

BEFORE THE ENVIRONMENTAL QUALITY COUNCIL
STATE OF WYOMING

IN THE MATTER OF:)
BASIN ELECTRICAL POWER COOPERATIVE)
DRY FORK STATION,) Docket No. 07-2801
AIR PERMIT CT-4631)

**RESPONDENT DEPARTMENT OF ENVIRONMENTAL QUALITY'S
MEMORANDUM IN SUPPORT OF MOTION FOR PARTIAL SUMMARY
JUDGMENT**

**Exhibit No. 7 – Black Hills Power & Light Co., Neil Simpson Unit #2
Permit No. CT-1028**



M. E. Larson

BEFORE THE
WYOMING ENVIRONMENTAL QUALITY COUNCIL
STATE OF WYOMING

FILED

AUG 30 1993

Terri A. Lorenson, Secretary
Environmental Quality Council

IN THE MATTER OF A PERMIT ISSUED TO)
BLACK HILLS POWER & LIGHT COMPANY,)
NEIL SIMPSON UNIT #2)
PERMIT NO. CT-1028) DOCKET NO. 2476-93

FINDINGS OF FACT, CONCLUSIONS OF LAW AND ORDER

On June 11, 1993, the Legal and Safety Employer Research, a division of the Western States Pipe Trades (herein referred to as "LASER"), appealed the decision of Charles A. Collins, the Administrator ("Administrator") of the Air Quality Division ("AQD"), and Dennis Hemmer, Director ("Director") of the Department of Environmental Quality ("DEQ"), to issue Permit No. CT-1028 to Black Hills Power and Light Company ("Black Hills") for construction of an 80 MW pulverized coal-fired steam electric generating plant, known as Neil Simpson Unit II (NS #2), adjacent to the existing Neil Simpson Unit I, five miles east of Gillette, in Campbell County, Wyoming.

Notice of Hearing, dated June 29, 1993 and served by mail to Black Hills, LASER, and the Director, set the hearing for 9:00 a.m. on Wednesday, July 21, 1993 at the hearing room of the Oil & Gas Commission, Basko Building, 777 West 1st Street in Casper, Wyoming.

On July 12, 1993, Black Hills served its Answer to LASER's appeal by telecopier and by Federal Express.

On July 9, 1993, Harold L. Bergman, Hearing Examiner and member of the EQC issued an Order setting a prehearing telephone conference for July 13, 1993 at 11:00 a.m. On July 13, 1993, Black Hills, LASER, the Director and the EQC through their attorneys and representatives participated in the prehearing telephone conference.

At the time and place designated in the Notice of Hearing, the EQC held a hearing on LASER's appeal with the following members present: Harold L. Bergman, who served as Hearing Examiner, John C. Darrington, Fred H. Carr and Vincent R. Lee. LASER appeared through its attorney pro se, John Williams; Black

Hills appeared through its Chairman, Chief Executive Officer and President, Daniel P. Landguth, and the Project Manager of NS #2, Tom Ohlmacher, and its attorneys, David E. Morrill and Mrg Simon. The Administrator was present and represented by Mary A. Throne, Assistant Attorney General for the DEQ. The EQC's attorney, Terri A. Lorenzon, was also present.

Black Hills, LASER and the DEQ filed prehearing briefs with the EQC. Black Hills and DEQ offered testimonial and documentary evidence. LASER presented documentary evidence. Black Hills, LASER and DEQ made opening and closing statements.

The EQC has carefully considered all of the evidence and exhibits presented and all arguments presented through written briefs and orally. From such review, the Council makes the following:

FINDINGS OF FACT

1. On August 6, 1992, Black Hills submitted an application to the DEQ for a Prevention of Significant Deterioration ("PSD") permit to construct NS #2, an 80 MW coal-fired steam electric generating plant in Campbell County, Wyoming, approximately five miles east of Gillette, Wyoming, at 13151 Highway 51, Gillette, Wyoming 82716-9716. Black Hills proposed to build NS #2 with a pulverized coal boiler with a spray lime scrubber to control sulfur dioxide (SO₂) emissions, a fabric filter to control particulate matter emissions and low-NO_x burners and overfire air control to control nitrogen oxides (NO_x) emissions. The coal for NS #2 will be provided by the mine at the site of NS #2, Wyodak Resources Development Corp., a subsidiary of Black Hills. The quality of the coal is a site-specific consideration which was taken into account in performing the BACT analysis.

2. NS #2 is a major emitting facility in that it will consist of a fossil-fuel boiler of more than 250 million Btu per hour heat input which emits or has the potential to emit 100 tons per year or more of pollutants and is therefore regulated under the Wyoming Environmental Quality Act, W.S. § 35-11-801, Section 21 of the Wyoming Air Quality Standards and Regulations.

("WAQSR"), and the PSD requirements found in Section 24 of the WAQSR.

3. The AQD requested additional information from Black Hills following a preliminary review of the application. On November 24, 1992, Black Hills resubmitted its air quality permit application to address AQD's requirement that the SO₂ emission rate could not exceed 0.20 lb/MMbtu during any two-hour period. The new application proposed a circulating dry scrubber and electrostatic precipitator in place of the spray lime scrubber and fabric filter.

4. On January 25, 1993, after extensive review of Black Hills' submission, the AQD issued its Permit Application Analysis, proposed permit, and public notice for a 30-day public comment period. (Tab 24 of State's Exhibit 23 and State's Exhibit 1).

5. *The News Record*, a daily newspaper of general circulation, printed and published in Gillette, Wyoming, published the public notice on February 1, 1993. The public notice invited comments for a period of 30 days ending March 4, 1993 in accordance with Section 21(m) of the WAQSR. All public comments received, including those of LASER's, are at tabs 25 and 26 of State's Exhibit 23, admitted into evidence.

6. At the request of LASER, the DEQ held a public hearing on March 19, 1993 at the Campbell County Library in Gillette, Wyoming, following notice by mail to all those who had submitted comments and publication of the hearing notice in *The News Record* on March 14, 1993. The Director and the Administrator closed the permit record at the end of the hearing. The transcript of the public hearing is at tab 28 of State's Exhibit 23, admitted into evidence.

7. The Administrator and the Director issued a memorandum to all participants in the public comment process, dated March 30, 1993 (tab 29 of State's Exhibit 23), reopening the record for a period of one week for the sole purpose of requesting clarification of the proposed NO_x emission rate associated with

the low-NO_x burner/overfire air proposed control methodology. Based on additional information gathered after reopening the record, the Administrator recommended a reduction in the NO_x emission rate.

8. On April 14, 1993, the Administrator and the Director issued Permit No. CT-1028 to Black Hills. Copies of Permit No. CT-1028, dated April 14, 1993, and the decision of the Administrator and Director, dated April 16, 1993, received as evidence at tab 31 of State's Exhibit 23, are expressly incorporated into these Findings by reference.

9. As set forth in its application, Black Hills conducted a complete best available control technology ("BACT") analysis for control of major pollutants, including particulate matter emissions, NO_x emissions and SO₂ emissions. Black Hills properly conducted a "top down" BACT analysis, taking into account site-specific concerns relating to technological considerations as well as energy, environmental and economic impacts of the available technologies presented in the application.

10. The DEQ/AQD independently reviewed Black Hills' BACT analysis and properly conducted its own top down BACT analysis, as required by EPA guidance. Based on this review, the DEQ/AQD approved an electrostatic precipitator to control particulates, a circulating dry scrubber for SO₂ emissions, and low-NO_x burners with overfire-air control for NO_x emissions. The DEQ/AQD concluded that serious technological, economic, environmental and energy considerations prevented selection of either Selective Catalytic Reduction ("SCR") or Selective Non-Catalytic Reduction ("SNCR") for NO_x control.

11. Evidence demonstrated that SCR technology may not be a viable method for removing NO_x from the combustion of western United States subbituminous coal. The extent of the life of the catalyst and the degree to which excessive pluggage will occur are yet to be determined. SNCR technology has been unreliable on the few pulverized coal boilers utilizing that system for NO_x removal and thus its viability for NS #2 is also questionable.

12. Certain serious environmental impacts may result from the installation of either an SCR or SNCR system on NS #2, including the danger to personal safety in delivering, storing and using ammonia (NH₃) on site, the creation of sulfuric acid mist, the problem in disposing of the catalyst of an SCR system, which is a hazardous material, excessive ammonia slip, ammonia odor and content in the ash and the potential impact on land and groundwater from disposing of that ash and not being able to commingle the ash with ash from other power plants on site for disposal.

13. The average cost effectiveness and incremental cost analyses conducted by Black Hills and the DEQ/AQD indicated that economic considerations justified rejection of both SCR and SNCR for the control of NO_x emissions. (Exhibit 23, tabs 14 and 24; Exhibit 38).

14. The energy use of either an SCR or SNCR system represents approximately 0.8 percent of the total output of NS #2.

15. Black Hills determined by competitive bid proposals that a pulverized coal boiler with a circulating dry scrubber and electrostatic precipitator costs substantially less than a circulating fluidized bed boiler with a fabric filter and SNCR system. These cost comparisons are analyzed in Black Hills Exhibit 38.

16. Due to the time delay inherent in a circulating fluidized bed boiler's ability to respond to increased SO₂ removal and the variance in the sulfur content in the coal to be used for NS #2, there is serious doubt that a circulating fluidized bed boiler could be operated to allow continuous compliance with Wyoming's SO₂ two-hour emissions limit of 0.20 lb/MMBtu.

17. Due to the qualities of coal to be used for NS #2 and the stringent SO₂ limitation, a free lime phenomenon would be likely to occur in a circulating fluidized bed boiler, thereby causing increased NO_x emissions and compromising the ability of

Black Hills to maintain the NO_x emissions limitation of the Permit.

18. NS #2 will have the lowest SO₂, NO_x and particulate emission rates of any coal-fired plant in Wyoming under the terms of Permit No. CT-1028.

19. LASER presented no credible evidence to support any of the factual allegations contained in its appeal, its brief or the oral statements of Mr. Williams.

20. LASER's list of BACT determinations from other permitting authorities (Exhibit No. 32) was not useful for assessing the BACT determination in Permit No. CT-1028. The list was hearsay and LASER presented no evidence as to the underlying factors in those decisions that may have provided some basis for comparing those emissions rates to the BACT determinations at issue here. Thus the list, even if legally relevant, was not persuasive.

21. LASER's reliance on EPA's March 18, 1993 comments to the DEQ/AQD (Exhibit No. 23, tab 27) questioning the DEQ/AQD's BACT determination for NO_x was misplaced. That document was hearsay, not supported by testimony and thus, was not credible evidence against the BACT determination in Permit No. CT-1028. Representatives of EPA did not seek to intervene in this proceeding or appear as witnesses to present evidence regarding their public comments. The EPA letter represented public comments received as part of the permitting process and the DEQ/AQD properly responded to those comments in its decision.

22. The documentary evidence and testimony presented by Black Hills and the DEQ/AQD were credible and not impeached by LASER.

From these Findings of Fact, the EQC makes the following:

CONCLUSIONS OF LAW

1. NS #2 is a major emitting facility as described at § 24(a)(i) of the WAQSR and is subject to the requirements of Section 24, containing Wyoming's requirements for PSD permits. Among other requirements, Section 24 requires that no permit

issue unless the source meets the emission standards represented by BACT, as determined by the DEQ/AQD for pollutants that the source has the potential to emit in significant amounts.

2. Black Hills conducted a BACT analysis for all pollutants that NS #2 has the potential to emit in significant amounts. The BACT analysis was conducted in full compliance with all applicable laws and regulations.

3. The DEQ/AQD issued PSD Permit No. CT-1028 in full compliance with the requirements of Section 801 of the Wyoming Environmental Quality Act, W.S. § 35-11-801, and Sections 21 and 24 of the WAQSR, including proper selection of BACT for SO₂, NO_x and particulates.

4. In issuing PSD Permit No. CT-1028, the DEQ/AQD complied with all procedural requirements as required by applicable laws and regulations.

5. The Applicant, Black Hills, defined the proposed source, a coal-fired steam electric generating plant with a pulverized coal boiler. Federal and state laws and regulations do not require the DEQ/AQD to redefine the source and as a result cause Black Hills to build a different type of boiler, such as a circulating fluidized bed boiler, rather than a pulverized coal boiler. The DEQ/AQD properly exercised its discretion not to redefine the source.

6. Notwithstanding the decisions of the DEQ/AQD not to require a BACT analysis of a circulating fluidized bed boiler, Black Hills properly rejected a circulating fluidized bed boiler due to concerns related to its ability to meet the required 0.2 lbs/MMBtu two hour emission limitation imposed by DEQ.

7. Neither the DEQ/AQD nor the EQC are bound by EPA comments concerning the application of BACT for PSD permits. The DEQ/AQD carefully considered EPA's comments as required during the public comment process.

8. The BACT decisions of other permitting authorities are not determinative of the appropriate emission rates for a source in Wyoming, although they may be helpful to both the DEQ/AQD and

the Applicant, Black Hills. BACT requires a site-specific analysis and the exercise of discretion by the permitting authority in applying technological, economic, environmental and energy considerations. Black Hills appropriately determined the lowest achievable emission rates of each major pollutant as the starting point for its top down BACT analysis and continued the top down BACT analysis until it selected the pollution controls representing BACT for NS #2. The DEQ/AQD independently reviewed the Black Hills BACT analysis and properly took into account technological, economic, environmental and energy considerations in selecting BACT and setting the emission rates for NS #2.

9. The DEQ/AQD and Black Hills properly rejected SCR and SNCR as BACT for NO_x based on economic, environmental, energy and technological considerations.

10. Black Hills properly rejected the circulating fluidized bed boiler due to technological considerations in accordance with relevant BACT considerations.

11. Black Hills conducted a proper BACT analysis in full compliance with all applicable laws and regulations, which was reviewed by the DEQ/AQD. The EQC affirms the BACT determinations made by the DEQ/AQD.

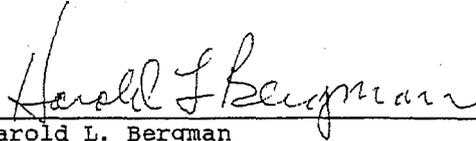
12. From all of the evidence presented, including testimony presented by the Administrator and Black Hills, Exhibits 1 through 24, 28, and 35-42, the EQC concludes that the Director and the Administrator issued Permit No. CT-1028 to Black Hills to construct NS #2 in compliance with all laws and regulations and finds no errors, either procedurally or substantively, in the DEQ/AQD decision.

ORDER

IT IS THEREFORE,

ORDERED, that the decision of the Director and the Administrator to issue Permit No. CT-1028 to Black Hills Corporation, doing business under the assumed name of Black Hills Power and Light Company, to build Neil Simpson Unit II is affirmed.

DATED August 26, 1993.



Harold L. Bergman
Hearing Examiner
for the Environmental Quality Council

CERTIFICATE OF SERVICE

I, Terri A. Lorenzon, certify that at Cheyenne, Wyoming, on the 30 day of August, 1993, I served a copy of the foregoing FINDINGS OF FACT, CONCLUSIONS OF LAW AND ORDER by depositing copies of the same in the United States mail, postage prepaid, duly enveloped and addressed to:

David E. Morrill and Mrg Simon
Morrill Brown & Thomas
625 Ninth Street, 8th Floor
P. O. Box 8108
Rapid City, SD 57709-8108

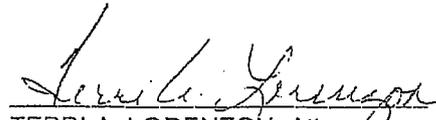
John Williams
Consultant for LASER
12770 Southwest Foothill Drive
Portland, OR 97225

and also to the following persons via interoffice mail:

Dennis Hemmer, Director
Department of Environmental Quality
122 W. 25th Street, Herschler Building
Cheyenne, WY 82002

Charles A. Collins, Administrator
Department of Environmental Quality
Air Quality Division
122 W. 25th Street, Herschler Bldg.
Cheyenne, WY. 82002

Mary A. Throne
Assistant Attorney General
Attorney General's Office
123 Capitol Building
Cheyenne, WY 82002


TERRI A. LORENZON, Attorney
Environmental Quality Council
2301 Central Avenue, Rm. 407
Cheyenne, WY 82002
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Permit



THE STATE OF WYOMING



MIKE SULLIVAN
GOVERNOR

Department of Environmental Quality

Herschler Building • 122 West 25th Street • Cheyenne, Wyoming 82002

Administration
(307) 777-7937

Air Quality Division
(307) 777-7391

Land Quality Division
(307) 777-7756
FAX (307) 634-0799

Solid Waste Management Program
(307) 777-7752

Water Quality Division
(307) 777-7781
FAX (307) 777-5973

April 14, 1993

Mr. Tom Ohlmacher
NS II Project Manager
Black Hills Power and Light Company
P.O. Box 1400
Rapid City, SD 57709

Permit No. CT-1028

Dear Mr. Ohlmacher:

The Division of Air Quality of the Wyoming Department of Environmental Quality has completed final review of Black Hills Power and Light Company's application to construct an 80 megawatt, pulverized coal fired steam electric generating plant, known as the Neil Simpson Unit II adjacent to the existing Neil Simpson Unit I, five miles east of Gillette, in Campbell County, Wyoming.

Following this agency's proposed approval of the request as published February 1, 1993 and in accordance with Section 21(m) of the Wyoming Air Quality Standards and Regulations, the public was afforded a 30-day period in which to submit comments concerning the proposed new source, and an opportunity for a public hearing. Comments were received and a public hearing was held on March 19, 1993. Comments received during the public comment period and comments received at the public hearing were considered in the final decision. Therefore, on the basis of the information provided to us, approval to construct coal fired steam electric generating plant as described in the application is hereby granted pursuant to Section 21 and 24 of the regulations with the following conditions:

1. That authorized representatives of the Division of Air Quality be given permission to enter and inspect any property, premise or place on or at which an air pollution source is located or is being constructed or installed for the purpose of investigating actual or potential sources of air pollution, and for determining compliance or non-compliance with any rules, regulations, standards, permits or orders.
2. That all commitments and descriptions set forth in the application for this permit, unless superseded by a specific condition of this permit, are incorporated herein by this reference and are enforceable as conditions of this permit.

3. That allowable particulate emission rates from the facility handling collectors control equipment shall be assigned as follows:

ALLOWABLE PARTICULATE EMISSIONS
 Handling Collection System

Point Source	lb/hr	grain loading	TPY ¹
Top Coal Storage Silo	0.5	0.01 gr/acf	3
Bottom Coal Storage Silo	0.3	0.01 gr/acf	1
Top of Boiler Building	1.0	0.01 gr/acf	4
Top of Fly Ash Handling Bldg.	0.3	0.01 gr/acf	1
Top of Lime Storage Silo	0.04	0.01 gr/acf	1

¹Based on 8760 operating hours per year.

4. That the opacity from all point sources listed in this analysis, including the handling collection system shall not exceed 20 percent.

5. That allowable emission rates from the PC boiler stack shall be assigned as follows:

PC BOILER STACK

Pollutant	lb/MMBtu	lb/hr	TPY ¹
Particulate	0.02	20	89
Sulfur Dioxide			
(a) 30 day rolling average	variable emission rate described under permit condition #7		
(b) 2 hour rolling average	0.20	203	889
Nitrogen Oxides	0.23	233	1022
(NO _x emission limit for first 2 years of operation, with future limitation described in condition #5)			
Carbon Monoxide	0.15	152	666
Volatile Organic Compounds	0.015	15	66

¹Based on 8760 operating hours per year.

6. That the NO_x emission control system for the facility shall be designed to achieve an emission rate of 0.23 lb/MMBtu or less and shall include low NO_x burners and overfire air control.

(a) During the first year of operation of the facility, BHP&L shall exercise its rights under the manufacturer's warranties for NO_x emission control and shall conduct operations so as to maximize the possibility of reducing the emissions of NO_x to the manufacturer's guarantee of 0.17 lb/MMBtu.

(b) During the first two years of operation of the facility BHP&L shall conduct a NO_x minimization/characterization study to determine the appropriate permit levels for NO_x emissions. Upon completion of the study BHP&L shall submit the results of the study to the Air Quality Division. Based on the results of the study, the burden shall be on BHP&L to establish why the level of 0.23 lb/MMBtu should not be lowered. In no case will the level be adjusted to exceed the initial maximum level of 0.23 lb/MMBtu.

(c) Within one year of the date of permit issuance, BHP&L shall submit a plan to the Division for approval which details methods and tests that will be utilized during the first two years after plant start-up to determine an adjusted NO_x emission limit.

7. That in addition to the 2 hour rolling average SO₂ emission limit of 0.20 lb/MMBtu, the PC boiler will be subject to a variable 30 day rolling average based on the sulfur content of the coal. The 30-day rolling average emission level of SO₂ from the PC unit stack shall not exceed the limit defined below:

Limit = 0.17 lb/MMBtu for SO₂IN ≤ 2.14 lb/MMBtu

Limit = 0.17 + 0.0294(SO₂IN - 2.14) for SO₂IN > 2.14 lb/MMBtu
and SO₂IN < 3.16 lb/MMBtu

Limit = 0.20 lb/MMBtu for SO₂IN ≥ 3.16 lb/MMBtu

where

Limit = 30 day rolling average SO₂ emission limit in lb/MMBtu
SO₂IN = 30 day rolling average SO₂ level as measured at the inlet
to the scrubber system in lb/MMBtu

8. That Black Hills Corporation shall install, certify, operate and maintain each of the continuous emission monitors (CEMS) as described below:

i) NO_x monitor on the PC boiler stack to demonstrate continuous compliance with the allowable NO_x limitations set forth in this permit.

ii) Opacity monitor to demonstrate compliance with the 20 percent opacity limitation.

iii) Sulfur dioxide monitor for measuring sulfur dioxide emissions at both the inlet and outlet of the sulfur dioxide control device.

iv) Oxygen or carbon dioxide monitor for measuring oxygen or carbon dioxide content of the flue gas at each location where sulfur dioxide or nitrogen oxides emissions are monitored.

Each monitoring system listed above shall comply with the following Wyoming Air Quality Standards and Regulations:

i) Subpart Da, Standards of Performance for Electric Utility Steam Generating Units, of Section 22, Appendix I.

ii) Section 22, Appendix II, B Performance Specification 2 for NO_x and SO₂, Performance Specification 3 for O₂ or CO₂, Performance Specification 1 for opacity.

iii) Quality Assurance requirements of Section 22, Appendix F.

9. That periods of emissions in excess of the standard for nitrogen oxides from the PC boiler stack are defined as any calculated 30 day rolling average nitrogen oxide emission rate measured by the CEMS in accordance with WAQSR, Section 22, Subpart Da, which exceeds 0.23 lb/MMBtu or a reduced emission limitation set in the future as described in condition #6. BHP&L will comply with all reporting and recordkeeping requirements as specified in Section 22 for nitrogen oxides.

10. That periods of excess emissions for opacity from the PC boiler stack are defined as all 6 minute periods during which the average opacity as determined according to WAQSR, Section 22, Subpart Da, exceeds 20 percent opacity. BHP&L will comply with all reporting and recordkeeping requirements as specified in Section 22 for opacity.

11. That periods of emissions in excess of the standard for sulfur dioxide from the PC boiler stack are defined as:

i) Any calculated 2 hour rolling average of SO₂ emissions as measured by the stack SO₂ CEMS in accordance with WAQSR, Section 22, Subpart Da which exceeds 0.20 lb/MMBtu. The 2 hour rolling average emission rate shall be determined at the end of each operating hour and be calculated as the arithmetic average of the SO₂ stack emission rates measured by the CEM system for the previous two boiler operating hours.

ii) Any calculated 30 day rolling average of SO₂ emissions as measured by the stack SO₂ CEMS in accordance with WAQSR, Section 22, Subpart Da which exceeds:

0.17 lb/MMBtu for SO₂IN ≤ 2.14 lb/MMBtu

0.17 + 0.0294(SO₂IN - 2.14) for SO₂IN > 2.14 lb/MMBtu
and SO₂IN < 3.16 lb/MMBtu

0.20 lb/MMBtu for SO₂IN ≥ 3.16 lb/MMBtu

where SO₂IN = 30 day rolling average SO₂ level as measured at
the inlet to the circulating scrubber system
inlet in lb/MMBtu

The 30 day rolling average emission rate shall be determined at the end of each boiler operating day. At the end of a boiler operating day, the 30 day rolling average emission limit and 30 day rolling average emission rate shall be calculated and compliance determined. The value of SO₂IN used to determine the 30 day rolling average limit shall be calculated as the arithmetic average of the hourly values of SO₂ measured at the circulating dry scrubber inlet for the preceding 30 boiler operating days. The 30 day average emission rate shall be calculated as the arithmetic average of the hourly values of SO₂ stack emissions as recorded by the CEMS in accordance with WAQSR, Section 22, Subpart Da for the preceding 30 boiler operating days. BHP&L will comply with all applicable reporting and recordkeeping requirements as specified in Section 22 for sulfur dioxide.

12. That in addition to Section 22, Subpart Da reporting requirements for 30 day average sulfur dioxide emission rates the following information shall be concurrently reported:

i) 30 day rolling average SO₂ emission levels as measured at the CDS inlet in lb/MMBtu.

ii) Excess emissions for calculated 2 hour rolling average SO₂ emission rates.

13. That calculations of 30 day average percent reduction in sulfur dioxide emissions will comply with Section 22, Subpart Da reduction standards and reporting requirements.

14. That to eliminate fugitive dust from unloading dry waste from the silo and loading the truck, BHP&L will install and maintain a telescoping chute with a recirculation fan pulling air from the area surrounding the discharge chute. This system shall be maintained and operated to minimize any fugitive emissions from the system.

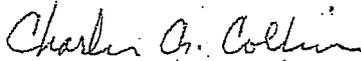
Mr. Tom Ohlmacher
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15. That to minimize transport emissions, the waste material will be entirely enclosed in the haul truck. Haul road routes will be treated with suitable chemical dust suppressants in addition to water to control fugitive dust emissions. All treated roads will be maintained on a continuous basis to the extent that the surface treatment remains viable as a control measure.

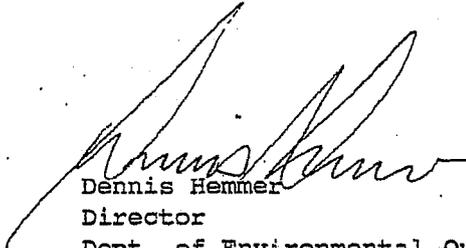
It must be noted that this approval does not relieve you of your obligation to comply with all applicable county, state, and federal standards, regulations or ordinances. Special attention must be given to Section 21 of the Wyoming Air Quality Standards and Regulations. Section 21(a) requires that a permit to operate is required in order to operate a facility after a 120-day start-up period, Section 21(i) requires notification of start-up, Section 21(j) requires that performance tests be conducted within 90 days of initial start-up, and Section 21(h) requires that construction or modification must commence within 24 months of date of permit issuance or the permit will become invalid, unless the Administrator extends such time period based on a satisfactory justification of the requested extension. Any appeal of this permit as a final action of the Department must be made to the Environmental Quality Council within sixty (60) days of permit issuance per Section 16, Chapter I, General Rules of Practice and Procedure, Department of Environmental Quality.

If we may be of further assistance to you, please feel free to contact this office.

Sincerely,



Charles A. Collins
Administrator
Air Quality Division



Dennis Hemmer
Director
Dept. of Environmental Quality

CAC:DH/md



BEFORE THE WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

IN THE MATTER OF BLACK HILLS)
POWER AND LIGHT COMPANY'S)
PERMIT APPLICATION TO CONSTRUCT)
THE NEIL SIMPSON UNIT II POWER)
PLANT.)

DECISION

I. INTRODUCTION

On August 6, 1992, the Air Quality Division received an application from Black Hills Power and Light Company (BHP&L) requesting permission to construct an 80 megawatt coal fired steam electric power plant at Wyodak, near Gillette, in Campbell County, Wyoming.

On October 19, 1992, BHP&L submitted a revised permit application as a result of Division comments regarding the initial application's proposed sulfur dioxide (SO₂) emission rate. The revised application proposed use of a circulating dry scrubber (CDS) for control of SO₂ emissions in place of a spray dryer absorber system in order to achieve 0.20 lbs SO₂/MMBtu heat input on a two(2) hour rolling average basis. The CDS scrubber is technically a circulating fluid bed dry scrubber.

The Division completed its analysis of the application on January 25, 1993, and placed a notice in the Gillette News Record on February 1, 1993, advertizing its proposed decision to issue the requested permit, calling for public comment on the proposal and application, and providing opportunity for a public hearing.

Just prior to close of the 30 day public comment period, the Division received comments on the application and proposed decision from the National Park Service, the Region VIII EPA Office, and LASER. LASER requested a public hearing. The Division scheduled a public hearing for March 19, 1993, in the Campbell County Library in Gillette. All parties that commented were advised of the time and place of the hearing and the hearing was advertised in the Gillette News Record. The hearing was held as scheduled and written or oral comments were presented by all parties including the applicant, BHP&L. The hearing was recorded by a court reporter and a transcript of the hearing is on file in the Division's office in Cheyenne.

On March 29, 1993, the Division reopened the hearing record for a period of one week to clarify the record regarding the

applicant's guaranteed emission rate for the proposed pulverized coal (PC) boiler utilizing low-NO_x burners with overfire air technology. The Division asked BHP&L to clarify the statement made by its project consultant, Black & Veatch, which indicated a manufacturer guaranteed nitrogen oxides (NO_x) emission rates lower than proposed in the application. Comments relative to this inquiry were received from LASER, EPA, and BHP&L.

II. ANALYSIS OF COMMENTS

A. Selection of Best Available Control Technology (BACT) For Control of Particulate Matter:

John Williams of LASER states that "The permit evaluation does not even mention or evaluate the efficiency of a baghouse or a Electrostatic Precipitator (ESP) for control of PM10." A review of the permit application will make it apparent that the particulate control analysis evaluates BACT for both TSP and PM10 emissions.

LASER also implies that a baghouse may provide better control of fine particulate (PM10) and states the 20 lbs/hour and 0.02 lb/MMBtu limitation proposed for the Neil Simpson Unit II (NSII) is not BACT based on the fact that several California plants have lower emission rates.

The applicant evaluated both a fabric filter baghouse and a electrostatic precipitator (ESP) as having potential application as particulate control devices for the plant. According to the applicant, selection of a CDS scrubber for SO₂ control precluded use of a baghouse due to the high inlet grain loading which would blind the bags resulting in a high pressure drop and increased penetration of particulate rendering the collection device less than effective. A top down BACT analysis was performed for the ESP starting with the most stringent particulate emission limit found in the BACT/LAER Clearing House, 0.012 lb/MMBtu (representing lowest achievable emissions rates (LAER)) and 0.02 lb/MMBtu. Both emission rates represent better than 99% collection efficiency but the small reduction gained by the lower rate (89 TPY vs 53 TPY) results in about \$10,000/ton of pollutant reduced, clearly much too expensive.

LASER also commented that the Division should have included more conditions on the baghouse particulate control used elsewhere at the plant. The Division is satisfied that it is sufficient to require an adequately sized baghouse to meet an

outlet grain loading with performance testing and periodic inspections to verify compliance with mass emission rates and opacity limitations--these are not potentially large sources.

In written comments offered at the hearing LASER also indicates they are not satisfied with the manner in which the ESP catch (fly ash and flue desulfurization wastes) will be handled and spoiled through the use of conditioners to dampen the material and trucks to haul it to the disposal area. Laser suggests the fly ash and combustion wastes should be piped to a spoils pond to eliminate road dust and unloading dust. The Division is satisfied that it can enforce the dust control program as proposed in the application to assure dust emissions are insignificant from these activities.

In conclusion, the Division is satisfied that BACT has been selected for control of particulate matter emissions from the proposed facility.

B. Selection of BACT for NO_x Emissions:

General Comments

All three of the commentators (EPA, the National Park Service, and LASER) referred to recent BACT determinations listed in the BACT/LAER Clearinghouse data base, which would indicate (without further review) that lower emission rates for NO_x (and SO₂) had been set for coal fired power plants utilizing other control technologies than that proposed for NSII. While it is instructive to review recent decisions concerning emission limitations to compare with the applicant's proposed selection of BACT, the summary information presented in the Clearinghouse data does not present all the factors considered in the selection of control equipment nor in the setting of the allowable emission rate. Such is the case in this matter.

While several of the commentators, most notably the National Park Service and John Williams of LASER, offered examples of other plants with lower emission rates, no mention was made as to other important factors which led to these limitations. One important factor was that all of the plants which were located in the East were either located in or adjacent to ozone nonattainment areas (NO_x is one of the precursors to the formation of ozone). In some cases those located adjacent to these areas were in ozone transport regions (e.g., Virginia is a signatory to the Northeast Ozone Transport Region Commission). The point to be made here is that construction of new plants in nonattainment areas must be equipped with LAER by law without regard to costs. The application of LAER in

adjacent areas or ozone transport regions is also probably required. The same can also be said of plants located in California that LASER referred to. California has many nonattainment areas not only for ozone but for PM10 as well. As a result, California requires BACT equivalent to LAER. There are no nonattainment areas in Wyoming for ozone, CO, SO₂, NO_x, or lead. There is one small PM10 nonattainment area in Sheridan, Wyoming.

The foregoing is not to say that LAER cannot be selected as BACT. BACT is by definition a process to determine an emission limitation based on the maximum degree of reduction of a pollutant subject to regulation which the Administrator determines is achievable, on a case by case basis, taking in to account energy, environmental, and economic impacts and other costs. This is an important distinction between LAER and BACT. It is also equally important to note that BACT does not require that a plant built in Wyoming should have the same emission limitation as a plant built in California or a plant built in Virginia. This is something that Mr. Williams of LASER publically said he did not believe in and it apparently is something which the National Park Service needs to be reminded of. BACT is a case by case, site by site selective process. EPA, in its "WEPCO Fix" decision adopting final rules under 40 CFR Parts 51, 52, and 60, page 32332 in the July 21, 1992 CFR, reinforces this by stating that the process or exercise of state discretion and case by case decision making was envisioned by Congress to be fundamental to the BACT process.

EPA Comments

Region VIII EPA has contacted Mr. Charles B. Sedman with EPA's Air and Energy Research Lab. Mr. Sedman seriously doubts the ability of any combustion controls on a PC boiler to meet a standard near 0.3 lb/MMBtu for NO_x. BHP&L recently retrofitted the PC boiler at NS Unit I with low-NO_x burner technology. BHP&L has stated that Unit I is capable of achieving 0.3 lb/MMBtu. The Division has also reviewed the technical paper presented by BHP&L experts at the ASME International Joint Power Generation Conference in San Diego on October 8, 1991. The paper is entitled "Western Coal Fired Boiler Retrofit for Emission Control and Efficiency Improvement." The paper presents post-retrofit NO_x emissions tests at 0.306 to 0.371 lb/MMBtu with impeller in its normal firing position, and 0.270 to 0.291 lb/MMBtu with the impeller retracted inside the nozzle. With the impeller in a normal firing position, this represents a 50 to 68 percent reduction in NO_x emissions and a 61 to 72 percent reduction when the

impeller is retracted. Mr. Sedman might be interested in reviewing the actual field studies performed at the NS Unit I plant.

On the one hand, EPA's research laboratory expert seriously doubts the field tested emission rates of the low NO_x boilers burning western coal, while on the other hand he has total confidence in the untested application of SCR and SNCR on PC boilers burning western coal. If the Air Quality Division has to choose between experts, BHP&L makes a better case. Considering that Unit II is a new boiler rather than a retrofit, and that there have been additional improvements to low-NO_x burners since the Unit I retrofit, and that B&W will have designed both Unit I and Unit II which burn the same coal, the Division will presume that BHP&L can achieve 0.28 lb/MMBtu.

EPA suggested that the applicant should have investigated other fuel combustion techniques for which lower NO_x emissions could be emitted. At the public hearing BHP&L did say that they requested and received firm bids on the plant equipment using four different boiler/air quality control systems. Two of these were CFB boilers with baghouses. The manufacturer of the CFB boilers could not give significantly better NO_x emission rates (with no add on control) than the PC boiler for the Gillette coal.

NO_x Emission Limit

The analysis examined emission rates as low as 0.08 lb/MMBtu and 0.15 lb/MMBtu for PC boilers. The National Park Service has listed PC boilers recently permitted at NO_x emission limits of 0.15 lb/MMBtu, 0.17 lb/MMBtu, 0.10 lb/MMBtu with a fall back of 0.17 lb/MMBtu. The applicant's analysis did consider rates as low as or lower than those listed by the Park Service. LASER listed three CFB units operating at NO_x emission limits of 0.074, 0.092, and 0.039 lb/MMBtu. The applicant's BACT analysis did not consider NO_x emission rates achieved with alternative combustion technologies.

The Division is satisfied, with revisions noted under Part II E, that BACT for NO_x control has been selected.

C. Selection of BACT for SO₂ Emissions

The Park Service commented that recently permitted Eastern power plants were proposing to meet higher SO₂ control efficiencies (as high as 95%) than Neil Simpson Unit II. The Division would caution against comparing SO₂ control

efficiencies between Eastern and Western coal burning facilities without regard to differences in sulfur content of the fuel. Since Eastern coal is typically much higher in sulfur than Western coal, it is easier to achieve a larger percent reduction. On page four of the Permit Application Analysis performed by the Division, control efficiencies for each of the BACT alternatives is given. Western "worse case coal" or dirty coal is more comparable to Eastern coal with respect to sulfur content. The proposed Neil Simpson Unit II can easily meet a 95% control efficiency when burning dirty coal.

The Park Service also commented that recently permitted Eastern power plants were proposing to meet SO₂ emission rates lower than what was proposed for the Neil Simpson Unit II. The Eastern plants cited have proposed to meet rates of 0.10 and 0.156 lb/MMBtu. The Park Service asked that the Division consider these recent determinations before making a final decision. The BACT analysis for BHP&L did consider SO₂ emission rates in this range, specifically 0.11 lb/MMBtu with a wet lime scrubber and 0.13 lb/MMBtu with a circulating dry scrubber.

Jim Wilson of LASER commented that a circulating dry scrubber meeting an SO₂ allowable of 0.17 lb/MMBtu was not BACT because there are five circulating fluidized bed boilers (CFBs) in California which meet emission limits of 0.109 lb/MMBtu or better. Mr. Wilson states that "Limestone or Sorbent injection with emission limits at or below 0.109 are BACT for SO₂." The Division disagrees with LASER's position that there is specific emission limit and control technology which defines what is BACT. The Division has relied on, and will continue to rely on the definition provided in the federal regulations, where it is stated that emission limitations and control technology are decided on a case by case basis. A review of the application and analysis will make it apparent that a Top Down BACT analysis was conducted for SO₂ and emission limit of 0.11 lb/MMBtu was considered.

The Division is satisfied that proposed SO₂ control equipment and emission limits represents BACT.

D. Miscellaneous

Long Term and Short Term Emission Limits:

LASER has claimed that the Neil Simpson II proposed permit does not contain enough short term limits, and that only short term limits are federally enforceable. The Division has set a

short term 2 hour SO₂ limit of 0.20 lb/MMBtu as well as a 30 day rolling average SO₂ of 0.17 lb/MMBtu and 203 lb/hr. The Division has also established a short term particulate emission limit on the main boiler through a 6 minute opacity limitation of 20 percent. All baghouses must meet a lb/hour particulate limit as well as an outlet grain loading in the form of grains/actual cubic foot. A lb/hr NO_x emission limit has been set as well as a 30 day rolling average limit in lb/MMBtu. In addition to performance testing, SO₂, NO_x, and particulate will be continuously monitored through Federally required continuous emissions systems which provide continuous compliance monitoring. The 30 day emission limits for SO₂, NO_x and opacity are required through Federal New Source Performance Standards. Federally required standards and federally required compliance monitoring are federally enforceable.

Top Down BACT

LASER contends that a Top Down BACT analysis was not performed on the Neil Simpson Unit II facility. There appears to be a fundamental difference in the way LASER and the Wyoming Air Quality Division interpret the intention of Top Down BACT. LASER has repeatedly made comments that a BACT decision was not made because the lowest achievable emission rates (LAER) were not selected for the Neil Simpson Unit II facility. While the Division agrees that LAER should be considered in the Top Down BACT process, the Division disagrees with LASER that LAER must be selected as BACT. The Division believes that lowest achievable emission rates published for PC boilers were considered in the application. These numbers were discussed in the comments above.

LASER thinks that the NSII permit application contains too much economic analysis. While economics are not a part a LAER decision, they are essential to a BACT review, and the Division conducted a BACT analysis. Furthermore, because EPA has consistently taken the position that there is no set acceptable cost per ton of pollutant removed, finances have to be analyzed on a case by case basis.

Visibility Monitoring

LASER has suggested that the applicant be required to assist the National Park Service in setting up an air quality monitoring program in the Devils Tower National Monument area. The Devils Tower National Monument is not a Class I area. The visibility screening was performed as a part of the additional impact analysis portion of the PSD application, which is

distinct from the Class I visibility analysis requirement. Both the Park Service and EPA commented that worse case dispersion conditions were incorrectly assumed. The Park Service remodeled the scenario using E stability and 1.0 meter/sec wind speed. The facility passed this conservative Level II VISCREEN analysis. The Park Service concluded that visual plume impacts at Devil's Tower were unlikely.

Auxiliary Boiler

The auxiliary boiler is no longer part of the Neil Simpson II project. The Division was notified by letter March 18, 1993, that the auxiliary boiler was no longer justified economically. Reference to the auxiliary boiler will be removed from the final permit.

PM10 Area of Impact

EPA wanted to point out that if the annual PM/PM10 impact from the proposed source exceeds the boundaries of the NW1/4 of Section 27 that the baseline date for the Powder River Basin will be triggered. Modeling performed by the applicant and reviewed by the Division shows the 1 $\mu\text{g}/\text{m}^3$ isopleth completely contained within the NW1/4 of Section 27. Figure 1 contained in the analysis shows this.

Soils and Vegetation

The National Park Service wished to point out that it is incorrect to assume that compliance with NAAQS will allow for protection of sensitive soils and vegetation in National Parks. The Park Service goes on to say that "given the small predicted impacts at the NPS units in vicinity of the proposed Neil Simpson Unit II facility, this concern is not a major issue at this time."

The comment has been noted, although the Park Service should realize that in the absence of standards or even recommendations of levels which would protect sensitive soils and vegetation, the Division has to rely on NAAQS.

E. Analysis of BHP&L's Post-Hearing NO_x Limitation Proposal

In reviewing the comments and testimony given at the March 19, 1993, Public Hearing, it was noted that BHP&L's consultant stated the NO_x emission rate for low NO_x burners to be installed was from 0.17 to 0.23 lb/MMBtu. Since the rate contained in the application was 0.28 lb/MMBtu, the Division reopened the record and asked BHP&L to provide clarification

and discussion on the control margin associated with the guaranteed rate of 0.28 lb/MMBtu and asked BHP&L to explain why the allowable emission limits should not be set at the lower rates.

In its response, BHP&L stated that the 0.17 and 0.23 lb/MMBtu levels were guarantees offered by two manufacturers and that BHP&L had signed a contract with the manufacturer which guarantees 0.17 lb/MMBtu. They further stated that the 0.28 lb/MMBtu limitation proposed in the application was not the PC boiler manufacturer's guarantee.

In explanation of the margin between the manufacturer's guarantee and proposed operating limit, BHP&L explained that the guarantee was only in effect for the first year of operation and only valid under a certain specified set of operating conditions during performance tests of short duration (3-hour average) at various specified steady state loads.

Thus, BHP&L contends that an operating margin must be applied to the PC boiler manufacturer's guaranteed emission level to provide a degree of confidence to the owner that the permit emission limit will be achieved at all times and under all applicable operating conditions throughout the life of the plant. The Division agrees that an appropriate operating margin over and above the guaranteed rate is needed.

In explaining the margin provided by the anticipated limitation of 0.28 lb/MMBtu, BHP&L states the original offered guarantee was 0.28 lb/MMBtu (with no margin) and they chose to purchase from the selected PC boiler manufacturer all available combustion control technology features such as low NO_x burners and overfire air, allowing the manufacturer to lower its guarantee, and thereby increasing the margin between the guarantee and anticipated emission limitation of 0.28 lb/MMBtu.

In determining or estimating the needed operating margin, BHP&L listed five variables associated with the level of boiler NO_x emitted and measured. These variables include:

1. Variation in NO_x related coal characteristics.
2. Inaccuracy of continuous emission monitor in measuring actual emission levels.
3. Ability of boiler operating control system to maintain constant NO_x levels.

4. Variation in coal fineness as a result of pulverizer performance degradation due to mill wear.

5. Variation in the air and fuel flow balance within the burners.

It is noted that the performance guarantee contract conditions address fuel variability (coal with a fixed carbon to volatile ratio not greater than 1.06 and a fineness gradation at the coal pulverizer outlet), operating load variability, and excess air. BHP&L provides an explanation of the margin (percent above guaranteed emission rate) for each of the above variables which totals to 35 percent. Based on the guaranteed rate of 0.17 lb/MMBtu the targeted permit level is 0.23 lb/MMBtu. Although the Division recognizes the need for an operating margin, it does not agree that item 2 listed above is relevant.

The applicant emphasizes that while the boiler manufacturer does have experience with Wyodak coal using low NO_x burners at the Neil Simpson Unit I retrofit project (NO_x emissions were brought below 0.30 lb/MMBtu) the 0.17 lbs/ MM BTU guarantee is based on projected capabilities of newer advanced boiler and combustion design not in widespread use.

Finally, BHPL proposes to accept an interim NO_x emission limitation of 0.23 lb/MMBtu during the first two years after unit start-up. They also request the right to adjust the limit if it is determined an additional margin beyond 35 percent is necessary. During this two year period BHP&L proposes to determine the margin associated with the NO_x emission variables using historical NO_x emissions data as measured by plant CEM and testing. They then propose to determine an adjusted NO_x limit by adding the applicable margin to the 95th percentile NO_x level averaged over the previous two years.

BHP&L further explains that a two year period is necessary since the first year allows the manufacturer to make required modifications during the initial one year guarantee period and thus, typically there are a greater number of forced shutdowns and periods of abnormal operation. The second year would represent normal operations during which representative emissions data can be gathered.

The Division is willing to accept this proposal with certain limitations and conditions as follows:

1. The Division is not willing to allow an adjustment to increase the 0.23 lb/MMBtu NO_x limit after the two year

period. If the BHP&L cannot demonstrate compliance with the 0.23 lb/MMBtu emission rate at the end of the two year period using proposed low NO_x burners with overfire air technology, then BHP&L must provide the Department with a compliance plan and schedule to achieve compliance with the limit through the addition of available add on controls.

2. The NO_x limit will be adjusted to decrease the 0.23 lb/MMBtu limit based on testing and plant CEM historical data for the two year period if appropriate.

3. BHP&L shall, within one year of date of permit issuance, provide a plan to the Division for approval which details methods and tests that will be utilized during the first two years after plant start-up to determine an adjusted NO_x emission limit.

Commenting on several aspects of this proposal: 1) the variability of boiler NO_x emissions should be accommodated by the measuring and compliance system since the NO_x limit will be based on a 30 day rolling average through the use of a CEM, 2) the Division, until further advised, does not agree that you should add an applicable margin to the 95th percentile NO_x level averaged over a two year period. It seems to us that the margin should already be in the CEM emission data.

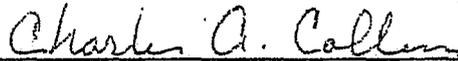
Finally, it is noted that BHP&L and the boiler manufacturer have exhibited a desire to use this project to demonstrate and improve combustion technology in PC boilers. To that end, BACT is forcing new or improved technology as it should. In addition at an emission limit of 0.23 lb/MMBtu, the incremental cost per ton of NO_x removed at a 0.15 lb/MMBtu emission rate for the next most effective control alternative (combustion controls with SCR) is about \$7800 per ton. This cost is excessive for only a modest reduction in emissions.

III. DECISION

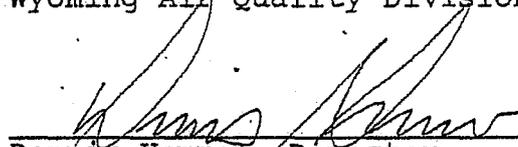
On the basis of the information provided in the application and all comments and information received prior to, during, and after the public hearing, the department has determined that a construction permit shall be issued to Black Hills Power and Light Company for the construction of an 80 megawatt coal fired steam electric power plant at Wyodak, near Gillette, in Campbell County, Wyoming.

The permit shall be issued with revised NO_x emission limitations and conditions as enumerated under Part II E of this decision. All other air contaminant emissions shall be limited with conditions as proposed in the Division's Analysis of the permit application. Proposed permit conditions relating to excess emissions were revised to be consistent with NSPS, Subpart Da.

Approved this 11 day of April, 1993.



Charles A. Collins, Administrator
Wyoming Air Quality Division


Dennis Hemmer, Director

Wyoming Department of Environmental Quality