AIR QUALITY PERMIT

Issued To: University of Montana Western - Dillon
710 South Atlantic
Dillon, MT 59725

Permit: # 3829-00
Application Complete: 7/24/06
Preliminary Determination Issued: 8/18/06
Department's Decision Issued: 9/6/06
Permit Final: 9/22/06
AFS #: 001-0005

An air quality permit, with conditions, is hereby granted to the University of Montana - Western (UMW), pursuant to Sections 75-2-204 and 211 of the Montana Code Annotated (MCA), as amended, and Administrative Rules of Montana (ARM) 17.8.740, *et seq*., as amended, for the following:

SECTION I: Permitted Facilities

A. Permitted Equipment

UMW operates a 19 million British thermal unit per hour (MMBtu/hr) heat input capacity wood-fired Chip-Tec boiler (close-coupled gasified boiler) with a steam production capacity of 11,000 pounds of steam per hour and associated wood-chip fuel storage facility; an 18.5 MMBtu/hr heat input capacity Cleaver Brooks natural gas-fired back-up boiler with a steam production capacity of 15,000 pounds of steam per hour. The Chip-Tec and Cleaver Brooks boilers are used to produce steam for the purpose of heating buildings and providing hot water for affected facilities campus-wide. In addition, UMW operates miscellaneous minor natural gas-fired emitting units including an Arcoaire furnace (0.06 MMBtu/hr) at the Kindercare Center, a Burnham boiler (1.8 MMBtu/hr) in the SUB, an AD Alpine kiln (0.4 MMBtu/hr) in the Main Hall, and 2 fryers and 2 grills in the Food Services Building.

B. Plant Location

The UMW campus is located at 710 South Atlantic in the town of Dillon. The legal description of the site is Section 19, Township 7 South, Range 8 West, Beaverhead County, Montana.

SECTION II: Conditions and Limitations

A. Operational and Emission Limitations

1. UMW 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 and ARM 17.8.752).

2. UMW shall not cause or authorize the production, handling, transportation, or storage of any material unless reasonable precautions to control emissions of airborne particulate matter are taken. Such emissions of airborne particulate matter from any stationary source shall not exhibit an opacity of 20% or greater averaged over 6 consecutive minutes (ARM 17.8.308 and ARM 17.8.752).

3. UMW 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 (ARM 17.8.308).

4. UMW shall treat all unpaved portions of the haul roads, access roads, parking lots, or general plant area with water and/or chemical dust suppressant as necessary to maintain compliance with the reasonable precautions limitation in Section II.A.3 (ARM 17.8.749).

5. UMW shall not operate the Chip-Tec wood-fired boiler and the Cleaver Brooks natural gas-fired boiler concurrently (ARM 17.8.749).

6. The Chip-Tec Boiler stack exhaust opening shall be a minimum of 34 feet above ground level (ARM 17.8.749).

7. The Cleaver Brooks boiler shall combust only pipeline quality natural gas (ARM 17.8.752).

8. Wood-chips used to fire the Chip-Tec boiler shall be delivered to the facility in enclosed (at least 3-sided) trucks (ARM 17.8.752).

9. Wood-chips used to fire the Chip-Tec boiler shall be stored in a below-ground storage bin contained within a building (ARM 17.8.752).

10. Wood-chips used to fire the Chip-Tec boiler shall be delivered to the boiler combustion chamber within an enclosed system (ARM 17.8.752).

11. Particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}) emissions from the Chip-Tec Boiler shall be controlled by multicyclones. PM_{10} emissions from the Chip-Tec Boiler stack shall be limited to 0.20 pounds per million British thermal unit (lb/MMBtu) (ARM 17.8.752).

12. Oxides of nitrogen (NO_x) emissions from the Chip-Tec boiler shall be controlled by good combustion practices. NO_x emissions from the Chip-Tec Boiler stack shall be limited to 0.22 lb/MMBtu (ARM 17.8.752).

13. Carbon monoxide (CO) emissions from the Chip-Tec boiler shall be controlled by good combustion practices. CO emissions from the Chip-Tec Boiler stack shall be limited to 0.14 lb/MMBtu (ARM 17.8.752).

14. Sulfur dioxide (SO_2) emissions from the Chip-Tec boiler shall be controlled by the combustion of wood and wood-waste only. SO_2 emissions from the Chip-Tec Boiler stack shall be limited to 0.025 lb/MMBtu (ARM 17.8.752).

15. Volatile Organic Compound (VOC) emissions from the Chip-Tec boiler shall be controlled by good combustion practices. VOC emissions from the Chip-Tec Boiler stack shall be limited to 0.017 lb/MMBtu (ARM 17.8.752).

B. Testing Requirements

1. Compliance with the Chip-Tec Boiler PM_{10} emission limit contained in Section II.A.11 shall be monitored by an initial performance source test conducted within 180 days after initial startup of the affected unit or according to another testing/monitoring schedule as may be approved by the Department of Environmental Quality (Department) in writing. After the initial source test, testing shall continue as required by the Department (ARM 17.8.105 and ARM 17.8.749).

2. Compliance with the Chip-Tec Boiler NO_x emission limit contained in Section II.A.12 shall be monitored by an initial performance source test conducted within 180 days after initial startup of the affected unit or according to another testing/monitoring schedule as may be approved by the Department in writing. UMW shall conduct performance source testing for NO_x and CO, concurrently. After the initial source test, testing shall continue as required by the Department (ARM 17.8.105 and ARM 17.8.749).

3. Compliance with the Chip-Tec Boiler CO emission limit contained in Section II.A.13 shall be monitored by an initial performance source test conducted within 180 days after initial startup of the affected unit or according to another testing/monitoring schedule as may be approved by the Department in writing. UMW shall conduct the performance source testing for CO and NO_x, concurrently. After the initial source test, testing shall continue as required by the Department (ARM 17.8.105 and ARM 17.8.749).

4. All compliance source tests shall conform to the requirements of the Montana Source Test Protocol and Procedures Manual (ARM 17.8.106).

5. The Department may require further testing (ARM 17.8.105).

C. Operational Reporting Requirements

1. UMW 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 the emission inventory contained in 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 to calculate operating fees, based on actual emissions from the facility, and/or to verify compliance with permit limitations (ARM 17.8.505).

2. UMW shall notify the Department of any construction or improvement project conducted pursuant to ARM 17.8.745, 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 17.8.745(1)(d) (ARM 17.8.745).

3. All records compiled in accordance with this permit must be maintained by UMW as a permanent business record for at least 5 years following the date of the measurement, must be available at the plant site for inspection by the Department, and must be submitted to the Department upon request (ARM 17.8.749).

D. Notification

1. Within 30 days after commencement of construction of the Chip-Tec Boiler and associated wood-fuel handling and storage system, UMW shall notify the Department of the date of commencement of construction (ARM 17.8.749).

2. Within 15 days after actual startup of the Chip-Tec Boiler and associated wood-fuel handling and storage system, UMW shall notify the Department of the date of actual startup (ARM 17.8.749).

SECTION III: General Conditions

A. Inspection – UMW 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 the terms, conditions, and matters stated herein shall be deemed accepted if UMW fails to appeal as indicated below.

C. Compliance with Statutes and Regulations – Nothing in this permit shall be construed as relieving UMW of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq*. (ARM 17.8.756).

D. Enforcement – Violations of limitations, conditions and requirements contained herein may constitute grounds for permit revocation, penalties, or other enforcement action 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 therefore, a hearing before the Board of Environmental Review (Board). A hearing shall be held under the provisions of the Montana Administrative Procedures Act. The filing of a request for a hearing does not stay the Department's decision, unless the Board issues a stay upon receipt of a petition and a finding that a stay is appropriate under Section 75-2-211(11)(b), MCA. The issuance of a stay on a permit by the Board postpones the effective date of the Department's decision until conclusion of the hearing and issuance of a final decision by the Board. If a stay is not issued by the Board, the Department's decision on the application is final 16 days after the Department's decision is made.

F. Permit Inspection – As required by ARM 17.8.755, Inspection of Permit, a copy of the air quality permit shall be made available for inspection by the Department at the location of the source.

G. Permit Fee – Pursuant to Section 75-2-220, MCA, as amended by the 1991 Legislature, failure to pay the annual operation fee by UMW may be grounds for revocation of this permit, as required by that section and rules adopted thereunder by the Board.

H. 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 (ARM 17.8.762).

Permit Analysis
University of Montana Western – Dillon
Permit #3829-00

I. Introduction/Process Description

The University of Montana Western – Dillon (UMW) is located at 710 South Atlantic in the town of Dillon. The legal description of the site is Section 19, Township 7 South, Range 8 West, Beaverhead County, Montana.

A. Permitted Equipment

UMW owns and operates the following emitting units:

- 19 million British thermal unit per hour (MMBtu/hr) heat input capacity wood-fired Chip-Tec boiler (close-coupled gasified boiler) with a steam production capacity of 11,000 pounds of steam per hour;
- Wood-chip fuel storage facility;
- 18.5 MMBtu/hr heat input capacity Cleaver Brooks natural gas-fired back-up boiler with a steam production capacity of 15,000 pounds of steam per hour; and
- Miscellaneous minor natural gas-fired emitting units including an Arcoaire furnace (0.06 MMBtu/hr) at the Kindercare Center, a Burnham boiler (1.8 MMBtu/hr) in the SUB, an AD Alpine kiln (0.4 MMBtu/hr) in the Main Hall, and 2 fryers and 2 grills in the Food Services Building.

B. Source Description

Installation and operation of the Chip-Tec boiler results in the UMW requirement for a Montana Air Quality Permit. The Chip-Tec wood-fired boiler is described as a "close coupled gasifier boiler". Combustion within the boiler takes place in two integrated steps. First, wood chips are heated to gasify the fuel under conditions of moderate temperature and limited oxygen. The gas is then mixed with more air and burned in the boiler chamber under conditions of high temperature and excess oxygen to complete combustion.

The Chip-Tec and Cleaver Brooks boilers are used to produce steam for the purpose of heating buildings and providing hot water for affected campus-wide facilities while the other listed emitting units provide services for various activities at campus facilities.

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 of Environmental Quality (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, Subchapter 1 – General Provisions, including but not limited to:

1. ARM 17.8.101 Definitions. This rule includes a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.105 Testing Requirements. Any person or persons responsible for the emission 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.

3. 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).

   UMW 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.

4. 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.

5. 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 of 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 as to create a public nuisance.

B. ARM 17.8, Subchapter 2 – Ambient Air Quality, including, but not limited to the following:

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 17.8.220 Ambient Air Quality Standard for Settled Particulate Matter
5. ARM 17.8.223 Ambient Air Quality Standard for PM_{10}

UMW shall maintain compliance with the applicable ambient air quality standards.

C. ARM 17.8, Subchapter 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 the 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 rule requires an opacity limitation of less than 20% for all fugitive emission sources and that reasonable precautions be taken to control emissions of airborne particulate matter. (2) Under this rule, UMW 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 17.8.309 Particulate Matter, Fuel Burning Equipment. This rule requires that no person shall cause, allow, or permit to be discharged into the atmosphere particulate matter caused by the combustion of fuel in excess of the amount determined by this rule.

4. ARM 17.8.310 Particulate Matter, Industrial Process. This rule requires that no person shall cause, allow, or permit to be discharged into the atmosphere particulate matter in excess of the amount set forth in this rule.

5. ARM 17.8.322 Sulfur Oxide Emissions--Sulfur in Fuel. (4) Commencing July 1, 1972, no person shall burn liquid or solid fuels containing sulfur in excess of 1 pound of sulfur per million Btu fired. (5) Commencing July 1, 1971, no person shall burn any gaseous fuel containing sulfur compounds in excess of 50 grains per 100 cubic feet of gaseous fuel, calculated as hydrogen sulfide at standard conditions. UMW will combust wood-waste for Chip-Tec boiler operations and natural gas for all other affected emitting units campus wide, which will meet this limitation.

6. ARM 17.8.340 Standard of Performance for New Stationary Sources and Emission Guidelines for Existing Sources. This rule incorporates, by reference, 40 CFR 60, Standards of Performance for New Stationary Sources (NSPS). This facility is not an NSPS affected source because it does not meet the definition of any NSPS subpart defined in 40 CFR 60.

D. ARM 17.8, Subchapter 4 – Stack Height and Dispersion Techniques, including, but not limited to:

1. ARM 17.8.401 Definitions. This rule includes a list of definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.402 Requirements. UMW must demonstrate compliance with the ambient air quality standards with a stack height that does not exceed Good Engineering Practices (GEP). The proposed height of the new or altered stack for UMW is below the allowable 65-meter GEP stack height.

E. ARM 17.8, Subchapter 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 rule 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. UMW 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. 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 prorate the required fee amount.

F. ARM 17.8, Subchapter 7 – Permit, Construction, and Operation of Air Contaminant Sources, including, but not limited to:

1. ARM 17.8.740 Definitions. This rule is a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.743 Montana Air Quality Permits--When Required. This rule requires a person to obtain an air quality permit or permit alteration to construct, alter, or use any air contaminant sources that have the Potential to Emit (PTE) greater than 25 tons per year (tpy) of any pollutant. UMW has a PTE greater than 25 tons per year of particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}), oxides of nitrogen (NO_x), and carbon monoxide (CO); therefore, an air quality permit is required.

3. ARM 17.8.744 Montana Air Quality Permits--General Exclusions. This rule identifies the activities that are not subject to the Montana Air Quality Permit program.

4. ARM 17.8.745 Montana Air Quality Permits--Exclusion for De Minimis Changes. This rule identifies the de minimis changes at permitted facilities that do not require a permit under the Montana Air Quality Permit Program.

5. ARM 17.8.748 New or Modified Emitting Units--Permit Application Requirements. (1) This rule requires that a permit application be submitted prior to installation, alteration, or use of a source. UMW submitted the required permit application for the current permit action. (7) 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. UMW submitted an affidavit of publication of public notice for the May 17, 2006, issue of the *Dillon Tribune*, a newspaper of general circulation in the Town of Dillon in Beaverhead County, as proof of compliance with the public notice requirements.

6. ARM 17.8.749 Conditions for Issuance or Denial of Permit. This rule requires that the permits issued by the Department must authorize the construction and operation of the facility or emitting unit subject to the conditions in the permit and the requirements of this subchapter. This rule also requires that the permit must contain any conditions necessary to assure compliance with the Federal Clean Air Act (FCAA), the Clean Air Act of Montana, and rules adopted under those acts.

7. ARM 17.8.752 Emission Control Requirements. This rule requires a source to install the maximum air pollution control capability that is technically practicable and economically feasible, except that BACT shall be utilized. The required BACT analysis is included in Section III of this permit analysis.

8. ARM 17.8.755 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.

9. ARM 17.8.756 Compliance with Other Requirements. This rule states that nothing in the permit shall be construed as relieving UMW of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq*.

10. ARM 17.8.759 Review of Permit Applications. This rule describes the Department's responsibilities for processing permit applications and making permit decisions on those permit applications that do not require the preparation of an environmental impact statement.

11. ARM 17.8.762 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, which in no event may be less than 1 year after the permit is issued.

12. ARM 17.8.763 Revocation of Permit. An air quality permit may be revoked upon written request of the permittee, or for violations of any requirement of the Clean Air Act of Montana, rules adopted under the Clean Air Act of Montana, the FCAA, rules adopted under the FCAA, or any applicable requirement contained in the Montana State Implementation Plan (SIP).

13. ARM 17.8.764 Administrative Amendment to Permit. An air quality permit may be amended 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 of emissions as a result of those changed conditions. The owner or operator of a facility may not increase the facility's emissions beyond permit limits unless the increase meets the criteria in ARM 17.8.745 for a de minimis change not requiring a permit, or unless the owner or operator applies for and receives another permit in accordance with ARM 17.8.748, ARM 17.8.749, ARM 17.8.752, ARM 17.8.755, and ARM 17.8.756, and with all applicable requirements in ARM Title 17, Chapter 8, Subchapters 8, 9, and 10.

14. ARM 17.8.765 Transfer of Permit. This rule 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.

G. ARM 17.8, Subchapter 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 FCAA that it would emit, except as this subchapter would otherwise allow.

This facility is not a major stationary source since this facility is not a listed source and the facility's PTE is below 250 tons per year of any pollutant (excluding fugitive emissions).

H. 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 source having:

a. PTE > 100 tons/year of any pollutant;

b. PTE > 10 tons/year of any one Hazardous Air Pollutant (HAP), PTE > 25 tons/year of a combination of all HAPs, or lesser quantity as the Department may establish by rule; or

c. PTE > 70 tons/year of particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10}) in a serious PM_{10} nonattainment area.

2. ARM 17.8.1204 Air Quality Operating Permit Program. (1) 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 #3829-00 for UMW, the following conclusions were made:

a. The facility's PTE is less than 100 tons/year for any pollutant.

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

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

d. This facility is not subject to any current NSPS.

e. This facility is not subject to any current NESHAP standards.

f. This source is not a Title IV affected source, nor a solid waste combustion unit.

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

Based on these facts, the Department determined that UMW is a minor source of emissions as defined under Title V and a Title V Operating Permit is not required.

III. BACT Determination

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

A BACT analysis was submitted by UMW in Permit Application #3829-00, addressing some available methods of controlling PM_{10}, NO_x, CO, sulfur dioxide (SO_2), and volatile organic compound (VOC) emissions from the Chip-Tec wood-fired boiler and the Cleaver-Brooks natural gas-fired boiler and fugitive particulate matter (PM) and PM_{10} emissions resulting from wood-chip material handling and storage operations. The Department reviewed these methods, as well as previous BACT determinations. The following control options have been reviewed by the Department in order to make the following BACT determination.

A. Chip-Tec Wood Fired Boiler

For the purpose of determining BACT for the various pollutants of concern resulting from operation of the proposed wood-fired boiler, UMW submitted a recently prepared report entitled "An Evaluation of Air Pollution Control Technologies for Small Wood-Fired Boilers" (Report) (Resource Systems Group, Inc., September 2001). Conclusions from the Report, which provide

basis for the BACT determination(s) are included in the following BACT analysis. A complete copy of the Report is on file with the Department as part of the complete application submitted for the current permit action.

1. PM/PM_{10} Emissions

   Emissions of particulate matter from wood-fired boilers are determined by two main factors, the combustion system and the particulate control system. The Report considers uncontrolled emissions from various small wood-fired boiler systems. In general, emissions from gasifier combustors such as the Chip-Tec system proposed by UMW are shown to be lower than other, more conventional, wood combustors. The primary combustion zone of a gasifier has lower velocities, and thus less turbulence, resulting in less particulate matter entrainment in the exhaust gas stream than would occur in more conventional wood combustion systems.

   The Report considers the following particulate matter control technologies: fabric filters, electrostatic precipitators (ESP), core separators, multi-cyclones, cyclones, and venturi and wet-scrubber systems. However, since issuance of the Report, it has been determined that the core separator technology is not an available control technology. In light of this, the most effective of the available particulate control technologies for small wood-fired boilers is a multi-cyclone system, such as that proposed for the Chip-Tec boiler under the current permit action.

   Under the current permit action, the Department determined that the proposed emission limit of 0.20 pounds of particulate matter per million British thermal unit (lb/MMBtu) constitutes BACT in this case. Further, the Department determined that the proposed combination of gasifier combustion technology with a multi-cyclone particulate emission control system is capable of achieving the BACT-determined emission limit.

2. NOx Emissions

   NOx emissions from the combustion of wood fuel have two origins. First is the fuel NOx, which is produced by the oxidation of the nitrogen in the fuel, and second is thermal or flame NOx, which is produced in the combustion flame from the oxidation of nitrogen in the air supplied to the boiler. Fuel NOx is dependent on the nitrogen content of the fuel, which is highly variable, but largely unaffected by combustion conditions. Thermal NOx is strongly affected by combustion conditions and is the primary source of NOx emissions resulting from wood combustion.

   The Report considers the following NOx control technologies: selective catalytic reduction (SCR), selective non-catalytic reduction (SNCR), and oxidation catalysts. Because of the relatively low level of NOx emissions resulting from the proposed boiler, the Report concludes, and the Department concurs, that any add-on NOx control technology would be cost-prohibitive. Further, attempts to reduce NOx emissions through the adjustment of combustion conditions would result in significantly increased CO emissions.

   The Report concludes, and the Department concurs, that there is no practical and cost-effective add-on control technology available for the control of NOx emissions from small wood-fired boilers. Therefore, under the current permit action, the Department determined that the proposed NOx emission limit of 0.22 lb/MMBtu constitutes BACT in this case. Further, the Department determined that the combustion conditions for the gasifier boiler without add-on NOx control is capable of achieving the BACT-determined emission limit.

3. CO Emissions

CO is produced in all combustion processes as a result of incomplete combustion and the CO emission rate for wood-fired boilers is highly variable. The Report concludes, and the Department concurs, that there is no practical and cost-effective add-on control technology available for the control of CO emissions from small wood-fired boilers. Therefore, under the current permit action, the Department determined that the proposed CO emission limit of 0.141 lb/MMBtu constitutes BACT in this case. Further, the Department determined that the combustion conditions for the wood-fired gasifier boiler without add-on CO control is capable of achieving the BACT-determined emission limit.

4. SO_2 Emissions

SO_2 emissions from wood combustion are inherently low due to the very low levels of sulfur contained in natural wood. The Report concludes, and the Department concurs, that there is no practical and cost-effective add-on control technology available for the control of SO_2 emissions from small wood-fired boilers. Therefore, under the current permit action, the Department determined that the proposed SO_2 emission limit of 0.025 lb/MMBtu constitutes BACT in this case. Further, the Department determined that the combustion conditions for the wood-fired gasifier boiler without add-on SO_2 control is capable of achieving the BACT-determined emission limit.

5. VOC Emissions

VOCs include a very wide range of organic compounds many of which are toxic or carcinogenic. There are more than thirty organic compounds widely recognized in wood-fired boiler exhaust gas including aldehydes, benzene, and several polycyclic organic compounds. The VOC emission rate is strongly affected by combustion conditions. Wood-fired boilers of modern design using staged combustion or gasification processes to ensure more complete combustion inherently have lower VOC emissions. However, the variable characteristics of wood and the difficulty of controlling the firing rate make the control of VOC emissions from wood-fired boilers technically difficult. Available VOC control technologies include natural gas or propane-fired thermal oxidizers, wet scrubbers, and catalytic afterburners. No control systems specifically for VOC emissions are currently in use for small wood-fired boilers such as that proposed by UMW.

The Report concludes, and the Department concurs, that there is no practical and cost-effective add-on control technology available for the control of VOC emissions from small wood-fired boilers. Therefore, under the current permit action, the Department determined that the proposed VOC emission limit of 0.017 lb/MMBtu constitutes BACT in this case. Further, the Department determined that the combustion conditions for the wood-fired gasifier boiler without add-on VOC control is capable of achieving the BACT-determined emission limit.

B. Cleaver Brooks Natural Gas-Fired Boiler

Natural gas fired boilers are inherently low emitters of air pollution due to characteristics of the natural gas fuel fired to operate the boiler. Potential NO_x and CO emissions from the Cleaver Brooks boiler are 8.10 tpy and 6.81 tpy, respectively, while potential emissions of all other regulated pollutants are less than 1 tpy. Because potential emissions of all regulated pollutants are low, incorporation of available pollutant-specific control technologies would result in high cost-effective ($/ton removed) values thereby making pollutant-specific add-on controls for

NO_x, CO, SO_2, PM/PM_{10} and VOCs economically infeasible in this case. Therefore, the Department determined that combustion of pipeline quality natural gas only and proper operation and maintenance of the Cleaver Brooks boiler with no additional control constitutes BACT for all regulated pollutants, in this case.

C. Wood-Fuel Material Handling and Storage

Wood-chips used to fire the Chip-Tec boiler will be delivered to the facility in enclosed (3-sided) trucks. The wood-chips will be supplied in the form of 2 ± ½ inch square chips with a typical moisture content ranging from 10-20%. The delivery trucks will off-load the 3-sided truck trailer into a below-ground storage bin contained within a building. From the underground storage bin, wood material will be moved within a completely enclosed system via an auger to the boilers combustion chamber. Because the wood chips are relatively large with a relatively high moisture content and because the process is partially or fully enclosed at all stages, the Department determined that the wood-fuel handling and storage process will result in negligible fugitive particulate emissions.

Therefore, under the current permit action, the Department determined that fully enclosed (wood-chip delivery to boiler) or partially enclosed (truck delivery and load-out) wood-fuel handling and storage operations constitutes BACT for the control of fugitive particulate emissions in this case. The Department determined that there is no additional practical and cost-effective control technology available for the control of fugitive particulate emissions from the affected processes.

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

IV. Emission Inventory

	ton/yr					
Emission Source	**PM**	**PM_{10}**	**NO_x**	**CO**	**SO_2**	**VOC**
Chip-Tec Wood-Fired Boiler	16.64	16.64	18.31	11.73	2.08	1.41
Cleaver Brooks Natural Gas-Fired Boiler	0.62	0.62	8.10	6.81	0.05	0.45
Miscellaneous Natural Gas-Fired Units	0.02	0.02	1.07	0.90	0.01	0.06
Wood-Waste Handling Fugitive Emissions	---	---	0.00	0.00	0.00	0.00
Total Facility Emissions	**17.28**	**17.28**	**27.48**	**19.44**	**2.14**	**1.92**
--- Negligible emissions						
A complete emission inventory for Permit #3829-00 is on file with the Department						

Chip-Tec Wood-Fired Boiler

Operating Parameters
Heat Input Capacity: 19 MMBtu/hr (Manufacturers Information)
Hours of Operation: 8760 hr/yr

PM Emissions

Emission Factor: 0.20 lb/MMBtu (BACT Determination)
Calculations: 0.20 lb/MMBtu * 19 MMBtu/hr * 8760 hr/yr * 0.0005 ton/lb = 16.64 ton/yr

PM_{10} Emissions

Emission Factor: 0.20 lb/MMBtu (BACT Determination)
Calculations: 0.20 lb/MMBtu * 19 MMBtu/hr * 8760 hr/yr * 0.0005 ton/lb = 16.64 ton/yr

NO_x Emissions

Emission Factor: 0.22 lb/MMBtu (AP-42, Section 1.6, Table 1.6-2, 9/03)
Calculations: 0.22 lb/MMBtu * 19 MMBtu/hr * 8760 hr/yr * 0.0005 ton/lb = 18.31 ton/yr

CO Emissions

Emission Factor: 0.141 lb/MMBtu (BACT Determination)
Calculations: 0.141 lb/MMBtu * 19 MMBtu/hr * 8760 hr/yr * 0.0005 ton/lb = 11.73 ton/yr

SO_2 Emissions

Emission Factor: 0.025 lb/MMBtu (AP-42, Section 1.6, Table 1.6-2, 9/03)
Calculations: 0.025 lb/MMBtu * 19 MMBtu/hr * 8760 hr/yr * 0.0005 ton/lb = 2.08 ton/yr

VOC Emissions

Emission Factor: 0.017 lb/MMBtu (AP-42, Section 1.6, Table 1.6-3, 9/03)
Calculations: 0.017 lb/MMBtu * 19 MMBtu/hr * 8760 hr/yr * 0.0005 ton/lb = 1.41 ton/yr

Cleaver Brooks Natural Gas-Fired Boiler

Operating Parameters
Heat Input Capacity: 18.5 MMBtu/hr Manufacturers Information
Fuel Heating Value: 0.001 MMscf/MMBtu (AP-42)
Hours of Operation: 8760 hr/yr

PM Emissions

Emission Factor: 7.6 lb/MMscf (PM Total Filterable and Condensable)
Calculations: 7.6 lb/MMscf * 0.001 MMscf/MMBtu * 18.5 MMBtu/hr = 0.14 lb/hr
0.14 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 0.62 ton/yr

PM_{10} Emissions

Emission Factor: 7.6 lb/MMscf (PM Total Filterable and Condensable)
Calculations: 7.6 lb/MMscf * 0.001 MMscf/MMBtu * 18.5 MMBtu/hr = 0.14 lb/hr
0.14 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 0.62 ton/yr

NOx Emissions

Emission Factor: 100 lb/MMscf
Calculations: 100 lb/MMscf * 0.001 MMscf/MMBtu * 18.5 MMBtu/hr = 1.85 lb/hr
1.85 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 8.10 ton/yr

CO Emissions

Emission Factor: 84 lb/MMscf
Calculations: 84 lb/MMscf * 0.001 MMscf/MMBtu * 18.5 MMBtu/hr = 1.55 lb/hr
1.55 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 6.81 ton/yr

SO_2 Emissions

Emission Factor: 0.6 lb/MMscf
Calculations: 0.6 lb/MMscf * 0.001 MMscf/MMBtu * 18.5 MMBtu/hr = 0.01 lb/hr
0.01 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 0.05 ton/yr

VOC Emissions

Emission Factor: 5.5 lb/MMscf
Calculations: 5.5 lb/MMscf * 0.001 MMscf/MMBtu * 18.5 MMBtu/hr = 0.10 lb/hr
0.10 lb/hr * 8760 hr/yr * 0.0005 ton/lb = 0.45 ton/yr

V. Existing Air Quality

The UMW campus is located within Section 19, Township 7 South, Range 8 West, Beaverhead 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 criteria pollutants. In the view of the Department, the amount of controlled emissions from this facility will not cause an exceedance of any ambient air quality standard.

VI. Ambient Air Impact Analysis

The current permit action is a result of a UMW proposal to install a wood-fired boiler at the UMW heating plant on the Dillon campus. Currently the UMW heating plant has two natural gas-fired boilers, one of which will be removed when the wood-fired boiler is installed. The remaining natural gas boiler will remain in place as a back-up boiler.

The proposed wood-fired boiler would have a heat input capacity of 19 MMBtu/hr. Potential emissions of criteria air pollutants from the heating plant with the wood-fired boiler in place will be: 4.18 pounds per hour (lb/hr) of NOx, 0.48 lb/hr of SO_2, 3.8 lb/hr of PM_{10}, 0.32 lb/hr of VOCs, and 2.68 lb/hr of CO. The Department estimated emissions of particulate matter with a mean aerodynamic diameter equal to or less than 2.5 micrometers ($PM_{2.5}$) from the wood-fired boiler to be 3.27 lb/hr. The proposed wood-fired boiler is to be used for building heat, so the actual hours of operations will be less than 8,760 hours per year.

The UMW boiler plant is located near the center of the campus. Buildings located near the heating plant include classrooms, office buildings, a residence hall, student dormitories and a day care center. Due to the proximity to sensitive receptors and the potential for plume downwash around nearby buildings, the Department required modeling for the proposed project. UMW submitted modeling to determine the ambient impacts from the proposed wood-fired boiler. The air quality classification for the UMW project area is "Unclassifiable or Better than National Standards" (40 CFR 81.327) for the NAAQS for all criteria pollutants.

MODELING PARAMETERS

Combined impacts of the natural gas-fired backup boiler and the proposed wood-fired boiler were not modeled because UMW does not intend to run the two boilers at the same time. Emissions of NOx, SO_2, CO, and PM_{10} were modeled to demonstrate compliance with the NAAQS and Montana Ambient Air Quality Standards (MAAQS). VOC emissions were modeled and the results compared to the ozone ambient standards. The modeling was performed in accordance with the methodology outlined in the New Source Review Workshop Manual, EPA, October 1990, Draft and Appendix W of 40 CFR 51, Guideline on Air Quality Models (revised), November 9, 2005.

The Environmental Protection Agency's (EPA) Industrial Source Complex (ISC3) model was used along with EPA's BPIP-PRIME downwash algorithm. No cumulative impact sources were included in the modeling and Department typical background concentrations were used. UMW's modeling used three years of surface meteorological data (1994-1996) collected with a 10-meter tower near Rocker, Montana. The surface data was processed with corresponding upper air data from the Great Falls NWS station. The Department ran the ISC-PRIME modeling files to verify the modeling results.

UMW used a stack height to 34 feet in the modeling submittal. Modeling conducted to a 34 feet stack height demonstrates compliance with currently applicable NAAQS and MAAQS; therefore, the permit requires a minimum stack height of 34 feet. However, the Department is recommending a stack height of at least 50 feet due to the effects of downwash, as discussed below. The following is a summary of the stack parameters modeled:

Proposed stack parameters as submitted:

Stack height:	34 feet
Stack Diameter:	2 feet
Volume Flow Rate:	8,876 actual cubic feet per minute
Exit Velocity:	47.1 feet per second

Department recommended stack parameters:

Stack height:	50 feet
Stack Diameter:	2 feet
Volume Flow Rate:	8,876 actual cubic feet per minute
Exit Velocity:	47.1 feet per second

The UMW modeling domain is limited to the immediate area of the heating plant. The model placed flagpole receptors at the window elevations for 1-story, 2-story, and 3-story buildings. The Department added receptors at 50-foot spacing throughout the campus area, with an exclusion area around the heating plant. The modeling was limited to simple terrain with source, building, and receptor elevations set to zero elevation.

DISCUSSION OF DOWNWASH

Air quality modeling of point sources with stack heights less than GEP stack height should consider the impacts associated with building wake effects (downwash). Downwashing causes the pollutant plume to fall to ground-level quicker near buildings. Incorporating building downwash for stacks with heights less than GEP increases model-predicted concentrations.

The BPIP program has been used to estimate GEP stack height for the UMW boiler stack and to determine the extent of downwashing from the nearby buildings. GEP stack height for the boiler stack at the proposed location is 115 feet. At a stack height equal to or greater than GEP, no downwashing is predicted to occur. Modeling has shown that the boiler plume impacts would

decrease significantly if the stack height were increased to 50 feet or higher. The improvement is due primarily to a reduction of the downwash effects causing the plume to loop down around nearby buildings.

NAAQS and MAAQS COMPLIANCE DEMONSTRATION

NAAQS and MAAQS modeling was conducted for criteria pollutants using point source emissions from the proposed boiler. Fugitive emissions from fuel handling operations were not modeled because the Department determined that these emissions are negligible for the proposed project. UMW did not submit $PM_{2.5}$ modeling, but the Department added a $PM_{2.5}$ analysis during the modeling review due to concerns specific to the proposed project. PM_{10} can be used as a surrogate for $PM_{2.5}$ impacts as long as the PM_{10} modeled impacts are below the $PM_{2.5}$ standard. The modeled PM_{10} 24-hour impacts from this boiler were greater than the current $PM_{2.5}$ NAAQS; therefore additional review of $PM_{2.5}$ impacts was triggered.

The first step of the $PM_{2.5}$ evaluation is estimating $PM_{2.5}$ emissions. According to the Environmental Protection Agency's AP-42, Compilation of Air Pollutant Emissions Factors, Section 1.6, Table 1.6-1, $PM_{2.5}$ emissions from combustion of wood and bark are 86% of the PM_{10} emissions. Based on this information and the permitted PM_{10} emission rate of 0.20 lb/MMBtu, deemed BACT under the current permit action, $PM_{2.5}$ emissions are estimated to be:

0.2 lb/MMBtu * 0.86 = 0.17 lb/MMBtu
0.17 lb/MMBtu * 19 MMBtu/hr = 3.27 lb/hr

Background $PM_{2.5}$ values have not been established for the Dillon area, but the background value for the 24-hour averaging period is expected to be in the range of 18-27 micrograms per cubic meter ($\mu g/m^3$). The background value for the annual averaging period is expected to be in the range of 5 - 9 $\mu g/m^3$. These estimates are based on monitoring data from operating $PM_{2.5}$ monitoring sites in Montana (www.epa.gov/air/data). These estimated background $PM_{2.5}$ concentrations are preliminary estimates for purposes of this analysis only.

Criteria pollutant modeling results are compared to the applicable NAAQS and MAAQS in Tables 1 and 2 below. Modeled impacts are added to background concentrations to determine the total predicted ambient concentration at the receptor of concern. Table 1 shows modeled impacts using the proposed 34-feet stack height. Table 2 shows modeled impacts using The Department's recommended stack height of 50 feet. Modeled concentrations show the impacts from the proposed boiler and include the Department's general background values. As shown in Table 1, the modeled concentrations are below the applicable NAAQS and MAAQS using the 34-feet stack height, though $PM_{2.5}$ compliance is inconclusive.

Table 2 shows compliance with all standards using the 50-foot stack height. The modeling results in Table 2 show that the boiler plume impacts would decrease significantly if the stack height were increased to 50 feet or higher. The improvements are due primarily to a reduction of the downwash effects causing the plume to loop down around nearby buildings.

Table 1: NAAQS/MAAQS Compliance Demonstration, 34-foot stack

Pollu-tant	Avg. Period	Modeled Conc.[a] ($\mu g/m^3$)	Backgrnd Conc. ($\mu g/m^3$)	Ambient Conc. ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	% of NAAQS	MAAQS ($\mu g/m^3$)	% of MAAQS
PM_{10}	24-hr	52.7	30	82.7	150	75	150	75
	Annual	9.65	8	17.6	50	35	50	35
$PM_{2.5}$	24-hr	41.2	≥ 18	≥ 59	65	≥ 91	150	------
	Annual	6.43	≥ 5	≥ 11	15	≥ 76	50	------
NO_2	1-hr	191	75	266	------	------	564	47
	Annual[b]	7.95	6	14.0	100	14	94	15
SO_2	1-hr	19.3	35	54.3	------	------	1,300	4.2
	3-hr	18.4	26	44.4	1,300	3.4	------	------
	24-hr	7.92	11	18.9	365	5.2	262	7.2
	Annual	1.22	3	4.22	80	5.3	52	8.1
CO	1-hr	123	1725	1848	40,000	4.6	26,450	7.0
	8-hr	70.0	1150	1220	10,000	12	10,350	12

[a] Short-term concentrations are H2H values except 24-hour PM_{10} is H4H, 24-hour $PM_{2.5}$ is H6H. $PM_{2.5}$ annual conc. is average of 3 modeled years.
[b] Annual NOx is converted to NO_2 by applying the ambient ratio method, as per DEQ guidance.

Table 2: NAAQS/MAAQS Compliance Demonstration, 50-foot stack

Pollu-tant	Avg. Period	Modeled Conc.[a] ($\mu g/m^3$)	Backgrnd Conc. ($\mu g/m^3$)	Ambient Conc. ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	% of NAAQS	MAAQS ($\mu g/m^3$)	% of MAAQS
PM_{10}	24-hr	18.5	30	48.5	150	32	150	32
	Annual	1.85	8	9.85	50	6.6	50	6.6
$PM_{2.5}$	24-hr	14.7	≥ 18	≥ 33	65	≥ 51	150	------
	Annual	1.30	≥ 5	≥ 5.30	15	≥ 35	50	------
NO_2	1-hr	56.2	75	131	------	------	564	23
	Annual[b]	1.53	6	7.53	100	7.5	94	8.0
SO_2	1-hr	6.26	35	41.3	------	------	1,300	3.2
	3-hr	5.92	26	31.9	1,300	2.5	------	------
	24-hr	2.64	11	13.6	365	3.7	262	5.2
	Annual	0.23	3	3.23	80	4.0	52	6.2
CO	1-hr	36.0	1725	1761	40,000	4.4	26,450	6.7
	8-hr	24.7	1150	1175	10,000	12	10,350	11

[a] Short-term concentrations are H2H values except 24-hour PM_{10} is H4H, 24-hour $PM_{2.5}$ is H6H. $PM_{2.5}$ annual conc. is average of 3 modeled years.
[b] Annual NOx is converted to NO_2 by applying the ambient ratio method, as per DEQ guidance.

CONCLUSION

The modeling results for UMW's proposed wood-fired boiler have demonstrated compliance with the NAAQS and MAAQS. However, the Department is recommending a higher stack height for this source due to it's proximity to buildings and sensitive receptors. The Department recommends a minimum stack height for this boiler of 50 feet, from ground level. The taller stack height will reduce the effects of plume downwash, resulting in lower ground level pollutant concentrations.

The Department determined, based on ambient air modeling, that the impacts from this permitting action will be minor. The Department believes it will not cause or contribute to a violation of any ambient air quality standard.

VII. Taking or Damaging Implication Analysis

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

VIII. Environmental Assessment

An environmental assessment, required by the Montana Environmental Policy Act, was completed for this project. A copy is attached.

DEPARTMENT OF ENVIRONMENTAL QUALITY
Permitting and Compliance Division
Air Resources Management Bureau
P.O. Box 200901, Helena, Montana 59620
(406) 444-3490

FINAL ENVIRONMENTAL ASSESSMENT (EA)

Issued To: University of Montana Western - Dillon
710 South Atlantic
Dillon, MT 59725

Air Quality Permit Number: 3829-00

Preliminary Determination Issued: August 18, 2006
Department Decision Issued: September 6, 2006
Permit Final: September 22, 2006

1. *Legal Description of Site*: The UMW campus is located at 710 South Atlantic in the town of Dillon. The legal description of the site is Section 19, Township 7 South, Range 8 West, Beaverhead County, Montana.

2. *Description of Project*: Installation and operation of a Chip-Tec wood-fired boiler under the Montana "Fuels for Schools" program. The Chip-Tec boiler would be used to produce steam for the purpose of heating buildings and providing hot water for affected campus-wide facilities.

3. *Objectives of Project*: Provide monetary energy savings and utility services to the University through the combustion of relatively cheap renewable and abundant local and state-wide wood-fuel resources in place of the previous natural gas fuel to heat campus facilities.

4. *Alternatives Considered*: In addition to the proposed action, the Department also considered the "no-action" alternative. The "no-action" alternative would deny issuance of the air quality preconstruction permit to the proposed facility. However, the Department does not consider the "no-action" alternative to be appropriate because UMW demonstrated compliance with all applicable rules and regulations as required for permit issuance. Therefore, the "no-action" alternative was eliminated from further consideration.

5. *A Listing of Mitigation, Stipulations, and Other Controls*: A list of enforceable conditions, including a BACT analysis, would be included in Permit #3829-00.

6. *Regulatory Effects on Private Property*: The Department considered alternatives to the conditions imposed in this permit as part of the permit development. The Department determined that the permit conditions are reasonably necessary to ensure compliance with applicable requirements and demonstrate compliance with those requirements and do not unduly restrict private property rights.

7. The following table summarizes the potential physical and biological effects of the proposed project on the human environment. The "no-action" alternative was discussed previously.

		Major	Moderate	Minor	None	Unknown	Comments Included
A	Terrestrial and Aquatic Life and Habitats			X			Yes
B	Water Quality, Quantity, and Distribution			X			Yes
C	Geology and Soil Quality, Stability and Moisture			X			Yes
D	Vegetation Cover, Quantity, and Quality			X			Yes
E	Aesthetics			X			Yes
F	Air Quality			X			Yes
G	Unique Endangered, Fragile, or Limited Environmental Resources			X			Yes
H	Demands on Environmental Resource of Water, Air and Energy			X			Yes
I	Historical and Archaeological Sites				X		Yes
J	Cumulative and Secondary Impacts			X			Yes

SUMMARY OF COMMENTS ON POTENTIAL PHYSICAL AND BIOLOGICAL EFFECTS: The following comments have been prepared by the Department.

A. Terrestrial and Aquatic Life and Habitats:

Emissions from the proposed project would affect terrestrial and aquatic life and habitats in the proposed project area. However, as detailed in Section V and Section VI of the permit analysis, any emissions and resulting impacts from the project would be minor due to the low concentration of those pollutants emitted.

Further, the proposed wood-fired boiler would operate within a building located in a previously disturbed area (college campus) and only a limited amount of new construction or ground disturbance to the area would be required. Overall, any impact to the terrestrial and aquatic life and habitats of the proposed project area would be minor.

B. Water Quality, Quantity and Distribution:

The proposed project would use only minor amounts of water for normal operations resulting in only minor impacts to water quantity and distribution in the area. Further, emissions from the proposed project would affect water quality in the proposed project area. However, as detailed in Section V and Section VI of the permit analysis, any emissions and resulting deposition impacts from the project would be minor due to the low concentration of those pollutants emitted. Overall, any impacts to water quality, quantity, and distribution in the project area would be minor.

C. Geology and Soil Quality, Stability, and Moisture:

The proposed project would not affect the geology, soil quality, stability, and moisture of the proposed project area. The wood-fired boiler would operate within an addition to an existing building located in an area currently covered by pavement and only a limited amount of new construction and no additional ground disturbance to the area would be required.

Further, as described in Section V and Section VI of the permit analysis, the project would result in minor air pollution emissions to the outside ambient environment. These pollutants would deposit on the soils in the surrounding area. Any impact from deposition of these pollutants would be minor due to dispersion characteristics and the low concentration of those pollutants emitted.

D. Vegetation Cover, Quantity, and Quality:

Emissions from the proposed project would affect vegetation cover, quantity, and quality in the proposed project area. However, as detailed in Section V and Section VI of the permit analysis any emissions and resulting impacts from the project would be minor.

Further, the wood-fired boiler would operate within an addition to an existing building in a previously disturbed area (college campus) and only a limited amount of new construction or ground disturbance to the area would be required. Overall, any impact to the vegetation cover, quantity, and quality of the proposed project area would be minor.

E. Aesthetics:

The proposed project would result in a minor effect on the aesthetic nature of the proposed project area because the wood-fired boiler would operate within an addition to an existing building in a previously disturbed area (college campus) and a limited amount of construction and site disturbance would be required for the construction project. Construction would occur in a previously disturbed area (college campus); therefore, the project would not change the aesthetic nature of the area. Further, visible emissions from the source would be limited to 20% opacity and the permit would include emission control requirements. Also, the project would not result in excess noise from normal operations.

F. Air Quality:

The proposed project would result in the emission of various pollutants to the ambient air in the proposed project area. However, as detailed in Section V and Section VI of the permit analysis, any air quality impacts from the proposed project would be minor. UMW conducted air dispersion modeling to determine the ambient air quality impacts from the project. Stack parameters and emission rates used in the model are contained in Section VI of the permit analysis and are on file with the Department. The modeling results for UMW's proposed wood-fired boiler demonstrate that the project, as proposed, would comply with the applicable National and Montana Ambient Air Quality Standards. Overall, any impacts to air quality in the proposed project area would be minor.

G. Unique Endangered, Fragile, or Limited Environmental Resources:

Emissions from the proposed project would affect unique, endangered, fragile, or limited environmental resources located in the proposed project area. However, as detailed in Section V and Section VI of the permit analysis, any emissions and resulting impacts from the project would be minor due to the low concentration of those pollutants emitted.

Further, the wood-fired boiler and all other existing facility emitting units would operate in a previously disturbed area (college campus), so the limited amount of construction and operating disturbance required for the project would not change the typical character of the area. Overall, any impact to any existing unique, endangered, fragile, or limited environmental resources in the proposed project area would be minor.

H. Demands on Environmental Resources of Water, Air, and Energy:

The proposed project would result in minor demands on environmental resources of water and air as discussed in Section 7.B and 7.F, respectively, of this EA. Further, as detailed in Section V and Section VI of the permit analysis, project impacts on air resources in the proposed project area would be minor due to dispersion characteristics and the low concentration of those pollutants emitted. Finally, because the project is small by industrial standards, little energy would be required for operation and the resulting impact on energy resources would be minor.

I. Historical and Archaeological Sites:

The proposed project would not result in any impact on historical and archaeological sites in the proposed project area. The wood-fired boiler would operate within an addition to an existing building located in a previously disturbed area (college campus) and would only require a limited amount of additional construction and no new ground disturbance.

According to previous correspondence from the Montana State Historic Preservation Office, there is low likelihood of any disturbance to any known archaeological or historic site, given previous disturbance within the area. Therefore, the operation would have no effect on any known historic or archaeological site that may be located within or near the proposed operating site.

J. Cumulative and Secondary Impacts:

Overall, the cumulative and secondary impacts from this project on the physical and biological environment in the immediate area would be minor due to the relatively small size and potential environmental impact of the proposed project. The Department believes that this facility could be expected to operate in compliance with all applicable rules and regulations as outlined in Permit #3829-00.

8. The following table summarizes the potential economic and social effects of the proposed project on the human environment. The "no-action" alternative was discussed previously.

		Major	Moderate	Minor	None	Unknown	Comments Included
A	Social Structures and Mores				X		Yes
B	Cultural Uniqueness and Diversity				X		Yes
C	Local and State Tax Base and Tax Revenue				X		Yes
D	Agricultural or Industrial Production				X		Yes
E	Human Health			X			Yes
F	Access to and Quality of Recreational and Wilderness Activities				X		Yes
G	Quantity and Distribution of Employment				X		Yes
H	Distribution of Population				X		Yes
I	Demands for Government Services			X			Yes
J	Industrial and Commercial Activity				X		Yes
K	Locally Adopted Environmental Plans and Goals				X		Yes
L	Cumulative and Secondary Impacts			X			Yes

SUMMARY OF COMMENTS ON POTENTIAL ECENOMIC AND SOCIAL EFFECTS: The Department has prepared the following comments.

A. Social Structures and Mores:
B. Cultural Uniqueness and Diversity:

The proposed project would not have any affect on the social structures or mores of the proposed area of operation because the project is small by industrial standards and operations would take place within a previously disturbed area (college campus). The predominant use of the surrounding area would not change as a result of the proposed project.

C. Local and State Tax Base and Tax Revenue:

The proposed project would have a minor impact on the local and state tax base and tax revenue. The project is small by industrial standards, thus, any economic impact to the area would be minor. Further, the project would require only a minor amount of new construction and a limited amount of employees/operators for normal operations.

D. Agricultural or Industrial Production:

Because the proposed project would operate within a previously disturbed area (college campus), the project would not affect or displace any land used for agricultural production and would require only a limited amount of additional industrial construction. Further, the nature of the project (campus heating) would dictate that no additional industrial production would result from the proposed project.

E. Human Health:

Permit #3829-00 would include limits and conditions to ensure the facility would be operated in compliance with all applicable air quality rules and standards. These rules and standards are designed to be protective of human health. As described in Section III of the permit analysis, the air emissions from the proposed facility would be minimized by the use of Best Available Control Technology (BACT) as required by Permit #3829-00. Overall, only minor impacts would be expected on human health from the proposed operations.

F. Access to and Quality of Recreational and Wilderness Activities:

Because the proposed project would operate within a previously disturbed area (college campus) the project would not affect any access to or quality of any recreation or wilderness activities in the area.

G. Quantity and Distribution of Employment:
H. Distribution of Population:

The proposed project would require only a limited amount of employees/operators for normal operations. Therefore, the proposed project would have only a minor impact on the quantity and distribution of population and employment in the area.

I. Demands for Government Services:

Government services would be required for acquiring the appropriate permits from government agencies. In addition, the permitted source of emissions would be subject to periodic inspections by government personnel. Demands for government services would be minor.

J. Industrial and Commercial Activity:

The proposed project would result in only a minor impact on local industrial and commercial activity because the proposed project would operate within a previously disturbed area (college campus), would require only a limited amount of additional industrial construction, and would not result in additional industrial production.

K. Locally Adopted Environmental Plans and Goals:

The Department is not aware of any locally adopted environmental plans or goals in the immediate area affected by the proposed project. The state standards would be protective of the proposed project area.

L. Cumulative and Secondary Impacts:

Overall, cumulative and secondary impacts from this project would result in minor impacts to the economic and social environment in the immediate area due to the relatively small size of the operation. The Department believes that this facility could be expected to operate in compliance with all applicable rules and regulations as would be outlined in Permit #3829-00.

Recommendation: No EIS is required.

If an EIS is not required, explain why the EA is an appropriate level of analysis: The current permit action is for the construction and operation of a wood-fired boiler. Permit #3829-00 includes conditions and limitations to ensure the facility would operate in compliance with all applicable rules and regulations. In addition, as detailed in the above EA there are no significant impacts associated with the proposed project.

Other groups or agencies contacted or which may have overlapping jurisdiction: Department of Administration – Architecture and Engineering, Department of Natural Resources and Conservation, Montana Historical Society – State Historic Preservation Office, Natural Resource Information System – Montana Natural Heritage Program.

Individuals or groups contributing to this EA: Department of Environmental Quality – Air Resources Management Bureau, Montana Historical Society – State Historic Preservation Office, Natural Resource Information System – Montana Natural Heritage Program.

EA prepared by: M. Eric Merchant, MPH
Date: August 15, 2006