



# Department of Environmental Quality



To protect, conserve and enhance the quality of Wyoming's environment for the benefit of current and future generations.

Dave Freudenthal, Governor

John Corra, Director

February 5, 2007

Mr. Fred Carl  
Environmental Manager  
Black Hills Corporation  
PO Box 1400  
Rapid City, SD 57709-1400

Permit No. CT-4517

Dear Mr. Carl:

The Division of Air Quality of the Wyoming Department of Environmental Quality has completed final review of Black Hills Corporation's application to construct a nominal 100 megawatt (MW) coal fired electric power generating station, to be known as WYGEN 3, located at 13151 Hwy 51, approximately five (5) miles east of Gillette in Campbell County, Wyoming.

Following this agency's proposed approval of the request as published October 13, 2006 and in accordance with Chapter 6, Section 2(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 have been received and were considered in the final permit. Therefore, on the basis of the information provided to us, approval to construct the Wygen 3 as described in the application is hereby granted pursuant to Chapter 6, Section 2 and 4 of the regulations with the following conditions:

1. 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. All substantive commitments and descriptions set forth in the application for this permit, unless superseded by a specific condition of this permit, are incorporated herein by this reference and are enforceable as conditions of this permit.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. A major source, as defined by Chapter 6, Section 3 (b)(xvii) of the WAQSR, shall file a complete application to obtain an operating permit within 12 months after commencing operations.
4. All notifications, reports and correspondence required by this permit shall be submitted to the Stationary Source Compliance Program Manager, Air Quality Division, 122 West 25th Street, Cheyenne, WY 82002 and a copy shall be submitted to the District Engineer, Air Quality Division, 1866 South Sheridan Avenue, Sheridan, WY 82801.
5. Owner or operator shall furnish the Administrator written notification of: (i) the anticipated date of initial startup not more than 60 days or less than 30 days prior to such date, and; (ii) the actual date of initial start-up within 15 days after such date in accordance with Chapter 6, Section 2(i) of the WAQSR.

Herschler Building • 122 West 25th Street • Cheyenne, WY 82002 • <http://deq.state.wy.us>

ADMIN/OUTREACH (307) 777-7758 FAX 777-3610	ABANDONED MINES (307) 777-6145 FAX 777-6462	AIR QUALITY (307) 777-7391 FAX 777-5616	INDUSTRIAL SITING (307) 777-7369 FAX 777-5973	LAND QUALITY (307) 777-7756 FAX 777-5864	SOLID & HAZ. WASTE (307) 777-7752 FAX 777-5973	WATER QUALITY (307) 777-7781 FAX 777-5973
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6. The date of commencement of construction shall be reported to the Administrator within 30 days of such date. The permit shall become invalid if construction or modification is not commenced within 24 months of the date of permit issuance or if construction is discontinued for a period of 24 months or more in accordance with Chapter 6, Section 2(h) of the WAQSR. The Administrator may extend such time period(s) upon a satisfactory showing that an extension is justified.
7. Performance tests shall be conducted within 30 days of achieving maximum design rate but not later than 90 days following initial start-up in accordance with Chapter 6, Section 2(j) of the WAQSR. The operator shall provide 15 days prior notice of the test date. If maximum design production rate is not achieved within 90 days of start-up, the Administrator may require testing at the rate achieved and again when maximum rate is achieved.
8. Emission rates shall not exceed levels in the following tables:

**PC Boiler (ES3-01) Allowable Emissions**

Pollutant	lb/MMBtu	lb/MW-hr	lb/hr	tpy
NO <sub>x</sub>	0.05 (12 month rolling)	1.0 (30-day rolling) <sup>1</sup>	65.0 (30-day rolling)	285
SO <sub>2</sub>	0.09 (12 month rolling)	1.4 (30-day rolling) <sup>1</sup>	156.0 (3-hr block) 117.0 (30-day rolling)	512
PM/PM <sub>10</sub>	0.012 <sup>2</sup>	—	15.6	68
CO	0.15	—	195.0	854
Hg	—	97×10 <sup>-6</sup> (12 month rolling) <sup>1</sup>	—	0.04

<sup>1</sup> NSPS Subpart Da Limit

<sup>2</sup> Filterable PM/PM<sub>10</sub>

9. Mercury emissions shall be addressed as follows:
  - A) A one year mercury optimization study shall be performed at the WYGEN 2 facility with a target emission rate of no more than 20×10<sup>-6</sup> lb/MW-hr, 12 month rolling average. A protocol for the study shall be submitted the Division for review and approval prior to commencement of the study. The protocol shall include a description of control technique(s) to be employed including type of sorbent, if applicable, and proposed operational parameters (e.g. carbon injection rate), test methods, and procedures. The results of the study shall be submitted to the Division at least 180 days prior to startup of WYGEN3.
  - B) A mercury control system shall be installed and operated at this facility within 90 days of initial startup. This permit will be reopened to revise the mercury limit in condition 8 and/or add operational parameters to this condition based on the results of the WYGEN 2 study.

10. Opacity shall be limited as follows:
- A) Visible emissions from the PC Boiler (ES3-01) shall be limited to 20% opacity (6-minute average) except for one 6-minute period per hour of not more than 27 percent opacity in accordance with NSPS, Subpart Da, 40 CFR 60.42Da(b).
  - B) Coal conveyors and associated dustless fogging systems shall be operated and maintained such that the conveyor enclosures and transfer points exhibit no visible emissions in accordance with 40 CFR part 60, Appendix A, Method 22.
  - C) Opacity shall be limited to less than 20% from all coal processing and conveying equipment, coal storage systems, and coal transfer and loading systems in accordance with NSPS, Subpart Y, 40 CFR 60.252(c) as determined by 40 CFR Part 60, Appendix A, Method 9.
  - D) Opacity from any other source of emissions at this facility shall be limited to 20% opacity in accordance with WAQSR, Chapter 3, Section 2(a) as determined by 40 CFR Part 60, Appendix A, Method 9.
11. Initial performance tests, required by Condition 7 of this permit, shall consist of the following:
- A) NO<sub>x</sub> - 30 day rolling average - Initial testing and compliance determination shall follow 40 CFR 60.48Da, 40 CFR 60.49Da, and 40 CFR 60.50Da.
  - B) SO<sub>2</sub> - EPA Method 6C or equivalent EPA Reference Methods shall be used to determine initial compliance with the SO<sub>2</sub> 3 hour emission limit. Tests shall consist of 3 runs of 3 hours each.
  - C) SO<sub>2</sub> - 30 day rolling average/Percent Reduction Requirements - Initial testing and compliance determination shall follow 40 CFR 60.48Da, 40 CFR 60.49Da, and 40 CFR 60.50Da.
  - D) PM/PM<sub>10</sub> - Testing shall follow 40 CFR 60.50Da to determine initial compliance with the lb/MMBtu limit established in this permit.
  - E) Opacity - PC Boiler: EPA Method 9 and the procedures in WAQSR, Chapter 5, Section 2(i) shall be used to determine initial compliance with opacity limits in this permit.

Coal Handling: 40 CFR Part 60, Appendix A, Method 22 shall be conducted on conveyor enclosures and transfer points to determine no visible fugitive particulate emissions. Performance tests shall be at least 30 minutes in duration, with observations taken from each side of the enclosure or transfer point.

Ash and Lime Handling: EPA Method 9 shall be used to determine initial compliance with opacity limits in this permit.

- F) CO – Three 1-hour tests following EPA Reference Methods 1-4 and 10 or equivalent EPA Reference Methods shall be used to determine initial compliance with the CO emission limit in this permit.
12. The following testing shall be performed in accordance with Conditions 7 and 13:
- A) PC Boiler Stack shall be tested to determine NH<sub>3</sub> emissions following EPA Conditional Test Method 27 (CTM-027) or equivalent methods. Results of the tests shall be reported in units of lb/hr and ppm<sub>v</sub> on a dry basis corrected to 3 percent O<sub>2</sub>.
- B) PC Boiler exhaust shall be tested at the PC Boiler Stack to determine total fluoride emissions following EPA Method 13A, 13B, or equivalent methods. Results of the tests shall be reported in units of lb/hr.
- C) PC Boiler exhaust shall be tested at the PC Boiler Stack to determine hydrogen chloride emissions following EPA Method 26 or equivalent methods. Results of the tests shall be reported in units of lb/hr.
- D) PC Boiler exhaust shall be tested at the PC Boiler Stack to determine emissions of metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, nickel, and selenium) using EPA Method 29 or equivalent methods. Results of the tests shall be reported in units of lb/hr.
- E) PC Boiler stack shall be tested to determine sulfuric acid mist (H<sub>2</sub>SO<sub>4</sub>) emissions following EPA Method 8 or equivalent methods. Results of the tests shall be reported in units of lb/hr. Sulfur dioxide (SO<sub>2</sub>) emission rates shall be determined during the H<sub>2</sub>SO<sub>4</sub> tests and reported.
- F) PC Boiler exhaust shall be tested at the PC Boiler Stack to determine condensable particulate matter emissions with three 1 hour tests following EPA Reference Method 202. Results of the tests shall be reported in units of lb/hr.
13. Prior to any performance testing or monitor certification testing required by this permit, a test protocol shall be submitted to the Division for approval, at least 30 days prior to testing. Results of the tests shall be submitted to this office within 45 days of completing.
14. Within 90 days of initial startup, Black Hills Corporation (BHC) shall use the following in-stack continuous emission monitoring (CEM) equipment on the PC Boiler stack to demonstrate continuous compliance with the emission limits set forth in this permit:
- A) BHC shall install, calibrate, operate, and maintain a monitoring system, and record the output, for measuring NO<sub>x</sub> emissions discharged to the atmosphere in units lb/MW-hr, lb/MMBtu and lb/hr. The NO<sub>x</sub> monitoring system shall consist of the following:
- i) A continuous emission NO<sub>x</sub> monitor located in the PC Boiler stack.

- ii) A continuous flow monitoring system for measuring the flow of exhaust gases discharged into the atmosphere.
  - iii) A watt meter to measure gross electrical output in megawatt-hours on a continuous basis.
  - iv) An in-stack oxygen or carbon dioxide monitor for measuring oxygen or carbon dioxide content of the flue gas at the location  $\text{NO}_x$  emissions are monitored.
- B) Black Hills Corporation shall install, calibrate, operate, and maintain a  $\text{SO}_2$  monitoring system, and record the output, for measuring emissions discharged to the atmosphere in units of lb/MMBtu and lb/hr. The  $\text{SO}_2$  monitoring system shall consist of the following:
  - i) A continuous emission  $\text{SO}_2$  monitor located in the PC Boiler stack.
  - ii) A continuous flow monitoring system for measuring the flow of exhaust gases discharged into the atmosphere.
  - iii) An in-stack oxygen or carbon dioxide monitor for measuring oxygen or carbon dioxide content of the flue gas at the location  $\text{SO}_2$  emissions are monitored.
- C) Black Hills Corporation shall install, calibrate, operate, and maintain a mercury CEM in accordance with 40 CFR 60 Subpart Da, and record the output, for measuring emissions discharged to the atmosphere in units of lb/MW-hr and lb/hr. As an alternative, Black Hills Corporation may use a sorbent trap monitoring in accordance with 40 CFR 60 Subpart Da and record emissions discharged to the atmosphere in units of lb/MW-hr and lb/hr.
- D) Black Hills Corporation shall install, calibrate, operate, and maintain a monitoring system, and record the output, for measuring the opacity of the emissions discharged to the atmosphere.
- E) Each continuous monitor system listed in this condition shall comply with the following:
  - i) NSPS Subpart Da, Standards of Performance for Electric Utility Steam Generating Units (40 CFR 60.49Da).
  - ii) Monitoring requirements of WAQSR, Chapter 5, Section 2(j) including the following:
    - a) 40 CFR 60, Appendix B, Performance Specification 1 for opacity, Performance Specification 2 for  $\text{NO}_x$  and  $\text{SO}_2$ , Performance Specification 3 for  $\text{O}_2$  or  $\text{CO}_2$ , and Performance Specification 12 for mercury. The monitoring systems must demonstrate linearity in accordance with Division requirements and be certified in both concentration (ppm) and units of the standard (lb/MMBtu, lb/MW-hr and lb/hr).

- b) Quality Assurance requirements of 40 CFR 60, Appendix F.
  - c) Black Hills Corporation shall develop and submit for the Division's approval a Quality Assurance plan for the monitoring systems listed in this condition within 90 days of initial startup.
15. Following the initial performance tests, compliance with the NO<sub>x</sub>, SO<sub>2</sub>, Hg, and opacity limits for the PC Boiler set forth in this permit shall be determined with data from the continuous monitoring systems required by Condition 14 of this permit as follows:

A) Exceedances of the limits shall be defined as follows:

- i) Any 12 month rolling average which exceeds the lb/MMBtu NO<sub>x</sub> or SO<sub>2</sub> limits as calculated using the following formula:

$$E_{avg} = \frac{\sum_{h=1}^n (C)_h}{n}$$

Where:

- $C$  = 1-hour average emission rate (lb/MMBtu) for hour "h" calculated using valid data from the CEM equipment required in Condition 14 and the procedures in 40 CFR 60, Appendix A, Method 19. Valid data shall meet the requirements of WAQSR, Chapter 5, Section 2(j).
  - $E_{avg}$  = Weighted 12 month rolling average emission rate (lb/MMBtu)
  - $n$  = The number of unit operating hours in the 12 month period with valid emissions data meeting the requirements of WAQSR, Chapter 5, Section 2(j).
- ii) Any 30-day rolling average which exceeds the lb/MW-hr NO<sub>x</sub> or SO<sub>2</sub> limits calculated in accordance 40 CFR 60.48Da, 60.49Da, and 60.50Da.
  - iii) Any 30-day rolling average calculated using valid data (output concentration and average hourly volumetric flowrate) from the CEM equipment required in Condition 14 which exceeds the lb/hr NO<sub>x</sub> or SO<sub>2</sub> limits established in this permit. Valid data shall meet the requirements of WAQSR, Chapter 5, Section 2(j). The 30-day average emission rate shall be calculated at the end of each boiler operating day (as defined in 40 CFR 60.41Da) as the arithmetic average of hourly emissions with valid data during the previous 30-day period.
  - iv) Any 3-hour block average of SO<sub>2</sub> calculated using valid data (output concentration and average hourly volumetric flowrate) from the CEM equipment required in Condition 14 which exceeds the lb/hr limit established in this permit. Valid data shall meet the requirements of WAQSR, Chapter 5, Section 2(j). The 3-hour average emission rate shall be calculated at the end of each 3-hour operating block as the arithmetic average of hourly emissions with valid data during the previous three operating hours.

- v) Any 12 month rolling average of mercury (Hg) emissions which exceeds the lb/MW-hr limit calculated in accordance 40 CFR Part 60, Subpart Da.
  - vi) Any 6-minute average opacity, except for one 6-minute period per hour of not more than 27 percent opacity, in excess of 20 percent in accordance with 40 CFR 60.42Da(b).
- B) Black Hills Corporation shall comply with all reporting and record keeping requirements as specified in WAQSR Chapter 5, Section 2(g) and 40 CFR Part 60, Subpart Da. All excess emissions shall be reported using the procedures and reporting format specified in WAQSR Chapter 5, Section 2(g). In addition, reporting and record keeping requirements for the 30-day rolling lb/MW-hr NO<sub>x</sub> and SO<sub>2</sub> limits, the 12 month rolling Hg limit, and the opacity limit shall follow the requirements in 40 CFR 60.51Da and 60.52Da.
16. Black Hills Corporation (BHC) shall comply with the following maintenance and inspection requirements for the coal conveyors and associated dustless fogging systems:
- A) Daily inspections shall be conducted at each of the coal conveyor enclosures and transfer points. BHC shall utilize a daily check form to document daily inspections. A representative form shall be submitted to and approved by the Division prior to utilization. Upon approval, the form will be incorporated as part of the permit. The form may be revised without administratively amending the applicable permit, but revisions shall be approved by the Division prior to implementation.
  - B) BHC shall institute a monthly preventative maintenance plan for each of the coal conveyor enclosures and dustless fogging systems. A representative plan shall be submitted to and approved by the Division prior to utilization. Upon approval, the plan will be incorporated as part of the permit. The monthly preventative maintenance plan may be revised without administratively amending the applicable permit, but revisions shall be approved by the Division prior to implementation.
17. Black Hills Corporation shall comply with all applicable requirements of 40 CFR 60 Subpart Da and Subpart Y.
18. Black Hills Corporation shall use a wet handling system for waste ash load-out. A pug mill rotary mixer shall be used to mix ash to a consistent moisture content of approximately 30 to 40% prior to loading into the ash haul truck. Black Hills Corporation shall record and maintain records of the quantity of water supplied to the pug mill spray nozzles and the quantity of ash loaded each calendar month. At the end of each calendar month, Black Hills Corporation shall calculate the moisture content of the waste ash by dividing the mass of water used by the mass of waste ash and water combined. Lime and ash shall be entirely enclosed in the haul trucks whenever the wet handling system is not operating. Black Hills Corporation shall maintain records of dates that the wet handling system is not operating and whether or not the haul trucks are covered.

19. Unpaved haul roads 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.
20. Black Hills Corporation shall comply with acid rain program regulations in WAQSR, Chapter 11, Section 2.
21. Records required by any applicable regulation or permit condition shall be maintained for a minimum period of five (5) years and shall be readily accessible to Division representatives.
22. Black Hills Corporation shall upgrade the existing meteorological monitoring site to collect the meteorological parameters specified below and operate this site in accordance with the requirements of 40 CFR Parts 50 and 58. Meteorological parameters shall be measured at multiple levels (2 meters, 10 meters, and 30 meters) to ensure that data used for modeling are representative of conditions for elevated releases. The following meteorological data shall be collected for a period such that five (5) complete years of meteorological data which are suitable for input to dispersion models are obtained:
  - 1) Horizontal wind speed at 10 meters and 30 meters
  - 2) Horizontal wind direction at 10 meters and 30 meters
  - 3) Lateral turbulence [Horizontal wind deviation ( $\sigma_\theta$ )] at 10 meters
  - 4) Vertical wind speed at 10 meters and 30 meters
  - 5) Delta temperature measurements between 2-10 meters and between 2-30 meters (Temperature to be measured at 2 m, 10 m, and 30 m)
  - 6) Solar Insolation or Net Radiation Measurements at approximately 1 meter
  - 7) Surface Pressure

Where:  $Z_0$  = surface roughness length  
 $\sigma_\theta$  = sigma theta (horizontal wind deviation)

The data generated by the network shall be submitted in an approved electronic format on a quarterly basis, within 60 days following the end of the quarter; these data shall be compiled for use in dispersion models utilizing the solar radiation-delta T method and the modified sigma theta method for determining atmospheric stability. Black Hills Corporation shall maintain a quality assurance plan for the monitoring network, as required by 40 CFR Part 58 and approved by the Division.

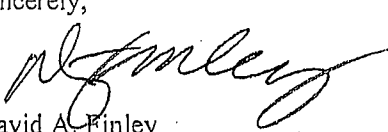
23. Black Hills Corporation shall submit an evaluation within 180 days after issuance of this permit addressing startup and shutdown issues including duration and frequency, operation of control devices, operational practices to minimize emissions, and emission profiles for  $\text{NO}_x$ , CO,  $\text{SO}_2$ , and  $\text{PM}_{10}$ . The evaluation shall address compliance with emission limits in this permit for  $\text{NO}_x$ ,  $\text{SO}_2$ , and opacity during startup and shutdown and include any necessary modeling. The Division will review the evaluation and revise conditions in this permit as necessary prior to initial startup.



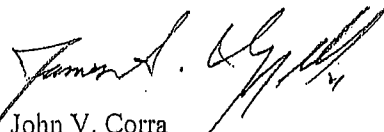
It must be noted that this approval does not relieve you of your obligation to comply with all applicable county, state, and federal standards, regulations or ordinances. Special attention must be given to Chapter 6, Section 2 of the Wyoming Air Quality Standards and Regulations, which details the requirements for compliance with conditions 3, 5, 6 and 7. 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,



David A. Finley  
Administrator  
Air Quality Division



John V. Corra  
Director  
Dept. of Environmental Quality

cc: Mike Warren