfunction).

The Big Stone II boiler emission rate for PM (filterable only) is 0.012 lb/MMBtu. Please note that the PM_{10} limit established in the BACT is 0.03 lb/MMBtu (filterable plus condensibles). The Big Stone II boiler will be in compliance with the opacity standards.

4) Mercury performance standards. The following performance standard for mercury emissions was added to Subpart Da on May 18, 2005, and applies to all units constructed after January 30, 2004:

- Subbituminous coal- fired units that use a wet FGD system must achieve a mercury emission rate of 42×10^{-6} lb per megawatt hour or less, based on a 12-month rolling average.

The Big Stone II boiler will be in compliance with the mercury standard.

Subpart Da will require continuous monitoring of the exhaust gas for NO_X, SO_2, mercury, and opacity.

4.2.2 Subpart Y

Subpart Y of the NSPS applies to any of the following affected facilities in coal preparation plants which were constructed or modified after October 24, 1974 and process more than 181 Mg (200 tons) per day: Thermal dryers, pneumatic coal-cleaning equipment (air tables), coal processing and conveying equipment (including breakers and crushers), coal storage systems, and coal transfer and loading systems.

New conveyors and storage systems shall not exhibit 20 percent opacity or greater.

4.2.3 Subpart OOO

Subpart OOO applies to crushers, grinding mills, screening operations, belt conveyors, storage bins, and enclosed truck loading stations at nonmetallic mineral processing plants. Wet limestone FGD systems will be installed to control emissions of SO_2 at the Big Stone facility. The FGD system requires a limestone processing system for operation, which is subject to Subpart OOO. The limestone crusher has a capacity greater than 25 tons per hour. Stack particulate emissions are limited to 0.022 gr/dscf and 7 percent opacity and fugitive emissions are limited to 10 percent opacity. The limestone processing system will comply with these requirements.

4.3 Internal Combustion Engine NSPS and NESHAP

The diesel generator is subject to the National Emission Standard for Hazardous Air Pollutants (NESHAP) as regulated by 40 CFR Part 63 Subpart ZZZZ. The diesel fire pump is exempt from this

NESHAP because its use will delegated to testing and emergency use. The diesel generator will be limited to 500 hours per year of operation.

NESHAP Subpart ZZZZ requires the generator to reduce CO emissions by 70 percent or more, or limit the concentration of formaldehyde in the stationary reciprocating internal combustion engine (RICE) exhaust to 580 parts per billion by dry volume (ppmdv) or less at 15 percent O_2.

The proposed NSPS Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines has been published in the Federal Register. The diesel generator and the diesel fire pump emission will be required to meet the NSPS.

This application assumes that the diesel generator will potentially operate for 500 hours per year. Table 4-2 shows the emission limitations in NSPS Subpart IIII which used for the dispersion modeling. The modeled emission rates are equal to the NSPS Subpart IIII limits for NO_x, HC, and PM_{10}.

Table 4-2: Emission Rate Comparison for the Diesel Generator.

Pollutant	NSPS Subpart IIII Emission Rates (gm/hp hr)
NO_x + HC*	2.4
CO	2.6
PM_{10}	0.15

*Hydrocarbons

4.4 South Dakota Air Quality Standards and Regulations

This section describes the regulations which apply to Big Stone II, according to the ARSD.

4.4.1 ARSD 74:36:09 - State Origin PSD Review

Under the 1977 Clean Air Act Amendments (CAAA), BACT and other PSD requirements applied to emissions of criteria pollutants and also to emissions of certain non-criteria pollutants regulated under Section 111 (NSPS) and Section 112 (NESHAP) of the Act. However, in Section 112(b)(6) of the 1990 CAAA, Congress specifically excluded the HAPs listed in Section 112(b)(1) from the PSD requirements. U.S. EPA clarified this exclusion in a March 11, 1991 memo from John Seitz. This memo stated that:

"the following pollutants, which have been regulated under PSD, are now exempt from Federal PSD applicability:

- arsenic
- asbestos
- benzene
- beryllium
- hydrogen sulfide
- mercury
- radionuclides (including radon and polonium)
- vinyl chloride

4.4.2 ARSD 74:36:05 - Operating Permits

Big Stone Plant unit I has applied for, and received, a Title V operating permit for the existing equipment at the Big Stone Power Plant. Big Stone will apply for an amendment to their Title V permit within 12 months after commencing operation of Big Stone II.

4.4.3 ARSD 74:37:01 - Air Permit, Emission and Inspection Fees

This section describes the fees necessary for submitting a permit to DENR for processing. The application includes the $100 permit application fee as indicated in ARSD 74:37:01

4.4.4 ARSD 74:36:06:02 - Allowable Emissions for Fuel-Burning Units - Particulate Emissions

Big Stone II will be subject to the requirements listed in ARSD 74:36:06:02. According to this rule, a fuel-burning unit with a heat input equal to or greater than 10 MMBtu/hr may not exceed the particulate matter emissions rate determined by the following equation:

$E = 0.811\ H^{-0.131}$, where

E = the allowable particulate emissions rate in lb/MMBtu of heat input and

H = heat input in MMBtu/hr (6,000);

E = 0.259 lb/MMBtu/hr (for Big Stone II)

The Big Stone II boiler emission rate for PM (filterable only) is 0.012 lb/MMBtu. Please note that the PM_{10} limit established in the BACT is 0.03 lb/MMBtu (filterable plus condensables). The unit will therefore be in compliance with this requirement.

The limits for the diesel fire pump and the diesel generator are 0.71 lb/MMBtu and 0.59 lb/MMBtu, respectively. These limits are higher than their corresponding emission rates. These rates are approximate since the exact heat rate for the units will not be known until a specific vendor is selected.

4.4.5 ARSD 74:36:06:02 - Allowable Emissions for Fuel-Burning Units - Sulfur Emissions

According to ARSD 74:36:06:02, a fuel-burning unit may not emit sulfur dioxide emissions to the ambient air in an amount greater than three pounds of sulfur dioxide per MMBtu of heat input to the unit based on a three-hour rolling average, which is the arithmetic average of three contiguous one-hour periods. Big Stone II will have an SO_2 emission rate of less than 3 lb/MMBtu and will be in compliance with this regulation.

The diesel fire pumps and the diesel generator will burn fuel with a sulfur content ≤ 0.05 percent sulfur, will have an SO_2 emission rate of less than 3 lb/MMBtu, and will be in compliance with this regulation.

4.4.6 ARSD 74:36:12 - Control of Visible Emissions

According to Chapter 74:36:12, of the ARSD, the opacity from the Big Stone II sources must not be greater than 20 percent. The Big Stone II sources will be in compliance with this regulation.

Exceptions are provided for:

- the presence of uncombined water
- smoke is emitted for the purpose of training or research and approved by the department
- For brief periods during such operations as soot blowing, start-up, shut-down, and malfunctions.

4.5 NAAQS

Part 6 of this permit application discusses the ambient air quality analysis and dispersion modeling that was performed for Big Stone II. Big Stone II is not expected to cause or contribute to a violation of the NAAQS. A full description of the NAAQS modeling analysis is included in Part 6.

4.6 Other Ambient Air Quality Standards

In addition to the NAAQS, PSD Class I and II increment consumption must be considered as part of the air quality analysis. There are no Class I areas within 300 km of the Big Stone Power Plant. The impact on visibility in the nearest sensitive area, Pipestone National Monument which is 145 km from the Big Stone Power Plant, was examined. To determine the effect of the plant on this Class II area, VISCREEN modeling was performed. Results of the modeling and a further discussion of the analysis can be found in Part 7.

Additionally, the impact of Big Stone II on soils, vegetation and threatened and endangered species was considered as part of the PSD process. The construction and operation of Big Stone II is not expected to have a detrimental effect on plants, soils or wildlife. A full analysis of these impacts can be found in Part 7 of this report.

4.7 Accidental Release Prevention

The CAA amendments of 1990 included language that requires chemical accident prevention provisions for affected facilities. Section 112(r), Prevention of Accidental Releases, established requirements for owners and operators of stationary sources, who produce, process, handle or store any number of regulated chemicals. The purpose of this requirement is to prevent and mitigate accidental releases of these substances by preparing detailed risk assessment and implementing a number of safety procedures through the preparation of a Risk Management Plan (RMP).

Affected facilities are those stationary sources that store, use, or handle any of the 140 listed hazardous chemicals of flammable/explosive substances in amounts greater than the listed threshold quantities. An analysis will be done after the design is finalized to determine if the generating station will store any of the listed chemicals or substances at quantities near or above the threshold levels. If any chemicals will be stored or handled on-site, Big Stone will comply with the accidental release provisions.

4.8 Monitoring and Compliance

Monitoring and compliance requirements for operation of the coal-fired boiler come from two sources. They are:

- New Source Performance Standards, 40 CFR Part 60, Subpart Da, Standards of Performance for Electric Utility Steam Generating Units
- Continuous Emissions Monitoring, 40 CFR Part 75

In instances where there are multiple requirements it is understood that compliance with the most restrictive requirement will demonstrate compliance with all other requirements.

4.9 Initial Compliance Demonstration

The performance test to demonstrate initial compliance will be conducted within 180 days of initial start up of the boiler or within 60 days after achieving maximum operational capacity. The following tests will be conducted:

- Particulate matter concentration, Reference Method 5 or 5B;
- PM_{10}, Reference Methods 5 or 201A and Method 202, adjusted for bias if necessary as described in Section 5.5;
- Non-methane hydrocarbons, Reference Method 25A and Reference Method 18 (if necessary);
- Carbon monoxide, Reference Method 10; and
- Visible emissions, Reference Method 9.

4.9.1 Continuous Emission Monitor (CEM)

The Big Stone II boiler is subject to the compliance monitoring requirements under the Acid Rain regulations in 40 CFR Part 75 and New Source Performance Standards in accordance with 40 CFR Part 60. The boiler will employ a continuous emission monitoring system (CEMS) in accordance with 40 CFR Part 75 to continuously monitor NO_x, SO_2, opacity, CO_2, and volumetric flow rate. The Big Stone II boiler will also comply with the continuous monitor requirements of the Clean Air Mercury Rule. The test plan will be contained in the Part 75 monitoring plan and certification application that will be submitted within the appropriate time periods. Monitoring required under NSPS is discussed in Section 4.2.

4.9.2 Compliance Assurance Monitoring (CAM)

The U. S. EPA promulgated CAM regulations on October 22, 1997 as 40 CFR Part 64. The regulations require that new major sources (defined in CAM regulations as those whose potential criteria pollutant emissions prior to a control device exceed 100 tons/yr) must have a monitoring plan for each such pollutant. However, the regulation exempts sources subject to certain standards issued after November 15, 1990; acid rain permitted sources, and sources who obtained federally enforceable construction permits containing continuous compliance methods specified in approved SIP regulations.

Since the proposed Big Stone II will be governed by post November 15, 1990 Acid Rain permit requirements and since the PSD permit will also include CEM requirements, CAM plans for SO_2 and NO_x are not required under 40 CFR Part 64. Because no specific control technology is being proposed for CO or VOC the uncontrolled emissions are equal to the controlled emissions and no CAM plan is required.

The following emission points may be subject to CAM for particulate emissions. CAM compliance will be addressed in the Title V operating permit application.

EP13	Big Stone II Boiler
EP17	Emergency Coal Reclaim Hopper
EP18	Yard Coal Silo Fill System
EP19	Yard Coal Silo Loadout System
EP20	Limestone Reclaim System
EP21	Limestone Receiving System
EP22	Coal Tripper/Silo Fill System
EP23	Fly ash silo bin vent
EP26	Coal Plant Transfer System
EP27	Coal Crusher Building - BSP II
EP29	Limestone Precrusher Building
EP30	Emergency Coal Stockout System
EP32	Coal Yard Transfer System

5. BACT

5.0 BEST AVAILABLE CONTROL TECHNOLOGY ANALYSIS

Any proposed construction at a major source having the potential to result in a net increase in emissions of regulated pollutant at levels greater than the corresponding PSD significance levels is subject to PSD review, including a BACT analysis for each of these pollutants. The projected controlled annual emissions and PSD significance levels for Big Stone II are shown in Table 5-1. The potential controlled emissions in Table 5-1 are based on continuous operation for an entire year (8,760 hours) at an assumed Maximum Continuous Rating (MCR) heat input of 6,000 MMBtu/hr, taking into account SO_2 and NO_x reductions from unit I.

Table 5-1: Big Stone II Total Annual Emissions and Significance Levels

Pollutant	Potential Controlled Emissions (tpy)	PSD Significance Level (tpy)	BACT Required
CO	3,946.59	**100**	Yes
NO_x	0 [A]	40	No
PM_{10}	922.71	**15**	Yes
SO_2	0 [A]	40	No
VOC	98.36	**40**	Yes
Lead	0.47	0.6	No
H_2SO_4	131.40	**7**	Yes
Fluorides	15.77	**3**	Yes

[(A)]Overall emissions are based on emission increases (i.e., Big Stone II addition) and decreases (i.e., Big Stone unit I decreases) that will be contemporaneous.

Table 5-1 indicates that the controlled potential to emit for PM_{10}, CO, VOC, sulfuric acid mist, and fluorides are greater than the respective PSD significance level. These five pollutants are subject to BACT review because they exceed the PSD significance levels. Emissions of SO_2 and NO_x are not subject to BACT review. Refer to Section 3.2 for additional information.

A BACT analysis was performed using the "top-down" approach, which is described in the next section. A summary of the proposed emission BACT results is shown in Table 5-2. A more detailed explanation behind the selection of each control technology and emission rate is given in Section 5.3 through 5.9.

Table 5-2: Summary of BACT for Big Stone II

Pollutant	Control Method	Emission Rate lb/MMBtu
PM_{10}	Baghouse	0.03
CO	Combustion Controls	0.15
VOC	Combustion Controls	0.0036
Sulfuric Acid Mist	Wet FGD and Baghouse	0.005
Fluorides	Wet FGD	0.0006

PM_{10}: The greatest degree of particulate control is achieved through the use of baghouses (fabric filters). Therefore, a baghouse capable of controlling emissions to 0.03 lb/MMBtu was selected as BACT for PM_{10}. This limit is for the filterable and condensable portion of PM_{10}, and a description of the methodology used to arrive at this emission limit is included in Section 5.5.

CO and VOC: Combustion controls are the only feasible method available to control CO and VOC emissions for a PC boiler. Combustion controls were selected as BACT for CO and VOC as discussed in Sections 5.6 and 5.7, respectively.

Sulfuric Acid Mist: Wet FGD used in conjunction with a baghouse was selected as BACT for sulfuric acid mist to control emissions to 0.005 lb/MMBtu. Sulfuric acid mist emissions are discussed further in Section 5.8.

Fluorides: The greatest degree of fluoride control is achieved through the use of wet FGD. Therefore, wet FGD to control emissions to 0.0006 lb/MMBtu was selected as BACT for fluorides as discussed in Section 5.9.

5.1 Top-Down Analysis

The Draft 1990 New Source Review Workshop Manual describes the "top-down" BACT process as follows:

> "In brief, the top-down process provides that all available control technologies be ranked in descending order of control effectiveness. The PSD applicant first examines the most stringent--or "top"--alternative. That alternative is established as BACT unless the applicant

demonstrates…that technical considerations, or energy, [secondary] environmental, or economic impacts justify a conclusion that the most stringent technology is not "achievable" in that case. If the most stringent technology is eliminated in this fashion, then the next most stringent alternative is considered, and so on."

The 1990 Workshop Manual identifies the basic steps of a top-down BACT analysis as follows:

Step 1 – Identify all control technologies

Step 2 – Eliminate all technically infeasible control technologies

Step 3 – Rank control technologies by control effectiveness

Step 4 – Evaluate most effective controls and document results

Step 5 – Select BACT

The EPA has consistently interpreted the statutory and regulatory BACT definitions as containing two core requirements that EPA believes must be met by any BACT determination. First, the BACT analysis must include consideration of the most stringent available technologies: i.e., those that provide the "maximum degree of emissions reduction." Second, any decisions to require a lesser degree of emissions reduction must be justified by an objective analysis of "energy, environmental, and economic impacts" contained in the record or the permit decisions (EPA, 1990).

The minimum BACT emission rate must be at least as restrictive as the NSPS, if such standard applies. As discussed in Part 4, the construction of Big Stone II is subject to 40 CFR 60, Subpart Da, "Standards of Performance for Electric Steam Generation Units for which Construction Commenced after September 18, 1978." This NSPS currently limits the total filterable particulate emissions to 0.03 lb/MMBtu; however, a reduction of the NSPS limit to 0.015 lb/MMBtu has been proposed by the EPA (70 FR 9705). If adopted, the revised emission rate would be applicable to all Subpart Da sources that commenced construction after February 28, 2005.

The BACT analysis evaluates control technologies for individual pollutants, but in the final analysis the control equipment has to be evaluated as an integrated air pollution control system. The control technologies are interdependent, and reducing emissions for one pollutant may result in adverse impacts and higher emissions of another pollutant. As one example, some technologies that reduce NO_X emissions will unavoidably result in higher CO and VOC emissions due to reaction kinetics. The best

overall air pollution control system utilizes the mix of control technologies that yields the optimal overall performance and lowest overall emission levels.

5.2 Identification of Control Options

Several sources were reviewed to determine the control technologies and emission limits that were consistent with BACT. EPA's RACT/BACT/LAER Clearinghouse (RBLC) database was the first reference queried. Other sources of information were EPA's National Coal-Fired Utility Projects Spreadsheet and industry knowledge of other projects that are being developed or constructed. Tables 5-3 and 5-4 list the emission limits (and the associated control technologies) established as BACT for pulverized coal units that have been permitted in the last 15 years.

5.2.1 RBLC Database

One of the best ways to identify available control technologies is to review previous BACT determinations for similar sources. The RBLC database was reviewed to identify recent BACT determinations for similar projects. This database is maintained on EPA's Technology Transfer Network website on the Internet at www.epa.gov/ttn/catc. Advanced queries of the database were conducted to identify control technology determinations previously made for sources similar to Big Stone II. These queries were conducted for RBLC permits issued from January 1990 to May 2005.

Although a specific boiler manufacturer has not been selected, the technology will be super-critical pulverized coal-firing. Therefore, only prior BACT determinations for PC boilers were included in the comparative analysis.

There are approximately 30 PC facilities identified in the RBLC that have been permitted since January 1990. Specific facility and emissions data is listed in Appendix D. Table 5-3 provides a summary of the range of emission limitations identified in the RBLC as BACT for comparable boiler facilities for each pollutant, and the control technology associated with the BACT limits.

Table 5-3: BACT Determinations for Pulverized Coal-Fired Boilers

Pollutant	Emission Limit (lb/MMBtu)	Control Technology Description Associated with BACT Emission Limit	Number of Occurrences
PM_{10}[1]	0.012 – 0.015	Baghouse	4
	0.018 – 0.03	Baghouse	25
	0.018 – 0.023	Electrostatic Precipitator (ESP)	7
CO	0.1 – 0.11	Combustion Control	9
	0.15 – 0.20	Combustion Control	28
VOC	0.0024 – 0.004	Combustion Control	17
	0.01 – 0.067	Combustion Control	20
H_2SO_4 Mist	0.00036 – 0.011	Dry FGD	11
	0.005 – 0.04	Wet FGD w/ or w/o Wet ESP	2
Fluorides	0.0004 – 0.01	Dry FGD	9
	0.000159 – 0.01	Wet FGD	5

[1]Some of the PM_{10} limits include the condensable fraction of PM_{10} and some do not. Table D-1 includes a unit by unit breakdown indicting the basis behind the permit limit (filterable only or filterable plus condensable).

5.2.2 Sources Other Than RLBC Database

In addition to reviewing RBLC for permitted units, other information sources were reviewed to determine current control technologies and emission rates for sources that are comparable to Big Stone II. One source was the National Coal-Fired Utility Projects Spreadsheet, which shows current new project activity as reported by the ten EPA regions. This source identified several PC fired facilities that had obtained a final permit but were not already included in the RBLC. Another information source was an industry review of pulverized coal units that are currently being developed or constructed. Specific facility and emissions data for the units identified in these searches are shown in Appendix D.

Table 5-4 summarizes the emission rate ranges and respective control technologies for the facilities identified by the non-RLBC reviews and searches. The emissions rates are based on emission rates stated in the permit.

Table 5-4: Permitted Rates for PC Boilers not included in the RLBC Database

Pollutant	Emission Limit (lbs/MMBtu)	Control Technology Description Associated with Emission Limit	Number of Occurrences[A]
PM_{10}	0.018	Baghouse	3
	0.015	Multiclone/Venturi Scrubber	1
	0.02 – 0.035	Electrostatic Precipitator (ESP)	3
CO	0.11 – 0.20	Combustion Controls	7
VOC	0.0034 – 0.0065	Combustion Controls	7
H_2SO_4 Mist	0.0046 – 0.01	Wet FGD	6
Fluorides	0.00001 – 0.00088	Wet FGD	6

Notes: A. Emissions rate data for Springerville (Nat. Coal-fired Utility Spreadsheet) not included because they are generally not based on BACT.

The review of the RBLC and other data sources confirmed that control equipment on pulverized coal units has been limited to a few types. Baghouses and electrostatic precipitators have both been used to control particulate and sulfuric acid mist from coal-fired boilers. Wet FGD or dry FGD have been used to control acid gases. No technology other than "combustion control" has been identified as BACT for CO or VOC emissions.

5.3 Coal-Fired PC Boiler: Nitrogen Oxides

Emissions netting is a term that refers to the process of considering certain previous and prospective federally enforceable emissions changes at an existing major source to determine if a "net emissions increase" of a pollutant will result from a proposed physical change or change in method of operation. If the net emission change is less than the Significant Emission Rate (SER), then the modification has "netted out" for that pollutant. Such pollutants are not subject to PSD review, which includes a BACT analysis and modeling.

The netting analysis for Big Stone II showed that net NO_x emission increases from the new generation unit would not exceed the PSD significance level. Therefore, NO_x emissions from the new unit are not subject to PSD requirements such as BACT review. Refer to Section 3.2.

5.4 Coal-Fired PC Boiler: Sulfur Dioxide

The netting analysis for Big Stone II has shown that net SO_2 emission increases from the new generation unit would not exceed the PSD significance level for SO_2. Therefore, SO_2 emissions from the new unit are not subject to PSD requirements such as BACT review. Refer to Section 3.2.

5.5 Coal-Fired PC Boiler: Particulate Matter / PM_{10}

PM_{10} emissions consist of "filterable" PM_{10} and "condensable" PM_{10}. Filterable PM_{10} consists of solid particles that can be collected on a filter media. Condensable PM_{10} is material that is vapor phase at stack conditions, but which condenses and/or reacts upon cooling and dilution in the ambient air to form solid or liquid PM immediately after discharge from the stack (i.e., in the stack plume). Historically, PM_{10} permit limits have generally focused on filterable emissions. However, some of the more recent permits have grouped the filterable and condensable particulate emissions under one PM_{10} emission limit.

There is an increasing concern regarding the ability to reliably measure condensable PM_{10} emissions. Method 202, the EPA test method used to determine condensable PM_{10}, has the potential to overestimate the emissions of this pollutant due to measurement of "artifact" contributions of SO_2 and NH_3 that react in the testing apparatus (to create ammonia salts) to give false indications of additional condensable PM_{10}.[2] A more significant issue for Powder River Basin (PRB) coal-fired units is that very little data exists to indicate these expected levels of condensable particulate emissions.

Although the use of the "nitrogen purge" as an optional procedure is allowed under Method 202, it may not adequately account for "artifacts" being created in the test methods. A controlled condensation system may help address this issue; however it is not part of the test method at this time. Conditional Test Method 039 has also been proposed by other utilities as a partial solution to the artifacts issue. Measurement and subtraction of ammonium chloride and ammonium sulfates from the sample could also aid in eliminating artifact error.

The Co-owners request that DENR acknowledge the artifact error and provide the Co-owners an opportunity to propose a solution to the artifact problem once testing of Big Stone II is required.

5.5.1 Evaluation of Control Options

Filterable particulate emissions from coal-fired combustion sources are generally controlled using either a fabric filter (also called baghouse) or an electrostatic precipitator (ESP). Both of these technologies are mature technologies that are available from a number of suppliers. There are other technologies that have not been permitted as BACT but have been retrofitted into existing facilities. For example, the Advanced Hybrid particulate collector is currently being utilized at Big Stone Plant unit I. It is a technology that is in the development stage as a part of the Department of Energy National Energy Technology

[2] Louis A. Corio and John Sherwell, "In-Stack Condensible Particulate Matter Measurements and Issues", Journal of Air & Waste Management Association, Feb. 2000.

Laboratory's Power Plant Improvement Initiative. The Advanced Hybrid is a combination of an ESP and a baghouse. The initial collection mechanism of the Advanced Hybrid consists of an "ESP" while the final collection mechanism is a "baghouse." The device is configured with rows of fabric filter bags located between perforated ESP collector plates, and is equipped with baffles to ensure that all the flue gas passes past and through the collector plates prior to entering the fabric filter bags. The Advanced Hybrid has only been applied full scale as a conversion of the original ESP at Big Stone unit I and has never been installed on a new source. Although the Advanced Hybrid is technically available, the technology is in the development stage.

In the last 20 years, baghouses have become widely accepted for particulate control on low-sulfur coal-fired boilers. Western subbituminous coal has high ash resistivity, which makes particulate collection more difficult in an ESP than for a baghouse. Therefore, the use of a fabric filter is the most effective means of controlling filterable particulate emissions from Big Stone II, and has been selected as the BACT control technique. The condensable portion of the emissions is controlled through wet scrubbing in an FGD system.

Table 5-3 illustrates that the majority of the coal-fired units use fabric filters rather than ESPs for PM_{10} control. As shown on Table D-1, the units utilizing fabric filters are also typically permitted with lower emission rates than those units utilizing ESPs.

5.5.2 Environmental Considerations

There are no environmental issues that would preclude the use of an ESP or baghouse on Big Stone II. However, a baghouse may be beneficial in meeting the mercury emission limitation defined by the EPA's Clean Air Mercury Rule.

5.5.3 Energy Considerations

There are no energy considerations that would preclude the selection of either ESP or baghouse as BACT for Big Stone II.

5.5.4 Economic Considerations

There are no economic considerations that would preclude the selection of either ESP or baghouse as BACT for Big Stone II.

5.5.5 PM_{10} BACT Determination

Baghouses limiting total PM_{10} emissions to 0.03 lb/MMBtu have been selected as BACT for Big Stone II. This emission limit is comparable with the PM_{10} limit (filterable plus condensable) for similar units that have been recently permitted. Installation of the baghouses will result in the lowest particulate emissions from Big Stone II. No other proven particulate control technology is available for the units that would achieve lower emission rates. Compliance with the BACT limit for total PM_{10} will be verified by reference method tests that have been adapted to prevent positive bias from artifact compounds that form in the testing apparatus. The averaging time for the emission limit will correspond to the time required to conduct a test using the test method (approximately 3 hours).

5.6 Coal-Fired PC Boiler: Carbon Monoxide

5.6.1 Evaluation of Control Options

The only method identified to practically control CO emissions from a coal-fired boiler entails the use of appropriate combustion control techniques. The RBLC database and EPA's National Coal-Fired Utility Projects Spreadsheet list no other CO control techniques for pulverized coal units.

CO emissions are the result of incomplete combustion. Operating with higher flame temperatures and longer furnace residence times can reduce CO emissions. Unfortunately, reducing CO emissions in this manner results in an increase of NO_X emissions. Balancing low CO and NO_X emissions is an appropriate consideration in the boiler design and operation. Generally, reducing NO_x emissions is considered to be more important than achieving lower CO emissions.

Control technologies such as CO catalysts are not currently available for use on a solid-fuel fired boiler. Catalytic reduction for CO is not technically feasible because ash in the gas stream would destroy the catalyst after a very short period of operation, resulting in extremely high operational and maintenance costs due to the frequent catalyst replacement.

5.6.2 Environmental Considerations

Environmental impacts are a consideration in the determination of BACT for CO. Operating the boiler to achieve lower CO emissions will result in higher NO_X emissions. Generally, reducing NO_X emissions is considered to be more important than achieving lower CO emissions.

5.6.3 Energy Considerations

There are no significant energy impacts to be considered in the BACT evaluation for CO controls.

5.6.4 Economic Considerations

As previously stated, there is no technically feasible alternative to combustion controls for reduction of CO emissions from a coal-fired boiler.

5.6.5 CO BACT Determination

Combustion controls to achieve CO emissions of 0.15 lb/MMBtu was selected as BACT for Big Stone II. Compliance with the BACT limit will be verified by reference method tests using EPA Method 10. The averaging time for the emission limit will correspond to the time required to conduct a test using the test method (approximately 3 hours).

5.7 Coal-Fired PC Boiler: Volatile Organic Compounds

5.7.1 Evaluation of Control Options

Combustion controls are the only method identified to control VOC emissions from a PC-fired boiler. Similar to CO, however, reducing VOC emissions results in higher NO_X emissions. Consequently, NO_X emissions are an environmental factor in establishing BACT for VOCs.

5.7.2 Environmental Considerations

Environmental impacts are a consideration in the determination of BACT for VOC. Operating the boiler to achieve lower VOC emissions will result in higher NO_X emissions. Generally, reducing NO_X emissions is considered to be more important than achieving lower VOC emissions.

5.7.3 Energy Considerations

There are no energy considerations that would preclude the selection of combustion controls as BACT for Big Stone II.

5.7.4 Economic Considerations

There are no economic considerations that would preclude the selection of combustion controls as BACT for Big Stone II.

5.7.5 VOC BACT Determination

An emission rate of 0.0036 lb/MMBtu using combustion controls is recommended as BACT for VOC emissions. Compliance with the BACT limit will be verified by reference method tests using EPA

Method 25. The averaging time for the emission limit will correspond to the time required to conduct a test using the test method (approximately 3-hours). An emission rate of 0.0036 lb/MMBtu is one of the lowest levels permitted for similar applications. It should be noted that the boiler manufacturer has not been selected, thus any further refinement of the VOC emission limit attainable for Big Stone II is not possible.

5.8 Coal-Fired PC Boiler: Sulfuric Acid Mist

The majority of the sulfur in a coal-fired boiler leaves the boiler as sulfur dioxide. A small percentage of the sulfur oxides leaving a boiler will be sulfur trioxide (SO_3). In addition, the flue gas passing through the catalyst bed of an SCR system results in more of the SO_2 in the flue gas being oxidized to SO_3. As the temperature of the flue gas decreases (when it passes through the economizer, SCR, and air heater), the SO_3 combines with water vapor to form H_2SO_4 vapor. Further decrease of the flue gas temperature (below the acid dew point) results in H_2SO_4 vapor condensing to an aerosol (sulfuric acid mist).

Since Big Stone II will fire a low sulfur subbituminous coal, the quantity of sulfuric acid mist formed will be lower than that produced by a similar unit firing bituminous coal.

5.8.1 Evaluation of Control Options

H_2SO_4 vapor tends to absorb on fly ash in the flue gas as it cools. Consequently, H_2SO_4 can be removed by removing particulate from the gas stream. A baghouse will be much more effective than an electrostatic precipitator at collecting the H_2SO_4. This is because the cake on the baghouse bags tends to act as a barrier. The H_2SO_4 vapor must pass through this barrier which enhances the adsorption of the vapor on the fly ash. The baghouse is expected to remove 90 percent of the H_2SO_4 from the gas stream of a pulverized PRB coal-fired unit.

Additional H_2SO_4 removal also occurs in the scrubber portion of the FGD system. Based on a paper by Southern Company entitled, "Estimating Total Sulfuric Acid Emissions form Coal-Fired Power Plants," a wet FGD system can be expected to further reduce sulfuric acid mist emissions by approximately 50 percent.[3] Based on the same paper, it is estimated that the total H_2SO_4 reduction across a baghouse/wet FGD combination would be 95 percent.

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[3] Keith Harrison and Larry Monroe, "Estimating Total Sulfuric Acid Emissions from Coal-Fired Power Plants" Southern Company Services, Sept. 1998.

Other control options for H_2SO_4 include sorbent injection and the use of a wet electrostatic precipitator.

When sorbent injection is used for H_2SO_4 control, the most common configuration is the injection of lime (CaO) into the flue gas upstream of the particulate collector. However, in the case of PRB coal firing such as at Big Stone II, the fly ash is already highly enriched in CaO. Thus the use of a baghouse for particulate control on a PRB coal-fired boiler effectively uses the same H_2SO_4 control mechanism as the sorbent injection control option. For this reason there are no examples in the industry for which sorbent injection has been used for H_2SO_4 control on a PRB coal-fired boiler.

A wet ESP is an available control option for H_2SO_4 control. Wet ESPs have previously been identified as BACT for H_2SO_4 in several cases, as shown in Tables D-5 through D-7. However, all these cases involved boilers firing high sulfur bituminous coal. No previous examples of the application of wet ESPs for H_2SO_4 control on a unit firing low sulfur coal exist.

Therefore, the combination of low-sulfur coal, a fabric filter baghouse and a wet FGD system has been selected as BACT control technology option for H_2SO_4 control.

5.8.2 Environmental Considerations

There are no additional environmental considerations for the use of a baghouse and a wet FGD to control sulfuric acid emissions as these technologies are already proposed to control particulate emissions and SO_2 emissions from Big Stone II.

5.8.3 Energy Considerations

There are no additional energy considerations for the use of a baghouse and a wet FGD to control sulfuric acid emissions as these technologies are already proposed to control particulate emissions and SO_2 emissions from Big Stone II.

5.8.4 Economic Considerations

There are no additional economic considerations for the use of a baghouse and a wet FGD to control sulfuric acid emissions as these technologies are already proposed to control particulate emissions and SO_2 emissions from Big Stone II. Although technically feasible, the addition of a wet ESP after the wet FGD for additional H_2SO_4 control would be very expensive, representing an increase of approximately 25 to 30 percent in the installed cost of the wet FGD. Due to the extremely low inlet concentrations of H_2SO_4 it would be unlikely that vendor guarantees for significant additional H_2SO_4 removal could be

obtained. Furthermore, because the baghouse/wet FGD combination is expected to achieve 95 percent H_2SO_4 control, the additional cost for the small increment of H_2SO_4 control provided by the wet ESP would not be cost effective on a $/ton H_2SO_4 removed basis.

5.8.5 Sulfuric Acid Mist BACT Determination

A fabric filter followed by a wet FGD limiting sulfuric acid mist emissions to 0.005 lb/MMBtu has been selected as BACT for Big Stone II. This emission limit is consistent with sulfuric acid mist limits from recently permitted units. Compliance with the BACT limit for sulfuric acid mist will be verified by EPA Method 8 or by the controlled condensate test method (ASTM D3266) The averaging time for the emission limit will correspond to the time required to conduct a test using the test method (approximately 3 hours).

5.9 Coal-Fired PC Boiler: Fluorides

5.9.1 Evaluation of Control Options

The combustion of coal results in the formation of hydrogen fluoride gas (HF) and other fluoride compounds (to a much smaller degree). HF is water soluble and can be controlled to a high level with a dry FGD/baghouse system or wet FGD system. Both types of FGD systems can remove HF at 90 percent and greater efficiency, with neither type offering a definite control advantage with respect to the other type. The technology identified to have the greatest potential to limit fluoride (hydrogen fluoride) emissions from Big Stone II is a wet FGD. This technology was also selected to control SO_2. There is no environmental, energy, or economic considerations that would preclude the use of a wet FGD for fluoride emission control at Big Stone II.

5.9.2 Environmental Considerations

There are no additional environmental considerations for the use of a wet FGD to control fluoride emissions as this technology is already proposed to control SO_2 emissions from Big Stone II.

5.9.3 Energy Considerations

There are no additional energy considerations for the use of a wet FGD to control fluoride emissions as this technology is already proposed to control SO_2 emissions from Big Stone II.

5.9.4 Economic Considerations

There are no additional economic considerations for the use of a wet FGD to control fluoride emissions as this technology is already proposed to control SO_2 emissions from Big Stone II.

5.9.5 Fluoride BACT Determination

Wet FGD limiting fluorides to 0.0006 lb/MMBtu has been selected as BACT for Big Stone II. This emission limit is consistent with fluoride emission limits from units in the RBLC that have fluoride emission limits (refer to RBLC fluoride summary table). Wet FGD will result in the lowest fluoride emissions from Big Stone II. No other control technology is available for the unit that would achieve lower emission rates. Compliance with the BACT limit for fluorides will be verified by reference method tests using EPA Method 13. The averaging time for the emission limit will correspond to the time required to conduct a test using the test method (approximately 3 hours).

5.10 Material Handling Equipment

5.10.1 Coal Handling Equipment

The coal handling equipment includes the railcar unloading system, transfer towers, the coal unloading system to the storage pile, the underground coal reclaim system from the storage pile, and the plant coal silo fill. For many of the transfer points, the emissions can be enclosed. This allows for mechanical collection of the material and subsequent removal from the exhaust gas stream. Baghouses have the highest control efficiencies of any particulate matter control option and, according to the "top-down" approach, must be considered first. The industry "standard" for baghouse outlet emission rates is 0.01 grains per dry standard cubic foot (gr/dscf). This emission rate is well in excess of 99.9 percent particulate removal efficiency for particles larger than 3 microns.

Rail car unloading will be performed by the existing rotary car dumper, where the existing baghouse will control the dust. Coal from the dumper will be discharged onto a belt conveyor that moves it either to the coal storage pile where it is discharged via fixed tripper, fabric filter, and lowering well or directly to the storage silos. The well is fitted with a wet spray header to help minimize dusting during the stock out process.

Coal reclaimed from the storage area will be conveyed to a crusher house and then to the tripper conveyors that operate at the top of the plant coal silos. Baghouses will collect coal dust at the transfer towers, crusher house, and top of the coal silos.

An examination of the different types of bags available for the baghouses was performed. Dust generated from the transportation and handling of raw coal tends towards larger particle sizes. Consequently, baghouses achieve a high degree of control of raw coal dust. After review of different baghouse vendors and equipment suppliers, it was determined that the coal handling baghouses should be able to achieve a particulate emission rate of 0.01 gr/dscf at the baghouse outlet. As such, all baghouses used to control particulate emissions from the transportation and handling of coal will achieve an outlet emission rate of 0.01 gr/dscf.

As an alternative, passive dust control systems will be provided with Discrete Element Modeled (DEM) transfer chutes. The DEM design will simulate and predict material flow and behavior during the system design process. Baghouse or the passive dust control system (either separately or in combination) will be provided at the following locations:

- Live Storage Silos & Reclaim System
- Transfer Building
- Crusher House
- Plant Transfer Tower and Silo Fill System

5.10.2 Limestone Handling Equipment

Limestone will be used as a reagent in the wet FGD system for Big Stone II. Limestone handling, storage and preparation equipment will be needed to supply the limestone to the FGD system. Limestone deliveries to the plant are anticipated to be by rail. The limestone will be mechanically conveyed to a covered limestone storage pile. The plant will have a limestone reclaim system and enclosed crusher to handle larger sized limestone, and a stock out conveyor. Particulate matter emissions from limestone handling operations will be controlled through baghouses, yielding the highest level of emission control.

As with coal dust, an examination of the different types of bags available for the baghouses was performed. Dust generated from the transportation and handling of limestone tends toward larger particle sizes, similar to that for coal dust. After review of different baghouse vendors and equipment suppliers, it was determined that a standard of 0.01 gr/dscf is an appropriate emission rate. As such, all baghouses used to control particulate emissions from the handling and storage of limestone will achieve an outlet emission rate of 0.01 gr/dscf.

5.10.3 Fly Ash Handling Equipment

Fly ash collected in the air heater hoppers and the fly ash collected in the baghouse hoppers will be conveyed to the fly ash storage silo. The fly ash will be pneumatically conveyed from hoppers to the silos, and baghouses will be used to control emissions at each transfer point. Baghouses offer the highest level of control and are chosen as BACT for the ash transfer points.

Fly ash is different chemically and physically from both limestone and coal dust. It is more difficult to achieve ultra-low emission rates for fly ash than it is for coal or limestone because of the small particle size of fly ash. After review of different baghouse vendors and equipment suppliers, it was determined that the industry standard of 0.01 gr/dscf is an appropriate emission rate. As such, all baghouses used to control particulate emissions from the transportation and handling of fly ash will achieve an outlet emission rate of 0.01 gr/dscf.

Fly ash in the storage silo can be conditioned (i.e. wetted) and loaded into open bed trucks for sale or transport to an onsite or offsite landfill.

5.11 Cooling Tower

Particulate emissions occur from the cooling tower as a result of the total solids (suspended and dissolved metals and minerals) in the water droplets entrained in the air stream leaving the cooling tower. These droplets of water (containing particulate) are known as drift. While the majority of the suspended water and particulate are deposited in or near the tower, some of the drift can exit through the top of the tower and enter the air as PM_{10}. The most efficient way to remove drift from cooling towers is by installing drift eliminators. Drift eliminators are designed to remove as many droplets as feasible before the air stream and entrained particulate leave the cooling towers.

Drift eliminators to control drift emissions to 0.0005 percent of the water flow through the cooling tower have been selected as BACT for particulate matter control on the cooling tower. This represents the highest or "top" option for BACT, and in accordance with EPA guidance, no further control techniques were considered.

5.12 Diesel Internal Combustion (IC) Engines

5.12.1 Emergency Fire Pumps

The emergency fire pumps will fire low sulfur diesel fuel (≤0.05 percent sulfur) and will be limited in operation to 500 hours per year each. The use of add-on controls for VOC and PM_{10} emissions has not

been documented in the RBLC for diesel engines similar to these units. Good combustion practices and proper maintenance procedures will be used to limit VOC and PM_{10} emissions from these engines.

The RBLC does not list CO add-on controls for engines of this size, however, a control vendor has indicated that a CO catalyst system may be used on a unit this size while burning diesel fuel. The CO catalyst system is an add-on control that converts CO to CO_2 by use of a catalyst. Add-on controls for CO are estimated to cost more than $10,000 per ton of CO removed, making them economically infeasible for diesel engines of this size. Consequently, CO catalyst has been eliminated as a possible CO emission reduction strategy. The proposed BACT control method for CO for the diesel fire pumps is good combustion practices. The use of good combustion practices will keep the emission of other criteria pollutants to low levels as well.

5.12.2 Diesel Generator

The diesel generator will fire low sulfur diesel fuel (500 hours per year potential). The use of add-on controls for VOC and PM_{10} emissions has not been documented in the RBLC for diesel engines similar to these units. Good combustion practices and proper maintenance procedures will be used to limit VOC and PM_{10} emissions from these engines.

The RBLC does not list CO add-on controls for engines of this size, however, a control vendor has indicated that a CO catalyst system may be used on a unit this size while burning diesel fuel. The CO catalyst system is an add-on control that converts CO to CO_2 by use of a catalyst. Add-on controls for CO are estimated to cost more than $10,000 per ton of CO removed, making them economically infeasible for diesel engines of this size. Consequently, CO catalyst has been eliminated as a possible CO emission reduction strategy. The proposed BACT control method for CO for the diesel fire pump is good combustion practices. The use of good combustion practices will keep the emission of other criteria pollutants to low levels as well.

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6. AIR DISPERSION MODELING

6.0 AIR DISPERSION MODELING

Since this project is subject to PSD review, an air dispersion modeling analysis is required for each pollutant subject to 40 CFR Part 52.21. According to the emission estimates for this project, CO and PM_{10} are subject to PSD review, and an air quality analysis was performed for each. Since VOCs are photoreactive pollutants and are generally regional in nature in terms of their contribution to ozone formation, no reactive-pollutant modeling of VOCs was conducted. In addition, Big Stone II requests that a pre-construction ambient ozone monitoring study not be required since potential VOC emissions are expected to be less than 100 tpy.

The results of the modeling indicate that the impacts of CO from Big Stone II will not result in a significant impact at any location. According to the draft "New Source Review Workshop Manual," no further modeling is required for a PSD applicant if the modeled impacts are below the significance levels. However, the modeling analyses show that Big Stone II's emissions exceed the PSD *de minimis* modeling significance thresholds for PM_{10}. A refined modeling analysis will be conducted for the annual PM_{10} averaging period and the 24-hour PM_{10} averaging period to demonstrate compliance with the National Ambient Air Quality Standards (NAAQS) and PSD Class II Increments.

6.1 Air Dispersion Model

Air dispersion modeling was performed using the latest version of the ISCST3 model (Version 02035). The ISCST3 model is an EPA-approved, steady state, Gaussian air dispersion model that is designed to estimate downwind concentrations from single or multiple sources using supplied meteorological data. The ISCST3 model is used for most industrial sources and PSD permits and is an appropriate model for this type of industrial facility.

Major features of the ISCST3 model are as follows:

- Plume rise due to momentum and buoyancy as a function of downwind distance for stack emissions;
- The influence of building wakes on plume transport and dispersion as evaluated by the Huber and Snyder Method for physical stack heights that are greater than $h_b + 0.5(l_b)$, where h_b is the building height and l_b is the lesser of the building height or width, and by the Schulman and Scire Method for stack heights that are less than or equal to $h_b + 0.5(l_b)$;

- Regulatory default option;
- Buoyancy-induced dispersion algorithm;
- Calm wind treatment of meteorological data;
- Procedures suggested by Briggs for evaluating stack-tip downwash;
- Default wind profile exponents;
- Default vertical potential temperature gradient;
- Consideration of the effect of gravitational settling and dry deposition on ambient particulate concentrations;
- Capability of simulating line, volume, and area sources;
- Concentration estimates for 1-hour to annual average; and,
- Adjustment procedures for complex terrain.

Details of the modeling algorithms contained in the ISC model may be found in the User's Guide for ISC. The regulatory default option was selected for this analysis since it met the USEPA guideline requirements. Further specifications, detailed in the air dispersion modeling analysis protocol, submitted to DENR on March 25, 2005 can be found in Appendix E of this report.

6.2 Model Stack Parameters

6.2.1 Big Stone II

Modeling runs were conducted at full load and partial loads to confirm that operation of Big Stone II will not result in impacts greater than the NAAQS or PSD increments. The stack parameters used in the analysis are given in Table 6-1. Emission rates for each of the pollutants at each operating load are given in Table 6-2.

Table 6-1: Big Stone II – Boiler Stack Parameters

Stack Height	Stack Diameter	Exit Velocity (ft/s)			Stack Temp. (°F)		
		Both Boilers	Boiler 2 Only	Both Boilers	Both Boilers	Boiler 2 Only	Both Boilers
498 ft	34 ft	29.68	29.68	33.89	138	136	137

Table 6-2: Boiler Potential Emission Rates

Pollutant	Capacity Emissions (lb/hr)		
	Both Boilers	Boiler 2 Only	Both Boilers
CO	458.20	900.00	1,358.20
PM_{10}	1,508.00	180.00	1,688.00

All emissions were modeled to correspond to their BACT emission levels.

6.2.2 Rotary Car Dumper

Big Stone II is modifying the existing rotary car dumper (#7a, b, c, and d) to have a stack height of 31.25 feet, no rain cap, and a grain loading of 0.01 gr/dscf.

6.2.3 Haul Roads

The haul road segments in the model are designated as "PR…" or "RR…" depending on whether the road is currently a paved road or a rock road. However, all haul roads will be paved as part of the Big Stone II project. Paved roads will be swept and/or wetted with water or another dust suppression agent as needed to control fugitive dust. Paved road emission factors were used to calculate the emissions from all haul road segments with a 50% control efficiency factor to account for the fugitive dust controls. Figures 6-2 through 6-9 show the road layouts.

Figure 6-1: Unit 1 Tire (Alternate Fuel) Haul Road

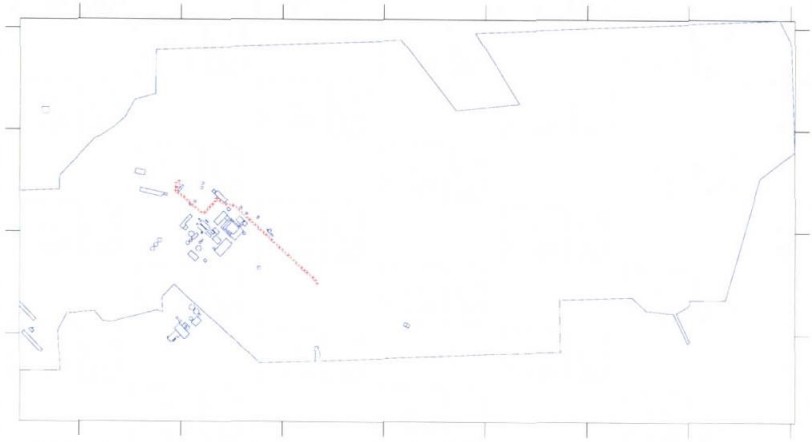


Figure 6-2: Common Haul Road to Main Entrance and Landfill Road

Figure 6-3: Gypsum Haul Road

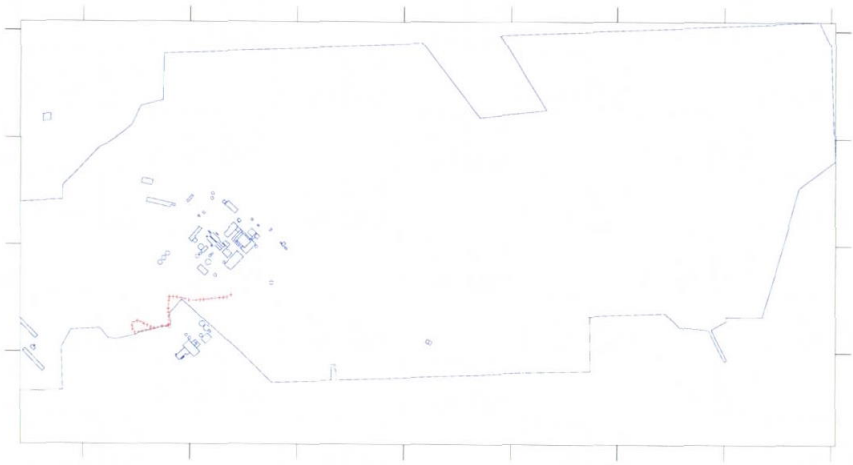


Figure 6-4: Limestone Haul Road

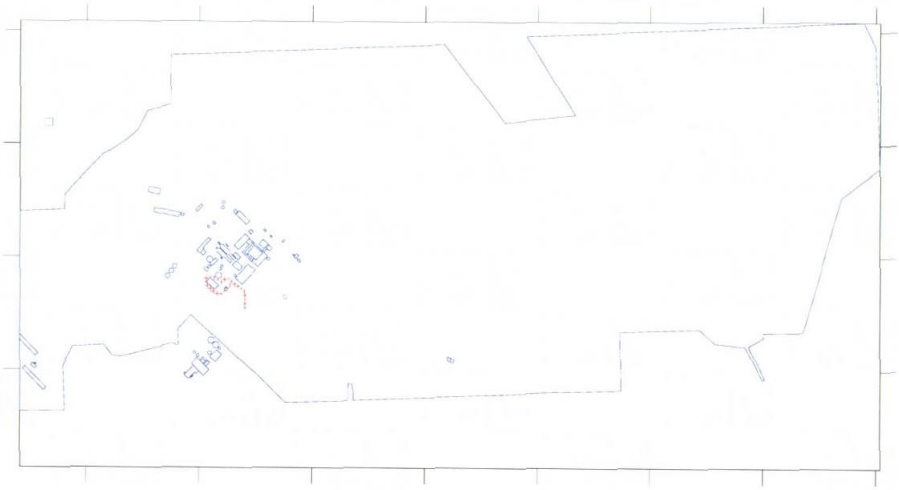


Figure 6-5: Unit 1 Fly Ash Haul Road

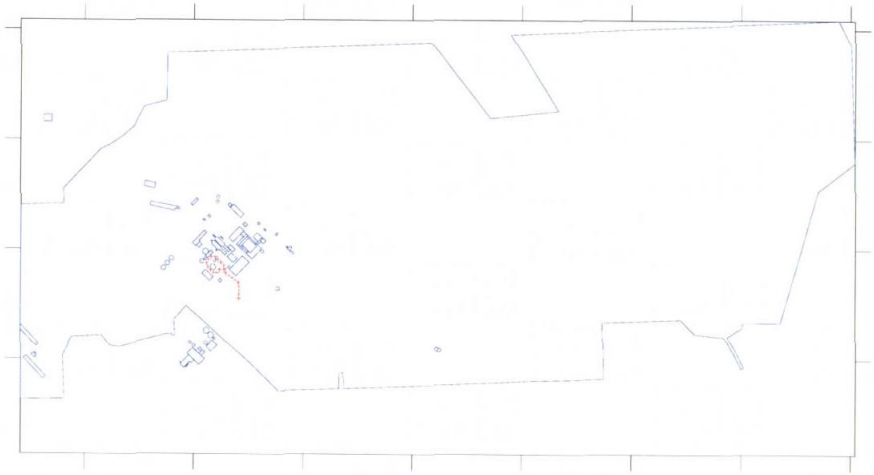


Figure 6-6: Unit 2 Fly Ash Haul Road

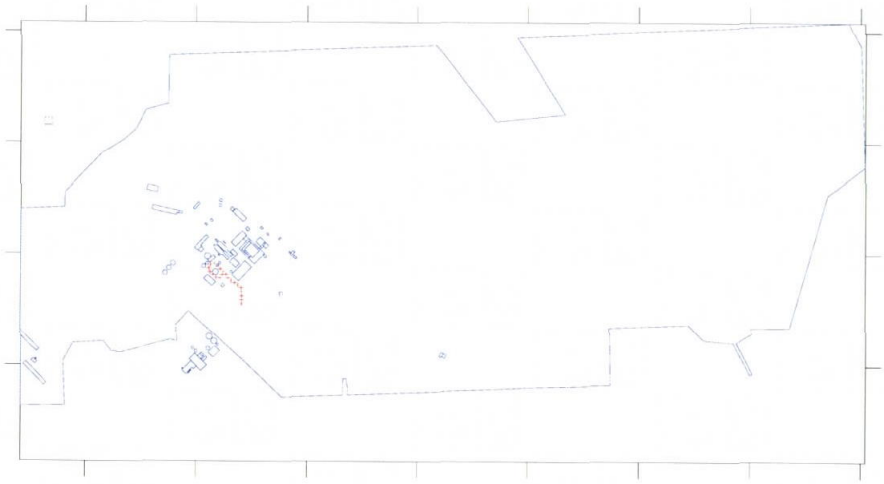


Figure 6-7: Unit 1 Bottom Ash Haul Road

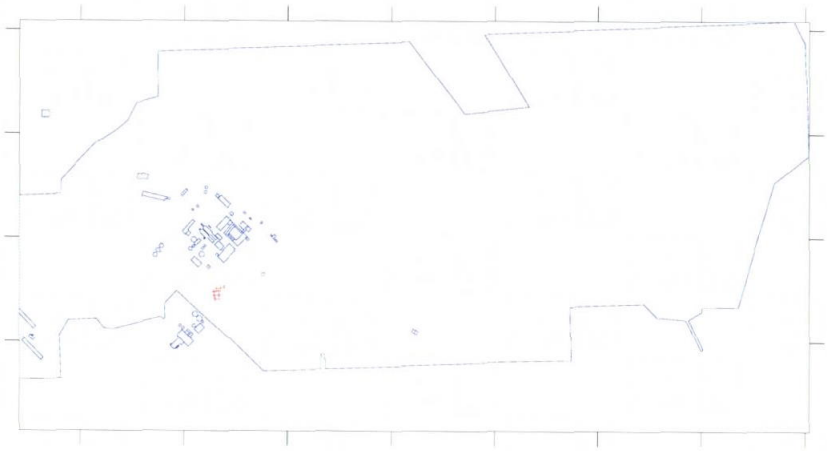
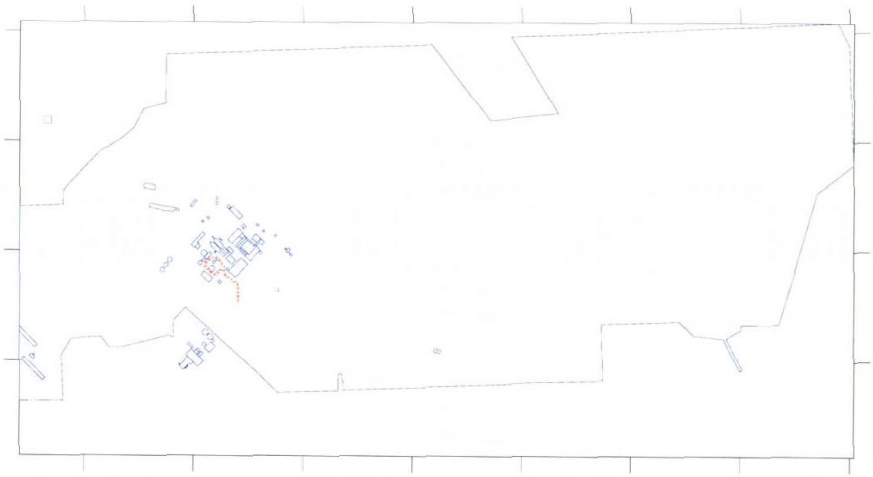


Figure 6-8: Unit 2 Bottom Ash Haul Road



6.3 Good Engineering Practice

Sources included in a PSD permit application are subject to Good Engineering Practice (GEP) stack height requirements outlined in 40 CFR Part 51, Sections 51.100 and 51.118. As defined by the regulations, GEP height is calculated as the greater of 65 meters (measured from the ground level elevation at the base of the stack) or the height resulting from the following formula:

$$GEP = H + 1.5L$$

Where,

H = the building height; and

L = the lesser of the building height or the greatest crosswind distance of the building - also known as maximum projected width.

To meet stack height requirements, the point sources were evaluated in terms of their proximity to nearby structures. The purpose of this evaluation was to determine if the discharge from the stack will become caught in the turbulent wake of a building or other structure, resulting in downwash of the plume. Downwash of the plume can result in elevated ground-level concentrations. EPA provides guidance for determining whether building downwash will occur in *Guideline for Determination of Good Engineering Practice Stack Height* (EPA, 1985). The downwash analysis was performed consistent with the methods prescribed in this guidance document.

The downwash analysis was completed using EPA's Building Profile Input Program (BPIP) model (Version 04112). The BPIP model provides direction-specific building dimensions to evaluate downwash conditions. Big Stone II will be located in a rural area and the only buildings that could potentially affect emissions from Big Stone II are the on-site structures.

Nearby structures, which were expected to influence building downwash, include the boiler building, turbine building, and ancillary structures. After running an initial BPIP model, it was determined that the GEP stack height for this project will exceed 65 meters. The new boiler building has a height of 255 feet (77.72 meters) and a maximum projected width of 105.62 meters.[4] This maximum projected width is the crosswind width of the boiler and the turbine generator building. The two separate buildings are combined into a single building for the purposes of calculation the maximum projected width, as explained in the "User's Guide to the Building Profile Input Program".

[4] Numbers calculated by BPIP. See BPIP output file for further details.

"Two structures 'overlay' each other when the most east and the most west corners of two structures are exactly upwind and downwind of each other, respectively. Combining of two structures that overlay each other produces the same areas of influence as if the structures had not been combined. To simplify BPIP, overlaying structures are combined in the program. Also, when the projected widths of the sufficiently close structures (tiers) do not completely overlay each other, the structures are combined and the gap between the two structures is treated as if the gap had been filled with a structure equal in height to the lower structure. Otherwise, the two structures are processed separately. Only those tiers that are sufficiently close initially are combined. Already-combined-tiers that become sufficiently close to other structures are not further combined." Page 2-10

Using the GEP formula above yields the following relation:

$$GEP = H + 1.5L = 77.72\ m + 1.5 * (77.72\ m) = 194.31\ m$$

Once GEP has been calculated, it is necessary to determine if the stack falls within the influence of the structure. EPA guidelines indicate that any structure within 5 times L (but less than 800 meters from the trailing edge of the structure) can affect the source. In this case, L was conservatively determined to be 77.62 m, yielding 5L = 388.1m (1,273 feet). Referring to Figure 2-1, the stack for Big Stone II is to be located approximately 134 m (440 feet) from the boiler building. The stack location is within 5L, allowing the GEP for this source to exceed 65m and be raised to 151.8 meters. The stack height of 498 feet (151.8 meters) for Big Stone II is therefore within the allowable GEP for this project.

6.4 PM_{10} Modeling Setup

The PM_{10} sources can be broken into two distinct groups – point sources and fugitive sources. The point sources included the following:

Cooling Tower	Combustion Units	Fly Ash:	Limestone:	Coal:
	• Boilers	• Storage	• Unloading	• Unloading
	• Diesel generators	• Loading	• Storage	• Transfer
	• Diesel fire pumps	• Dust Collectors	• Dust Collectors	• Dust Collectors
			• Crusher	• Crusher

The emission calculations are contained in Appendix C.

Additionally, fugitive sources will generate PM_{10} emissions in conjunction with the new boiler. Fugitive emissions will arise from the following operations:

Haul Roads:
- Limestone
- Fly Ash
- Bottom Ash
- Tires (Biofuel)
- Gypsum

Storage Piles:
- Wind Erosion
- Pile Maintenance

Emissions from the haul roads are described in the "Fugitive Emissions Protocol," included in Appendix F.

For the purposes of the air dispersion modeling analysis, volume sources are used to represent the emissions from haul roads and any open conveyor drop points. Area sources are used to represent fugitive emissions from the coal storage piles and the landfill. As the parameters for volume sources are defined in the ISCST3 user manual, haul roads are assumed to be 30 feet (9.144 m) wide; therefore a 30-foot by 30-foot volume source can be assumed. This allows the haul road to be broken up into segments aligned in 30-foot by 30-foot segments. The ISCST3 Model allows the user to either have haul roads situated directly next to each other (exact representation) or with a space between them the size of one volume source (approximate representation). The approximate representation was used for these runs to minimize the number of sources and decrease computational time. A 30-foot (9.144 m) road width corresponds to an initial lateral dimension of 8.51 m ($2 \cdot 9.144$ m $\div$ 2.15m). It is assumed that the trucks hauling the fly ash are 10 feet (3.048 m) high, making the initial vertical dimension 1.42 m (3.048 m $\div$ 2.15). The release height corresponds to approximately the top of the wheel (1.0 m).

For the area sources, the dimensions of each pile approximate the area that each of the piles covers. Fugitive emissions from these sources were estimated from the AP-42 section on industrial wind erosion.[5]

Both the point and volume sources were modeled to correspond to the boiler operating at 100 percent capacity. During the runs where only one boiler will be operating, the fugitive emission sources will remain at emission levels corresponding to 100 percent unit load. While this method does not accurately reflect the operations at the facility, the results of the model will yield a worst-case impact scenario.

[5] AP-42 Section 13.2.5, *Industrial Wind Erosion* (1/95 Update).

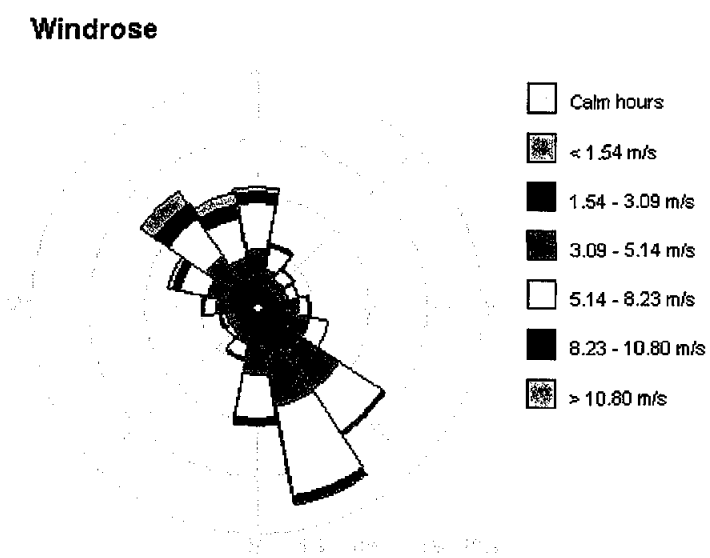
6.5 Receptor Grid

The overall purpose of the modeling analysis is to ensure that operation of the proposed facility will not result in, or contribute to concentrations above the National Ambient Air Quality Standards (NAAQS) or PSD Class II increments. The modeling runs were conducted using the ISCST3 model in simple terrain within a 10 by 10 kilometer Cartesian grid to determine the significant impact area for each pollutant. The grid incorporated the following spacing between receptors: 100-meter out to 2 kilometers, 250-meter out to 5 kilometers, and 1,000-meter out to 10 kilometers. If the significant impact area exceeded 10 kilometers the grid would have been extended to encompass the entire significant impact area. If the modeling impacts show "hot spots" outside 1,000 meters, 100-meter grid spacing would be used to encompass the maximum concentrations to ensure that the maximum impact has been identified. Receptors were also placed along the property boundary at a spacing of 50 meters. After reviewing the topography of the area, it was determined that terrain elevations should be incorporated into the model. Therefore, the appropriate United States Geological Survey (USGS) 7.5 minute topographical maps (from electronic DEM data) were used to obtain the necessary receptor elevations.

6.6 Meteorological Data

Surface air meteorological data from Huron, SD (14936) with Aberdeen, SD (14929) upper air data from 2000-2004 was used in the analysis. The anemometer height is 20 feet. The dominant wind direction is shown in Figure 6-1. The raw data had missing values for a five hour period on February 9, 2002 (hours 13 through 17). These values were filled in using data from the same time period from Mitchell, SD.

Figure 6-9: Big Stone Power Plant Windrose



6.7 Rural Dispersion Coefficients

Based on the Auer scheme, the existing land use for a three-kilometer area surrounding the proposed site is more than 50 percent rural. The population density is also less than 750 people/km^2 for the same area. Rural coefficients are appropriate for the Big Stone II area. Therefore, rural dispersion coefficients were used in the ISCST3 Model.

6.8 Cavity Analysis

The ISCST3 program cannot model impacts that occur within the cavity regions of building downwash. Calculations of the cavity distance indicated that there were no predicted concentrations at an ambient receptor, and it was therefore not necessary to include the cavity concentrations in the final modeling analysis. The calculations from the cavity analysis can be found in Appendix G.

6.9 Significant Impact Area Determination

The ISCST3 model was run for the proposed facility using the worst-case capacity scenario for the coal-fired boiler. If any modeled pollutant results in an impact below the significance levels for each averaging period, no further modeling for that pollutant to determine compliance with the NAAQS or PSD Class II increments is needed. However, if the model predicts impacts at or above the modeling significance level for any pollutant, a cumulative analysis including all point sources within the radius of impact (ROI) will be required for that pollutant. Based on the initial modeling results, Big Stone requested from DENR an emission inventory of PSD increment-consuming sources and NAAQS sources that are located within the ROI and should be included in the modeling analyses.

6.10 NAAQS and Class II Increment Analysis

For the NAAQS and PSD increment analysis, all major stationary sources that emit pollutants subject to this analysis and located within 50 kilometers of the ROI were addressed. A source within 50 kilometers of the impact area may be eliminated from the analysis if it is determined to have a negligible contribution to air quality impacts at the generating station. Big Stone consulted with the DENR to determine acceptable methods of eliminating sources from the analysis. Background air quality values for Grant County are available from the DENR to add to model-predicted concentrations for comparison to the NAAQS and are shown in Table 6-3. If the refined analysis does not result in any concentrations above the NAAQS or PSD increments, no further modeling will be conducted.

Table 6-3: Background Levels (μg/m³)

PM_{10} 24 Hr	PM_{10} Annual
32	12.1

6.11 Ambient Monitoring

The modeling analysis for emission sources at the proposed Big Stone facility also addressed the pre-construction monitoring provision of the PSD regulations. The regulations specify significant monitoring levels for each PSD pollutant that triggers the requirement to perform one year of pre-construction ambient air monitoring. For any impacts predicted to be below the monitoring significance levels, Big Stone will request an exemption from pre-construction ambient air monitoring. If any predicted concentrations reaching or exceeding the monitoring *de minimis* levels are observed, Big Stone will consult with the DENR to determine if pre-construction ambient air monitoring will be required. If so, Big Stone will request local ambient monitoring data to fulfill the pre-construction monitoring provisions of the PSD regulations or develop an acceptable monitoring plan. Table 6-4 shows the NAAQS, modeling/monitoring significance levels, and PSD increments.[6]

Table 6-4: NAAQS, Significance Levels and Class I and II Increments (μg/m³)

Pollutant	Averaging Period	NAAQS	Modeling Significance Level	Monitoring Significance Level	PSD Class II Increments
CO	8-hour	10,000	500	575	NA
	1-hour	40,000	2,000	NA	NA
PM_{10}	Annual	50	1	NA	17
	24-hour	150	5	10	30

6.12 Screening Model Results

After examining the modeling results at all load levels, it was determined that exceedances of the annual modeling significance level occurred, and that refined modeling would be required. All predicted impacts were lower than the ambient air monitoring *de minimis* level and no pre-construction monitoring was required. The maximum modeled concentrations are given in Table 6-5. The model input and output files are provided on CD-ROM in Appendix G.

[6] The pollutants that are allowed one NAAQS exceedance per year and one PSD Increment exceedance per year are: 1-hour and 8-hour CO and 24-hour PM/PM_{10}.

Table 6-5: Screening Level Maximum Modeled Concentrations

Pollutant	Averaging Period	UTM Coordinates (meters)		Year	Predicted Concentration ($\mu g/m^3$)	Significance Level ($\mu g/m^3$)
		East	North			
CO	1-hour	695165.31	5018972	2002	1,034.09	2,000
	8-hour	695165.31	5018972	2000	166.55	500
PM_{10}	24-hour	694767.5	5019789	2002	**30.97**	5
	Annual	695100	5019000	2001	**5.00**	1

6.13 NAAQS Modeling Results

After examining the modeling results, it was determined that Big Stone II will not cause the NAAQS to be exceeded at any point where the facility will have a significant impact. Table 6-6 lists the results from the NAAQS analysis.

Table 6-6: PM_{10} NAAQS Modeling Results ($\mu g/m^3$)

Averaging Period	NAAQS	Maximum Modeled Impact: All NAAQS Sources				Background Concentration	Total Concentration
		Easting	Northing	Year	Concentration		
24-hour	150	695,090.81	5019039	2002	97.63	32	129.63
Annual	50	695165.31	5018972	2004	17.42	12.1	29.52

6.14 Class II Increment Modeling Results

After examining the modeling results, it was determined that Big Stone II will not cause the PSD Increment to be exceeded at any point where the facility will have a significant impact. Table 6-7 lists the results from the NAAQS analysis.

Table 6-7: PM_{10} Increment Modeling Results ($\mu g/m^3$)

Averaging Period	PSD Increment	Maximum Modeled Impact: All NAAQS Sources			
		Easting	Northing	Year	Concentration
24-hour	30	694960.81	5018900	2000	26.24
Annual	17	695100	5019000	2001	5.00

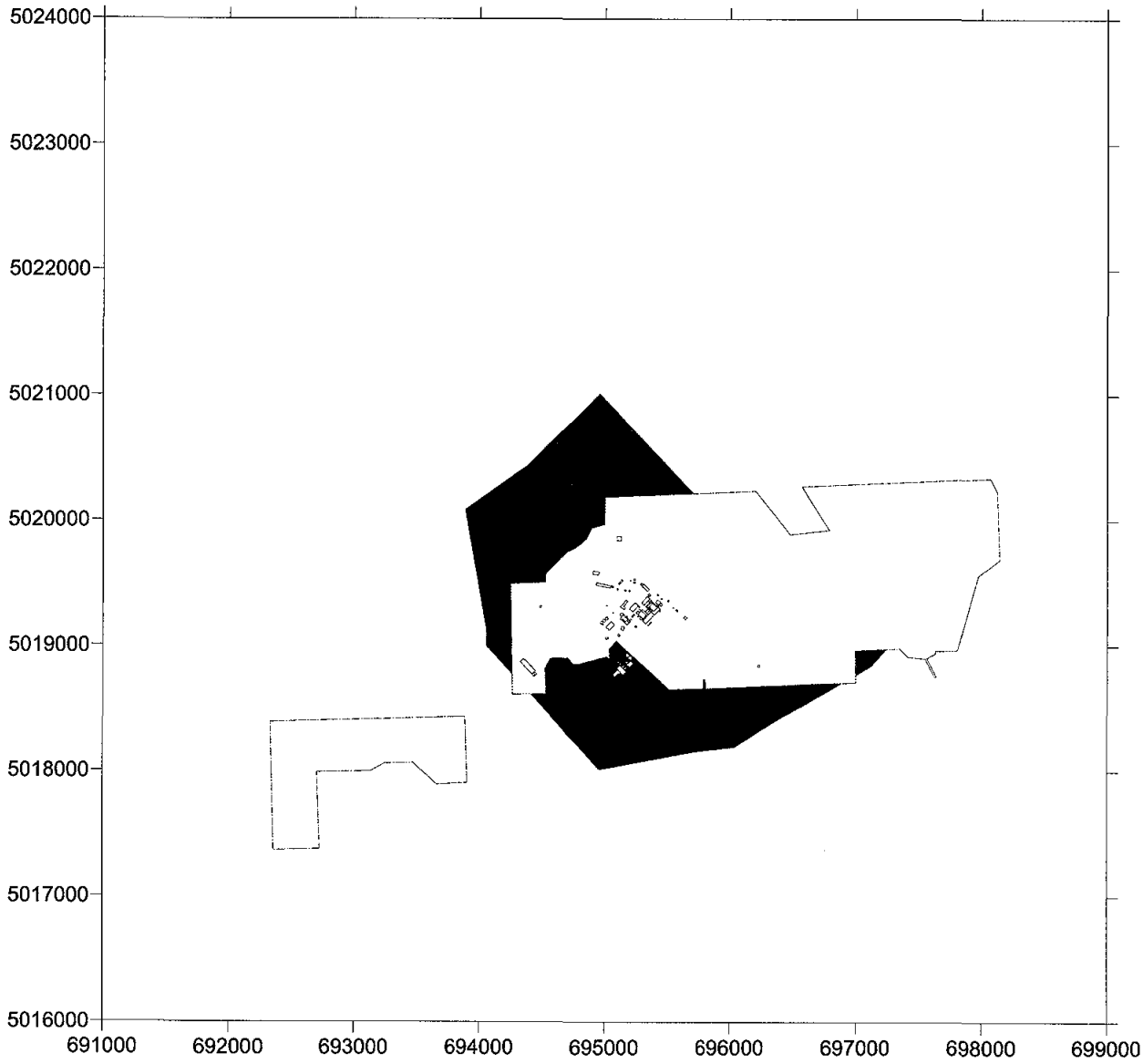
6.15 Concentration Contour Plot

Per DENR's request, the concentration contour plots for PM_{10} annual average at 1 $\mu g/m^3$ is shown in Figure 6-10.

6.16 Conclusion

The dispersion modeling predicts that there will be no exceedances of the Increment and NAAQS thresholds. The operation of the Big Stone II Project will not cause or contribute to a significant degradation of ambient air quality. After examining the results of the model, it has been determined that the PSD modeling requirements for CO and PM_{10} have been met and no further modeling is required.

Figure 6-10: PM_{10} Increment Annual Average (1μg/m^3)



7. ADDITIONAL IMPACTS

7.0 ADDITIONAL IMPACTS

The additional impacts analysis requirement under PSD assesses the ambient air quality impact analysis, soils and vegetation impacts, visibility impairment, and growth analysis for the project.

7.1 Construction Impacts

Construction of Big Stone II has the potential for short-term adverse effects on air quality in the immediate area around the site. Diesel fumes from construction vehicles and dust from site preparation and construction vehicle operation can affect local air quality during certain meteorological conditions. However, these instances are limited in time and area of effect.

The Grant County area is in attainment or is unclassified for all criteria pollutants. Operation of construction vehicles is not expected to significantly affect ambient air quality. During dry periods, fugitive dust will be minimized through the application of water to on-site roads used by construction equipment.

7.2 Vegetation Impacts

Vegetation in the region of eastern South Dakota and western Minnesota was historically dominated by tallgrass prairie in an area referred to as the Prairie Parkland Region[7]. Glaciation left this area with a mosaic of rolling glacial till uplands and pothole depressions. In areas that haven't been developed or converted to cropland, tallgrass prairie dominates the drier, exposed upland areas and commonly consists of big bluestem (*Andropogon gerardii*), Indian grass (*Sorghastrum nutans*), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), prairie dropseed (*Sporobolous heterolepis*), and porcupine grass (*Hesperostipa spartea*). Areas that are more protected from dry, hot conditions by moisture or east- to north-facing slopes more commonly consist of savannas, woodlands or forests dominated by oaks (*Quercus* spp.), eastern cottonwood (*Populus deltoides*), ash (*Fraxinus* spp.), and willows (*Salix* spp.).

The following sections briefly describe the potential effects of NO_2, SO_2, CO, and PM_{10} produced by Big Stone II on the nearby vegetation. The potential effects of the air emissions to vegetation within the immediate vicinity of the Big Stone Power Plant were compared to scientific research examining the

[7] Faber-Langendoen 2001

effects of pollution on vegetation. Damage to vegetation often results from acute exposure to pollution, but may also occur after prolonged or chronic exposures. Acute exposures are typically manifested by internal physical damage to leaf tissues, while chronic exposures are more associated with the inhibition of physiological processes such as photosynthesis, carbon allocation, and stomatal functioning.

7.2.1 Sulfur Dioxide

Short- and long-term exposure to sulfur dioxide has been shown to have detrimental effects on many plant species[8]. Numerous studies have been conducted studying the effects of SO_2 on vegetation including crop plants[9], trees and shrubs[10], and herbaceous plants[11]. Symptoms of SO_2 injury in leaves manifest as interveinal necrotic blotches in angiosperms and red brown banding in gymnosperms[12]. A number of the plants studied include those found in the Prairie Parkland Region or are raised for agriculture in the area. Plants include red cedar (*Juniperus virginiana*), oaks, sumacs (*Rhus* spp.), ash, raspberries (*Rubus* spp.), American elm (*Ulmus americana*), red maple (*Acer rubrum*), black willow (*Salix nigra*), bracken fern (*Pteridium aquilinum*), soybean (*Glycine max*), and corn (*Zea mays*). Injury threshold concentrations varied by species and dose (131-5,240 $\mu g/m^3$ for 8 hours, 393-3,930 $\mu g/m^3$ for 2 hours, and 1,310 $\mu g/m^3$ for 4 hours), and were significantly higher than the SO_2 emissions expected to occur near the Big Stone Power Plant. Even lichens and bryophytes, which are pollution bio-indicators due to their well-documented sensitivity to air pollution, would not be affected by long term exposure to SO_2 emissions from Big Stone II. They do not experience injury, decreased abundance, or lowered CO_2 uptake until SO_2 concentrations reach 5 to 40 $\mu g/m^3$ SO_2[13], 13 to 26 $\mu g/m^3$ SO_2[14], and 400 $\mu g/m^3$ SO_2[15] annually.

[8] See reviews by Heath 1980; Kozlowski and Constantinidou 1986; Darrall 1989

[9] Guderian and Stratman (1968) in Kozlowski and Constantinidou 1986; Huang et al. 1976; Reinert et al. 1975; Tingey et al. 1971; Darrall 1989

[10] Linzon 1986; Kozlowski and Constantinidou 1986; Darrall 1989

[11] Winner and Mooney 1980; Westman et al. 1985; Darrall 1989

[12] Kozlowski and Constantinidou 1986

[13] Will-Wolf 1980; Holopainen 1984; McCune 1988; and Treshow and Anderson 1989

[14] LeBlanc and Rao 1975; Wetmore 1988

[15] Hart et al. 1988

7.2.2 Nitrogen Oxides

During fuel combustion, atmospheric nitrogen is oxidized to nitrogen oxide and small amounts of NO_2[16]. The NO is photochemically oxidized to NO_2, which is then subsequently consumed during the production of ozone and peroxyacetyl nitrates (PANs). As with SO_2 emission research, NO_2 has been shown to deleteriously impact vegetation[17]. Typical leaf injury responses include interveinal necrotic blotches similar to SO_2 injury for angiosperms and red-brown distal necrosis in gymnosperms[18]. Injury threshold concentrations vary by species and dose, but are much higher than that of SO_2 as described above. In general, short term high, concentrations of NO_2 are required for deleterious impacts on plants[19]. The injury threshold for two crop plants grown in the region – tomato (*Lycopersicon esculentum*) and annual sunflower (*Helianthus annuus*) – is 4 hours at a concentration of 7,380 $\mu g/m^3$. A common, weedy plant found throughout the Prairie Parkland Region, lamb's quarters (*Chenopodium album*), was not injured for two hours at concentrations 1.9 ug/m^3 NO_2. Furthermore, short term fumigations of approximately 1 hour, 20 hours, and 48 hours at NO_2 concentrations of 940 to 38,000 $\mu g/m^3$, 470 $\mu g/m^3$, and 3,000 to 5,000 $\mu g/m^3$, respectively, have been shown to deter photosynthesis in a number of herbaceous [tomato, oats (*Avena sativa*), alfalfa (*Medicago sativa*)] and woody plants[20]. Moreover, Taylor and McLean (1970), in their review of NO_2 effects on vegetation noted that long term exposures of phytotoxic doses of NO_2 ranged from 280 to 560 $\mu g/m^3$. All the above concentrations are significantly higher than the NO_2 emissions expected to occur near the Big Stone Power Plant.

7.2.3 Synergistic Effects of Pollutants

Air pollutants are known to act in concert to cause injury to or decrease the functioning of plants[21]. Synergistic refers to the combined effects of pollutants when they are greater than is expected from the additive effect of the compounds. The inhibitory effects of SO_2 and NO_2[22], NO_2 and NO[23], NO_2 and O_3[24] and O_3 and SO_2[25] have been reported in various short-term studies for crop plants (e.g., soybean, broad bean (*Vicia faba*), annual sunflower, and tomato) and various trees that grow in the Prairie Parkland Region [e.g., eastern cottonwood, sugar maple (*Acer saccharum*), ash, and oak]. Concentrations of

[16] Chang 1981

[17] Taylor et al. 1975; Heath 1980; Kozlowski and Constantinidou 1986; and Darrall 1989

[18] Kozlowski and Constantinidou 1986

[12] Prinz and Brandt 1985

[20] Hill and Bennett 1970; Capron and Mansfield 1976; and Smith 1981

[21] See reviews of Reinert et al. 1975; Omrod 1982

[22] White et al. 1974; Wright et al. 1986

[23] Capron and Mansfield 1976

[24] Furakawa et al. 1984; Okana et al. 1985

[25] Costonis 1970, Carlson 1979; Jensen 1981; Omrod et al. 1981

pollutants (80 to 981 $\mu g/m^3$) in these studies are substantially higher than concentrations predicted to occur near the Big Stone Power Plant. Consequently, no synergistic effects of the air pollutants are expected to inhibit vegetation at or near the Big Stone Power Plant.

7.2.4 Particulate Matter

Particulates may contain trace elements and heavy metals such as arsenic, boron, beryllium, copper, fluoride, nickel, lead, mercury, manganese, and cobalt[26]. These compounds have been shown to be detrimental to vegetation typically within the immediate vicinity of the source[27]. The most obvious effect of particle deposition on vegetation is a physical smothering of the leaf surface. This will reduce light transmission to the plant, in turn causing a decrease in photosynthesis[28]. However, only small amounts of particulate matter are emitted from power plants. Particulate matter concentrations due to operation of Big Stone II are expected to increase by 5.00 $\mu g/m^3$. These levels are considered negligible, so it is highly unlikely that particulate matter emissions will impact vegetation adjacent to the Big Stone Power Plant.

7.2.5 Carbon Monoxide

Carbon monoxide is not known to injure plants nor has it been shown to be taken up by plants. Consequently, no adverse impacts to vegetation at or near the Big Stone Power Plant are expected from CO stack emissions.

7.3 Soil Impacts

Eight soil mapping units have been identified at or in the immediate vicinity of the project site[29]. They include:

- Heimdal-Sisseton loams, 2 to 6 percent slopes (HbB)
- Heimdal-Sisseton loams, 6 to 9 percent slopes (HbC)
- Heimdal-Svea loams, 0 to 2 percent slopes (HcA)
- Heimdal-Svea loams, 2 to 6 percent slopes (HcB)
- Vallers-Tonka complex (Vc)
- Parnell silty clay loam

[26] Wangen and Turner 1980

[27] Woolhouse 1990

[28] Meteorological Service of Canada 2002

[29] Miller 1979

- Tonka silt loam (Ta)
- Vallers loam

Sulfates and nitrates caused by SO_2 and NO_2 deposition on soil can be beneficial and detrimental to soils depending on their composition. However, given the low emission impacts, Big Stone II should not significantly affect the soils on site or in the immediate vicinity.

7.4 Impacts on Threatened and Endangered Species

The following discussion on threatened and endangered species is based on Barr Engineering's assessment as contained in the South Dakota Energy Conversion Facility Siting Permit Application for Big Stone II.

The U.S. Fish and Wildlife Service has identified three federally listed species that may occur in the project area (USFWS/Gober 2004, September 16, 2004 letter to Jeffrey Lee/Barr Engineering). They are the Bald eagle (*Haliaeetus leucocephalus*), the Topeka shiner (*Notropis topeka*), and the western prairie fringed orchid (*Platanthera praeclara*).

The bald eagle, a federally threatened species, is known to occur in Grant County and throughout South Dakota. New nests appear in Grant County and in South Dakota in general each year, and the birds nest from January through August. The USFWS restricts construction within one-quarter (0.25) mile of an active bald eagle nest. A bald eagle nest was identified and mapped approximately 1700' (0.3 mile) north of the existing east water storage and cooling pond. The nest is nearly 1.5 miles northwest of the proposed Big Stone II plant site, and over 1.5 miles from the proposed cooling tower. It is nearly 3 miles northwest of the proposed new water storage pond.

The Topeka shiner, a federally endangered species, is listed as a "possible" occurrence in Grant County. The species is not listed as South Dakota state threatened or endangered. The South Dakota Department of Game, Fish and Parks has no current or historic locations of the Topeka shiner in Grant County, and all known occurrences of the Topeka shiner in South Dakota are in streams south southeast of Grant County (S. Dakota Dept. of Game, Fish and Parks 2003. Topeka Shiner Management Plan for South Dakota.).

Construction of the Big Stone II plant is not likely to result in any direct, indirect or cumulative impacts on the Topeka shiner. This is because the only potential habitat for the fish, the Whetstone River, is outside of the construction limits of the project, and will receive no discharge from the plant. In the event that, prior to or during construction, the Topeka shiner is found in the Whetstone River, the South Dakota Department of Transportation Special Provisions for Construction Practices in Streams Inhabited by the Topeka Shiner (SDDOT 2003) can be implemented.

The western prairie fringed orchid, a federally threatened species, is also listed as a "possible" occurrence in Grant County. There are currently no known populations of this plant species in South Dakota. However, the species has historically been distributed throughout the tall grass prairie west of the Mississippi River in the Central United States and southern Canada, and one of the three largest remaining populations is approximately 122 miles north of the Big Stone II site. Moreover, the species' preferred habitat of mesic prairie swales exists in several small areas within the Big Stone II project area. A number of the known plant associates of the western prairie fringed orchid are also present, including big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), and several sedge (*Carex* spp.) species.

Field surveys conducted in September 2004 did not locate any populations of western prairie fringed orchid. As a result, there are currently no anticipated direct impacts on this species. Indirect impacts include loss of potential habitat, alteration of surface drainage patterns and a potential increase in non-native invasive species.

Operation of Big Stone II should not cause any adverse impacts to protected species or potential habitats since facility air emissions meet all ambient air quality standards and PSD increments. Consultation under Section 7 of the Endangered Species Act regarding the Big Stone II project is being conducted in conjunction with an Environmental Impact Statement under the National Environmental Policy Act being prepared by the Western Area Power Administration. DENR is required to coordinate its PSD review for Big Stone II "to the maximum extent feasible and reasonable" with the EIS review. 40 CFR 52.21(s).

7.5 Growth Impacts

Big Stone II is expected to increase employment in the area. The building phase will last approximately four years. Construction employment of approximately 700 workers is expected over the course of the construction period. Projected employment, reflecting full time jobs directly tied to the operation of Big

Stone II, is estimated at 35 additional people at the generating station site. This will result in moderate amounts of secondary employment created by the economic activity of the plant. In the immediate vicinity of the plant and as a result of Big Stone II, residential and commercial growth will result in secondary air emissions (i.e. increased vehicular use) but are not expected to significantly impact air quality.

7.6 Class II Area Visual Impact Analysis

A visibility analysis was performed on the Pipestone National Monument in southwestern Minnesota. The visibility analysis was performed in accordance with the guidelines set forth in EPA-450/4-88-015, Workbook for Plume Visual Impact Screening and Analysis. Within the document, the model VISCREEN is recommended for plume visibility analysis. Several refinement levels of VISCREEN are described. The first level VISCREEN analysis uses worst-case meteorological conditions (F-class stability, 1 m/s wind speed). This level of screening results in the most conservative (worst-case) visibility results. If the plume visibility against the sky and terrain is below a level perceivable to the human eye, the visibility modeling is complete. Otherwise, a second level VISCREEN analysis, that uses actual meteorological data and refined particle characteristics, can be performed. The second level model will result in a more realistic visibility analysis. If this plume visibility still does not meet sky and terrain contrast levels, a third level model may be required that adds more statistical analysis.

The first level VISCREEN model was performed for Big Stone II. Emissions from Big Stone II only were considered. The inputs into the model included particulate matter, NO_X, primary NO_2, soot, and primary SO_4. The maximum annual particulate emissions from Big Stone II are 788 tons/yr[30]. The corresponding NO_X emission rate is 1,840 tons/yr.

According to the workbook, primary NO_2, soot, and primary SO_4 can be assumed to be zero except for very specific sources. Since the power plant is not one of the specified sources, the emissions for the last three species (primary NO_2, soot, and primary SO_4) are assumed to be zero. The next set of inputs into the level one VISCREEN model considers the distance between the source, observer and area, and the background visual range. The distance between the source and observer is 145 kilometers.

Background visibility was determined from the VISCREEN manual to be 40 kilometers. The last inputs into the model are particle sizes, background ozone, plume-source-observer angle, stability, and wind

[30] Emissions are only from the boiler. Not including emissions from materials handling or fugitive emissions.

speed. All of these inputs are automatically set if the default option is chosen. For the level one analysis, the workbook tells the analyst to choose the default option, which sets the following particle sizes:

- background fine = 0.3 μm diameter, 1.5 g/cm^3 density
- background course = 6 μm diameter, 2.5 g/cm^3 density
- plume particulate = 2 μm diameter, 2.5 g/cm^3 density
- plume soot = 0.1 μm diameter, 2 g/cm^3 density
- plume primary sulfate = 0.5 μm diameter, 1.5 g/cm^3

The background ozone is 0.04 parts per million (ppm), the plume-source-observer angle is 11.25 degrees, the worst case atmospheric stability is an F stability class, and the worst case wind speed is 1 m/s.

The VISCREEN model output compares the calculated Delta E and contrast from the plume to present default comparison values. Delta E is the color difference parameter used to characterize the perceptibility of the plume on a color difference between the plume and a viewing background such as the sky, a cloud, or a terrain feature. Color differences are due to differences in three dimensions: brightness (L*), color hue (a*), and saturation (b*). Delta E is calculated for several lines of sight. A green contrast analysis is also performed for various lines of sight using a green wavelength and contrasting the plume with the terrain and sky backgrounds. The critical E value is 2.0 and the green contrast value is 0.05.

The results of the Level 1 VISCREEN model are shown in Appendix H. The visual results pass the Class I screening criteria at the Pipestone National Monument located 145 km away. With respect to visibility conditions around the plant, there are no known Class II screening visibility criteria that have been recommended at this time. Big Stone II will be constructed in a Class II area. Operation of the proposed emission sources will demonstrate compliance with state regulations restricting stack gas opacity to 20 percent. Big Stone believes that if emissions comply with these levels, no adverse visibility impacts will occur in the immediate vicinity around the plant.

7.7 Conclusion

Based upon the results presented in this section of the report, it is concluded that the construction of Big Stone II will not have a significant adverse impact on the surrounding area.

8. REFERENCES

8.0 REFERENCES

Air & Waste Management Association. Air Pollution Engineering Manual. Second Edition. Ed. Wayne T. Davis. New York: John Wiley & Sons, 2000.

Auer, A.H. "Correlation of Land Use and Cover with Meteorological Anomalies." Journal of Applied Meteorology. 17 (1978): 636-643.

Capron, AC and TA. Mansfield. "Inhibition of Net Photosynthesis in Tomato in Air Polluted with NO and NO2." Journal of Experimental Botany. 27 (1976): 1181-1186.

Carlson, RW. "Reduction in the Photosynthetic Rate of Acer, Quercus, and Fraxinus Species Caused by Sulphur and Ozone." Environmental Pollution. 18 (1979): 159-170.

Caterpillar. Caterpillar Performance Handbook. Ed. 31. Peoria: Caterpillar Inc., 1990.

Chang, R. Chemistry. New York: Random House Inc., 1981.

Costonis, AC. "Acute Foliar Injury of Easter White Pine Induced by Sulfur Dioxide and Ozone." Phytopathology. 60 (1970): 994-999.

Darrall, NM. "The Effect of Air Pollutants on Physiological Processes in Plants." Plant, Cell and Environment. 12 (1989): 1-30.

Furakawa, AM Yokoyama, T Ushijima, and T Totsuka. "The Effects of NO_2 and/or NO on Photosynthesis of Sunflower Leaves." Studies on the Effects of Air Pollutant Mixtures on Plants, Part 1. Research Report from the Institute of Environmental Studies. 65 (1984): 89-98.

Hallgren, J-E. "Photosynthetic Gas Exchange in Leaves Affected by Air Pollutants." Gaseous Air Pollutants and Plant Metabolism. Ed. M.J. Koziol and F.R. Whatley. London: Buttersworth, 1984. 147-160.

Hart, R, PG Webb, RH Biggs, and KM Portier. "The Use of Lichen Fumigation Studies to Evaluate the Effects of New Emission Sources on Class I Areas." Journal of Air Pollution Association. 38 (1988): 144-147.

Heath, RL. "Ozone." Responses of Plants to Air Pollution. Ed. JB Mudd and TT Kozlowski. New York: Academic Press, 1975.

Heath, RL. "Initial Events in Injury to Plants by Air Pollutants." Annual Review of Plant Physiology. 31 (1980): 395-431.

Hill, AC and JH Bennett. "Inhibition of Apparent Photosynthesis by Nitrogen Oxides." Atmospheric Environment. 4 (1970): 341-348.

Hill, AC and N Littlefield. "Ozone: Effect on Apparent Photosynthesis, Rate of Transpiration and Stomatal Closure in Plants." Environmental Science and Technology. 3 (1969):52-56.

Holopainen, TH. "Types and Distribution of Ultrastructural Symptoms in Epiphytic Lichens in Several Urban and Industrial Environments in Finland." Annales Botanica Fennici. 21 (1984): 213-229.

Huang, TSR, CL Mulchi, and MK Aycock, Jr. "Correlations Between Air Pollution Injury and Certain Agronomic, Chemical, and Physical Characteristics of Maryland Tobacco." Journal Environmental Quality. 5 (1976): 352-356.

Hughes, HE. 1982. *Soil Survey of Greene and Lawrence Counties, Missouri.* USDA Soil Conservation Service in Cooperation with the Missouri Agricultural Experiment Station, March.

Irwin, J.S. Proposed Criteria for Selection of Urban Versus Rural Dispersion Coefficients. North Carolina: U.S. Environmental Protection Agency Meteorology and Assessment Division, 1979.

Jensen, K. F. "Growth Analysis of Hybrid Poplar Cuttings Fumigated with Ozone and Sulphur Dioxide." Environmental Pollution (Series A). 26 (1981): 243-250.

Kozlowski, TT and HA Constantinidou. "Responses of Woody Plants to Environmental Pollution, Part I Sources and Types of Pollutants and Plant Responses." Forestry Abstracts. 47 (1986): 5-51.

LeBlanc, F. and DN Rao. 1975. "Effects of Air Pollutants on Lichens and Bryophytes." Responses of Plants to Air Pollution. Ed. JB Mudd and TT Kozlowski. New York: Academic Press, 1975.

Linzon, SN. "Effects of Gaseous Pollutants on Forests in Eastern North America." Water, Air, and Soil Pollution. 31 (1986):537-550.

Mansfield, TA and P-H Freer-Smith. 1984. "The Role of Stomata in Resistance Mechanisms." Gaseous Air Pollutants and Plant Metabolism. Ed. M.J. Koziol and F. R. Whatley. London: Buttersworth, 1984. 131-146

McCune, B. "Lichen Communities along O_3 and SO_2 Gradients in Indianapolis." The Bryologist. 91 (1988): 223-228.

Meteorological Service of Canada. 2002. "Ambient Particulate Matter: An Overview – Environmental Effects of Particulate Matter." World Wide Web page for the Government of Canada. http://www.msc-smc.ec.gc.ca/saib/smog/docs/Ecapm3/sections/5_e.html

Okana, K, O. Ito, G. Takeba, A. Shimizu, and T. Totsuka. "Effects of O_3 and NO_2 Alone or in Combination on the Distribution of ^{13}C-Assimilate in Kidney Bean Plants." Japanese Journal of Crop Science. 54 (1985): 152-159.

Omrod, D.P. "Air Pollutant Interactions in Mixtures." Effects of Gaseous Air Pollution in Agriculture and Horticulture. Ed. M.H. Unsworth and D.P. Omrod. London: Butterworth, 1982.

Omrod, D.P., V.J. Black, and M.H. Unsworth. "Depression of Net Photosynthesis in Vicia faba L. Exposed to Sulphur Dioxide and Ozone." Nature (London). 291 (1981): 585-586.

Perry, Robert H. and Don W. Green. Perry's Chemical Engineer's Handbook. 6th Ed. New York: McGraw-Hill, Inc. 1984.

Prinz, B. and CJ Brandt. "Effects of Air Pollution on Vegetation." Pollutants and Their Ecotoxicological Significance. Ed. HW Nurnberg. New York: John Wiley & Sons, 1985. 67-84.

Pye, JM. "Impact of Ozone on the Growth and Yield of Trees: A Review." Journal of Environmental Quality. 17 (1988): 347-360.

Reich, PB and RG Amundson. "Ambient Levels of Ozone Reduce Net Photosynthesis in Tree and Crop Species." Science. 230 (1985): 566-570.

Reich, PB. "Quantifying Plant Response to Ozone: a Unifying Theory." Tree Physiology. 3 (1987): 63-91.

Reiling, K and AW Davison. "The Response of Native, Herbaceous Species to Ozone: Growth and Fluorescence Screening." New Phytologist. 120 (1982): 29-37.

Reinert, R.A., A.S. Heagle, W.W. Heck. "Plant Responses to Pollutant Combinations." Responses of Plants to Air Pollution. Ed. J.B. Mudd and T.T. Kozlowski. London: Academic Press, 1975.

Smith, W. H., Air Pollution and Forests, New York: Springer-Verlag, 1981.

Southern Company Protocol. Estimated Total Sulfuric Acid Emissions from Coal-Fired Power Plants. Ed. Hardman, Stacy, and Dismukes. September 1998

Taylor, OC and DC MCLean. "Nitrogen Oxides and Peroxyacyl Nitrates." Recognition of Air Pollution Injury to Vegetation: A Pictorial Atlas. Ed. JS Jacobsen. Pittsburgh: Air Pollution Control Association, 1970. E1-E14.

Taylor, OC, CR Thompson, DT Tingey, and RA Reinert. "Oxides of Nitrogen." Responses of Plants to Air Pollution. Ed. JB Mudd and TT Kozlowski. New York: Academic Press, 1975. 122-140

Tingey, DT., RA Reinert, JA. Dunning, and WW Heck. "Vegetation Injury from the Interaction of Nitrogen Dioxide and Sulfur Dioxide." Phytopathology. 61 (1971): 1506-1511.

Treshow, M and FK Anderson. Plant Stress and Air Pollution. New York: John Wiley & Sons, 1989.

U.S. Environmental Protection Agency. Compilation of Air Pollutant Emission Factors, Fifth Edition. North Carolina: Office of Air Quality Planning and Standards, 1995.

U.S. Environmental Protection Agency. Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for Stack Height Regulations). EPA-450/4-80-023LR. North Carolina: Office of Air Quality Planning and Standards, 1985.

U.S. Environmental Protection Agency. Guideline on Air Quality Models (Revised). EPA-450/2-78-027R-C. North Carolina: Office of Air Quality Planning and Standards, 1995.

U.S. Environmental Protection Agency. New Source Review Workshop Manual – Draft. North Carolina: Office of Air Quality Planning and Standards, 1990.

U.S. Environmental Protection Agency. OAQPS Control Cost Manual, Fourth Edition. EPA-450/3-90-006. North Carolina: Office of Air Quality Planning and Standards, 1990.

U.S. Environmental Protection Agency. RACT/BACT/LAER Information System. EPA RBLC Web Site, Research Triangle Park.

U.S. Environmental Protection Agency. Workbook for Plume Visual Impact Screening and Analysis. EPA-450/4-88-015. North Carolina: Office of Air Quality Planning and Standards, 1988.

Wangen, L.E. and F.B. Turner. "Trace Elements in Vegetation Downwind of a Coal-Fired Power Plant." Water, Air, and Soil Pollution. 13 (1980): 99-108.

Westman, KP Preston, LB Weeks, and WE. "SO_2 Effects on the Growth of Native Plants." SO_2 and Vegetation. Ed. WE Winner et al. Palo Alto: Stanford University Press, 1985.

Wetmore, CM. "Lichens and Air Quality in Indiana National Lakeshore." Mycotaxon. XXXIII (1988): 25-39.

White, K.L., A.C. Hill, and J.H. Bennett. "Synergistic Inhibition of Apparent Photosynthesis Rate of Alfalfa by Combinations of Sulphur Dioxide and Nitrogen Dioxide." Environmental Science and Technology. 8 (1974): 574-576.

Winner, WE and HA Mooney. "Ecology of SO_2 Resistance: III. Metabolic Changes of C_3 and C_4 Atriplex Species Due to SO_2 Fumigation." Oecologia. 44 (1980): 49-54.

Wright, E.A., P.W. Lucas, D.A. Cottam, and T.A. Mansfield. "Physiological Responses of Plants to SO_2, O_2, and O_3. Implications for Drought Resistance." Direct Effects of Dry and Wet Deposition on Forest Ecosystems--In Particular Canopy Interactions. Lokeberg: EEC Cost Workshop, 1986.

APPENDIX A

South Dakota
Department of Environment & Natural Resources
Protecting SD's Tomorrow...Today

Air Quality Permit Application Form
Title V (Part 70) Operating Permit

General Information Form
And
Certification of Applicant Form

SEND ALL MATERIALS TO:

SD Department of Environment and Natural Resources
Air Quality Program
523 East Capitol
Pierre, South Dakota 57501-3181

(Please complete shaded areas - if you have questions call (605) 773-3151)

A. GENERAL INFORMATION

If permit is being renewed or amended, give existing permit number:	28.0801-29
1. Facility name:	Big Stone Power Plant
2. Mailing address:	
Street and/or box number	215 South Cascade Street
City, state, zip code	Fergus Falls, MN 56537
3. Facility location (if plant is portable, enter location at time of submittal):	
Street and city	Big Stone City
Legal description and county	Grant County

(Quarter, Section, Township, Range)

4. Permit contact:	
Name/title	Terry Graumann, Manager Environmental Engineering
Telephone number	218-739-8407
5. Facility contact, if different than permit contact (Person to contact for arranging inspections):	
Name/title	
Telephone number	
6. Responsible official:	
Name/title	Terry Graumann, Manager Environmental Engineering
Telephone number	218-739-8407

A responsible official is defined as a president, vice president, secretary, or treasurer for a corporation; general partner or the proprietor for a partnership; and principal executive officer or ranking elected official for municipal, state, federal or public agency.

B. PLANT DESCRIPTION

1. Standard Industrial Classification Code (SIC code):

Primary SIC code: 4911 Secondary SIC code (if applicable):

Please contact the Department if unable to determine your SIC code.

2. Briefly describe the operations at the facility, including raw materials and finished products:

Coal Power Plant. The plant is used to produce electricity.

Please attach one copy, if available, of any prepared plans and the manufacturer's specifications of any equipment, including pollution control devices. If additional space is needed to describe operations, please attach the additional paper to this application.

3. A **new source or modification to an existing source** is required to demonstrate that the operation of the new source or modification will not prevent or interfere with the attainment or maintenance of an applicable ambient air quality standard. Please attach air dispersion modeling or other documents that will demonstrate the new source or modification will not prevent or interfere with the attainment or maintenance of an applicable ambient air quality standard.

Has air dispersion modeling been conducted (please check one)? [X] Yes [ ] No

If air dispersion modeling has been conducted, please attach a copy of the report to this application unless the Department has a copy already.

C. COMPLIANCE PLAN

If it is anticipated that a permitted unit will not be operating in compliance at the time of permit issuance, a proposed compliance plan shall be included with the application. The proposed compliance plan shall include a narrative description of the following:

1. The requirements (i.e., statutes, air quality rules, permit conditions, etc.) the source is not in compliance with at the time of submittal of this application or permit issuance;
2. How the facility intends to bring the unit(s) into compliance; and
3. A compliance schedule for when the source will achieve compliance with such requirements;

The compliance schedule must include a statement that progress reports will be submitted at least once every six months and must be at least as stringent as that contained in any judicial consent decree or administrative order to which the applicant is subject.

D. MAPS

For stationary sources only, please enclose a map or a drawing showing roadways, location of plant and the nearest residents in each direction from the source. Include other structures, which may be affected.

E. AIR QUALITY EMISSIONS SUMMARY

If air quality emissions are available, please complete the following table:

	Actual	Potential Controlled	Potential Uncontrolled
Pollutant	(tons per year)	(tons per year)	(tons per year)
Particulate	See Attached		
Sulfur Dioxide			
Nitrogen Oxide			
Carbon Monoxide			
Volatile Organic Compounds			
Hazardous Air Pollutants (if applicable)			

Remember that potential emissions are calculated assuming that the permitted unit is operated 24 hours per day, 7 days per week, 52 weeks per year at maximum design capacity. Attach all calculations, MSDS sheets for all products containing volatile organic compounds and/or hazardous air pollutants, and other supporting documentation.

Please contact the Department if assistance is needed for calculating emissions for the permitted units such as emission factors, clarifying what potential emissions are, efficiency for control equipment, etc.

F. ADDITIONAL FORMS

The following forms must be completed for each piece of specific equipment at the facility and submitted with this form:

Boiler	Incinerator	Kiln Dryer
Miscellaneous Process	Paint Booth	Storage Tank

The following forms must be completed for each piece of specific air control equipment at the facility and submitted with this form:

Baghouse	Cyclone	Electrostatic Precipitator
Miscellaneous Control	Thermo Oxidizer	Wet Scrubber

G. CERTIFICATION OF COMPLIANCE

I certify the following:

1. The methods such as monitoring, record keeping, reporting, and stack test performance results described within this application shall be used to determine continuous or intermittent compliance;
2. A compliance certification document will be submitted to the Department at least annually or at other times designated by the Department for the duration of the permit;
3. The source is in compliance and will continue to demonstrate compliance with all applicable requirements, except for those designated in the attached compliance plan (if applicable); and
4. This application is submitted in accordance with the provisions of the South Dakota Codified Laws 34A-1 and Administrative Rules of South Dakota 74:36. To the best of my knowledge, after reasonable inquiry, the statements and information contained in the application and supporting documents are true, accurate, and complete. In accordance with South Dakota Codified Laws 1-40-27, I have also enclosed a completed Certification of Applicant form.

Signature:		6/18/06
Print Name:	Terry Graumann	Date
	Responsible Official	

South Dakota
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CERTIFICATION OF APPLICANT

(please complete shaded areas - if you have questions call (605) 773-3151)

In the Matter of the Application of	Big Stone Power Plant
	(Facility Name)
State of	South Dakota
County of	Grant

I, Terry Graumann, the applicant in the above matter after being duly sworn upon oath hereby certify the following information in regard to this application:

South Dakota Codified Laws Section 1-40-27 provides:

"The secretary may reject an application for any permit filed pursuant to Titles 34A or 45, including any application by any concentrated swine feeding operation for authorization to operate under a general permit, upon making a specific finding that:

(1) The applicant is unsuited or unqualified to perform the obligations of a permit holder based upon a finding that the applicant, any officer, director, partner or resident general manager of the facility for which application has been made:

(a) Has intentionally misrepresented a material fact in applying for a permit;

(b) Has been convicted of a felony or other crime involving moral turpitude;

(c) Has habitually and intentionally violated environmental laws of any state or the United States which have caused significant and material environmental damage;

(d) Has had any permit revoked under the environmental laws of any state or the United States; or

(e) Has otherwise demonstrated through clear and convincing evidence of previous actions that the applicant lacks the necessary good character and competency to reliably carry out the obligations imposed by law upon the permit holder; or

(2) The application substantially duplicates an application by the same applicant denied within the past five years which denial has not been reversed by a court of competent jurisdiction. Nothing in this subdivision may be construed to prohibit an applicant from submitting a new application for a permit previously denied, if the new application represents a good faith attempt by the applicant to correct the deficiencies that served as the basis for the denial in the original application.

All applications filed pursuant to Titles 34A and 45 shall include a certification, sworn to under oath and signed by the applicant, that he is not disqualified by reason of this section from obtaining a permit. In the absence of evidence to the contrary, that certification shall constitute a prima facie showing of the suitability and qualification of the applicant. If at any point in the application review, recommendation or hearing process, the secretary finds the applicant has intentionally made any material misrepresentation of fact in regard to this certification, consideration of the application may be suspended and the application may be rejected as provided for under this section.

Applications rejected pursuant to this section constitute final agency action upon that application and may be appealed to circuit court as provided for under chapter 1-26."

Pursuant to SDCL 1-40-27, I certify that I have read the forgoing provision of state law, and that I am not disqualified by reason of that provision from obtaining the permit for which application has been made.

Dated this 18th, day of June, 20 06

Applicant (signature)

Subscribed and sworn before me this:

Dated this 18th, day of June, 20 06

Nancy D. Tollerson

Notary Public (signature)

My commission expires: January 31, 2010

NANCY D. TOLLERSON
Notary Public
Minnesota
My Commission Expires January 31, 2010

(SEAL)

PLEASE ATTACH SHEET DISCLOSING ALL FACTS PERTAINING TO SDCL 1-40-27 (1) (a) THROUGH (e).
ALL VIOLATIONS MUST BE DISCLOSED, BUT WILL NOT AUTOMATICALLY RESULT IN THE REJECTION OF AN APPLICATION.

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Air Quality Permit Application Form

Boiler Turbine or Furnace

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit or Minor Operating Permit.
(please complete shaded areas)

1. Facility identification (i.e., Boiler #1, Unit #1, etc): 13
2. Manufacturer: TBD | Manufacture date:
3. Model number: TBD
4. Type (i.e., steam boiler, simple cycle combustion turbine, generator, etc.)

Unit II only normal flow max load

5. Maximum designed operating rate (name plate):

	6,000.00	million Btus per hour heat input	
or		horsepower with boiler efficiency:	
or		kilowatts with boiler efficiency:	

6. Check the appropriate box(es) for primary and secondary fuels:

	Natural gas				Propane
	Distillate oil	Sulfur content			Weight percent
	Residual oil	Sulfur content			Weight percent
	Bituminous Coal	X	Subbituminous Coal		Lignite Coal
Coal sulfur content	0.80	Weight percent	Coal ash content	9.0	Weight percent
	Other (please specify)				

7. Has a stack test been conducted (check appropriate box)? [ ] Yes [X] No

If a stack test has been conducted, please attach a copy of the most recent stack test report to this application. If the Department already has a copy of the most recent stack test, please specify the date of most recent stack test.

Date of most recent stack test:

Control Equipment: If applicable, types of air pollution control equipment (Examples: baghouse, cyclone, wet scrubber, electrostatic precipitator, thermal oxidizer, miscellaneous control device, etc.).

Baghouse, wet flue gas desulfurization, selective catalytic reduction

Please complete the appropriate air quality permit application form for each type of control equipment that controls air emissions from this operation.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting: [1]		feet	695,103.41	meters
Y- Coordinate or Northing: [1]		feet	5,019,218.73	meters
Base Elevation of Stack: [1]	1,124	feet		meters
Stack Height:	498	feet		meters
Exit Stack Diameter	34.00	feet		meters
Exit Stack Temperature	See below	degrees Fahrenheit		

Exit Stack Velocity and/or Flow Rate:

Velocity: See below feet per second _____ meters per second

and/or

Flow Rate: See below actual cubic feet per minute _____ actual cubic meters per second

Parameter	Boiler 1 Only	Boiler 2 Only	Both Boilers
Temperature (F)	138	136	137
Velocity (ft/s)	29.68	33.89	63.57
Flowrate (acfm)	6,213,000	6,918,000	13,131,000

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Air Quality Permit Application

Baghouse

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit, Minor Operating Permit, or the General Permits.

(please complete shaded areas)

Equipment and processes served by this baghouse (please list all equipment and processes):

	Equipment and Processes
1.	Unit 13: Unit II Boiler only normal flow max load
2.	
3.	
4.	
5.	

Manufacturer Information:

Manufacturer?	TBD		
Manufacturer date?	TBD	Installation date?	Spring 2007
Manufacturer's designed control efficiency?		%	

Type of baghouse (please check one)?

	Reverse Air		Pulse Jet		Shaker		Other (specify)

Type of bags?	TBD		
Number of bags?	TBD	Air/cloth ratio?	TBD

Baghouse Operation and Maintenance:

Pressure drop across baghouse?	TBD	inches water (minimum)	TBD	inches water (maximum)
Inlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)
Outlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)

Describe maintenance of baghouse (use of dye test, visual inspections, changing bag frequency, etc.):

Bag changing dependent on application and grain loading.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting: [1]		feet	or	695,103.41	meters
Y- Coordinate or Northing: [1]		feet	or	5,019,218.73	meters
Base Elevation of Stack: [1]	1,124	feet	or		meters
Stack Height:	498	feet	or		meters
Exit Stack Diameter	34.00	feet	or		meters
Exit Stack Temperature	See below	degrees Fahrenheit			

Exit Stack Velocity and/or Flow Rate:

Velocity:	See below	feet per second		meters per second
		and/or		
Flow Rate:	See below	actual cubic feet per minute		actual cubic meters per second

[1] - Portable asphalt plants, rock crushers, or concrete plants do not have to provide the requested information in these categories.

Parameter	Boiler 1 Only	Boiler 2 Only	Both Boilers
Temperature (F)	138	136	137
Velocity (ft/s)	29.68	33.89	63.57
Flowrate (acfm)	6,213,000	6,918,000	13,131,000

South Dakota
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Air Quality Permit Application

Wet Scrubber Data Sheet

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit, Minor Operating Permit, or the General Permits.

(please complete shaded areas)

Equipment and processes served by this wet scrubber (please list all equipment and processes):

	Equipment and Processes
1.	Unit 13: Unit II Boiler FGD (Flue Gas Desulfurization)
2.	
3.	
4.	
5.	

Manufacturer Information:

Manufacturer? TBD

Manufacturer date? TBD | Installation date? Spring 2007

Manufacturer's designed control efficiency? _____ %

Type of wet scrubber (please check one)?

☐ Venturi ☐ Demister ☐ Other (specify) _____

Scrubbing Additives? _____

Wet Scrubber Operation and Maintenance:

Pressure drop across wet scrubber? TBD inches water (minimum) TBD inches water (maximum)

Inlet Temperature? TBD Fahrenheit (minimum) TBD Fahrenheit (maximum)

Outlet Temperature? TBD Fahrenheit (minimum) TBD Fahrenheit (maximum)

Water recycled (check one)? ☐ Yes ☐ No

If yes, number of pond(s): _____ Pond size: _____ Type of liner: _____

If no, describe type of treatment and location of any planned water discharge from the property:

Describe maintenance of wet scrubber (visual inspection, how often ponds are cleaned, etc.)

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting: [1]		feet	or	695,103.41	meters
Y- Coordinate or Northing: [1]		feet	or	5,019,218.73	meters
Base Elevation of Stack: [1]	1,124	feet	or		meters
Stack Height:	498	feet	or		meters
Exit Stack Diameter	34.00	feet	or		meters
Exit Stack Temperature	See below	degrees Fahrenheit			

Exit Stack Velocity and/or Flow Rate:

Velocity:	See below	feet per second		meters per second
		and/or		
Flow Rate:	See below	actual cubic feet per minute		actual cubic meters per second

[1] - Portable asphalt plants, rock crushers, or concrete plants do not have to provide the requested information in these categories.

Parameter	Boiler 1 Only	Boiler 2 Only	Both Boilers
Temperature (F)	138	136	137
Velocity (ft/s)	29.68	33.89	63.57
Flowrate (acfm)	6,213,000	6,918,000	13,131,000

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Air Quality Permit Application Form

Miscellaneous Control Device

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit, Minor Operating Permit, or the General Permits.

(please complete shaded areas)

Describe the miscellaneous control device and how it works:

Coal Fired-Boiler using subbituminous pulverized coal to generate steam to power to a 600 MW steam powered generator.

Equipment and processes served by this baghouse (please list all equipment and processes):

	Equipment and Processes
1.	Unit 13: Unit II Boiler SCR (Selective Catalytic Reduction)
2.	
3.	
4.	
5.	

Manufacturer Information:

Manufacturer?	TBD		
Manufacturer date?	TBD	Installation date?	Spring 2007
Manufacturer's designed control efficiency?		%	

Miscellaneous Control Device Operation and Maintenance:

Pressure drop across control unit?	4	Inches water (minimum)	5	inches water (maximum)
Inlet Temperature?	675	Fahrenheit (minimum)	725	Fahrenheit (maximum)
Outlet Temperature?	125	Fahrenheit (minimum)	137	Fahrenheit (maximum)

Describe maintenance of control unit (use of visual inspections, maintenance schedule, etc.):

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting: [1]		feet	or	695,103.41	meters
Y- Coordinate or Northing: [1]		feet	or	5,019,218.73	meters
Base Elevation of Stack: [1]	1,124	feet	or		meters
Stack Height:	498	feet	or		meters
Exit Stack Diameter	34.00	feet	or		meters
Exit Stack Temperature	See below	degrees Fahrenheit			

Exit Stack Velocity and/or Flow Rate:

Velocity: See below feet per second [ ] meters per second

and/or

Flow Rate: See below actual cubic feet per minute [ ] actual cubic meters per second

[1] - Portable asphalt plants, rock crushers, or concrete plants do not have to provide the requested information in these categories.

Parameter	Boiler 1 Only	Boiler 2 Only	Both Boilers
Temperature (F)	138	136	137
Velocity (ft/s)	29.68	33.89	63.57
Flowrate (acfm)	6,213,000	6,918,000	13,131,000

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Air Quality Permit Application Form

Miscellaneous Process

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit or Minor Operating Permit.
(please complete shaded areas)

1. Facility identification (i.e., Boiler #1, Unit #1, etc): 14
2. Manufacturer: TBD | Manufacture date:
3. Model number: TBD
4. Type (i.e., steam boiler, simple cycle combustion turbine, generator, etc.)

Emergency Fire Water Pump – BSP II

5. Maximum designed operating rate (name plate):

		million Btus per hour heat input
or	420	horsepower
or		kilowatts

6. Check the appropriate box(es) for primary and secondary fuels:

	Natural gas			Propane	
X	Distillate oil	Sulfur content	0.05	Weight percent	
	Residual oil	Sulfur content		Weight percent	
	Bituminous Coal		Subbituminous Coal		Lignite Coal
Coal sulfur content		Weight percent	Coal ash content		Weight percent
	Other (please specify)				

7. Has a stack test been conducted (check appropriate box)? [ ] Yes [X] No

If a stack test has been conducted, please attach a copy of the most recent stack test report to this application. If the Department already has a copy of the most recent stack test, please specify the date of most recent stack test.

Date of most recent stack test:

Control Equipment: If applicable, types of air pollution control equipment (Examples: baghouse, cyclone, wet scrubber, electrostatic precipitator, thermal oxidizer, miscellaneous control device, etc.).

Please complete the appropriate air quality permit application form for each type of control equipment that controls air emissions from this operation.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting:		feet	695,645	meters
Y- Coordinate or Northing:		feet	5,019,225.50	meters
Base Elevation of Stack:	1,124	feet		meters
Stack Height:	15.00	feet		meters
Exit Stack Diameter	0.83	feet		meters
Exit Stack Temperature	904.00	degrees Fahrenheit		

Exit Stack Velocity and/or Flow Rate:

Velocity:	76.58	feet per second		meters per second
		and/or		
Flow Rate:	2,486.07	actual cubic feet per minute		actual cubic meters per second

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Air Quality Permit Application Form

Miscellaneous Process

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit or Minor Operating Permit.
(please complete shaded areas)

1. Facility identification (i.e., Boiler #1, Unit #1, etc): 15
2. Manufacturer: TBD | Manufacture date:
3. Model number: TBD
4. Type (i.e., steam boiler, simple cycle combustion turbine, generator, etc.)

Emergency Diesel Generator - BSP II

5. Maximum designed operating rate (name plate):

		million Btus per hour heat input
or	2,220	horsepower
or		kilowatts

6. Check the appropriate box(es) for primary and secondary fuels:

	Natural gas				Propane
X	Distillate oil	Sulfur content	0.05	Weight percent	
	Residual oil	Sulfur content		Weight percent	
	Bituminous Coal		Subbituminous Coal		Lignite Coal
Coal sulfur content		Weight percent	Coal ash content		Weight percent
	Other (please specify)				

7. Has a stack test been conducted (check appropriate box)? [ ] Yes [X] No

If a stack test has been conducted, please attach a copy of the most recent stack test report to this application. If the Department already has a copy of the most recent stack test, please specify the date of most recent stack test.

Date of most recent stack test:

Control Equipment: If applicable, types of air pollution control equipment (Examples: baghouse, cyclone, wet scrubber, electrostatic precipitator, thermal oxidizer, miscellaneous control device, etc.).

Please complete the appropriate air quality permit application form for each type of control equipment that controls air emissions from this operation.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting:		feet	695,329	meters
Y- Coordinate or Northing:		feet	5,019,197	meters
Base Elevation of Stack:	1,124	feet		meters
Stack Height:	15.00	feet		meters
Exit Stack Diameter	1.50	feet		meters
Exit Stack Temperature	900.00	degrees Fahrenheit		

Exit Stack Velocity and/or Flow Rate:

Velocity:	100.44	feet per second		meters per second

and/or

Flow Rate:	10,650.00	actual cubic feet per minute		actual cubic meters per second

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Air Quality Permit Application Form

Miscellaneous Process

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit or Minor Operating Permit.
(please complete shaded areas)

1. Facility identification (i.e., Boiler #1, Unit #1, etc): 16
2. Manufacturer: TBD | Manufacture date:
3. Model number: TBD
4. Type (i.e., steam boiler, simple cycle combustion turbine, generator, etc.)

Cooling Tower (18 Cells)

5. Maximum designed operating rate (name plate):

	312,540.00 gpm	million Btus per hour heat input
or		horsepower
or		kilowatts

6. Check the appropriate box(es) for primary and secondary fuels:

☐	Natural gas			☐	Propane
☐	Distillate oil	Sulfur content			Weight percent
☐	Residual oil	Sulfur content			Weight percent
☐	Bituminous Coal	☐	Subbituminous Coal	☐	Lignite Coal
Coal sulfur content			Weight percent	Coal ash content	Weight percent
☐	Other (please specify)				

7. Has a stack test been conducted (check appropriate box)? ☐ Yes ☒ No

If a stack test has been conducted, please attach a copy of the most recent stack test report to this application. If the Department already has a copy of the most recent stack test, please specify the date of most recent stack test.

Date of most recent stack test:

Control Equipment: If applicable, types of air pollution control equipment (Examples: baghouse, cyclone, wet scrubber, electrostatic precipitator, thermal oxidizer, miscellaneous control device, etc.).

0.0005% drift eliminators

Please complete the appropriate air quality permit application form for each type of control equipment that controls air emissions from this operation.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting:		feet	See below	meters
Y- Coordinate or Northing:		feet	See below	meters
Base Elevation of Stack:	1,124 (per cell)	feet		meters
Stack Height:	60.00 (per cell)	feet		meters
Exit Stack Diameter	33.00 (per cell)	feet		meters
Exit Stack Temperature	61.00 (per cell)	degrees Fahrenheit		

Exit Stack Velocity and/or Flow Rate:

Velocity:	39.60 (per cell)	feet per second		meters per second
		and/or		
Flow Rate:	2,032,180 (per cell)	actual cubic feet per minute		actual cubic meters per second

Cooling Tower's X/Y Coordinates (in UTM meters)

X	Y
694338.85	5018869.86
694348.72	5018859.54
694358.10	5018848.78
694368.41	5018838.01
694378.79	5018826.81
694389.54	5018816.04
694398.91	5018806.18
694409.72	5018794.53
694420.04	5018783.76
694351.85	5018882.40
694362.16	5018871.20
694372.47	5018860.43
694381.91	5018850.57
694392.66	5018838.92
694403.41	5018828.61
694412.85	5018818.29
694422.72	5018807.53
694433.47	5018796.76

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Air Quality Permit Application Form

Miscellaneous Process

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit or Minor Operating Permit.
(please complete shaded areas)

1. Facility identification (i.e., Boiler #1, Unit #1, etc): 17
2. Manufacturer: TBD | Manufacture date:
3. Model number: TBD
4. Type (i.e., steam boiler, simple cycle combustion turbine, generator, etc.)

Emergency Coal Reclaim System

5. Maximum designed operating rate (name plate):

		million Btus per hour heat input
or		horsepower
or		kilowatts

6. Check the appropriate box(es) for primary and secondary fuels:

☐	Natural gas		☐	Propane	
☐	Distillate oil	Sulfur content			Weight percent
☐	Residual oil	Sulfur content			Weight percent
☐	Bituminous Coal	☐	Subbituminous Coal	☐	Lignite Coal
Coal sulfur content			Weight percent	Coal ash content	Weight percent
☐	Other (please specify)				

7. Has a stack test been conducted (check appropriate box)? ☐ Yes ☒ No

If a stack test has been conducted, please attach a copy of the most recent stack test report to this application. If the Department already has a copy of the most recent stack test, please specify the date of most recent stack test.

Date of most recent stack test:

Control Equipment: If applicable, types of air pollution control equipment (Examples: baghouse, cyclone, wet scrubber, electrostatic precipitator, thermal oxidizer, miscellaneous control device, etc.).

Baghouse

Please complete the appropriate air quality permit application form for each type of control equipment that controls air emissions from this operation.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting:		feet	695,011.94	meters
Y- Coordinate or Northing:		feet	5,019,412.50	meters
Base Elevation of Stack:	1,124	feet		meters
Stack Height:	20	feet		meters
Exit Stack Diameter	2.20	feet		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit		

Exit Stack Velocity and/or Flow Rate:

Velocity:	59.19	feet per second		meters per second
		and/or		
Flow Rate:	13,500.00	actual cubic feet per minute		actual cubic meters per second

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Air Quality Permit Application

Baghouse

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit, Minor Operating Permit, or the General Permits.

(please complete shaded areas)

Equipment and processes served by this baghouse (please list all equipment and processes):

	Equipment and Processes
1.	Unit 17: Emergency Coal Reclaim System
2.	
3.	
4.	
5.	

Manufacturer Information:

Manufacturer?	TBD		
Manufacturer date?	TBD	Installation date?	Spring 2007
Manufacturer's designed control efficiency?	0.01 gr/dscf	%	

Type of baghouse (please check one)?

	Reverse Air	X	Pulse Jet		Shaker		Other (specify)

Type of bags?	TBD		
Number of bags?	TBD	Air/cloth ratio?	TBD

Baghouse Operation and Maintenance:

Pressure drop across baghouse?	TBD	inches water (minimum)	TBD	inches water (maximum)
Inlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)
Outlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)

Describe maintenance of baghouse (use of dye test, visual inspections, changing bag frequency, etc.):

Bag changing dependent on application and grain loading.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting: [1]		feet	or	695,011.94	meters
Y- Coordinate or Northing: [1]		feet	or	5,019,412.50	meters
Base Elevation of Stack: [1]	1,124	feet	or		meters
Stack Height:	20	feet	or		meters
Exit Stack Diameter	2.20	feet	or		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit			

Exit Stack Velocity and/or Flow Rate:

Velocity:	59.19	feet per second		meters per second
		and/or		
Flow Rate:	13,500.00	actual cubic feet per minute		actual cubic meters per second

[1] - Portable asphalt plants, rock crushers, or concrete plants do not have to provide the requested information in these categories.

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Air Quality Permit Application Form

Miscellaneous Process

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit or Minor Operating Permit.
(please complete shaded areas)

1. Facility identification (i.e., Boiler #1, Unit #1, etc): 18
2. Manufacturer: TBD | Manufacture date:
3. Model number: TBD
4. Type (i.e., steam boiler, simple cycle combustion turbine, generator, etc.)

Yard Coal Silo Fill System

5. Maximum designed operating rate (name plate):

		million Btus per hour heat input
or		horsepower
or		kilowatts

6. Check the appropriate box(es) for primary and secondary fuels:

☐	Natural gas		☐	Propane	
☐	Distillate oil	Sulfur content			Weight percent
☐	Residual oil	Sulfur content			Weight percent
☐	Bituminous Coal	☐	Subbituminous Coal	☐	Lignite Coal
Coal sulfur content			Weight percent	Coal ash content	Weight percent
☐	Other (please specify)				

7. Has a stack test been conducted (check appropriate box)? ☐ Yes ☒ No

If a stack test has been conducted, please attach a copy of the most recent stack test report to this application. If the Department already has a copy of the most recent stack test, please specify the date of most recent stack test.

Date of most recent stack test:

Control Equipment: If applicable, types of air pollution control equipment (Examples: baghouse, cyclone, wet scrubber, electrostatic precipitator, thermal oxidizer, miscellaneous control device, etc.).

Baghouse

Please complete the appropriate air quality permit application form for each type of control equipment that controls air emissions from this operation.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting:		feet	695,015.25	meters
Y- Coordinate or Northing:		feet	5,019,221.00	meters
Base Elevation of Stack:	1,124	feet		meters
Stack Height:	235.00	feet		meters
Exit Stack Diameter	3.60	feet		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit		

Exit Stack Velocity and/or Flow Rate:

Velocity:	58.95	feet per second		meters per second
		and/or		
Flow Rate:	36,000.00	actual cubic feet per minute		actual cubic meters per second

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Air Quality Permit Application

Baghouse

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit, Minor Operating Permit, or the General Permits.

(please complete shaded areas)

Equipment and processes served by this baghouse (please list all equipment and processes):

	Equipment and Processes
1.	Unit 18: Yard Coal Silo Fill System
2.	
3.	
4.	
5.	

Manufacturer Information:

Manufacturer?	TBD		
Manufacturer date?	TBD	Installation date?	Spring 2007
Manufacturer's designed control efficiency?	0.01 gr/dscf	%	

Type of baghouse (please check one)?

	Reverse Air	X	Pulse Jet		Shaker		Other (specify)

Type of bags?	TBD		
Number of bags?	TBD	Air/cloth ratio?	TBD

Baghouse Operation and Maintenance:

Pressure drop across baghouse?	TBD	inches water (minimum)	TBD	inches water (maximum)
Inlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)
Outlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)

Describe maintenance of baghouse (use of dye test, visual inspections, changing bag frequency, etc.):

Bag changing dependent on application and grain loading.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting: [1]		feet	or	695,015.25	meters
Y- Coordinate or Northing: [1]		feet	or	5,019,221.00	meters
Base Elevation of Stack: [1]	1,124	feet	or		meters
Stack Height:	235.00	feet	or		meters
Exit Stack Diameter	3.60	feet	or		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit			

Exit Stack Velocity and/or Flow Rate:

Velocity:	58.95	feet per second		meters per second
		and/or		
Flow Rate:	36,000.00	actual cubic feet per minute		actual cubic meters per second

[1] - Portable asphalt plants, rock crushers, or concrete plants do not have to provide the requested information in these categories.

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Air Quality Permit Application Form

Miscellaneous Process

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit or Minor Operating Permit.
(please complete shaded areas)

1. Facility identification (i.e., Boiler #1, Unit #1, etc): 19
2. Manufacturer: TBD Manufacture date:
3. Model number: TBD
4. Type (i.e., steam boiler, simple cycle combustion turbine, generator, etc.)

Yard Coal Silo Loadout System

5. Maximum designed operating rate (name plate):

		million Btus per hour heat input
or		horsepower
or		kilowatts

6. Check the appropriate box(es) for primary and secondary fuels:

☐	Natural gas		☐	Propane	
☐	Distillate oil	Sulfur content			Weight percent
☐	Residual oil	Sulfur content			Weight percent
☐	Bituminous Coal	☐	Subbituminous Coal	☐	Lignite Coal
Coal sulfur content			Weight percent	Coal ash content	Weight percent
☐	Other (please specify)				

7. Has a stack test been conducted (check appropriate box)? ☐ Yes ☒ No

If a stack test has been conducted, please attach a copy of the most recent stack test report to this application. If the Department already has a copy of the most recent stack test, please specify the date of most recent stack test.

Date of most recent stack test:

Control Equipment: If applicable, types of air pollution control equipment (Examples: baghouse, cyclone, wet scrubber, electrostatic precipitator, thermal oxidizer, miscellaneous control device, etc.).

Baghouse

Please complete the appropriate air quality permit application form for each type of control equipment that controls air emissions from this operation.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting:		feet	694,986.44	meters
Y- Coordinate or Northing:		feet	5,019,172.00	meters
Base Elevation of Stack:	1,124	feet		meters
Stack Height:	20	feet		meters
Exit Stack Diameter	2.80	feet		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit		

Exit Stack Velocity and/or Flow Rate:

Velocity:	60.90	feet per second		meters per second
		and/or		
Flow Rate:	22,500.00	actual cubic feet per minute		actual cubic meters per second

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Air Quality Permit Application

Baghouse

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit, Minor Operating Permit, or the General Permits.

(please complete shaded areas)

Equipment and processes served by this baghouse (please list all equipment and processes):

	Equipment and Processes
1.	Unit 19: Yard Coal Silo Loadout System
2.	
3.	
4.	
5.	

Manufacturer Information:

Manufacturer?	TBD		
Manufacturer date?	TBD	Installation date?	Spring 2007
Manufacturer's designed control efficiency?	0.01 gr/dscf	%	

Type of baghouse (please check one)?

	Reverse Air	X	Pulse Jet		Shaker		Other (specify)

Type of bags?	TBD		
Number of bags?	TBD	Air/cloth ratio?	TBD

Baghouse Operation and Maintenance:

Pressure drop across baghouse?	TBD	inches water (minimum)	TBD	inches water (maximum)
Inlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)
Outlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)

Describe maintenance of baghouse (use of dye test, visual inspections, changing bag frequency, etc.):

Bag changing dependent on application and grain loading.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting: [1]		feet	or	694,986.44	meters
Y- Coordinate or Northing: [1]		feet	or	5,019,172.00	meters
Base Elevation of Stack: [1]	1,124	feet	or		meters
Stack Height:	20.00	feet	or		meters
Exit Stack Diameter	2.80	feet	or		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit			

Exit Stack Velocity and/or Flow Rate:

Velocity:	60.90	feet per second		meters per second
		and/or		
Flow Rate:	22,500.00	actual cubic feet per minute		actual cubic meters per second

[1] - Portable asphalt plants, rock crushers, or concrete plants do not have to provide the requested information in these categories.

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Air Quality Permit Application Form

Miscellaneous Process

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit or Minor Operating Permit.
(please complete shaded areas)

1. Facility identification (i.e., Boiler #1, Unit #1, etc): 20
2. Manufacturer: TBD Manufacture date:
3. Model number: TBD
4. Type (i.e., steam boiler, simple cycle combustion turbine, generator, etc.)

Limestone Reclaim System

5. Maximum designed operating rate (name plate):

		million Btus per hour heat input
or		horsepower
or		kilowatts

6. Check the appropriate box(es) for primary and secondary fuels:

☐	Natural gas		☐	Propane	
☐	Distillate oil	Sulfur content			Weight percent
☐	Residual oil	Sulfur content			Weight percent
☐	Bituminous Coal	☐	Subbituminous Coal	☐	Lignite Coal
Coal sulfur content			Weight percent	Coal ash content	Weight percent
☐	Other (please specify)				

7. Has a stack test been conducted (check appropriate box)? ☐ Yes ☒ No

If a stack test has been conducted, please attach a copy of the most recent stack test report to this application. If the Department already has a copy of the most recent stack test, please specify the date of most recent stack test.

Date of most recent stack test:

Control Equipment: If applicable, types of air pollution control equipment (Examples: baghouse, cyclone, wet scrubber, electrostatic precipitator, thermal oxidizer, miscellaneous control device, etc.).

Baghouse

Please complete the appropriate air quality permit application form for each type of control equipment that controls air emissions from this operation.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting:		feet	695,071.88	meters
Y- Coordinate or Northing:		feet	5,019,152.50	meters
Base Elevation of Stack:	1,124	feet		meters
Stack Height:	20.00	feet		meters
Exit Stack Diameter	2.10	feet		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit		

Exit Stack Velocity and/or Flow Rate:

Velocity:	57.74	feet per second		meters per second
		and/or		
Flow Rate:	12,000.00	actual cubic feet per minute		actual cubic meters per second

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Air Quality Permit Application

Baghouse

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit, Minor Operating Permit, or the General Permits.

(please complete shaded areas)

Equipment and processes served by this baghouse (please list all equipment and processes):

	Equipment and Processes
1.	Unit 20: Limestone Reclaim System
2.	
3.	
4.	
5.	

Manufacturer Information:

Manufacturer?	TBD		
Manufacturer date?	TBD	Installation date?	Spring 2007
Manufacturer's designed control efficiency?	0.01 gr/dscf	%	

Type of baghouse (please check one)?

	Reverse Air	X	Pulse Jet		Shaker		Other (specify)

Type of bags?	TBD		
Number of bags?	TBD	Air/cloth ratio?	TBD

Baghouse Operation and Maintenance:

Pressure drop across baghouse?	TBD	inches water (minimum)	TBD	inches water (maximum)
Inlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)
Outlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)

Describe maintenance of baghouse (use of dye test, visual inspections, changing bag frequency, etc.):

Bag changing dependent on application and grain loading.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting: [1]		feet	or	695,071.88	meters
Y- Coordinate or Northing: [1]		feet	or	5,019,152.50	meters
Base Elevation of Stack: [1]	1,124	feet	or		meters
Stack Height:	20.00	feet	or		meters
Exit Stack Diameter	2.10	feet	or		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit			

Exit Stack Velocity and/or Flow Rate:

Velocity:	57.74	feet per second		meters per second
		and/or		
Flow Rate:	12,000.00	actual cubic feet per minute		actual cubic meters per second

[1] - Portable asphalt plants, rock crushers, or concrete plants do not have to provide the requested information in these categories.

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Air Quality Permit Application Form

Miscellaneous Process

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit or Minor Operating Permit.
(please complete shaded areas)

1. Facility identification (i.e., Boiler #1, Unit #1, etc): 21
2. Manufacturer: TBD Manufacture date:
3. Model number: TBD
4. Type (i.e., steam boiler, simple cycle combustion turbine, generator, etc.)

Limestone Receiving System

5. Maximum designed operating rate (name plate):

		million Btus per hour heat input
or		horsepower
or		kilowatts

6. Check the appropriate box(es) for primary and secondary fuels:

☐	Natural gas		☐	Propane	
☐	Distillate oil	Sulfur content			Weight percent
☐	Residual oil	Sulfur content			Weight percent
☐	Bituminous Coal	☐	Subbituminous Coal	☐	Lignite Coal
Coal sulfur content			Weight percent	Coal ash content	Weight percent
☐	Other (please specify)				

7. Has a stack test been conducted (check appropriate box)? ☐ Yes ☒ No

If a stack test has been conducted, please attach a copy of the most recent stack test report to this application. If the Department already has a copy of the most recent stack test, please specify the date of most recent stack test.

Date of most recent stack test:

Control Equipment: If applicable, types of air pollution control equipment (Examples: baghouse, cyclone, wet scrubber, electrostatic precipitator, thermal oxidizer, miscellaneous control device, etc.).

Baghouse

Please complete the appropriate air quality permit application form for each type of control equipment that controls air emissions from this operation.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting:		feet	695,022.56	meters
Y- Coordinate or Northing:		feet	5,019,074.00	meters
Base Elevation of Stack:	1,124	feet		meters
Stack Height:	20.00	feet		meters
Exit Stack Diameter	1.90	feet		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit		

Exit Stack Velocity and/or Flow Rate:

Velocity:	58.78	feet per second		meters per second
		and/or		
Flow Rate:	10,000.00	actual cubic feet per minute		actual cubic meters per second

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Air Quality Permit Application

Baghouse

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit, Minor Operating Permit, or the General Permits.

(please complete shaded areas)

Equipment and processes served by this baghouse (please list all equipment and processes):

	Equipment and Processes
1.	Unit 21: Limestone Receiving System
2.	
3.	
4.	
5.	

Manufacturer Information:

Manufacturer?	TBD		
Manufacturer date?	TBD	Installation date?	Spring 2007
Manufacturer's designed control efficiency?	0.01 gr/dscf	%	

Type of baghouse (please check one)?

	Reverse Air	X	Pulse Jet		Shaker		Other (specify)

Type of bags?	TBD		
Number of bags?	TBD	Air/cloth ratio?	TBD

Baghouse Operation and Maintenance:

Pressure drop across baghouse?	TBD	inches water (minimum)	TBD	inches water (maximum)
Inlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)
Outlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)

Describe maintenance of baghouse (use of dye test, visual inspections, changing bag frequency, etc.):

Bag changing dependent on application and grain loading.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting: [1]		feet	or	695,022.56	meters
Y- Coordinate or Northing: [1]		feet	or	5,019,074.00	meters
Base Elevation of Stack: [1]	1,124	feet	or		meters
Stack Height:	20.00	feet	or		meters
Exit Stack Diameter	1.90	feet	or		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit			

Exit Stack Velocity and/or Flow Rate:

Velocity:	58.78	feet per second		meters per second
		and/or		
Flow Rate:	10,000.00	actual cubic feet per minute		actual cubic meters per second

[1] - Portable asphalt plants, rock crushers, or concrete plants do not have to provide the requested information in these categories.

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Air Quality Permit Application Form

Miscellaneous Process

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit or Minor Operating Permit.
(please complete shaded areas)

1. Facility identification (i.e., Boiler #1, Unit #1, etc): 22
2. Manufacturer: TBD | Manufacture date:
3. Model number: TBD
4. Type (i.e., steam boiler, simple cycle combustion turbine, generator, etc.)

Coal Tripper/Silo Fill System

5. Maximum designed operating rate (name plate):

		million Btus per hour heat input
or		horsepower
or		kilowatts

6. Check the appropriate box(es) for primary and secondary fuels:

☐	Natural gas		☐	Propane	
☐	Distillate oil	Sulfur content			Weight percent
☐	Residual oil	Sulfur content			Weight percent
☐	Bituminous Coal	☐	Subbituminous Coal	☐	Lignite Coal
Coal sulfur content			Weight percent	Coal ash content	Weight percent
☐	Other (please specify)				

7. Has a stack test been conducted (check appropriate box)? ☐ Yes ☒ No

If a stack test has been conducted, please attach a copy of the most recent stack test report to this application. If the Department already has a copy of the most recent stack test, please specify the date of most recent stack test.

Date of most recent stack test:

Control Equipment: If applicable, types of air pollution control equipment (Examples: baghouse, cyclone, wet scrubber, electrostatic precipitator, thermal oxidizer, miscellaneous control device, etc.).

Baghouse

Please complete the appropriate air quality permit application form for each type of control equipment that controls air emissions from this operation.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting:		feet	695,299.00	meters
Y- Coordinate or Northing:		feet	5,019,273.00	meters
Base Elevation of Stack:	1,124	feet		meters
Stack Height:	279.00	feet		meters
Exit Stack Diameter	5.10	feet		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit		

Exit Stack Velocity and/or Flow Rate:

Velocity:	57.93	feet per second		meters per second
		and/or		
Flow Rate:	71,000.00	actual cubic feet per minute		actual cubic meters per second

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Air Quality Permit Application

Baghouse

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit, Minor Operating Permit, or the General Permits.

(please complete shaded areas)

Equipment and processes served by this baghouse (please list all equipment and processes):

	Equipment and Processes
1.	Unit 22: Coal Tripper/Silo Fill System
2.	
3.	
4.	
5.	

Manufacturer Information:

Manufacturer?	TBD		
Manufacturer date?	TBD	Installation date?	Spring 2007
Manufacturer's designed control efficiency?	0.01 gr/dscf	%	

Type of baghouse (please check one)?

	Reverse Air	X	Pulse Jet		Shaker		Other (specify)

Type of bags?	TBD		
Number of bags?	TBD	Air/cloth ratio?	TBD

Baghouse Operation and Maintenance:

Pressure drop across baghouse?	TBD	inches water (minimum)	TBD	inches water (maximum)
Inlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)
Outlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)

Describe maintenance of baghouse (use of dye test, visual inspections, changing bag frequency, etc.):

Bag changing dependent on application and grain loading.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting: [1]		feet	or	695,299.00	meters
Y- Coordinate or Northing: [1]		feet	or	5,019,273.00	meters
Base Elevation of Stack: [1]	1,124	feet	or		meters
Stack Height:	279.00	feet	or		meters
Exit Stack Diameter	5.10	feet	or		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit			

Exit Stack Velocity and/or Flow Rate:

Velocity:	57.93	feet per second		meters per second
		and/or		
Flow Rate:	71,000.00	actual cubic feet per minute		actual cubic meters per second

[1] - Portable asphalt plants, rock crushers, or concrete plants do not have to provide the requested information in these categories.

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Air Quality Permit Application Form

Miscellaneous Process

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit or Minor Operating Permit.
(please complete shaded areas)

1. Facility identification (i.e., Boiler #1, Unit #1, etc): 23
2. Manufacturer: TBD Manufacture date:
3. Model number: TBD
4. Type (i.e., steam boiler, simple cycle combustion turbine, generator, etc.)

Fly ash silo bin vent

5. Maximum designed operating rate (name plate):

		million Btus per hour heat input
or		horsepower
or		kilowatts

6. Check the appropriate box(es) for primary and secondary fuels:

☐	Natural gas		☐	Propane	
☐	Distillate oil	Sulfur content			Weight percent
☐	Residual oil	Sulfur content			Weight percent
☐	Bituminous Coal	☐	Subbituminous Coal	☐	Lignite Coal
Coal sulfur content			Weight percent	Coal ash content	Weight percent
☐	Other (please specify)				

7. Has a stack test been conducted (check appropriate box)? ☐ Yes ☒ No

If a stack test has been conducted, please attach a copy of the most recent stack test report to this application. If the Department already has a copy of the most recent stack test, please specify the date of most recent stack test.

Date of most recent stack test:

Control Equipment: If applicable, types of air pollution control equipment (Examples: baghouse, cyclone, wet scrubber, electrostatic precipitator, thermal oxidizer, miscellaneous control device, etc.).

Baghouse

Please complete the appropriate air quality permit application form for each type of control equipment that controls air emissions from this operation.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting:		feet	695,217.63	meters
Y- Coordinate or Northing:		feet	5,019,237.50	meters
Base Elevation of Stack:	1,124	feet		meters
Stack Height:	110	feet		meters
Exit Stack Diameter	1.9	feet		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit		

Exit Stack Velocity and/or Flow Rate:

Velocity:	52.90	feet per second		meters per second
		and/or		
Flow Rate:	9,000.00	actual cubic feet per minute		actual cubic meters per second

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Air Quality Permit Application

Baghouse

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit, Minor Operating Permit, or the General Permits.

(please complete shaded areas)

Equipment and processes served by this baghouse (please list all equipment and processes):

	Equipment and Processes
1.	Unit 23: Fly ash silo bin vent
2.	
3.	
4.	
5.	

Manufacturer Information:

Manufacturer?	TBD		
Manufacturer date?	TBD	Installation date?	Spring 2007
Manufacturer's designed control efficiency?	0.01 gr/dscf	%	

Type of baghouse (please check one)?

	Reverse Air	X	Pulse Jet		Shaker		Other (specify)

Type of bags?	TBD		
Number of bags?	TBD	Air/cloth ratio?	TBD

Baghouse Operation and Maintenance:

Pressure drop across baghouse?	TBD	inches water (minimum)	TBD	inches water (maximum)
Inlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)
Outlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)

Describe maintenance of baghouse (use of dye test, visual inspections, changing bag frequency, etc.):

Bag changing dependent on application and grain loading.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting: [1]		feet	or	695,217.63	meters
Y- Coordinate or Northing: [1]		feet	or	5,019,237.50	meters
Base Elevation of Stack: [1]	1,124	feet	or		meters
Stack Height:	110.00	feet	or		meters
Exit Stack Diameter	1.9	feet	or		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit			

Exit Stack Velocity and/or Flow Rate:

Velocity:	52.90	feet per second		meters per second

and/or

Flow Rate:	9,000.00	actual cubic feet per minute		actual cubic meters per second

[1] - Portable asphalt plants, rock crushers, or concrete plants do not have to provide the requested information in these categories.

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Air Quality Permit Application Form

Miscellaneous Process

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit or Minor Operating Permit.
(please complete shaded areas)

1. Facility identification (i.e., Boiler #1, Unit #1, etc): 24
2. Manufacturer: TBD | Manufacture date:
3. Model number: TBD
4. Type (i.e., steam boiler, simple cycle combustion turbine, generator, etc.)

Limestone Day Bins Vent

5. Maximum designed operating rate (name plate):

		million Btus per hour heat input
or		horsepower
or		kilowatts

6. Check the appropriate box(es) for primary and secondary fuels:

☐	Natural gas		☐	Propane	
☐	Distillate oil	Sulfur content		Weight percent	
☐	Residual oil	Sulfur content		Weight percent	
☐	Bituminous Coal	☐	Subbituminous Coal	☐	Lignite Coal
Coal sulfur content		Weight percent	Coal ash content		Weight percent
☐	Other (please specify)				

7. Has a stack test been conducted (check appropriate box)? ☐ Yes ☒ No

If a stack test has been conducted, please attach a copy of the most recent stack test report to this application. If the Department already has a copy of the most recent stack test, please specify the date of most recent stack test.

Date of most recent stack test:

Control Equipment: If applicable, types of air pollution control equipment (Examples: baghouse, cyclone, wet scrubber, electrostatic precipitator, thermal oxidizer, miscellaneous control device, etc.).

Baghouse

Please complete the appropriate air quality permit application form for each type of control equipment that controls air emissions from this operation.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting:		feet	695,149.5	meters
Y- Coordinate or Northing:		feet	5,019,202.00	meters
Base Elevation of Stack:	1,124	feet		meters
Stack Height:	128.00	feet		meters
Exit Stack Diameter	1.33	feet		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit		

Exit Stack Velocity and/or Flow Rate:

Velocity: 0.33* feet per second _____ meters per second

and/or

Flow Rate: 3,281 actual cubic feet per minute _____ actual cubic meters per second

*obstructed or horizontal discharge

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Air Quality Permit Application

Baghouse

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit, Minor Operating Permit, or the General Permits.

(please complete shaded areas)

Equipment and processes served by this baghouse (please list all equipment and processes):

	Equipment and Processes
1.	Unit 24: Limestone Day Bins Vent
2.	
3.	
4.	
5.	

Manufacturer Information:

Manufacturer?	TBD		
Manufacturer date?	TBD	Installation date?	Spring 2007
Manufacturer's designed control efficiency?	0.01 gr/dscf	%	

Type of baghouse (please check one)?

	Reverse Air	X	Pulse Jet		Shaker		Other (specify)

Type of bags?	TBD		
Number of bags?	TBD	Air/cloth ratio?	TBD

Baghouse Operation and Maintenance:

Pressure drop across baghouse?	TBD	inches water (minimum)	TBD	inches water (maximum)
Inlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)
Outlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)

Describe maintenance of baghouse (use of dye test, visual inspections, changing bag frequency, etc.):

Bag changing dependent on application and grain loading.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting: [1]		feet	or	695,149.5	meters
Y- Coordinate or Northing: [1]		feet	or	5,019,202.00	meters
Base Elevation of Stack: [1]	1,124	feet	or		meters
Stack Height:	128.00	feet	or		meters
Exit Stack Diameter	1.33	feet	or		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit			

Exit Stack Velocity and/or Flow Rate:

Velocity:	0.33*	feet per second		meters per second
		and/or		
Flow Rate:	3,281	actual cubic feet per minute		actual cubic meters per second

[1] - Portable asphalt plants, rock crushers, or concrete plants do not have to provide the requested information in these categories.

*obstructed or horizontal discharge

South Dakota Department of Environment & Natural Resources
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Air Quality Permit Application Form

Miscellaneous Process

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit or Minor Operating Permit.
(please complete shaded areas)

1. Facility identification (i.e., Boiler #1, Unit #1, etc): 25
2. Manufacturer: TBD | Manufacture date:
3. Model number: TBD
4. Type (i.e., steam boiler, simple cycle combustion turbine, generator, etc.)

Diesel FW Booster Pump (Boiler)

5. Maximum designed operating rate (name plate):

		million Btus per hour heat input
or	225.00	horsepower
or		kilowatts

6. Check the appropriate box(es) for primary and secondary fuels:

	Natural gas			Propane	
X	Distillate oil	Sulfur content	0.05	Weight percent	
	Residual oil	Sulfur content		Weight percent	
	Bituminous Coal		Subbituminous Coal		Lignite Coal
Coal sulfur content		Weight percent	Coal ash content		Weight percent
	Other (please specify)				

7. Has a stack test been conducted (check appropriate box)? [ ] Yes [X] No

If a stack test has been conducted, please attach a copy of the most recent stack test report to this application. If the Department already has a copy of the most recent stack test, please specify the date of most recent stack test.

Date of most recent stack test:

Control Equipment: If applicable, types of air pollution control equipment (Examples: baghouse, cyclone, wet scrubber, electrostatic precipitator, thermal oxidizer, miscellaneous control device, etc.).

Please complete the appropriate air quality permit application form for each type of control equipment that controls air emissions from this operation.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting:		feet	695,265.44	meters
Y- Coordinate or Northing:		feet	5,019,234.00	meters
Base Elevation of Stack:	1,124	feet		meters
Stack Height:	11.00	feet		meters
Exit Stack Diameter	0.67	feet		meters
Exit Stack Temperature	749.00	degrees Fahrenheit		

Exit Stack Velocity and/or Flow Rate:

Velocity:	55.76	feet per second		meters per second
		and/or		
Flow Rate:	1,179.54	actual cubic feet per minute		actual cubic meters per second

South Dakota Department of Environment & Natural Resources
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Air Quality Permit Application Form

Miscellaneous Process

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit or Minor Operating Permit.
(please complete shaded areas)

1. Facility identification (i.e., Boiler #1, Unit #1, etc): 26
2. Manufacturer: TBD Manufacture date:
3. Model number: TBD
4. Type (i.e., steam boiler, simple cycle combustion turbine, generator, etc.)

Coal Plant Transfer System

5. Maximum designed operating rate (name plate):

		million Btus per hour heat input
or		horsepower
or		kilowatts

6. Check the appropriate box(es) for primary and secondary fuels:

☐	Natural gas		☐	Propane	
☐	Distillate oil	Sulfur content			Weight percent
☐	Residual oil	Sulfur content			Weight percent
☐	Bituminous Coal	☐	Subbituminous Coal	☐	Lignite Coal
Coal sulfur content			Weight percent	Coal ash content	Weight percent
☐	Other (please specify)				

7. Has a stack test been conducted (check appropriate box)? ☐ Yes ☒ No

If a stack test has been conducted, please attach a copy of the most recent stack test report to this application. If the Department already has a copy of the most recent stack test, please specify the date of most recent stack test.

Date of most recent stack test:

Control Equipment: If applicable, types of air pollution control equipment (Examples: baghouse, cyclone, wet scrubber, electrostatic precipitator, thermal oxidizer, miscellaneous control device, etc.).

Baghouse

Please complete the appropriate air quality permit application form for each type of control equipment that controls air emissions from this operation.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting:		feet	695,048.75	meters
Y- Coordinate or Northing:		feet	5,019,459.50	meters
Base Elevation of Stack:	1,124	feet		meters
Stack Height:	20.00	feet		meters
Exit Stack Diameter	1.8	feet		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit		

Exit Stack Velocity and/or Flow Rate:

Velocity:	58.94	feet per second		meters per second
		and/or		
Flow Rate:	9,000.00	actual cubic feet per minute		actual cubic meters per second

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Air Quality Permit Application

Baghouse

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit, Minor Operating Permit, or the General Permits.

(please complete shaded areas)

Equipment and processes served by this baghouse (please list all equipment and processes):

	Equipment and Processes
1.	Unit 26: Coal Plant Transfer System
2.	
3.	
4.	
5.	

Manufacturer Information:

Manufacturer?	TBD		
Manufacturer date?	TBD	Installation date?	Spring 2007
Manufacturer's designed control efficiency?	0.01 gr/dscf	%	

Type of baghouse (please check one)?

	Reverse Air	X	Pulse Jet		Shaker		Other (specify)

Type of bags?	TBD		
Number of bags?	TBD	Air/cloth ratio?	TBD

Baghouse Operation and Maintenance:

Pressure drop across baghouse?	TBD	inches water (minimum)	TBD	inches water (maximum)
Inlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)
Outlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)

Describe maintenance of baghouse (use of dye test, visual inspections, changing bag frequency, etc.):

Bag changing dependent on application and grain loading.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting: [1]		feet	or	695,048.75	meters
Y- Coordinate or Northing: [1]		feet	or	5,019,459.50	meters
Base Elevation of Stack: [1]	1,124	feet	or		meters
Stack Height:	20.00	feet	or		meters
Exit Stack Diameter	1.8	feet	or		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit			

Exit Stack Velocity and/or Flow Rate:

Velocity:	58.94	feet per second		meters per second
		and/or		
Flow Rate:	9,000.00	actual cubic feet per minute		actual cubic meters per second

[1] - Portable asphalt plants, rock crushers, or concrete plants do not have to provide the requested information in these categories.

South Dakota Department of Environment & Natural Resources
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Air Quality Permit Application Form

Miscellaneous Process

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit or Minor Operating Permit.
(please complete shaded areas)

1. Facility identification (i.e., Boiler #1, Unit #1, etc): 27
2. Manufacturer: TBD | Manufacture date:
3. Model number: TBD
4. Type (i.e., steam boiler, simple cycle combustion turbine, generator, etc.)

Coal Crusher Building – BSP II

5. Maximum designed operating rate (name plate):

		million Btus per hour heat input
or		horsepower
or		kilowatts

6. Check the appropriate box(es) for primary and secondary fuels:

☐	Natural gas		☐	Propane	
☐	Distillate oil	Sulfur content			Weight percent
☐	Residual oil	Sulfur content			Weight percent
☐	Bituminous Coal	☐	Subbituminous Coal	☐	Lignite Coal
Coal sulfur content			Weight percent	Coal ash content	Weight percent
☐	Other (please specify)				

7. Has a stack test been conducted (check appropriate box)? ☐ Yes ☒ No

If a stack test has been conducted, please attach a copy of the most recent stack test report to this application. If the Department already has a copy of the most recent stack test, please specify the date of most recent stack test.

Date of most recent stack test:

Control Equipment: If applicable, types of air pollution control equipment (Examples: baghouse, cyclone, wet scrubber, electrostatic precipitator, thermal oxidizer, miscellaneous control device, etc.).

Baghouse

Please complete the appropriate air quality permit application form for each type of control equipment that controls air emissions from this operation.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting:		feet	695,099.38	meters
Y- Coordinate or Northing:		feet	5,019,452.50	meters
Base Elevation of Stack:	1,124	feet		meters
Stack Height:	95.00	feet		meters
Exit Stack Diameter	3.3	feet		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit		

Exit Stack Velocity and/or Flow Rate:

Velocity:	58.46	feet per second		meters per second
		and/or		
Flow Rate:	30,000	actual cubic feet per minute		actual cubic meters per second

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Air Quality Permit Application

Baghouse

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit, Minor Operating Permit, or the General Permits.

(please complete shaded areas)

Equipment and processes served by this baghouse (please list all equipment and processes):

	Equipment and Processes
1.	Unit 27: Coal Crusher Building – BSP II
2.	
3.	
4.	
5.	

Manufacturer Information:

Manufacturer?	TBD		
Manufacturer date?	TBD	Installation date?	Spring 2007
Manufacturer's designed control efficiency?	0.01 gr/dscf	%	

Type of baghouse (please check one)?

	Reverse Air	X	Pulse Jet		Shaker		Other (specify)

Type of bags?	TBD		
Number of bags?	TBD	Air/cloth ratio?	TBD

Baghouse Operation and Maintenance:

Pressure drop across baghouse?	TBD	inches water (minimum)	TBD	inches water (maximum)
Inlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)
Outlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)

Describe maintenance of baghouse (use of dye test, visual inspections, changing bag frequency, etc.):

Bag changing dependent on application and grain loading.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting: [1]		feet	or	695,099.38	meters
Y- Coordinate or Northing: [1]		feet	or	5,019,452.50	meters
Base Elevation of Stack: [1]	1,124	feet	or		meters
Stack Height:	95.00	feet	or		meters
Exit Stack Diameter	3.3	feet	or		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit			

Exit Stack Velocity and/or Flow Rate:

Velocity:	58.46	feet per second		meters per second
		and/or		
Flow Rate:	30,000	actual cubic feet per minute		actual cubic meters per second

[1] - Portable asphalt plants, rock crushers, or concrete plants do not have to provide the requested information in these categories.

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Air Quality Permit Application Form

Miscellaneous Process

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit or Minor Operating Permit.
(please complete shaded areas)

1. Facility identification (i.e., Boiler #1, Unit #1, etc): Unit 28
2. Manufacturer: TBD Manufacture date:
3. Model number: TBD
4. Type (i.e., steam boiler, simple cycle combustion turbine, generator, etc.)

Limestone stackout conveyor -fugitive

5. Maximum designed operating rate (name plate):

		million Btus per hour heat input
or		horsepower
or		kilowatts

6. Check the appropriate box(es) for primary and secondary fuels:

☐	Natural gas		☐	Propane	
☐	Distillate oil	Sulfur content			Weight percent
☐	Residual oil	Sulfur content			Weight percent
☐	Bituminous Coal	☐	Subbituminous Coal	☐	Lignite Coal
Coal sulfur content			Weight percent	Coal ash content	Weight percent
☐	Other (please specify)				

7. Has a stack test been conducted (check appropriate box)? ☐ Yes ☒ No

If a stack test has been conducted, please attach a copy of the most recent stack test report to this application. If the Department already has a copy of the most recent stack test, please specify the date of most recent stack test.

Date of most recent stack test:

Control Equipment: If applicable, types of air pollution control equipment (Examples: baghouse, cyclone, wet scrubber, electrostatic precipitator, thermal oxidizer, miscellaneous control device, etc.).

Please complete the appropriate air quality permit application form for each type of control equipment that controls air emissions from this operation.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting:		feet	695,039.81	meters
Y- Coordinate or Northing:		feet	5,019,164.50	meters
Base Elevation of Stack:	1,124.00	feet		meters

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Air Quality Permit Application Form

Miscellaneous Process

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit or Minor Operating Permit.
(please complete shaded areas)

1. Facility identification (i.e., Boiler #1, Unit #1, etc): 29
2. Manufacturer: TBD Manufacture date:
3. Model number: TBD
4. Type (i.e., steam boiler, simple cycle combustion turbine, generator, etc.)

Limestone Precrusher Building

5. Maximum designed operating rate (name plate):

		million Btus per hour heat input
or		horsepower
or		kilowatts

6. Check the appropriate box(es) for primary and secondary fuels:

☐	Natural gas		☐	Propane	
☐	Distillate oil	Sulfur content		Weight percent	
☐	Residual oil	Sulfur content		Weight percent	
☐	Bituminous Coal	☐	Subbituminous Coal	☐	Lignite Coal
Coal sulfur content		Weight percent	Coal ash content		Weight percent
☐	Other (please specify)				

7. Has a stack test been conducted (check appropriate box)? ☐ Yes ☒ No

If a stack test has been conducted, please attach a copy of the most recent stack test report to this application. If the Department already has a copy of the most recent stack test, please specify the date of most recent stack test.

Date of most recent stack test:

Control Equipment: If applicable, types of air pollution control equipment (Examples: baghouse, cyclone, wet scrubber, electrostatic precipitator, thermal oxidizer, miscellaneous control device, etc.).

Baghouse

Please complete the appropriate air quality permit application form for each type of control equipment that controls air emissions from this operation.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting:		feet	695,119.44	meters
Y- Coordinate or Northing:		feet	5,019,091.00	meters
Base Elevation of Stack:	1,124	feet		meters
Stack Height:	85.00	feet		meters
Exit Stack Diameter	1.00	feet		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit		

Exit Stack Velocity and/or Flow Rate:

Velocity:	0.33*	feet per second		meters per second
		and/or		
Flow Rate:	1,759	actual cubic feet per minute		actual cubic meters per second

*obstructed or horizontal discharge

South Dakota Department of Environment & Natural Resources
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Air Quality Permit Application

Baghouse

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit, Minor Operating Permit, or the General Permits.

(please complete shaded areas)

Equipment and processes served by this baghouse (please list all equipment and processes):

Equipment and Processes

1.	Unit 29: Limestone Precrusher Building
2.	
3.	
4.	
5.	

Manufacturer Information:

Manufacturer?	TBD		
Manufacturer date?	TBD	Installation date?	Spring 2007
Manufacturer's designed control efficiency?	0.01 gr/dscf	%	

Type of baghouse (please check one)?

	Reverse Air	X	Pulse Jet		Shaker		Other (specify)

Type of bags?	TBD		
Number of bags?	TBD	Air/cloth ratio?	TBD

Baghouse Operation and Maintenance:

Pressure drop across baghouse?	TBD	inches water (minimum)	TBD	inches water (maximum)
Inlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)
Outlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)

Describe maintenance of baghouse (use of dye test, visual inspections, changing bag frequency, etc.):

Bag changing dependent on application and grain loading.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting: [1]		feet	or	695,119.44	meters
Y- Coordinate or Northing: [1]		feet	or	5,019,091.00	meters
Base Elevation of Stack: [1]	1,124	feet	or		meters
Stack Height:	85.00	feet	or		meters
Exit Stack Diameter	1.00	feet	or		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit			

Exit Stack Velocity and/or Flow Rate:

Velocity:	0.33*	feet per second		meters per second
		and/or		
Flow Rate:	1,759	actual cubic feet per minute		actual cubic meters per second

[1] - Portable asphalt plants, rock crushers, or concrete plants do not have to provide the requested information in these categories.

*obstructed or horizontal discharge

South Dakota Department of Environment & Natural Resources
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Air Quality Permit Application Form

Miscellaneous Process

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit or Minor Operating Permit.
(please complete shaded areas)

1. Facility identification (i.e., Boiler #1, Unit #1, etc): 30
2. Manufacturer: TBD | Manufacture date:
3. Model number: TBD
4. Type (i.e., steam boiler, simple cycle combustion turbine, generator, etc.)

Emergency Coal Stockout System

5. Maximum designed operating rate (name plate):

		million Btus per hour heat input
or		horsepower
or		kilowatts

6. Check the appropriate box(es) for primary and secondary fuels:

☐	Natural gas		☐	Propane	
☐	Distillate oil	Sulfur content			Weight percent
☐	Residual oil	Sulfur content			Weight percent
☐	Bituminous Coal	☐	Subbituminous Coal	☐	Lignite Coal
Coal sulfur content			Weight percent	Coal ash content	Weight percent
☐	Other (please specify)				

7. Has a stack test been conducted (check appropriate box)? ☐ Yes ☒ No

If a stack test has been conducted, please attach a copy of the most recent stack test report to this application. If the Department already has a copy of the most recent stack test, please specify the date of most recent stack test.

Date of most recent stack test:

Control Equipment: If applicable, types of air pollution control equipment (Examples: baghouse, cyclone, wet scrubber, electrostatic precipitator, thermal oxidizer, miscellaneous control device, etc.).

Baghouse

Please complete the appropriate air quality permit application form for each type of control equipment that controls air emissions from this operation.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting:		feet	695,016.06	meters
Y- Coordinate or Northing:		feet	5,019,321.50	meters
Base Elevation of Stack:	1,124	feet		meters
Stack Height:	110.00	feet		meters
Exit Stack Diameter	3.17	feet		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit		

Exit Stack Velocity and/or Flow Rate:

Velocity: 0.33* feet per second [ ] meters per second

and/or

Flow Rate: 17,065 actual cubic feet per minute [ ] actual cubic meters per second

*obstructed or horizontal discharge

South Dakota Department of Environment & Natural Resources
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Air Quality Permit Application

Baghouse

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit, Minor Operating Permit, or the General Permits.

(please complete shaded areas)

Equipment and processes served by this baghouse (please list all equipment and processes):

	Equipment and Processes
1.	Unit 30: Emergency Coal Stockout System
2.	
3.	
4.	
5.	

Manufacturer Information:

Manufacturer?	TBD		
Manufacturer date?	TBD	Installation date?	Spring 2007
Manufacturer's designed control efficiency?	0.01 gr/dscf	%	

Type of baghouse (please check one)?

	Reverse Air	X	Pulse Jet		Shaker		Other (specify)

Type of bags?	TBD		
Number of bags?	TBD	Air/cloth ratio?	TBD

Baghouse Operation and Maintenance:

Pressure drop across baghouse?	TBD	inches water (minimum)	TBD	inches water (maximum)
Inlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)
Outlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)

Describe maintenance of baghouse (use of dye test, visual inspections, changing bag frequency, etc.):

Bag changing dependent on application and grain loading.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting: [1]		feet	or	695,016.06	meters
Y- Coordinate or Northing: [1]		feet	or	5,019,321.50	meters
Base Elevation of Stack: [1]	1,124	feet	or		meters
Stack Height:	110.00	feet	or		meters
Exit Stack Diameter	3.17	feet	or		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit			

Exit Stack Velocity and/or Flow Rate:

Velocity:	0.33*	feet per second		meters per second
		and/or		
Flow Rate:	17,065	actual cubic feet per minute		actual cubic meters per second

[1] - Portable asphalt plants, rock crushers, or concrete plants do not have to provide the requested information in these categories.
*obstructed or horizontal discharge

South Dakota Department of Environment & Natural Resources
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Air Quality Permit Application Form

Miscellaneous Process

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit or Minor Operating Permit.
(please complete shaded areas)

1. Facility identification (i.e., Boiler #1, Unit #1, etc): 32
2. Manufacturer: TBD | Manufacture date:
3. Model number: TBD
4. Type (i.e., steam boiler, simple cycle combustion turbine, generator, etc.)

Coal Yard Transfer System

5. Maximum designed operating rate (name plate):

		million Btus per hour heat input
or		horsepower
or		kilowatts

6. Check the appropriate box(es) for primary and secondary fuels:

☐	Natural gas		☐	Propane	
☐	Distillate oil	Sulfur content			Weight percent
☐	Residual oil	Sulfur content			Weight percent
☐	Bituminous Coal	☐	Subbituminous Coal	☐	Lignite Coal
Coal sulfur content			Weight percent	Coal ash content	Weight percent
☐	Other (please specify)				

7. Has a stack test been conducted (check appropriate box)? ☐ Yes ☒ No

If a stack test has been conducted, please attach a copy of the most recent stack test report to this application. If the Department already has a copy of the most recent stack test, please specify the date of most recent stack test.

Date of most recent stack test:

Control Equipment: If applicable, types of air pollution control equipment (Examples: baghouse, cyclone, wet scrubber, electrostatic precipitator, thermal oxidizer, miscellaneous control device, etc.).

Baghouse

Please complete the appropriate air quality permit application form for each type of control equipment that controls air emissions from this operation.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting:		feet	695,069.63	meters
Y- Coordinate or Northing:		feet	5,019,263.50	meters
Base Elevation of Stack:	1,124	feet		meters
Stack Height:	55.00	feet		meters
Exit Stack Diameter	1.83	feet		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit		

Exit Stack Velocity and/or Flow Rate:

Velocity: 0.33* feet per second [ ] meters per second

and/or

Flow Rate: 5,301 actual cubic feet per minute [ ] actual cubic meters per second

*obstructed or horizontal discharge

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Air Quality Permit Application

Baghouse

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit, Minor Operating Permit, or the General Permits.

(please complete shaded areas)

Equipment and processes served by this baghouse (please list all equipment and processes):

	Equipment and Processes
1.	Unit 32: Coal Yard Transfer System
2.	
3.	
4.	
5.	

Manufacturer Information:

Manufacturer?	TBD		
Manufacturer date?	TBD	Installation date?	Spring 2007
Manufacturer's designed control efficiency?	0.01 gr/dscf	%	

Type of baghouse (please check one)?

	Reverse Air	X	Pulse Jet		Shaker		Other (specify)

Type of bags?	TBD		
Number of bags?	TBD	Air/cloth ratio?	TBD

Baghouse Operation and Maintenance:

Pressure drop across baghouse?	TBD	inches water (minimum)	TBD	inches water (maximum)
Inlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)
Outlet Temperature?	Ambient	Fahrenheit (minimum)	Ambient	Fahrenheit (maximum)

Describe maintenance of baghouse (use of dye test, visual inspections, changing bag frequency, etc.):

Bag changing dependent on application and grain loading.

Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting: [1]		feet	or	695,069.63	meters
Y- Coordinate or Northing: [1]		feet	or	5,019,263.50	meters
Base Elevation of Stack: [1]	1,124	feet	or		meters
Stack Height:	55.00	feet	or		meters
Exit Stack Diameter	1.83	feet	or		meters
Exit Stack Temperature	Ambient	degrees Fahrenheit			

Exit Stack Velocity and/or Flow Rate:

Velocity:	0.33*	feet per second		meters per second
		and/or		
Flow Rate:	5,301	actual cubic feet per minute		actual cubic meters per second

[1] - Portable asphalt plants, rock crushers, or concrete plants do not have to provide the requested information in these categories.

*obstructed or horizontal discharge

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Air Quality Permit Application Form

Miscellaneous Process

This form is to be submitted, if necessary, along with the Title V (Part 70) Operating Permit or Minor Operating Permit.
(please complete shaded areas)

1. Facility identification (i.e., Boiler #1, Unit #1, etc): 33
2. Manufacturer: TBD | Manufacture date:
3. Model number: TBD
4. Type (i.e., steam boiler, simple cycle combustion turbine, generator, etc.)

Diesel FW Booster Pump (Silos)

5. Maximum designed operating rate (name plate):

		million Btus per hour heat input
or	340.00	horsepower
or		kilowatts

6. Check the appropriate box(es) for primary and secondary fuels:

	Natural gas				Propane
X	Distillate oil	Sulfur content	0.05	Weight percent	
	Residual oil	Sulfur content		Weight percent	
	Bituminous Coal		Subbituminous Coal		Lignite Coal
Coal sulfur content		Weight percent	Coal ash content		Weight percent
	Other (please specify)				

7. Has a stack test been conducted (check appropriate box)? [ ] Yes [X] No

If a stack test has been conducted, please attach a copy of the most recent stack test report to this application. If the Department already has a copy of the most recent stack test, please specify the date of most recent stack test.

Date of most recent stack test:

Control Equipment: If applicable, types of air pollution control equipment (Examples: baghouse, cyclone, wet scrubber, electrostatic precipitator, thermal oxidizer, miscellaneous control device, etc.).

Please complete the appropriate air quality permit application form for each type of control equipment that controls air emissions from this operation.

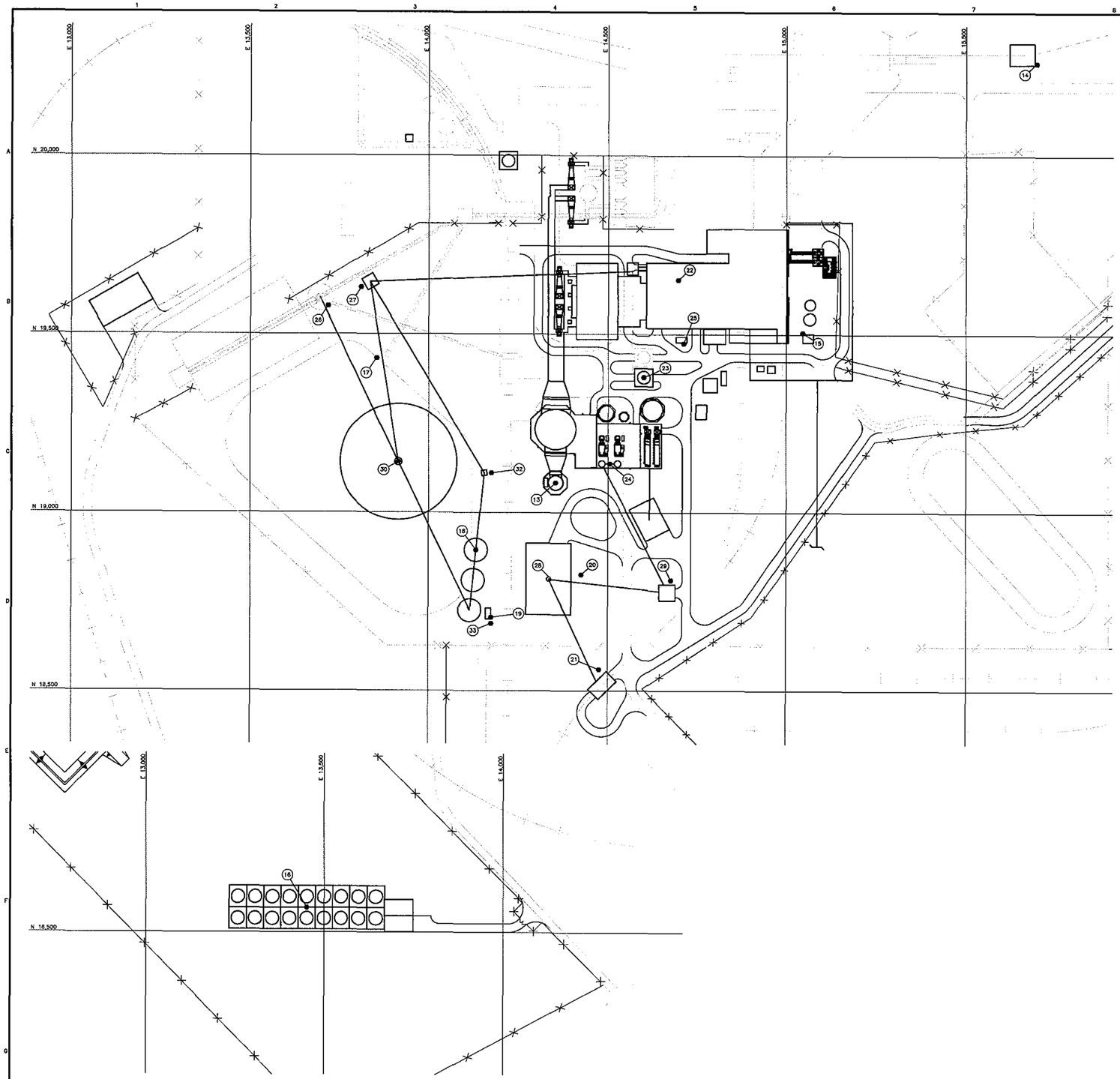
Stack Information: If this application is a renewal, contact the air program. We may have this information.

X- Coordinate or Easting:		feet	695,048.84	meters
Y- Coordinate or Northing:		feet	5,019,103.43	meters
Base Elevation of Stack:	1,124	feet		meters
Stack Height:	11.00	feet		meters
Exit Stack Diameter	0.83	feet		meters
Exit Stack Temperature	988.00	degrees Fahrenheit		

Exit Stack Velocity and/or Flow Rate:

Velocity:	67.60	feet per second		meters per second
		and/or		
Flow Rate:	2,194.54	actual cubic feet per minute		actual cubic meters per second

APPENDIX B



EMISSIONS POINT TABLE

EMISSIONS POINT ID	S1001 REF NO. (NOTE 4)	SYSTEM DESIGNATION	TIEDOWN LOCATION (NOTE 2) NORTH	TIEDOWN LOCATION (NOTE 2) EAST	DISCHARGE EL (NOTE 3)	REMARKS
13	7	PC BOILER (CHIMNEY)	19,083.2	14,354.0	498.0	
14	51	EMERGENCY FIRE WATER PUMP BSP II	20,260.0	15,695.0	15.0	
15	50	EMERGENCY DIESEL GENERATOR BSP II	19,505.0	15,045.0	15.0	
16	31	COOLING TOWER	18,568.3	13,451.6	60.0	
17	28	EMERGENCY RECLAIM COAL SYSTEM	19,431.9	13,855.6	20.0	
18	26	YARD COAL SILO FILL SYSTEM	18,894.2	14,132.5	235.0	
19	25	YARD COAL SILO LOADOUT SYSTEM	18,688.0	14,175.0	20.0	
20	36	LIMESTONE RECLAIM SYSTEM	18,825.0	14,425.0	20.0	
21	34	LIMESTONE RECEIVING SYSTEM	18,560.0	14,475.0	20.0	
22	1	COAL TRIPPER/SILO FILL SYSTEM	19,552.0	14,695.0	279.0	
23	12	FLY ASH SILO BIN VENT	19,378.9	14,598.9	110.0	2 REDUNDANT VENTS
24	17	LIMESTONE DAY BINS VENT	19,136.5	14,504.7	128.0	
25	49	DIESEL FW BOOSTER PUMP (BOILER)	19,473.8	14,711.0	11.0	
26	–	COAL PLANT TRANSFER SYSTEM	19,578.4	13,718.5	20.0	
27	23	COAL CRUSHER BUILDING BSP II	19,530.8	13,811.5	93.0	
28	38	LIMESTONE STOCKOUT CONVEYOR FUGITIVE	18,813.0	14,336.0	–	
29	18	LIMESTONE PRECRUSHER BUILDING	18,810.0	14,575.0	85.0	
30	27	EMERGENCY COAL STOCKOUT	19,141.3	13,916.1	110.0	
31	–	EXISTING FW PUMP BSPI	–	–	–	NOT SHOWN
32	53	COAL YARD TRANSFER SYSTEM	19,110.5	14,175.3	20.0	
33	52	DIESEL FW BOOSTER PUMP (SILOS)	18,705.0	14,175.0	11.0	

NOTES

1. THIS DRAWING IS PROVIDED FOR AIR PERMITTING PURPOSES ONLY AND IS NOT CONSIDERED A DRAWING REQUIRED FOR CONSTRUCTION.
2. TIEDOWN COORDINATES ARE GIVEN IN BSP II PLANT COORDINATE SYSTEM. FOR CONVERSION TO OTHER SYSTEMS SEE COORDINATE CONVERSION TABLE THIS DRAWING.
3. DISCHARGE ELEVATIONS ARE APPROXIMATE AND ARE BASED ON MSL AND ASSUMED SURROUNDING GRADE. BUILDING GROUND FLOOR ELEVATION IS ASSUMED AT EL 1124.0.
4. S1001 REF NO. REFERS TO THE ID NUMBER OF THE CORRESPONDING STRUCTURE AS INDICATED ON THE SITE ARRANGEMENT, MAIN PLANT AREA, CSTA-S1001.

LEGEND

EMISSIONS POINT LOCATION

(13) EMISSIONS POINT ID

COORDINATE CONVERSIONS

SYSTEM	NORTH	EAST
BSP II PLANT COORDINATES (FT)	20,000	15,000
BSP I PLANT COORDINATES (FT)	10,000	5,000
NAD83 SD STATE PLANE, NORTH (FT)	555,438.2687	2,886,389.8962
NAD27 SD STATE PLANE, NORTH (FT)	555,450.6247	2,898,002.2601
NAD83 UTM, ZONE 14, NORTH (M)	5,019,710.8872	695,268.3808
NAD27 UTM, ZONE 14, NORTH (M)	5,019,498.2439	695,300.3830

STATE PLANE 42° PLANT N

100' 50' 0 100' 200'
1" = 100'

NOT TO BE USED
FOR CONSTRUCTION

NO	DATE	REVISIONS AND RECORD OF ISSUE	DRWN	DES	CHK	PDE	APP
D	06/16/06	GENERAL REVISIONS	AET	MJT		MD	USM
C	06/07/06	REVISED COAL YARD AREA	SLS	MJT		MD	USM
B	05/16/06	ISSUED FOR OWNER REVIEW	SLS	MJT		MD	USM
A	05/15/06	ISSUED FOR IN-HOUSE REVIEW	SLS	MJT		MD	USM

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF SOUTH DAKOTA.
SIGNED
DATE REG NO.

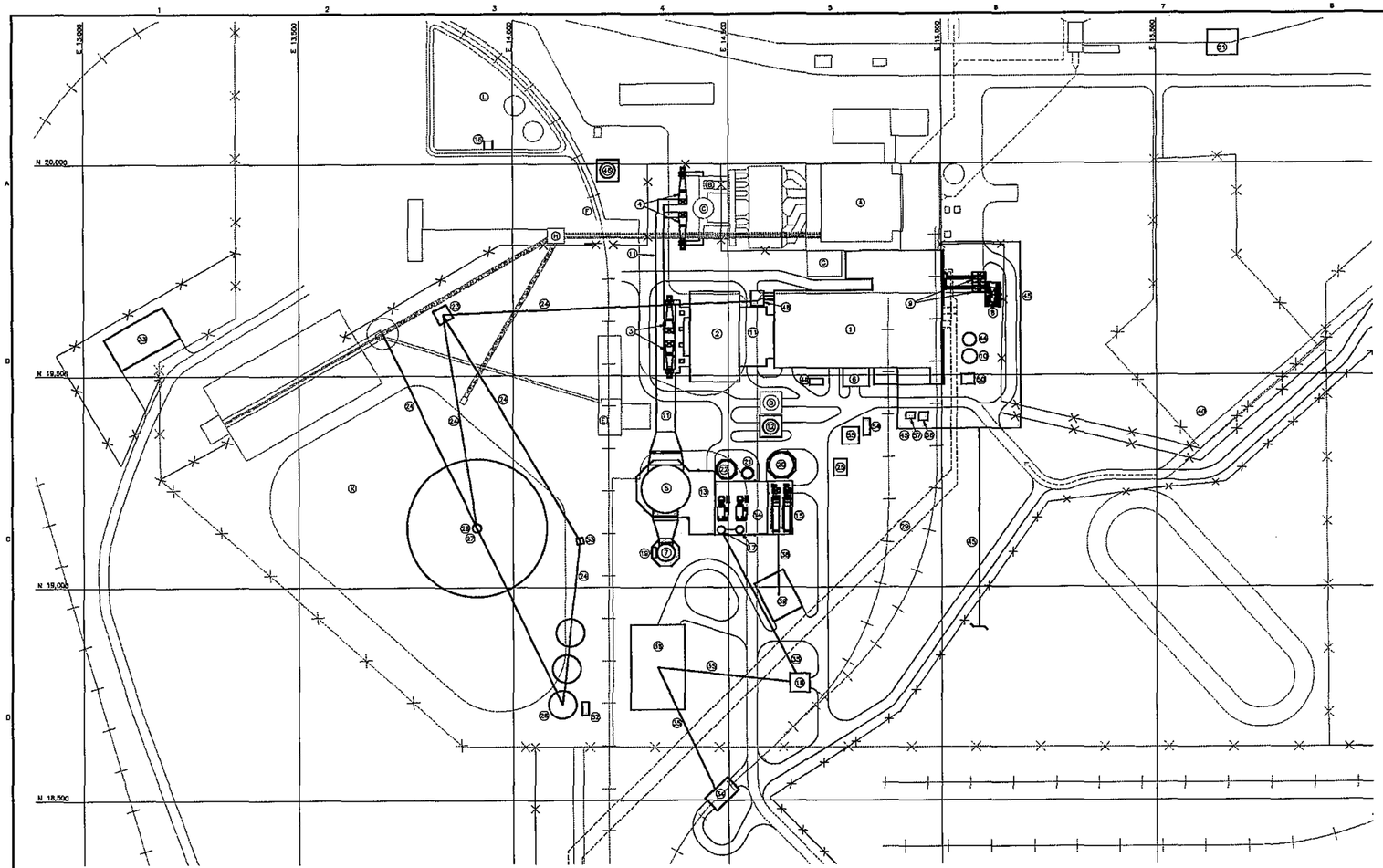
BLACK & VEATCH CORPORATION
ENGINEER MJT DRAWN SLS
CHECKED DATE

BIG STONE II CO-OWNERS
BIG STONE II POWER PLANT

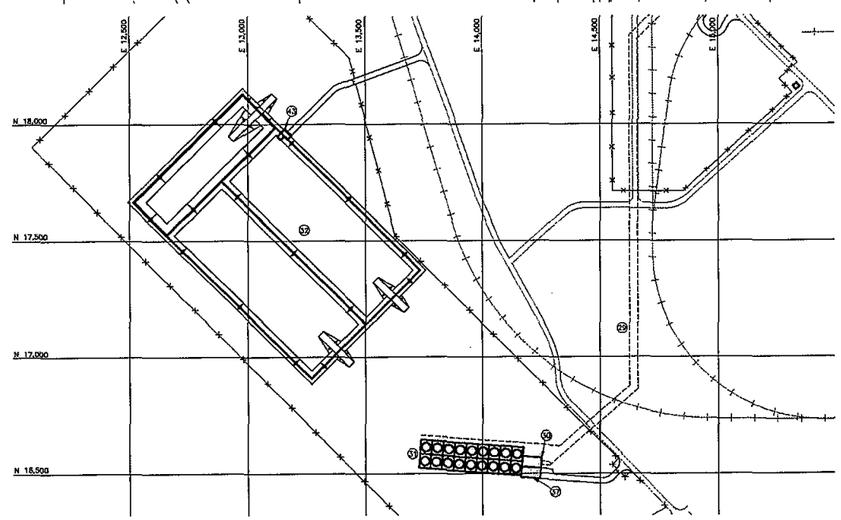
SITE EMISSIONS POINTS
LOCATION DRAWING

PROJECT / DRAWING NUMBER: 142662-CSTA-S1020
REV: D
CODE
AREA

ACAD 15.05
XREF: E1 V4.1
TAV46837
142662-CSTA-S1020
06/16/06 1:00:11



MAIN PLANT AREA
SCALE: 1"=100'



COOLING TOWER AND BLOWDOWN POND AREA
SCALE: 1"=200'

BIG STONE II POWER PLANT LEGEND

ID	FACILITY	TIEDOWN LOCATION NORTH	TIEDOWN LOCATION EAST	REMARKS
1	GENERATION BUILDING			
2	FABRIC FILTER			
3	ID FANS (BSP II)			
4	FGD BOOSTER FANS (BSP I)			
5	COMMON WET SCRUBBER			
6	BOTTOM ASH LOAD OUT AREA			
7	CHIMNEY			
8	GENERATOR STEP-UP TRANSFORMER			
9	UNIT AUXILIARY TRANSFORMERS			
10	DEMIN STORAGE TANK			
11	EXHAUST DUCTWORK			
12	FLY ASH SILO (BSP II)			
13	FLUE GAS DESULFURIZATION (FGD) BUILDING			
14	REAGENT PREP BUILDING			
15	FGD BYPRODUCT DEWATERING BUILDING			
16	FUEL OIL PUMP STRUCTURE			
17	LIMESTONE DAY BINS			
18	LIMESTONE PRECRUSHER			
19	CEMS ENCLOSURE			
20	REAGENT SLURRY STORAGE TANK			
21	RECLAIM WATER TANK			
22	FILTER FEED TANK			
23	COAL CRUSHER BUILDING			
24	COAL CONVEYOR			
25	AMMONIA STORAGE AREA			
26	YARD COAL SILOS			
27	EMERGENCY STOCKOUT LOWERING WELL			
28	EMERGENCY COAL RECLAIM STRUCTURE			
29	CIRCULATING WATER PIPE			
30	CIRCULATING WATER PUMP STRUCTURE			
31	COOLING TOWER			
32	COOLING TOWER BLOWDOWN POND			
33	YARD SERVICES BUILDING			
34	LIMESTONE RECEIVING DUMPER STRUCTURE			
35	LIMESTONE CONVEYOR			
36	LIMESTONE STORAGE BUILDING			
37	CHEMICAL FEED BUILDING			
38	FGD BYPRODUCT STOCKOUT CONVEYOR			
39	FGD BYPRODUCT STORAGE/TRUCK LOAD OUT AREA			
40	230KV SUBSTATION ADDITION			
41	WASTEWATER TREATMENT BUILDING			SEE DWG S1000
42	MAKEUP WATER STORAGE POND PUMP STRUCTURE			SEE DWG S1000
43	WASTEWATER PUMP STRUCTURE			
44	CONDENSATE STORAGE TANK			
45	PROCESS STEAM PIPE RACK			
46	TEMPORARY LOCATION OF BSP1 FLY ASH SILO			
47	MAKEUP WATER STORAGE POND			SEE DWG S1000
48	COAL TRIPPER TRANSFER STRUCTURE			
49	POWERBLOCK FIREWATER BOOSTER PUMP			
50	EMERGENCY DIESEL GENERATOR BUILDING			
51	WATER SUPPLY PUMP STRUCTURE			
52	COAL AREA FIREWATER BOOSTER PUMPS			
53	TRANSFER/EMERGENCY SILO UNLOADING			
54	OIL/WATER SEPARATOR			
55	WASTEWATER LIFT STATION			
56	HYDROGEN STORAGE AREA			
57	CARBON DIOXIDE STORAGE AREA			

EXISTING BIG STONE I POWER PLANT LEGEND

ID	FACILITY	TIEDOWN LOCATION NORTH	TIEDOWN LOCATION EAST	REMARKS
A	GENERATION BUILDING (BSP I)			
B	EXHAUST DUCTWORK (BSP I)			
C	CHIMNEY (BSP I)			
D	FLY ASH SILO (BSP I)			
E	RAIL CAR UNLOADING BUILDING			
F	COAL DELIVERY RAIL LOOP			
G	SCR ACCESS (FUTURE)			
H	COAL PRECRUSHER/TRANSFER HOUSE (BSP I)			
J	BRINE CONCENTRATOR (BSP I)			
K	INACTIVE COAL STORAGE PILE			
L	FUEL OIL STORAGE AREA			

COORDINATE CONVERSIONS

SYSTEM	NORTH	EAST
BSP II PLANT COORDINATES (FT)	20,000	15,000
BSP I PLANT COORDINATES (FT)	10,000	5,000
NAD83 SD STATE PLANE, NORTH (FT)	550,438.0587	2,868,369.8962
NAD27 SD STATE PLANE, NORTH (FT)	555,450.6247	2,868,002.3901
NAD83 UTM, ZONE 14, NORTH (M)	5,019,710.8872	695,268.3808
NAD27 UTM, ZONE 14, NORTH (M)	5,019,498.2439	695,300.3630

NOT TO BE USED
FOR CONSTRUCTION

NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PROJ	APP
C	08/07/08	GENERAL REVISIONS	SLS	MJT		MDH	JSM
B	05/16/08	ISSUED FOR OWNER REVIEW	SLS	MJT		MDH	JSM
A	05/15/08	ISSUED FOR IN-HOUSE REVIEW	SLS	MJT		MDH	JSM

STATE PLANE 42° PLANT N

1" = 100' (100' 50' 0 100' 200')
1" = 200' (200' 100' 0 200' 400')

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF SOUTH DAKOTA.
SIGNED _____ DATE _____ REG NO. _____

BLACK & VEATCH CORPORATION
DESIGNED MJT DRAWN SLS
CHECKED DATE

BIG STONE II CO-OWNERS
BIG STONE II POWER PLANT
SITE ARRANGEMENT
MAIN PLANT AREA

PROJECT 142662 DRAWING NUMBER CSTA-S1001 REV C
CODE
AREA

ACAD 15.05
S1-40-08
SEASWIN
AUGUST 2
08/07/08

APPENDIX C

Old #	New #	Description	Revised		Originial		Notes
			PM10 tpy	CO tpy	PM10 tpy	CO tpy	
24	13	Unit II only normal flow max load	788.40	3,942.00	788.40	4,204.80	Revised BACT value
25	14	Emergency Fire Water Pump - BSP II	0.03	0.60	0.29	0.88	Changed to NSPS values
26	15	Emergency Diesel Generator - BSP II	0.18	3.18	7.50	55.74	Changed to NSPS values
27	16	Cooling Tower	20.55		20.55		
13	17	Emergency Coal Reclaim System	5.07		5.07		
14	18	Yard Coal Silo Fill System	13.52		13.52		
15	19	Yard Coal Silo Loadout System	8.45		8.45		
16	20	Limestone Reclaim System	4.51		4.51		
17	21	Limestone Receiving System	3.75		3.75		
18	22	Coal Tripper/Silo Fill System	26.66		26.66		
19	23ab	Fly ash silo bin vent	3.38		3.38		
20,21	24	Limestone Day Bins Vent	1.49		0.26		Modified source
NA	25	Diesel FW Booster Pump (Boiler)	0.02	0.32			New Source
22	26	Coal Plant Transfer System	3.38		-		New Source
23	27	Coal Crusher Building - BSP II	11.26		11.26		
NA	29	Limestone Precrusher Building	0.80				New Source
NA	30	Emergency Coal Stockout System	7.76		-		New Source
NA	32	Coal Yard Transfer System	2.41		3.38		Modified source
NA	33	Diesel FW Booster Pump (Silos)	0.03	0.49			New Source
Roads	Roads	Roads	14.31		28.63		
Piles	Piles	Piles	6.73		7.08		
29	28	Limestone stackout conveyor - fugitive	0.02		0.13		Modified source
28	NA	Unit 2 fly ash loading to trucks (dry)	0.00		0.10		Deleted Source
Total			**922.71**	**3,946.59**	**932.91**	**4,261.41**	

(10.20) (314.82)

STACKID		Size	Size Units	Height (ft)	Temp. (F)	Velocity (ft/sec)	Diameter (ft)	ACFM	Discharge Type*
1	B & W steam generator (old)	5800	mmBtu/hr	498.00	321	48.09	24.17	1,323,845	V
2	1973 combustion steam boiler No. 2 FO	210	mmBtu/hr	85.00	606	21.12	6.50	42,047	V
3	1961 Bros steam heating boiler No. 2 FO	98	mmBtu/hr	90.00	525	26.02	4.00	19,620	V
4	1974 WPS emergency generator No. 2 FO	1341.022	HP	23.00	880	60.69	1.00	2,860	D
13	Chimney - BSP II	6,000.00	mmBtu/hr	498.00	131.00	36.00	34.00	1,961,000.00	V
14	Emergency Fire Water Pump - BSP II	420.00	HP	15.00	904.00	76.5841234	0.83		V
15	Emergency Diesel Generator - BSP II	2,220.00	HP	15.00	900.00	100.44	1.50	10,650.00	V
25	Diesel FW Booster Pump (Boiler)	225.00	HP	11.00	749.00	55.76	0.67		V
33	Diesel FW Booster Pump (Silos)	340.00	HP	11.00	988.00	67.60	0.83		V
31	Existing Fire Pump	3.24	gal/hr	40.00	900.00	212.21	0.50	2,500.00	V

STACKID	Name	Emissions (lb/hr)			Emissions (tpy)			Hours of
		PM10	CO	VOC	PM10	CO	VOC	Operation
1	B & W steam generator (old)	1,508.00	458.20	37.12	6,605.04	2,006.92	162.59	8760
2	1973 combustion steam boiler No. 2 FO	1.50	7.50	0.30	6.57	32.85	1.31	8760
3	1961 Bros steam heating boiler No. 2 FO	0.70	3.50	0.14	3.07	15.33	0.61	8760
4	1974 WPS emergency generator No. 2 FO	0.94	7.38	0.95	4.11	32.31	4.14	8760
13	Chimney - BSP II	180.00	900.00	21.60	788.40	3,942.00	94.61	8760
14	Emergency Fire Water Pump - BSP II	0.14	2.41	1.39	0.03	0.60	0.35	500
15	Emergency Diesel Generator - BSP II	0.73	12.73	11.75	0.18	3.18	2.94	500
25	Diesel FW Booster Pump (Boiler)	0.07	1.29	0.74	0.02	0.32	0.19	500
33	Diesel FW Booster Pump (Silos)	0.11	1.95	1.12	0.03	0.49	0.28	500
31	Existing Fire Pump	1.00	3.08	1.17	0.25	0.77	0.29	500
				TOTAL:	7,407.70	6,034.76	267.30	

STACKID	Name	Emission Factors						
		PM10		CO		VOC		
1	B & W steam generator (old)	0.26	lb/MMBtu	0.079	lb/MMBtu	0.0064	lb/MMBtu	
2	1973 combustion steam boiler No. 2 FO	0.01	lb/MMBtu	0.04	lb/MMBtu	1.43E-03	lb/MMBtu	
3	1961 Bros steam heating boiler No. 2 FO	0.01	lb/MMBtu	0.04	lb/MMBtu	1.43E-03	lb/MMBtu	
4	1974 WPS emergency generator No. 2 FO	0.0007	lb/hp-hr	5.50E-03	lb/hp-hr	7.05E-04	lb/hp-hr	
13	Chimney - BSP II	0.03	lb/MMBtu	0.15	lb/MMBtu	0.0036	lb/MMBtu	
14	Emergency Fire Water Pump - BSP II	0.15	g/bhp-hr	2.60	g/bhp-hr	1.50	g/bhp-hr	assumed half of NMHC+NOX factor was NMHC
15	Emergency Diesel Generator - BSP II	0.15	g/bhp-hr	2.60	g/bhp-hr	2.40	g/bhp-hr	assumed half of NMHC+NOX factor was NMHC
25	Diesel FW Booster Pump (Boiler)	0.15	g/bhp-hr	2.60	g/bhp-hr	1.50	g/bhp-hr	assumed half of NMHC+NOX factor was NMHC
33	Diesel FW Booster Pump (Silos)	0.15	g/bhp-hr	2.60	g/bhp-hr	1.50	g/bhp-hr	assumed half of NMHC+NOX factor was NMHC
31	Existing Fire Pump	0.31	lb/MMBtu	0.95	lb/MMBtu	0.36	lb/MMBtu	

Heating Value - Liquid Fuels - Distillate Oil	140,000 Btu/gal
Old Units Fuel Oil - % Sulfur	0.05 % Sulfur
Natural gas heating value	1,020 MMBtu/MMcf

STACKID	Name	PM		CO		VOC	
2	1973 combustion steam boiler No. 2 FO	1	lb/1000 gal	5	lb/1000 gal	0.2	lb/1000 gal
3	1961 Bros steam heating boiler No. 2 FO	1	lb/1000 gal	5	lb/1000 gal	0.2	lb/1000 gal

Big Stone II

Emissions Sources

Coal Handling System

Emission Points - Daily

Stack ID	Description	Thruput	Units	cfm	Operation hr	Control %	Factor	Units	After Control (lb/hr)	After Control (ton/yr)
5	Live fuel storage building transfer point			8,300	8760		0.02	gr/cf	1.42	6.23
6	Rotary car dumper conveyor			12,000	8760		0.02	gr/cf	2.06	9.01
7a	Rotary car dumper building			30,500	8760		0.01	gr/cf	2.61	11.45
7b	Rotary car dumper building			30,500	8760		0.01	gr/cf	2.61	11.45
7c	Rotary car dumper building			30,500	8760		0.01	gr/cf	2.61	11.45
7d	Rotary car dumper building			30,500	8760		0.01	gr/cf	2.61	11.45
8	Fuel transfer house			15,650	8760		0.02	gr/cf	2.68	11.75
9	North fuel conveying systems			14,200	8760		0.02	gr/cf	2.43	10.66
10	South fuel conveying systems			16,500	8760		0.02	gr/cf	2.83	12.39
17	Emergency Coal Reclaim System			13,500	8760		0.01	gr/scf	1.16	5.07
18	Yard Coal Silo Fill System			36,000	8760		0.01	gr/scf	3.09	13.52
19	Yard Coal Silo Loadout System			22,500	8760		0.01	gr/scf	1.93	8.45
22	Coal Tripper/Silo Fill System			71,000	8760		0.01	gr/scf	6.09	26.66
26	Coal Plant Transfer System			9,000	8760		0.01	gr/scf	0.77	3.38
27	Coal Crusher Building - BSP II			30,000	8760		0.01	gr/scf	2.57	11.26
30	Emergency Coal Stockout System			17,065	8760		0.01	gr/scf	1.77	7.76
32	Coal Yard Transfer System			5,301	8760		0.01	gr/scf	0.55	2.41
IAC_WE	Inactive Coal Pile Wind Erosion				8760	25%	0.01		0.53	2.33
IAC_PM	Inactive Coal Pile Maintenance				8760	25%	0.98	lb/VMT	0.65	3.82
IAC_LI	Inactive Coal Pile Load-in	3600.0	tons/hr		8760	25%	0.000114	lb/ton	0.31	0.04

Fly Ash Handling System

Emission Points

Stack ID	Description	cfm	Operation hr	Emission Factor	Units	After Control (lb/hr)	After Control (ton/yr)
11	Fly ash storage silo	5,320	8760	0.02	gr/acf	0.91	3.99
23ab	Fly ash silo bin vent	9,000.00	8760	0.01	gr/scf	0.77	3.38

Limestone Handling System

Emission Points

Stack ID	Description	Design Rate Thruput	Design Rate Units	cfm	Operation hr	Control %	Emission Factor	Units	After Control (lb/hr)	After Control (ton/yr)
12	Lime storage silo			1,500	8760		0.02	gr/cf	0.26	1.13
20	Limestone Reclaim System			12,000	8760		0.01	gr/scf	1.03	4.51
21	Limestone Receiving System			10,000	8760		0.01	gr/scf	0.86	3.75
24	Limestone Day Bins Vent			3,281	8760		0.01	gr/scf	0.34	1.49
28	Limestone stackout conveyor - fugitive	11	tph		8760		3.32E-04	lb/ton	0.0036	0.02
29	Limestone Precrusher Building			1,759	8760		0.01	gr/scf	0.18	0.80
LS_WE	Limestone Pile Wind Erosion (cover)				8760				0.04	0.17

Gypsum Handling System

Emission Points

Stack ID	Description	Design Rate Thruput	Design Rate Units	Emission Factor	Units	Source	Operation hr	Control %	PM10 (lb/hr)	PM10 (ton/yr)
GP_WE	Gypsum Pile Wind Erosion						8760		0.01	0.04
GP_LI	Gypsum Pile Load-in	100	tons/hr	0.0003	lb/ton	drop eqn	8760		0.03	0.15
GP_LO	Gypsum Pile Load-out	82.5	tons/hr	0.0003	lb/ton	drop eqn	8760		0.03	0.12

Landfill System

Emission Points

Stack ID	Description	Design Rate Thruput	Design Rate Units	Emission Factor	Emission Units	Source	Control %	Operation hr	PM10 (lb/hr)	PM10 (ton/yr)
LF_WE	Landfill Wind Erosion							8760	0.66	2.87
LF_LI	Landfill Load-in	150.00	tph	0.0003	lb/ton	drop eqn	50%	8760	0.02	0.11
LF_PM	Landfill Pile Maintenance	0.89	VMT/hr					8760	0.87	3.82

Drop Equation for load in/load out: From AP-42, Section 13.2.4 (1/95)

$$E = \frac{k\,(0.0032)\,(U/5)^{1.3}}{(M/2)^{1.4}}$$

k =	0.35
U = mean wind speed (mph)	11.10
M = material moisture content	

	coal	21.42
	ash	1.00
	gypsum	10.00
	landfill	10.00
E (lb PM10/ton)	Limestone	10.00
	coal	1.14E-04
	ash	8.33E-03
	gypsum	3.32E-04
	landfill	3.32E-04
	Limestone	3.32E-04

New baghouses (grain loading)	0.01	gr/scf	Skidmore

Coal		Limestone	Gypsum		Ash
% moisture (for piles)	21.42	Density (lb/ft3)	10.00	moisture	Moisture %
density (lb/ft3)	45	85	65.00	lb/cf density	for dry loadout
coal pile load in tph	3,600.00	Moisture %	100	load in tph	1.00
		10.00	82.5	load out tph	

Wind Erosion - See related spreadsheets: From AP-42, Section 13.2.5 (1/95)

		Height ft	Density lb/ft3	Amount tons	Area ft2	Moisture %	Angle of Slope	Threshold Friction	PM10 lb/hr	PM10 tpy
LS_WE	Limestone Pile Wind Erosion	53.00	85.00	15,000	20,106	10.00	26.6	0.62	0.04	0.17
IAC_WE	Inactive Coal Pile Wind Erosion	45.00	45.00	697,000	566,280	21.42	26.6	1.02	0.71	3.11
GP_WE	Gypsum Pile Wind Erosion	25.00	65.00	9,572	5,000	10.00	26.6	0.62	0.01	0.04
LF_WE	Landfill Wind Erosion	15.00	65.00	1,300,000	522,720	10.00	26.6	1.02	0.66	2.87

Pile Maintenance - Unpaved Haul Road Emissions: From AP-42, Section 13.2.2 (2/03)

Emission Factor => E = k(s/12)^a (W/3)^b* ((365-p)/365)

Vehicle Miles Traveled (VMT) = 2 * Length of Landfill Segment * Maximum Hourly Amount Pushed / Weight of Vehicle

	Where:	
	E = Emission factor (pounds per VMT)	
	PM10	
k = constant (PM10)	1.5	Taken from Table 13.2.2-2 in AP-42
a = constant	0.9	Taken from Table 13.2.2-2 in AP-42
b = constant	0.45	Taken from Table 13.2.2-2 in AP-42
s = surface material silt content (%)	2.2	AP-42 table 13.2.4-1, 1/95, coal fired power plant coal as received
W = mean vehicle weight (tons)	51.25	
p = Number of days with 0.01" of precipitation	100	
Maximum hourly amount pushed =	412.50	tons
Capacity of dozer=	25	tons
maximum speed (estimate)	2.50	mph
Length of Road Segment=	0.08	miles

		W tons	VMT/hr	PM10 lb/VMT	PM10 lb/hr	PM10 tpy
IAC_PM	Inactive Coal Pile Maintenance	70.00	0.89	0.98	0.87	3.82
LF_PM	Landfill Pile Maintenance	70.00	0.89	0.98	0.87	3.82

Haul Road Emission Calculations

Vehicle Miles Traveled (VMT) = 2 * Length of Haul Road * Maximum Hourly Amount Hauled
Capacity of Vehicle

Unpaved Haul Road Emissions: From AP-42, Section13.2.2 (12/03)

Emission Factor => E = $\frac{k * (s/12)^a * (W/3)^b}{} \frac{[365 - P]}{365}$

Where

		E = Emission factor (pounds per VMT)	
For PM-10:	1.5	k = constant	Taken from Table 13.2.2-2 in AP-42
	0.9	a = constant	Taken from Table 13.2.2-2 in AP-42
	0.45	b = constant	Taken from Table 13.2.2-2 in AP-42
	8.3	s = surface material silt content (%)	Taken from Table 13.2.2-1 in AP-42
		W = mean vehicle weight (tons)	(Loaded truck weight + Unloaded truck weight)/2
	10.00	S = Average speed of vehicles (mph)	If average speed is greater than 15 mph, then enter 15
	100	P = Number of days with 0.01" of precipitation	Figure 13.2.2-1

Control for watering of paved roads per BACM 50%

Paved Haul Road Emission Equations, From AP-42 Section 13.2.1 (12/03)

Emission Factor => E = [k * (sL/2)^0.65 * (W/3)^1.5 -C]* (1 - (1.2*P)/N) =

	Loaded tons	Unloaded tons	Load tons
Truck	40	15	25
Scraper	88.75	51.25	37.5
CAT model 7	76	36	40

Where

	E = Emission factor (pounds per VMT)	
0.016	k = constant	Taken from Table 13.2.1-1 in AP-42
0.000	C = Emission factor for exhaust, brake wear, and tire wea	Table 13.2.1-2
0.600	sL = Silt loading (g/m2)	Table 13.2.1-3, ubiquitous baseline for <500 trucks per day
	W = mean vehicle weight (tons)	
100.000	P = Number of days with 0.01" of precipitation	Figure 13.2.1-2
365.000	N = number of days in averaging period	365 days per year

Calculations

		Vehicle Typ	Paved	Trucks		Length meters	(miles)	Speed mph	Truck Weight Loaded tons	Unloaded tons	Max Hourly tons	Emission Factor lb PM10/VMT
Rock Road Tires	Tires	Truck	yes	-		952.840	0.59	10.00	40	15	27.5	0.14
SUM ROCK ROAD TIRES			yes		RR_T							
Paved Road Tires	Tires	Truck	yes	-		1060.704	0.66	10.00	40	15	27.5	0.14
SUM PAVED ROAD TIRES			yes		PR_T							
Rock Road All	Limestone	Truck	yes	2		951.660	0.59	10.00	40	15	27.5	0.14
Rock Road All	Bottom Ash Unit 1	truck	yes	-		951.660	0.59	10.00	40	15	27.5	0.14
Rock Road All	Bottom Ash Unit 2	truck	yes	1		951.660	0.59	10.00	40	15	27.5	0.14
Rock Road All	Fly Ash Unit 1	truck	yes	-		951.660	0.59	10.00	40	15	27.5	0.14
Rock Road All	Fly Ash Unit 2	truck	yes	3		951.660	0.59	10.00	40	15	27.5	0.14
Rock Road All	Gypsum	truck	yes	3		951.660	0.59	10.00	40	15	27.5	0.14
SUM ROCK ROAD ALL			yes		RR_ALL							
Paved Road All	Limestone	Truck	yes	2		750.000	0.47	10.00	40	15	27.5	0.14
Paved Road All	Bottom Ash Unit 1	truck	yes	-		750.000	0.47	10.00	40	15	27.5	0.14
Paved Road All	Bottom Ash Unit 2	truck	yes	1		750.000	0.47	10.00	40	15	27.5	0.14
Paved Road All	Fly Ash Unit 1	truck	yes	-		750.000	0.47	10.00	40	15	27.5	0.14
Paved Road All	Fly Ash Unit 2	truck	yes	3		750.000	0.47	10.00	40	15	27.5	0.14
Paved Road All	Gypsum	truck	yes	3		750.000	0.47	10.00	40	15	27.5	0.14
Paved Road All	Tires	Truck	yes	-		750.000	0.47	10.00	40	15	27.5	0.14
SUM PAVED ROAD ALL			yes		PR_ALL							
Rock Road Gypsum	Gypsum	truck	yes	3		1320.590	0.82	10.00	40	15	27.5	0.14
SUM ROCK ROAD GYPSUM			yes		RR_G							
Limestone	Limestone	Truck	yes	2		638.340	0.40	10.00	40	15	27.5	0.14
SUM ROCK ROAD LIMESTONE			yes		RR_L							
Rock Road Bottom Ash	Bottom Ash Unit 2	truck	yes	1		620.540	0.39	10.00	40	15	27.5	0.14
SUM ROCK ROAD BOTTOM ASH			yes		RR_BA							
Rock Road Existing Bottom	Bottom Ash Unit 1	truck	yes	-		198.000	0.12	10.00	40	15	27.5	0.14
SUM RR EXISTING BOTTOM ASH			yes		RR_EBA							
Rock Road Existing Fly Ash	Fly Ash Unit 1	truck	yes	-		602.860	0.37	10.00	40	15	27.5	0.14
SUM RR EXISTING FLY ASH			yes		RR_EFA							
Rock Road New Fly Ash	Fly Ash Unit 2	truck	yes	3		565.960	0.35	10.00	40	15	27.5	0.14
SUM RR NEW FLY ASH			yes		RR_NFA							
Rock Road Landfill	All Materials	CAT model	yes	9		2157.984	1.34	10.00	76	36	56	0.40
SUM RR LANDFILL			yes		RR_LF							

Increment Haul Roads

	Vehicle Miles Traveled VMT/hr	Emissions Uncontrolled lb PM10/hr	Controlled lb PM10/hr	Controlled M10/hr/segı	# segments
Tires	0.00E+00	0.000	0.000	-	28
				-	28
Tires	0.00E+00	0.000	0.000	-	29
				-	29
Limestone	1.07E+00	0.145	0.072	0.0027	27
Bottom Ash Unit 1	0.00E+00	0.000	0.000	-	27
Bottom Ash Unit 2	5.53E-01	0.075	0.038	0.0014	27
Fly Ash Unit 1	0.00E+00	0.000	0.000	-	27
Fly Ash Unit 2	1.67E+00	0.228	0.114	0.0042	27
Gypsum	1.57E+00	0.213	0.107	0.0040	27
				0.0122	27
Limestone	8.40E-01	0.114	0.057	0.0027	21
Bottom Ash Unit 1	0.00E+00	0.000	0.000	-	21
Bottom Ash Unit 2	4.36E-01	0.059	0.030	0.0014	21
Fly Ash Unit 1	0.00E+00	0.000	0.000	-	21
Fly Ash Unit 2	1.32E+00	0.179	0.090	0.0043	21
Gypsum	1.24E+00	0.168	0.084	0.0040	21
Tires	0.00E+00	0.000	0.000	-	21
				0.0124	21
Gypsum	2.18E+00	0.296	0.148	0.0035	42
				0.0035	42
Limestone	7.15E-01	0.097	0.049	0.0019	25
				0.0019	25
Bottom Ash Unit 2	3.60E-01	0.049	0.024	0.0011	23
				0.0011	23
Bottom Ash Unit 1	0.00E+00	0.000	0.000	-	9
				-	9
Fly Ash Unit 1	0.00E+00	0.000	0.000	-	23
				-	23
Fly Ash Unit 2	9.95E-01	0.135	0.068	0.0032	21
				0.0032	21
All Materials	1.21E+01	4.775	2.388	0.0405	59
				0.0405	59

Increment Haul Roads

Haul Road Emission Calculations

Vehicle Miles Traveled (VMT) = 2 * Length of Haul Road * Maximum Hourly Amount Hauled
Capacity of Vehicle

Unpaved Haul Road Emissions: From AP-42, Section13.2.2 (12/03)

Emission Factor => E = $\frac{k * (s/12)^a * (W/3)^b}{} \frac{[365 - P]}{365}$

		Where	
		E = Emission factor (pounds per VMT)	
For PM-10:	1.5	k = constant	Taken from Table 13.2.2-2 in AP-42
	0.9	a = constant	Taken from Table 13.2.2-2 in AP-42
	0.45	b = constant	Taken from Table 13.2.2-2 in AP-42
	8.3	s = surface material silt content (%)	Taken from Table 13.2.2-1 in AP-42
		W = mean vehicle weight (tons)	(Loaded truck weight + Unloaded truck weight)/2
	10.00	S = Average speed of vehicles (mph)	If average speed is greater than 15 mph, then enter 15
	100	P = Number of days with 0.01" of precipitation	Figure 13.2.2-1

Control for watering of paved roads per BACM 50%

Paved Haul Road Emission Equations, From AP-42 Section 13.2.1 (12/03)

Emission Factor => E = [k * (sL/2)^0.65 * (W/3)^1.5 -C]* (1 - (1.2*P)/N) =

	Loaded tons	Unloaded tons	Load tons
Truck	40	15	25
Scraper	88.75	51.25	37.5
CAT model 7	76	36	40

	Where	
	E = Emission factor (pounds per VMT)	
0.016	k = constant	Taken from Table 13.2.1-1 in AP-42
0.00047	C = Emission factor for exhaust, brake wear, and tire wea	Table 13.2.1-2
0.6	sL = Silt loading (g/m2)	Table 13.2.1-3, ubiquitous baseline for <500 trucks per day
	W = mean vehicle weight (tons)	
100	P = Number of days with 0.01" of precipitation	Figure 13.2.1-2
365	N = number of days in averaging period	365 days per year

Calculations

		Vehicle Typ	Paved	Trucks		Length meters	(miles)	Speed mph	Truck Weight Loaded tons	Unloaded tons	Max Hourly tons	Emission Factor lb PM10/VMT
Rock Road Tires	Tires	Truck	yes	1		952.84	0.59	10.00	40	15	27.5	0.14
SUM ROCK ROAD TIRES			yes		RR_T							
Paved Road Tires	Tires	Truck	yes	1		1,060.70	0.66	10.00	40	15	27.5	0.14
SUM PAVED ROAD TIRES			yes		PR_T							
Rock Road All	Limestone	Truck	yes	3		951.66	0.59	10.00	40	15	27.5	0.14
Rock Road All	Bottom Ash Unit 1	truck	yes	2		951.66	0.59	10.00	40	15	27.5	0.14
Rock Road All	Bottom Ash Unit 2	truck	yes	1		951.66	0.59	10.00	40	15	27.5	0.14
Rock Road All	Fly Ash Unit 1	truck	yes	1		951.66	0.59	10.00	40	15	27.5	0.14
Rock Road All	Fly Ash Unit 2	truck	yes	3		951.66	0.59	10.00	40	15	27.5	0.14
Rock Road All	Gypsum	truck	yes	5		951.66	0.59	10.00	40	15	27.5	0.14
SUM ROCK ROAD ALL			yes		RR_ALL							
Paved Road All	Limestone	Truck	yes	3		750.00	0.47	10.00	40	15	27.5	0.14
Paved Road All	Bottom Ash Unit 1	truck	yes	2		750.00	0.47	10.00	40	15	27.5	0.14
Paved Road All	Bottom Ash Unit 2	truck	yes	1		750.00	0.47	10.00	40	15	27.5	0.14
Paved Road All	Fly Ash Unit 1	truck	yes	1		750.00	0.47	10.00	40	15	27.5	0.14
Paved Road All	Fly Ash Unit 2	truck	yes	3		750.00	0.47	10.00	40	15	27.5	0.14
Paved Road All	Gypsum	truck	yes	5		750.00	0.47	10.00	40	15	27.5	0.14
Paved Road All	Tires	Truck	yes	1		750.00	0.47	10.00	40	15	27.5	0.14
SUM PAVED ROAD ALL			yes		PR_ALL							
Rock Road Gypsum	Gypsum	truck	yes	5		1,320.59	0.82	10.00	40	15	27.5	0.14
SUM ROCK ROAD GYPSUM			yes		RR_G							
Limestone	Limestone	Truck	yes	3		638.34	0.40	10.00	40	15	27.5	0.14
SUM ROCK ROAD LIMESTONE			yes		RR_L							
Rock Road Bottom Ash	Bottom Ash Unit 2	truck	yes	1		620.54	0.39	10.00	40	15	27.5	0.14
SUM ROCK ROAD BOTTOM ASH			yes		RR_BA							
Rock Road Existing Bottom /	Bottom Ash Unit 1	truck	yes	2		198.00	0.12	10.00	40	15	27.5	0.14
SUM RR EXISTING BOTTOM ASH			yes		RR_EBA							
Rock Road Existing Fly Ash	Fly Ash Unit 1	truck	yes	1		602.86	0.37	10.00	40	15	27.5	0.14
SUM RR EXISTING FLY ASH			yes		RR_EFA							
Rock Road New Fly Ash	Fly Ash Unit 2	truck	yes	3		565.96	0.35	10.00	40	15	27.5	0.14
SUM RR NEW FLY ASH			yes		RR_NFA							
Rock Road Landfill	All Materials	CAT model	yes	11		2,157.98	1.34	10.00	76	36	56	0.40
SUM RR LANDFILL			yes		RR_LF							

	Vehicle Miles Traveled VMT/hr	Emissions Uncontrolled lb PM10/hr	Controlled lb PM10/hr	Controlled PM10/hr/segm	# segments
Tires	5.92E-01	0.081	0.040	0.0014	28
				0.0014	28
Tires	6.59E-01	0.090	0.045	0.0015	29
				0.0015	29
Limestone	1.94E+00	0.264	0.132	0.0049	27
Bottom Ash Unit 1	1.18E+00	0.161	0.080	0.0030	27
Bottom Ash Unit 2	5.53E-01	0.075	0.038	0.0014	27
Fly Ash Unit 1	6.02E-01	0.082	0.041	0.0015	27
Fly Ash Unit 2	1.67E+00	0.228	0.114	0.0042	27
Gypsum	2.86E+00	0.388	0.194	0.0072	27
				0.0222	27
Limestone	1.53E+00	0.208	0.104	0.0050	21
Bottom Ash Unit 1	9.32E-01	0.127	0.063	0.0030	21
Bottom Ash Unit 2	4.36E-01	0.059	0.030	0.0014	21
Fly Ash Unit 1	4.75E-01	0.065	0.032	0.0015	21
Fly Ash Unit 2	1.32E+00	0.179	0.090	0.0043	21
Gypsum	2.25E+00	0.306	0.153	0.0073	21
Tires	4.66E-01	0.063	0.032	0.0015	21
				0.0240	21
Gypsum	3.96E+00	0.539	0.270	0.0064	42
				0.0064	42
Limestone	1.30E+00	0.177	0.088	0.0035	25
				0.0035	25
Bottom Ash Unit 2	3.60E-01	0.049	0.024	0.0011	23
				0.0011	23
Bottom Ash Unit 1	2.46E-01	0.033	0.017	0.0019	9
				0.0019	9
Fly Ash Unit 1	3.82E-01	0.052	0.026	0.0011	23
				0.0011	23
Fly Ash Unit 2	9.95E-01	0.135	0.068	0.0032	21
				0.0032	21
All Materials	1.48E+01	5.861	2.930	0.0497	59
				0.0497	59

NAAQS Haul Roads

APPENDIX D

RBLC ID	Facility	Process	Fuel	Size	Unit	Control Device	Emission Limit[A]	Emission Unit	Efficiency	Permit Date
SC-0104	Santee Cooper Cross Generating Station	Boiler, No. 3 and No. 4	Coal, Bituminous	5700	MMBtu/hr	ESP	0.018 (Note B)	lb/MMBtu		2/5/2004
AR-0074	Plum Point Energy	Boiler , Unit 1 - SN-01	Bituminous Coal	800	MW	Baghouse	0.018 (Note B)	lb/MMBtu		8/20/2003
MT-0022	Bull Mountain, No. 1, LLC - Roundup Power Project	Boiler, PC No. 1	Coal	390	MW	Fabric Filters	0.015	lb/MMBtu	99.8	7/21/2003
MT-0022	Bull Mountain, No. 1, LLC - Roundup Power Project	Boiler, PC No. 2	Coal	390	MW	Fabric Filters	0.015	lb/MMBtu	99.8	7/21/2003
IA-0067	MidAmerican Energy Company	CBEC 4 Boiler	PRB Coal	7675	MMBtu/hr	Baghouse	0.025 (Note B)	lb/MMBtu	99.7	6/17/2003
KY-0084	Thoroughbred Generating Station	Boiler, (2)	Coal	7446	MMBtu/hr	ESP/WESP	0.018 (Note B)	lb/MMBtu		10/11/2002
KS-0026	Holcomb Unit #2	Boiler, Pulverized Coal	Subbituminous Coal	660	MW	Dry Fabric Filter	0.018 (Note B)	lb/MMBtu	99.71	9/25/2002
WY-0057	WYGEN 2	500 MW PC Boiler	Subbituminous Coal	5145.7	MMBtu/hr	Fabric Filter	0.012	lb/MMBtu		8/17/1999
MO-0050	Kansas City Power & Light Co. - Hawthorn Station	Electric Generation, Boiler, Coal	Coal	384	T/H	Fabric Filter System	0.018 (Note B)	lb/MMBtu		8/8/1995
PA-0133	Mon Valley Energy Limited Partnership	Pulverized Coal Fired Boiler	Bit. Coal	966	MMBtu/hr	Fabric Filter Teflon Bags	0.015	lb/MMBtu	99.95	8/23/1993
VA-0213	SEI Birchwood, Inc.	Boiler, Pulverized Coal	Coal	2200	MMBtu/hr	Baghouse	39.6	lb/hr	99.9	12/7/1992
NC-0057	Roanoke Valley Project II	Boiler, Pulverized Coal-Fired	Coal	517	MMBtu/hr	Fabric Filter	0.018	lb/MMBtu	99.75	7/15/1992
SC-0027	South Carolina Electric And Gas Company	Boiler, Pulverized Coal Fired, Unit No. 1	Coal	385	MW	Fabric Filters	0.018	lb/MMBtu	99.5	7/15/1992
SC-0027	South Carolina Electric And Gas Company	Boiler, Pulverized Coal Fired, Unit No. 2	Coal	385	MW	Fabric Filters	0.018	lb/MMBtu	99.5	7/15/1992
SC-0027	South Carolina Electric And Gas Company	Boiler, Pulverized Coal Fired, Unit No. 3	Coal	385	MW	Fabric Filters	0.018	lb/MMBtu	99.5	12/23/1991
FL-0044	Orlando Utilities Commission	Boiler, PC	Coal	4286	MMBtu/hr	ESP	0.02	lb/MMBtu		4/29/1991
VA-0181	Old Dominion Electric Cooperative	Boiler, 2 units	Coal	4085	MMBtu/hr	Fabric Filter	0.018	lb/mmBtu	99.9	1/24/1991
NC-0054	Roanoke Valley Project	Boiler, PC	Coal	1700	MMBtu/hr	Fabric Filter	0.018	lb/MMBtu	99	11/28/1990
SC-0028	Santee Cooper (S.C. Public Service Authority)	Boiler, Pulverized Coal Fired, Cross Unit No. 1	Coal	500	MW	ESP	0.023	lb/MMBtu	99.5	8/17/1990
VA-0176	Hadson Power 13	Boiler	Coal	30228	lb/hr coal	Cyclone, Baghouse	0.018	lb/MMBtu	99.9	5/9/1990
VA-0171	Mecklenburg Cogeneration Limited Partnership	Boiler, Pulverized Bit Coal, 4 Units	Coal	834.5	MMBtu/hr	Fabric Filter	0.018	lb/MMBtu	99.9	

Notes:
A) Emission limit is for filterable particulate unless otherwise indicated.
B) Emission limit is for filterable and condensible particulate matter.

RBLC ID	Facility	Process	Fuel	Size	Unit	Control Device	Emission Limit	Emission Unit	Efficiency	Permit Date
IA-0067	MidAmerican Energy Company	CBEC 4 Boiler	PRB Coal	7675	MMBtu/hr	Baghouse	0.027	lb/MMBtu	99.7	6/17/2003
KY-0084	Thoroughbred Generating Station	Boiler, Coal, (2)	Coal	7446	MMBtu/hr	ESP, and Wet Electrostatic Precipitator (WESP)	0.018	lb/MMBtu	99	10/11/2002
WY-0057	WYGEN 2	500 MW PC Boiler	Subbituminous Coal	5145.7	MMBtu/hr	Fabric Filter	0.012	lb/MMBtu		9/25/2002
WY-0039	Two Elk Generation Partners, Limited Partnership	Boiler, Steam Electric Power Generating	Pulverized Coal	250	MW	Baghouse	0.02	lb/MMBtu	99.5	2/27/1998
WY-0047	Encoal Corporation-Encoal North Rochelle Facility	Boiler, Coal Fired, Main Stack	Subbituminus Coal	3960	MMBtu/hr	Baghouse	0.02	lb/MMBtu	99	10/10/1997
WY-0048	Wygen, Inc. - Wygen Unit One	Boiler, Pulverized Coal Fired, Steam Electric Power		80	MW	Electrostatic Precipitator	0.02	lb/MMBtu	99	9/6/1996
WY-0046	Black Hills Power And Light Company-Neil Simpson U	Boiler, Pulverized Coal Fired Steam Electric Power		80	MW	Electrostatic Precipitator	0.02	lb/MMBtu	99	4/14/1993
MI-0228	Indelk Energy Services Of Otsego	Boiler (Coal)	Coal	778	MMBtu/hr	Bagfilter	0.03	lb/MMBtu	99.9	3/16/1993
NC-0057	Roanoke Valley Project II	Boiler, Pulverized Coal-Fired	Coal	517	MMBtu/hr	Fabric Filter	0.018	lb/MMBtu	99.75	12/7/1992
SC-0027	South Carolina Electric And Gas Company	Boiler, Pulverized Coal Fired, Unit No. 1	Coal	385	MW	Fabric Filters	0.02	lb/MMBtu		7/15/1992
SC-0027	South Carolina Electric And Gas Company	Boiler, Pulverized Coal Fired, Unit No. 2	Coal	385	MW	Fabric Filters	0.02	lb/MMBtu	99.5	7/15/1992
SC-0027	South Carolina Electric And Gas Company	Boiler, Pulverized Coal Fired, Unit No. 3	Coal	385	MW	Fabric Filters	0.02	lb/MMBtu	99.5	7/15/1992
NJ-0015	Keystone Cogeneration Systems, Inc.	Boiler (Pulverized Bituminous Coal)	Coal, Bituminous	2116	MMBtu/hr	Fabric Filter	0.018	lb/MMBtu	99.9	9/6/1991
VA-0181	Old Dominion Electric Cooperative	Boiler, 2 units	Coal	4085	MMBtu/hr	Fabric Filter	0.02	lb/MMBtu	99.9	4/29/1991
NC-0054	Roanoke Valley Project	Boiler, Pc	Coal	1700	MMBtu/hr	Fabric Filter	0.02	lb/MMBtu	99	1/24/1991
NJ-0014	Chambers Cogeneration Limited Partnership	Boilers (Pulverized-Coal) (2)	Coal	1389	MMBtu/hr (each)	Fabric Filter	0.018	lb/MMBtu	99.9	12/26/1990
SC-0028	Santee Cooper (S.C. Public Service Authority)	Boiler, Pulverized Coal Fired, Cross Unit No. 1	Coal	500	Megawatts	Electrostatic Precipitator (ESP)	0.025	lb/MMBtu	99.5	11/28/1990
VA-0176	Hadson Power 13	Boiler	Coal	30228	lb/H Coal	Cyclone, Lime Spray Dryer, Baghouse	0.02	lb/MMBtu	99.9	8/17/1990
VA-0171	Mecklenburg Cogeneration Limited Partnership	Boiler, Pulverized Bit Coal, 4 Ea	Coal	834.5	MMBtu/hr	Fabric Filter	0.02	lb/MMBtu	99.9	5/9/1990

RBLC ID	Facility	Process	Fuel	Size	Unit	Control Device	Emission Limit	Emission Unit	Permit Date
*NE-0018	Whelan Energy Center	Unit 2 Utility Boiler	PRB coal	2210	MMBtu/hr	Good Combustion Controls	0.15	lb/MMBtu	3/30/2004
AR-0074	Plum Point Energy	Boiler , Unit 1 - SN-01	Bituminous Coal	800	MW	Combustion Controls	0.16	lb/MMBtu	8/20/2003
MT-0022	Bull Mountain, No. 1, LLC - Roundup Power Project	Boiler, PC No. 1	Coal	390	MW		0.15	lb/MMBtu	7/21/2003
MT-0022	Bull Mountain, No. 1, LLC - Roundup Power Project	Boiler, PC No. 2	Coal	390	MW		0.15	lb/MMBtu	7/21/2003
IA-0067	MidAmerican Energy Company	CBEC 4 Boiler	PRB Coal	7675	MMBtu/hr	Combustion Controls	0.154	lb/MMBtu	6/17/2003
KY-0084	Thoroughbred Generating Station	Boiler, Coal, (2)	Coal	7446	MMBtu/hr	Proper Boiler Design And Operation	0.1	lb/MMBtu	10/11/2002
KS-0026	Holcomb Unit #2	Boiler, Pulverized Coal	Subbituminous Coal	660	MW	Good Combustion Practices	0.15	lb/MMBtu	10/08/2002
WY-0057	WYGEN 2	500 MW PC Boiler	Subbituminous Coal	5145.7	MMBtu/hr	Good Combustion Control.	0.15	lb/MMBtu	9/25/2002
MO-0050	Kansas City Power & Light Co. - Hawthorn Station	Electric Generation, Boiler, Coal	Coal	384	T/H	Good Combustion Practices	0.16	lb/MMBtu	8/17/1999
WY-0039	Two Elk Generation Partners, Limited Partnership	Boiler, Steam Electric Power Generating	Pulverized Coal	250	MW		0.15	lb/MMBtu	2/27/1998
WY-0047	Encoal Corporation-Encoal North Rochelle Facility	Boiler, Coal Fired, Main Stack	Subbituminus Coal	3960	MMBtu/hr		0.15	lb/MMBtu	10/10/1997
WY-0048	Wygen, Inc. - Wygen Unit One	Boiler, Pulverized Coal Fired, Steam Electric Power		80	MW		0.15	lb/MMBtu	9/6/1996
PA-0133	Mon Valley Energy Limited Partnership	Pulverized Coal Fired Boiler	Bituminous Coal	966	MMBtu/hr		0.2	lb/MMBtu	8/8/1995
VA-0213	SEI Birchwood, Inc.	Boiler, Pulverized Coal	Coal	2200	MMBtu/hr	Combustion Technology	440	lb/hr	8/23/1993
WY-0046	Black Hills Power And Light Company-Neil Simpson U	Boiler, Pulverized Coal Fired Steam Electric Power		80	MW	Combustion Control	0.15	lb/MMBtu	4/14/1993
MI-0228	Indelk Energy Services Of Otsego	Boiler (Coal)	Coal	778	MMBtu/hr	Combustion Control	0.1	lb/MMBtu	3/16/1993
NC-0057	Roanoke Valley Project Ii	Boiler, Pulverized Coal-Fired	Coal	517	MMBtu/hr	Combustion Technology	0.2	lb/MMBtu	12/7/1992
SC-0027	South Carolina Electric And Gas Company	Boiler, Pulverized Coal Fired, Unit No. 1	Coal	385	MW	Combustion Efficiency	0.15	lb/MMBtu	7/15/1992
SC-0027	South Carolina Electric And Gas Company	Boiler, Pulverized Coal Fired, Unit No. 2	Coal	385	MW	Combustion Efficiency	0.15	lb/MMBtu	7/15/1992
SC-0027	South Carolina Electric And Gas Company	Boiler, Pulverized Coal Fired, Unit No. 3	Coal	385	MW	Combustion Efficiency	0.15	lb/MMBtu	7/15/1992
FL-0044	Orlando Utilities Commission	Boiler, PC	Coal	4286	MMBtu/hr	Combustion Control	0.15	lb/MMBtu	12/23/1991
MA-0033	Ware Cogen	Boiler, Unit 2, Coal	Coal	30	MW	Good Combustion Control.	0.2	lb/MMBtu	12/2/1991
NJ-0015	Keystone Cogeneration Systems, Inc.	Boiler (Pulverized Bituminous Coal)	Coal, Bituminous	2116	MMBtu/hr	Advanced Combustion Control	0.11	lb/MMBtu	9/6/1991
VA-0181	Old Dominion Electric Cooperative	Boiler, 2 units	Coal	4085	MMBtu/hr	Boiler Design	0.1	lb/MMBtu	4/29/1991
NC-0054	Roanoke Valley Project	Boiler, PC	Coal	1700	MMBtu/hr	Combustion Control	0.2	lb/MMBtu	1/24/1991
NJ-0014	Chambers Cogeneration Limited Partnership	Boilers (Pulverized-Coal) (2)	Coal	1389	MMBtu/hr (each)	Advanced Combustion Control	0.11	lb/MMBtu	12/26/1990
SC-0028	Santee Cooper (S.C. Public Service Authority)	Boiler, Pulverized Coal Fired, Cross Unit No. 1	Coal	500	MW	Combustion Efficiency	0.1	lb/MMBtu	11/28/1990
VA-0176	Hadson Power 13	Boiler	Coal	30228	lb/hr coal	Combustion; CEM	0.2	lb/MMBtu	8/17/1990
VA-0171	Mecklenburg Cogeneration Limited Partnership	Boiler, Pulverized Bit Coal, 4 Units	Coal	834.5	MMBtu/hr	Good Combustion Practices	0.2	lb/MMBtu	5/9/1990

RBLC ID	Facility	Process	Fuel	Size	Unit	Control Device	Emission Limit	Emission Unit	Permit Date
AR-0074	Plum Point Energy	Boiler , Unit 1 - SN-01	Bituminous Coal	800	MW	Combustion Controls	0.02	lb/MMBtu	8/20/2003
MT-0022	Bull Mountain, No. 1, LLC - Roundup Power Project	Boiler, PC No. 1	Coal	390	MW		0.003	lb/MMBtu	7/21/2003
MT-0022	Bull Mountain, No. 1, LLC - Roundup Power Project	Boiler, PC No. 2	Coal	390	MW		0.003	lb/MMBtu	7/21/2003
IA-0067	MidAmerican Energy Company	CBEC 4 Boiler	PRB Coal	7675	MMBtu/hr	Combustion Controls	0.0036	lb/MMBtu	6/17/2003
KY-0084	Thoroughbred Generating Station	Boiler, Coal, (2)	Coal	7446	MMBtu/hr	Proper Boiler Design And Operation	0.0072	lb/MMBtu	10/11/2002
KS-0026	Holcomb Unit #2	Boiler, Pulverized Coal	Subbituminous Coal	660	MW	Good Combustion Practices	0.0035	lb/MMBtu	10/08/2002
WY-0057	WYGEN 2	500 MW PC Boiler	Subbituminous Coal	5145.7	MMBtu/hr	Good Combustion Control	0.01	lb/MMBtu	9/25/2002
MO-0050	Kansas City Power & Light Co. - Hawthorn Station	Electric Generation, Boiler, Coal	Coal	384	T/H	Good Combustion Practices	0.0036	lb/MMBtu	8/17/1999
WY-0039	Two Elk Generation Partners, Limited Partnership	Boiler, Steam Electric Power Generating	Pulverized Coal	250	MW		0.015	lb/MMBtu	2/27/1998
WY-0047	Encoal Corporation-Encoal North Rochelle Facility	Boiler, Coal Fired, Main Stack	Subbituminus Coal	3960	MMBtu/hr		0.05	lb/MMBtu	10/10/1997
WY-0048	Wygen, Inc. - Wygen Unit One	Boiler, Pulverized Coal Fired, Steam Electric Power		80	MW		0.015	lb/MMBtu	9/6/1996
PA-0133	Mon Valley Energy Limited Partnership	Pulverized Coal Fired Boiler	Bituminous Coal	966	MMBtu/hr		0.01	lb/MMBtu	8/8/1995
VA-0213	SEI Birchwood, Inc.	Boiler, Pulverized Coal	Coal	2200	MMBtu/hr	Combustion Technology	22	lb/hr	8/23/1993
WY-0046	Black Hills Power And Light Company-Neil Simpson U	Boiler, Pulverized Coal Fired Steam Electric Power		80	MW	Combustion Control	0.015	lb/MMBtu	4/14/1993
MI-0228	Indelk Energy Services Of Otsego	Boiler (Coal)	Coal	778	MMBtu/hr	Combustion Control	0.01	lb/MMBtu	3/16/1993
NC-0057	Roanoke Valley Project II	Boiler, Pulverized Coal-Fired	Coal	517	MMBtu/hr	Combustion Technology	0.03	lb/MMBtu	12/7/1992
SC-0027	South Carolina Electric And Gas Company	Boiler, Pulverized Coal Fired, Unit No. 1	Coal	385	MW	Combustion Efficiency	0.01	lb/MMBtu	7/15/1992
SC-0027	South Carolina Electric And Gas Company	Boiler, Pulverized Coal Fired, Unit No. 2	Coal	385	MW	Combustion Efficiency	0.01	lb/MMBtu	7/15/1992
SC-0027	South Carolina Electric And Gas Company	Boiler, Pulverized Coal Fired, Unit No. 3	Coal	385	MW	Combustion Efficiency	0.01	lb/MMBtu	7/15/1992
FL-0044	Orlando Utilities Commission	Boiler, PC	Coal	4286	MMBtu/hr	Combustion Control	0.015	lb/MMBtu	12/23/1991
MA-0033	Ware Cogen	Boiler, Unit 2, Coal	Coal	30	MW	Good Combustion Control	0.067	lb/MMBtu	12/2/1991
NJ-0015	Keystone Cogeneration Systems, Inc.	Boiler (Pulverized Bituminous Coal)	Coal, Bituminous	2116	MMBtu/hr	Advanced Combustion Control	0.0036	lb/MMBtu	9/6/1991
VA-0181	Old Dominion Electric Cooperative	Boiler, 2	Coal	4085	MMBtu/hr	Boiler Design	0.01	lb/MMBtu	4/29/1991
NC-0054	Roanoke Valley Project	Boiler, PC	Coal	1700	MMBtu/hr	Combustion Control	0.03	lb/MMBtu	1/24/1991
NJ-0014	Chambers Cogeneration Limited Partnership	Boilers (Pulverized-Coal) (2)	Coal	1389	MMBtu/hr (each)	Advanced Combustion Control	0.0036	lb/MMBtu	12/26/1990
SC-0028	Santee Cooper (S.C. Public Service Authority)	Boiler, Pulverized Coal Fired, Cross Unit No. 1	Coal	500	MW	Combustion Efficiency	0.012	lb/MMBtu	11/28/1990
VA-0176	Hadson Power 13	Boiler	Coal	30228	lb/hr coal	Combustion; CEM	0.03	lb/MMBtu	8/17/1990
VA-0171	Mecklenburg Cogeneration Limited Partnership	Boiler, Pulverized Bit Coal, 4 Ea	Coal	834.5	MMBtu/hr	Good Combustion Practices	0.0027	lb/MMBtu	5/9/1990

RBLC ID	Facility	Process	Fuel	Size	Unit	Control Device	Emission Limit	Emission Unit	Efficiency	Permit Date
AR-0074	Plum Point Energy	Boiler , Unit 1 - SN-01	Bituminous Coal	800	MW	Dry FGD/Fabric Filter	0.0061	lb/MMBtu		8/20/2003
MT-0022	Bull Mountain, No. 1, LLC - Roundup Power Project	Boiler, PC No. 1	Coal	390	MW	Dry Flue Gas Desulfurization (FGD) - Spray Dryer Absorber	0.0064	lb/MMBtu	90	7/21/2003
MT-0022	Bull Mountain, No. 1, LLC - Roundup Power Project	Boiler, PC No. 2	Coal	390	MW	Dry Flue Gas Desulfurization (FGD) - Spray Dryer Absorber	0.0064	lb/MMBtu	90	7/21/2003
IA-0067	MidAmerican Energy Company	CBEC 4 Boiler	PRB Coal	7675	MMBtu/hr	Lime Spray Dryer Flue Gas Desulfurization	0.0042	lb/MMBtu		6/17/2003
KY-0084	Thoroughbred Generating Station	Boiler, Coal, (2)	Coal	7446	MMBtu/hr	Proper Boiler Design and Control Technology, ESP, FGD, WESP	0.00497	lb/MMBtu		10/11/2002
VA-0213	SEI Birchwood, Inc.	Boiler, Pulverized Coal	Coal	2200	MMBtu/hr	Lime Spray Drying System (FGD System)	4.8	lb/hr	0	8/23/1993
SC-0027	South Carolina Electric And Gas Company	Boiler, Pulverized Coal Fired, Unit No. 1	Coal	385	MW	Spray Dryer Absorber	0.011	lb/MMBtu	0	7/15/1992
SC-0027	South Carolina Electric And Gas Company	Boiler, Pulverized Coal Fired, Unit No. 2	Coal	385	MW	Spray Dryer Absorber	0.011	lb/MMBtu	0	7/15/1992
SC-0027	South Carolina Electric And Gas Company	Boiler, Pulverized Coal Fired, Unit No. 3	Coal	385	MW	Spray Dryer Absorber	0.011	lb/MMBtu	0	7/15/1992
SC-0028	Santee Cooper (S.C. Public Service Authority)	Boiler, Pulverized Coal Fired, Cross Unit No. 1	Coal	500	Megawatts	FGD System	0.04	lb/MMBtu	50	11/28/1990
VA-0176	Hadson Power 13	Boiler	Coal	30228	lb/h coal	Permit Limitation	19.4	lb/d	0	8/17/1990

RBLC ID	Facility	Process	Fuel	Size	Unit	Control Device	Emission Limit	Emission Unit	Permit Date
SC-0104	Santee Cooper Cross Generating Station	Boiler, No. 3 and No. 4	Coal, Bituminous	5700	MMBtu/hr	FGD System	0.0003	lb/MMBtu	2/5/2004
AZ-0074	Plum Point Energy	Boiler, Unit 1-SN-01	Coal, Subbituminous	800	MW	Dry FGD/Fabric Filter	0.0004	lb/MMBtu	8/20/2003
IA-0067	MidAmerican Energy Company	CBEC 4 Boiler & 3 Carbon Silos	PRB Coal	7675	MMBtu/hr	Lime Spray Dryer Flue Gas Desulfurization	0.0009	lb/MMBtu	6/17/2003
KY-0084	Thoroughbred Generating Station	Boiler, (2)	Coal	7446	MMBtu/hr	WFGD/WESP	0.000159	lb/MMBtu	10/11/2002
VA-0213	SEI Birchwood, Inc.	Boiler, Pulverized Coal	Coal	2200	MMBtu/hr	Lime Spray Dryer	3.6	lb/hr (HF)	8/23/1993
SC-0027	South Carolina Electric And Gas Company	Boiler, Pulverized Coal Fired, Unit No. 1	Coal	385	MW	Fabric Filters And FGD System(SDA)	0.01	lb/MMBtu	7/15/1992
SC-0027	South Carolina Electric And Gas Company	Boiler, Pulverized Coal Fired, Unit No. 2	Coal	385	MW	Fabric Filters And FGD System(SDA)	0.01	lb/MMBtu	7/15/1992
SC-0027	South Carolina Electric And Gas Company	Boiler, Pulverized Coal Fired, Unit No. 3	Coal	385	MW	Fabric Filters And FGD System(SDA)	0.01	lb/MMBtu	7/15/1992
NJ-0015	Keystone Cogeneration Systems, Inc.	Boiler (Pulverized Bituminous Coal)	Coal, Bituminous	2116	MMBtu/hr	Spray Dryer Adsorber	2.28	lb/hr (HF)	9/6/1991
NC-0054	Roanoke Valley Project	Boiler, PC	Coal	1700	MMBtu/hr	Dry Lime FGD	0.000538	lb/MMBtu	1/24/1991
SC-0028	Santee Cooper (S.C. Public Service Authority)	Boiler, Pulverized Coal Fired, Cross Unit No. 1	Coal	500	MW	FGD System	0.01	lb/MMBtu	11/28/1990

National Coal-Fired Utility Projects Spreadsheet
Permit Limits for Pulverized Coal Units[A]

Facility	MW	Permit Status	Emission Limit (lb/MMBtu)									Equipment
			Fuel	SO_2	NOx	PM	PM_{10}[G]	CO	VOC	H_2SO_4[D]	Fluorine	
Prairie Energy - Corn Belt Energy (IL)	91	Final	Bit. Coal	0.15[C]	0.12	0.02	0.02	0.2	0.0065	0.0046		LNB/SCR/ESP/WFGD
Bison - Rocky Mountain Power (MT)	113	Final	Sub-Bit. Coal	0.15	0.09		0.015	0.15	0.0034		0.67 lb/hr	SCR/MC/VS
Springerville - Tucson Electric (AZ)[K]	2 @ 360	Final	PRB	0.6	Note B	0.015	0.055[H]	0.15	0.06 lb/ton	Note E	0.00044	LNB/SCR/SDA/FF

Notes:
A) This table lists information for power plants with final air permits that are being developed and constructed.
B) 1.6 lb/MW-hr energy output
C) 92% SO_2 reduction required if SO_2 emissions greater than 0.10 lb/mmBtu
D) Sulfuric Acid Mist
E) Collective emission limit for Springerville Units 1-4 is 211 tpy.
F) (not used)
G) Emission limit is for filterable particulate unless otherwise indicated.
H) Emission limit is for filterable and condensible particulate matter.
J) (not used)
K) Emission limits for Springerville are not based on BACT.

Equipment

LNB	Low NOx Burners
OFA	Over Fired Air
SCR	Selective Catalytic Reduction
FF	Fabric Filter
ESP	Electrostatic Precipitator
WESP	Wet Electrostatic Precipitator
WFGD	Wet Flue Gas Desulfurization
SDA	Spray Dryer Absorber
MC	Multiclone
VS	Venturi Scrubber
ACI	Activated Carbon Injection

Permit Limits for Recently Permitted Pulverized Coal Units[A]

Facility	MW	Permit Status	Emission Limit (lb/MMBtu)									Equipment
			Fuel	SO_2	NOx	PM	PM_{10}[C]	CO	VOC	H_2SO_4[B]	Fluorine	
Prairie State - (IL)	2 @ 750	Final	Bit. Coal	0.182	0.07	0.015	0.015[D]	0.12	0.004	0.005	0.00026	LNB/SCR/ESP/WFGD/WESP
Longview Power - GenPower (WV)	600	Final	Bit. Coal	0.12	0.07	0.018	0.018[D]	0.11	0.004	0.0075	0.00001	LNB/SCR/WFGD/BH/DSI
Elm Road Generating (WI)	2 @ 615	Final	Bit. Coal	0.15	0.08	0.018	0.018	0.12	0.0035	0.01	0.00088	LNB/OFA/SCR/FF/WFGD/WESP

Notes:
A) This table lists information for power plants with final air permits that are being developed and constructed.
B) Sulfuric Acid Mist
C) Emission limit is for filterable particulate.
D) Emission limit is for filterable and condensable particulate.

Equipment

LNB	Low NOx Burners
OFA	Over Fired Air
SCR	Selective Catalytic Reduction
FF	Fabric Filter
BH	Baghouse
WESP	Wet Electrostatic Precipitator
WFGD	Wet Flue Gas Desulfurization
DSI	Dry Sorbent Injection

APPENDIX E

Prevention of Significant Deterioration Air Dispersion Modeling Protocol

600-MW Coal-Fired Boiler
Big Stone II
Otter Tail Corporation

March 2005

Burns & McDonnell
SINCE 1898

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1.0 INTRODUCTION

Otter Tail Corporation (Otter Tail) is proposing to construct a new 600+ megawatt (MW) [net] pulverized coal (PC) fired boiler at the existing Big Stone Power Plant near Milbank, South Dakota. Potential emissions indicate that the proposed construction will be a major addition at an existing major source, subject to a Prevention of Significant Deterioration (PSD) construction permit review. Since a PSD permit requires an assessment of ambient impacts for those pollutants subject to PSD review, this document presents an air dispersion modeling protocol to be used in developing the PSD application. Submittal of this protocol will allow the South Dakota Department of Environment and Natural Resources (DENR) to review and comment upon the methodology to be employed in the modeling analysis.

Included in this document is a brief description of the project, proposed model to be used, and input parameters for the proposed model. This modeling protocol has been drafted in accordance with USEPA modeling guidelines.

2.0 PROJECT DESCRIPTION

Otter Tail is proposing to build one new coal-fired boiler at its existing site at Big Stone Power Plant near Milbank, South Dakota.

The boiler will have a nameplate heat input capacity greater than 250 million Btu per hour and, according to the PSD regulations, will be classified as a named installation according to 40 CFR 52.21. Therefore it is subject to PSD review if emissions of any pollutant exceed 100 tons per year (tpy). The coal-fired boiler will trigger PSD review since the emissions of multiple pollutants are expected to exceed their respective *de minimis* levels.

3.0 PROPOSED MODEL

Otter Tail is proposing to use the Industrial Source Complex Short-Term (ISCST3) model (version 02035 or newer) for the air quality analysis. The ISCST3 model is an EPA-approved, steady state Gaussian plume model capable of modeling multiple sources in simple and complex terrain. ISCST3 is the model used for most industrial sources and PSD permits and is an appropriate model for these types of sources.

The following default model options will be used:

- Final Plume Rise
- Stack-tip Downwash
- Buoyancy-induced Dispersion
- Calms Processing
- No Use of Missing Data Processing Routine
- Default Wind Profile Exponents
- Default Vertical Potential Temperature Gradient
- Rural Dispersion

Details of the modeling algorithms contained in the ISCST3 model may be found in the User's Guide for ISCST3. The regulatory default option will be selected for this analysis since this project meets the USEPA guideline requirements.

4.0 MODELING PARAMETERS

Since it is expected that PSD review will be triggered, all pollutants regulated under 40 CFR Part 52.21 that are emitted in a significant quantity will require an air quality analysis. According to preliminary calculations, NO_X, SO_2, CO, and PM_{10} are expected to be subject to PSD review, and an air quality analysis will be performed for them. Since VOCs are photoreactive pollutants and are generally regional in nature in terms of their contribution to ozone formation, no reactive-pollutant modeling of VOCs is proposed at this point. In addition, Otter Tail requests that a pre-construction ambient ozone monitoring study not be required since potential VOC emissions are expected to be less than 100 tpy.

To determine the facility's significant impact area (SIA), emissions from the proposed source will be modeled alone, that is, without other sources in the area. The initial step in defining the SIA will be to model the boiler at 100, 75, 50, and 25 percent capacity for each pollutant to determine the operating capacity that results in the worst-case ambient impact. The capacity analysis will be performed using the 5-year meteorological data set of 1999 through 2004. Once the worst-case capacity is identified, the boiler will be modeled to determine the SIA. The SIA is determined to be the distance from the proposed fence line that any pollutant concentration exceeds its PSD modeling significance level (MSL). Each load case will be analyzed using the five years of meteorological data, and the significant impact areas for each averaging period will be determined. From this data, if the modeling results indicate that a pollutant does exceed the PSD MSL for any averaging period, the maximum distance from the property line that the pollutant concentration exceeds the MSL will be determined. This distance will then be increased by 50 kilometers (km), in accordance with the 1990 Draft New Source Review Guidance (known as the radius

of impact [ROI]). The ROI will then be identified and submitted to the DENR for refined modeling purposes.

4.1 Emission Rates

These emission rates represent operations at worst-case ambient conditions under various operating capacities, respectively. The ISCST3 model will give the ambient ground-level impact results for all pollutants, including NO_X. However, impacts of NO_2 must be examined for comparison to NAAQS, PSD increments and significance values. Therefore, the resulting concentrations of NO_X will be screened using the EPA approved Ambient Ratio Method (ARM). Tier 2 of the ARM allows the use of an empirically derived NO_2/NO_X ratio of 0.75, which means that approximately 75 percent of the NO_X emissions will be converted to NO_2, the regulated pollutant. This factor will be applied to the modeled results for NO_X to determine the predicted ground level concentration of NO_2.

4.2 Good Engineering Practice Stack Height

Sources included in a PSD permit application are subject to Good Engineering Practice (GEP) stack height requirements outlined in 40 CFR Part 51, Sections 51.100 and 51.118. As defined by the regulations, GEP height is calculated as the greater of 65 meters (measured from the ground level elevation at the base of the stack) or the height resulting from the following formula:

$$GEP = H + 1.5L$$

Where,

H = the building height; and

L = the lesser of the building height or the greatest crosswind distance of the building - also known as maximum projected width.

To meet stack height requirements, the proposed point sources will be evaluated in terms of their proximity to nearby structures. The purpose of this evaluation is to determine if the discharge from each stack will become caught in the turbulent wake of a building or other structure, resulting in downwash of the plume. Downwash of the plume can result in elevated ground-level concentrations. EPA provides guidance for determining whether building downwash will occur in *Guideline for Determination of Good Engineering Practice Stack Height* (EPA, 1985). The downwash analysis will be performed consistent with the methods prescribed in this guidance document. The generation facility and associated point sources will be evaluated in terms of their proximity to nearby structures.

Calculations for determining the direction-specific downwash parameters will be performed using EPA's Building Profile Input Program, otherwise referred to as the BPIP downwash algorithm, Version 95086.

4.3 Emission Source Parameters

In addition to point sources, fugitive sources, such as haul roads and storage piles, will also be examined for determining compliance with the air quality standards. For the purposes of the air dispersion modeling analysis, it was determined that volume sources will be used to represent the emissions from haul roads and any open conveyor drop points. Area sources will be used to represent fugitive emissions from the coal storage piles and the landfill.

As the parameters for volume sources are defined in the ISCST3 user manual, haul roads are assumed to be 30 feet (9.144 m) wide; therefore a 30 foot by 30 foot volume source can be assumed. This allows the haul road to be broken up into segments aligned in 30-foot by 30-foot segments. The ISCST3 Model allows the user to either have haul roads situated directly next to each other (exact representation) or with a space between them the size of one volume source (approximate representation). The approximate representation will be used for these runs to minimize the number of sources and decrease computational time. A 30-foot (9.144 m) road width corresponds to an initial lateral dimension of 8.51 m ($2 \cdot 9.144$ m $\div$ 2.15m). It is assumed that the scrapers or mine trucks hauling the fly ash are 10 feet (3.048 m) high, making the initial vertical dimension 1.42 m (3.048 m $\div$ 2.15). The release height will correspond to approximately the top of the wheel (1.5 m for mine trucks or scrapers). This approach is conservative since the top of the wheel is higher than 1.5 m.

The coal loadout onto the active storage pile (essentially an open conveyor drop point) will be modeled as a volume source with a lateral dimension of 0.28 meters, a vertical dimension of 0.93 meters and a release height of 2.0 meters.[1] For the area sources, the dimensions of each pile will approximate the area that each of the piles covers. Fugitive emissions from these sources will be estimated from the AP-42 section on industrial wind erosion.[2]

Both the point and volume sources will be modeled to correspond to the boiler operating at 100 percent capacity. During the runs where the boiler will be operating at 75, 50, or 25 percent capacity, the fugitive emission sources will remain at emission levels corresponding to 100 percent unit load. While this

[1] Based on actual conveyor dimensions and calculation methods listed in Table 1-6 of *User's Guide for the Industrial Source Complex (ISC3) Dispersion Models, Volume II.*

[2] AP-42 Section 13.2.5, *Industrial Wind Erosion* (1/95 Update).

method does not accurately reflect the operations at the facility, the results of the model will yield a worst-case impact scenario.

5.0 MODELING METHODOLOGY

5.1 Receptor Grid

The overall purpose of the modeling analysis is to ensure that operation of the proposed facility will not result in, or contribute to concentrations above the National Ambient Air Quality Standards (NAAQS) or PSD Class II increments. The modeling runs will be conducted using the ISCST3 model in simple terrain within a Cartesian grid to determine the significant impact area for each pollutant. The grid will incorporate the following spacing between receptors: 100-meter out to 1 kilometer, 500-meter out to 5 kilometers, and 1,000-meter out to 50 kilometers. If the significant impact area exceeds 50 kilometers the grid will be extended to encompass the entire significant impact area. If the modeling impacts show "hot spots" outside 1,000 meters, 100-meter grid spacing will be used to encompass the maximum concentrations to ensure that the maximum impact has been identified. Receptors will also be placed along the property boundary at a spacing of 50 meters. After reviewing the topography of the area, it was determined that terrain elevations should be incorporated into the model. Therefore, the appropriate USGS 7.5 minute topographical maps (from electronic DEM data) will be used to obtain the necessary receptor elevations.

5.2 Meteorological Data

Surface air meteorological data from Huron with Aberdeen upper air data from 1999-2004 will be used in the analysis.

5.3 Model Parameters

Based on the Auer scheme, the existing land use for a three-kilometer area surrounding the proposed site is more than 50 percent rural. Also, the population density is less than 750 people/km^2 for the same area. Therefore, rural dispersion coefficients will be used in the ISCST3 Model.

The ISCST3 program cannot model impacts that occur within the cavity regions of building downwash. To compensate for this deficiency, the SCREEN3 modeling program will be run (version 96043). SCREEN3 will only be used to calculate the impact from point sources within cavity regions of buildings. Otter Tail proposes to run the SCREEN3 model for each point source using a 1 g/s emission rate. Predicted concentrations will then be scaled to the source-specific maximum emission rate. If these concentrations occur within the fenceline of the proposed site, further analysis will not be required. Since

the SCREEN3 model generates 1-hour concentrations, the approved EPA conversion factors shown in Table 1 will be used to compute concentrations for longer averaging periods.

Table 1: SCREEN3 Conversion Factors

Averaging Time	Conversion Factor
3-hour	0.9
8-hour	0.7
24-hour	0.4
Annual	0.08

5.4 Significant Impact Area Determination

The ISCST3 Model will be run for the proposed facility using the worst-case capacity scenario for the coal-fired boiler. If any modeled pollutant results in an impact below the significance levels for each averaging period, no further modeling for that pollutant to determine compliance with the NAAQS or PSD Class II increments is needed. However, if the model predicts impacts at or above the MSL for any pollutant, a cumulative analysis including all point sources within the ROI will be required for that pollutant. Depending on the initial modeling results, Otter Tail will request from DENR an emission inventory of PSD increment-consuming sources and NAAQS sources that are located within the ROI and should be included in the modeling analyses.

5.5 NAAQS and Class II Increment Analysis

For the NAAQS and PSD increment analysis, all major stationary sources that emit pollutants subject to this analysis and located within 50 kilometers of the ROI will be addressed. A source within 50 kilometers of the impact area may be eliminated from the analysis if it is determined to have a negligible contribution to air quality impacts at the generating station. Otter Tail will consult with DENR to determine acceptable methods of eliminating sources from the analysis. Background air quality values will be provided by the DENR to add to model-predicted concentrations for comparison to the NAAQS. If the refined analysis does not result in any concentrations above the NAAQS or PSD increments, no further modeling will be conducted.

5.6 Ambient Monitoring

The modeling analysis for emission sources at the proposed Otter Tail facility will also address the pre-construction monitoring provision of the PSD regulations. The regulations specify significant monitoring *de minimis* levels for each PSD pollutant that triggers the requirement to perform one year of pre-construction ambient air monitoring. For any impacts predicted to be below the monitoring *de minimis*

levels, Otter Tail will request an exemption from pre-construction ambient air monitoring. If any predicted concentration reaching or exceeding the monitoring *de minimis* levels are observed, Otter Tail will consult with the DENR to determine the adequacy the historical pre-construction ambient air monitoring. Table 2 shows the NAAQS, modeling/monitoring significance levels, and PSD increments.[3]

Table 2: NAAQS, Significance Levels and Class II Increments ($\mu g/m^3$)

Pollutant	Averaging Period	NAAQS	Modeling Significance Level	Monitoring Significance Level	PSD Class II Increment
TSP	24-hour	150 (state standard)	--	--	--
NO_X	annual	100	1	14	25
CO	8-hour	10,000	500	575	NA
	1-hour	40,000	2,000	NA	NA
PM_{10}	annual	50	1	NA	17
	24-hour	150	5	10	30
SO_2	annual	80	1	NA	20
	24-hour	365	5	13	91
	3-hour	1,300*	25	NA	512

* Secondary standard.

6.0 CLASS I AREA IMPACTS

PSD regulations require that a proposed major source perform an assessment of air quality impacts at Class I areas if these areas are located within 300 km of the proposed facility. Recent Federal Land Manager (FLM) guidance indicates that all Class I areas within 300 km should be reviewed in the course of a PSD application. There are no Class I areas within 300 km of the Big Stone Power Plant. Typically, proposed facilities over 300 km from a Class I area are not a threat to visibility impairment.

7.0 SUMMARY

Otter Tail would like to proceed with the initial modeling analysis as soon as possible in order to ensure that a pre-construction ambient air monitoring study will not be required. Also, if emission inventories and background air quality data are needed from DENR and other agencies to complete refined modeling analyses, initial modeling to determine the ROI for each pollutant should be expedited to give DENR enough time to process these requests.

[3] The pollutants that are allowed one NAAQS exceedance per year and one PSD Increment exceedance per year are: 1-hour and 8-hour CO; 3-hour and 24-hour SO_2; and 24-hour PM/PM_{10}.

APPENDIX F

Prevention of Significant Deterioration Fugitive Calculation Protocol

600-MW Coal-Fired Boiler

Big Stone II Partners

Updated

June 2006

Burns & McDonnell
SINCE 1898

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1.0 INTRODUCTION

Big Stone II Partners (Big Stone) is proposing to construct a new 600+ megawatt (MW) [net] pulverized coal (PC) fired boiler at the existing Big Stone Power Plant near Milbank, South Dakota. Potential emissions indicate that the proposed construction will be a major addition at an existing major source, subject to a Prevention of Significant Deterioration (PSD) construction permit review. Since a PSD permit requires an assessment of ambient impacts for those pollutants subject to PSD review, this document presents a brief description of the fugitive sources, input parameters, and calculations methodology. Submittal of this protocol will allow the South Dakota Department of Environment and Natural Resources (DENR) to review and comment upon the methodology to be employed in calculating the fugitive emissions to be used in the modeling analysis.

Included in this document is a brief description of the fugitive sources, input parameters, and calculation methodology.

Please note that existing sources at the facility do not consume increment.

2.0 PROTOCOL DESCRIPTION

Associated with the new coal-fired boiler and the existing boilers are fugitive emissions from material handling of coal, limestone, ash, and other materials. This protocol is intended to address these fugitive emissions and quantify them in order for them to be modeled.

3.0 STORAGE PILES

The facility will include three storage piles and a landfill, as shown in Table 1. An existing temporary bottom ash storage pile for Unit 1 is assumed to have no fugitive emissions, since the material is wet, and is not left in the open for a significant period of time before it is either sold or transported to the landfill for disposal.

Table 1: Storage Piles.

Model ID	Description
LS	Limestone Pile
GP	Gypsum Pile
IAC	Inactive Coal Pile
LF	Landfill

3.1 Wind Erosion

Wind erosion for both the active and dead storage piles will be calculated based on AP-42 section 13.2.5 "Industrial Wind Erosion", dated January 1995. Due to the length and complexity of this method, it is not restated in this document. Please refer to the AP-42 section for details.

Table 2: Storage Pile Wind Erosion Parameters.

Description	Height (ft)	Density (lb/ft^3)	Amount (tons)	Area (ft^2)	Moisture (%)	Threshold Friction Velocity (m/s)
Limestone Pile	53.00	85.00	15,000	20,106	10.00	0.62
Inactive Coal Pile	45.00	45.00	697,000	566,280	21.42	1.02
Gypsum Pile	25.00	65.00	9,572	5,000	10.00	0.62
Landfill	15.00	65.00	1,300,000	522,720	10.00	1.02

The threshold friction velocity for the landfill is most appropriately 1.02 m/s (overburden) as opposed to 0.62 m/s (scraper tracks on a coal pile). Although the landfill is maintained by a scraper, the material composing the landfill is more similar to overburden than to raw coal.

The EMISFACT modeling option in ISC was used to model wind erosion emissions only during Stability Classes A6, B6, C6, D6, E6, and F6.

3.2 Pile Maintenance

Maintenance of the landfill and inactive coal storage piles consists of reshaping the pile with mobile equipment.

Fugitive emissions will be calculated based on AP-42 Section 13.2.2 dated December 2003, Unpaved Roads.

$$E = k\left(\frac{s}{12}\right)^a\left(\frac{W}{3}\right)^b\left[\frac{365-P}{365}\right]$$

Where: k = 1.5 for PM_{10}
a = 0.9 for PM_{10}
b = 0.45 for PM_{10}
s = material silt content (%) = 2.2
W = weight of the vehicle (tons)
P = 100 days from Figure 13.2.2-1

The coal silt content used is 2.2 percent and is taken from AP-42 table 13.2.4-1 dated December 2003 for coal fired power plant coal as received. A scraper is used for the landfill pile maintenance and a bulldozer or a scraper is used for the coal pile maintenance. Calculations will be made assuming a scraper since it is heavier than a bulldozer. It is assumed that a scraper has a capacity of 25 tons. It is assumed that the maximum speed is 2.5 mph and the travel path is 400 feet, therefore, the maximum hourly amount of material pushed is 412.5 tons. Table 3 shows the calculated emissions from pile maintenance. The piles are operational 8,760 hrs/yr. A 25 percent control efficiency is applied to the inactive coal pile to account for the dust control measures applied as needed.

Table 3: Storage Pile Maintenance Parameters.

	W (tons)	VMT/hr	PM_{10} (lb/VMT)	PM_{10} (lb/hr)	PM_{10} (tpy)
Inactive Coal Pile Maintenance	70.00	0.89	0.98	0.65	3.82
Landfill Pile Maintenance	70.00	0.89	0.98	0.87	3.82

3.3 Load-in and Load-out

The loading in and out of the storage piles is accounted for in the material handling transfer points using the drop equation. See Section 5.1.

4.0 ROADS

Roads at the site are both paved and unpaved. Fugitive emissions will be calculated using AP-42. The truck types used and their respective weights are shown in Table 4.

Table 4: Truck Types and Weight.

Truck Types	Loaded (lbs)	Unloaded (lbs)	Capacity (lbs)
18 Wheeler	80,000	30,000	50,000
Scraper	177,500	102,500	75,000
CAT model 740 articulated truck	152,000	72,000	80,000

4.1 Paved Roads

Paved road emissions will be calculated using AP-42 Section 13.2.1 dated December 2003, Paved Roads with a 50% control efficiency factor to account for the fugitive dust controls.

$$E = \left[k\left(\frac{sL}{2}\right)^{0.65}\left(\frac{W}{3}\right)^{1.5} - C \right]\left(1 - \frac{1.2P}{N}\right)$$

Where:

E = Emission factor (pounds per Vehicle Mile Traveled)
k = constant (PM_{10}) = 0.016 Taken from Table 13.2.1-1 in AP-42
sL = Silt loading (g/m^2) = 0.6 Table 13.2.1-3, ubiquitous baseline for <500 trucks per day
W = mean vehicle weight (tons) = Varies by truck type - See Table 4
C = Emission factor for exhaust, brake wear, and tire wear = 0.00047 from Table 13.2.1-2
P = Number of days with 0.01" of precipitation = 100 taken from Figure 13.2.1-2 in AP-42
N = number of days in averaging period = 365 days per year

AP-42 notes a silt loading of 2.4 g/m^2 for wintertime baseline conditions in areas that experience frozen precipitation with periodic application of antiskid material. However, if there is no moisture on the road, then Big Stone has no need for application of antiskid material. Therefore, Big Stone applies antiskid material only when there is moisture on the road, creating an inherent "watering effect" control on the road. This natural moisture content can be conservatively assumed to be at least 75%, which mathematically leads back to a silt loading of 0.6 g/m^2. Therefore, for the sake of simplicity in the calculations, a silt loading of 0.6 g/m^2 will be used regardless of time of year.

4.2 Unpaved Roads

Unpaved road emissions will be calculated using AP-42 Section 13.2.2 dated December 2003, Unpaved Roads.

$$E = k\left(\frac{s}{12}\right)^{a}\left(\frac{W}{3}\right)^{b}\left[\frac{365 - P}{365}\right]$$

Where:

E = Emission factor (pounds per Vehicle Mile Traveled)
k = constant (PM_{10}) = 1.5 Taken from Table 13.2.2-2 in AP-42
s = silt content (%) = 8.3 Taken from Table 13.2.2-1 in AP-42

a = constant (PM_{10}) = 0.9 Taken from Table 13.2.2-2 in AP-42
W = mean vehicle weight (tons) = Varies by truck type - See Table 4
b = constant (PM_{10}) = 0.45 Taken from Table 13.2.2-2 in AP-42
P = Number of days with 0.01" of precipitation = 100, taken from Figure 13.2.2-1 in AP-42

5.0 Material Handling Sources

Material handling sources at the facility consist of both existing and new sources as shown in Table 5. The existing sources were enumerated in the Title V application.

5.1 Material Transfer Points (Drop Equation)

Fugitive emission from material transfer points will be calculated using the drop equation in AP-42 Section 13.2.4, Aggregate Handling and Storage Piles dated January 1995.

$$E = \frac{k\,(0.0032)\,(U/5)^{1.3}}{(M/2)^{1.4}}$$

Where:

E = Emission Factor in lb PM_{10}/ton dropped

k = particle size multiplier = 0.35 for PM_{10}

U = mean wind speed (mph) = 11.10 mph – averaged from 2000-2004

M = material moisture content = 21.42% for coal, 10% for gypsum, limestone, and landfill, and 1% for ash

E = 1.1×10^{-4} lb/ton for PM_{10} from coal

8.33×10^{-3} lb/ton for PM_{10} from ash

3.32×10^{-4} lb/ton for PM_{10} from gypsum, limestone, and landfill

The drop equation will be used to calculate emissions from the following sources:

Model designation	Description
IAC_LI	Inactive Coal Pile Load-in
28	Limestone stackout conveyor - fugitive
GP_LI	Gypsum Pile Load-in
GP_LO	Gypsum Pile Load-out
LF_LI	Landfill Load-in

5.2 Dust Collector Grain Loading

Emissions for all dust collectors will be calculated using the rated grain loading for each baghouse. This methodology was selected since the design grain loading and flow rates are known and documented for this new equipment.

$$E\ (lb/hr) = (gr/dscf) * (dscf/hr) * (lb/\ 7{,}000\ gr)$$

6.0 SUMMARY

Calculation of fugitive emissions from the Big Stone facility will be made using AP-42 or other accepted methods. Big Stone requests concurrence from SD DENR of proposed methods by June 1, 2005 in order to expedite the emission calculations, dispersion modeling, and application submittal.

Table 5: Material Handling Sources

Dust Collector #	Description
Existing	
5	Live fuel storage building transfer point
6	Rotary car dumper conveyor
7a	Rotary car dumper building
7b	Rotary car dumper building
7c	Rotary car dumper building
7d	Rotary car dumper building
8	Fuel transfer house
9	North fuel conveying systems-dust collector
10	South fuel conveying systems-dust collector
11	Fly ash storage silo
12	Lime storage silo
New	
17	Emergency Coal Reclaim System
18	Yard Coal Silo Fill System
19	Yard Coal Silo Loadout System
20	Limestone Reclaim System
21	Limestone Receiving System
22	Coal Tripper/Silo Fill System
23	Fly Ash Silo Bin Vent
24	Limestone Day Bins Vent
26	Coal Plant Transfer System
27	Coal Crusher Building - BSP II
29	Limestone Precrusher Building
30	Emergency Coal Stockout System
32	Coal Yard Transfer System

APPENDIX G

Cavity

Cavity 1 Calculations

Equations

$$C = \frac{A * W}{1.0 + B\,(W/Hb)}$$ when L/Hb <2 or W/Hb<2

Or

$$C = \frac{1.75 * W}{1.0 + 0.25\,(W/Hb)}$$ when L/Hb >2 or W/Hb>2

Hb = Building Height (m)
L = Alongwind Building Dimension (m)
W = Crosswind Building Dimension (m)
A = -2.0 + 3.7 *(L/Hb)^(-1/3)
B = -.15 + .305 *(L/Hb)^(-1/3)

#	Building	Height (ft)	Hb (m)	L (ft)	W (ft)	L (m)	W (m)	A	B	C1 Cavity (m)	Nearest Fence Line (m)	Cavity Inside Fence?
1a	furnace	274.00	83.52	175.00	135.00	53.34	41.15	2.30	0.20	85.86	275.00	True
1b	backend	144.00	43.89	135.00	60.00	41.15	18.29	1.78	0.16	30.51	275.00	True
1c	xfer tower	184.00	56.08	35.00	25.00	10.67	7.62	4.43	0.38	32.12	290.00	True
1d	tripper bay	198.00	60.35	175.00	45.00	53.34	13.72	1.86	0.17	24.51	315.00	True
1f	turbine hall	98.00	29.87	315.00	115.00	96.01	35.05	0.51	0.06	47.43	260.00	True
1g	aux bay	141.00	42.98	40.00	30.00	12.19	9.14	3.63	0.31	31.12	260.00	True
1i	control	81.00	24.69	100.00	50.00	30.48	15.24	1.45	0.13	20.39	328.00	True
1j	admin	64.00	19.51	100.00	60.00	30.48	18.29	1.19	0.11	19.66	328.00	True
2_ff	Fabric Filter	60.00	18.29	215.00	120.00	65.53	36.58	0.42	0.05	42.67	271.00	True
6_bash	Bottom Ash Load Out Area	30.00	9.14	65.00	45.00	19.81	13.72	0.86	0.09	17.46	260.00	True
13_wfgd	fgd building	90.00	27.43	82.00	80.00	24.99	24.38	1.82	0.16	38.64	195.00	True
14_RPB	Reagent Prep Building	30.00	9.14	165.00	125.00	50.29	38.10	0.10	0.02	32.66	176.00	True
14b	Reagent Prep Building	65.00	19.81	110.00	43.00	33.53	13.11	1.10	0.11	13.53	158.00	True
15a	fgd byproduct dewatering building	30.00	9.14	86.00	86.00	26.21	26.21	0.60	0.06	26.72	158.00	True
15b	fgd byproduct dewatering building	50.00	15.24	86.00	39.00	26.21	11.89	1.09	0.10	11.96	183.00	True
16_fop	Fuel Oil Pump Structure	18.00	5.49	25.00	20.00	7.62	6.10	1.32	0.12	7.06	490.00	True
17dbe	Day Bin Enclosure	125.00	38.10	70.00	30.00	21.34	9.14	2.49	0.22	21.62	165.00	True
18lime	limestone precrusher building	90.00	27.43	35.00	30.00	10.67	9.14	3.07	0.27	25.76	42.00	True
23_ccrsh	Coal Crusher Building	90.00	27.43	35.00	30.00	10.67	9.14	3.07	0.27	25.76	406.00	True
30_CWPB	Circulating Water Pump Building	30.00	9.14	155.00	45.00	47.24	13.72	0.14	0.03	17.46	80.00	True
31_CTwr	Cooling Tower Building	34.00	10.36	336.00	132.00	102.41	40.23	(0.28)	(0.01)	35.73	67.00	True
33_MB	Yard Services Building	25.00	7.62	154.00	60.00	46.94	18.29	0.02	0.02	20.00	70.00	True
34_lrds	Limestone Receiving Dumper Structure	25.00	7.62	120.00	24.00	36.58	7.32	0.19	0.03	10.32	59.00	True
36_lsb	Limestone Storage Building	68.00	20.73	200.00	125.00	60.96	38.10	0.58	0.05	45.68	100.00	True
37_CFB	Chemical Feed Building	30.00	9.14	80.00	47.00	24.38	14.33	0.67	0.07	18.01	65.00	True
39_fgdlo	FGD Byproducts Storage/Truck Load Out Ar	43.00	13.11	100.00	75.00	30.48	22.86	0.79	0.08	27.86	102.00	True
42_CH	Unit 2 Crusher House	85.00	25.91	40.00	30.00	12.19	9.14	2.76	0.24	23.22	410.00	True
43_wwpmp	Wastewater Pump Structure	20.00	6.10	30.00	18.00	9.14	5.49	1.23	0.12	6.12	185.00	True
48_cbxfe	Coal Tripper Transfer Structure	200.00	60.96	32.00	17.00	9.75	5.18	4.82	0.41	24.11	320.00	True
49_boost	Powerblock Firewater Booster Pumps	10.00	3.05	31.00	14.00	9.45	4.27	0.54	0.06	5.53	260.00	True
50_gen	Emergency Diesel Generator Building	18.00	5.49	40.00	25.00	12.19	7.62	0.84	0.08	9.90	260.00	True
51_wsps	Water Supply Pump Structure	30.00	9.14	155.00	45.00	47.24	13.72	0.14	0.03	17.46	495.00	True
52_fp	Coal Area Firewater Booster Pumps	10.00	3.05	31.00	14.00	9.45	4.27	0.54	0.06	5.53	167.00	True
53emerg	Transfer emergency silo unloading	50.00	15.24	21.00	20.00	6.40	6.10	2.94	0.26	16.25	225.00	True
nle_GB	grains bldg	47.00	14.33	135.00	100.00	41.15	30.48	0.60	0.06	34.82	Outside Already	True
nle_CB	mechanical bldg	27.00	8.23	190.00	110.00	57.91	33.53	(0.07)	0.01	29.07	Outside Already	True
nle_PB	process bldg	66.00	20.12	245.00	115.00	74.68	35.05	0.39	0.05	42.73	Outside Already	True
nle_DEB1	d and e bldg 1	77.00	23.47	60.00	30.00	18.29	9.14	2.02	0.18	17.26	Outside Already	True
nle_DEB2	d and e bldg 2	44.00	13.41	60.00	45.00	18.29	13.72	1.34	0.13	16.25	Outside Already	True
nle_POB	process office bldg	16	4.88	82	35	24.99	10.67	0.15	0.03	12.07	Outside Already	True
BSI_33A	33A - Boiler	293	89.31	170	140	51.82	42.67	2.44	0.22	94.24	375.00	True
BSI_33B	33B - Boiler	183	55.78	165	50	50.29	15.24	1.83	0.17	26.68	370.00	True
BSI_33C	33C - Boiler	136	41.45	120	25	36.58	7.62	1.86	0.17	13.73	370.00	True
BSI_33D	33D - Turb/Gen Bld	91	27.74	210	115	64.01	35.05	0.80	0.08	46.61	363.00	True
BSI_33E	33E - Boiler	63	19.20	210	200	64.01	60.96	0.48	0.05	59.48	364.00	True
BSI_33F	33F - Boiler	136	41.45	170	25	51.82	7.62	1.43	0.13	10.67	420.00	True
BSI_33G	33G - Aux Boiler Building	33	10.06	60	60	18.29	18.29	1.03	0.10	15.96	410.00	True
BSI34_PB	34_Unit 1 Precipitator	77.5	23.62	235	90	71.63	27.43	0.56	0.06	37.20	361.00	True
BSI36_SB	36 - Service Building	24	7.32	60	60	18.29	18.29	0.73	0.07	19.69	447.00	True
BSI_36A	36A - Hallway to Power Building	16	4.88	125	30	38.10	9.14	(0.14)	0.00	10.89	428.00	True
BSI63_MS	63 - Maintenance Shop	29	8.84	100	90	30.48	27.43	0.45	0.05	27.03	440.00	True
BS1_CWDS	Unit 1 Circulating H2O Discharge Stru	10	3.05	40	25	12.19	7.62	0.33	0.04	8.21	510.00	True
BS1_STB	Sewage Treatment Building	10	3.05	35	18	10.67	5.49	0.44	0.05	6.62	490.00	True
BS1SWPH	Service Water Pump House	10	3.05	38	30	11.58	9.14	0.37	0.05	9.14	490.00	True
BS1_ASB	Acid Storage Building	10	3.05	23	17	7.01	5.18	0.80	0.08	6.36	500.00	True
BS1_CCS	Chlorine Container Storage	15	4.57	55	25	16.76	7.62	0.40	0.05	9.41	500.00	True
bs1_LUnl	Limestone Unloading	30	9.14	45	42	13.72	12.80	1.23	0.12	13.56	182.00	True
bs1_LCSB	Live Coal Storage Building	72	21.95	400	70	121.92	21.34	0.09	0.02	30.04	340.00	True
bs1_CSB	Coal Storage Barn	89	27.13	47	33	14.33	10.06	2.58	0.23	23.91	428.00	True
bs1AFU/S	Unit 1 Alternative Fuel Unloading	16	4.88	148	37	45.11	11.28	(0.24)	(0.00)	12.51	430.00	True
bs1_FP	Fire Pump	15	4.57	118	105	35.97	32.00	(0.14)	0.00	20.37	134.00	True
bs1_WH	Unit 1 Warehouse	22.5	6.86	215	75	65.53	22.86	(0.26)	(0.01)	21.82	470.00	True
bs1_WH2	Unit 1 Warehouse	22.5	6.86	50	45	15.24	13.72	0.84	0.08	16.00	490.00	True
bs1_SB	Unit 1 Cold Lime Softening Buildin	25	7.62	55	40	16.76	12.19	0.84	0.08	15.24	448.00	True
E_RD	E_Rotary Dumper	29.5	8.99	235	120	71.63	36.58	(0.15)	0.00	31.74	262.00	True
H_CrusH	H-Coal Crusher House	120	36.58	40	35	12.19	10.67	3.34	0.29	32.82	408.00	True
J_EBC	Existing Brine Concentrator	95	28.96	57	45	17.37	13.72	2.39	0.21	29.76	147.00	True

Cavity 2 Calculations

Equations

$$C = \frac{A * W}{1.0 + B\ (W/Hb)}$$ when L/Hb <2 or W/Hb<2

Or

$$C = \frac{1.75 * W}{1.0 + 0.25\ (W/Hb)}$$ when L/Hb >2 or W/Hb>2

Hb = Building Height (m)
L = Alongwind Building Dimension (m)
W = Crosswind Building Dimension (m)
A = -2.0 + 3.7 *(L/Hb)^(-1/3)
B = -.15 + .305 *(L/Hb)^(-1/3)

#	Building	Height (ft)	Hb (m)	W (ft)	L (ft)	W (m)	L (m)	A	B	C2 Cavity (m)	Nearest Fence Line (m)	Cavity Inside Fence?
1a	furnace	274.00	83.52	175.00	135.00	53.34	41.15	2.68	0.24	124.43	275.00	True
1b	backend	144.00	43.89	135.00	60.00	41.15	18.29	2.95	0.26	97.84	275.00	True
1c	xfer tower	184.00	56.08	35.00	25.00	10.67	7.62	5.20	0.44	51.13	290.00	True
1d	tripper bay	198.00	60.35	175.00	45.00	53.34	13.72	4.06	0.35	165.54	315.00	True
1f	turbine hall	98.00	29.87	315.00	115.00	96.01	35.05	1.51	0.14	93.16	260.00	True
1g	aux bay	141.00	42.98	40.00	30.00	12.19	9.14	4.20	0.36	46.43	260.00	True
1i	control	81.00	24.69	100.00	50.00	30.48	15.24	2.35	0.21	56.87	328.00	True
1j	admin	64.00	19.51	100.00	60.00	30.48	18.29	1.78	0.16	43.33	328.00	True
2_ff	Fabric Filter	60.00	18.29	215.00	120.00	65.53	36.58	0.94	0.09	60.49	271.00	True
6_bash	Bottom Ash Load Out Area	30.00	9.14	65.00	45.00	19.81	13.72	1.23	0.12	22.49	260.00	True
13_wfgd	fgd building	90.00	27.43	82.00	80.00	24.99	24.38	1.85	0.17	40.09	195.00	True
14_RPB	Reagent Prep Building	30.00	9.14	165.00	125.00	50.29	38.10	0.30	0.04	37.06	176.00	True
14b	Reagent Prep Building	65.00	19.81	110.00	43.00	33.53	13.11	2.25	0.20	56.27	158.00	True
15a	fgd byproduct dewatering building	30.00	9.14	86.00	86.00	26.21	26.21	0.60	0.06	26.72	158.00	True
15b	fgd byproduct dewatering building	50.00	15.24	86.00	39.00	26.21	11.89	2.02	0.18	40.35	183.00	True
16_fop	Fuel Oil Pump Structure	18.00	5.49	25.00	20.00	7.62	6.10	1.57	0.14	9.98	490.00	True
17dbe	Day Bin Enclosure	125.00	38.10	70.00	30.00	21.34	9.14	3.95	0.34	70.84	165.00	True
18lime	limestone precrusher building	90.00	27.43	35.00	30.00	10.67	9.14	3.34	0.29	31.99	42.00	True
23_ccrsh	Coal Crusher Building	90.00	27.43	35.00	30.00	10.67	9.14	3.34	0.29	31.99	406.00	True
30_CWPB	Circulating Water Pump Building	30.00	9.14	155.00	45.00	47.24	13.72	1.23	0.12	36.08	80.00	True
31_CTwr	Cooling Tower Building	34.00	10.36	336.00	132.00	102.41	40.23	0.35	0.04	51.64	67.00	True
33_MB	Yard Services Building	25.00	7.62	154.00	60.00	46.94	18.29	0.76	0.08	32.34	70.00	True
34_lrds	Limestone Receiving Dumper Structure	25.00	7.62	120.00	24.00	36.58	7.32	1.75	0.16	29.09	59.00	True
35_lsb	Limestone Storage Building	68.00	20.73	200.00	125.00	60.96	38.10	1.02	0.10	61.48	100.00	True
37_CFB	Chemical Feed Building	30.00	9.14	80.00	47.00	24.38	14.33	1.19	0.11	25.60	65.00	True
39_fgdlo	FGD Byproducts Storage/Truck Load Out Ar	43.00	13.11	100.00	75.00	30.48	22.86	1.07	0.10	33.73	102.00	True
42_CH	Unit 2 Crusher House	85.00	25.91	40.00	30.00	12.19	9.14	3.24	0.28	34.83	410.00	True
43_wwpmp	Wastewater Pump Structure	20.00	6.10	30.00	18.00	9.14	5.49	1.83	0.17	13.42	185.00	True
48_cbxfe	Coal Tripper Transfer Structure	200.00	60.96	32.00	17.00	9.75	5.18	6.42	0.54	57.56	320.00	True
49_boost	Powerblock Firewater Booster Pumps	10.00	3.05	31.00	14.00	9.45	4.27	1.31	0.12	9.32	260.00	True
50_gen	Emergency Diesel Generator Building	18.00	5.49	40.00	25.00	12.19	7.62	1.32	0.12	13.72	260.00	True
51_wsps	Water Supply Pump Structure	30.00	9.14	155.00	45.00	47.24	13.72	1.23	0.12	36.08	495.00	True
52_fp	Coal Area Firewater Booster Pumps	10.00	3.05	31.00	14.00	9.45	4.27	1.31	0.12	9.32	167.00	True
53emerg	Transfer emergency silo unloading	50.00	15.24	21.00	20.00	6.40	6.10	3.02	0.26	17.41	225.00	True
nle_GB	grains bldg	47.00	14.33	135.00	100.00	41.15	30.48	0.88	0.09	41.91	Outside Already	True
nle_CB	mechanical bldg	27.00	8.23	180.00	110.00	57.91	33.53	0.32	0.04	36.73	Outside Already	True
nle_PB	process bldg	66.00	20.12	245.00	115.00	74.68	35.05	1.07	0.10	67.78	Outside Already	True
nle_DEB1	d and e bldg 1	77.00	23.47	60.00	30.00	18.29	9.14	3.07	0.27	46.40	Outside Already	True
nle_DEB2	d and e bldg 2	44.00	13.41	60.00	45.00	18.29	13.72	1.67	0.15	25.31	Outside Already	True
nle_POB	process office bldg	16.00	4.88	82.00	35.00	24.99	10.67	0.85	0.08	19.17	Outside Already	True
BSI_33A	33A - Boiler	293.00	89.31	170.00	140.00	51.82	42.67	2.73	0.24	124.28	375.00	True
BSI_33B	33B - Boiler	183.00	55.78	165.00	50.00	50.29	15.24	3.70	0.32	144.49	370.00	True
BSI_33C	33C - Boiler	136.00	41.45	120.00	25.00	36.58	7.62	4.51	0.39	122.84	370.00	True
BSI_33D	33D - Turb/Gen Bld	91.00	27.74	210.00	115.00	64.01	35.05	1.42	0.13	71.03	363.00	True
BSI_33E	33E - Boiler	63.00	19.20	210.00	200.00	64.01	60.96	0.52	0.06	61.10	364.00	True
BSI_33F	33F - Boiler	136.00	41.45	170.00	25.00	51.82	7.62	4.51	0.39	157.48	420.00	True
BSI_33G	33G - Aux Boiler Building	33.00	10.06	60.00	60.00	18.29	18.29	1.03	0.10	15.96	410.00	True
BSI34_PB	34 Unit 1 Precipitator	77.50	23.62	235.00	60.00	71.63	27.43	1.52	0.14	71.30	361.00	True
BSI36_SB	36 - Service Building	24.00	7.32	60.00	60.00	18.29	18.29	0.73	0.07	19.69	447.00	True
BSI_36A	36A - Hallway to Power Building	16.00	4.88	125.00	30.00	38.10	9.14	1.00	0.10	22.58	428.00	True
BSI63_MS	63 - Maintenance Shop	29.00	8.84	100.00	90.00	30.48	27.43	0.54	0.06	28.65	440.00	True
BS1_CWDS	Unit 1 Circulating H2O Discharge Stru	10.00	3.05	40.00	25.00	12.19	7.62	0.73	0.07	10.67	510.00	True
BS1_STB	Sewage Treatment Building	10.00	3.05	35.00	18.00	10.67	5.49	1.04	0.10	9.96	490.00	True
BS1SWPH	Service Water Pump House	10.00	3.05	38.00	30.00	11.58	9.14	0.57	0.06	10.39	490.00	True
BS1_ASB	Acid Storage Building	10.00	3.05	23.00	17.00	7.01	5.18	1.10	0.11	7.79	500.00	True
BS1_CCS	Chlorine Container Storage	15.00	4.57	55.00	25.00	16.76	7.62	1.12	0.11	15.31	500.00	True
bs1_LUnl	Limestone Unloading	30.00	9.14	45.00	42.00	13.72	12.80	1.31	0.12	15.15	182.00	True
bs1_LCSB	Live Coal Storage Building	72.00	21.95	400.00	70.00	121.92	21.34	1.73	0.16	89.31	340.00	True
bs1_CSB	Coal Storage Barn	89.00	27.13	47.00	33.00	14.33	10.06	3.15	0.27	39.41	428.00	True
bs1AFU/S	Unit 1 Alternative Fuel Unloading	16.00	4.88	148.00	37.00	45.11	11.28	0.80	0.08	23.83	430.00	True
bs1_FP	Fire Pump	15.00	4.57	118.00	105.00	35.97	32.00	(0.07)	0.01	21.22	134.00	True
bs1_WH	Unit 1 Warehouse	22.50	6.86	215.00	75.00	65.53	22.86	0.48	0.05	33.84	470.00	True
bs1_WH2	Unit 1 Warehouse	22.50	6.86	50.00	45.00	15.24	13.72	0.94	0.09	17.15	490.00	True
bs1_SB	Unit 1 Cold Lime Softening Buildin	25.00	7.62	55.00	40.00	16.76	12.19	1.16	0.11	18.93	448.00	True
E_RD	E Rotary Dumper	29.50	8.99	235.00	120.00	71.63	36.58	0.32	0.04	41.90	262.00	True
H_CrusH	H-Coal Crusher House	120.00	36.58	40.00	35.00	12.19	10.67	3.58	0.31	39.55	408.00	True
J_EBC	Existing Brine Concentrator	95.00	28.96	57.00	45.00	17.37	13.72	2.75	0.24	41.68	147.00	True

Meteorological Data (Missing Values)

From: "Richard A. Perry" <dperry@beeline-software.com>
To: "'Robynn Andracsek'" <RAndracsek@burnsmcd.com>
Date: 3/24/2005 2:06:04 PM
Subject: RE: RE: Big Stone II met data- Missing Values

Hi Robynn,

Here are your met files. I have also included a spreadsheet with the data from Mitchell, SD used to fill the five missing hours.

Invoice will follow by mail.

Dick

-----Original Message-----
From: Robynn Andracsek [mailto:RAndracsek@burnsmcd.com]
Sent: Monday, March 21, 2005 11:13 AM
To: TGraumann@otpco.com
Cc: dperry@beeline-software.com; Dave Hendry; otpconus@burnsmcd.com; Stephen Gosoroski; Todd Sundbom
Subject: Fwd: RE: Big Stone II met data- Missing Values

FYI

Robynn Andracsek
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114
(816) 822-3596 phone
(816) 942-3816 fax
RAndracsek@burnsmcd.com

>>> <Jason.Knapp@state.sd.us> 3/21/2005 10:10:17 AM >>>
Robynn,

In order to fill in the missing data we will have to find the closest and most representative site. I'm assuming this will be the Sioux Falls, SD site. I am not familiar with the sites in ND and MN but would be willing to substitute data from a site in either of these states if the data is more representative.

-----Original Message-----
From: Robynn Andracsek [mailto:RAndracsek@burnsmcd.com]
Sent: Wednesday, March 16, 2005 3:03 PM
To: Jason.Knapp@state.sd.us; Kyrik.Rombough@state.sd.us
Cc: Dave Hendry; otpconus@burnsmcd.com; Stephen Gosoroski; Todd Sundbom; TGraumann@otpco.com
Subject: Big Stone II met data- Missing Values

Kyrik-

There are some serious missing values in the data- a five hour period on what looks like an extremely stormy day. We need your guidance on how to fill in this missing data. Please see the attached file.

Thanks.

Robynn Andracsek
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114
(816) 822-3596 phone
(816) 942-3816 fax
RAndracsek@burnsmcd.com

>>> "Richard A. Perry" <dperry@beeline-software.com> 3/16/2005 2:58:45 PM >>>
Hi Robynn,

Here are the days 8-10 Feb 2002. I added the column headers for your benefit. Open the file in Notepad so the columns will stay lined up.

Dick

				T	DP	RH	Pres	WD	WS	Vis	Ceil	weather	cld1	cld2	cld3
14936A2002020801	9999	9999	9999	31	24	76	2991	0	0	10	77777	9999	0	99999	99999
14936A2002020802	9999	9999	9999	28	23	81	2989	180	5.8	10	77777	9999	0	99999	99999
14936A2002020803	9999	9999	9999	26	21	81	2989	210	3.5	10	77777	9999	0	99999	99999
14936A2002020804	9999	9999	9999	27	23	85	2987	0	0	10	77777	9999	0	99999	99999
14936A2002020805	9999	9999	9999	27	23	85	2985	60	6.9	10	77777	9999	0	99999	99999
14936A2002020806	9999	9999	9999	27	22	81	2986	190	5.8	10	77777	9999	0	99999	99999
14936A2002020807	9999	9999	9999	27	21	78	2984	130	8.1	10	77777	9999	0	99999	99999
14936A2002020808	9999	9999	9999	28	20	72	2982	160	9.2	10	77777	9999	0	99999	99999
14936A2002020809	9999	9999	9999	31	23	72	2981	120	6.9	10	77777	9999	0	99999	99999
14936A2002020810	9999	9999	9999	38	24	57	2981	180	9.2	10	77777	9999	0	99999	99999
14936A2002020811	9999	9999	9999	43	27	53	2977	150	12.7	10	77777	9999	0	99999	99999
14936A2002020812	9999	9999	9999	47	28	48	2975	160	12.7	10	77777	9999	0	99999	99999
14936A2002020813	9999	9999	9999	53	28	38	2970	150	12.7	10	77777	9999	0	99999	99999
14936A2002020814	9999	9999	9999	55	28	36	2966	150	9.2	10	77777	9999	0	99999	99999
14936A2002020815	9999	9999	9999	54	31	42	2962	140	11.5	10	77777	9999	0	99999	99999
14936A2002020816	9999	9999	9999	53	32	45	2959	140	11.5	10	77777	9999	0	99999	99999
14936A2002020817	9999	9999	9999	50	33	52	2958	150	8.1	10	77777	9999	0	99999	99999
14936A2002020818	9999	9999	9999	45	32	61	2959	130	9.2	10	77777	9999	0	99999	99999
14936A2002020819	9999	9999	9999	45	32	61	2960	160	9.2	10	77777	9999	0	99999	99999
14936A2002020820	9999	9999	9999	42	32	68	2961	150	11.5	10	77777	9999	0	99999	99999
14936A2002020821	9999	9999	9999	39	32	76	2960	160	10.4	7	77777	9999	0	99999	99999
14936A2002020822	9999	9999	9999	37	32	82	2961	160	10.4	6	77777	8E+05	0	99999	99999
14936A2002020823	9999	9999	9999	36	32	86	2961	130	9.2	5	77777	7E+05	0	99999	99999
14936A2002020824	9999	9999	9999	35	32	89	2962	100	10.4	4	77777	7E+05	0	99999	99999
14936A2002020901	9999	9999	9999	34	32	92	2964	90	8.1	4	77777	7E+05	0	99999	99999
14936A2002020902	9999	9999	9999	33	32	96	2966	60	8.1	4	77777	7E+05	0	99999	99999
14936A2002020903	9999	9999	9999	33	31	92	2967	50	11.5	4	77777	7E+05	2030	99999	99999
14936A2002020904	9999	9999	9999	34	31	89	2968	30	10.4	4	3400	7E+05	4034	99999	99999
14936A2002020905	9999	9999	9999	34	32	92	2974	30	13.8	3	1000	7E+05	4010	6039	99999
14936A2002020906	9999	9999	9999	34	32	92	2977	30	16.1	3	1000	7E+05	6010	99999	99999
14936A2002020907	9999	9999	9999	35	32	89	2982	30	15	3	1000	7E+05	6010	99999	99999
14936A2002020908	9999	9999	9999	34	32	92	2987	20	15	4	1400	4E+07	6014	99999	99999
14936A2002020909	9999	9999	9999	33	32	96	2991	20	21.9	0.5	700	4E+07	4007	4012	6018
14936A2002020910	9999	9999	9999	33	32	96	2995	20	20.7	0.5	700	4E+07	4007	6011	99999
14936A2002020911	9999	9999	9999	33	31	92	3000	20	26.5	1.8	1300	4E+07	4013	6017	99999
14936A2002020912	9999	9999	9999	31	30	96	3005	20	28.8	1	600	4E+07	4006	6013	99999
14936A2002020913	9999	9999	9999	999.9	999.9	999	9999	999	99.9	999.9	99999	1E+08	99999	99999	99999

				T	DP	RH	Pres	WD	WS	Vis	Ceil	weather	cld1	cld2	cld3
14936A2002020914	9999	9999	9999	999.9	999.9	999	9999	999	99.9	999.9	99999	1E+08	99999	99999	99999
14936A2002020915	9999	9999	9999	999.9	999.9	999	9999	999	99.9	999.9	99999	1E+08	99999	99999	99999
14936A2002020916	9999	9999	9999	999.9	999.9	999	9999	999	99.9	999.9	99999	1E+08	99999	99999	99999
14936A2002020917	9999	9999	9999	999.9	999.9	999	9999	999	99.9	999.9	99999	1E+08	99999	99999	99999
14936A2002020918	9999	9999	9999	29	22	75	3027	10	30	10	2800	8E+05	6028	99999	99999
14936A2002020919	9999	9999	9999	27	21	78	3032	10	33.4	10	6000	9999	2034	6060	99999
14936A2002020920	9999	9999	9999	26	20	78	3036	10	26.5	10	10000	9999	2080	4100	99999
14936A2002020921	9999	9999	9999	24	17	75	3040	10	26.5	10	77777	9999	0	99999	99999
14936A2002020922	9999	9999	9999	22	17	82	3044	10	30	10	77777	9999	0	99999	99999
14936A2002020923	9999	9999	9999	22	17	82	3046	10	31.1	10	77777	9999	0	99999	99999
14936A2002020924	9999	9999	9999	20	17	89	3047	360	24.2	10	77777	9999	0	99999	99999
14936A2002021001	9999	9999	9999	18	14	84	3050	360	20.7	10	77777	9999	2016	99999	99999
14936A2002021002	9999	9999	9999	17	13	84	3051	360	18.4	10	77777	9999	0	99999	99999
14936A2002021003	9999	9999	9999	16	12	84	3053	360	18.4	10	77777	9999	0	99999	99999
14936A2002021004	9999	9999	9999	14	9	80	3054	350	13.8	10	77777	9999	0	99999	99999
14936A2002021005	9999	9999	9999	13	9	84	3057	330	11.5	10	77777	9999	0	99999	99999
14936A2002021006	9999	9999	9999	12	8	84	3058	330	10.4	10	77777	9999	0	99999	99999
14936A2002021007	9999	9999	9999	11	8	88	3058	320	10.4	8	77777	9999	0	99999	99999
14936A2002021008	9999	9999	9999	11	8	88	3059	320	6.9	7	77777	9999	0	99999	99999
14936A2002021009	9999	9999	9999	15	11	84	3059	330	5.8	9	77777	9999	0	99999	99999
14936A2002021010	9999	9999	9999	19	13	77	3059	330	9.2	10	77777	9999	0	99999	99999
14936A2002021011	9999	9999	9999	23	16	74	3059	290	9.2	10	77777	9999	0	99999	99999
14936A2002021012	9999	9999	9999	27	18	69	3057	300	8.1	10	77777	9999	0	99999	99999
14936A2002021013	9999	9999	9999	32	19	59	3055	280	9.2	10	77777	9999	0	99999	99999
14936A2002021014	9999	9999	9999	34	22	61	3051	270	8.1	10	77777	9999	0	99999	99999
14936A2002021015	9999	9999	9999	37	24	60	3049	280	6.9	10	77777	9999	0	99999	99999
14936A2002021016	9999	9999	9999	38	24	57	3046	240	11.5	10	77777	9999	0	99999	99999
14936A2002021017	9999	9999	9999	38	25	60	3044	240	8.1	10	77777	9999	0	99999	99999
14936A2002021018	9999	9999	9999	34	22	61	3042	210	5.8	10	77777	9999	0	99999	99999
14936A2002021019	9999	9999	9999	33	23	67	3039	200	8.1	10	77777	9999	0	99999	99999
14936A2002021020	9999	9999	9999	33	22	64	3037	210	11.5	10	77777	9999	0	99999	99999
14936A2002021021	9999	9999	9999	31	21	67	3032	200	9.2	10	77777	9999	0	99999	99999
14936A2002021022	9999	9999	9999	31	20	64	3027	190	11.5	10	77777	9999	0	99999	99999
14936A2002021023	9999	9999	9999	29	19	66	3022	190	11.5	10	77777	9999	0	99999	99999
14936A2002021024	9999	9999	9999	29	19	66	3018	200	13.8	10	77777	9999	0	99999	99999

Unedited Surface Weather Observations (METAR/SPEC)	Latitude	Longitude	Station Elev. (ft)	Time Conversion	Day	Mon.		Year		SID	Station (Type, Name, State)
	43° 47'	-98° 02'	1294	6	9	2		2002		MHE	ASOS MITCHELL, SD

		WIND					VISIBILITY									
TYPE	TIME (LST)	DIR TRUE	SPD KTS	S-D MPH (Computed)	GUST KTS	VARIABILITY TRUE	SURFACE STATUTE MILES	RUNWAY VISUAL RANGE (FT)	PRESENT WEATHER	SKY CONDITIONS	TEMP °C	TEMP °F (Computed)	DEW POINT °C	DEW POINT °F (Computed)	ALTI-METER INS.	REMARKS AND SUPPLEMENTAL CODED DATA
1	2	3	4	4A	5	6	7	8	9	10	11	11A	12	12A	13	14
S	59	80	6	6.9			4		BR	CLR	0	32	-1	30	A2961	SLP034 T00001011
S	159	40	8	9.2			3		BR	CLR	-1	30	-2	28	A2961	SLP032 T10061017
S	259	30	5	5.8			4		BR	SCT110	-1	30	-2	28	A2963	SLP040 T10061022 53010
S	359	350	7	8.1			4		BR	FEW110	-1	30	-2	28	A2964	SLP045 T10061017
S	459	350	10	11.5			4		BR	CLR	0	32	-1	30	A2968	SLP058 T00001011
S	559	360	13	15.0			4		BR	OVC038	1	34	-1	30	A2972	SLP074 T00061006 10006 21011 53030
S	608	360	14	16.1			4		BR	SCT009 OVC038	1	34	-1	30	A2973	
S	620	360	13	15.0			4		BR	BKN009 OVC038	1	34	-1	30	A2974	
S	659	350	13	15.0			4		BR	OVC009	1	34	0	32	A2977	SLP092 T00110000
S	759	350	17	19.6			3		BR	OVC007	1	34	0	32	A2981	SLP105 T00110000
S	815	350	17	19.6			2 1/2		BR	OVC007	1	34	0	32	A2982	
S	859	350	17	19.6	23		3		BR	OVC009	2	36	0	32	A2985	SLP121 T00170000 51042
S	925	350	19	21.9	23		4		BR	OVC011	1	34	-1	30	A2987	
S	959	350	20	23.0	26		4		UP BR	BKN008 OVC014	1	34	-1	30	A2989	PK WND 35026/1554 UPB45 SLP134 P0000 T00111006
S	1011	360	21	24.2	26		5		BR	BKN010 OVC016	1	34	-1	30	A2990	PK WND 35026/1605 UPE08 CIG 007V012 P0000
S	1059	350	20	23.0	25		6		BR	OVC012	1	34	-1	30	A2994	PK WND 35027/1649 UPE08 SLP152 P0000 T00111006
S	1129	350	19	21.9	26		2 1/2		-SN BR	OVC014	01	34	-01	30	A2996	PK WND 36026/1726 UPB00E11SNB11 P0000
S	1142	350	18	20.7	23		1 1/2		-SN BR	OVC014	01	34	-01	30	A2997	PK WND 36026/1726 UPB00E11SNB11 P0000
S	1159	350	20	23.0	26		1 3/4		-SN BR	OVC014	01	34	-01	30	A2998	PK WND 35026/1754 UPB00E11SNB11 SLP167 P0000 60000
S	1205	350	21	24.2	25		2		-SN BR	SCT011 OVC017	01	34	-01	30	A2999	P0000
S	1208	350	22	25.3	25		1 3/4		-SN BR	BKN013 OVC017	01	34	-01	30	A2999	P0000
S	1216	350	21	24.2	27		1 1/2		-SN BR	OVC015	01	34	-01	30	A2999	PK WND 34027/1814 P0000
S	1226	360	24	27.6	29		1 3/4		-SN BR	BKN013 OVC018	01	34	-01	30	A2999	PK WND 36029/1825 P0000
S	1235	350	21	24.2	29		3		-SN BR	OVC015	01	34	-01	30	A3000	PK WND 35029/1829 P0000
S	1243	350	21	24.2			2 1/2		-SN BR	OVC013	01	34	-01	30	A3000	PK WND 35029/1829 P0000
S	1259	350	23	26.5			4		-SN BR	OVC013	01	34	-01	30	A3000	PK WND 35029/1829 SLP173 P0001 T00061006
S	1313	350	23	26.5	30		2		-SN BR	OVC015	01	34	-01	30	A3001	PK WND 36031/1903 P0000
S	1316	350	25	28.8	30		1 3/4		-SN BR	SCT010 OVC016	01	34	-01	30	A3001	PK WND 36031/1903 P0000
S	1331	340	26	30.0	32		1 1/2		-SN BR	BKN010 OVC017	00	32	-01	30	A3002	PK WND 34032/1929 CIG 006V014 P0000
S	1359	350	28	32.3	37		1/2		SN FZFG	BKN010 OVC013	-01	30	-02	28	A3003	PK WND 34037/1956 CIG 007V011 SLP185 P0000 T100610
S	1425	340	26	30.0	35		1/2		SN FZFG	BKN008 OVC014	-01	30	-02	28	A3005	PK WND 35039/2013 CIG 007V011 P0001

Unedited Surface Weather Observations (METAR/SPEC)	Latitude	Longitude	Station Elev. (ft)	Time Conversion	Day	Mon.		Year		SID	Station (Type, Name, State)
	43° 47'	-98° 02'	1294	6	9	2		2002		MHE	ASOS MITCHELL, SD

		WIND					VISIBILITY									
TYPE	TIME (LST)	DIR TRUE	SPD KTS	S-D MPH (Computed)	GUST KTS	VARIABILITY TRUE	SURFACE STATUTE MILES	RUNWAY VISUAL RANGE (FT)	PRESENT WEATHER	SKY CONDITIONS	TEMP °C	TEMP °F (Computed)	DEW POINT °C	DEW POINT °F (Computed)	ALTI-METER INS.	REMARKS AND SUPPLEMENTAL CODED DATA
S	1433	350	31	35.7	38		1/4		+SN FZFG	BKN010 OVC014	-01	30	-02	28	A3005	PK WND 35039/2013 CIG 007V014 P0001
S	1459	350	29	33.4	38		1/2		SN FZFG	BKN010 OVC015	-02	28	-02	28	A3007	PK WND 35042/2048 SLP198 P0001 60002 T10171022 530
S	1524	350	31	35.7	38		1/4		SN FZFG	BKN013 OVC018	-02	28	-02	28	A3009	PK WND 34039/2105 P0001
S	1559	350	35	40.3	40		1/2		SN FZFG	OVC016	-02	28	-03	27	A3012	PK WND 34040/2158 SLP215 P0002 T10221033
S	1614	350	33	38.0	40		1 3/4		-SN BR	OVC016	-02	28	-04	25	A3013	PK WND 35042/2200 VIS 1 1/4V2 1/2 P0000
S	1620	350	33	38.0	39		3		UP	OVC016	-02	28	-04	25	A3013	PK WND 35042/2200 UPB19SNE19 P0000
S	1659	350	29	33.4	36		4		-SN BR	OVC016	-02	28	-04	25	A3017	PK WND 35042/2200 UPB19E53SNE19B48E52B53 SLP233 P0
S	1705	350	32	36.9	36		1 3/4		-SN BR	OVC016	-02	28	-04	25	A3018	PK WND 35036/2305 P0000
S	1716	350	32	36.9	38		3/4		-SN BR	BKN014 OVC019	-02	28	-03	27	A3019	PK WND 35038/2316 P0000
S	1726	350	28	32.3	39		1/2		SN FZFG	OVC016	-02	28	-03	27	A3019	PK WND 34039/2318 P0000
S	1733	350	30	34.6	36		1/2		SN FZFG	OVC014	-02	28	-03	27	A3020	PK WND 34039/2318 P0000
S	1759	350	27	31.1	37		1/2		FZFG	BKN014 OVC020	-03	27	-03	27	A3022	PK WND 34039/2318 SNEMM SLP251 P0001 60005 T102810
S	1809	350	27	31.1	37		1/2		FZFG	FEW012 BKN017 OVC024	-03	27	-03	27	A3023	PK WND 34037/0004 PWINO FZRANO
S	1822	350	28	32.3	38		1 1/4		BR	OVC018	-02	28	-04	25	A3025	PK WND 34038/0013 PWINO FZRANO
S	1859	350	31	35.7	36		1		BR	FEW012 SCT021 OVC029	-02	28	-04	25	A3028	PK WND 34038/0046 SLP269 T10221039 PWINO FZRANO
S	1907	350	27	31.1	39		3/4		BR	SCT010 BKN021 OVC029	-03	27	-04	25	A3029	PK WND 35039/0100 PWINO FZRANO
S	1914	350	30	34.6	35		3/4		BR	BKN010 BKN019 OVC029	-03	27	-03	27	A3029	PK WND 35039/0100 PWINO FZRANO
S	1927	340	28	32.3	36		1		BR	VV010	-03	27	-04	25	A3030	PK WND 35039/0100 P0001 PWINO FZRANO
S	1949	350	29	33.4	41		1 1/2		BR	BKN022 BKN029 OVC040	-03	27	-05	23	A3031	PK WND 35041/0143 P0001 PWINO FZRANO
S	1959	340	25	28.8	32		4		BR	BKN027 OVC040	-03	27	-05	23	A3032	PK WND 35041/0143 SLP282 P0001 T10281050 PWINO FZR
S	2059	340	25	28.8	33		10			OVC029	-03	27	-07	19	A3035	PK WND 34038/0246 SLP294 60001 T10331067 51042 PWI
S	2135	340	28	32.3	39		10			SCT029 BKN055 OVC080	-04	25	-08	18	A3038	PK WND 34040/0325 PWINO FZRANO
S	2159	340	26	30.0	36		10			FEW024 BKN029 OVC100	-04	25	-08	18	A3039	PK WND 34040/0325 SLP309 T10441078 PWINO FZRANO
S	2227	340	25	28.8	34		10			SCT024 OVC039	-05	23	-08	18	A3040	PK WND 34034/0420 PWINO FZRANO
S	2259	340	24	27.6	33		10			CLR	-06	21	-08	18	A3040	PK WND 34034/0441 SLP313 T10561083 PWINO FZRANO
S	2359	340	24	27.6	33		10			CLR	-06	21	-09	16	A3043	PK WND 34033/0558 SLP325 60001 T10611089 11022 210

Inventory Source Information from Minnesota and North Dakota

Matthew McClasky - Inventory Request

From: "Cicha, Joe G." <jcicha@state.nd.us>
To: "Matt McClasky (mmcclasky@burnsmcd.com)" <mmcclasky@burnsmcd.com>
Date: 5/17/2005 8:50 AM
Subject: Inventory Request

Good morning,

My supervisor Steve Weber is away at a modeling workshop, so he asked me to response to your request. For your area of concern, North Dakota has no significant sources of PM-10. If you have any questions or additional requests, feel free to contact me.

Joe Cicha
North Dakota Department of Health
Division of Air Quality
1200 Missouri Avenue
Bismarck, ND 58504-5264
(701) 328-5288
(701) 328-5200 fax
jcicha@state.nd.us

From: Robynn Andracsek
To: McClasky, Matthew
Subject: Fwd: RE: Otter Tail Project Big Stone Plant

>>> "Nelson, Christopher" <Christopher.Nelson@state.mn.us> 5/25/2005 9:19:38 AM >>>
The attached file contains available modeling data for sources in counties near the SD/MN border. Let me know if you have questions. I will be out of the office this afternoon until next Tuesday.

Thanks,
Chris Nelson

Christopher J. Nelson, P.E.
Risk Evaluation/Air Modeling
Minnesota Pollution Control Agency
520 Lafayette Rd. N.
St. Paul, MN 55155

651-296-7750 voice
651-297-7709 fax
christopher.nelson@state.mn.us

BIGSTONE.ZIP contains available modeling parameters for several "large" source located in
Chippewa, Lac Qui Parle, Stevens, and Swift counties in Minnesota.

NAAQS Sources
Associated Milk Producers - Dawson (AMP2.xls): no specific location data available
Chippewa Valley Ethanol Company (CVEC.P10, parameters.xls)
Fibrominn (FIB.p10, FIB.so2, parameters.xls)
Xcel-Minnesota Valley (XMV.nox, XMV.p10, XMV.so2)
Diversified Energy (DCO.nox, DCO.p10, parameters.xls)

Increment Consuming Sources
Fibrominn (FIBSEP04.NOX, FIBSEP04.P10, FIBSEP04.SO2): Minor Source Baseline Date is 2002.

2005/05/24
07300016
Associated Milk Producers Inc - Dawson
Highway 212 E
Dawson
Lac Qui Parle

Stack	Description	Stack Height (ft)	Stack Width (ft)	Stack Length (ft)	Exit Flow Rate (acfm)	Temperature (F)	Discharge Direction	Emissions (lb/hr)		
								NOX	PM10	SO2
SV001M	Nebraska Boiler Stack	32	3.33		9575	250	Up, No Cap	21.850	5.700	126.360
SV002M	Cleaver-Brooks Boiler Stack	32	4.25		25000	585	Up, No Cap	15.370	.540	.040
SV003M	Main Emergency Generator Stack	15	.5		50	650	Horizontal	19.000	1.320	1.240
SV006M	Atomizer Dryer Stack	97	4.58		58000	190	Up, No Cap	1.940	21.770	.007
SV007M	Fluidized Bed Dryer Stack	97	2.42		12250	105	Up, No Cap		8.370	
SV008M	Surge Bin Baghouse Stack	87	.5			65	Horizontal		7.450	

Approximate Facility Location

Latitute	44.9264
Longitude	-96.0405

Facility	Model ID	Pollutant	Emission Rate (g/s)
Fibrominn	FIBRO	NOX	16
CVEC	FWPUMP	NOX	1.89
CVEC	FWPUMP	SO2	0.03
CVEC	SV015	NOX	2.41
CVEC	SV015	SO2	0.013
CVEC	SV6&7	NOX	15.2
CVEC	SV6&7	SO2	1
DenCo	SRC3	SO2	0.12

```
** THISFILE: FIBSEP04.NOX
** FIBSEP04:
** FIBSEP04: FIBROMINN, SWIFT COUNTY. UPDATED PM10 PSD MODELING.
** FIBSEP04:
** FIBSEP04: REFERENCE:
** FIBSEP04: 9/24/04 SUBMITTAL TO MPCA BY ALTERNATIVE RESOURCES, INC ON BEHALF
** FIBSEP04: OF FIBROMINN LLC, "UPDATED AIR QUALITY IMPACTS ANALYSIS
** FIBSEP04: FOR MINOR DESIGN CHANGES FOR THE FIBROMINN BIOMASS POWER PLANT,
** FIBSEP04: BENSON, MINNESOTA."
** FIBSEP04:
** FIBSEP04: REFERENCE FOR SO2 AND NOX EMISSION RATES:
** FIBSEP04: 8/15/02 LETTER FROM TERENCE WALMSLEY, FIBROMINN, REVISED VOL.3:
** FIBSEP04: "APPLICATION FOR PREVENTION OF SIGNIFICANT DETERIORATION (PSD)
** FIBSEP04: PERMIT TO CONSTRUCT, AND A FEDERAL PART-70 PERMIT TO OPERATE FOR
THE
** FIBSEP04: FIBROMINN BIOMASS POWER PLANT, BENSON, MINNESOTA,
** FIBSEP04: VOLUME 3 OF 3 (REVISED AUGUST, 2002)", DATED AUGUST 15, 2002.
** FIBSEP04: OUTPUT AND RELATED FILES, MAY 6, 2002" WITH CD-ROM TITLED:
** FIBSEP04: "1233-4 FIBROMINN 8/1/02 ALTERNATIVE RESOURCES, INC."
** FIBSEP04:
** FIBSEP04: NOTE: SO2 & NOX INCREMENT FILES UPDATED BY MPCA FROM NEW PM10
** FIBSEP04: SOURCE PARAMETERS (ONLY MAIN STACK EMITS SO2 & NOX)

SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
   LOCATION FIBRO POINT 293822.709 5022056.310 314.600
   SRCPARAM FIBRO 16.00 91.440 405.000 24.40000 2.490
   BUILDHGT FIBRO 42.70 42.70 42.70 28.30 28.30 28.30
   BUILDHGT FIBRO 25.90 25.90 25.90 25.90 25.90 25.90
   BUILDHGT FIBRO 25.90 25.90 42.70 42.70 42.70 42.70
   BUILDHGT FIBRO 42.70 42.70 42.70 28.30 28.30 28.30
   BUILDHGT FIBRO 25.90 25.90 25.90 25.90 25.90 25.90
   BUILDHGT FIBRO 25.90 25.90 42.70 42.70 42.70 42.70
   BUILDWID FIBRO 37.41 40.19 40.19 32.80 48.80 49.61
   BUILDWID FIBRO 143.76 142.42 136.76 140.81 143.77 142.37
   BUILDWID FIBRO 101.90 108.85 40.19 40.19 39.34 33.82
   BUILDWID FIBRO 37.41 40.19 40.19 32.80 48.80 49.61
   BUILDWID FIBRO 143.76 142.42 136.76 140.81 143.77 142.37
   BUILDWID FIBRO 101.90 108.85 40.19 40.19 39.34 33.82
   BUILDLEN FIBRO 40.08 44.20 46.99 38.52 47.53 44.35
   BUILDLEN FIBRO 95.86 75.78 53.40 67.64 88.65 106.98
   BUILDLEN FIBRO 88.72 87.28 47.67 45.41 41.77 36.86
   BUILDLEN FIBRO 40.08 44.20 46.99 38.52 47.53 44.35
   BUILDLEN FIBRO 95.86 75.78 53.40 67.64 88.65 106.98
   BUILDLEN FIBRO 88.72 87.28 47.67 45.41 41.77 36.86
   XBADJ    FIBRO 63.41 44.20 46.99 49.61 52.70 48.95
   XBADJ    FIBRO -116.45 -104.31 -89.00 -90.11 -92.90 -92.86
   XBADJ    FIBRO -75.95 -87.00 47.67 45.41 -103.37 -102.68
   XBADJ    FIBRO -103.48 44.20 46.99 -88.13 -100.24 -93.29
   XBADJ    FIBRO 20.59 28.53 35.60 22.47 4.24 -14.12
   XBADJ    FIBRO -12.77 -0.27 47.67 45.41 61.60 65.81
   YBADJ    FIBRO 11.92 44.20 46.99 24.02 24.13 37.04
   YBADJ    FIBRO -6.10 -17.90 -29.17 -39.54 -48.71 -56.41
   YBADJ    FIBRO 53.19 45.81 47.67 45.41 17.34 2.75
   YBADJ    FIBRO -11.92 44.20 46.99 -24.02 -24.13 -37.04
   YBADJ    FIBRO 6.10 17.90 29.17 39.54 48.71 56.41
   YBADJ    FIBRO -53.19 -45.81 47.67 45.41 -17.34 -2.75
   CONCUNIT 1000000 (GRAMS/SEC) (MICROGRAMS/CUBIC-METER)
   SRCGROUP ALL
SO FINISHED
```

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**
****************************************
**
** ISC-PRIME Input Produced by:
** ISC-AERMOD View Ver. 4.8.5
** Lakes Environmental Software Inc.
** Date: 7/20/2004
** File: C:\fIBROBEN\87-1hr.PIN
**
****************************************
**
**
****************************************
** ISC-PRIME Control Pathway
****************************************
**
**
CO STARTING
   TITLEONE 1233-4 FIBROMINN
   TITLETWO 1987 100% LOAD Fine Grid 1-hr
   MODELOPT DFAULT CONC NOCMPL  RURAL
   AVERTIME 1 3 24 ANNUAL
   POLLUTID OTHER
   TERRHGTS ELEV
   RUNORNOT RUN
   ERRORFIL 87-1hr.err
CO FINISHED
**
****************************************
** ISC-PRIME Source Pathway
****************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
   LOCATION FIBRO POINT 293822.709 5022056.310 314.600
** Source Parameters **
   SRCPARAM FIBRO 1 91.440 405.000 24.40000 2.490
** Building Downwash **
   BUILDHGT FIBRO 42.70 42.70 42.70 28.30 28.30 28.30
   BUILDHGT FIBRO 25.90 25.90 25.90 25.90 25.90 25.90
   BUILDHGT FIBRO 25.90 25.90 42.70 42.70 42.70 42.70
   BUILDHGT FIBRO 42.70 42.70 42.70 28.30 28.30 28.30
   BUILDHGT FIBRO 25.90 25.90 25.90 25.90 25.90 25.90
   BUILDHGT FIBRO 25.90 25.90 42.70 42.70 42.70 42.70
   BUILDWID FIBRO 37.41 40.19 40.19 32.80 48.80 49.61
   BUILDWID FIBRO 143.76 142.42 136.76 140.81 143.77 142.37
   BUILDWID FIBRO 136.64 126.76 40.19 40.19 39.34 33.82
   BUILDWID FIBRO 37.41 40.19 40.19 32.80 48.80 49.61
   BUILDWID FIBRO 143.76 142.42 136.76 140.81 143.77 142.37
   BUILDWID FIBRO 136.64 126.76 40.19 40.19 39.34 33.82
   BUILDLEN FIBRO 40.08 44.20 46.99 38.52 47.53 44.35
   BUILDLEN FIBRO 95.86 75.78 53.40 67.64 88.65 106.98
   BUILDLEN FIBRO 122.05 133.41 47.67 45.41 41.77 36.86
   BUILDLEN FIBRO 40.08 44.20 46.99 38.52 47.53 44.35
   BUILDLEN FIBRO 95.86 75.78 53.40 67.64 88.65 106.98
   BUILDLEN FIBRO 122.05 133.41 47.67 45.41 41.77 36.86
   XBADJ    FIBRO 63.41 44.20 46.99 49.61 52.70 48.95
   XBADJ    FIBRO -116.45 -104.31 -89.00 -90.11 -92.90 -92.86
   XBADJ    FIBRO -90.00 -84.41 47.67 45.41 -103.37 -102.68
   XBADJ    FIBRO -103.48 44.20 46.99 -88.13 -100.24 -93.29
   XBADJ    FIBRO 20.59 28.53 35.60 22.47 4.24 -14.12
   XBADJ    FIBRO -32.05 -49.00 47.67 45.41 61.60 65.81
   YBADJ    FIBRO 11.92 44.20 46.99 24.02 24.13 37.04
   YBADJ    FIBRO -6.10 -17.90 -29.17 -39.54 -48.71 -56.41
   YBADJ    FIBRO -62.39 -66.47 47.67 45.41 17.34 2.75
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   YBADJ    FIBRO -11.92 44.20 46.99 -24.02 -24.13 -37.04
   YBADJ    FIBRO 6.10 17.90 29.17 39.54 48.71 56.41
   YBADJ    FIBRO 62.39 66.47 47.67 45.41 -17.34 -2.75
   CONCUNIT 1000000 (GRAMS/SEC) (MICROGRAMS/CUBIC-METER)
   SRCGROUP ALL
SO FINISHED
```

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**
**
****************************************
** ISC-PRIME Control Pathway
****************************************
**
**
CO STARTING
   TITLEONE 1233-4 FIBROMINN
   TITLETWO 5 YEAR 100% LOAD PARTICULATE
   MODELOPT DFAULT CONC NOCMPL  RURAL
   AVERTIME 24
   POLLUTID OTHER
   TERRHGTS ELEV
   RUNORNOT RUN
   ERRORFIL 5YR.ERR
CO FINISHED
**
****************************************
** ISC-PRIME Source Pathway
****************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
   LOCATION FIBRO POINT 293822.709 5022056.310 314.600
   LOCATION LIME POINT 293834.220 5022115.250 314.600
   LOCATION ASH POINT 293764.460 5022104.030 314.600
   LOCATION FUEL POINT 293931.640 5022144.340 314.600
   LOCATION RD1 VOLUME 293537.390 5021783.120 314.600
   LOCATION RD2 VOLUME 293543.490 5021783.120 314.600
   LOCATION RD3 VOLUME 293549.590 5021783.120 314.600
   LOCATION RD4 VOLUME 293555.690 5021783.120 314.600
   LOCATION RD5 VOLUME 293561.790 5021783.120 314.600
   LOCATION RD6 VOLUME 293567.890 5021783.120 314.600
   LOCATION RD7 VOLUME 293573.990 5021783.120 314.600
   LOCATION RD8 VOLUME 293580.090 5021783.120 314.600
   LOCATION RD9 VOLUME 293586.190 5021783.120 314.600
   LOCATION RD10 VOLUME 293592.290 5021783.120 314.600
   LOCATION RD11 VOLUME 293598.390 5021783.120 314.600
   LOCATION RD12 VOLUME 293604.490 5021783.120 314.600
   LOCATION RD13 VOLUME 293610.590 5021783.120 314.600
   LOCATION RD14 VOLUME 293616.690 5021783.120 314.600
   LOCATION RD15 VOLUME 293622.790 5021783.120 314.600
   LOCATION RD16 VOLUME 293628.890 5021783.120 314.600
   LOCATION RD17 VOLUME 293634.990 5021783.120 314.600
   LOCATION RD18 VOLUME 293641.090 5021783.120 314.600
   LOCATION RD20 VOLUME 293653.290 5021783.120 314.600
   LOCATION RD21 VOLUME 293659.390 5021783.120 314.600
   LOCATION RD22 VOLUME 293665.490 5021783.120 314.600
   LOCATION RD23 VOLUME 293671.590 5021783.120 314.600
   LOCATION RD24 VOLUME 293677.690 5021783.120 314.600
   LOCATION RD25 VOLUME 293683.790 5021783.120 314.600
   LOCATION RD26 VOLUME 293689.890 5021783.120 314.600
   LOCATION RD27 VOLUME 293695.990 5021783.120 314.600
   LOCATION RD28 VOLUME 293702.090 5021783.120 314.600
   LOCATION RD29 VOLUME 293708.190 5021783.120 314.600
   LOCATION RD30 VOLUME 293714.290 5021783.120 314.600
   LOCATION RD31 VOLUME 293720.390 5021783.120 314.600
   LOCATION RD32 VOLUME 293726.490 5021783.120 314.600
   LOCATION RD33 VOLUME 293732.590 5021783.120 314.600
   LOCATION RD34 VOLUME 293738.690 5021783.120 314.600
   LOCATION RD35 VOLUME 293745.220 5021783.470 314.600
   LOCATION RD36 VOLUME 293751.280 5021784.170 314.600
   LOCATION RD37 VOLUME 293757.340 5021784.870 314.600
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   LOCATION RD38 VOLUME 293762.800 5021787.590 314.600
   LOCATION RD19 VOLUME 293647.190 5021783.120 314.600
   LOCATION RD39 VOLUME 293768.260 5021790.310 314.600
   LOCATION RD40 VOLUME 293773.720 5021793.030 314.600
   LOCATION RD41 VOLUME 293778.660 5021796.620 314.600
   LOCATION RD42 VOLUME 293783.600 5021800.210 314.600
   LOCATION RD43 VOLUME 293788.540 5021803.800 314.600
   LOCATION RD44 VOLUME 293792.070 5021808.770 314.600
   LOCATION RD45 VOLUME 293795.600 5021813.740 314.600
   LOCATION RD46 VOLUME 293799.130 5021818.710 314.600
   LOCATION RD47 VOLUME 293803.180 5021825.170 314.600
   LOCATION RD48 VOLUME 293807.230 5021831.630 314.600
   LOCATION RD49 VOLUME 293811.230 5021838.090 314.600
   LOCATION RD50 VOLUME 293816.640 5021847.660 314.600
   LOCATION RD51 VOLUME 293822.050 5021857.230 314.600
   LOCATION RD52 VOLUME 293829.400 5021868.810 314.600
   LOCATION RD53 VOLUME 293837.580 5021880.940 314.600
   LOCATION RD54 VOLUME 293845.760 5021893.070 314.600
   LOCATION RD55 VOLUME 293853.940 5021905.200 314.600
   LOCATION RD56 VOLUME 293862.120 5021917.330 314.600
   LOCATION RD57 VOLUME 293870.300 5021929.460 314.600
   LOCATION RD58 VOLUME 293878.480 5021941.590 314.600
   LOCATION RD59 VOLUME 293886.660 5021953.720 314.600
   LOCATION RD60 VOLUME 293894.840 5021965.850 314.600
   LOCATION RD61 VOLUME 293903.020 5021977.980 314.600
   LOCATION RD62 VOLUME 293911.200 5021990.110 314.600
   LOCATION RD63 VOLUME 293919.380 5022002.240 314.600
   LOCATION RD64 VOLUME 293927.560 5022014.370 314.600
   LOCATION RD65 VOLUME 293935.740 5022026.500 314.600
   LOCATION RD66 VOLUME 293943.920 5022038.630 314.600
   LOCATION RDB VOLUME 293969.010 5022031.910 314.600
** Source Parameters **
   SRCPARAM FIBRO 5.97 91.440 405.000 24.40000 2.490
   SRCPARAM LIME 0.03 15.500 293.000 7.77000 0.300
   SRCPARAM ASH 0.0011 26.200 293.000 0.32000 0.305
   SRCPARAM FUEL 0.27 23.000 293.000 9.14000 1.570
   SRCPARAM RD1 0.00026 3.510 2.840 1.630
   SRCPARAM RD2 0.00026 3.510 2.840 1.630
   SRCPARAM RD3 0.00026 3.510 2.840 1.630
   SRCPARAM RD4 0.00026 3.510 2.840 1.630
   SRCPARAM RD5 0.00026 3.510 2.840 1.630
   SRCPARAM RD6 0.00026 3.510 2.840 1.630
   SRCPARAM RD7 0.00026 3.510 2.840 1.630
   SRCPARAM RD8 0.00026 3.510 2.840 1.630
   SRCPARAM RD9 0.00026 3.510 2.840 1.630
   SRCPARAM RD10 0.00026 3.510 2.840 1.630
   SRCPARAM RD11 0.00026 3.510 2.840 1.630
   SRCPARAM RD12 0.00026 3.510 2.840 1.630
   SRCPARAM RD13 0.00026 3.510 2.840 1.630
   SRCPARAM RD14 0.00026 3.510 2.840 1.630
   SRCPARAM RD15 0.00026 3.510 2.840 1.630
   SRCPARAM RD16 0.00026 3.510 2.840 1.630
   SRCPARAM RD17 0.00026 3.510 2.840 1.630
   SRCPARAM RD18 0.00026 3.510 2.840 1.630
   SRCPARAM RD20 0.00026 3.510 2.840 1.630
   SRCPARAM RD21 0.00026 3.510 2.840 1.630
   SRCPARAM RD22 0.00026 3.510 2.840 1.630
   SRCPARAM RD23 0.00026 3.510 2.840 1.630
   SRCPARAM RD24 0.00026 3.510 2.840 1.630
   SRCPARAM RD25 0.00026 3.510 2.840 1.630
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   SRCPARAM RD30 0.00026 3.510 2.840 1.630
   SRCPARAM RD31 0.00026 3.510 2.840 1.630
   SRCPARAM RD32 0.00026 3.510 2.840 1.630
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   SRCPARAM RD33 0.00026 3.510 2.840 1.630
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   SRCPARAM RD35 0.00026 3.510 2.840 1.630
   SRCPARAM RD36 0.00026 3.510 2.840 1.630
   SRCPARAM RD37 0.00026 3.510 2.840 1.630
   SRCPARAM RD38 0.00026 3.510 2.840 1.630
   SRCPARAM RD19 0.00026 3.510 2.840 1.630
   SRCPARAM RD39 0.00026 3.510 2.840 1.630
   SRCPARAM RD40 0.00026 3.510 2.840 1.630
   SRCPARAM RD41 0.00026 3.510 2.840 1.630
   SRCPARAM RD42 0.00026 3.510 2.840 1.630
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   SRCPARAM RD44 0.00026 3.510 2.840 1.630
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   SRCPARAM RD47 0.00033 3.510 3.540 1.630
   SRCPARAM RD48 0.00033 3.510 3.540 1.630
   SRCPARAM RD49 0.00033 3.510 3.540 1.630
   SRCPARAM RD50 0.00047 3.510 5.100 1.630
   SRCPARAM RD51 0.00047 3.510 5.100 1.630
   SRCPARAM RD52 0.00059 3.510 6.379 1.630
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   SRCPARAM RD62 0.00063 3.510 6.800 1.630
   SRCPARAM RD63 0.00063 3.510 6.800 1.630
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   SRCPARAM RD65 0.00063 3.510 6.800 1.630
   SRCPARAM RD66 0.00063 3.510 6.800 1.630
   SRCPARAM RDB 0.00208 3.510 11.256 1.630
** Building Downwash **
   BUILDHGT FIBRO 42.70 42.70 42.70 28.30 28.30 28.30
   BUILDHGT FIBRO 25.90 25.90 25.90 25.90 25.90 25.90
   BUILDHGT FIBRO 25.90 25.90 42.70 42.70 42.70 42.70
   BUILDHGT FIBRO 42.70 42.70 42.70 28.30 28.30 28.30
   BUILDHGT FIBRO 25.90 25.90 25.90 25.90 25.90 25.90
   BUILDHGT FIBRO 25.90 25.90 42.70 42.70 42.70 42.70
   BUILDHGT LIME 42.70 42.70 42.70 42.70 42.70 42.70
   BUILDHGT LIME 42.70 42.70 42.70 42.70 42.70 42.70
   BUILDHGT LIME 42.70 42.70 42.70 42.70 42.70 42.70
   BUILDHGT LIME 42.70 42.70 42.70 42.70 42.70 42.70
   BUILDHGT LIME 42.70 42.70 42.70 42.70 42.70 42.70
   BUILDHGT LIME 42.70 42.70 42.70 42.70 42.70 42.70
   BUILDHGT ASH 25.90 25.90 42.70 42.70 42.70 42.70
   BUILDHGT ASH 42.70 42.70 42.70 38.40 25.90 25.90
   BUILDHGT ASH 25.90 25.90 25.90 25.90 25.90 25.90
   BUILDHGT ASH 25.90 25.90 42.70 42.70 42.70 42.70
   BUILDHGT ASH 42.70 42.70 42.70 38.40 25.90 25.90
   BUILDHGT ASH 25.90 25.90 25.90 25.90 25.90 25.90
   BUILDHGT FUEL 21.90 21.90 25.60 28.30 28.30 38.40
   BUILDHGT FUEL 42.70 42.70 42.70 42.70 42.70 21.90
   BUILDHGT FUEL 21.90 21.90 21.90 21.90 21.90 21.90
   BUILDHGT FUEL 21.90 21.90 25.60 28.30 28.30 38.40
   BUILDHGT FUEL 42.70 28.30 28.30 28.30 42.70 21.90
   BUILDHGT FUEL 21.90 21.90 21.90 21.90 21.90 21.90
   BUILDWID FIBRO 37.41 40.19 40.19 32.80 48.80 49.61
   BUILDWID FIBRO 143.76 142.42 136.76 140.81 143.77 142.37
   BUILDWID FIBRO 101.90 108.85 40.19 40.19 39.34 33.82
   BUILDWID FIBRO 37.41 40.19 40.19 32.80 48.80 49.61
   BUILDWID FIBRO 143.76 142.42 136.76 140.81 143.77 142.37
   BUILDWID FIBRO 101.90 108.85 40.19 40.19 39.34 33.82
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BUILDWID LIME 37.41 42.19 45.70 47.81 48.48 47.67
BUILDWID LIME 45.41 41.77 36.86 40.08 44.20 46.99
BUILDWID LIME 48.35 48.23 46.66 43.66 39.34 33.82
BUILDWID LIME 37.41 42.19 45.70 47.81 48.48 47.67
BUILDWID LIME 45.41 41.77 36.86 40.08 44.20 46.99
BUILDWID LIME 48.35 48.23 46.66 43.66 39.34 33.82
BUILDWID ASH 67.64 88.65 45.70 47.81 48.48 47.67
BUILDWID ASH 45.41 41.77 36.86 57.22 79.28 91.86
BUILDWID ASH 101.90 108.85 112.50 95.86 75.78 53.40
BUILDWID ASH 67.64 88.65 45.70 47.81 48.48 47.67
BUILDWID ASH 45.41 41.77 36.86 57.22 79.28 91.86
BUILDWID ASH 101.90 108.85 112.50 95.86 75.78 53.40
BUILDWID FUEL 59.15 72.66 52.70 46.51 48.80 56.47
BUILDWID FUEL 45.41 41.77 36.86 40.08 44.20 101.86
BUILDWID FUEL 100.08 95.25 87.54 77.16 64.44 49.76
BUILDWID FUEL 59.15 72.66 87.90 46.51 48.80 56.47
BUILDWID FUEL 45.41 46.73 43.12 45.54 44.20 101.86
BUILDWID FUEL 100.08 95.25 87.54 77.16 64.44 49.76
BUILDLEN FIBRO 40.08 44.20 46.99 38.52 47.53 44.35
BUILDLEN FIBRO 95.86 75.78 53.40 67.64 88.65 106.98
BUILDLEN FIBRO 88.72 87.28 47.67 45.41 41.77 36.86
BUILDLEN FIBRO 40.08 44.20 46.99 38.52 47.53 44.35
BUILDLEN FIBRO 95.86 75.78 53.40 67.64 88.65 106.98
BUILDLEN FIBRO 88.72 87.28 47.67 45.41 41.77 36.86
BUILDLEN LIME 40.08 44.20 46.99 48.35 48.23 46.66
BUILDLEN LIME 43.66 39.34 33.82 37.41 42.19 45.70
BUILDLEN LIME 47.81 48.48 47.67 45.41 41.77 36.86
BUILDLEN LIME 40.08 44.20 46.99 48.35 48.23 46.66
BUILDLEN LIME 43.66 39.34 33.82 37.41 42.19 45.70
BUILDLEN LIME 47.81 48.48 47.67 45.41 41.77 36.86
BUILDLEN ASH 140.81 143.77 46.99 48.35 48.23 46.66
BUILDLEN ASH 43.66 39.34 33.82 37.41 98.11 91.44
BUILDLEN ASH 88.72 87.28 83.18 143.76 142.42 136.76
BUILDLEN ASH 140.81 143.77 46.99 48.35 48.23 46.66
BUILDLEN ASH 43.66 39.34 33.82 37.41 98.11 91.44
BUILDLEN ASH 88.72 87.28 83.18 143.76 142.42 136.76
BUILDLEN FUEL 96.18 100.55 68.04 49.28 47.53 46.66
BUILDLEN FUEL 43.66 39.34 33.82 37.41 42.19 83.95
BUILDLEN FUEL 92.69 98.62 101.55 101.40 98.16 91.94
BUILDLEN FUEL 96.18 100.55 112.12 49.28 47.53 46.66
BUILDLEN FUEL 43.66 34.07 27.29 31.64 42.19 83.95
BUILDLEN FUEL 92.69 98.62 101.55 101.40 98.16 91.94
XBADJ    FIBRO 63.41 44.20 46.99 49.61 52.70 48.95
XBADJ    FIBRO -116.45 -104.31 -89.00 -90.11 -92.90 -92.86
XBADJ    FIBRO -75.95 -87.00 47.67 45.41 -103.37 -102.68
XBADJ    FIBRO -103.48 44.20 46.99 -88.13 -100.24 -93.29
XBADJ    FIBRO 20.59 28.53 35.60 22.47 4.24 -14.12
XBADJ    FIBRO -12.77 -0.27 47.67 45.41 61.60 65.81
XBADJ    LIME 3.36 -1.32 -5.96 -10.42 -14.56 -18.26
XBADJ    LIME -21.41 -23.90 -25.67 -31.72 -37.98 -43.09
XBADJ    LIME -46.88 -49.25 -50.13 -49.48 -47.33 -43.74
XBADJ    LIME -43.44 -42.89 -41.03 -37.93 -33.67 -28.40
XBADJ    LIME -22.26 -15.44 -8.15 -5.68 -4.21 -2.61
XBADJ    LIME -0.93 0.78 2.46 4.07 5.56 6.87
XBADJ    ASH -146.82 -145.52 38.64 43.02 46.09 47.76
XBADJ    ASH 47.98 46.75 44.09 35.03 9.19 7.75
XBADJ    ASH -0.66 -13.01 -24.96 -1.02 3.80 8.50
XBADJ    ASH 6.02 1.75 -85.63 -91.36 -94.32 -94.42
XBADJ    ASH -91.65 -86.09 -77.91 -72.44 -107.30 -99.19
XBADJ    ASH -88.07 -74.27 -58.22 -142.74 -146.23 -145.27
XBADJ    FUEL -80.86 -77.65 -137.95 -82.59 -87.33 -117.17
XBADJ    FUEL -122.90 -124.89 -123.09 -122.61 -119.58 -4.28
XBADJ    FUEL -5.55 -6.65 -7.55 -8.22 -8.65 -8.81
XBADJ    FUEL -15.32 -22.90 25.83 33.32 39.79 70.52
XBADJ    FUEL 79.24 51.37 52.22 45.50 77.38 -79.67
XBADJ    FUEL -87.15 -91.97 -94.00 -93.17 -89.52 -83.14
YBADJ    FIBRO 11.92 44.20 46.99 24.02 24.13 37.04
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   YBADJ    FIBRO -6.10 -17.90 -29.17 -39.54 -48.71 -56.41
   YBADJ    FIBRO 53.19 45.81 47.67 45.41 17.34 2.75
   YBADJ    FIBRO -11.92 44.20 46.99 -24.02 -24.13 -37.04
   YBADJ    FIBRO 6.10 17.90 29.17 39.54 48.71 56.41
   YBADJ    FIBRO -53.19 -45.81 47.67 45.41 -17.34 -2.75
   YBADJ    LIME 13.02 16.89 20.24 22.98 25.01 26.29
   YBADJ    LIME 26.77 26.44 25.30 23.40 20.78 17.54
   YBADJ    LIME 13.75 9.56 5.07 0.42 -4.23 -8.76
   YBADJ    LIME -13.02 -16.89 -20.24 -22.98 -25.01 -26.29
   YBADJ    LIME -26.77 -26.44 -25.30 -23.40 -20.78 -17.54
   YBADJ    LIME -13.75 -9.56 -5.07 -0.42 4.23 8.76
   YBADJ    ASH -9.36 -22.49 -34.57 -23.25 -11.23 1.13
   YBADJ    ASH 13.46 25.38 36.53 37.99 37.86 46.74
   YBADJ    ASH 54.07 59.76 63.63 -30.10 -17.34 -4.05
   YBADJ    ASH 9.36 22.49 34.57 23.25 11.23 -1.13
   YBADJ    ASH -13.46 -25.38 -36.53 -37.99 -37.86 -46.74
   YBADJ    ASH -54.07 -59.76 -63.63 30.10 17.34 4.05
   YBADJ    FUEL -28.19 -33.45 19.56 37.34 26.71 45.41
   YBADJ    FUEL 32.76 14.71 -3.79 -22.17 -39.87 -21.15
   YBADJ    FUEL -14.28 -6.98 0.53 8.03 15.28 22.07
   YBADJ    FUEL 28.19 33.45 -37.16 -37.34 -26.71 -45.41
   YBADJ    FUEL -32.76 8.65 20.39 31.52 39.87 21.15
   YBADJ    FUEL 14.28 6.98 -0.53 -8.03 -15.28 -22.07
   CONCUNIT 1000000 (GRAMS/SEC) (MICROGRAMS/CUBIC-METER)
   SRCGROUP ALLFIBRO FIBRO LIME RD1 RD10 RD11 RD12 RD13 RD14 RD15 RD16 RD17
   SRCGROUP ALLFIBRO RD18 RD19 RD2 RD20 RD21 RD22 RD23 RD24 RD25 RD26 RD27
   SRCGROUP ALLFIBRO RD28 RD29 RD3 RD30 RD31 RD32 RD33 RD34 RD35 RD36 RD37
   SRCGROUP ALLFIBRO RD38 RD39 RD4 RD40 RD41 RD42 RD43 RD44 RD45 RD46 RD47
   SRCGROUP ALLFIBRO RD48 RD49 RD5 RD50 RD51 RD52 RD53 RD54 RD55 RD56 RD57
   SRCGROUP ALLFIBRO RD58 RD59 RD6 RD60 RD61 RD62 RD63 RD64 RD65 RD66 RD7
   SRCGROUP ALLFIBRO RD8 RD9 RDB FUEL ASH
   SRCGROUP ALL
SO FINISHED
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** BREEZE ISC GIS Pro v4.1.1 - G:\MODELS\ISC\DENCO\AERA\PM1087.dat
** Trinity Consultants

** PRIME

CO STARTING
CO TITLEONE  Diversified Energy Co. AERA
CO TITLETWO  PM Modeling
CO MODELOPT  DFAULT  CONC  RURAL
CO AVERTIME  24  ANNUAL
CO POLLUTID  OTHER
CO TERRHGTS  FLAT
CO RUNORNOT  RUN
CO FINISHED

SO STARTING
SO ELEVUNIT  METERS
SO LOCATION  SRC3  POINT  89.6  133.0  0
** SRCDESCR  RTO Stack
SO LOCATION  SRC1  POINT  130.6  67.0  0
** SRCDESCR  Boiler #1
SO LOCATION  SRC2  POINT  131.0  71.9  0
** SRCDESCR  Boiler #2
SO LOCATION  SRC4  POINT  144.2  68.3  0
** SRCDESCR  Boiler#3
SO LOCATION  SRC5  POINT  134.8  178.3  0
** SRCDESCR  Grain Handling
SO LOCATION  SRC6  POINT  144.4  178.9  0
** SRCDESCR  Hammermill Stack
SO LOCATION  SRC7  VOLUME  144.6  167.4  0
** SRCDESCR  Fugitive DDGS and Grain Handling
SO LOCATION  SRC8  VOLUME  110.1  167.7  0
** SRCDESCR  Fugitive DDGS and Grain Handling 2
SO LOCATION  SRC9  POINT  113.3  56.3  0
** SRCDESCR  Golden Lyk
SO LOCATION  SRC10  POINT  164.5  98.3  0
** SRCDESCR  Loadout Flare
SO LOCATION  SRC11  POINT  111.9  149.6  0
** SRCDESCR  DDGS Cooler Stack
SO LOCATION  SRC12  AREA  67.2  162.2  0
** SRCDESCR  Road 1
SO LOCATION  SRC14  AREA  67.6  52.0  0
** SRCDESCR  Road 2
SO LOCATION  SRC16  AREA  136.3  53.4  0
** SRCDESCR  Road 3
SO LOCATION  SRC17  AREA  187.1  61.9  0
** SRCDESCR  Road 4
SO LOCATION  SRC18  AREA  145.1  172.3  0
** SRCDESCR  Road 5
SO LOCATION  SRC19  AREA  109.6  162.3  0
** SRCDESCR  Road 6
SO LOCATION  SRC20  AREA  53.5  169.1  0
** SRCDESCR  Road 7
SO LOCATION  SRC21  AREA  36.0  37.5  0
** SRCDESCR  Road 8
SO LOCATION  SRC23  POINT  210.6  143.6  0
** SRCDESCR  New Cooling Tower
SO LOCATION  SRC24  POINT  234.0  83.0  0
** SRCDESCR  Old Cooling Tower
SO SRCPARAM  SRC3  4.409926E-01  24.384  435.9278  11.46  1.517904
SO SRCPARAM  SRC1  1.918948E-02  10.3632  457.0389  10.65  0.59436
SO SRCPARAM  SRC2  1.918948E-02  10.3632  449.8167  10.7  0.585216
SO SRCPARAM  SRC4  4.699721E-02  11.2776  456.4833  20.19  0.762
SO SRCPARAM  SRC5  6.299894E-02  1.8288  294.2611  27.84  0.509016
SO SRCPARAM  SRC6  7.559874E-02  2.7432  294.2611  50  0.381
SO SRCPARAM  SRC7  7.244879E-03  1.8288  2.124456  2.124456
SO SRCPARAM  SRC8  7.244879E-03  1.8288  2.124456  2.124456
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SO SRCPARAM  SRC9  4.283928E-02  9.7536  294.2611  6.468057  0.6096
SO SRCPARAM  SRC10  2.015966E-03  10.9728  755.3722  2.6  1.014984
SO SRCPARAM  SRC11  7.559874E-02  18.288  293.15  20.22  0.445008
SO SRCPARAM  SRC12  4.776121E-06  0.5  11.7  117  180  2
SO SRCPARAM  SRC14  4.776121E-06  0.5  11.7  68.40002  88.4  2
SO SRCPARAM  SRC16  4.776121E-06  0.5  9.899998  58.49999  82  2
SO SRCPARAM  SRC17  4.776121E-06  0.5  10  100  0  2
SO SRCPARAM  SRC18  4.776121E-06  0.5  10  45.20001  91.7  2
SO SRCPARAM  SRC19  4.776121E-06  0.5  10  55.49999  -90  2
SO SRCPARAM  SRC20  4.776121E-06  0.5  13.5  14.9  -90  2
SO SRCPARAM  SRC21  4.776121E-06  0.5  15.7  28.7  68.7  2
SO SRCPARAM  SRC23  4.787920E-02  9.348216  294.2611  5.747508  7.760208
SO SRCPARAM  SRC24  5.795903E-02  8.8392  294.2611  5.456178  6.897624
SO BUILDHGT  SRC3  9.75  12.19  12.19  12.19  9.75  9.75
SO BUILDHGT  SRC3  9.75  0.0  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC3  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC3  9.75  12.19  18.29  18.29  18.29  18.29
SO BUILDHGT  SRC3  12.19  12.19  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC3  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDWID  SRC3  109.35  39.4  41.91  43.15  108.45  101.0
SO BUILDWID  SRC3  90.48  0.0  10.72  77.18  90.29  10.72
SO BUILDWID  SRC3  108.29  112.47  113.23  110.55  107.07  103.4
SO BUILDWID  SRC3  109.35  39.4  33.82  31.54  28.79  25.65
SO BUILDWID  SRC3  39.04  35.21  10.7  10.66  10.69  10.72
SO BUILDWID  SRC3  108.29  112.47  113.23  110.55  107.07  103.4
SO BUILDLEN  SRC3  77.18  39.1  41.73  43.09  112.47  113.23
SO BUILDLEN  SRC3  110.55  0.0  10.72  109.35  111.97  10.72
SO BUILDLEN  SRC3  112.6  108.45  101.0  90.48  77.21  68.0
SO BUILDLEN  SRC3  77.18  39.1  25.83  28.94  31.67  33.92
SO BUILDLEN  SRC3  39.34  35.98  10.7  10.66  10.69  10.72
SO BUILDLEN  SRC3  112.6  108.45  101.0  90.48  77.21  68.0
SO XBADJ     SRC3  -76.06  17.14  20.29  22.82  -63.51  -55.18
SO XBADJ     SRC3  -45.18  0.0  19.04  -19.01  -16.04  18.87
SO XBADJ     SRC3  -8.74  -4.64  -0.39  3.86  8.0  11.9
SO XBADJ     SRC3  -1.11  -56.25  -90.64  -95.42  -97.54  -96.94
SO XBADJ     SRC3  -65.39  -61.17  -53.15  -53.48  -30.39  -29.59
SO XBADJ     SRC3  -103.86  -103.81  -100.6  -94.34  -85.22  -79.9
SO YBADJ     SRC3  -35.67  -25.29  -18.77  -11.68  -49.58  -50.1
SO YBADJ     SRC3  -49.1  0.0  -6.2  -37.48  -31.05  6.83
SO YBADJ     SRC3  -15.76  -7.27  1.43  10.1  19.73  30.3
SO YBADJ     SRC3  35.67  25.29  25.33  11.45  -2.78  -16.93
SO YBADJ     SRC3  -10.81  -17.95  6.2  -2.19  -2.52  -6.83
SO YBADJ     SRC3  15.76  7.27  -1.43  -10.1  -19.73  -30.3
SO BUILDHGT  SRC1  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC1  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC1  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC1  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC1  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC1  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDWID  SRC1  109.35  111.97  113.33  112.6  108.45  101.0
SO BUILDWID  SRC1  90.48  77.21  68.0  77.18  90.29  100.82
SO BUILDWID  SRC1  108.29  112.47  113.23  110.55  107.07  103.4
SO BUILDWID  SRC1  109.35  111.97  113.33  112.6  108.45  101.0
SO BUILDWID  SRC1  90.48  77.21  68.0  77.18  90.29  100.82
SO BUILDWID  SRC1  108.29  112.47  113.23  110.55  107.07  103.4
SO BUILDLEN  SRC1  77.18  90.29  100.82  108.29  112.47  113.23
SO BUILDLEN  SRC1  110.55  107.07  103.4  109.35  111.97  113.33
SO BUILDLEN  SRC1  112.6  108.45  101.0  90.48  77.21  68.0
SO BUILDLEN  SRC1  77.18  90.29  100.82  108.29  112.47  113.23
SO BUILDLEN  SRC1  110.55  107.07  103.4  109.35  111.97  113.33
SO BUILDLEN  SRC1  112.6  108.45  101.0  90.48  77.21  68.0
SO XBADJ     SRC1  -18.19  -28.2  -37.52  -45.7  -52.49  -57.69
SO XBADJ     SRC1  -61.13  -62.72  -62.4  -70.85  -77.14  -81.09
SO XBADJ     SRC1  -82.58  -81.55  -78.05  -72.18  -64.11  -54.1
SO XBADJ     SRC1  -58.99  -62.09  -63.3  -62.59  -59.98  -55.54
SO XBADJ     SRC1  -49.42  -44.35  -41.0  -38.5  -34.83  -32.24
SO XBADJ     SRC1  -30.02  -26.89  -22.95  -18.3  -13.1  -13.9
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SO YBADJ     SRC1  16.17  21.15  24.42  26.28  27.33  27.55
SO YBADJ     SRC1  26.94  25.51  20.1  20.4  16.94  12.89
SO YBADJ     SRC1  8.44  3.74  -1.07  -5.86  -9.18  -10.7
SO YBADJ     SRC1  -16.17  -21.15  -24.42  -26.28  -27.33  -27.55
SO YBADJ     SRC1  -26.94  -25.51  -20.1  -20.4  -16.94  -12.89
SO YBADJ     SRC1  -8.44  -3.74  1.07  5.86  9.18  10.7
SO BUILDHGT  SRC2  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC2  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC2  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC2  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC2  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC2  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDWID  SRC2  109.35  111.97  113.33  112.6  108.45  101.0
SO BUILDWID  SRC2  90.48  77.21  68.0  77.18  90.29  100.82
SO BUILDWID  SRC2  108.29  112.47  113.23  110.55  107.07  103.4
SO BUILDWID  SRC2  109.35  111.97  113.33  112.6  108.45  101.0
SO BUILDWID  SRC2  90.48  77.21  68.0  77.18  90.29  100.82
SO BUILDWID  SRC2  108.29  112.47  113.23  110.55  107.07  103.4
SO BUILDLEN  SRC2  77.18  90.29  100.82  108.29  112.47  113.23
SO BUILDLEN  SRC2  110.55  107.07  103.4  109.35  111.97  113.33
SO BUILDLEN  SRC2  112.6  108.45  101.0  90.48  77.21  68.0
SO BUILDLEN  SRC2  77.18  90.29  100.82  108.29  112.47  113.23
SO BUILDLEN  SRC2  110.55  107.07  103.4  109.35  111.97  113.33
SO BUILDLEN  SRC2  112.6  108.45  101.0  90.48  77.21  68.0
SO XBADJ     SRC2  -23.08  -32.94  -41.97  -49.71  -55.95  -60.49
SO XBADJ     SRC2  -63.19  -63.96  -62.8  -70.39  -75.84  -78.99
SO XBADJ     SRC2  -79.73  -78.06  -74.01  -67.71  -59.36  -49.2
SO XBADJ     SRC2  -54.1  -57.35  -58.86  -58.58  -56.52  -52.75
SO XBADJ     SRC2  -47.37  -43.11  -40.6  -38.96  -36.13  -34.35
SO XBADJ     SRC2  -32.87  -30.39  -26.99  -22.77  -17.86  -18.8
SO YBADJ     SRC2  15.72  19.85  22.32  23.43  23.83  23.51
SO YBADJ     SRC2  22.47  20.75  15.2  15.51  12.2  8.45
SO YBADJ     SRC2  4.43  0.29  -3.87  -7.91  -10.43  -11.1
SO YBADJ     SRC2  -15.72  -19.85  -22.32  -23.43  -23.83  -23.51
SO YBADJ     SRC2  -22.47  -20.75  -15.2  -15.51  -12.2  -8.45
SO YBADJ     SRC2  -4.43  -0.29  3.87  7.91  10.43  11.1
SO BUILDHGT  SRC4  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC4  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC4  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC4  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC4  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC4  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDWID  SRC4  109.35  111.97  113.33  112.6  108.45  101.0
SO BUILDWID  SRC4  90.48  77.21  68.0  77.18  90.29  100.82
SO BUILDWID  SRC4  108.29  112.47  113.23  110.55  107.07  103.4
SO BUILDWID  SRC4  109.35  10.69  10.72  10.68  108.45  101.0
SO BUILDWID  SRC4  90.48  77.21  68.0  77.18  90.29  100.82
SO BUILDWID  SRC4  108.29  112.47  113.23  110.55  107.07  103.4
SO BUILDLEN  SRC4  77.18  90.29  100.82  108.29  112.47  113.23
SO BUILDLEN  SRC4  110.55  107.07  103.4  109.35  111.97  113.33
SO BUILDLEN  SRC4  112.6  108.45  101.0  90.48  77.21  68.0
SO BUILDLEN  SRC4  77.18  10.69  10.72  10.68  112.47  113.23
SO BUILDLEN  SRC4  110.55  107.07  103.4  109.35  111.97  113.33
SO BUILDLEN  SRC4  112.6  108.45  101.0  90.48  77.21  68.0
SO XBADJ     SRC4  -21.83  -34.07  -45.45  -55.44  -63.75  -70.12
SO XBADJ     SRC4  -74.36  -76.34  -76.0  -84.01  -89.48  -92.22
SO XBADJ     SRC4  -92.16  -89.3  -83.73  -75.61  -65.2  -52.8
SO XBADJ     SRC4  -55.35  -55.88  -56.65  -55.82  -48.72  -43.11
SO XBADJ     SRC4  -36.19  -30.73  -27.4  -25.33  -22.5  -21.11
SO XBADJ     SRC4  -20.44  -19.15  -17.27  -14.87  -12.02  -15.2
SO YBADJ     SRC4  29.34  33.49  35.55  35.86  35.08  33.23
SO YBADJ     SRC4  30.37  26.59  18.8  16.76  11.07  4.96
SO YBADJ     SRC4  -1.29  -7.51  -13.5  -19.08  -22.8  -24.3
SO YBADJ     SRC4  -29.34  8.74  -0.17  -9.07  -35.08  -33.23
SO YBADJ     SRC4  -30.37  -26.59  -18.8  -16.76  -11.07  -4.96
SO YBADJ     SRC4  1.29  7.51  13.5  19.08  22.8  24.3
SO BUILDHGT  SRC5  18.29  18.29  18.29  18.29  18.29  18.29
```

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SO BUILDHGT  SRC5  18.29  18.29  18.29  18.29  18.29  18.29
SO BUILDHGT  SRC5  18.29  18.29  18.29  18.29  18.29  18.29
SO BUILDHGT  SRC5  18.29  18.29  18.29  18.29  18.29  18.29
SO BUILDHGT  SRC5  18.29  18.29  18.29  18.29  18.29  18.29
SO BUILDHGT  SRC5  18.29  18.29  18.29  18.29  18.29  18.29
SO BUILDWID  SRC5  36.43  35.41  33.82  31.54  28.79  25.65
SO BUILDWID  SRC5  22.08  18.34  14.74  18.54  22.27  25.83
SO BUILDWID  SRC5  28.94  31.67  33.92  35.48  36.46  36.84
SO BUILDWID  SRC5  36.43  35.41  33.82  31.54  28.79  25.65
SO BUILDWID  SRC5  22.08  18.34  14.74  18.54  22.27  25.83
SO BUILDWID  SRC5  28.94  31.67  33.92  35.48  36.46  36.84
SO BUILDLEN  SRC5  18.54  22.27  25.83  28.94  31.67  33.92
SO BUILDLEN  SRC5  35.48  36.46  36.84  36.43  35.41  33.82
SO BUILDLEN  SRC5  31.54  28.79  25.65  22.08  18.34  14.74
SO BUILDLEN  SRC5  18.54  22.27  25.83  28.94  31.67  33.92
SO BUILDLEN  SRC5  35.48  36.46  36.84  36.43  35.41  33.82
SO BUILDLEN  SRC5  31.54  28.79  25.65  22.08  18.34  14.74
SO XBADJ     SRC5  2.65  2.99  2.98  2.72  2.13  1.23
SO XBADJ     SRC5  0.12  -1.24  -2.82  -4.47  -6.24  -8.07
SO XBADJ     SRC5  -9.83  -11.53  -13.12  -14.49  -15.67  -16.72
SO XBADJ     SRC5  -21.18  -25.26  -28.81  -31.66  -33.79  -35.14
SO XBADJ     SRC5  -35.59  -35.22  -34.02  -31.95  -29.16  -25.74
SO XBADJ     SRC5  -21.71  -17.26  -12.53  -7.59  -2.67  1.98
SO YBADJ     SRC5  -13.74  -11.46  -8.83  -5.94  -2.86  0.3
SO YBADJ     SRC5  3.45  6.5  9.35  11.92  14.12  15.9
SO YBADJ     SRC5  17.19  17.96  18.18  17.86  16.99  15.6
SO YBADJ     SRC5  13.74  11.46  8.83  5.94  2.86  -0.3
SO YBADJ     SRC5  -3.45  -6.5  -9.35  -11.92  -14.12  -15.9
SO YBADJ     SRC5  -17.19  -17.96  -18.18  -17.86  -16.99  -15.6
SO BUILDHGT  SRC6  18.29  18.29  18.29  18.29  18.29  18.29
SO BUILDHGT  SRC6  18.29  18.29  18.29  18.29  18.29  18.29
SO BUILDHGT  SRC6  18.29  18.29  18.29  18.29  18.29  18.29
SO BUILDHGT  SRC6  18.29  18.29  18.29  18.29  18.29  18.29
SO BUILDHGT  SRC6  18.29  18.29  18.29  18.29  18.29  18.29
SO BUILDHGT  SRC6  18.29  18.29  18.29  18.29  18.29  18.29
SO BUILDWID  SRC6  36.43  35.41  33.82  31.54  28.79  25.65
SO BUILDWID  SRC6  22.08  18.34  14.74  18.54  22.27  25.83
SO BUILDWID  SRC6  28.94  31.67  33.92  35.48  36.46  36.84
SO BUILDWID  SRC6  36.43  35.41  33.82  31.54  28.79  25.65
SO BUILDWID  SRC6  22.08  18.34  14.74  18.54  22.27  25.83
SO BUILDWID  SRC6  28.94  31.67  33.92  35.48  36.46  36.84
SO BUILDLEN  SRC6  18.54  22.27  25.83  28.94  31.67  33.92
SO BUILDLEN  SRC6  35.48  36.46  36.84  36.43  35.41  33.82
SO BUILDLEN  SRC6  31.54  28.79  25.65  22.08  18.34  14.74
SO BUILDLEN  SRC6  18.54  22.27  25.83  28.94  31.67  33.92
SO BUILDLEN  SRC6  35.48  36.46  36.84  36.43  35.41  33.82
SO BUILDLEN  SRC6  31.54  28.79  25.65  22.08  18.34  14.74
SO XBADJ     SRC6  0.39  -0.86  -2.34  -3.91  -5.61  -7.39
SO XBADJ     SRC6  -9.11  -10.8  -12.42  -13.82  -15.06  -16.09
SO XBADJ     SRC6  -16.8  -17.24  -17.41  -17.21  -16.74  -16.12
SO XBADJ     SRC6  -18.93  -21.41  -23.49  -25.03  -26.05  -26.53
SO XBADJ     SRC6  -26.37  -25.66  -24.42  -22.6  -20.35  -17.73
SO XBADJ     SRC6  -14.74  -11.55  -8.25  -4.87  -1.59  1.38
SO YBADJ     SRC6  -4.39  -2.65  -0.82  1.03  2.85  4.58
SO YBADJ     SRC6  6.17  7.58  8.75  9.66  10.27  10.58
SO YBADJ     SRC6  10.56  10.22  9.57  8.63  7.43  6.0
SO YBADJ     SRC6  4.39  2.65  0.82  -1.03  -2.85  -4.58
SO YBADJ     SRC6  -6.17  -7.58  -8.75  -9.66  -10.27  -10.58
SO YBADJ     SRC6  -10.56  -10.22  -9.57  -8.63  -7.43  -6.0
SO BUILDHGT  SRC9  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC9  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC9  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC9  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC9  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC9  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDWID  SRC9  109.35  111.97  113.33  112.6  108.45  101.0
SO BUILDWID  SRC9  90.48  77.21  68.0  77.18  90.29  100.82
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SO BUILDWID  SRC9  108.29  112.47  113.23  110.55  107.07  103.4
SO BUILDWID  SRC9  109.35  111.97  113.33  112.6  108.45  101.0
SO BUILDWID  SRC9  90.48  77.21  68.0  77.18  90.29  100.82
SO BUILDWID  SRC9  108.29  112.47  113.23  110.55  107.07  103.4
SO BUILDLEN  SRC9  77.18  90.29  100.82  108.29  112.47  113.23
SO BUILDLEN  SRC9  110.55  107.07  103.4  109.35  111.97  113.33
SO BUILDLEN  SRC9  112.6  108.45  101.0  90.48  77.21  68.0
SO BUILDLEN  SRC9  77.18  90.29  100.82  108.29  112.47  113.23
SO BUILDLEN  SRC9  110.55  107.07  103.4  109.35  111.97  113.33
SO BUILDLEN  SRC9  112.6  108.45  101.0  90.48  77.21  68.0
SO XBADJ     SRC9  -4.64  -12.23  -19.61  -26.39  -32.36  -37.36
SO XBADJ     SRC9  -41.22  -43.82  -45.1  -55.67  -64.54  -71.46
SO XBADJ     SRC9  -76.2  -78.63  -78.67  -76.32  -71.65  -64.8
SO XBADJ     SRC9  -72.53  -78.06  -81.22  -81.91  -80.11  -75.87
SO XBADJ     SRC9  -69.34  -63.25  -58.3  -53.68  -47.43  -41.87
SO XBADJ     SRC9  -36.4  -29.82  -22.33  -14.16  -5.57  -3.2
SO YBADJ     SRC9  0.99  8.56  14.79  19.9  24.41  28.17
SO YBADJ     SRC9  31.08  33.04  30.8  33.94  32.92  30.81
SO YBADJ     SRC9  27.76  23.87  19.26  14.06  9.71  6.6
SO YBADJ     SRC9  -0.99  -8.56  -14.79  -19.9  -24.41  -28.17
SO YBADJ     SRC9  -31.08  -33.04  -30.8  -33.94  -32.92  -30.81
SO YBADJ     SRC9  -27.76  -23.87  -19.26  -14.06  -9.71  -6.6
SO BUILDHGT  SRC10  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC10  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC10  12.19  12.19  12.19  18.29  18.29  18.29
SO BUILDHGT  SRC10  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC10  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC10  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDWID  SRC10  10.69  10.69  10.72  10.68  10.68  10.72
SO BUILDWID  SRC10  90.48  77.21  68.0  77.18  90.29  10.72
SO BUILDWID  SRC10  43.09  43.13  41.87  35.48  36.46  36.84
SO BUILDWID  SRC10  10.69  10.69  10.72  10.68  10.68  10.72
SO BUILDWID  SRC10  90.48  77.21  68.0  77.18  90.29  100.82
SO BUILDWID  SRC10  108.29  112.47  113.23  10.69  10.69  10.72
SO BUILDLEN  SRC10  10.69  10.69  10.72  10.68  10.68  10.72
SO BUILDLEN  SRC10  110.55  107.07  103.4  109.35  111.97  10.72
SO BUILDLEN  SRC10  43.15  43.07  41.69  22.08  18.34  14.74
SO BUILDLEN  SRC10  10.69  10.69  10.72  10.68  10.68  10.72
SO BUILDLEN  SRC10  110.55  107.07  103.4  109.35  111.97  113.33
SO BUILDLEN  SRC10  112.6  108.45  101.0  10.69  10.69  10.72
SO XBADJ     SRC10  9.84  10.06  9.8  9.11  7.96  6.39
SO XBADJ     SRC10  -103.69  -101.54  -96.3  -98.8  -98.29  -53.4
SO XBADJ     SRC10  -89.57  -92.03  -91.68  -99.82  -99.61  -96.72
SO XBADJ     SRC10  -20.53  -20.75  -20.52  -19.79  -18.64  -17.11
SO XBADJ     SRC10  -6.86  -5.53  -7.1  -10.55  -13.68  -18.53
SO XBADJ     SRC10  -24.17  -29.08  -33.1  6.5  8.03  9.14
SO YBADJ     SRC10  -2.6  0.07  2.75  5.34  7.77  9.96
SO YBADJ     SRC10  9.12  0.57  -11.2  -16.31  -24.06  5.4
SO YBADJ     SRC10  22.8  11.15  -0.83  17.31  1.63  -14.1
SO YBADJ     SRC10  2.6  -0.07  -2.75  -5.34  -7.77  -9.96
SO YBADJ     SRC10  -9.12  -0.57  11.2  16.31  24.06  31.17
SO YBADJ     SRC10  37.32  42.35  46.08  -9.85  -7.64  -5.2
SO BUILDHGT  SRC11  12.19  12.19  12.19  12.19  12.19  18.29
SO BUILDHGT  SRC11  12.19  12.19  12.19  12.19  12.19  12.19
SO BUILDHGT  SRC11  12.19  12.19  12.19  12.19  12.19  12.19
SO BUILDHGT  SRC11  12.19  18.29  18.29  18.29  18.29  18.29
SO BUILDHGT  SRC11  12.19  12.19  12.19  12.19  12.19  12.19
SO BUILDHGT  SRC11  12.19  12.19  12.19  12.19  12.19  12.19
SO BUILDWID  SRC11  36.07  39.4  41.91  43.15  43.07  25.65
SO BUILDWID  SRC11  39.04  35.21  30.4  35.29  39.1  41.73
SO BUILDWID  SRC11  43.09  43.13  41.87  39.34  35.98  34.7
SO BUILDWID  SRC11  36.07  35.41  33.82  31.54  28.79  25.65
SO BUILDWID  SRC11  39.04  35.21  30.4  35.29  39.1  41.73
SO BUILDWID  SRC11  43.09  43.13  41.87  39.34  35.98  34.7
SO BUILDLEN  SRC11  35.29  39.1  41.73  43.09  43.13  33.92
SO BUILDLEN  SRC11  39.34  35.98  34.7  36.07  39.4  41.91
SO BUILDLEN  SRC11  43.15  43.07  41.69  39.04  35.21  30.4
```

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SO BUILDLEN  SRC11  35.29  22.27  25.83  28.94  31.67  33.92
SO BUILDLEN  SRC11  39.34  35.98  34.7  36.07  39.4  41.91
SO BUILDLEN  SRC11  43.15  43.07  41.69  39.04  35.21  30.4
SO XBADJ     SRC11  -6.74  -6.08  -5.24  -4.23  -3.1  35.41
SO XBADJ     SRC11  -0.58  0.35  -1.9  -5.88  -9.69  -13.2
SO XBADJ     SRC11  -16.3  -18.92  -20.96  -22.36  -23.08  -23.2
SO XBADJ     SRC11  -28.54  -60.06  -65.12  -68.37  -69.78  -69.33
SO XBADJ     SRC11  -38.76  -36.33  -32.8  -30.18  -29.71  -28.71
SO XBADJ     SRC11  -26.84  -24.16  -20.74  -16.68  -12.13  -7.2
SO YBADJ     SRC11  -12.15  -10.01  -7.76  -5.27  -2.62  13.7
SO YBADJ     SRC11  2.84  5.48  8.0  10.9  13.47  15.63
SO YBADJ     SRC11  17.31  18.47  19.07  19.09  18.34  15.45
SO YBADJ     SRC11  12.15  23.16  14.32  5.03  -4.4  -13.7
SO YBADJ     SRC11  -2.84  -5.48  -8.0  -10.9  -13.47  -15.63
SO YBADJ     SRC11  -17.31  -18.47  -19.07  -19.09  -18.34  -15.45
SO BUILDHGT  SRC23  0.0  0.0  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC23  9.75  9.75  12.19  12.19  12.19  18.29
SO BUILDHGT  SRC23  18.29  18.29  0.0  0.0  0.0  0.0
SO BUILDHGT  SRC23  0.0  0.0  0.0  0.0  0.0  0.0
SO BUILDHGT  SRC23  0.0  0.0  0.0  0.0  0.0  0.0
SO BUILDHGT  SRC23  0.0  0.0  0.0  0.0  0.0  0.0
SO BUILDWID  SRC23  0.0  0.0  113.33  112.6  10.68  10.72
SO BUILDWID  SRC23  90.48  77.21  52.62  60.17  66.14  25.83
SO BUILDWID  SRC23  28.94  31.67  0.0  0.0  0.0  0.0
SO BUILDWID  SRC23  0.0  0.0  0.0  0.0  0.0  0.0
SO BUILDWID  SRC23  0.0  0.0  0.0  0.0  0.0  0.0
SO BUILDWID  SRC23  0.0  0.0  0.0  0.0  0.0  0.0
SO BUILDLEN  SRC23  0.0  0.0  102.09  111.26  10.68  10.72
SO BUILDLEN  SRC23  118.88  114.52  58.82  55.4  50.55  33.82
SO BUILDLEN  SRC23  31.54  28.79  0.0  0.0  0.0  0.0
SO BUILDLEN  SRC23  0.0  0.0  0.0  0.0  0.0  0.0
SO BUILDLEN  SRC23  0.0  0.0  0.0  0.0  0.0  0.0
SO BUILDLEN  SRC23  0.0  0.0  0.0  0.0  0.0  0.0
SO XBADJ     SRC23  0.0  0.0  -143.86  -155.8  -56.47  -56.18
SO XBADJ     SRC23  -162.51  -154.81  -100.6  -104.12  -104.49  -91.07
SO XBADJ     SRC23  -90.2  -86.83  0.0  0.0  0.0  0.0
SO XBADJ     SRC23  0.0  0.0  0.0  0.0  0.0  0.0
SO XBADJ     SRC23  0.0  0.0  0.0  0.0  0.0  0.0
SO XBADJ     SRC23  0.0  0.0  0.0  0.0  0.0  0.0
SO YBADJ     SRC23  0.0  0.0  55.41  38.32  2.7  -6.22
SO YBADJ     SRC23  -17.68  -36.04  25.11  12.11  -1.13  8.05
SO YBADJ     SRC23  -4.95  -17.8  0.0  0.0  0.0  0.0
SO YBADJ     SRC23  0.0  0.0  0.0  0.0  0.0  0.0
SO YBADJ     SRC23  0.0  0.0  0.0  0.0  0.0  0.0
SO YBADJ     SRC23  0.0  0.0  0.0  0.0  0.0  0.0
SO SRCGROUP  ALL
SO SRCGROUP  ROADS  SRC12  SRC14  SRC16  SRC17  SRC18  SRC19  SRC20  SRC21
SO SRCGROUP  RTO  SRC3
SO SRCGROUP  BOILERS  SRC1  SRC2  SRC4
SO SRCGROUP  GRAINH  SRC5
SO SRCGROUP  HAMMER  SRC6
SO SRCGROUP  FUGGDDG  SRC7  SRC8
SO SRCGROUP  GOLDLYK  SRC9
SO SRCGROUP  LOADOUTF  SRC10
SO SRCGROUP  COOLER  SRC11
SO FINISHED
```

```
** BREEZE ISC GIS Pro v4.1.1 - G:\MODELS\ISC\DENCO\TO50ft\NOx87.dat
** Trinity Consultants

** PRIME

CO STARTING
CO TITLEONE  Diversified Energy Co. AERA
CO TITLETWO  NOx Modeling
CO MODELOPT  DFAULT  CONC  RURAL
CO AVERTIME  1  ANNUAL
CO POLLUTID  OTHER
CO TERRHGTS  FLAT
CO RUNORNOT  RUN
CO FINISHED

SO STARTING
SO ELEVUNIT  METERS
SO LOCATION  SRC3  POINT  89.6  133.0  0
** SRCDESCR  RTO Stack
SO LOCATION  SRC1  POINT  130.6  67.0  0
** SRCDESCR  Boiler #1
SO LOCATION  SRC2  POINT  131.0  71.9  0
** SRCDESCR  Boiler #2
SO LOCATION  SRC4  POINT  144.2  68.3  0
** SRCDESCR  Boiler#3
SO LOCATION  SRC10  POINT  164.5  98.3  0
** SRCDESCR  Loadout Flare
SO LOCATION  SRC5  POINT  156.5  94.1  0
** SRCDESCR  Methanator flare
SO SRCPARAM  SRC3  4.636725E-01  15.24  435.9278  11.46  1.517904
SO SRCPARAM  SRC1  2.469559E-01  10.3632  457.0389  10.65  0.59436
SO SRCPARAM  SRC2  2.469559E-01  10.3632  449.8167  10.7  0.585216
SO SRCPARAM  SRC4  6.047899E-01  11.2776  456.4833  20.19  0.762
SO SRCPARAM  SRC10  2.645956E-02  10.9728  755.3722  2.6  1.014984
SO SRCPARAM  SRC5  2.582957E-03  11.2776  1033.15  3.24  0.3048
SO BUILDHGT  SRC3  9.75  12.19  12.19  12.19  9.75  9.75
SO BUILDHGT  SRC3  9.75  0.0  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC3  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC3  9.75  12.19  18.29  18.29  18.29  18.29
SO BUILDHGT  SRC3  12.19  12.19  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC3  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDWID  SRC3  109.35  39.4  41.91  43.15  108.45  101.0
SO BUILDWID  SRC3  90.48  0.0  10.72  77.18  90.29  10.72
SO BUILDWID  SRC3  108.29  112.47  113.23  110.55  107.07  103.4
SO BUILDWID  SRC3  109.35  39.4  33.82  31.54  28.79  25.65
SO BUILDWID  SRC3  39.04  35.21  10.7  10.66  10.69  10.72
SO BUILDWID  SRC3  108.29  112.47  113.23  110.55  107.07  103.4
SO BUILDLEN  SRC3  77.18  39.1  41.73  43.09  112.47  113.23
SO BUILDLEN  SRC3  110.55  0.0  10.72  109.35  111.97  10.72
SO BUILDLEN  SRC3  112.6  108.45  101.0  90.48  77.21  68.0
SO BUILDLEN  SRC3  77.18  39.1  25.83  28.94  31.67  33.92
SO BUILDLEN  SRC3  39.34  35.98  10.7  10.66  10.69  10.72
SO BUILDLEN  SRC3  112.6  108.45  101.0  90.48  77.21  68.0
SO XBADJ     SRC3  -76.06  17.14  20.29  22.82  -63.51  -55.18
SO XBADJ     SRC3  -45.18  0.0  19.04  -19.01  -16.04  18.87
SO XBADJ     SRC3  -8.74  -4.64  -0.39  3.86  8.0  11.9
SO XBADJ     SRC3  -1.11  -56.25  -90.64  -95.42  -97.54  -96.94
SO XBADJ     SRC3  -65.39  -61.17  -53.15  -53.48  -30.39  -29.59
SO XBADJ     SRC3  -103.86  -103.81  -100.6  -94.34  -85.22  -79.9
SO YBADJ     SRC3  -35.67  -25.29  -18.77  -11.68  -49.58  -50.1
SO YBADJ     SRC3  -49.1  0.0  -6.2  -37.48  -31.05  6.83
SO YBADJ     SRC3  -15.76  -7.27  1.43  10.1  19.73  30.3
SO YBADJ     SRC3  35.67  25.29  25.33  11.45  -2.78  -16.93
SO YBADJ     SRC3  -10.81  -17.95  6.2  -2.19  -2.52  -6.83
SO YBADJ     SRC3  15.76  7.27  -1.43  -10.1  -19.73  -30.3
SO BUILDHGT  SRC1  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC1  9.75  9.75  9.75  9.75  9.75  9.75
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SO BUILDHGT  SRC1  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC1  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC1  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC1  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDWID  SRC1  109.35  111.97  113.33  112.6  108.45  101.0
SO BUILDWID  SRC1  90.48  77.21  68.0  77.18  90.29  100.82
SO BUILDWID  SRC1  108.29  112.47  113.23  110.55  107.07  103.4
SO BUILDWID  SRC1  109.35  111.97  113.33  112.6  108.45  101.0
SO BUILDWID  SRC1  90.48  77.21  68.0  77.18  90.29  100.82
SO BUILDWID  SRC1  108.29  112.47  113.23  110.55  107.07  103.4
SO BUILDLEN  SRC1  77.18  90.29  100.82  108.29  112.47  113.23
SO BUILDLEN  SRC1  110.55  107.07  103.4  109.35  111.97  113.33
SO BUILDLEN  SRC1  112.6  108.45  101.0  90.48  77.21  68.0
SO BUILDLEN  SRC1  77.18  90.29  100.82  108.29  112.47  113.23
SO BUILDLEN  SRC1  110.55  107.07  103.4  109.35  111.97  113.33
SO BUILDLEN  SRC1  112.6  108.45  101.0  90.48  77.21  68.0
SO XBADJ     SRC1  -18.19  -28.2  -37.52  -45.7  -52.49  -57.69
SO XBADJ     SRC1  -61.13  -62.72  -62.4  -70.85  -77.14  -81.09
SO XBADJ     SRC1  -82.58  -81.55  -78.05  -72.18  -64.11  -54.1
SO XBADJ     SRC1  -58.99  -62.09  -63.3  -62.59  -59.98  -55.54
SO XBADJ     SRC1  -49.42  -44.35  -41.0  -38.5  -34.83  -32.24
SO XBADJ     SRC1  -30.02  -26.89  -22.95  -18.3  -13.1  -13.9
SO YBADJ     SRC1  16.17  21.15  24.42  26.28  27.33  27.55
SO YBADJ     SRC1  26.94  25.51  20.1  20.4  16.94  12.89
SO YBADJ     SRC1  8.44  3.74  -1.07  -5.86  -9.18  -10.7
SO YBADJ     SRC1  -16.17  -21.15  -24.42  -26.28  -27.33  -27.55
SO YBADJ     SRC1  -26.94  -25.51  -20.1  -20.4  -16.94  -12.89
SO YBADJ     SRC1  -8.44  -3.74  1.07  5.86  9.18  10.7
SO BUILDHGT  SRC2  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC2  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC2  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC2  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC2  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC2  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDWID  SRC2  109.35  111.97  113.33  112.6  108.45  101.0
SO BUILDWID  SRC2  90.48  77.21  68.0  77.18  90.29  100.82
SO BUILDWID  SRC2  108.29  112.47  113.23  110.55  107.07  103.4
SO BUILDWID  SRC2  109.35  111.97  113.33  112.6  108.45  101.0
SO BUILDWID  SRC2  90.48  77.21  68.0  77.18  90.29  100.82
SO BUILDWID  SRC2  108.29  112.47  113.23  110.55  107.07  103.4
SO BUILDLEN  SRC2  77.18  90.29  100.82  108.29  112.47  113.23
SO BUILDLEN  SRC2  110.55  107.07  103.4  109.35  111.97  113.33
SO BUILDLEN  SRC2  112.6  108.45  101.0  90.48  77.21  68.0
SO BUILDLEN  SRC2  77.18  90.29  100.82  108.29  112.47  113.23
SO BUILDLEN  SRC2  110.55  107.07  103.4  109.35  111.97  113.33
SO BUILDLEN  SRC2  112.6  108.45  101.0  90.48  77.21  68.0
SO XBADJ     SRC2  -23.08  -32.94  -41.97  -49.71  -55.95  -60.49
SO XBADJ     SRC2  -63.19  -63.96  -62.8  -70.39  -75.84  -78.99
SO XBADJ     SRC2  -79.73  -78.06  -74.01  -67.71  -59.36  -49.2
SO XBADJ     SRC2  -54.1  -57.35  -58.86  -58.58  -56.52  -52.75
SO XBADJ     SRC2  -47.37  -43.11  -40.6  -38.96  -36.13  -34.35
SO XBADJ     SRC2  -32.87  -30.39  -26.99  -22.77  -17.86  -18.8
SO YBADJ     SRC2  15.72  19.85  22.32  23.43  23.83  23.51
SO YBADJ     SRC2  22.47  20.75  15.2  15.51  12.2  8.45
SO YBADJ     SRC2  4.43  0.29  -3.87  -7.91  -10.43  -11.1
SO YBADJ     SRC2  -15.72  -19.85  -22.32  -23.43  -23.83  -23.51
SO YBADJ     SRC2  -22.47  -20.75  -15.2  -15.51  -12.2  -8.45
SO YBADJ     SRC2  -4.43  -0.29  3.87  7.91  10.43  11.1
SO BUILDHGT  SRC4  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC4  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC4  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC4  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC4  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC4  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDWID  SRC4  109.35  111.97  113.33  112.6  108.45  101.0
SO BUILDWID  SRC4  90.48  77.21  68.0  77.18  90.29  100.82
SO BUILDWID  SRC4  108.29  112.47  113.23  110.55  107.07  103.4
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SO BUILDWID  SRC4  109.35  10.69  10.72  10.68  108.45  101.0
SO BUILDWID  SRC4  90.48  77.21  68.0  77.18  90.29  100.82
SO BUILDWID  SRC4  108.29  112.47  113.23  110.55  107.07  103.4
SO BUILDLEN  SRC4  77.18  90.29  100.82  108.29  112.47  113.23
SO BUILDLEN  SRC4  110.55  107.07  103.4  109.35  111.97  113.33
SO BUILDLEN  SRC4  112.6  108.45  101.0  90.48  77.21  68.0
SO BUILDLEN  SRC4  77.18  10.69  10.72  10.68  112.47  113.23
SO BUILDLEN  SRC4  110.55  107.07  103.4  109.35  111.97  113.33
SO BUILDLEN  SRC4  112.6  108.45  101.0  90.48  77.21  68.0
SO XBADJ     SRC4  -21.83  -34.07  -45.45  -55.44  -63.75  -70.12
SO XBADJ     SRC4  -74.36  -76.34  -76.0  -84.01  -89.48  -92.22
SO XBADJ     SRC4  -92.16  -89.3  -83.73  -75.61  -65.2  -52.8
SO XBADJ     SRC4  -55.35  -55.88  -56.65  -55.82  -48.72  -43.11
SO XBADJ     SRC4  -36.19  -30.73  -27.4  -25.33  -22.5  -21.11
SO XBADJ     SRC4  -20.44  -19.15  -17.27  -14.87  -12.02  -15.2
SO YBADJ     SRC4  29.34  33.49  35.55  35.86  35.08  33.23
SO YBADJ     SRC4  30.37  26.59  18.8  16.76  11.07  4.96
SO YBADJ     SRC4  -1.29  -7.51  -13.5  -19.08  -22.8  -24.3
SO YBADJ     SRC4  -29.34  8.74  -0.17  -9.07  -35.08  -33.23
SO YBADJ     SRC4  -30.37  -26.59  -18.8  -16.76  -11.07  -4.96
SO YBADJ     SRC4  1.29  7.51  13.5  19.08  22.8  24.3
SO BUILDHGT  SRC10  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC10  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC10  12.19  12.19  12.19  18.29  18.29  18.29
SO BUILDHGT  SRC10  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC10  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC10  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDWID  SRC10  10.69  10.69  10.72  10.68  10.68  10.72
SO BUILDWID  SRC10  90.48  77.21  68.0  77.18  90.29  10.72
SO BUILDWID  SRC10  43.09  43.13  41.87  35.48  36.46  36.84
SO BUILDWID  SRC10  10.69  10.69  10.72  10.68  10.68  10.72
SO BUILDWID  SRC10  90.48  77.21  68.0  77.18  90.29  100.82
SO BUILDWID  SRC10  108.29  112.47  113.23  10.69  10.69  10.72
SO BUILDLEN  SRC10  10.69  10.69  10.72  10.68  10.68  10.72
SO BUILDLEN  SRC10  110.55  107.07  103.4  109.35  111.97  10.72
SO BUILDLEN  SRC10  43.15  43.07  41.69  22.08  18.34  14.74
SO BUILDLEN  SRC10  10.69  10.69  10.72  10.68  10.68  10.72
SO BUILDLEN  SRC10  110.55  107.07  103.4  109.35  111.97  113.33
SO BUILDLEN  SRC10  112.6  108.45  101.0  10.69  10.69  10.72
SO XBADJ     SRC10  9.84  10.06  9.8  9.11  7.96  6.39
SO XBADJ     SRC10  -103.69  -101.54  -96.3  -98.8  -98.29  -53.4
SO XBADJ     SRC10  -89.57  -92.03  -91.68  -99.82  -99.61  -96.72
SO XBADJ     SRC10  -20.53  -20.75  -20.52  -19.79  -18.64  -17.11
SO XBADJ     SRC10  -6.86  -5.53  -7.1  -10.55  -13.68  -18.53
SO XBADJ     SRC10  -24.17  -29.08  -33.1  6.5  8.03  9.14
SO YBADJ     SRC10  -2.6  0.07  2.75  5.34  7.77  9.96
SO YBADJ     SRC10  9.12  0.57  -11.2  -16.31  -24.06  5.4
SO YBADJ     SRC10  22.8  11.15  -0.83  17.31  1.63  -14.1
SO YBADJ     SRC10  2.6  -0.07  -2.75  -5.34  -7.77  -9.96
SO YBADJ     SRC10  -9.12  -0.57  11.2  16.31  24.06  31.17
SO YBADJ     SRC10  37.32  42.35  46.08  -9.85  -7.64  -5.2
SO BUILDHGT  SRC5  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC5  9.75  9.75  9.75  9.75  9.75  9.75
SO BUILDHGT  SRC5  9.75  12.19  12.19  18.29  18.29  18.29
SO BUILDHGT  SRC5  18.29  9.75  9.75  9.75  9.75  9.75
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SO BUILDWID  SRC5  10.69  10.69  10.72  10.68  10.68  10.72
SO BUILDWID  SRC5  90.48  77.21  68.0  77.18  90.29  10.72
SO BUILDWID  SRC5  10.68  43.13  41.87  35.48  36.46  36.84
SO BUILDWID  SRC5  36.43  10.69  10.72  10.68  10.68  10.72
SO BUILDWID  SRC5  90.48  77.21  68.0  77.18  90.29  100.82
SO BUILDWID  SRC5  108.29  112.47  113.23  110.55  107.07  103.4
SO BUILDLEN  SRC5  10.69  10.69  10.72  10.68  10.68  10.72
SO BUILDLEN  SRC5  110.55  107.07  103.4  109.35  111.97  10.72
SO BUILDLEN  SRC5  10.68  43.07  41.69  22.08  18.34  14.74
SO BUILDLEN  SRC5  18.54  10.69  10.72  10.68  10.68  10.72
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SO BUILDLEN  SRC5  110.55  107.07  103.4  109.35  111.97  113.33
SO BUILDLEN  SRC5  112.6  108.45  101.0  90.48  77.21  68.0
SO XBADJ     SRC5  15.37  16.74  17.44  17.47  16.79  15.42
SO XBADJ     SRC5  -94.74  -92.93  -88.3  -91.65  -92.21  -58.51
SO XBADJ     SRC5  -50.16  -90.1  -91.32  -101.03  -102.36  -100.92
SO XBADJ     SRC5  -100.34  -27.43  -28.15  -28.15  -27.47  -26.14
SO XBADJ     SRC5  -15.81  -14.14  -15.1  -17.7  -19.76  -23.36
SO XBADJ     SRC5  -27.6  -31.0  -33.46  -34.91  -35.29  -41.0
SO YBADJ     SRC5  -9.75  -6.01  -2.08  1.91  5.84  9.59
SO YBADJ     SRC5  10.33  3.32  -7.0  -10.78  -17.38  7.07
SO YBADJ     SRC5  5.34  19.98  8.19  26.26  10.24  -6.1
SO YBADJ     SRC5  -22.25  6.01  2.08  -1.91  -5.84  -9.59
SO YBADJ     SRC5  -10.33  -3.32  7.0  10.78  17.38  23.53
SO YBADJ     SRC5  28.96  33.52  37.05  39.46  39.4  36.6
SO SRCGROUP  ALL
SO SRCGROUP  RTO  SRC3
SO SRCGROUP  LOADOUTF  SRC10
SO SRCGROUP  METHFLAR  SRC5
SO SRCGROUP  BOILER#1  SRC1
SO SRCGROUP  BOILER#2  SRC2
SO SRCGROUP  BOILER#3  SRC4
SO FINISHED
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** ISC-PRIME Input Produced by:
** ISC-AERMOD View Ver. 4.6.2
** Lakes Environmental Software Inc.
** Date: 5/12/2003
** File: C:\ISCView4\CVEC.PIN
**
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**
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****************************************
** ISC-PRIME Control Pathway
****************************************
**
**
CO STARTING
   TITLEONE 2 GENERATORS AT 20 FEET, FIRE PUMP AT 20
   TITLETWO 1986-1990
   MODELOPT DFAULT CONC NOCMPL  RURAL
   AVERTIME 24 ANNUAL
   POLLUTID OTHER
   TERRHGTS ELEV
   RUNORNOT RUN
CO FINISHED
**
****************************************
** ISC-PRIME Source Pathway
****************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
   LOCATION SV05 POINT 293275.350 5022644.050 316.200
   LOCATION SV013 POINT 293287.470 5022644.050 316.200
   LOCATION SV011 POINT 293307.900 5022693.220 316.300
   LOCATION SV012 POINT 293345.050 5022706.040 316.300
   LOCATION SV6&7 POINT 293365.480 5022619.110 316.200
   LOCATION SV8&9 POINT 293370.770 5022619.110 316.200
   LOCATION SV015 POINT 293238.631 5022671.314 316.300
   LOCATION SV016 POINT 293366.270 5022642.560 316.200
   LOCATION COOL1C POINT 293247.019 5022636.748 316.200
   LOCATION COOL2C POINT 293243.397 5022636.885 316.200
   LOCATION COOL3C POINT 293239.642 5022637.027 316.200
   LOCATION COOL4C POINT 293235.662 5022637.045 316.200
   LOCATION COOL5C POINT 293231.819 5022637.191 316.200
   LOCATION COOL6C POINT 293228.111 5022637.376 316.200
   LOCATION COOL7C POINT 293220.311 5022637.528 316.200
   LOCATION COOL8C POINT 293206.477 5022638.013 316.200
   LOCATION GPBAG POINT 293410.930 5022671.260 316.200
   LOCATION FWPUMP POINT 293406.340 5022741.870 315.200
   LOCATION CVECFS3 VOLUME 293327.590 5022702.280 316.300
   LOCATION LOADOUTE VOLUME 293417.020 5022653.150 316.200
   LOCATION ONRD1 VOLUME 293520.930 5022524.139 315.470
   LOCATION ONRD2 VOLUME 293521.117 5022533.278 315.470
   LOCATION ONRD3 VOLUME 293521.263 5022540.886 315.470
   LOCATION ONRD4 VOLUME 293521.482 5022550.023 315.470
   LOCATION ONRD5 VOLUME 293521.702 5022559.160 315.470
   LOCATION ONRD6 VOLUME 293521.992 5022568.298 315.470
   LOCATION ONRD7 VOLUME 293522.142 5022577.435 315.470
   LOCATION ONRD8 VOLUME 293522.361 5022586.572 315.470
   LOCATION ONRD9 VOLUME 293522.581 5022595.710 315.470
   LOCATION ONRD10 VOLUME 293522.801 5022604.847 315.470
   LOCATION ONRD11 VOLUME 293523.021 5022613.984 315.470
   LOCATION ONRD12 VOLUME 293523.240 5022623.122 315.470
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LOCATION ONRD13 VOLUME 293523.460 5022632.259 315.470
LOCATION ONRD14 VOLUME 293523.680 5022641.397 315.470
LOCATION ONRD15 VOLUME 293523.900 5022650.534 315.470
LOCATION ONRD16 VOLUME 293524.119 5022659.671 315.470
LOCATION ONRD17 VOLUME 293524.339 5022668.809 315.470
LOCATION ONRD18 VOLUME 293524.559 5022677.946 315.470
LOCATION ONRD19 VOLUME 293524.779 5022687.083 315.470
LOCATION ONRD20 VOLUME 293418.870 5022520.320 316.100
LOCATION ONRD21 VOLUME 293419.050 5022529.460 316.100
LOCATION ONRD22 VOLUME 293419.200 5022537.060 316.100
LOCATION ONRD23 VOLUME 293419.420 5022546.200 316.100
LOCATION ONRD24 VOLUME 293419.640 5022555.340 316.100
LOCATION ONRD25 VOLUME 293419.860 5022564.480 316.100
LOCATION ONRD26 VOLUME 293420.080 5022573.610 316.100
LOCATION ONRD27 VOLUME 293420.030 5022582.750 316.100
LOCATION ONRD28 VOLUME 293420.520 5022591.890 316.100
LOCATION ONRD29 VOLUME 293420.740 5022601.030 316.100
LOCATION ONRD30 VOLUME 293420.960 5022610.160 316.100
LOCATION ONRD31 VOLUME 293421.180 5022619.300 316.100
LOCATION ONRD32 VOLUME 293421.400 5022628.440 316.100
LOCATION ONRD33 VOLUME 293421.620 5022637.580 316.100
LOCATION ONRD34 VOLUME 293421.840 5022646.710 316.100
LOCATION ONRD36 VOLUME 293422.280 5022664.990 316.100
LOCATION ONRD37 VOLUME 293422.500 5022674.130 316.100
LOCATION ONRD38 VOLUME 293422.720 5022683.260 316.100
LOCATION ONRD39 VOLUME 293422.940 5022692.400 316.100
LOCATION ONRD40 VOLUME 293423.160 5022701.540 316.100
LOCATION ONRD41 VOLUME 293423.380 5022710.670 316.100
LOCATION ONRD42 VOLUME 293423.600 5022719.810 316.100
LOCATION ONRD43 VOLUME 293423.820 5022728.950 316.100
LOCATION ONRD44 VOLUME 293424.040 5022738.090 316.100
LOCATION ONRD47 VOLUME 293196.860 5022529.100 316.200
LOCATION ONRD48 VOLUME 293197.080 5022538.240 316.200
LOCATION ONRD49 VOLUME 293197.030 5022547.370 316.200
LOCATION ONRD50 VOLUME 293197.520 5022556.510 316.200
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LOCATION ONRD53 VOLUME 293198.180 5022583.920 316.200
LOCATION ONRD54 VOLUME 293198.400 5022593.060 316.200
LOCATION ONRD55 VOLUME 293198.620 5022602.020 316.200
LOCATION ONRD56 VOLUME 293198.840 5022611.330 316.200
LOCATION ONRD57 VOLUME 293199.060 5022620.470 316.200
LOCATION ONRD58 VOLUME 293199.280 5022629.610 316.200
LOCATION ONRD59 VOLUME 293199.500 5022638.750 316.200
LOCATION ONRD60 VOLUME 293199.720 5022647.880 316.200
LOCATION ONRD61 VOLUME 293199.940 5022657.020 316.200
LOCATION ONRD62 VOLUME 293200.160 5022666.160 316.200
LOCATION ONRD63 VOLUME 293200.380 5022675.300 316.200
LOCATION ONRD64 VOLUME 293200.600 5022684.430 316.200
LOCATION ONRD65 VOLUME 293200.820 5022693.570 316.200
LOCATION ONRD66 VOLUME 293201.040 5022702.710 316.200
LOCATION ONRD67 VOLUME 293201.260 5022711.850 316.200
LOCATION ONRD68 VOLUME 293201.480 5022720.980 316.200
LOCATION ONRD69 VOLUME 293201.700 5022730.120 316.200
LOCATION ONRD70 VOLUME 293201.700 5022730.120 316.100
LOCATION ONRD71 VOLUME 293210.830 5022730.450 316.200
LOCATION ONRD72 VOLUME 293219.970 5022730.770 316.200
LOCATION ONRD73 VOLUME 293229.100 5022731.100 316.200
LOCATION ONRD74 VOLUME 293238.230 5022731.430 316.200
LOCATION ONRD75 VOLUME 293247.370 5022731.760 316.200
LOCATION ONRD76 VOLUME 293256.500 5022732.080 316.200
LOCATION ONRD77 VOLUME 293265.640 5022732.410 316.200
LOCATION ONRD78 VOLUME 293274.770 5022732.740 316.200
LOCATION ONRD79 VOLUME 293283.910 5022733.070 316.200
LOCATION ONRD80 VOLUME 293293.040 5022733.390 316.200
LOCATION ONRD81 VOLUME 293302.170 5022733.720 316.200
LOCATION ONRD82 VOLUME 293311.310 5022734.050 316.200
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   LOCATION ONRD83 VOLUME 293320.440 5022734.370 316.200
   LOCATION ONRD84 VOLUME 293329.580 5022734.700 316.200
   LOCATION ONRD85 VOLUME 293338.710 5022735.030 316.200
   LOCATION ONRD86 VOLUME 293347.840 5022735.360 316.200
   LOCATION ONRD87 VOLUME 293356.980 5022735.680 316.200
   LOCATION ONRD88 VOLUME 293366.110 5022736.010 316.200
   LOCATION ONRD89 VOLUME 293375.250 5022736.340 316.200
   LOCATION ONRD90 VOLUME 293384.380 5022736.670 316.200
   LOCATION ONRD91 VOLUME 293393.520 5022736.990 316.200
   LOCATION ONRD92 VOLUME 293402.650 5022737.320 316.200
   LOCATION ONRD93 VOLUME 293411.780 5022737.650 316.200
   LOCATION ONRD95 VOLUME 293433.180 5022733.800 316.100
   LOCATION ONRD96 VOLUME 293442.320 5022729.600 316.100
   LOCATION ONRD97 VOLUME 293451.460 5022725.300 316.100
   LOCATION ONRD98 VOLUME 293460.600 5022721.100 316.100
   LOCATION ONRD99 VOLUME 293469.740 5022716.800 316.200
   LOCATION ONRD100 VOLUME 293478.880 5022712.600 316.200
   LOCATION ONRD101 VOLUME 293488.020 5022708.300 316.200
   LOCATION ONRD102 VOLUME 293497.160 5022704.100 316.100
   LOCATION ONRD103 VOLUME 293506.300 5022699.800 316.100
   LOCATION ONRD104 VOLUME 293515.440 5022695.600 316.100
   LOCATION ONRD105 VOLUME 293524.580 5022691.300 316.100
   LOCATION ONRD106 VOLUME 293428.340 5022537.060 316.100
   LOCATION ONRD107 VOLUME 293437.480 5022537.060 316.100
   LOCATION ONRD108 VOLUME 293446.620 5022537.060 316.100
   LOCATION ONRD109 VOLUME 293455.760 5022537.060 316.100
   LOCATION ONRD110 VOLUME 293464.900 5022537.060 316.200
   LOCATION ONRD111 VOLUME 293474.040 5022537.060 316.200
   LOCATION ONRD112 VOLUME 293483.180 5022537.060 316.200
   LOCATION ONRD113 VOLUME 293492.320 5022537.060 316.100
   LOCATION ONRD114 VOLUME 293501.460 5022537.060 316.100
   LOCATION ONRD115 VOLUME 293510.600 5022537.060 316.100
   LOCATION GPDRY VOLUME 293391.250 5022669.030 316.200
** DESCRSRC GPC Grain Dryer
** Source Parameters **
   SRCPARAM SV05 0.055 8.530 422.000 18.20000 0.790
   SRCPARAM SV013 0.055 8.530 422.000 18.20000 0.790
   SRCPARAM SV011 0.139 12.800 311.000 31.60000 0.460
   SRCPARAM SV012 0.008 1.680 293.000 16.20000 0.500
   SRCPARAM SV6&7 0.15 6.096 739.000 23.90000 0.508
   SRCPARAM SV8&9 0.15 6.096 739.000 23.90000 0.508
   SRCPARAM SV015 1.26 22.900 422.000 15.80000 1.980
   SRCPARAM SV016 0.12 7.620 293.000 18.40000 0.860
   SRCPARAM COOL1C 0.00557 10.400 293.000 44.50000 3.050
   SRCPARAM COOL2C 0.00557 10.400 293.000 44.50000 3.050
   SRCPARAM COOL3C 0.00557 10.400 293.000 44.50000 3.050
   SRCPARAM COOL4C 0.00557 10.400 293.000 44.50000 3.050
   SRCPARAM COOL5C 0.00557 10.400 293.000 44.50000 3.050
   SRCPARAM COOL6C 0.00557 10.400 293.000 44.50000 3.050
   SRCPARAM COOL7C 0.0187 11.000 293.000 8.70000 5.500
   SRCPARAM COOL8C 0.0187 11.000 293.000 8.70000 5.500
   SRCPARAM GPBAG 0.206 7.620 293.000 19.70000 0.762
   SRCPARAM FWPUMP 0.056 6.096 786.000 18.71 0.356
   SRCPARAM CVECFS3 0.011 9.140 8.350 3.660
   SRCPARAM LOADOUTE 0.085 4.880 3.350 4.530
   SRCPARAM ONRD1 0.00609 3.510 4.250 1.630
   SRCPARAM ONRD2 0.00609 3.510 4.250 1.630
   SRCPARAM ONRD3 0.00609 3.510 4.250 1.630
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   SRCPARAM ONRD12 0.00609 3.510 4.250 1.630
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SRCPARAM ONRD72 0.00609 3.510 4.250 1.630
SRCPARAM ONRD73 0.00609 3.510 4.250 1.630
SRCPARAM ONRD74 0.00609 3.510 4.250 1.630
SRCPARAM ONRD75 0.00609 3.510 4.250 1.630
SRCPARAM ONRD76 0.00609 3.510 4.250 1.630
SRCPARAM ONRD77 0.00609 3.510 4.250 1.630
SRCPARAM ONRD78 0.00609 3.510 4.250 1.630
SRCPARAM ONRD79 0.00609 3.510 4.250 1.630
SRCPARAM ONRD80 0.00609 3.510 4.250 1.630
SRCPARAM ONRD81 0.00609 3.510 4.250 1.630
SRCPARAM ONRD82 0.00609 3.510 4.250 1.630
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   BUILDHGT SV8&9 28.96 28.96 28.96 25.90 25.90 25.90
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BUILDHGT SV8&9 25.90 25.90 25.90 25.90 25.90 25.90
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BUILDLEN SV016 61.21 69.23 33.77 36.88 34.22 30.51
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   YBADJ     GPBAG -8.35 -0.77 6.83 10.36 -11.42 -9.28
   YBADJ     GPBAG 0.15 9.57 18.71 27.27 -22.50 -14.49
   YBADJ     GPBAG -6.04 1.24 7.95 19.40 22.55 15.69
   YBADJ     GPBAG 8.35 0.77 -6.83 -14.23 -21.19 9.28
   YBADJ     GPBAG -0.15 -9.57 -18.71 -27.27 22.50 15.13
   YBADJ     FWPUMP -10.74 -19.24 9.00 12.14 -0.72 24.53
   YBADJ     FWPUMP 3.31 -18.01 3.62 4.52 5.27 10.97
   YBADJ     FWPUMP 1.88 -7.26 11.83 8.65 5.21 1.62
   YBADJ     FWPUMP -2.02 -5.61 -9.00 -12.14 0.72 -0.42
   YBADJ     FWPUMP -1.54 -2.62 -3.63 -4.52 -5.27 -5.86
   YBADJ     FWPUMP 18.14 4.38 -9.50 -7.43 -27.26 9.90
   CONCUNIT 1000000 (GRAMS/SEC) (MICROGRAMS/CUBIC-METER)
   SRCGROUP GEN SV6&7 SV8&9
   SRCGROUP NEWFWP FWPUMP
   SRCGROUP ALL
SO FINISHED
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```
** THISFILE: FIBSEP04.P10
** FIBSEP04:
** FIBSEP04: FIBROMINN, SWIFT COUNTY. UPDATED PM10 PSD MODELING.
** FIBSEP04:
** FIBSEP04: REFERENCE:
** FIBSEP04: 9/24/04 SUBMITTAL TO MPCA BY ALTERNATIVE RESOURCES, INC ON BEHALF
** FIBSEP04: OF FIBROMINN LLC, "UPDATED AIR QUALITY IMPACTS ANALYSIS
** FIBSEP04: FOR MINOR DESIGN CHANGES FOR THE FIBROMINN BIOMASS POWER PLANT,
** FIBSEP04: BENSON, MINNESOTA."
** FIBSEP04:
** FIBSEP04: NOTE: SO2 & NOX INCREMENT FILES UPDATED BY MPCA FROM NEW PM10
** FIBSEP04: SOURCE PARAMETERS (ONLY MAIN STACK EMITS SO2 & NOX)

SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
   LOCATION FIBRO POINT 293822.709 5022056.310 314.600
   LOCATION LIME POINT 293834.220 5022115.250 314.600
   LOCATION ASH POINT 293764.460 5022104.030 314.600
   LOCATION FUEL POINT 293931.640 5022144.340 314.600
   LOCATION RD1 VOLUME 293537.390 5021783.120 314.600
   LOCATION RD2 VOLUME 293543.490 5021783.120 314.600
   LOCATION RD3 VOLUME 293549.590 5021783.120 314.600
   LOCATION RD4 VOLUME 293555.690 5021783.120 314.600
   LOCATION RD5 VOLUME 293561.790 5021783.120 314.600
   LOCATION RD6 VOLUME 293567.890 5021783.120 314.600
   LOCATION RD7 VOLUME 293573.990 5021783.120 314.600
   LOCATION RD8 VOLUME 293580.090 5021783.120 314.600
   LOCATION RD9 VOLUME 293586.190 5021783.120 314.600
   LOCATION RD10 VOLUME 293592.290 5021783.120 314.600
   LOCATION RD11 VOLUME 293598.390 5021783.120 314.600
   LOCATION RD12 VOLUME 293604.490 5021783.120 314.600
   LOCATION RD13 VOLUME 293610.590 5021783.120 314.600
   LOCATION RD14 VOLUME 293616.690 5021783.120 314.600
   LOCATION RD15 VOLUME 293622.790 5021783.120 314.600
   LOCATION RD16 VOLUME 293628.890 5021783.120 314.600
   LOCATION RD17 VOLUME 293634.990 5021783.120 314.600
   LOCATION RD18 VOLUME 293641.090 5021783.120 314.600
   LOCATION RD20 VOLUME 293653.290 5021783.120 314.600
   LOCATION RD21 VOLUME 293659.390 5021783.120 314.600
   LOCATION RD22 VOLUME 293665.490 5021783.120 314.600
   LOCATION RD23 VOLUME 293671.590 5021783.120 314.600
   LOCATION RD24 VOLUME 293677.690 5021783.120 314.600
   LOCATION RD25 VOLUME 293683.790 5021783.120 314.600
   LOCATION RD26 VOLUME 293689.890 5021783.120 314.600
   LOCATION RD27 VOLUME 293695.990 5021783.120 314.600
   LOCATION RD28 VOLUME 293702.090 5021783.120 314.600
   LOCATION RD29 VOLUME 293708.190 5021783.120 314.600
   LOCATION RD30 VOLUME 293714.290 5021783.120 314.600
   LOCATION RD31 VOLUME 293720.390 5021783.120 314.600
   LOCATION RD32 VOLUME 293726.490 5021783.120 314.600
   LOCATION RD33 VOLUME 293732.590 5021783.120 314.600
   LOCATION RD34 VOLUME 293738.690 5021783.120 314.600
   LOCATION RD35 VOLUME 293745.220 5021783.470 314.600
   LOCATION RD36 VOLUME 293751.280 5021784.170 314.600
   LOCATION RD37 VOLUME 293757.340 5021784.870 314.600
   LOCATION RD38 VOLUME 293762.800 5021787.590 314.600
   LOCATION RD19 VOLUME 293647.190 5021783.120 314.600
   LOCATION RD39 VOLUME 293768.260 5021790.310 314.600
   LOCATION RD40 VOLUME 293773.720 5021793.030 314.600
   LOCATION RD41 VOLUME 293778.660 5021796.620 314.600
   LOCATION RD42 VOLUME 293783.600 5021800.210 314.600
   LOCATION RD43 VOLUME 293788.540 5021803.800 314.600
   LOCATION RD44 VOLUME 293792.070 5021808.770 314.600
   LOCATION RD45 VOLUME 293795.600 5021813.740 314.600
   LOCATION RD46 VOLUME 293799.130 5021818.710 314.600
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   LOCATION RD47 VOLUME 293803.180 5021825.170 314.600
   LOCATION RD48 VOLUME 293807.230 5021831.630 314.600
   LOCATION RD49 VOLUME 293811.230 5021838.090 314.600
   LOCATION RD50 VOLUME 293816.640 5021847.660 314.600
   LOCATION RD51 VOLUME 293822.050 5021857.230 314.600
   LOCATION RD52 VOLUME 293829.400 5021868.810 314.600
   LOCATION RD53 VOLUME 293837.580 5021880.940 314.600
   LOCATION RD54 VOLUME 293845.760 5021893.070 314.600
   LOCATION RD55 VOLUME 293853.940 5021905.200 314.600
   LOCATION RD56 VOLUME 293862.120 5021917.330 314.600
   LOCATION RD57 VOLUME 293870.300 5021929.460 314.600
   LOCATION RD58 VOLUME 293878.480 5021941.590 314.600
   LOCATION RD59 VOLUME 293886.660 5021953.720 314.600
   LOCATION RD60 VOLUME 293894.840 5021965.850 314.600
   LOCATION RD61 VOLUME 293903.020 5021977.980 314.600
   LOCATION RD62 VOLUME 293911.200 5021990.110 314.600
   LOCATION RD63 VOLUME 293919.380 5022002.240 314.600
   LOCATION RD64 VOLUME 293927.560 5022014.370 314.600
   LOCATION RD65 VOLUME 293935.740 5022026.500 314.600
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   LOCATION RDB VOLUME 293969.010 5022031.910 314.600
** Source Parameters **
   SRCPARAM FIBRO 5.97 91.440 405.000 24.40000 2.490
   SRCPARAM LIME 0.03 15.500 293.000 7.77000 0.300
   SRCPARAM ASH 0.0011 26.200 293.000 0.32000 0.305
   SRCPARAM FUEL 0.27 23.000 293.000 9.14000 1.570
   SRCPARAM RD1 0.00026 3.510 2.840 1.630
   SRCPARAM RD2 0.00026 3.510 2.840 1.630
   SRCPARAM RD3 0.00026 3.510 2.840 1.630
   SRCPARAM RD4 0.00026 3.510 2.840 1.630
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   SRCPARAM RD10 0.00026 3.510 2.840 1.630
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   SRCPARAM RD41 0.00026 3.510 2.840 1.630
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   SRCPARAM RDB 0.00208 3.510 11.256 1.630
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   BUILDHGT FIBRO 25.90 25.90 25.90 25.90 25.90 25.90
   BUILDHGT FIBRO 25.90 25.90 42.70 42.70 42.70 42.70
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   BUILDHGT FIBRO 25.90 25.90 42.70 42.70 42.70 42.70
   BUILDHGT LIME 42.70 42.70 42.70 42.70 42.70 42.70
   BUILDHGT LIME 42.70 42.70 42.70 42.70 42.70 42.70
   BUILDHGT LIME 42.70 42.70 42.70 42.70 42.70 42.70
   BUILDHGT LIME 42.70 42.70 42.70 42.70 42.70 42.70
   BUILDHGT LIME 42.70 42.70 42.70 42.70 42.70 42.70
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   BUILDHGT ASH 42.70 42.70 42.70 38.40 25.90 25.90
   BUILDHGT ASH 25.90 25.90 25.90 25.90 25.90 25.90
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   BUILDHGT ASH 42.70 42.70 42.70 38.40 25.90 25.90
   BUILDHGT ASH 25.90 25.90 25.90 25.90 25.90 25.90
   BUILDHGT FUEL 21.90 21.90 25.60 28.30 28.30 38.40
   BUILDHGT FUEL 42.70 42.70 42.70 42.70 42.70 21.90
   BUILDHGT FUEL 21.90 21.90 21.90 21.90 21.90 21.90
   BUILDHGT FUEL 21.90 21.90 25.60 28.30 28.30 38.40
   BUILDHGT FUEL 42.70 28.30 28.30 28.30 42.70 21.90
   BUILDHGT FUEL 21.90 21.90 21.90 21.90 21.90 21.90
   BUILDWID FIBRO 37.41 40.19 40.19 32.80 48.80 49.61
   BUILDWID FIBRO 143.76 142.42 136.76 140.81 143.77 142.37
   BUILDWID FIBRO 101.90 108.85 40.19 40.19 39.34 33.82
   BUILDWID FIBRO 37.41 40.19 40.19 32.80 48.80 49.61
   BUILDWID FIBRO 143.76 142.42 136.76 140.81 143.77 142.37
   BUILDWID FIBRO 101.90 108.85 40.19 40.19 39.34 33.82
   BUILDWID LIME 37.41 42.19 45.70 47.81 48.48 47.67
   BUILDWID LIME 45.41 41.77 36.86 40.08 44.20 46.99
   BUILDWID LIME 48.35 48.23 46.66 43.66 39.34 33.82
   BUILDWID LIME 37.41 42.19 45.70 47.81 48.48 47.67
   BUILDWID LIME 45.41 41.77 36.86 40.08 44.20 46.99
   BUILDWID LIME 48.35 48.23 46.66 43.66 39.34 33.82
   BUILDWID ASH 67.64 88.65 45.70 47.81 48.48 47.67
   BUILDWID ASH 45.41 41.77 36.86 57.22 79.28 91.86
   BUILDWID ASH 101.90 108.85 112.50 95.86 75.78 53.40
   BUILDWID ASH 67.64 88.65 45.70 47.81 48.48 47.67
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BUILDWID ASH 45.41 41.77 36.86 57.22 79.28 91.86
BUILDWID ASH 101.90 108.85 112.50 95.86 75.78 53.40
BUILDWID FUEL 59.15 72.66 52.70 46.51 48.80 56.47
BUILDWID FUEL 45.41 41.77 36.86 40.08 44.20 101.86
BUILDWID FUEL 100.08 95.25 87.54 77.16 64.44 49.76
BUILDWID FUEL 59.15 72.66 87.90 46.51 48.80 56.47
BUILDWID FUEL 45.41 46.73 43.12 45.54 44.20 101.86
BUILDWID FUEL 100.08 95.25 87.54 77.16 64.44 49.76
BUILDLEN FIBRO 40.08 44.20 46.99 38.52 47.53 44.35
BUILDLEN FIBRO 95.86 75.78 53.40 67.64 88.65 106.98
BUILDLEN FIBRO 88.72 87.28 47.67 45.41 41.77 36.86
BUILDLEN FIBRO 40.08 44.20 46.99 38.52 47.53 44.35
BUILDLEN FIBRO 95.86 75.78 53.40 67.64 88.65 106.98
BUILDLEN FIBRO 88.72 87.28 47.67 45.41 41.77 36.86
BUILDLEN LIME 40.08 44.20 46.99 48.35 48.23 46.66
BUILDLEN LIME 43.66 39.34 33.82 37.41 42.19 45.70
BUILDLEN LIME 47.81 48.48 47.67 45.41 41.77 36.86
BUILDLEN LIME 40.08 44.20 46.99 48.35 48.23 46.66
BUILDLEN LIME 43.66 39.34 33.82 37.41 42.19 45.70
BUILDLEN LIME 47.81 48.48 47.67 45.41 41.77 36.86
BUILDLEN ASH 140.81 143.77 46.99 48.35 48.23 46.66
BUILDLEN ASH 43.66 39.34 33.82 37.41 98.11 91.44
BUILDLEN ASH 88.72 87.28 83.18 143.76 142.42 136.76
BUILDLEN ASH 140.81 143.77 46.99 48.35 48.23 46.66
BUILDLEN ASH 43.66 39.34 33.82 37.41 98.11 91.44
BUILDLEN ASH 88.72 87.28 83.18 143.76 142.42 136.76
BUILDLEN FUEL 96.18 100.55 68.04 49.28 47.53 46.66
BUILDLEN FUEL 43.66 39.34 33.82 37.41 42.19 83.95
BUILDLEN FUEL 92.69 98.62 101.55 101.40 98.16 91.94
BUILDLEN FUEL 96.18 100.55 112.12 49.28 47.53 46.66
BUILDLEN FUEL 43.66 34.07 27.29 31.64 42.19 83.95
BUILDLEN FUEL 92.69 98.62 101.55 101.40 98.16 91.94
XBADJ    FIBRO 63.41 44.20 46.99 49.61 52.70 48.95
XBADJ    FIBRO -116.45 -104.31 -89.00 -90.11 -92.90 -92.86
XBADJ    FIBRO -75.95 -87.00 47.67 45.41 -103.37 -102.68
XBADJ    FIBRO -103.48 44.20 46.99 -88.13 -100.24 -93.29
XBADJ    FIBRO 20.59 28.53 35.60 22.47 4.24 -14.12
XBADJ    FIBRO -12.77 -0.27 47.67 45.41 61.60 65.81
XBADJ    LIME 3.36 -1.32 -5.96 -10.42 -14.56 -18.26
XBADJ    LIME -21.41 -23.90 -25.67 -31.72 -37.98 -43.09
XBADJ    LIME -46.88 -49.25 -50.13 -49.48 -47.33 -43.74
XBADJ    LIME -43.44 -42.89 -41.03 -37.93 -33.67 -28.40
XBADJ    LIME -22.26 -15.44 -8.15 -5.68 -4.21 -2.61
XBADJ    LIME -0.93 0.78 2.46 4.07 5.56 6.87
XBADJ    ASH -146.82 -145.52 38.64 43.02 46.09 47.76
XBADJ    ASH 47.98 46.75 44.09 35.03 9.19 7.75
XBADJ    ASH -0.66 -13.01 -24.96 -1.02 3.80 8.50
XBADJ    ASH 6.02 1.75 -85.63 -91.36 -94.32 -94.42
XBADJ    ASH -91.65 -86.09 -77.91 -72.44 -107.30 -99.19
XBADJ    ASH -88.07 -74.27 -58.22 -142.74 -146.23 -145.27
XBADJ    FUEL -80.86 -77.65 -137.95 -82.59 -87.33 -117.17
XBADJ    FUEL -122.90 -124.89 -123.09 -122.61 -119.58 -4.28
XBADJ    FUEL -5.55 -6.65 -7.55 -8.22 -8.65 -8.81
XBADJ    FUEL -15.32 -22.90 25.83 33.32 39.79 70.52
XBADJ    FUEL 79.24 51.37 52.22 45.50 77.38 -79.67
XBADJ    FUEL -87.15 -91.97 -94.00 -93.17 -89.52 -83.14
YBADJ    FIBRO 11.92 44.20 46.99 24.02 24.13 37.04
YBADJ    FIBRO -6.10 -17.90 -29.17 -39.54 -48.71 -56.41
YBADJ    FIBRO 53.19 45.81 47.67 45.41 17.34 2.75
YBADJ    FIBRO -11.92 44.20 46.99 -24.02 -24.13 -37.04
YBADJ    FIBRO 6.10 17.90 29.17 39.54 48.71 56.41
YBADJ    FIBRO -53.19 -45.81 47.67 45.41 -17.34 -2.75
YBADJ    LIME 13.02 16.89 20.24 22.98 25.01 26.29
YBADJ    LIME 26.77 26.44 25.30 23.40 20.78 17.54
YBADJ    LIME 13.75 9.56 5.07 0.42 -4.23 -8.76
YBADJ    LIME -13.02 -16.89 -20.24 -22.98 -25.01 -26.29
YBADJ    LIME -26.77 -26.44 -25.30 -23.40 -20.78 -17.54
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   YBADJ    LIME -13.75 -9.56 -5.07 -0.42 4.23 8.76
   YBADJ    ASH -9.36 -22.49 -34.57 -23.25 -11.23 1.13
   YBADJ    ASH 13.46 25.38 36.53 37.99 37.86 46.74
   YBADJ    ASH 54.07 59.76 63.63 -30.10 -17.34 -4.05
   YBADJ    ASH 9.36 22.49 34.57 23.25 11.23 -1.13
   YBADJ    ASH -13.46 -25.38 -36.53 -37.99 -37.86 -46.74
   YBADJ    ASH -54.07 -59.76 -63.63 30.10 17.34 4.05
   YBADJ    FUEL -28.19 -33.45 19.56 37.34 26.71 45.41
   YBADJ    FUEL 32.76 14.71 -3.79 -22.17 -39.87 -21.15
   YBADJ    FUEL -14.28 -6.98 0.53 8.03 15.28 22.07
   YBADJ    FUEL 28.19 33.45 -37.16 -37.34 -26.71 -45.41
   YBADJ    FUEL -32.76 8.65 20.39 31.52 39.87 21.15
   YBADJ    FUEL 14.28 6.98 -0.53 -8.03 -15.28 -22.07
   CONCUNIT 1000000 (GRAMS/SEC) (MICROGRAMS/CUBIC-METER)
   SRCGROUP ALL
SO FINISHED
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** THISFILE: FIBSEP04.SO2
** FIBSEP04:
** FIBSEP04: FIBROMINN, SWIFT COUNTY. UPDATED PM10 PSD MODELING.
** FIBSEP04:
** FIBSEP04: REFERENCE:
** FIBSEP04: 9/24/04 SUBMITTAL TO MPCA BY ALTERNATIVE RESOURCES, INC ON BEHALF
** FIBSEP04: OF FIBROMINN LLC, "UPDATED AIR QUALITY IMPACTS ANALYSIS
** FIBSEP04: FOR MINOR DESIGN CHANGES FOR THE FIBROMINN BIOMASS POWER PLANT,
** FIBSEP04: BENSON, MINNESOTA."
** FIBSEP04:
** FIBSEP04: REFERENCE FOR SO2 AND NOX EMISSION RATES:
** FIBSEP04: 8/15/02 LETTER FROM TERENCE WALMSLEY, FIBROMINN, REVISED VOL.3:
** FIBSEP04: "APPLICATION FOR PREVENTION OF SIGNIFICANT DETERIORATION (PSD)
** FIBSEP04: PERMIT TO CONSTRUCT, AND A FEDERAL PART-70 PERMIT TO OPERATE FOR
THE
** FIBSEP04: FIBROMINN BIOMASS POWER PLANT, BENSON, MINNESOTA,
** FIBSEP04: VOLUME 3 OF 3 (REVISED AUGUST, 2002)", DATED AUGUST 15, 2002.
** FIBSEP04: OUTPUT AND RELATED FILES, MAY 6, 2002" WITH CD-ROM TITLED:
** FIBSEP04: "1233-4 FIBROMINN 8/1/02 ALTERNATIVE RESOURCES, INC."
** FIBSEP04:
** FIBSEP04: NOTE: SO2 & NOX INCREMENT FILES UPDATED BY MPCA FROM NEW PM10
** FIBSEP04: SOURCE PARAMETERS (ONLY MAIN STACK EMITS SO2 & NOX)

SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
   LOCATION FIBROST POINT 293822.709 5022056.310 314.600
   SRCPARAM FIBROST 23.00 91.440 405.000 24.40000 2.490
   LOCATION FIBROLT POINT 293822.709 5022056.310 314.600
   SRCPARAM FIBROLT 16.90 91.440 405.000 24.40000 2.490
   BUILDHGT FIBROST 42.70 42.70 42.70 28.30 28.30 28.30
   BUILDHGT FIBROST 25.90 25.90 25.90 25.90 25.90 25.90
   BUILDHGT FIBROST 25.90 25.90 42.70 42.70 42.70 42.70
   BUILDHGT FIBROST 42.70 42.70 42.70 28.30 28.30 28.30
   BUILDHGT FIBROST 25.90 25.90 25.90 25.90 25.90 25.90
   BUILDHGT FIBROST 25.90 25.90 42.70 42.70 42.70 42.70
   BUILDWID FIBROST 37.41 40.19 40.19 32.80 48.80 49.61
   BUILDWID FIBROST 143.76 142.42 136.76 140.81 143.77 142.37
   BUILDWID FIBROST 101.90 108.85 40.19 40.19 39.34 33.82
   BUILDWID FIBROST 37.41 40.19 40.19 32.80 48.80 49.61
   BUILDWID FIBROST 143.76 142.42 136.76 140.81 143.77 142.37
   BUILDWID FIBROST 101.90 108.85 40.19 40.19 39.34 33.82
   BUILDLEN FIBROST 40.08 44.20 46.99 38.52 47.53 44.35
   BUILDLEN FIBROST 95.86 75.78 53.40 67.64 88.65 106.98
   BUILDLEN FIBROST 88.72 87.28 47.67 45.41 41.77 36.86
   BUILDLEN FIBROST 40.08 44.20 46.99 38.52 47.53 44.35
   BUILDLEN FIBROST 95.86 75.78 53.40 67.64 88.65 106.98
   BUILDLEN FIBROST 88.72 87.28 47.67 45.41 41.77 36.86
   XBADJ    FIBROST 63.41 44.20 46.99 49.61 52.70 48.95
   XBADJ    FIBROST -116.45 -104.31 -89.00 -90.11 -92.90 -92.86
   XBADJ    FIBROST -75.95 -87.00 47.67 45.41 -103.37 -102.68
   XBADJ    FIBROST -103.48 44.20 46.99 -88.13 -100.24 -93.29
   XBADJ    FIBROST 20.59 28.53 35.60 22.47 4.24 -14.12
   XBADJ    FIBROST -12.77 -0.27 47.67 45.41 61.60 65.81
   YBADJ    FIBROST 11.92 44.20 46.99 24.02 24.13 37.04
   YBADJ    FIBROST -6.10 -17.90 -29.17 -39.54 -48.71 -56.41
   YBADJ    FIBROST 53.19 45.81 47.67 45.41 17.34 2.75
   YBADJ    FIBROST -11.92 44.20 46.99 -24.02 -24.13 -37.04
   YBADJ    FIBROST 6.10 17.90 29.17 39.54 48.71 56.41
   YBADJ    FIBROST -53.19 -45.81 47.67 45.41 -17.34 -2.75
   BUILDHGT FIBROLT 42.70 42.70 42.70 28.30 28.30 28.30
   BUILDHGT FIBROLT 25.90 25.90 25.90 25.90 25.90 25.90
   BUILDHGT FIBROLT 25.90 25.90 42.70 42.70 42.70 42.70
   BUILDHGT FIBROLT 42.70 42.70 42.70 28.30 28.30 28.30
   BUILDHGT FIBROLT 25.90 25.90 25.90 25.90 25.90 25.90
   BUILDHGT FIBROLT 25.90 25.90 42.70 42.70 42.70 42.70
   BUILDWID FIBROLT 37.41 40.19 40.19 32.80 48.80 49.61
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   BUILDWID FIBROLT 143.76 142.42 136.76 140.81 143.77 142.37
   BUILDWID FIBROLT 101.90 108.85 40.19 40.19 39.34 33.82
   BUILDWID FIBROLT 37.41 40.19 40.19 32.80 48.80 49.61
   BUILDWID FIBROLT 143.76 142.42 136.76 140.81 143.77 142.37
   BUILDWID FIBROLT 101.90 108.85 40.19 40.19 39.34 33.82
   BUILDLEN FIBROLT 40.08 44.20 46.99 38.52 47.53 44.35
   BUILDLEN FIBROLT 95.86 75.78 53.40 67.64 88.65 106.98
   BUILDLEN FIBROLT 88.72 87.28 47.67 45.41 41.77 36.86
   BUILDLEN FIBROLT 40.08 44.20 46.99 38.52 47.53 44.35
   BUILDLEN FIBROLT 95.86 75.78 53.40 67.64 88.65 106.98
   BUILDLEN FIBROLT 88.72 87.28 47.67 45.41 41.77 36.86
   XBADJ    FIBROLT 63.41 44.20 46.99 49.61 52.70 48.95
   XBADJ    FIBROLT -116.45 -104.31 -89.00 -90.11 -92.90 -92.86
   XBADJ    FIBROLT -75.95 -87.00 47.67 45.41 -103.37 -102.68
   XBADJ    FIBROLT -103.48 44.20 46.99 -88.13 -100.24 -93.29
   XBADJ    FIBROLT 20.59 28.53 35.60 22.47 4.24 -14.12
   XBADJ    FIBROLT -12.77 -0.27 47.67 45.41 61.60 65.81
   YBADJ    FIBROLT 11.92 44.20 46.99 24.02 24.13 37.04
   YBADJ    FIBROLT -6.10 -17.90 -29.17 -39.54 -48.71 -56.41
   YBADJ    FIBROLT 53.19 45.81 47.67 45.41 17.34 2.75
   YBADJ    FIBROLT -11.92 44.20 46.99 -24.02 -24.13 -37.04
   YBADJ    FIBROLT 6.10 17.90 29.17 39.54 48.71 56.41
   YBADJ    FIBROLT -53.19 -45.81 47.67 45.41 -17.34 -2.75
   CONCUNIT 1000000 (GRAMS/SEC) (MICROGRAMS/CUBIC-METER)
   SRCGROUP ALLST FIBROST
   SRCGROUP ALLLT FIBROLT
SO FINISHED
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CO STARTING
CO TITLEONE MINNESOTA VALLEY - ALL SOURCES - SV003 OPERATES 8-4
CO TITLETWO NAD83
CO MODELOPT DFAULT CONC   Rural
CO AVERTIME 24 ANNUAL
CO POLLUTID PM10
CO MULTYEAR H6H pmall87.SAV
CO EVENTFIL pmall87.EVT SOCONT
CO TERRHGTS Elev
CO RUNORNOT RUN
CO ERRORFIL ERRORS.LST
CO FINISHED

SO STARTING
** Point Sources
SO LOCATION     SV001      POINT          299988.6   4964059.5     277.4
SO LOCATION     SV002      POINT          300008.4   4964051.5     277.4
SO LOCATION     SV003      POINT          299998.4   4964209.8     277.4
SO LOCATION     SV004      POINT          299985.6   4964051.2     277.4
SO LOCATION     SV005      POINT          299985.6   4964053.9     277.4

**Process Fugitive Sources
SO LOCATION     IA001UR    AREA           300037.3   4964168.7     277.4
SO LOCATION     IA001WE    AREA           300037.3   4964168.7     277.4
SO LOCATION     IA002UR    AREA           300175.3   4964026.4     277.4
SO LOCATION     IA002WE    AREA           300175.3   4964026.4     277.4
SO LOCATION     IA003      AREA           299989.8   4964066.9     277.4
SO LOCATION     FS001      AREA           299867.1   4964159.5     277.4
SO LOCATION     FS002      AREA           299867.1   4964159.5     277.4
SO LOCATION     FS003      AREA           299867.1   4964159.5     277.4
SO LOCATION     FS004      AREA           299872.6   4964180.2     277.4
SO LOCATION     FS005WE    AREA           299867.3   4964170.1     277.4
SO LOCATION     FS005UR    AREA           299867.3   4964170.1     277.4
SO LOCATION     FS005PM    AREA           299867.3   4964170.1     277.4
SO LOCATION     FS006      AREA           299856.7   4964215.1     277.4
SO LOCATION     FS007      AREA           299987.6   4964222.3     277.4


**Process Unpaved Road Fugitive Sources
**  1.  Fly Ash Transport from Disposal Basin to Plant Access Road
SO LOCATION     IA004011   AREA           300195.6   4964094.4     277.4
**  2.  Coke Storage Stockpile to Crusher Hopper
SO LOCATION     IA004021   AREA           299972.6   4964183.6     277.4
SO LOCATION     IA004022   AREA           299954.1   4964216.9     277.4
**  3.  Coal Storage Stockpile to Crusher Hopper
SO LOCATION     IA004031   AREA           299907.8   4964225.4     277.4
SO LOCATION     IA004032   AREA           299856.7   4964232.6     277.4
**  4.  Coal Storage Stockpile to Alternate Plant Access Road
SO LOCATION     IA004041   AREA           299828.4   4964255.3     277.4
**  5.  Alternate Plant Access Road
SO LOCATION     IA004051   AREA           299779.3   4964236.5     277.4
SO LOCATION     IA004052   AREA           299729.5   4964203.0     277.4
SO LOCATION     IA004053   AREA           299679.8   4964169.4     277.4
**  Paved Road Fugitive Sources
**  A.  Plant Access Rd. (N. of Ash Disposal Basins) to Alternate Plant Ent.
SO LOCATION     IA004A01   AREA           300123.3   4964109.5     277.4
SO LOCATION     IA004A02   AREA           300043.5   4964080.5     277.4
SO LOCATION     IA004A03   AREA           299983.3   4964070.2     277.4
SO LOCATION     IA004A04   AREA           299923.1   4964070.2     277.4
SO LOCATION     IA004A05   AREA           299869.0   4964111.9     277.4
SO LOCATION     IA004A06   AREA           299820.2   4964154.3     277.4
**  B.  East Gate to Plant Access Road North of Ash Disposal Basins
SO LOCATION     IA004B01   AREA           300197.7   4964150.2     277.4
**  C.   US Highway 212 Entrance to Alternate Plant Entrance
SO LOCATION     IA004C01   AREA           299685.4   4964151.2     277.4
SO LOCATION     IA004C02   AREA           299753.4   4964151.2     277.4
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**HOUR/CONTROL FACTORS FOR PROCESS FUGITIVES
SO EMISFACT SV003 HROFDY 7*0.0 8*1.0 9*0.0
SO EMISFACT FS001-FS004 HROFDY 6*0.0 10*1.0 8*0.0
SO EMISFACT FS005UR HROFDY 6*0.0 10*1.0 8*0.0
SO EMISFACT FS005PM HROFDY 6*0.0 10*1.0 8*0.0
SO EMISFACT FS006 HROFDY 6*0.0 10*1.0 8*0.0
SO EMISFACT FS007 HROFDY 6*0.0 10*1.0 8*0.0
SO EMISFACT IA001UR HROFDY 6*0.0 10*1.0 8*0.0
SO EMISFACT IA003 HROFDY 6*0.0 10*0.15 8*0.0

SO EMISFACT IA004011 HROFDY 6*0.0 10*1.0 8*0.0
SO EMISFACT IA004021-IA004022 HROFDY 6*0.0 10*0.5 8*0.0
SO EMISFACT IA004031-IA004032 HROFDY 6*0.0 10*0.5 8*0.0
SO EMISFACT IA004041 HROFDY 6*0.0 10*0.5 8*0.0
SO EMISFACT IA004051-IA004053 HROFDY 6*0.0 10*0.5 8*0.0
SO EMISFACT IA004A01-IA004A06 HROFDY 6*0.0 10*1.0 8*0.0
SO EMISFACT IA004B01 HROFDY 6*0.0 10*1.0 8*0.0
SO EMISFACT IA004C01-IA004C02 HROFDY 6*0.0 10*1.0 8*0.0
SO EMISFACT IA002UR HROFDY 6*0.0 10*1.0 8*0.0


**WIND EROSION - WS SCALER (CONSIDERS 50% AND 90% CONTROL)
SO EMISFACT FS005WE STAR 0.0 8.84 32.40 65.04 106.82 286.92
SO EMISFACT FS005WE STAR 0.0 8.84 32.40 65.04 106.82 286.92
SO EMISFACT FS005WE STAR 0.0 8.84 32.40 65.04 106.82 286.92
SO EMISFACT FS005WE STAR 0.0 8.84 32.40 65.04 106.82 286.92
SO EMISFACT FS005WE STAR 0.0 8.84 32.40 65.04 106.82 286.92
SO EMISFACT FS005WE STAR 0.0 8.84 32.40 65.04 106.82 286.92
SO EMISFACT IA001WE STAR 0.0 8.84 32.40 65.04 106.82 286.92
SO EMISFACT IA001WE STAR 0.0 8.84 32.40 65.04 106.82 286.92
SO EMISFACT IA001WE STAR 0.0 8.84 32.40 65.04 106.82 286.92
SO EMISFACT IA001WE STAR 0.0 8.84 32.40 65.04 106.82 286.92
SO EMISFACT IA001WE STAR 0.0 8.84 32.40 65.04 106.82 286.92
SO EMISFACT IA001WE STAR 0.0 8.84 32.40 65.04 106.82 286.92
SO EMISFACT IA002WE STAR 0.0 4.42 16.20 32.52  53.41 143.46
SO EMISFACT IA002WE STAR 0.0 4.42 16.20 32.52  53.41 143.46
SO EMISFACT IA002WE STAR 0.0 4.42 16.20 32.52  53.41 143.46
SO EMISFACT IA002WE STAR 0.0 4.42 16.20 32.52  53.41 143.46
SO EMISFACT IA002WE STAR 0.0 4.42 16.20 32.52  53.41 143.46
SO EMISFACT IA002WE STAR 0.0 4.42 16.20 32.52  53.41 143.46

**  Point Source Parameters
**                                Q: (g/s)   Ht. (m)      T (K)        V (m/s)
dia (m)
SO SRCPARAM     SV001          40.8240        84.43        418.0      10.74
3.66
SO SRCPARAM     SV002           0.3175        39.62        449.7       7.08
0.41
SO SRCPARAM     SV003           0.1190         3.66        294.1      21.01
0.56
SO SRCPARAM     SV004           0.0810        30.02        294.1       0.01
0.36
SO SRCPARAM     SV005           0.0810        30.02        294.1       0.01
0.36

**  Area Source Input into ISC3
**                          g/sm2      H             X Dim        Y Dim
Angle
** Process Fugitives
SO SRCPARAM     IA001UR     4.7061E-05          3.0         43.8       37.4
0
SO SRCPARAM     IA001WE     8.6660E-07          3.0         43.8       37.4
0
SO SRCPARAM     IA002UR     4.0427E-07          3.0         57.4       68.7
0
SO SRCPARAM     IA002WE     8.2087E-06          3.0         57.4       68.7
0
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SO SRCPARAM     IA003       9.1197E-04          30.0          4.4        3.7
0
SO SRCPARAM     FS001       1.4303E-04           3.0         15.9        6.5
0
SO SRCPARAM     FS002       1.4303E-04           3.0         15.9        6.5
0
SO SRCPARAM     FS003       1.4303E-04           3.0         15.9        6.5
0
SO SRCPARAM     FS004       1.0397E-03          15.0          4.0        3.6
0
SO SRCPARAM     FS005WE     2.6896E-06          10.0         82.0       65.5
0
SO SRCPARAM     FS005UR     6.8809E-07          10.0         82.0       65.5
0
SO SRCPARAM     FS005PM     1.1653E-05          10.0         82.0       65.5
0
SO SRCPARAM     FS006       3.3213E-05           3.0         10.6       17.5
0
SO SRCPARAM     FS007       6.3992E-05           3.0          8.4        8.3
0

** Unpaved Road Fugitives
**  1.  Ash Transport from Disposal Basin to Plant Access Road
SO SRCPARAM     IA004011    5.8748E-06            3         10.0       43.6
0
**  2.  Coke Storage Stockpile to Crusher Hopper
SO SRCPARAM     IA004021    7.0764E-05            3         64.8       10.0
0.0
SO SRCPARAM     IA004022    7.0764E-05            3         32.2       10.0
74.0
**  3.  Coal Storage Stockpile to Crusher Hopper
SO SRCPARAM     IA004031    2.1475E-04            3         51.6       10.0
8.0
SO SRCPARAM     IA004032    2.1475E-04            3         51.6       10.0
8.0
**  4.  Coal Storage Stockpile to Alternate Plant Access Road
SO SRCPARAM     IA004041    7.3341E-05            3         33.6       10.0
40.0
**  5.  Alternate Plant Access Road
SO SRCPARAM     IA004051    7.3341E-05            3         10.0       60.0
56.0
SO SRCPARAM     IA004052    7.3341E-05            3         10.0       60.0
56.0
SO SRCPARAM     IA004053    7.3341E-05            3         10.0       60.0
56.0

**  Paved Road Fugitive Sources
**  A.  Plant Access Rd. (N. of Ash Disposal Basins) to Alternate Plant Ent.
SO SRCPARAM     IA004A01    1.0867E-04            3         10.0       85.8
61
SO SRCPARAM     IA004A02    1.0867E-04            3         10.0       85.8
70
SO SRCPARAM     IA004A03    1.0867E-04            3         60.2       10.0
0
SO SRCPARAM     IA004A04    1.0867E-04            3         60.2       10.0
0
SO SRCPARAM     IA004A05    1.0867E-04            3         64.6       10.0
41
SO SRCPARAM     IA004A06    1.0867E-04            3         64.6       10.0
41
**  B.  East Gate to Plant Access Road North of Ash Disposal Basins
SO SRCPARAM     IA004B01    1.4815E-04            3         10.0       82.4
49
**  C.   US Highway 212 Entrance to Alternate Plant Entrance
SO SRCPARAM     IA004C01    1.0867E-04            3         68.0       10.0
0
SO SRCPARAM     IA004C02    1.0867E-04            3         68.0       10.0
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0

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SO BUILDHGT SV001      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV001      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV001      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV001      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV001      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV001      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDWID SV001      29.49    31.68    32.91    33.14    32.37    30.61
SO BUILDWID SV001      27.92    24.38    20.10    24.38    27.92    30.61
SO BUILDWID SV001      32.37    33.14    32.91    31.68    29.49    26.40
SO BUILDWID SV001      29.49    31.68    32.91    33.14    32.37    30.61
SO BUILDWID SV001      27.92    24.38    20.10    24.38    27.92    30.61
SO BUILDWID SV001      32.37    33.14    32.91    31.68    29.49    26.40
SO BUILDHGT SV002      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV002      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV002      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV002      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV002      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV002      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDWID SV002      29.49    31.68    32.91    33.14    32.37    30.61
SO BUILDWID SV002      27.92    24.38    20.10    24.38    27.92    30.61
SO BUILDWID SV002      32.37    33.14    32.91    31.68    29.49    26.40
SO BUILDWID SV002      29.49    31.68    32.91    33.14    32.37    30.61
SO BUILDWID SV002      27.92    24.38    20.10    24.38    27.92    30.61
SO BUILDWID SV002      32.37    33.14    32.91    31.68    29.49    26.40
SO BUILDHGT SV003       9.14     9.14     9.14     9.14     9.14     9.14
SO BUILDHGT SV003       9.14     9.14     9.14     9.14     9.14     9.14
SO BUILDHGT SV003       9.14     9.14     9.14     9.14     9.14     9.14
SO BUILDHGT SV003       9.14     9.14     9.14     9.14     9.14     9.14
SO BUILDHGT SV003       9.14     9.14     9.14     9.14     9.14     9.14
SO BUILDHGT SV003       9.14     9.14     9.14     9.14     9.14     9.14
SO BUILDWID SV003       9.15    10.01    10.58    10.82    10.73    10.32
SO BUILDWID SV003       9.60     8.58     7.30     8.58     9.60    10.32
SO BUILDWID SV003      10.73    10.82    10.58    10.01     9.15     8.00
SO BUILDWID SV003       9.15    10.01    10.58    10.82    10.73    10.32
SO BUILDWID SV003       9.60     8.58     7.30     8.58     9.60    10.32
SO BUILDWID SV003      10.73    10.82    10.58    10.01     9.15     8.00
SO BUILDHGT SV004      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV004      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV004      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV004      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV004      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV004      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDWID SV004      29.49    31.68    32.91    33.14    32.37    30.61
SO BUILDWID SV004      27.92    24.38    20.10    24.38    27.92    30.61
SO BUILDWID SV004      32.37    33.14    32.91    31.68    29.49    26.40
SO BUILDWID SV004      29.49    31.68    32.91    33.14    32.37    30.61
SO BUILDWID SV004      27.92    24.38    20.10    24.38    27.92    30.61
SO BUILDWID SV004      32.37    33.14    32.91    31.68    29.49    26.40
SO BUILDHGT SV005      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV005      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV005      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV005      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV005      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV005      36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDWID SV005      29.49    31.68    32.91    33.14    32.37    30.61
SO BUILDWID SV005      27.92    24.38    20.10    24.38    27.92    30.61
SO BUILDWID SV005      32.37    33.14    32.91    31.68    29.49    26.40
SO BUILDWID SV005      29.49    31.68    32.91    33.14    32.37    30.61
SO BUILDWID SV005      27.92    24.38    20.10    24.38    27.92    30.61
SO BUILDWID SV005      32.37    33.14    32.91    31.68    29.49    26.40

SO SRCGROUP ALL
SO FINISHED
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CO STARTING
CO TITLEONE MINNESOTA VALLEY - TWO POINT SOURCES - NOX
CO TITLETWO SV001 @ 100% LOAD - NAD83
CO MODELOPT DFAULT CONC   Rural
CO AVERTIME ANNUAL
CO POLLUTID NOX
CO EVENTFIL NOX10089.EVT SOCONT
CO TERRHGTS Elev
CO RUNORNOT RUN
CO ERRORFIL ERRORS.LST
CO FINISHED

SO STARTING
** Point Sources
SO LOCATION     SV001      POINT          299988.6   4964059.5     277.4
SO LOCATION     SV002      POINT          300008.4   4964051.5     277.4

**  Point Source Parameters
**                        Q: (g/s)   Ht. (m)      T (K)        V (m/s)   dia
(m)
SO SRCPARAM     SV001           82.026        84.43        418.0     10.74
3.66
SO SRCPARAM     SV002            0.113        39.62        449.7      7.08
0.41



SO BUILDHGT SV001       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV001       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV001       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV001       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV001       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV001       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDWID SV001       29.49    31.68    32.91    33.14    32.37    30.61
SO BUILDWID SV001       27.92    24.38    20.10    24.38    27.92    30.61
SO BUILDWID SV001       32.37    33.14    32.91    31.68    29.49    26.40
SO BUILDWID SV001       29.49    31.68    32.91    33.14    32.37    30.61
SO BUILDWID SV001       27.92    24.38    20.10    24.38    27.92    30.61
SO BUILDWID SV001       32.37    33.14    32.91    31.68    29.49    26.40
SO BUILDHGT SV002       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV002       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV002       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV002       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV002       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV002       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDWID SV002       29.49    31.68    32.91    33.14    32.37    30.61
SO BUILDWID SV002       27.92    24.38    20.10    24.38    27.92    30.61
SO BUILDWID SV002       32.37    33.14    32.91    31.68    29.49    26.40
SO BUILDWID SV002       29.49    31.68    32.91    33.14    32.37    30.61
SO BUILDWID SV002       27.92    24.38    20.10    24.38    27.92    30.61
SO BUILDWID SV002       32.37    33.14    32.91    31.68    29.49    26.40

SO SRCGROUP ALL
SO FINISHED


RE STARTING
RE ELEVUNIT FEET
```

```
CO STARTING
CO TITLEONE MINNESOTA VALLEY - TWO POINT SOURCES - SO2
CO TITLETWO SV001 @ 100% LOAD - NAD83
CO MODELOPT DFAULT CONC   Rural
CO AVERTIME 1 3 24 ANNUAL
CO POLLUTID SO2
CO EVENTFIL SO210091.EVT SOCONT
CO TERRHGTS Elev
CO RUNORNOT RUN
CO ERRORFIL ERRORS.LST
CO FINISHED

SO STARTING
** Point Sources
SO LOCATION     SV001      POINT          299988.6   4964059.5     277.4
SO LOCATION     SV002      POINT          300008.4   4964051.5     277.4

**  Point Source Parameters
**                                Q: (g/s)   Ht. (m)      T (K)       V (m/s)
dia (m)
SO SRCPARAM     SV001          272.16         84.43        418.0      10.74
3.66
SO SRCPARAM     SV002            0.5557       39.62        449.7       7.08
0.41


SO BUILDHGT SV001       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV001       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV001       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV001       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV001       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV001       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDWID SV001       29.49    31.68    32.91    33.14    32.37    30.61
SO BUILDWID SV001       27.92    24.38    20.10    24.38    27.92    30.61
SO BUILDWID SV001       32.37    33.14    32.91    31.68    29.49    26.40
SO BUILDWID SV001       29.49    31.68    32.91    33.14    32.37    30.61
SO BUILDWID SV001       27.92    24.38    20.10    24.38    27.92    30.61
SO BUILDWID SV001       32.37    33.14    32.91    31.68    29.49    26.40
SO BUILDHGT SV002       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV002       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV002       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV002       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV002       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDHGT SV002       36.58    36.58    36.58    36.58    36.58    36.58
SO BUILDWID SV002       29.49    31.68    32.91    33.14    32.37    30.61
SO BUILDWID SV002       27.92    24.38    20.10    24.38    27.92    30.61
SO BUILDWID SV002       32.37    33.14    32.91    31.68    29.49    26.40
SO BUILDWID SV002       29.49    31.68    32.91    33.14    32.37    30.61
SO BUILDWID SV002       27.92    24.38    20.10    24.38    27.92    30.61
SO BUILDWID SV002       32.37    33.14    32.91    31.68    29.49    26.40

SO SRCGROUP ALL
SO FINISHED
```

Northern Lights Ethanol Modeling Information

Robynn Andracsek - FW: Site plan for Northern Lights Ethanol

From: <TGraumann@otpco.com>
To: <RAndracsek@burnsmcd.com>
Date: 4/7/2005 4:17 PM
Subject: FW: Site plan for Northern Lights Ethanol

Robyn,

FYI

Have a Nice Day!

Terry

Terry Graumann

Terry Graumann
Manager, Environmental Services
Otter Tail Power Company
P.O. Box 496
215 S. Cascade
Fergus Falls, MN 56538-0496
Telephone: 218-739-8407 Fax: 218-739-8629
E-Mail: tgraumann@otpco.com

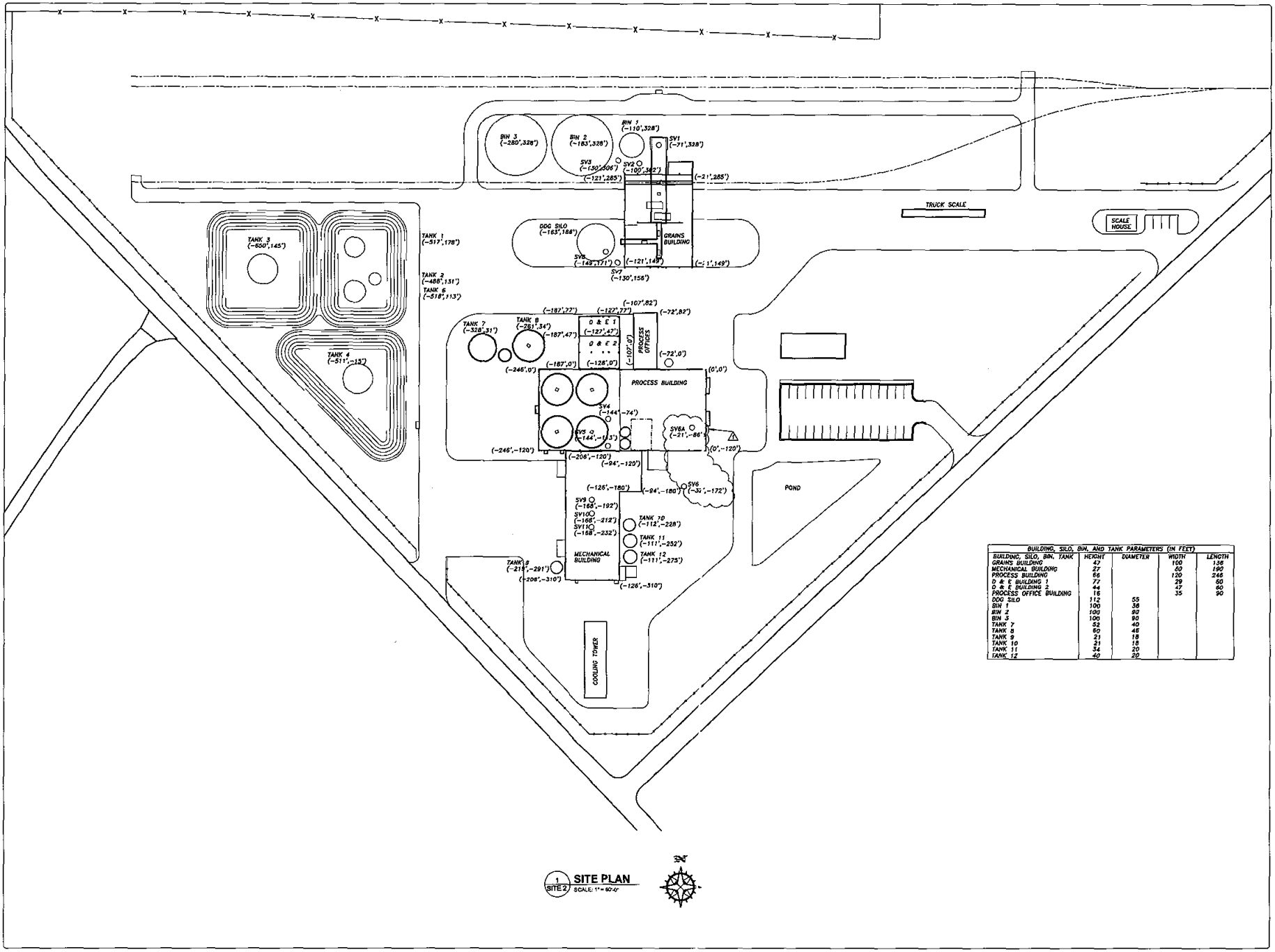
-----Original Message-----
From: Zigich, Daren [mailto:Daren.Zigich@broin.com]
Sent: Thursday, April 07, 2005 3:25 PM
To: Graumann, Terry
Subject: Site plan for Northern Lights Ethanol

Terry,

Here is a site plan for Northern Lights Ethanol. I have attached a pdf file for your viewing pleasure and the CAD file should be small enough to email on to whoever needs it. I will send you a table of the stack parameters and emission rates for the other stacks.

One thing I'm not sure about is whether or not you need to consider our SO2 emissions? We generally only burn natural gas except for those limited times in the winter when natural gas is curtailed and your Big Stone boiler is offline. In that scenario we run our boilers on the diesel fuel that Big Stone supplies to the plant. I don't have SO2 data for that case so we would just have to use emissions factors. We did test for NOx and PM which does increase over the natural gas rate. As you know, most of the time our boilers are offline. I will try to make a table that explains this further.

Sincerely,
Daren



BUILDING, SILO, BIN, AND TANK PARAMETERS (IN FEET)				
BUILDING, SILO, BIN, TANK	HEIGHT	DIAMETER	WIDTH	LENGTH
GRAINS BUILDING	47		100	136
MECHANICAL BUILDING	27		60	190
PROCESS BUILDING	66		120	246
D & E BUILDING 1	77		29	60
D & E BUILDING 2	44		47	60
PROCESS OFFICE BUILDING	16		35	90
DDG SILO	112	55		
BIN 1	100	36		
BIN 2	100	90		
BIN 3	100	90		
TANK 7	52	40		
TANK 8	60	46		
TANK 9	21	18		
TANK 10	21	18		
TANK 11	34	20		
TANK 12	40	20		

1 SITE 2 **SITE PLAN**
SCALE: 1" = 60'-0"

Plot Date: Apr 07, 2005 Plot Time: 11:25am File Name: F:\DWG\NLE\Civil\SITE 2.dwg, Layout: SITE 2 By: greggmik

B & A

BROIN & ASSOCIAT
PLANT DESIGN, ENGINEER
2209 E. 57th STREET N.
SIOUX FALLS, SD 57104
TEL. (605) 965-2200
FAX. (605) 965-2203

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Revisions:
1 04-09-02 RGG
ADDED SV6 & SV6A

Project Title
NORTHERN LIGHTS ETHAN LLC

BIG STONE CITY, SD

Sheet Title:
SITE PLAN FOR EMISSION

Project: N
Date: 06-20-
Drawn By: R
Checked By:
Copyright Broin & Assoc. 20

SITE 2

Robynn Andracsek - FW: Emissions and stack parameters for Northern Lights Ethanol

From: <TGraumann@otpco.com>
To: <RAndracsek@burnsmcd.com>
Date: 4/14/2005 12:06 PM
Subject: FW: Emissions and stack parameters for Northern Lights Ethanol
CC: <dhendry@burnsmcd.com>, <sgosoro@burnsmcd.com>, <tsundbom@burnsmcd.com>, <otpconus@burnsmcd.com>

Robyn,

The attached files provide the emissions information for the Northern Lights Ethanol Plant. Based on the attached information and the previous site map, it would appear that we may be missing specific location information. What are your thoughts?

Terry

Terry Graumann

Terry Graumann
Manager, Environmental Services
Otter Tail Power Company
P.O. Box 496
215 S. Cascade
Fergus Falls, MN 56538-0496
Telephone: 218-739-8407 Fax: 218-739-8629
E-Mail: tgraumann@otpco.com

-----Original Message-----
From: Zigich, Daren [mailto:Daren.Zigich@broin.com]
Sent: Wednesday, April 13, 2005 2:52 PM
To: Graumann, Terry
Subject: Emissions and stack parameters for Northern Lights Ethanol

Terry,

Sorry for the delay but here are some emission estimates and stack parameters for Northern Lights Ethanol. The high SO2 numbers are strictly from our ability to burn up to 0.5% fuel oil in the boilers. However, due to our annual 100 ton cap on all pollutants our ability to use oil is limited. The fuel oil also effects the PM and NOx numbers on the boilers. The site drawing I sent you last week shows a 3rd boiler stack (SV11). That unit was never permitted or installed so just disregard that extra stack.

If you have any questions please feel free to contact me. Also if your modelers want to discuss the fugitive emissions further, I would be happy to break those down further so that they may make a better assessment of their impacts.

Hope this helps.

Sincerely,
Daren K. Zigich, P.E.
Broin and Associates

Northern Lights Ethanol
Emissions Summary

Point Sources

Stack Vent	Process Unit	Dryer	Boiler	Control	VOC		PM-10		PM		NOx		CO		HAPs		SO2	
					lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY
1	1			BH	0.00	0.00	1.00	4.40	1.00	4.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2			BH	0.00	0.00	0.11	0.47	0.11	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	3			BH	0.00	0.00	0.39	1.69	0.39	1.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	4			WS/RCO	0.16	0.68	0.04	0.16	0.04	0.16	0.49	2.15	0.41	1.80	0.04	0.16	0.00	0.00
5	5			WS	0.91	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	6	1, 2		MC,RTO	12.56	55.02	3.52	15.42	3.52	15.42	12.68	55.54	15.50	67.89	1.13	4.95	negl.	negl.
7	7			BH	2.56	11.21	1.02	4.47	1.02	4.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	8			BH	0.00	0.00	0.04	0.16	0.04	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9			1		0.31	1.38	0.08	0.35	0.08	0.35	17.82	13.69	12.96	12.31	negl.	negl.	42.20	37.98
10			2		0.31	1.38	0.08	0.35	0.08	0.35	17.82	13.69	12.96	12.31	negl.	negl.	42.20	37.98
Total					16.82	73.66	6.27	27.46	6.27	27.46	48.81	85.06	41.83	94.31	1.17	5.11	84.40	75.96

BH - Baghouse RTO - Regenerative Thermal Oxidizer
WS - Wet Scrubber MC - Multi-Cyclone

Fugitive Sources	VOC		PM-10		PM	
	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY
Grain Receiving, loading and truck traffic	0.00	0.00	0.54	2.38	1.90	8.32
Equipment leaks and loading rack	4.56	19.96	0.00	0.00	0.00	0.00
Storage Tanks 1 - 6	0.32	1.41	0.00	0.00	0.00	0.00
Total	4.88	21.37	0.54	2.38	1.90	8.32

	VOC		PM-10		PM		NOx		CO		HAPs*		SO2	
	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY
Emissions Estimate	21.70	95.03	6.81	29.84	8.17	35.78	48.81	85.06	41.83	94.31	1.17	5.11	84.40	75.96

*Estimated HAPs speciation (Acetaldehyde=3.8 TPY, Formaldehyde=0.9 TPY, Methanol=0.2 TPY, Acrolein=0.2 TPY)

Northern Lights Ethanol Stack Vent Information

Stack Vent	Height	dia (in.)	temp F	discharge	flow (acfm)
SV1	85	36	70	horz.	23,450
SV2	68	12	70	horz.	2,500
SV3	15	16	70	horz.	9,000
SV4	68	32	450	vert.	17,000
SV5	68	8	70	vert.	1,200
SV6	100	66	300	vert.	90,000
SV7	15	26	90	vert.	23,800
SV8	112	4x6	70	horz.	850
SV9	32	36	410	vert.	30,000
SV10	32	36	410	vert.	30,000

From: <TGraumann@otpco.com>
To: <RAndracsek@burnsmcd.com>
Date: 4/18/2005 6:51:27 AM
Subject: FW: FW: Emissions and stack parameters for Northern LightsEthanol

Robyn,

Here are the answers to your questions from last week.

Terry

Terry Graumann
Manager, Environmental Services
Otter Tail Power Company
P.O. Box 496
215 S. Cascade
Fergus Falls, MN 56538-0496
Telephone: 218-739-8407 Fax: 218-739-8629
E-Mail: tgraumann@otpco.com

-----Original Message-----
From: Zigich, Daren [mailto:Daren.Zigich@broin.com]
Sent: Sunday, April 17, 2005 8:03 PM
To: Graumann, Terry
Subject: RE: FW: Emissions and stack parameters for Northern LightsEthanol

Terry,

Here are hopefully some answers.

1. As stated in an earlier email, stack vent 11 was never permitted or installed. Stack vent 6a is just an emergency dump stack for the dryers should the RTO go down. Unless you need to model our emissions during startup, shutdown and breakdown conditions, I would simply ignore stack 6a. We never try to operate more than about 30 minutes at a time through that stack. If it goes on longer than that we bring the dryers down.

2. I have some information that puts the slab of the process building (a good average elevation on the site) at 1104 feet ASL.

3. We usually do not include them in modeling our other sites but if you believe they are significant the dimensions are as follows:

Tanks 1 and 6 are 32 feet diameter and 32 feet tall
Tanks 3 and 4 are 60 feet diameter and 48 feet tall
Tank 2 is 23 feet diameter and 21 feet tall

The tanks are in a containment dike that further lowers their height above the surrounding ground level by 2 to 3 feet.

I Hope that helps.

Sincerely,
Daren

-----Original Message-----
From: TGraumann@otpco.com [mailto:TGraumann@otpco.com]
Sent: Thursday, April 14, 2005 3:45 PM
To: Zigich, Daren
Subject: FW: FW: Emissions and stack parameters for Northern LightsEthanol

Daren,

Are you able to respond to our modelers questions below?

Terry

Terry Graumann
Manager, Environmental Services
Otter Tail Power Company
P.O. Box 496
215 S. Cascade
Fergus Falls, MN 56538-0496
Telephone: 218-739-8407 Fax: 218-739-8629
E-Mail: tgraumann@otpco.com

-----Original Message-----
From: Robynn Andracsek [mailto:RAndracsek@burnsmcd.com]
Sent: Thursday, April 14, 2005 3:23 PM
To: Graumann, Terry
Cc: Dave Hendry; Stephen Gosoroski; Todd Sundbom
Subject: Re: FW: Emissions and stack parameters for Northern LightsEthanol

Terry-

Very good data. Just a couple of questions:

1) Should stacks 6a and 11 be modeled? They are on the map but not on the spreadsheet.

2) What is the base elevation of the site?

3) Dimensions were not provided for tanks 1-6. Any reason why they should be excluded? If not, please provide height and diameter.

Robynn Andracsek
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114
(816) 822-3596 phone
(816) 822-3494 fax
RAndracsek@burnsmcd.com

APPENDIX H

Visual Effects Screening Analysis for
Source: bsii
Class I Area: pipestone natl mon.

*** Level-1 Screening ***

Input Emissions for

Particulates	788.00	TON/YR
NOx (as NO2)	1840.00	TON/YR
Primary NO2	.00	TON/YR
Soot	.00	TON/YR
Primary SO4	.00	TON/YR

**** Default Particle Characteristics Assumed

Transport Scenario Specifications:

Background Ozone:	.04 ppm
Background Visual Range:	40.00 km
Source-Observer Distance:	145.00 km
Min. Source-Class I Distance:	145.00 km
Max. Source-Class I Distance:	145.00 km
Plume-Source-Observer Angle:	11.25 degrees
Stability:	6
Wind Speed:	1.00 m/s

R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	84.	145.0	84.	2.00	.151	.05	.001
SKY	140.	84.	145.0	84.	2.00	.027	.05	-.001
TERRAIN	10.	84.	145.0	84.	2.00	.015	.05	.000
TERRAIN	140.	84.	145.0	84.	2.00	.004	.05	.000

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	70.	137.9	99.	2.00	.158	.05	.001
SKY	140.	70.	137.9	99.	2.00	.028	.05	-.001
TERRAIN	10.	60.	132.6	109.	2.00	.021	.05	.000
TERRAIN	140.	60.	132.6	109.	2.00	.006	.05	.000