Air Quality Permit

Issued To: Continental Energy Services, Inc.
Silver Bow Generation Plant
101 N. Main Street
Butte, MT 59701

Permit #3165-00
Application Received: 7/20/01
Preliminary Determination Issued: 8/8/01
Department Decision Issued: 3/14/02
Permit Final:
AFS Number: 093-0017

An air quality permit, with conditions, is hereby granted to Continental Energy Services, Inc. Silver Bow Generation Plant (SBGP) pursuant to Sections 75-2-204 and 211, Montana Code Annotated (MCA), as amended, and Administrative Rules of Montana (ARM) 17.8.701, *et seq*., as amended, for the following:

Section I: Permitted Facilities

A. Plant Location

SBGP submitted a permit application to construct a nominal 500 megawatt (MW) electrical power generation facility approximately 6 miles west of Butte, Montana. The legal description of the site location is Section 35, Township 3 North, Range 9 West, in Silver Bow County, Montana.

B. Permitted Equipment

SBGP is proposing to install and operate a stationary facility to produce electrical power for delivery to the existing power grid. The facility will consist of two nominal 175 MW combine cycle turbines and a 150 MW steam turbine and will be capable of generating approximately 500-MW of power for delivery to the existing power grid. A complete list of the permitted equipment for the natural gas fired 500-MW electrical power generation facility is contained in the permit analysis.

SECTION II: Limitations and Conditions

A. Emission Limitations and Control Requirements

1. SBGP shall operate and maintain an SCR unit on each of the 175 MW natural gas powered combined cycle turbine/heat recovery steam generator (HRSG) stacks. Emissions from each of the 175 MW natural gas powered turbine/HRSG stacks shall not exceed the following limits:

NO_x	25.2 lb/hr (ARM 17.8.715)
CO	139.9 lb/hr (ARM 17.8.710)
PM_{10}	32.4 lb/hr (ARM 17.8.710)
VOC	17.0 lb/hr (ARM 17.8.710)

2. Each of the two HRSG duct burners shall be limited to a maximum of 4000 hours of operation during any rolling 12-month time period (ARM 17.8.710).

3. SBGP shall only combust pipeline quality natural gas in the combined cycle turbines (ARM 17.8.710).

4. SBGP shall not cause or authorize emissions to be discharged into the outdoor atmosphere from any sources installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes (ARM 17.8.304).

5. SBGP shall not cause or authorize emissions to be discharged into the atmosphere from haul

roads, access roads, parking lots, or the general plant property without taking reasonable precautions to control emissions of airborne particulate matter (ARM 17.8.308).

6. SBGP shall treat all unpaved portions of the access roads, parking lots, and general plant area with fresh water and/or chemical dust suppressant as necessary to maintain compliance with the reasonable precautions limitation in Section II.A.5 (ARM 17.8.710).

7. SBGP shall comply with all applicable standards and limitations, and the reporting, recordkeeping, and notification requirements contained in 40 CFR 60, Subpart Da, which includes but is not limited to the following limitations on each HRSG (ARM 17.8.340 and 40 CFR 60, Subpart Da).

PM	0.03 lb/MMBtu
NO_x	0.20 lb/MMBtu

8. SBGP shall comply with all applicable standards and limitations, and the reporting, recordkeeping, and notification requirements contained in 40 CFR 60, Subpart GG, which includes, but is not limited to the following limitations on each turbine (ARM 17.8.340 and 40 CFR 60, Subpart GG).

NO_x	113 ppmvd at 15% O_2
SO_2	0.015 % by volume at 15% O_2
Fuel	< 0.8% sulfur by weight

9. SBGP shall comply with all applicable standards and limitations, and the reporting, recordkeeping, and notification requirements contained in 40 CFR 63, Subpart Q (ARM 17.8.342 and 40 CFR 63, Subpart Q).

10. SBGP shall comply with all applicable standards and limitations, and the reporting, recordkeeping, and notification requirements of the Acid Rain Program contained in 40 CFR 72-78 (40 CFR 72 through 40 CFR 78).

B. Testing Requirements

1. SBGP shall test each of the 175 MW turbines for NO_x and CO, concurrently, within 180 days of initial start-up of each of the 175 MW turbines, or according to another testing/monitoring schedule as may be approved by the Department, to demonstrate compliance with the NO_x and CO emission limits contained in Section II.A.1. The NO_x and CO testing shall continue on an every-2-year basis, or according to another testing/monitoring schedule as may be approved by the Department (ARM 17.8.105 and 17.8.710).

2. SBGP shall test the each of the 175 MW turbines for PM_{10} within 180 days of initial start-up of each of the 175 MW turbines, or according to another testing/monitoring schedule as may be approved by the Department, to demonstrate compliance with the PM_{10} emission limit contained in Section II.A.1. The testing shall continue on an every-2-year basis, or according to another testing/monitoring schedule as may be approved by the Department (ARM 17.8.105 and 17.8.710).

3. All compliance source tests shall be conducted in accordance with the Montana Source Test Protocol and Procedures Manual (ARM 17.8.106).

4. The Department may require additional testing (ARM 17.8.105).

C. Operational Reporting Requirements

1. SBGP shall supply the Department with annual production information for all emission points, as required, by the Department in the annual emission inventory request. The request will include, but is not limited to, all sources of emissions identified in Section I of the permit analysis.

   Production information shall be gathered on a calendar-year basis and submitted to the Department by the date required in the emission inventory request. Information shall be in the units required by the Department. This information may be used for calculating operating fees based on actual emissions from the facility, and/or to verify compliance with permit limitations (ARM 17.8.505).

2. SBGP shall document, by month, the total hours of operation of each HRSG duct burner. By the 25th day of each month, SBGP shall total the hours of operation of each HRSG duct burner during the previous 12 months to verify compliance with the limitation in Section II.A.2. A written report, including the previous 12-month total hours of operation of each HRSG duct burner, shall be submitted annually to the Department no later than March 1 and may be submitted along with the annual emission inventory (ARM 17.8.710).

3. SBGP shall notify the Department of any construction or improvement project conducted pursuant to ARM 17.8.705(1)(r) that would include a change in control equipment, stack height, stack diameter, stack flow, stack gas temperature, source location, or fuel specifications, or would result in an increase in source capacity above its permitted operation or the addition of a new emission unit. The notice must be submitted to the Department, in writing, 10 days prior to start up or use of the proposed de minimis change, or as soon as reasonably practicable in the event of an unanticipated circumstance causing the de minimis change, and must include the information requested in ARM 17.8.705(1)(r) (iv) (ARM 17.8.705).

4. The records compiled in accordance with this permit shall be maintained by SBGP as a permanent business record for at least 5-years following the date of the measurement, shall be submitted to the Department upon request, and shall be available at the plant site for inspection by the Department (ARM 17.8.710).

D. Notification

SBGP shall provide the Department with written notification of the following dates within the specified time periods (ARM 17.8.710):

1. Commencement of construction of the power generation facility within 30 days after commencement of construction.

2. Actual start-up date of each of the two 175 MW turbines/HRSG units within 15 days after the actual start-up of each turbines/HRSG units.

3. Actual start-up date of each of the two 175 MW turbines/HRSG units within 15 days after the actual start-up of each turbines/HRSG units.

E. Applicant Accepted Conditions

CES has agreed to implement several mitigation measures, as described in the Record of Decision for the CES Silver Bow Generation Project and the measures as imposed at the project sponsors' request pursuant to §75-1-201(5)(b), MCA. These mitigation measures are enforceable conditions this permit and shall remain in the permit for the lifetime of the facility.

1. CES shall provide the Federal Aviation Administration (FAA) with information regarding residential land uses surrounding the generation plant and industrial park, and identify

preferred lighting for the exhaust stacks that does not include strobe lights if omission of strobe lights meets FAA and other governmental regulations (MCA §75-1-201(5)(b)).

2. CES shall implement noise control measures at the generation plant such as silencers for decreasing noise generated by combustion turbines, heat recovery steam generators, and steam turbines to comply with the TIFID noise limits during normal operations (MCA §75-1-201(5)(b)).

Section III: General Conditions

A. Inspection - The recipient shall allow the Department's representatives access to the source at all reasonable times for the purpose of making inspections or surveys, collecting samples, obtaining data, auditing any monitoring equipment (CEMS, CERMS) or observing any monitoring or testing, and otherwise conducting all necessary functions related to this permit.

B. Waiver - The permit and all the terms, conditions, and matters stated herein shall be deemed accepted if the recipient fails to appeal as indicated below.

C. Compliance with Statutes and Regulations - Nothing in this permit shall be construed as relieving any permittee of the responsibility for complying with any applicable federal or Montana statute, rule or standard, except as specifically provided in ARM 17.8.701, *et seq.* (ARM 17.8.717).

D. Enforcement - Violations of limitations, conditions and requirements contained herein may constitute grounds for permit revocation, penalties or other enforcement as specified in Section 75-2-401, *et seq.*, MCA.

E. Appeals - Any person or persons jointly or severally adversely affected by the Department's decision may request, within 15 days after the Department renders its decision, upon affidavit setting forth the grounds therefor, a hearing before the Board of Environmental Review (Board). A hearing shall be held under the provisions of the Montana Administrative Procedures Act. The Department's decision on the application is not final unless 15 days have elapsed and there is no request for a hearing under this section. The filing of a request for a hearing postpones the effective date of the Department's decision until the conclusion of the hearing and issuance of a final decision by the Board.

F. Permit Inspection - As required by ARM 17.8.716, Inspection of Permit, a copy of the air quality permit shall be made available for inspection by Department personnel at the location of the permitted source.

G. Construction Commencement - Construction must begin within 3 years of permit issuance and proceed with due diligence until the project is complete or the permit shall be revoked.

H. Permit Fees - Pursuant to Section 75-2-220, MCA, as amended by the 1991 Legislature, the continuing validity of this permit is conditional upon the payment by the permittee of an annual operation fee, as required, by that Section and rules adopted thereunder by the Board.

Permit Analysis
Continental Energy Services, Inc.
Silver Bow Generation Plant
Permit #3165-00

I. Introduction/Process Description

A. Permitted Equipment

On July 20, 2001, a complete permit application was submitted by Continental Energy Services, Inc. Silver Bow Generation Plant (SBGP) to install two 175 megawatt (MW) Siemens-Westinghouse 501FD combined cycle gas turbines, and two associated heat recovery steam generator (HRSG) to produce electrical power. Emissions of oxides of nitrogen (NO_x) will be controlled by selective catalytic reduction (SCR) unit installed on each turbine. SBGP will also install and operate a 150 MW steam turbine and associated cooling towers. The natural gas fired 500-MW electrical power generation facility will operate at the legal location of Section 35, Township 3 North, Range 9 West, Silver Bow County, Montana, which is located 6 miles west of Butte, Montana.

B. Source Description

A gas turbine is an internal combustion engine that operates with rotary rather than reciprocating motion. Gas turbines are essentially composed of three major components: compressor, combustor, and power turbine. The compressor draws in ambient air and compresses it to a pressure of up to 30 times ambient pressure. The compressed air is then directed to the combustor section where fuel is introduced, ignited, and burned. The hot combustion gases are then diluted with additional cool air from the compressor section and directed to the turbine section. Energy is recovered in the turbine section in the form of shaft horsepower; typically greater than 50 percent of the horsepower is required to drive the internal compressor section. The balance of the recovered shaft energy is available to drive the external load unit. The compressor and turbine sections can be a single fan-like wheel assembly, but are usually made up of a series of stages. The compressor and turbine sections may be associated with one or several connecting shafts. In a single shaft gas turbine, all compressor and turbine stages are fixed to a single continuous shaft and operate at the same speed. The single shaft configuration is typically used to drive electric generators.

The power block of the SBGP project will be composed of two combustion turbines, two HRSGs, one steam turbine, and three power generators one driven by each turbine. A combination of a turbine and its dedicated power generator is referred to as a turbine unit. A combined cycle facility generates electricity with the combustion turbine from the initial combustion of the fuel and an HRSG from the resulting heat. Within each combustion turbine unit, a mixture of compressed air and natural gas is fired in the combustor to produce compressed hot combustion gases. Expansion of these gases in the turbine rotates the turbine shaft, which turns a generator to produce electricity.

Within the HRSG, exhaust heat from the combustion turbines is used to create steam to drive the steam turbine. Supplemental energy can be added in the HRSG with a natural gas-fired duct burner. The use of the duct burner increases steam production and ultimately increases the steam turbine power output. After passing steam through the steam turbine, the steam is condensed in the cooling towers and returned to the HRSG for reuse.

The SBGP facility will consist of one steam turbine and two combine cycle gas turbines with SCR to control NO_x emissions. The Model 501FD gas turbines are manufactured by Siemens-Westinghouse and have a nominal power output of 175 MW. The steam turbine has a nominal power output of 150 MW. The nominal power output of the facility is 500 MW.

The Department placed NO_x emission limits on the facility and required the installation and operation of an SCR unit on each turbine/HRSG unit. The Department also limited the hours of operation of the HRSG duct burners to keep the SBGP facility below the volatile organic compound (VOC) premonitoring threshold. SBGP is required to track the hours of operation of each HRSG duct burner per a rolling 12-month time period. The Department also placed emission limits on the facility for carbon monoxide (CO), VOCs, and particulate matter <10 µm (PM_{10}).

C. MEPA Mitigation Changes

Through the MEPA process the applicant proposed mitigation measures. The Department has incorporated a portion of those mitigation measures in this permitting action. The conditions pertaining to the mitigation measures are included in Section II.E of the permit and are intended to remain in the permit for the lifetime of the facility.

II. Applicable Rules and Regulations

The following are partial explanations of some applicable rules and regulations that apply to the facility. The complete rules are stated in the Administrative Rules of Montana (ARM) and are available, upon request, from the Department. Upon request, the Department will provide references for location of complete copies of all applicable rules and regulations, or copies where appropriate.

A. ARM 17.8, Sub-Chapter 1, General Provisions, including, but not limited to:

1. ARM 17.8.105 Testing Requirements. Any person or persons responsible for the emissions of any air contaminant into the outdoor atmosphere shall, upon written request of the Department, provide the facilities and necessary equipment (including instruments and sensing devices) and shall conduct tests, emission or ambient, for such periods of time as may be necessary, using methods approved by the Department. Based on the emissions from the turbines, the Department determined that initial testing for NO_x, CO, and PM_{10} is necessary. Furthermore, based on the emissions from the turbines, the Department determined that additional testing every 2-years is necessary to demonstrate compliance with the PM_{10}, NO_x and CO limits.

2. ARM 17.8.106 Source Testing Protocol. The requirements of this rule apply to any emission source testing conducted by the Department, any source, or other entity as required by any rule in this chapter, or any permit or order issued pursuant to this chapter, or the provisions of the Clean Air Act of Montana, 75-2-101, *et seq.*, Montana Code Annotated (MCA).

   SBGP shall comply with the requirements contained in the Montana Source Test Protocol and Procedures Manual including, but not limited to, using the proper test methods and supplying the required reports. A copy of the Montana Source Test Protocol and Procedures Manual is available from the Department upon request.

3. ARM 17.8.110 Malfunctions. (2) The Department must be notified promptly, by telephone, whenever a malfunction occurs that can be expected to create emissions in excess of any applicable emission limitation, or to continue for a period greater than 4 hours.

4. ARM 17.8.111 Circumvention. (1) No person shall cause or permit the installation or use of any device or any means that, without resulting in reduction in the total amount of air contaminant emitted, conceals or dilutes an emission of air contaminant that would otherwise violate an air pollution control regulation. (2) No equipment that may produce emissions shall be operated or maintained in such a manner that a public nuisance is created.

B. ARM 17.8, Sub-Chapter 2, Ambient Air Quality, including, but not limited to:

1. ARM 17.8.210 Ambient Air Quality Standards for Sulfur Dioxide
2. ARM 17.8.211 Ambient Air Quality Standards for Nitrogen Dioxide
3. ARM 17.8.212 Ambient Air Quality Standards for Carbon Monoxide
4. ARM 17.8.213 Ambient Air Quality Standard for Ozone
5. ARM 17.8.220 Ambient Air Quality Standard for Settled Particulate Matter
6. ARM 17.8.221 Ambient Air Quality Standard for Visibility
7. ARM 17.8.223 Ambient Air Quality Standard for PM_{10}

SBGP must maintain compliance with the applicable ambient air quality standards.

C. ARM 17.8, Sub-Chapter 3, Emission Standards, including, but not limited to:

1. ARM 17.8.304 Visible Air Contaminants. This rule requires that no person may cause or authorize emissions to be discharged into an outdoor atmosphere from any source installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes.

2. ARM 17.8.308 Particulate Matter, Airborne. (1) This section requires an opacity limitation of 20% for all fugitive emission sources and that reasonable precautions be taken to control emissions of airborne particulate. (2) Under this section, SBGP shall not cause or authorize the use of any street, road, or parking lot without taking reasonable precautions to control emissions of airborne particulate matter.

3. ARM 17.8.340 Standard of Performance for New Stationary Sources. This section incorporates, by reference, 40 CFR Part 60, Standards of Performance for New Stationary Sources (NSPS). SBGP's 175-MW turbines are considered NSPS affected facilities under 40 CFR Part 60 and are subject to the requirements of the following subparts.

   40 CFR Part 60, Subpart Da, Standards of Performance for Electric Utility Steam Generating Units. This subpart applies to both of the 175-MW turbine HRSGs because they are capable of combusting more than 250 MMBtu/hr of heat input of fossil fuel.

   40 CFR Part 60, Subpart GG, Standards of Performance for Stationary Gas Turbines. This subpart applies to both of the 175-MW turbines because the turbines were constructed after October 3, 1977, and because the turbines will have a heat input capacity of greater than 10.7 gigajoules per hour.

4. ARM 17.8.341 Emission Standards for Hazardous Air Pollutants. This section incorporates, by reference, 40 CFR Part 61, National Emission Standards for Hazardous Air Pollutants. Since the emission of Hazardous Air Pollutants (HAP) from the SBGP power generation facility is less than 10 tons per year for any individual HAP and less than 25 tons per year for all HAP combined, the SBGP facility is not subject to the provisions of 40 CFR Part 61.

5. ARM 17.8.342 Emission Standards for Hazardous Air Pollutants for Source Categories. This section incorporates, by reference, 40 CFR Part 63, National Emission Standards for Hazardous Air Pollutants for Source Categories. Since the emission of HAP from the SBGP power generation facility is less than 10 tons per year for any individual HAP and less than 25 tons per year for all HAP combined. SBGP is subject to the provisions of 40 CFR Part 63 Subpart Q, National Emission Standards for Hazardous Air Pollutants for Industrial Process Cooling Towers.

D. ARM 17.8, Sub-Chapter 5, Air Quality Permit Application, Operation and Open Burning Fees, including, but not limited to:

1. ARM 17.8.504 Air Quality Permit Application Fees. This section requires that an applicant submit an air quality permit application fee concurrent with the submittal of an air quality permit application. A permit application is incomplete until the proper application fee is paid to the

Department. SBGP submitted the appropriate permit application fee for the current permit action.

2. ARM 17.8.505 Air Quality Operation Fees. An annual air quality operation fee must, as a condition of continued operation, be submitted to the Department by each source of air contaminants holding an air quality permit, excluding an open burning permit, issued by the Department; and the air quality operation fee is based on the actual, or estimated actual, amount of air pollutants emitted during the previous calendar-year.
An air quality operation fee is separate and distinct from an air quality permit application fee. The annual assessment and collection of the air quality operation fee, described above, shall take place on a calendar-year basis. The Department may insert into any final permit issued after the effective date of these rules, such conditions as may be necessary to require the payment of an air quality operation fee on a calendar-year basis, including provisions that pro-rate the required fee amount.

E. ARM 17.8, Sub-Chapter 7, Permit, Construction and Operation of Air Contaminant Sources, including, but not limited to:

1. ARM 17.8.701 Definitions. This rule is a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.704 General Procedures for Air Quality Preconstruction Permitting. This air quality preconstruction permit contains requirements and conditions applicable to both construction and subsequent use of the permitted equipment.

3. ARM 17.8.705 When Permit Required--Exclusions. This rule requires a facility to obtain an air quality permit or permit alteration if they construct, alter, or use any air contaminant sources that have the potential to emit more than 25 tons per year of any pollutant. SBGP has the potential to emit greater than 25 tons per year of particulate matter (PM), PM_{10}, NO_x, CO, and VOC; therefore, a permit is required.

4. ARM 17.8.707 Waivers. ARM 17.8.706 requires the permit application to be submitted 180 days prior to construction. This rule allows the Department to waive this time limit. The Department hereby waives this time limit.

5. ARM 17.8.710 Conditions for Issuance of Permit. This section requires that SBGP demonstrate compliance with applicable rules and standards before a permit can be issued. Also, a permit may be issued with such conditions as are necessary to assure compliance with all applicable rules and standards. SBGP demonstrated compliance with applicable rules and standards as required for permit issuance.

6. ARM 17.8.715 Emission Control Requirements. SBGP is required to install on the new or altered source the maximum air pollution control capability which is technically practicable and economically feasible, except that Best Available Control Technology (BACT) shall be used. A BACT analysis was conducted for sources of NO_x, CO, VOC, PM, and PM_{10} at this facility. The BACT analysis can be found in Section IV.

7. ARM 17.8.716 Inspection of Permit. This rule requires that air quality permits shall be made available for inspection by the Department at the location of the source.

8. ARM 17.8.717 Compliance with Other Statutes and Rules. This rule states that nothing in the permit shall be construed as relieving SBGP of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.701, *et seq.*

9. ARM 17.8.720 Public Review of Permit Applications. This rule requires that the applicant

notify the public by means of legal publication in a newspaper of general circulation in the area affected by the application for a permit. SBGP submitted an affidavit dated June 14, 2001, from the Montana Standard, a newspaper of general circulation in Silver Bow County, as proof of compliance with the public notice requirement.

10. ARM 17.8.731 Duration of Permit. An air quality permit shall be valid until revoked or modified as provided in this subchapter, except that a permit issued prior to construction of a new or altered source may contain a condition providing that the permit will expire unless construction is commenced within the time specified in the permit, that in no event may be less than 1 year after the permit is issued.

11. ARM 17.8.733 Modification of Permit. An air quality permit may be modified for changes in any applicable rules and standards adopted by the Board of Environmental Review (Board) or changed conditions of operation at a source or stack that do not result in an increase in emissions because of those changed conditions. A source may not increase its emissions beyond those found in its permit unless the source applies for and receives another permit.

12. ARM 17.8.734 Transfer of Permit. This section states that an air quality permit may be transferred from one person to another if written notice of Intent to Transfer, including the names of the transferor and the transferee, is sent to the Department.

F. ARM 17.8, Sub-Chapter 8, Prevention of Significant Deterioration of Air Quality, including, but not limited to:

1. ARM 17.8.801 Definitions. This rule is a list of applicable definitions used in this subchapter.

2. ARM 17.8.818 Review of Major Stationary Sources and Major Modifications--Source Applicability and Exemptions. The requirements contained in ARM 17.8.819 through ARM 17.8.827 shall apply to any major stationary source and any major modification, with respect to each pollutant subject to regulation under the Federal Clean Air Act (FCAA) that it would emit, except as this subchapter would otherwise allow.

   The SBGP facility is a listed source and the potential emissions are greater than 100 tons per year for CO, NO_x, PM, and PM_{10}. The facility also triggers a review of VOC because the potential VOC emissions exceed the significance levels. Based on this information, SBGP submitted an application to meet the requirement of a Prevention of Significant Deterioration (PSD) review.

G. ARM 17.8, Subchapter 12 - Operating Permit Program Applicability, including, but not limited to:

1. ARM 17.8.1201 Definitions. (23) Major Source under Section 7412 of the FCAA is defined as any stationary source having:

   a. Potential To Emit (PTE) > 10 ton/year of any one HAP, or PTE > 25 ton/year of a combination of all HAP, or lesser quantity as the Department may establish by rule.

   b. PTE > 100 ton/year of any pollutant.

   c. Sources with the PTE > 70 ton/year of PM_{10} in a serious PM_{10} nonattainment area.

2. ARM 17.8.1204 Air Quality Operating Permit Program Applicability. Title V of the FCAA Amendments of 1990 requires that all sources, as defined in ARM 17.8.1204(1), obtain a Title V Operating Permit. In reviewing and issuing Air Quality Permit #3165-00 for SBGP, the following conclusions were made:

a. The facility's PTE is greater than 100 ton/year for several criteria pollutants.

b. The facility's PTE is less than 10 ton/year of any one HAP and less than 25 ton/year of all HAPs.

c. This facility is not located in a serious PM_{10} nonattainment area.

d. This facility is subject to a current NSPS standard (40 CFR 60, Subpart Da and 40 CFR 60 Subpart GG).

e. This facility is subject to a current NESHAP standard (40 CFR 63, Subpart Q).

f. This facility is a Title IV affected source.

g. This facility is not an EPA designated Title V source.

Based on the above information, the SBGP facility is a major source for Title V and, thus, a Title V Operating Permit is required.

III. BACT Determination

A BACT determination is required for each new or altered source. SBGP shall install on the new source the maximum air pollution control capability that is technically practicable and economically feasible, except that the BACT shall be utilized.

A. NO_x BACT

The BACT analysis included SCR, selective noncatalytic reduction (SNCR), wet chemistry scrubber, NO_x scrubber, and low temperature oxidation (LoTOx). A summary of the analysis of these controls is shown below.

1. SCR

SCR is a post-combustion gas treatment technique for reduction of nitric oxide (NO) and nitrogen dioxide (NO_2) in the engine exhaust stream to molecular nitrogen, water, and oxygen. In the SCR process, aqueous or anhydrous ammonia (NH_3) or urea is used as a reducing agent, and is injected into the flue gas upstream of the catalyst bed. NO_x and NH_3 combine at the catalyst surface, forming an ammonium salt intermediate, which subsequently decomposes to produce elemental nitrogen and water.

SCR works best for flue gas temperatures between 575°F and 750°F. The control efficiency for an SCR is typically estimated between 80% and 90%. The stack temperature for the turbines is approximately 1050°F.

An SCR unit would cost approximately $5,800 per ton of NO_x removed. Because the overall cost of using this technology is comparable to that required by other recently permitted similar sources within the nation and because the SCR is expected to be 88% efficient, the Department determined that SCR technology does constitute BACT in this case.

2. SNCR

The use of SNCR technology is based on the noncatalytic decomposition of NO_x in the flue gas to nitrogen and water using a reducing agent (e.g., ammonia or urea). The reactions take place at much higher temperatures than in an SCR, typically between 1650°F and 1800°F. The stack temperature for the proposed turbines is approximately 1050°F.

With a lower stack temperature, the use of SNCR with the turbines would require additional heating of the gas stream. The additional heating of the gas stream would result in additional pollutants and would drive up the cost per ton of reduction of air emissions. Furthermore, the residence time that is required for the reaction to occur using SNCR is generally longer than can be accommodated by the exit velocity of a gas turbine. Due to the higher cost per ton of reduction and the lower control efficiency from this technology in comparison with an SCR unit, the potential for increased air emissions, and the technical difficulties of using this control technology, the Department determined that SNCR does not constitute BACT in this case.

3. Low Temperature Oxidation (LoTOx)

With the LoTOx control alternative, oxygen and nitrogen are injected at approximately 380°F to transform NO and NO_2 into N_2O_5 using an ozone generator and a reactor duct. N_2O_5, that is soluble, dissociates in a wet scrubber into nitrogen and water. This system requires oxygen, nitrogen, a cooling water supply, and treatment for the effluent. The estimated control efficiency for the system is 80-90%, which is comparable to that of an SCR unit.

The LoTOx control technology has only been demonstrated to work on coal-fired industrial boilers. Due to the questions on the effectiveness of using this control technology for a natural gas fired turbine and the overall cost of using this technology, the Department determined that LoTOx technology does not constitute BACT in this case.

4. Wet Chemistry Scrubber

There is no standard model for this system. A scrubbing system consists of several stages. The Stages include converting NO to NO_2, then quenching the NO_2 to induce chemical reactions in an aqueous stage. Chemical reactions are carried out in subsequent stages in order to break down NO_2. The system requires chemical reagents and water treatment or chemical disposal provisions. The number of reagents and treatment requirements varies depending on design. The estimated control efficiency is approximately 80%.

In general, the highest percent reduction of NO_x emissions obtained by using wet chemistry is still lower than the resulting percent reduction from the SCR unit. Since the SCR unit will result in lower NO_x emissions than the use of wet chemistry, and has been proven to work on other combined cycle turbines, the Department determined that wet chemistry does not constitute BACT in this case.

In summary, based on the potential emissions from each of the turbines and the incremental cost to control the NO_x emissions, the Department determined that SCR unit will constitute BACT for the control of NO_x emissions from the turbines.

B. CO and VOC BACT

The BACT analysis included oxidation with a catalytic oxidizer or a regenerative thermal oxidizer and proper design and combustion for the turbine. A summary of the analysis of these controls is shown below.

1. Oxidation

Oxidation controls ideally break down the molecular structure of an organic compound into CO_2 and water vapor. Temperature, residence time, and turbulence of the system affect CO and VOC control efficiency. Incinerators or oxidizers have the potential for very high CO and VOC control efficiency; however, this efficiency comes at the expense of potentially increasing NO_x emissions. Typically, when an incinerator is designed for either CO or VOC control, the pollutant that the control device is designed for has a higher efficiently. When the pollutants were analyzed together, an 80% control efficiency was used for both CO and VOC.

A thermal incinerator operates at temperatures ranging between 1450°F and 1600°F. Catalytic incineration is similar to thermal incineration; however, catalytic incineration allows for oxidation at temperatures ranging from 600°F to 1000 °F. The catalyst systems that are used are typically metal oxides such as nickel oxide, copper oxide, manganese oxide, or chromium oxide. Due to the high temperatures required for complete destruction, fuel costs can be expensive and fuel consumption can be excessive with oxidation units. To lower fuel usage, regenerative thermal oxidizers (RTO's) or catalytic oxidizers can be used to preheat contaminated process air in a heat recovery chamber. The cost effectiveness of catalytic oxidation is approximately $7,000 per ton, and the cost effectiveness for an RTO is approximately $14,800 per ton. Due to the high cost per ton of CO and VOC reduction, the Department determined that oxidation controls do not constituted BACT in this case.

2. No Additional Control

No additional control would involve using proper combustion practices to minimize the CO and VOC emissions. Based on the high cost per ton of CO and VOC reduction for the other CO and VOC control technologies, the Department determined that no additional control constitutes BACT in this case.

In summary, RTO or catalytic oxidizer application on the proposed turbines is considered to be economically infeasible with costs greater than industry norms. Additionally, oxidizer application could potentially pose additional adverse energy and environmental impacts. Therefore, due to economic, energy, and environmental considerations, the Department concurs with SBGP that no additional control constitutes BACT for CO and VOC emissions from the turbines.

C. PM/PM_{10} BACT

The BACT analysis included electrostatic precipitators (ESPs), fabric filters (baghouses), and wet scrubbers as control for the turbines. A summary of the analysis of the controls for the turbines is shown below.

1. Electrostatic Precipitator (ESP)

An ESP uses electric forces to move particles out of a gas stream and on to collection plates. The particles are given an electric charge by forcing them to pass through the corona that surrounds a highly charged electrode. The electrical field then forces the charged particles to the opposite charged electrode, usually a plate. Solid particles are removed from the collection electrode by a shaking process known as "rapping."

ESPs are configured in several ways. The types ESPs analyzed are the plate wire precipitator, the flat plate precipitator, the tubular precipitator, the wet precipitator, and the two-stage precipitator.

The plate wire precipitator is the most common and is designed to handle large volumes of gas. The flat wire precipitator is designed to use flat plates instead of wires for high voltage electrodes and usually handles gas flows ranging from 100,000 to 200,000 actual cubic feet per minute (acfm). Tubular precipitators are typically parallel tubes with electrodes running along the axis of the tubes. Tubular precipitators have typical applications in sulfuric acid plants, coke oven byproduct gas cleaning, and steel sinter plant. Wet precipitators can be used as discussed above but with wet walls. The advantage of wet precipitators is particles

are not re-entrained due to the rapping of the walls, but the disadvantage is the complexity of the wash and handling and disposal of the slurry. Finally, the two-stage precipitators are in parallel and are designed for indoor application, low gas flows below 50,000 acfm, and submicrometer sources.
Because of the difficulty in treating large volumes of gas with an ESP, the technical feasibility of this option is in question. Regardless of the technical feasibility, the cost of this control technology would be cost prohibitive when looking at the relatively low uncontrolled emissions of particulate matter. For these reasons, an ESP does not constitute BACT for control of particulate emissions from the turbines.

2. Fabric Filter (Baghouse)

   Baghouses consist of one or more isolated compartments containing rows of fabric filter bags or tubes. The gas stream passes through the fabric filter, where particulate is retained on the upstream face of the bags, while the remaining gas stream is vented to the atmosphere or to another pollution control device. While bags can be obtained that are capable of handling such a high temperature gas, the cost effectiveness of installing a baghouse with the appropriate bags is cost prohibitive and well above industry norms. For these reasons, a baghouse does not constitute BACT for control of particulate emissions from the turbines.

3. Wet Scrubber

   Wet scrubbers typically use water to impact, intercept, or diffuse a particulate-laden gas stream. With impaction, particulate matter is accelerated and impacted onto a surface area or into a liquid droplet through devices such as venturis and spray chambers. Using interception, particles flow nearly parallel to the water droplets, that allows the water to intercept the particles. Diffusion is used for particles smaller than 0.5 microns and where there is a high temperature difference between the gas and the scrubbing liquid.

   Using a wet scrubber would result in additional environmental concerns, most notably, the large volume of wastewater that would result from the process. In addition, the cost effectiveness of this technology would be greater than industry norms due to the high cost of the control technology and the relatively low uncontrolled emissions of particulate matter. For these reasons, a wet scrubber does not constitute BACT for particulate emissions from the turbines.

4. No Additional Control

   The high volumetric flow rate of gas through the turbines, with relatively low particulate loading, makes the total annual cost of control equipment cost prohibitive. For these reasons, the use of no additional control will constitute BACT for the turbines.

The control options selected as part of this review have controls and control costs that are comparable to other recently permitted similar sources. The control options that were selected are capable of achieving the appropriate emission standards.

IV. Emission Inventory

	Ton/Year					
Source	PM	PM_{10}	NO_x	CO	VOC	SO_x
Gas Turbine #1 175 MW	83.7	83.7	61.3	159.0	24.1	3.94
Gas Turbine #2 175 MW	83.7	83.7	61.3	159.0	24.1	3.94
HRSG #1	30.8	26.6	22.4	207.2	23.0	1.40
HRSG #2	30.8	26.6	22.4	207.2	23.0	1.40
Cooling Towers	6.35	6.35	0.00	0.00	0.00	0.00
Totals	235	227	168	732	94.2	10.7

(SOURCE #01)
<u>Siemens-Westinghouse 501FD 175MW Gas Turbine</u>

Size = 175 MW
Hours of Operation = 8,760 hr/yr
Max Fuel Flow = 20,323,200 MMBtu/yr
Heat Input = 2,320 MMBtu/hr
% Sulfur in Fuel = 0.0023
Fuel Heating Value = 1,020 Btu/SCF

PM Emissions
Emission Factor: 19.1 lb/hr {Manufacturer's Guarantee}
Calculations: 19.1 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 83.7 ton/yr

PM_{10} Emissions
Emission Factor: 19.1 lb/hr {Manufacturer's Guarantee}
Calculations: 19.1 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 83.7 ton/yr

NO_x Emissions
Emission Factor: 14.0 lb/hr {Manufacturer's Guarantee}
Calculations: 14.0 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 61.3 ton/yr

CO Emissions
Emission Factor: 36.3 lb/hr {Manufacturer's Guarantee}
Calculations: 36.3 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 159.0 ton/yr

VOC Emissions
Emission Factor: 5.5 lb/hr {Manufacturer's Guarantee}
Calculations: 5.5 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 24.1 ton/yr

SO_x Emissions
Emission Factor: 0.90 lb/hr {Manufacturer's Guarantee}
Calculations: 0.90 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 3.94 ton/yr

(SOURCE #02)
<u>Siemens-Westinghouse 501FD 175MW Gas Turbine</u>

Size = 175 MW
Hours of Operation = 8,760 hr/yr
Max Fuel Flow = 20,323,200 MMBtu/yr
Heat Input = 2,320 MMBtu/hr
% Sulfur in Fuel = 0.0023
Fuel Heating Value = 1,020 Btu/SCF

PM Emissions
Emission Factor: 19.1 lb/hr {Manufacturer's Guarantee}
Calculations: 19.1 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 83.7 ton/yr

PM_{10} Emissions
Emission Factor: 19.1 lb/hr {Manufacturer's Guarantee}
Calculations: 19.1 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 83.7 ton/yr

NO_x Emissions
Emission Factor: 14.0 lb/hr {Manufacturer's Guarantee}
Calculations: 14.0 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 61.3 ton/yr

CO Emissions
Emission Factor: 36.3 lb/hr {Manufacturer's Guarantee}
Calculations: 36.3 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 159.0 ton/yr

VOC Emissions
Emission Factor: 5.5 lb/hr {Manufacturer's Guarantee}
Calculations: 5.5 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 24.1 ton/yr

SO_x Emissions
Emission Factor: 0.90 lb/hr {Manufacturer's Guarantee}
Calculations: 0.90 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 3.94 ton/yr

(SOURCE #03)
Siemens-Westinghouse HRSG#1 (Duct Burner #1)
Hours of Operation = 4,000 hr/yr

PM Emissions
Emission Factor: 15.4 lb/hr {Manufacturer's Guarantee}
Calculations: 15.4 lb/hr * 4000 hr/yr * 0.0005 ton/lb = 30.8 ton/yr

PM_{10} Emissions
Emission Factor: 13.3 lb/hr {Manufacturer's Guarantee}
Calculations: 13.3 lb/hr * 4000 hr/yr * 0.0005 ton/lb = 26.6 ton/yr

NO_x Emissions
Emission Factor: 11.2 lb/hr {Manufacturer's Guarantee}
Calculations: 11.2 lb/hr * 4000 hr/yr * 0.0005 ton/lb = 22.4 ton/yr

CO Emissions
Emission Factor: 103.6 lb/hr {Manufacturer's Guarantee}
Calculations: 103.6 lb/hr * 4000 hr/yr * 0.0005 ton/lb = 207.2 ton/yr

VOC Emissions
Emission Factor: 11.5 lb/hr {Manufacturer's Guarantee}
Calculations: 11.5 lb/hr * 4000 hr/yr * 0.0005 ton/lb = 23.0 ton/yr

SO_x Emissions
Emission Factor: 0.70 lb/hr {Manufacturer's Guarantee}
Calculations: 0.70 lb/hr * 4000 hr/yr * 0.0005 ton/lb = 1.40 ton/yr

(SOURCE #04)
Siemens-Westinghouse HRSG#1 (Duct Burner #2)
Hours of Operation = 4,000 hr/yr

PM Emissions
Emission Factor: 15.4 lb/hr {Manufacturer's Guarantee}
Calculations: 15.4 lb/hr * 4000 hr/yr * 0.0005 ton/lb = 30.8 ton/yr

PM_{10} Emissions
Emission Factor: 13.3 lb/hr {Manufacturer's Guarantee}
Calculations: 13.3 lb/hr * 4000 hr/yr * 0.0005 ton/lb = 26.6 ton/yr

NO_x Emissions
Emission Factor: 11.2 lb/hr {Manufacturer's Guarantee}
Calculations: 11.2 lb/hr * 4000 hr/yr * 0.0005 ton/lb = 22.4 ton/yr

CO Emissions
Emission Factor: 103.6 lb/hr {Manufacturer's Guarantee}
Calculations: 103.6 lb/hr * 4000 hr/yr * 0.0005 ton/lb = 207.2 ton/yr

VOC Emissions

Emission Factor: 11.5 lb/hr {Manufacturer's Guarantee}

Calculations: 11.5 lb/hr * 4000 hr/yr * 0.0005 ton/lb = 23.0 ton/yr

SO_x Emissions

Emission Factor: 0.70 lb/hr {Manufacturer's Guarantee}

Calculations: 0.70 lb/hr * 4000 hr/yr * 0.0005 ton/lb = 1.40 ton/yr

(SOURCE #04)
Cooling Towers

PM Emissions

Emission Factor: 1.45 lb/hr {Manufacturer's Guarantee}

Calculations: 1.45 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 6.35 ton/yr

PM_{10} Emissions

Emission Factor: 1.45 lb/hr {Manufacturer's Guarantee}

Calculations: 1.45 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 6.35 ton/yr

V. Ambient Air Quality Impacts

The plant site is located in Section 35, Township 3 North, Range 9 West, in Silver Bow County, Montana. The air quality of this area is classified as either "Better than National Standards" or unclassifiable/attainment of the National Ambient Air Quality Standards (NAAQS) for all criteria pollutants except PM_{10}. Ambient modeling, PSD increment analysis and PM_{10} nonattainment analysis were submitted by SBGP and reviewed by the Department. All of the analyses demonstrate that this facility will not cause or contribute to a violation of any ambient air quality standards.

The ISC3 modeling, using 3 years of on-site surface meteorological data collected at the Rhodia facility and the same 3 years of Great Falls meteorological data, showed compliance with the NAAQS and Montana Ambient Air Quality Standards (MAAQS). All modeled concentrations were below the premonitoring de minimis levels.

The PSD increment analyses was completed for both PM_{10} and NO_x by modeling for the Class I and Class II increment. SBGP, AsiMI, and Rhodia were included in the PM_{10} increment analysis, and only SBGP was included in the NO_x increment analysis. Both analyses demonstrated compliance with the appropriate increment. Also, both the Yellowstone Park increment analyses and the PM_{10} nonattainment analysis demonstrated compliance with the standards. Further, analyses for regional haze, Air Quality Relate Value (AQRV), Class I Increment, Class I Visibility Impact, and Lake Acidification analyses were performed using ISC3 and CALPUFF. All modeling was forwarded to the U.S. Environmental Protection Agency (EPA), the National Park Service (NPS), and the U.S. Forest Service (USFS).

VI. Taking or Damaging Implication Analysis

As required by 2-10-101 through 105, MCA, the Department conducted a private property taking and damaging assessment and determined there are no taking or damaging implications.

VII. Environmental Assessment

An Environmental Impact Statement is being prepared for this project by the Department.