MFSA Certificate Amendment Notice
for
Implementation of Dry Disposal Technology
at
Colstrip Units 3 and 4

Prepared For:
Montana Department of Environmental Quality

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A MFSA Certificate Amendment Notification

For Implementation of
Dry Disposal Technology[1] at Colstrip

1. Introduction

Colstrip Units 3 and 4 combust locally mined sub-bituminous Powder River Basin coal to each produce 805 MW (gross) of electricity. Byproducts from wet flue gas scrubbing at Units 3 and 4 are disposed in an effluent holding pond (EHP) southeast of the plant-site.

Unit 3 began commercial operation in 1984, and Unit 4 began commercial operation in 1986. These Units were sited and constructed pursuant to a certificate issued under the Major Facility Siting Act (MFSA), Mont. Code Ann. § 75-20, et seq. ("Certificate"). That Certificate governs Units 3 and 4 and their associated facilities. The EHP is such an associated facility. Talen Montana, LLC (Talen) (formerly PPL Montana, LLC) has operated Colstrip since December 17, 1999.

As described below, Talen intends to implement Dry Disposal Technology on Units 3 and 4 in the future for additional processing of the scrubber byproduct which is placed in the final disposal pond. Dry Disposal Technology will result in the handling of its effluent in a landfill-like manner, and this amendment is requested to identify this additional processing and handling.

2. Legal Standard

Under ARM 17.20.1801, a notice for a certificate amendment must be filed if "a certificate holder desires to change or add to a facility for which a certificate has been granted[.]" Changes or additions subject to this section include:

(1) any change in location or design or any addition to a facility or an associated facility that could reasonably be expected to result in a material increase in any environmental impact;
(2) any change in location or design or any addition to a facility or an associated facility that could reasonably be expected to result in impacts to new geographic areas or human, animal or plant populations that were not evaluated prior to the issuance of the certificate;
(3) any change in or addition to a facility or an associated facility affecting compliance with a condition of the certificate; and
(4) any change in or addition to a facility or associated facility that would materially change the basis of any finding required by subchapter 16.

As addressed in detail below, the only potential criterion above that could be triggered by the implementation of Dry Disposal Technology is subsection (3). Because of this potential trigger, and out of an abundance of caution, Talen is providing this amendment notice.

"Within 30 days after notice of an amendment to a certificate is given as set forth in 75-20-213, including notice to all active parties to the original proceeding, the department shall determine whether the proposed change in the facility would result in a material increase in any environmental impact of the facility or a substantial change in the location of all or a portion of the

[1] The term "Dry Disposal Technology" refers to a group of similar material handling technologies that will reduce the moisture of the Colstrip scrubber effluent paste - from the current nominal value of 35 % to that of moist soil, around 20%. Specific pieces of equipment may vary to some extent, but the overall process is the same.

facility as set forth in the certificate." Mont. Code Ann. § 75-20-219(1). "In those cases in which the department determines that the proposed change in the facility would not result in a material increase in any environmental impact or would not be a substantial change in the location of all or a portion of the facility, the department shall automatically grant the amendment either as applied for or upon terms or conditions that the department considers appropriate." Mont. Code Ann. § 75-20-219(2).

As addressed below, it is appropriate for MDEQ to "automatically grant" this amendment, because it will not result in a material increase in any environmental impact of the facility or a substantial change in the location of all or a portion of the facility. This is because the implementation of Dry Disposal Technology will occur in the same location as the current effluent pasting process and will lessen the amount of liquid ultimately disposed of in the Units 3 and 4 final disposal pond. Thus, Talen requests that MDEQ automatically grant the amendment in accordance with Section 75-20-219(2).

3. Project Description

Byproducts from the Units 3 and4 flue gas scrubbers are slurried by pipeline to their final disposal location in the Units 3 and4 EHP. The EHP is located about 5 miles southeast of the generating units. Slurry is currently dewatered to approximately 35% moisture (from about 88%) using paste technology[2] at a "paste plant" that sits within the perimeter of the EHP. The liquids that are removed from the slurry in the paste plant are either recycled through re-use back at the plant or are evaporated after the paste is placed in the ponds.

When Dry Disposal Technology is employed, it will further dewater the material created by the paste plant before the dewatered material is placed in the EHP. The technology works by using filtration, vacuum, or other dewatering technique to reduce the moisture of the paste plant material. The moisture reduction is about 15% --from approximately 35% down to about 20%. The final moisture level can be adjusted somewhat, but the target moisture is similar to that of moist soil. This moisture content inherently keeps dust from forming. The paste plant is located within the perimeter of the EHP towards its center between Cells C and J. This location facilitates disposal of material in all areas of the pond. The Dry Disposal Technology will be adjacent to the existing paste plant, so it will remain in the same footprint of the EHP boundary. As with the paste plant, location will facilitate disposal of material throughout the existing footprint of the EHP.

After processing by the Dry Disposal Technology, the resulting slurry will be handled in a landfill-like manner. The material will be placed within the EHP using conveyors, trucks or other conveying mechanisms and contoured or compacted as necessary to accomplish Talen's goals for the safe, efficient, and enduring operation of the pond in compliance with all regulations.

Because less liquid will be ultimately placed in the EHP, Dry Disposal Technology will reduce the potential for pond seepage. With regard to air quality impacts, the process ponds are already identified as potential emitting units in Talen's Title V permit, and Talen has a dust monitoring and control program in place. There will be no noise increase because Dry Disposal Technology is a quieter technology than the paste plant and evaporators are already operating at the EHP. The process equipment will not be a significant visual addition to the paste plant or other structures and features in the pond areas.

[2] Details of paste technology have been previously submitted to MDEQ and are available upon request.

A provision of the Certificate, Finding of Fact No. 31 (XXXI)[3] from the Board of Natural Resources and Conservation and the Board of Health and Environmental Sciences, issued on November 21, 1975 (adopted in the Board of Natural Resources and Conservation's Findings of Fact, Opinion, Decision, Order, and Recommendations, which was issued on July 22, 1976, as the "MFSA Certificate") states:.

> *"Much of the waste matter from the four units, such as ash from the scrubber and boiler systems, suspended solids, sediment, and other matter, will be disposed of by using water to convey them to their eventual destinations, the disposal ponds. In some instances the wastes will be further processed and clean water will be returned into the system in order to reduce the amount of water used. Waste ash from various systems and some other waste will be first sluiced to temporary retention ponds located in a 40-acre area just south of the plants. These wastes will eventually be moved to the ultimate disposal ponds by slurry pipeline. The first two permanent disposal areas developed will be located approximately 10,000 feet northwest from the plants in Sections 20, 21, 28 and 29, Township 2 North, Range 41 East. During the life of Units 3 and 4, it will be necessary to develop further disposal ponds to be located in Sections 5, 6, 7 and 8, Township 1 North, Range 42 East. After these ponds are filled with waste, they will be dried up, covered with dirt and reclaimed; the first permanent retention pond will contain a surface acreage of approximately 112 acres and it, like all the other retention ponds, will be sealed, using normal construction methods. The first permanent retention pond will have a useful life of approximately six years if the pond is utilized for all four units. Its useful life will be approximately 12 years in the event that it is utilized for the wastes from Units 1 and 2 only. (Labrie, 20-2625-2628, 21-2731--2733; Grimm 12-1701-1712; Berube, 22-2831-2838, 2860-2861, 45-6474-6475, 6527-6530; (Applicants' Ex. 501A, 51.) (A-32)*

Although further processing of the waste matter was contemplated, Talen seeks an amendment to ensure that the Dry Disposal Technology it currently contemplates is among that further processing. In order to more accurately describe the handling of Colstrip scrubber byproducts at the EHP in a landfill-like manner, Talen requests the following amendment to Finding 31:

> *Much of the waste matter from the four units, such as ash from the scrubber and boiler systems, suspended solids, sediment, and other matter, will be disposed of by using water to convey them to their eventual destinations, the disposal ponds. In some instances the wastes will be further processed and clean water will be returned into the system in order to reduce the amount of water used. <u>Such further processing may occur before or after the material is sent to the disposal ponds. If such further processing results in "non-liquid" material (as defined in 40 CFR 258.28(c)(1)) being placed in a landfill-like manner within the perimeter of the disposal ponds, then any potential air emissions issues associated with this material will be considered as part of the facility's Title V Operating Permit.</u> Waste ash from various systems and some other waste will be first sluiced to temporary retention ponds located in a 40-acre area just south of the plants. ~~These wastes~~ <u>Wastes from the scrubber system</u> will eventually be moved to the ultimate disposal ponds by slurry pipeline. The first two permanent disposal areas developed will be located approximately 10,000 feet northwest from the plant in Sections 20, 21, 28, and 29, Township 2 North, Range 42 East. During the life of Units 3 and 4, it will be necessary to develop further disposal ponds to be located in Sections 5, 6, 7 and 8, Township 1 North, Range 42 East. After these ponds are filled with waste, they will be dried*

[3] Because of the detailed treatment of Finding XXXI in this section, this provision is not discussed further in Section 5 of this notice. Section 5 is a holistic review of all potentially applicable Certificate provisions.

up, covered with dirt and reclaimed~~;~~. ~~the first permanent retention pond will contain a surface acreage of approximately 112 acres and it, like all the other retention ponds, will be sealed, using normal construction methods. The first permanent retention pond will have a useful life of approximately six years if the pond is utilized for all four units. Its useful life will be approximately 12 years in the event that it is utilized for the wastes from Units 1 and 2 only.~~ (Labrie, 20-2625-2628, 21-2731--2733; Grimm 12-1701-1712; Berube, 22-2831-2838, 2860-2861, 45-6474-6475, 6527-6530; (Applicants' Ex. 501A, 51.) (A-32), 2016 "Dry Disposal" Amendment.

4. Anticipated Project Schedule

Colstrip intends to utilize Dry Disposal Technology to aid compliance with EPA's coal combustion residuals rule, 40 CFR Parts 257 and 261 Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities)(Final Rule, 80 Federal Register 21302, April 17, 2015).

5. Review of Dry Disposal Technology Under Units 3 and 4's MFSA Certificate

This section contains an analysis of the Certificate and if/how Dry Disposal Technology would impact it. For efficiency, this analysis omits certain provisions that are not relevant to the requested change. These non-applicable provisions are listed in Exhibit 1.

Board of Natural Resources and Conservation Findings of Fact

"SECTION 70-816(2)(1) EFFECTS ON NATURAL SYSTEMS, WILDLIFE, PLANT LIFE

54. That the effects of the facility as proposed on the natural systems, wildlife and plant life will not be significant. (Kemp, NR 46, 9373-9374; Wahlquist, NR 22, 3804; Wilderson, NR 29 5284; Couture, NR 49, 9867; Brown, BH 48, 9684-9685; App. Ex. 292.)"

Discussion: The addition of Dry Disposal Technology would not affect compliance with, or change, this provision. Dry Disposal Technology is only an enhanced way of handling the current byproducts of the Colstrip scrubbing process. This technology does not change the amount or chemical characteristics of the material transported and stored in the EHP, only the content of liquid that is ultimately disposed of in the EHP. Since this technology is being implemented to aid compliance with the CCR rule, and any dusting will be rendered negligible through current controls, the technology should have positive environmental effects.

SECTION 70-816(3)(a) and (b) HYDROLOGIC STUDIES

61. That seepage from the waste disposal ponds will be minimal and will be collected by wells and returned to the ponds. (McMillan, BH 43, 6185-6191, 6194; App. Ex. 175.)

62. That the seepage from the surge pond is expected to be approximately 112 gpm. (Berube, BH 22, 2831-2839; Grimm, BH 24, 6370-6376; Northern Plains Exhibits 2 and 3A; McMillan, BH 43, 6178-6243.)

SECTION 70-816(3)(d) INVENTORY OF EFFLUENTS

64. That the effluents emanating from Colstrip 1-4 are not anticipated to impair the quality of the ground and surface water of the area and will not violate applicable standards, however

careful monitoring of seepage and complete sealing of sludge ponds will ensure that water quality of the area is not degraded. (BHES-Findings XXXV-XXXIX).

65. That the units as proposed will use a closed loop water system which system does not discharge effluents from the plants into ground water or surface water or large evaporation ponds and therefore will have no effect on the ground or surface water in the area. (Labrie, BH 20, 2627, NR 45, 4644-4646, Exhibit "A".)

SECTION 70-816(3)(f) RELATIONSHIP TO WATER QUALITY STANDARDS

66. That the facility as proposed will not violate any applicable water standards. (Botz, BH 39, 5223 5227; Willems, BH 38, 5157-5158, Exhibit "A".)

SECTION 70-816 (3)(h) EFFECTS ON PLANT AND ANIMAL LIFE

68. That neither withdrawal of the water from the Yellowstone River under the conditions prescribed by the BHES, nor the minimum seepage from the ponds will have any act on plants, animals, wildlife, fish or vegetation in the areas directly and indirectly effected by such withdrawals. (Dunkle, BH 29,3821 -3826; Willems, BH 38, 5157; Botz, BH 39, 5229-5231; Martin, NR 45, 9055, Exhibit "A".)

70. That seepage from the surge ponds will be monitored by observation wells which will be constructed at appropriate sites around said ponds. (McMillian, BH 43, 6185; App. Ex. 175, Exhibit "A".)

71. That observation wells will be constructed around the sludge ponds to ensure that any seepage from the ponds will not exceed the estimated minimum amounts around the rim and through the foundation of the dam. (McMillan, BH 43, 6191-619 4, Exhibit "A".)

Discussion of eight provisions listed above: A summary of the above provisions indicates that 1) seepage from the disposal ponds will be minimal; 2) will be monitored and or collected with a groundwater well network; 3) the conclusion, based upon the effluent chemical characteristics and pond management practices is that the effluents will not impair water quality, or significantly impact plants, animals or humans, and 4) Colstrip will use a closed loop system. The addition of Dry Disposal Technology simply adds a step in the flow of the scrubber byproduct from the scrubbers to the pond. This process will reduce seepage potential, but it does not change the chemical characteristics of the material deposited in the ponds. It does not change the fact that Colstrip's system is closed loop or the existence or location of the groundwater well network. Due to the potential reduction in seepage, the technology should provide only positive impacts on human health or the environment.

88. That waste materials from scrubber units and boilers will be conveyed to sealed ash disposal ponds and eventually dried and the disposal ponds reclaimed. (Labrie, BH 20, 2065-2628, BH 21, 2731-2733; Grimm, BH 12, 1701-1702; Berube, BH 22, 2831-2838, 2860-2861, BH 45, 6474-6475, 6527-6530; App. Exs. 50A, 51.)

SECTION 70-816(5)(a) SOLID WASTE INVENTORY

89. That all effluents from seepage from the waste disposal ponds have been analyzed (Northern Plains Resource Council Exhibit 3A; Grimm, BII44, 6370-6376), and to insure no adverse effects on the area the waste disposal ponds will be sealed and monitoring wells installed.

SECTION 70 816 (5)(b) DISPOSAL PROGRAM

90. That the ash and sludge disposal program projects temporary retention ponds located in a 40-acre area just south of the plants and then the wastes are slurred to permanent disposal ponds. The first two permanent disposal areas developed (112 and 147 acres each) will be located 10,000 feet northwest of the plants in Section 20, 21, 28 and 29, T2N, R41E. A third pond is proposed in Sections 5,

6, 7 and 8, T1N, RL 2W. When these ponds are filled, they will be dried up, covered with soil and reclaimed. (Labrie, BH 20, 2625-2628, BH 21, 2731-2733; Grimm, BH 12, 1701-1702; Berube, BH 22, 2831-2838, 2860-2861, BH 45, 6474-6475, 6527-6530; App. Exs. 50A, 51.)
SECTION 70-816 (5) (c) RELATIONSHIP OF DISPOSAL PRACTICES TO ENVIRONMENTAL QUALITY CRITERIA
91. That the disposal ponds will not impair the quality of the ground or surface water of the area or violate any applicable standards. (Berube, BH 22, 2831-2839; McMillan, BH 43, 6178-6234; Botz, BH 39, 5223-5227; Willems, BH 38, 5157-5158.)
SECTION 70-816 (5)(d) CAPACITY OF DISPOSAL SITES TO ACCEPT PROJECTED WASTE LOADINGS
92. That all three permanent ponds will service the 37 year life of the plant. (Labrie, BH 20, 2625-2628, BH 21, 2731-2733.)

Discussion of five provisions listed above: Dry Disposal Technology simply adds a step in the flow of the scrubber byproduct from the scrubbers to the ponds. This process does not necessitate a change in location of the ponds, negatively impact the life of the ponds, change the chemical characteristics of the pond material, or change the conclusion that the effluents from Colstrip will have minimal impacts to human health or the environment if managed properly, as is done at Colstrip. Nor does this technology require a change in the final reclamation practices applicable to the ponds.

SECTION 70-816 (7)(b) OPERATIONAL LEVELS
95. That after the units are operating, additional noise reducing features will be added as required to meet all standards. (Labrie, NR 13, 2111-2113.)

Discussion: Dry Disposal Technology does not cause any more noise than the processes already located at the ponds, including the paste plant and evaporators.

Board of Natural Resources and Conservation Conclusions of Law

"4. The facility, Colstrip Units #3 and #4 and associate facilities, represents the minimum adverse environmental impact considering the state of available technology and the nature and economics of the various alternatives.
5. The probable environmental impact from the construction and operation of the facility will be minimal."
"10. The only authorized state air and water quality agency, the Board of Health and Environmental Sciences, has certified that the proposed facility, Colstrip Units #3 and #4 and associated facilities will not violate state and federally established standards and implementation plans."

Discussion of three provisions listed above: Use of Dry Disposal Technology does not alter any of these original Conclusions about the construction of the facility. Dry Disposal Technology will improve the protection offered by the water management system at Colstrip and is not expected to impact fugitive emissions, which have monitoring and control provisions enforceable under Colstrip's Title V permit.

12. That the Board of Natural Resources and Conservation grant the application requested and issue a certificate of and Environmental Compatibility and public need required by the Utility Siting Act of 1973 subject, however, to the following terms and conditions, to wit:

a. That the Applicants take what measures are necessary through the enlargement of existing ponds or the construction of additional surge pond facilities so as to ensure a fifty (50) day supply of water at all times, for the operation of the four Colstrip units.

b. That the Applicants, at their expenses, shall in full cooperation with the Montana Department of Fish and Game, The Montana Department of Natural Resources and Conservation, and the Montana Department of Health and Environmental Sciences, construct, maintain and operate a water gauging station, at the point of withdrawal of water from the Yellowstone River at Nichols, Montana, or just upstream from said withdrawal point, that will measure the daily flow of water at said point of withdrawal, and that the Applicants shall furnish all measurements on a periodic basis to the Montana Department of Fish and Game, the Montana Department of Natural Resources and Conservation, and the Mont. Department of and State Board of Health and Environmental Sciences.

c. That the seepage from the existing surge pond and any enlarged or additional surge ponds be monitored, as specified by the State Board of Health and Environmental Sciences, and that every feasible engineering means be taken by the Applicants to minimize such seepage.

d. That the sludge pond or ponds shall be completely sealed. If the conventional means such as compaction and bentonite application do not seal the pond(s), as indicated by monitoring wells the Applicants shall install and operate, then extreme measures even up to complete sealing by a plastic membrane shall be taken.[4]

e. That the reclamation of the sludge ponds, when they are filled and dried out, shall follow the basic reclamation requirements and standards applicable to the proper covering of highly saline backfill in coal areas.

Discussion of Conclusion 12 and listed conditions: As described previously, Dry Disposal Technology is an addition to the processing of the scrubber effluents as they are conveyed to the ponds. This process will reduce seepage potential, but it does not change the chemical characteristics of the material deposited in the ponds. The technology is unrelated to the design of the EHP, and does not change the nature of Colstrip's closed loop system or the existence or location of the groundwater well network. Due to the potential reduction in seepage, the technology should provide only positive impacts to the effects on human health or the environment. Also, the final reclamation and responses to seepage from the ponds remain unchanged by Dry Disposal Technology, since they do not relate specifically to the absence or presence of a particular technology in the effluent flow process.

Board of Natural Resources and Conservation Amendments – None applicable

Board of Health and Environmental Sciences Findings of Fact

[4] This condition has been modified by the 1984 "12d Stipulation", which provides for a monitoring program on certain neighboring land and responses to any described impacts. For the purposes of this amendment notice, the existence of the Stipulation does not change this condition in a material way.

XVIII.
Tentative specifications have been prepared advising this Board' of the proposed construction and operation, of Units #3 and #4 (Applicants' Ex. 100)."

Discussion: Dry Disposal technology does not change the way Colstrip operates or was constructed.

XXIX
A closed loop water system (a system which does not discharge effluents from the plants downstream or into other waters) was adopted for Colstrip Units 1-4 so that there would be no discharge from the plants into the Yellowstone River or other state waters. (Labrie 20-2627, 45-6444-6446).

XXXIX.
The various ponds which will be used for storage of water in the evaporation and disposal of water and waste materials emanating from Colstrip Units 1-4 will have seepage not anticipated to impair the quality of the ground water in the area. (Northern Plains Ex.2, 3A; Berube, 22-2831-2839; Grimm, 44-6370-6376).

Discussion (XXIX, and XXXIX): Dry Disposal technology does not change any of the closed loop nature of the scrubber effluent disposal system. Dry Disposal Technology may reduce seepage from the pond and so will aid in the protection of the ground water in the area.

Board of Health and Environmental Sciences Conclusions of Law – None applicable that are not embodied in the above discussions

Board of Health and Environmental Sciences Amendments – None Applicable

6. Fugitive Dust and Its Control

Although there is no specific Certificate provision about fugitive dust, control of fugitive dust is important to minimizing the impact from plant operations. Dry Disposal Technology, and the related landfill-like manner with which the slurry is handled, relates to the process ponds and potential dust issues arising from pond operation.

Discussion: The Colstrip Title V permit OP0513-13 lists the Process Ponds as an emitting unit (EU14) and specifies required monitoring and control. EPA's coal combustion residuals rule will also require the monitoring and control of fugitive dust at the Units 3&4 Effluent Holding Pond.[5] Colstrip has an existing effective monitoring and control program in place for addressing any potential dusting from the material deposited in the pond. Consequently, measures are already in place to effectively address any fugitive emissions from Dry Disposal Technology.

[5] 40 CCR §257.80

7. MEPA Criteria Review Not Applicable

Section 75-20-216 explains that "[a]n environmental impact statement or analysis prepared pursuant to the Montana Environmental Policy Act may be included in the department findings if compelling evidence indicates that adverse environmental impacts are likely to result due to the construction and operation of a proposed facility." Here, there is no indication that there is anything but positive environmental impact, let alone that "adverse environmental impacts are likely to result." A MEPA analysis is, therefore, unnecessary.

8. Conclusion

As addressed in detail above, the use of Dry Disposal Technology to further process the scrubber slurry from Colstrip Units 3 and 4 will not result in either a material increase in any environmental impact of the facility or a substantial change in the location of all or a portion of the facility. In fact, the use of this process will actually lessen the amount of water ultimately disposed of in the EHP and will occur directly adjacent to the current pasting process. For those reasons, Talen believes it is appropriate that MDEQ automatically grant the amendment in accordance with Section 75-20-219(2).

Exhibit 1
Non-Applicable Certificate Provisions

Following is a listing of provisions contained in the Units 3&4 MFSA Certificate, noted with one or more of the following letters, which indicate why the provision was judged non-applicable to this amendment notice.

A – Deals with the need for the facility, regional planning, where the facility should be built, alternatives to the original facility, or other similar issues which were already decided as evidenced by the original granting of the MFSA certificate, and thus cannot be changed by actions occurring today such as a change to a new source of Rosebud Seam coal.
B – Deals with a completely un-related issue such as transmission, recreational facilities, laws and regulations not relevant to this amendment notice, construction practices, or similar issues, and thus cannot be changed by actions occurring today such as a change to a new source of Rosebud Seam coal.
C – Deals with a simple statement of the occurrence, completion, or existence of other proceedings, bodies, effective regulations, or other laws and thus cannot be impacted by actions occurring today.
D – Deals with a potentially relevant provision that is duplicative to one already dealt with in the amendment notice.
E – Deals with original financial aspects of the facility, aspects which are not relevant currently or which would have to be updated if considered and thus are un-related to the source of fuel used by Units 3&4

<u>From the hearing before the Board of Natural Resources and Conservation</u>
SECTION 70-810(a) BASIS OF THE NEED FOR THE FACILITY

1. That by the time of completion of the facilities there will be a need for the energy produced therefrom in applicants' service areas. **A**

SECTION 70-81(b) NATURE OF PROBABLE ENVIRONMENTAL IMPACT

2. That the nature of the probable environmental impact involves certain biological, economic, and sociological impacts on the people and on the natural environment, but that these impacts will be minimal and not unreasonable when considered in conjunction with the need and benefits to be derived from the proposed facilities. **A, D**

SECTI0N 70-810(c) MINIMUM ADVERSE ENVIRONMENTAL IMPACT

3. That the proposed facility represents the minimum adverse environmental impact, on both the human and natural environment, considering the state of available technology and the nature and economics of the various alternatives. **A**

SECTION 70-810(e) CONSISTENT WITH REGIONAL PLANS

4. That there is a distinct lack of regional or statewide energy development planning by any governmental body to date, but that in the absence of such plans, the facilities as proposed are consistent with regional plans for the expansion of the appropriate grids of the utility systems serving the state and interconnected utility systems, who are parties to the Application, and further that the proposed facilities will serve the interests of the utility systems of the Applicants insofar as economy and reliability are concerned. The transmission lines will be constructed above the ground. **A**

SECTION 70-810(f) STATE AND LOCAL LAWS

5. That the location of the facilities as proposed conforms to applicable state and local laws and regulations promulgated and issued under the Act. **B**

SECTION 70-810(g) PUBLIC INTEREST, CONVENIENCE AND NECESSITY

6. That the facilities as proposed will serve the public interest, convenience and necessity. **A**

SECTION 70-810(h) AIR AND WATER CERTIFICATION

7. That the Board of Health and Environmental Sciences, of and for the State of Montana, is the duly authorized agent empowered to determine whether or not the facilities as proposed will violate state and federally established air and water quality standards and implementation plans. **C**

8. That the Board of Health and Environmental Sciences has, after a hearing held pursuant to notice, certified to the Board of Natural Resources and Conservation that the facilities as proposed will not violate state and federally established air and water quality standards and implementation plans, a duly certified copy of the Board of Health's Findings of Fact, Conclusion of Law and hereto, marked as Exhibit "A" for identification, and by this reference fully and completely incorporated herein and made part hereof. **C**

SECTION 70-816(1) ENERGY NEEDS

9. That the collective loads and resources forecast by the Applicants, excluding Colstrip Units 3 and 4, covering peak for the years 1975-1976 through 1985-1986, shows a collective surplus of peak until 1982-1983, at which time a deficit of 855 megawatts is forecast. A deficit continues for each year thereafter with the greatest deficit being 2,536 megawatts in 1985-1986. Even with Colstrip Units 3 and 4 on line, a collective deficit of 281 megawatts is forecast in 1984-1985 and 1,295 megawatts in 1985-1986. (Hofacker, NR13. 1939-1947; App. Exs. 3C, 3D, 4C, 4D, 5B, 5C, 7B, 7C; Knight, NR 14, 2284-2286; App. Exs.18B, 18D: Nogle, t,R 15, 2453-2456; App. Exs. 20A, 20B; Bredemeir, NR 16, 2602-2604; App. Exs. 19A, 19B; Lisbakken, NR 17, 2867- 2872, 2374-2877; App. Exs. 21B, 21C, 21E and 21G.) **A**

10. That the collective loads and resources forecast by the Applicants, excluding Colstrip Units 3 and 4, covering average energy for the years 1975-1976 through 1985-1986, shows a collective surplus of energy for the years 1976-1977 and 1977-1978, with deficits indicated for all other years, with the greatest deficit being 1764 megawatts for the year 1982-1983. Even with Colstrip Units 3 and 4 on line, they forecast a collective deficit in average energy in four (4) out of the six (6) years commencing with 1980-1981, the greatest deficit in any one year being 723 megawatts in 1982-1983. (Hofacker, NR 13, 1.939-1942, 1945-1948; App. Exs: 3C , 3E, 4C, 4E, 6B. 6C, 8B, 8C; Knight, NR 14, 2284-2286; App. Exs. 18B,18C; Nogle, NR 15, 2453-2456; App. Exs. 20 20B; Bredemeier, NR 16, 2603-2605, App. Exs. 19, l9C, Lisbakken, NR 17, 2867-2872, 2874-2877; App. Exs. 21B, 2lD, 21F, 21H.) **A**

SECTION 70-816(1)(a) GROWTH

11. That available load growth information for the Applicants' systems supports there forecast covering future load growth for both peak and average energy. (Hofacker, NR 13,1963; Knight NR 15, 2436-2437; Nogle 16, 2567; Bredemeier, NR-16, 2629-2630; Lisbakken, NR 17, 2937-2940; Gregg, NR 47, 9388-9390.) **A**

12. That the Pacific Northwest Utilities Conference Committees, West Group Forecast of power loads and recourses, dated March 1, 1976, covering the period from July, 1976 to June 1987,

forecasts an annual rate of growth for the West Group of utilities of approximately 5.1 percent insofar as peak is concerned, and 4.8 percent insofar as energy is concerned (Goldhammer, NR 44, 8915; App. Exs. 240H.) **A**

13. That during the period from 1961 to 1975 the combined sales of the Applicants to their customers grew at an annual rate of approximately six (6) percent per year, and should the foregoing growth pattern continue, the growth rate of the Applicants would be 6.6 percent to 7.5 percent from the present to 1980, and 3.9 percent to 5.4 percent per year for the period 1980-1990. (Anderson, NR 49, 9916-9920.) **A**

14. That the future consumptive use of electricity by the customers of the Applicants involves a degree of uncertainty; however, the historical projections of past trends to forecast future load demands, while reliable in the past, may fall short of the actual consumptive growth demand in the future. (Hofacker, NR 6, 1092-1108, NR 7, 1111-1122: Knight, NR 14, 2283-2284;Nogle, NR 15, 2457-2459: Bredemeier, NR 16, 2605-2606; Lisbakken, NR 17, 2867-2870; Anderson, NR 18, 2954-2956,2970-2979; Coldiron, NR 20, 3358-3366; NR 49, 9826.) **A**

15. That Montana Rural Electric Copperatives serve a large portion of the Montana agricultural community; that they are facing severe electrical energy shortages by virtue of their increased consumptive demand and by the curtailment of electrical energy supply by the Bonneville Power Administration and the Bureau of Reclamation above their existing contrast demand limits.

The BPA delivers power to satisfy a substantial portion of Montana's electric power needs. BPA sold about half of the electrical energy consumed within the state of Montana from 1970-1974. Only one-fifth of the amount supplied by BPA to Montana was generated in Montana and the balance, four-fifths, was generated at projects located in the state of Washington, Idaho and Oregon. During 1975, total sales to BPA customers in Montana averaged 474 megawatts, much of which is delivered by transmission facilities owned by The Montana Power Company.

BPA presently serves rural cooperatives in Montana including Flathead, Lincoln, Missoula, Ravalli Counties and Vigilante Electric Cooperatives, and BPA also markets power to the U.S. Bureau of Indian Affairs Flathead Irrigation Project, and the BPA will commence to serve Glacier Electric Cooperative in 1977 or 1978.

BPA sent a letter, dated January 9, 1976, to cooperatives in Montana which predicted energy shortages commencing 1978-79, primarily due to various delays in construction of generating plants. BPA's letter stated even a very successful voluntary conservation program, although necessary, would probably not be adequate to manage the forecasted electrical energy shortages, and therefore asked the cooperatives to make plans for curtailment programs.

The Bureau of Reclamation also serves cooperatives in Montana and other cooperatives receive power from generating plants in North Dakota. Montana's rural cooperatives east of the Continental Divide receive approximately one-half of their energy supplies form the Montana Power Company.

The Bureau of Reclamation has notified cooperatives in Montana that the Bureau of Reclamation will not supply their energy growth needs beyond 1977, and, therefore, after 1977, each cooperative must purchase their electric supply, above their existing contract demand limits from some other source. Central Montana Generation and Transmission (Montana G&T) endeavors to contract for supplies of electricity for fifteen cooperatives in Montana. Montana G&T has a contract with The Montana Power Company whereby The Montana Power Company will provide for annual load growth of the Montana G&T's cooperatives, but this contract between Montana G&T and The Montana Power Company requires mutual agreement of both parties.

The Montana G&T will be seeking 202 megawatts of power by 1985 which is an increase of some 388 percent from present requirements.
Cooperatives in Montana have been experiencing exceptionally high rates of growth. Ravalli County Cooperative has experienced an average compound growth rate of 9% from 1970 to 1975. During 1970-1975, Missoula Electric Cooperative experienced a 13% annual growth rate. The compounded kilowatt hour growth rate of Missoula Electric Co-op from 1960 to 1975 was 11.1% per year.
From 1970 to 1975 Vigilante Co-op experienced a 12% growth rate. The peak demand of Vigilante Cooperative in 1975 was almost 2% times greater than its peak demand in 1970. Most of this increase in usage is in irrigation, home heating and new customers. Fergus Electric Cooperative's demand for irrigation increased 20% from 1974-1975, and a similar increase is expected in the future.
The average annual growth rate of Flathead Irrigation Project power system has been 7.2% for the past twenty years, and the growth rate for the next ten years is expected to continue to increase at an even faster rate. This increasing use of electricity is stimulated by decreasing availability and increasing costs of oil and propane.
Park Electric Cooperative customers have more than doubled in the past seven years and Park Electric has experienced a total average increase of 65/o in load growth from 1970-1975.
Despite encouragement to its customers to conserve electricity, Sun River Electric Cooperative rural residential loads increased over 12% last year.
The average annual increase in total kilowatt hour sales of the Yellowstone Valley Electric Cooperative for the past five years has been 12%. Some of this increase in power consumption is due to new customers, but the average usage per customer has also increased, partly because of electric heating and irrigation.
Big Horn Electric Cooperative's annual average increase has been 8.5% over the past twenty years, and electricity for Irrigation has increased 140% during the last five years.

McCone Electric Cooperative has experienced a load growth of 7.4% during 1974 and a 10.1% increase in 1975. (Siring, NR 27, 4730-4731; Rader, NR 25, 4469; Pike NR 30, 5548-5550, Pike Exhibit "A"; Hanson, NR 29, 5113; Follensbee, NR 32, 5084-5085; Gregg, NR 47, 9394-9395; Wilderson, NR 29, 5279-5280; Berberet, NR 29, 5321-5322; Rader, NR 25, 4470; Sept, NR 26, 4583-4584; Zahller, NR 36, 6909-6910; Pile, NR 31, 5902-5903; Casterline NR 35, 6719.) **A**

16. That the Montana Department of Natural Resources did not make a complete, thorough independent study and analysis of the consumptive electrical energy growth patterns and future electrical energy supply potential of and for the Montana Rural Electrical Cooperatives in the preparation of its Draft and Final Environmental Impact Statement on the Application. (Wicks 1 NR 3O, 5695-5697.) **A**

SECTION 70-816 (1)(b) ALTERNATIVE SOURCES OF ENERGY17. That the Montana Power Company, since the early 1960's, as a matter of company policy, has been a net importer of approximately 20 percent of its electricity requirements from other utility companies. Even with Colstrip, Unit 1 on line the company is importing approximately 15 percent of its peak resources and approximately 13 percent of its average energy resources in the current year, 1975-1976. (O'Connor, NR 1, 233-234; Hofacker, NR6, 1088-1089, NR 13, 1947; Goldhammer, NR 17, 2751.) **A**

18. Pacific Power's load and resource forecast for its Montana stem shows that approximately 85% of its Peak requirement must be imported from outside the state. Excluding Colstrip Units 3 and 4, the forecast shows that it is necessary to import 117 mw in 1980-1981 to meet the load. By 1985-1986, the imports would increase to 179 mw. With Colstrip Units 3 and 4 on line, these

imports are reduced to 47 mw in 1980-1981 and to 39 mw in 1985- 86.(Lisbakken, R 17-2874-2877; App. Exs. 21C,21E,21G.) **A**

19. Pacific Power's load and resource forecast for its Montana system shows that approximately 95%-98% of its average energy requirements must be imported from outside the state. Excluding Colstrip Units 3 and 4, the forecast shows that it is necessary to import 65 mw in 1980-1981 to meet the average energy load. By 1985-1986 the imports would increase to 93 mw. With Colstrip Units 3 and 4 on line, these imports are reduced to 26 mw in 1980-1981 and to zero mw in 1981-1982 and thereafter through 1985-1986. If the forecast is extended, it would show that for this year and thereafter imports would need to be commenced again. (Libakken, NR17-2874-2877; App. Exs. 21D, 21F, 21H.) **A**

20. That the lead time necessary to put on line a coal- fired steam generating unit in the state of Montana is approximately nine to ten years. Included in the foregoing estimate is time for the selection of a site location and for the accumulation of meteorological data (air, temperature, weather, etc.), time for the obtaining of a permit under the Montana Utility Siting Act and time for placing orders for the materials and for building the plant. (Hofacker, NR 8, 1333; Labrie, NR 13, 2094.) **A**

21. That during the time that Colstrip Units 3 and 4 were under consideration by the Applicants, there were not available and desirable any other alternative sources of energy which were as feasible, suitable and reasonable as the generation to be produced from Colstrip Units 3 and 4. There is still no available, alternative source of energy to meet projected load growth demands available to the Applicants. (O'Connor, NR 1, 241-242, NRl, 245 248, 251-253, NR4, 727-735; Hofacker, NR8, 1316-1317, NR 10, 1630 1634, 1638, 1641-1642; Labrie, NR 13, 2080-2087, 2089-2100, 2103-2104, NR 14, 2184-2189, 2192-2207, NR 25-26, 4492-4498, NR 45, 9092 9093; Knight, NR 14, 2286-2295; Nogle, NR 15, 2463; Bredemeier, NR 16, 2607; Lisbakken, NR 17, 2871, 2877; Goldhammer, NR 17, 2745-2746, 2748-2749, 2751-2752, 2821-2831; Hanson, NR 29, 5113, 5116; App. Exs. 16, 17, 227, 228, 229, 230,231,267, 267A, 267B.) **A**

SECTION 70-816 (1)(c) ALTERNATIVE SOURCES OF ENERGY IN LIEU OF PROPOSED FACILITY

22. That prior to the time that the decision was made by the Montana Power and Puget Power to build Colstrip Units 1 and 2, more than ten possible sites in the state of Montana were considered for the location of the generation plant by Montana Power. Many siting studies were prepared and much research and investigation accomplished by the company which considered economic, environmental and other factors involved, applicable to the prospective locations. The eventual choice was Colstrip which was considered to have the most advantages. Once this site was selected and money spent to develop it, the Colstrip site also became the logical place for the construction of Units 3 and 4. This decision was based upon the same reasons why Colstrip was selected for Units 1 and 2 as well as the fact that the site had already been developed for Units 1 and 2. (Labrie, NR 13, 2080-2084, 2094-2095, NR 45, 9085, App. Exs. 14, 16, 16 267, 267A, 2678.) **A**

23. That prior to the time that it was decided to make application for Colstrip Units 3 and 4, Montana Power and the other Applicants made various studies, investigations and research concerning the availability and desirability of alternative sources of energy in lieu of the coal-fired steam generating plants planned for Colstrip, Montana. Among the alternatives considered were the following: the construction and operation of alternative generation sources such as hydroelectric, nuclear, oil and gas, coal gasification or liquefication, solar, geothermal, magnetohydrodynamics and wind; not building additional generation; building smaller units; and building the plant in another location. Upon the basis of the foregoing research, it was decided that coal-fired steam generating plants located at Colstrip such as Units 3 and 4, were the lowest cost

alternative and otherwise best choice available to meet the Applicants' power needs in the future and would result in the lowest cost to their customers.(See citations for Finding No. 19.) **A**

24. That it is more economical to generate power at Colstrip, Montana, using coal-fired steam plants, as is contemplated with Colstrip Units 3 and 4, and transmit this power to the service areas of the Applicants and the Pacific Northwest over existing and proposed transmission lines rather than ship coal by railroad from the Colstrip area to alternate power generation plants located in Montana or in the Pacific Northwest and transmit this power over transmission lines to the Applicants' service areas and to the Pacific Northwest. (Hofacker, NR 7,1161--1208; Labrie, NR 13, 2081-2085, NR 26, 4494; Bredemeier, NR 16, 271.4-2718; Pettibone, NR 19, 3058-3071; Woodley, NR 27, 4629-4611, 4659-4689, NR 46, 9298; App. Exs. 12, 22, 214, 229, 232,2 32A , 2 32 B .) **A**

25. That generally speaking a large power generating plant, all other things being equal, costs less to build per unit of capacity than a small plant and larger plants per unit of capacity are less costly to operate than small ones. The foregoing truism is known as "economies of scale." Prior to the decision to build Colstrip Units 3 and 4, various alternatives of larger plants vs. small plants were considered. (Labrie, NR 13, 2085-2090, 2092-2094; Noble, NR 16, 2571-2573; App. Ex. 17.) **A**

SECTION 70-816(1)(d) PROMOTIONAL ACTIVITIES

26. That while the applicants have in the past promoted increased use of electricity, it is evident that more recent promotion conservation measures indicates a lack of any significant promotion which may have given rise to the need for the power to be produced by Colstrip Units 3 and 4. (O'Connor, NR 2, 276-279; Knight, NR 14, 2288; Nogle, NR 15, 2456-2457; Bredemeier,NR 16, 2606-2607; Lisbakken, NR 17, 2871; Richards,NR 43, 8523-8533.) **A**

SECTION 70-316 (l) (e) SOCIALLY BENEFICIAL USES

27. That the power to be produced from Colstrip Units 3 and 4 will be used, directly and indirectly, for socially beneficial purposes, namely: to allow for the development and expansion of municipal waste water and sewage treatment facilities, (Westien, NR 25-26, 4571-4575; Hansen, NR 31, 5874-5879); to allow for the development and, expansion by the agricultural community of sprinkler irrigation, (Hansen, NR 31, 5876; Johnson, NR 27, 4725; Eddleman, NR 31, 5884-5885); to allow for the increased development and expansion of those industries which heretofore have adversely affected both the human and natural environment by allowing said industries to install and operate air and water quality control devices, which will require substantial amounts of electrical energy, in order to comply with air and water quality standards and regulations, (Hearst, NR 27, L 692; Potts, NR 30,5405-5406); to allow for the continued expansion of research in the field of alternative energy sources, (Gregg, NR 47, 9394-9395) and to allow for the maintenance and preservation of a progressive rather than a regressive society, (Hamrell, NR 28, 1917; Christman, NR 28, 4912; Martin, NR 28, /J-920-4921; Gi11igan, NR 28, 4924; Robinson, NR 28, 4891; Halderman, NR 28, 4896; Howe, NR 28, 4900; Charette , NR 31, 5759; Harris, NR 31, 57641 Pine, NR 33, 6179-6180; Fontaine, NR 31, 5757; Pile, NR 31, 5901; Brown NR 48, 9684; Cox NR 26, 4514; Gross, NR 27 4669). **A**

SECTION 70-816 (1) (f) CONSERVATION ACTIVITIES

28. That conservation activities can be effective in decreasing electrical power demands for a period of time if such conservation activities are engaged in by the public at large, the business, industrial and agricultural committees and the procedure of electrical power. However, conservation activities, in and of themselves, will not materially and significantly reduce the demand for electrical power. (O'Connor, NR2, 279-281; Hofacker, NR 13, 1951; Knight, NR 11,

2288-2289; Nog1e, NR 15, 2156- 2457; Bredemeier, NR 16, 2606; Lisbakken NR 17, 2870; Goldhammer, NR 17, 2747-2748, 2841-2842; Gregg, NR 47, 9405.) **A**

SECTION 70-816 (l)(g) RESEARCH ACTIVITIES

29. That all of the Applicants have in the past, and are now, participating in research activities to develop more efficient methods of energy generation and to develop methods of minimizing the environmental impact of energy generation and trans mission facilities. **A, B**

SECTION 70-816 (2) LAND-USE IMPACTS

30. That the land-use impacts of the facility as proposed are not significant nor inconsistent for a facility of this type or nature. **A**

SECTION 70-816(2)(a) AREA OF LAND REQUIRED AND ULTIMATE USE

31. That the area of land required for the facility as proposed, and the ultimate use thereof when compared with the benefits which will be derived therefrom by a majority of the people served thereby, is consistent and not unrealistic for a project of this type and nature. (Labrie, NR 13, 2106-2109; Wahlquist, NR 22, 3818; App. Exs. 92, 98.) **A**

SECTION 70-816(2)(b) CONSISTENCY WITH LAND USE PLANS

32. That no area wide state or regional land-use plan or plans exist so as to compare the consistency of the facility as proposed with such plan or plans. (Labrie, NR 13, 2109; Cumins, NR 48, 9620.) **A, C**

SECTION 70-816(2)(c) CONSISTENCY WITH NEARBY LAND-USE.

33. That the facility as proposed, specifically the site of the proposed Colstrip Units 3 and 4, is consistent with the general land-use in and around Colstrip proper; however, an inconsistency of land-use does exist in that the regional land-use patterns are predominantly agriculturally oriented. (Labrie, NR 13, 2109-2110.) **A**

34. That the inconsistency between the specific land-use of the site of the proposed Colstrip Units 3 and 4 and the regional agriculturally oriented land-use is compatible. **A**

SECTION 70-816(2)(d) ALTERNATIVE USES OF THE SITE 35. That in view of the existence of Colstrip Units 1 and 2, which units are contiguous and adjacent to the site for the proposed Colstrip Units 3 and 4, any alternative use of the site would not be within the realm of achieving the highest and best use of the land area involved. (Labrie, NR 13, 2109-2110.) **A**

SECTION 70-816(2)(e) IMPACT ON POPULATION

36. That impact on the population already in the area will be minimal in view of the fact that Colstrip Units 1 and 2 are a reality. The accumulative effect of the proposed Colstrip Units 3 and 4, together with the existing Units 1 and 2, on the population already in the area will not be significant. **A**

37. That the impact on the population attracted by the construction and/or operation of the proposed facility will be a self-imposed impact and is not considered significant. **A**

38. That the impact of availability of energy from the proposed facility on the growth patterns and population dispersal will be a benefit and not a detriment to the population in the immediate locality, the state of Montana and the Pacific Northwest in general. **A**

39. That a significant beneficial impact on Rosebud County and the state of Montana will occur by virtue of the tax revenues which will be generated by the proposed facility, which estimated total

annual revenues range from a low of $2,170,000 in 1980 to a high of $8,507,000 in 1982 to the state of Montana, with accumulative total tax revenue to the state of Montana for the prop6sed units f6r the three years from 1980 through 1982 of potentially $17,092,000. The estimated total annual revenue to be received by Rosebud County in the form of taxes from the proposed facility varies from a low of $1,856,000 in 1978 to a high of $6,585,000 in 1982. The cumulative total tax revenue generated by the proposed facility to Rosebud County for the years 1978-1982 is estimated to be $23,179,000. (Beisel, NR 19, 3160-3175; Cumins, NR 48, 9620-9626, 9666-9675; Logan, NR 48, 9745-9753, 9794-9795; O'Connor, NR 2, 268-270, Schmechel, NR 22, 3877; Hofacker NR 7, 1208-1264, NR8, 1313-1315; App. Exs. 13, 26, 27, 28, 29, 30, 223, 224, 225; Williams, NR 24, 4140-4147; Crosswhite, NR 25-26, 4302-4304.) **E**

SECTION 70-316 (2)(f) GEOLOGIC SUITABILITY OF SITE AND ROUTE

40. That the geologic suitability of the site and route for the facility as proposed was taken into account and considered insofar as design characteristics are concerned. (Labrie, NR 13, 2113; Z6bel, NR 24, 4199.) **A**

41. That considering the geologic suitability of the proposed corridor, from Colstrip to Hot Springs, with regard to the potential seismic activity, together with the transmission line design criteria indicates no problem from earth tremors will be encountered. (Labrie, NR 13, 2113; Z bel, NR 24, 4214.) **C**

SECTION 70-816(2)(g) SEISMOLIGIC CHARACTERISTICS

42. That the frequency and magnitude of seismic activity in the Colstrip area is minimal. (Labrie, NR 13, 2113.) 43. That the design of the proposed facility, specifically the site for the proposed Colstrip Units 3 and 4, has considered the seismology of the area. (Labrie, NR 13, 2113.) **A**

44. That the proposed corridor within which the transmission facility will be located to transmit the power generated by the proposed Colstrip Units 3 and 4 is located in geographic areas, portions of which have been known to have a higher frequency of occurrence and magnitude of seismic activity than the Colstrip site itself. **B**

45. That the geologic suitability of the proposed corridor insofar as seismic activity is concerned was taken into account in the selection of the site for the facility as proposed. (Labrie, NR 13, 2113.) **B**

SECTION 70-816(2)(h) CONSTRUCTION PRACTICES

46. That the construction practices to be followed in the construction of the plants are consistent with normal practices for such facilities (Labrie NR13,2110), and further, that formally adopted transmission line construction guidelines should be developed and approved by this Board prior to the commencement of construction. **B**

SECTION 70-816(2)(i) EXTENT OF EROSION, SCOURING, WASTING OF LAND

47. That the construction reclamation practices of the Applicants safeguards and ensures that a minimum of erosion, scouring and wasting of land, both at the site of the proposed facility and as a result of the fossil fuel demands of the facility, will result. The Montana Reclamation Act will govern the mined areas. (Labrie, NR 13, 2110-2111, 2114-2115; Hodder, NR 27, 4541; Wahlquist, NR 22, 3819.) **B**

SECTION 70-816 (2) (j) CORRIDOR DESIGN AND CONSTRUCTIONS PRECAUTIONS

48. That a two-mile wide corridor has been proposed by the Applicants and this corridor is a reasonable one from the standpoint of minimizing the environmental impact on both the human and natural environments. The final center-line selection is subject to approval of the Board. (Walquist, NR 22, 3820; Zobel, NR 24, 4201, 4202; App. Exs. 92, 98, 99.) **B**

49. That the corridor-selection process as used by the Applicants is consistent with one method that has been in use. (Wahlquist, NR 22, 3820.) **B**

50. That some construction precautions to be followed during the installation of the transmission facilities have been proposed by the Applicants (Zobal, NR 24, 4202, 4210-4211), but that these guidelines need to be assembled and clearly stated in a Construction Guidelines document for the State of Montana. **B**

51. That the design of the transmission lines was especially adapted for the project as proposed to minimize and eliminate field effects, prevent violations of photo chemical oxidant standards and meets all applicable code requirements.

The power generated at Colstrip will be transmitted over two parallel 500 KV transmission lines starting at Colstrip and terminating at Hot Springs, Montana, with switching stations located at Colstrip and at or near Broadview and Helena, Montana. At Broadview will be installed 500 KV buses to tie the two lines together. The line terminals will be equipped with three cycle circuit breakers and high speed relaying to rapidly interrupt and isolate faulty line sections together with series compensation and line reactors of adequate size to satisfy the requirements for power transfer capability and voltage regulation. Also planned is the installation of transformation from 500 KV to 230 KV to allow Montana Power Company to tie into its present 230 KV grid system as well as the intertie south to Yellowtail Dam and other utilities in Wyoming. Near Helena, there will be a switching station consisting of circuit breakers, series capacitors, line reactors, relays and communications. The two 500 KV lines will be tied or bussed together at this station. The terminal at Hot Springs, Montana, was selected because Bonneville Power Administration (BPA) has a 500 KV station at that location. BPA will wheel the power from Hot Springs west for three Applicant utilities: Washington Water Power, Puget Sound Power & Light, and Portland General Electric and Pacific Power and Light will receive its power at Hot Springs for use in Northwestern Montana.

The transmission lines will be steel tower construction using different tower construction which are identical to those shown in Applicants' Exhibits 70,71,72. Each structure is galvanized steel and all insulators are g1ass.

Construction will be long span construction which envisions approximately four pairs of structures per mile and thus visual exposure is minimized. Also, the lines will be located to avoid as much as possible population centers and residences. The structures as planned are “see through” structures and thus appearance is minimized. Alternatives of aluminum, wood/and welded steel were studied and rejected due to cost and environmental considerations.

The transmission lines will be designed and constructed to withstand two inches of radial ice with no wind or a 120 mile per hour wind on bare wire, which are the extreme conditions anticipated. The lines are also designed for an unbalanced ice load, that is, a condition where ice drops off the wire which can twist the structures. The design factors and criteria selected are suitable and reasonable for the transmission lines.

The Mallard 795 conductor with four conductor bundle configuration was selected over other alternatives. This conductor meets strength requirements and results in lower noise levels because of its larger size. The load and corona losses expected are 72.5 kilowatts (KW) per mile per line at a line loading of 750 megawatts (MW) and 103.6 KW per mile per line at a line loading of 900 MW. These line losses are well within acceptable limits.

Operating experience through 1973 of over 11,000 miles of 500 KV transmission in the United States and 2600 miles of experience by BPA through 1975 demonstrate that extra high voltage (EIIV) lines can be designed and operated with minimum adverse effects on the environment and humans.

The minimum conductor-to-ground clearances for Colstrip lines (37’ mid span and 41’ at road crossings) will reduce induced currents on the largest vehicles to values well below five milliamps (MA) levels. This five MA current level is used as the maximum continuous current that the general

public may be exposed to. It is the design criteria in wide use and based on extensive research on what are called current let-go thresholds of people.
Any fence on the right-of-way parallel to the line will be grounded every 100 feet to keep the current below 5 MA. Also, fences crossing the right-of-way will be grounded at each edge of the right-of-way and at every gate or other opening.
Corona related and are discharge effects which principally occur during light rain or snow or heavy wind or from nicks and scratches on the conductor surface, can cause audible noise effects. Corona effects can also produce radio interference (RI) and television interference (TVI). For Colstrip transmission conductor design, the predicted foul weather audible noise at the edge of the right-a-way is 53 decibels (db(a)). Based on data gathered by BPA, such level is at the lower end of the range of noise levels (52.5 to 58.5 db(a)) in which moderate or some complaints can be expected. Audible noise will not, however, be annoyance problem from the Colstrip lines. Based on analysis by C.T. Main, the predicted fair weather radio noise level is 46 db above 1 millivolt per meter (MV/M) at 1 MHZ at the edge of the 300 foot right-of-way. The average foul weather radio noise will be 20 db higher. With 300 foot right-of-way, 20% of the type "B" stations will receive class "B" service at the edge of the right-of-way. Due to appreciable lateral attenuation of radio noise, households located further than 150 feet from the edge of the right-of-way will receive 100% of type "B" stations with signal to noise ratio of 24 db.
Ozone produced by corona on transmission lines cannot be measured under field conditions due to the minute amounts produced, their rapid dispersal and ambient levels which vary widely. No violation of the photochemical or ozone standard will occur from the operation of the switching stations or transmission lines.
The location and design of each tower structure will meet or exceed all requirements for strength and electrical conductor clearance above ground in accordance with the National Electric Safety Code, which has been adopted to insure protection of the public health and safety. The Colstrip line clearances will, in every instance, exceed the criteria of such codes. (Zobel, NR 24, 4212-4216; Ender, NR 25, 4369-4375, 4378, 4422; Faith, BH 36, 6236-6238; Mueller, BH 36, 4826-4827; Wilkerson, NR 29, 3283.) **B**

SECTION 70-816(2)(k) SCENIC IMPACTS

52. That minimal adverse scenic impact will occur from the construction of Colstrip Units 3 and 4. **A**

53. That scenic impacts will occur from the construction of the transmission line within the corridor proposed by the Applicants. However, such scenic impacts can be minimized by the final selection of the center line of the transmission facility itself, and the use of the proposed towers designed to carry the transmission line. (Labrie, NR 13, 2111; Schmechel, NR 22, 2875-2876, Zobel, NR 24, 4195-4196.) **B**

SECTION 70-816 (2) (m) IMPACTS ON ARCHITECTURE, ARCHEOLOGY, CULTURAL AREAS AND FEATURES

55. That the effects of the facility as proposed on architecture, archeology, cultural areas and features will not be significant, and in the case of transmission line, can be mitigated by proper attention being given to the location of the towers.(Labrie, NR13, 2111; Schmechel, NR 22, 2875-2876; Wahlquist, NR 72, 3802, 380; Zobel, NR 24, 4204.) **A, B**

SECTION 70-816(2)(n) EXTENT OF RECREATIONAL OPPORTUNITIES AND RELATED COMPATIBLE USES

56. The extent of the recreational opportunities and related compatible uses are minimal. **B**

SECTION 70-816(2)(o)

PUBLIC RECREATION PLAN FOR THE PROJECT

57. That the Applicants have proposed an adequate public recreation plan at the Colstrip townsite, developed in conjunction with the facility as proposed. (Schmechel, NR 22, 3879; Labrie, NR 13, 2108; Spring, NR 23, 3941-3945; App. Exs. 37, 38, 39, 46B, 46C, and 46D.) **B**

SECTION 70-816(2)(p) PUBLIC FACILITIES AND ACCOMMODATION

58. That the Applicants have proposed an adequate plan at the Colstrip townsite for public facilities and accommodations, developed in conjunction with the facility as proposed. (Schmechel, NR 22,3879; Labrie, NR 13, 2108; Spring, NR 23, 3941-3945; App. Exs. 37, 38, 39, 46B, 46C and 46D.) **B**

SECTION 70-816(2)(q) OPPORTUNITIES FOR JOINT USE OF WASTE HEAT FROM FACILITY 59.

That there is no opportunity for joint use of the waste heat from the facility as proposed by other energy intensive industries. (Labrie, NR 13, 2111.) **B**

SECTION 70-816(3) WATER RESOURCES IMPACTS

60. That the Board of Health and Environmental Sciences, the duly authorized agency empowered to determine whether or not the proposed facility will violate state and federally established standards and implementation plans insofar as air and water quality are concerned, has, after hearing duly noticed and held, issued twenty-one (21)pages of Findings of Fact regarding air and water resources and impacts which Findings of Fact and Conclusions of Law are fully and completely incorporated and adopted herein. (Exhibit "A".) **C**

SECTION 70-816 (3) (c) COOLING TOWER EVALUATION

63. That after the evaluation of eight (8) separate systems, a mechanical draft evaporative cooling tower system has been selected by the Applicants as the most reliable and economical. (Berube, BH 11, 1511-1531.) **B**

SECTION 70-816 (3) (g) EFFECTS ON WATER USED BY OTHERS

67. That the Applicants previously established and filed water rights entitling them to use the projected withdrawal from the Yellowstone River and the historic flows and past use of the waters of said River indicate that sufficient water is available for the withdrawals projected, and that such withdrawals will not significantly affect the quantity or quality of the Yellowstone River for other users of the water therefrom. (Labrie, BH 21, 2726; App. Ex. 165; Dunkle, BH 29, 3824-3826; Willems, BH 38, 5157; Botz, BH 39, 5529-5231, Exhibit "A".) **B**

69. That the withdrawal of water from the Yellowstone River will not affect the wetland ecosystem, directly or indirectly, of the Yellowstone River in any significant respect. (Martin, NR 15, 9055; App. :E:x. 208, Exh.tbit "A".) **B**

72. "SECTION 70-816(4) AIR QUALITY IMPACTS

That the Board of Health and Environmental Sciences, the duly authorized agency empowered to determine whether or not the proposed facility will violate state and federally established standards and implementation plans insofar as air and water quality are concerned, has, after hearing duly noticed and held, issued twenty-one (21) pages of Findings of Fact regarding air and water resources and impacts which Findings of Fact and Conclusions of Law are fully and completely incorporated and adopted herein. (Exhibit "A".)" **C**

SECTION 70-816(3)(j) MONITORING PROGRAMS

73. That the meteorological data obtained over the one year study period insofar as wind direction and velocity, ambient temperature ranges, precipitation values, inversion occurrences and other effects influencing the dispersion of the plume have been analyzed and the results from said analysis incorporated into the design of the proposed facility to ensure that air quality impacts will be minimized and air quality standards met. (Heimbach, BH 24, 3082, App. Exs. 76, Parts 1 and 2, 76B; Crow, BH 25, 3319-3324, 3339, 3348; BH 26, 3425; Faith, BH 2, 201.) **B**

74. That further meteorological data will be collected prior to final selection of the proposed corridor. **B**

SECTION 70-816(4)(b) TOPOGRAPHY

75. That the terrain in the Colstrip area is of a rolling nature and that said terrain does not affect the dispersion of pollutants from stacks having a height such as those proposed. (Faith, BH 2, 204) **B, C**

SECTION 70-816(4)(c) STANDARDS IN EFFECT AND PROJECTED

76. That the standards in effect and projected for emissions for the proposed facility are the New Source Performance Standards, Title 40, Chapter One, Part 60, Code of Federal Regulations, Section 60.40, et. seq; Section 16-2.14 (1)-S 14082 Montana Administrative Code, and that no different standards are projected to apply to the proposed Colstrip Units 3 and 4. In adopting federal primary standards, the Clean Air Act of 1970 required that for each pollutant there exists a threshold level or margin of safety below which harmful human health effects do not occur. The current 24-hour federal primary ambient standard for sulfur dioxide is 365 micrograms per cubic meter (ug/m3) (1.14 ppm), while the Montana standard is 265 ug/m3 or 0.10 ppm. The available epidemiologic data establishes a threshold between 300 ug/m3 and 500 ug/m3 and thus the federal and Montana standards protect public health. The federal annual standard is 80 ug/m3 (0. 03 ppm) for sulfur dioxide and Montana /is more stringent, being 0.02 ppm or 52 ug/m3. No significant increase in morbidity results from long term exposure to so2 concentrations below the federal standard and with the Montana standard a greater margin of safety is included. The federal primary standard maximum 24-hour level for particulate matter is 260 ug/m3 while Montana is 200 ug/m3 not to be exceeded for more than one percent of the days a year. Epidemiologic data supports a threshold between 300 and 375 ug/m3. Thus the federal and Montana standards are well below such level and are adequate to protect public health. The federal and Montana annual primary ambient air quality for particulate matter if 75 ug/m3. The data which supports the threshold level suggests a safety actor of at least 33%. While there is no sulfate federal standard, the Montana sulfate standards are set to protect public health. Further as to sulfates, there is no scientific basis at present for assigning any public health risk to sulfate levels presently measured in western United States. Further, the adoption of new source performance standard which govern Colstrip #3 and #4 set by the Environmental Protection agency is set to insure that the ambient air quality standards are not violated. The federal secondary 3 hour standard of 1300 ug/m3 not to be exceeded more than one per year is sufficient to protect public welfare which includes effects on soils, water, crops, vegetation, man-made materials, animals, wildlife, weather, visibility and climate, damage to and deterioration of property, and hazards to transportation, as well as effects on economic values an on personal comfort and well-being. The federal secondary standard for particulates is 60 ug/m3, annual arithmetic Mean and 150 ug/m3, maximum 24-hour concentration not to be exceeded more than once per year. In addition, the Montana long term and short term standards apply to public welfare. The Montana fluoride standards cited in these findings are also

applicable to public welfare. All standards which are in effect are sufficient to protect public welfare. (Brandt, NR 46, 9174-9116; Colucci, BH 44.6291-6293; App. Ex. 275.) **C**

"[SECTION 70-816(4)(c) STANDARDS IN EFFECT AND PROJECTED]

77. That the Board of Health and Environmental Sciences of the State of Montana has reviewed the Application for the proposed facility and the design thereof, insofar as the New Source Performance Standards are concerned. (Exhibit "A" .) **C**

78. That the emission control system for the proposed facility is based on the best available control technology for the specific plants to reduce emissions to levels within the New Source Performance Standards. (Berube. BH 8, 111, 113.) **B,C**

79. That the best available control technology is synonymous with the highest state of the art and is that technology specifically designed to the specific site constraints which include the nature of the coal being burned, the meteorology of the area, the evaporative potential, the available ash disposal site and the available water, together with economic considerations. (Grimm, BH 45, 8986-8987.)**B,C**

SECTION 70-816(4)(d) EMMISSIONS AND CONTROLS (i) – (v)

80. That the Board of Health and Environmental Sciences of the State of Montana has considered the stack design and the emission control systems of said facilities and determined that said emissions would not violate state and federally established emission standards. (Exhibit "A".) Subsequent tests of Colstrip No. 1 have resulted in emissions well within state and federal standards. **B,C**

SECTION 70-816(4)(e) RELATONSHIP TO PRESENT AND PROJECTED AIR QUALITY

81. That the Board of Health and Environmental Sciences of the State of Montana has considered the relationship of expected maximum ground level concentrations of the pollutants therein specified and found in its Finding of Fact No. XXIV, incorporated herein by this reference, that the same were within the standards in effect and projected for Colstrip 3 & 4, which said standards are set forth in Finding 76 herein. **B,C**

82. That while there will be no emissions of sulfuric acid as such emitted directly from the proposed facilities, sulfuric acid can subsequently occur under certain conditions by the conversion of sulphur dioxide to sulfuric acid by oxidation and hydrolysis. That because of the arid climate and basic soils of the Colstrip area of southeastern Montana, the occurrence of and effects of sulfuric acid mists, if any, will be minimal. (Berube, BH 8, 1021, BH 9, 1248-1249; Abrams, BH 46, 6600, 6603; Faith, BH 5, 580, 584; Northern Cheyenne Exhibit 2.) **B,C**

83. That the plumes from the proposed Colstrip plants will not increase the ozone or photo chemical oxidant ground level concentrations or background levels. (Colucci, BH 44, 6259.) B,C

84. That the trace elements emitted from the proposed Colstrip plants will have no significant impact on soils, local vegetation, wildlife, domestic animals or humans. (Edmonds, BH 21, 3514)B,C

85. That while no acid precipitation or other toxic substances are expected to be created or developed from the operation of the proposed facility, and no significant change in the pH of the precipitation in the Colstrip area will occur (Edmonds, BH 21, 3514), stringent monitoring of air pollutants will warn of exceptions to these expectations, and careful sludge disposal will alleviate possible water contamination problems."**B,C**

"SECTION 70-816(4)(f) MONITORING PROGRAM

86. That the Applicants have selected eleven (11) primary and secondary sites to monitor ground level concentrations in and around the proposed facility. (Grimm, BH 12,1739-1740;App. Ex. 112.)**B,C**

87. That the operation of the air quality system in Colstrip Unit 1 will be closely monitored by the Department of Health and Environmental Sciences and the Applicants and the data gathered therefrom will be interpreted by the Department of Health and Environmental

Sciences as to the effectiveness of the air quality control systems installed thereon. (Exhibit "A")." **B,C**

93. That analysis of coal from the Colstrip area indicates the presence of trace amounts of radioactive substances, such as radium, uranium and thorium. The quantities found are so low as to be insignificant. It appears that no land-use controls over development and population, waste disposal or special safeguards or monitoring are required for radiation impacts. (Labrie, NR 13, 2111.) **B, C**

SECTION 70-816 (7)(a) NOISE IMPACTS-CONSTRUCTION PERIOD LEVELS

94. That the United States Department of Labor, Occupational Safety and Health Administration (OHSA) has adopted occupational noise standards which apply to the Colstrip plants and that OSHA noise regulations have been and will continue to be taken into account in the design of Units 3 and 4. All OSHA standards, together with the comparable Montana occupation noise standards will be met. (Labrie, NR 13, 2111-2113.) **B, C**

SECTION 70-816 (7)(b) OPERATIONAL LEVELS

SECTION 70-816(7)(c) RELATIONSHIP OF PRESENT AND PROJECTED NOISE LEVELS TO EXISTING AND POTENTIAL STRICTER NOISE STANDARDS

96. That all present standards will be complied with and no potential stricter noise levels are known. (Labrie, NR13, 2111-2113.) **B, C**

SECTION 70-816 (7) (d) MONITORING ADEQUACY OF DEVICES AND METHODS

97. That adequacy monitoring devices are being utilized by trained personnel in order to establish the noise levels of Units 1 and 2 and will also be used at Units 3 and 4. (Labrie, NR 13, 2111-2113.) **B, C**

Conclusions of Law From Proceedings Before the Board of Natural Resources and Conservation

1. That Applicants have met the burden of proof required herein and that each finding of fact set forth herein is supported by substantial credible evidence contained in the record of these proceedings. **C**

2. The Board hereby adopts all of the Findings of Fact and Conclusions of Law heretofore entered in this proceeding by the Montana Board of Health and Environmental Sciences and dated November 21, 1975. **C**

6. All of the requirements and criteria of the Montana Utility Siting Act of 1973, including but not restricted to Sections 70-810, 70-811, 70-816, Revised Codes of Montana, 1947, have been met, satisfied and complied with by the Applicants. C

7. Colstrip Units #3 and #4 and associated facilities are consistent with regional plans for expansion of the appropriate grid of the utility systems serving Montana and interconnected utility systems, such facilities will serve the interests of utility system economy and reliability, and none will be constructed underground. **A, B, C**

8. The location of Colstrip Units #3 and #4 and associated facilities as proposed conforms to applicable state and local laws and regulations issued thereunder. **A**

9. Colstrip Units #3 and #4 and associated facilities will serve the public interest, convenience and necessity. **A**

11. There are not available any viable or reasonable alternatives to the proposed facilities. **A**

12. That the Board of Natural Resources and Conservation grant the application requested and issue a certificate of and Environmental Compatibility and public need required by the Utility Siting Act of 1973 subject, however, to the following terms and conditions, to wit:

f. That the Applicants' general contractor, Bechtel Corporation, shall attempt to work with the Northern Cheyenne Tribe, and its members, in an effort to establish programs to develop skilled labor among the Northern Cheyenne tribal members to the end that said Northern Cheyenne tribal members may be usefully employed during the construction of and subsequent operation of Colstrip Units 3 and 4. **A, C**

g. That the Applicants, at their expenses, shall in cooperation with both the Montana Department of Health and Environmental Sciences and the Tribal Council of the Northern Cheyenne Tribe, construct, maintain and operate an air quality monitoring station on the Northern Cheyenne Reservation as part of the total air quality monitoring program, and further that the Applicants shall compile, collect and furnish all of the results of said monitoring station on a periodic basis to the Department of Health and Environmental Sciences and to the Tribal Council of the Northern Cheyenne Tribe. **A, C**

h. That all monitoring programs heretofore institute in regard to Colstrip Units 1 and 2, and in the Application proposed be implemented and instituted so as to provide a continual flow of factual data insofar as air, surface and ground water are concerned. **A, C**

i. That the Applicants enter into a written agreement with the Board of Health and Environmental Sciences for the payment of the monitoring facilities and operation thereof required by said Board in their certification heretofore issued, and for any further monitoring required in the conditions set forth herein by the State Board of Natural Resources and Conservation. **A, C**

j. That as and when Units #3 and #4 come on line, the Applicants and the Department of Health and Environmental Sciences shall set up by a new agreement a reasonable continuing schedule of monitoring, covering sites, kinds of tests, frequency of tests, and other matters deemed necessary, to maintain the integrity of the monitoring system in determining compliance or non-compliance with the Montana Air Quality standards over a long period of time. **A, C**

k. That the Applicants prepare and transmit a written offer to each of the Montana Rural Electric Cooperatives offering said Cooperatives an opportunity to purchase ownership in the proposed Colstrip Units 3 and 4, which ownership shall be in such amounts as may be mutually agreed upon by and between the Applicants and the Cooperatives, individually or collectively, desiring to purchase such ownership, which will be sufficient to meet the projected energy demands placed on the Cooperatives. **A, C**

l. That relative to the transmission facilities:

1. The Applicants are recognized as responsible for all aspects of said construction, irrespective of how they may sub-contract the work. **B**

2. The Applicants shall develop a set of construction Guidelines which must be approved by this Board, and they must do so and receive approval before transmission line construction commences. This recognizes that the Colstrip-Broadview segment is covered by previous Conclusions from this Board, relative to the 230 KV line. However, whatever must be done to upgrade that segment to 500 KV must comply with the Construction Guidelines. These Construction Guidelines must not only stipulate construction practices which will minimize Environmental damage, but must also cover the reclamation of unavoidably or accidentally damaged land or water resources. As part of the contracts or subcontracts relative to transmission line construction, the Applicants shall stipulate compliance with the Construction Guidelines, and a performance bond shall be required covering not only construction aspects but also reclamation aspects. Details of the Bonding shall be set forth in the Construction Guidelines. **B**

3. The Applicants shall continue to gather both geologic and meteorologic data for the area of the proposed corridor and submit the same to the Department of Natural Resources and Conservation for its review, so as to determine the proper design and location of the transmission line towers in areas of severe meteorological occurrences, with specific references to the problems of the accumulation of ice and problems of high velocity winds. **B**

4. The final location of the center line of the right-of-way of the Transmission line is subject to the future approval of this Board. Specific means and procedures shall be worked out with this Board for the approval process. The selection of the final center-line location shall as far as possible avoid skylining, will skirt bases of hills, will avoid closely paralleling main highways, will avoid crossing irrigation or potential irrigation lands except on property boundaries, will cross roads and streams directly rather than obliquely, and will otherwise minimize the impact of those lines. **B**

5. The, final proposed location of the center-line for the transmission facility, associated with Colstrip Units #3 and #4 shall be located in cooperation with and consultation with the individual land owners whose land the said facility passes over, through and across so as to mitigate the effects of said transmission facility on the individual land owners. When the Applicants submit the final proposed location of the center-line for the final approval by this Board, they shall include information substantiating compliance with this related Condition. **B**

6. The features of design of the Transmission lines shall be as stated by the Applicants' Findings, and by any modifications which may mitigate geologic, seismic, or meteorologic problems. B

m. That the conditions set forth in pp 22 and 23in the Findings of Fact of the State Board of Health and Environmental Sciences of the State of Montana are hereby fully and completely incorporated as conditions herein. **C**

n. That the Applicants make every effort, and report periodically to the State Board of Health and Environmental Sciences on those efforts, to continually increase the efficiency of the air pollution control system, by adopting or adapting new technology. Any modifications of the air pollution control system, or its means of operation, that will result in emission levels lower than those specified in the Findings of Fact and Conclusions of Law by the Board of Health and Environmental Sciences, which are approved by the Departments or Board of Health and Environmental Sciences shall be adopted and incorporated herein. The applicants shall serve the Board of Natural Resources and Conservation with a certified copy of the approval of modifications and the new permits which have been issued by the Board or Department of Health and Environmental Sciences within 10 days of such final decision at which time the Board of Narural Resources and Conservation shall issue a notice to show cause why the certificate should not be so modified. **C**

Amendments to the MFSA Certificate -
February 10, 1978 – Adoption of Construction Guidelines **A, B**,
June 1, 1979 – Potential Use of McKay Seam Coal
Mine mouth Versus Load Center Power Generation
Transmission Facilities Siting **A, B**
September 12, 1980 – Transmission Routing **B**
September 12, 1980 – Supplemental Yellowtail Dam Water Release Agreement **B**
January 12, 1981 – Ownership Transfer from Puget Sound Energy construction company **B**
March 31, 1981 – Amended descriptions of pollution control equipment. **B**
June 18, 1982 – Ownership Offer to MT Cooperatives **B, E**
August 10, 2004 – Allowed offsite reuse/recycling of bottom ash. **B**

Board of Health and Environmental Sciences Findings of Fact -
I.

The air quality standards applicable to Colstrip Units #3 and #4 are:

A. Emissions:

New Source Performance Standards (Title 40, 2 Chapter 1, Part 60, Code of Federal Regulations, Section 60, 40, et seq.):

Particulate Matter:

(1) No discharge to exceed 0.18 g per million cal heat imput being .10 lb per million BTU; and,

(2) Exhibit greater than 20% opacity except that a maximum of 40% opacity shall be permissible for not more than two (2) minutes in any hour. Where the pressure of uncombined water is the only reason for failure to meet the requirements of this paragraph, such failure will not be a violation of this section.

Sulfur Dioxide:

No discharge to exceed (2) 2.2 g per million Cal heat imput being 1.2 lb per million BTU.

Nitrogen Dioxide:

No discharge to exceed (3) 1.26 g per million Cal heat imput being 0.70 lb. per million BTU.

B. Ambient Air Quality Standards: (Montana)

Sulfur Dioxide: 0.02 ppm (52 ug/m3) Annual

0.10 ppm (2 ug/m3) 24 hr.

(Not to be exceeded for more than one per cent (1%) of the time)

0.25 ppm (65 ug/m3) 1 hr.

(not to be exceeded for more than one hour in any four consecutive days at same receptor point)

Total Suspended Particulates:

75 ug/m3 Annual

200 ug/m3 24 hour

(Not to be exceeded for more than one per cent of days per year)

Suspended Sulfate:

4 ug/m3 Annual

12 ug/m3 _ _

(Not to be exceeded over one per cent of the time)

Sulfuric Acid Mist:

4 ug/m3 Annual

12/ugm3 _ _

(Not to be exceeded over one per cent of the time)

30 ug/m3 1 hour

(Not to be exceeded over one per cent of the time)

Lead: 5.0 ug/m3 30 day Average

Beryllium: 0.01 ug/m3 30 day Average

Flouride, Total in Air as HF-1 ppb 24 hour Average

National: (ug/m3)

			Primary	Secondary
Sulfur Dioxide	Annual	80	_ _	
	24 hour	365		
	(Not to be exceeded more than once a year)			
3 hour	_ _	1300		
Particulates:	Annual	75		60
	24 hour	260		150
	(Not to be exceeded more than once a year)			
Photochemical Oxidants (Ozone):		160 (.08 ppm)	_ _	
	(Not to be exceeded more than once per year)			
Nitrogen Oxides:	Annual	_ _		100

C. For Class II significant deterioration standards allowable increase applicable to Units 3 and 4 only: (ug/m3)

Sulfur Dioxide	Annual	15
	24 hour	100
	3 hour maximum	700
Particulates:	Annual	10
	24 hour maximum	30

(A-20)

D. Air quality permit 1187-M1 is fully and completely incorporated herein and made part hereof and by reference is deemed controlling if it should be determined to be in conflict with any of the provisions of A through C of this finding. (Permit 1187-M1) **C**

II.

The water quality standards applicable to Colstrip Units #3 and #4 are Section 69-4827, Revised Codes of Montana, 1947 (Water Pollution), and Section 69-4901 through Section 69-4908, Revised Codes of Montana, 1947 (Public Water Supply). The applicable water quality regulations of the State of Montana pertaining to this portion of the hearing are found- in Section 16-2.14(10)-Sl4480, entitled "Water Quality Standards'', pp. 16 375.2 through 16-393.8, Vol. 2, Title 16, Health and Environmental Sciences of the Montana Administrative Code. The foregoing water quality standards found in the Montana Administrative Code pertain only to surface water; ground water standards have not yet been adopted by the Board of Health and Environmental Sciences. There are no federal water quality statutes, rules, regulations, standards or laws which are applicable to this hearing. (A-43) **C**

III.

Under the foregoing Montana Administrative Code, the Yellowstone River drainage from the Billings water supply intake to the North Dakota state line, with the exception of various tributaries listed in the code, has a water use classification of B-D3 (Department of Health's Exhibit 27; Section 16-2.14(10)-S14480(4), p. 16-387, Vol. 2, Title 16 of the Montana Administrative Code. (A44) **C**

IV.

The system to be constructed for the control of emissions from Colstrip Units #3 and #4, consists of venturi wet scrubber modules (Applicant's Exhibit 63), (Grimm, 12-1712). There will be eight scrubber modules constructed for Unit 3 and eight scrubber modules for Unit #4 (Grimm, 12-1717), with one module in each unit to be used as a spare,.(Grimm, 13-1841). (A1) **A,C**

V.

The components that make up each individual module include: dampers, so the modules can be isolated for maintenance, (Grimm, 12-1718), and turning vanes and flow distributors [to] the Venturi plumb bob section, (Grimm, 12-1719), the absorption vessel with counter current absorption sprays and agitated integral recycle tank with top mounted agitator, (Grimm, 12-1721, 1722, 14-1936) 1 (Applicants' Exhibit 109); backup counter current absorption sprays; a regeneration tank; the Koch or wash tray to remove entrained scrubber sludge from the flue gas, (Grimm, 12 7 1723, 1726), Applicants' Exhibit 110); demisters that separate entrained moisture from the flue gas, (Grimm, 12-1727, 1729), Applicants' Exhibit 111), a stainless steel fleximesh, (Abrams 15-2138); flue gas reheater to reheat the scrubbed gases to 175° Fahrenheit,(Grimm, 12-1729, 1730), equipped with a soot blower to-remove fly ash deposits, (Grimm, 14-1950), and the dry induced draft fan which pulls the flue gas through the scrubber system by a suction or vacuum process. (Grimm, 12-1730). For operation purposes, access ports for observation into the scrubber

will be provided to allow the operator to observe any build-up of solid deposits, (Grimm, 14-1935). (A2) **A, C**

VI.

The Venturi scrubber system captures the fly ash present in the flue gas, (Grimm, 12-1745). The fly ash results from the burning of the coal, (Grimm, 12-1720), and contains alkali material of calcium and magnesium which absorbs the sulfur dioxide, (Grimm, 12-1720, 1745). The fly ash is recovered in the Venturi section and drops to the recycle tank, which holds 12% per centum quantity of suspended solids so as to eliminate scaling of the system, (Grimm, 12-1746). The resulting water/fly ash alkaline slurry is recycled through the Venturi and the counter current absorption spray section to effect sulfur dioxide removal. (Grimm, 12-1717, 1720) **A, C**

VII.

The flue gas enters the Venturi at the preheaters outlet, (Grimm, 12-1717). The pressure drop in the throat of the Venturi is governed by the plumb bob and it restricts the flue gas stream so that the velocity of the flue gas, when increased, mixes with the liquor (water or recycled slurry) which is thus atomized. The atomized liquor drops contact the particulate in the flue gas and enlarges the fine particulate because of the deposition of the atomized particles of liquor. Thus the higher the velocity of the gas through the throat of the Venturi, the higher atomization and more removal of fine particulate takes place. (Abrams, 15-2026). The flue gas passes into the absorber sections where the wash tray and demister remove entrained scrubber sludge and water droplets. (Grimm, 12-1726, 1727, 13-1828). Then, upon leaving the absorber section, it passes through, the reheater section which heats the gases above their dew point to a temperature of 175° Fahrenheit, (Grimm, 12-1730). This reheating protects the induced draft fan from contract with a wet gas,thus keeping it dry and the heated gas gives the plume more buoyancy (Grimm, 12-1730, 13-1842; Raben, 23-3013). Waste scrubber sludge is continually bled from the system at a rate proportionate to the boiler load and removed fly ash. (A4) A, **C**

VIII.3

Chemical control of the scrubber system should be maintained at a ph of 5.0 6.0 to 5.6 6.5 (Grimm, 13-1867), to prevent scale, i.e., crystals of calcium sulfate and calcium sulfite, (Applicants' Exhibit 74, p. 3-2). A liquid to gas ratio of 33, i.e., 33 gallons of liquid per thousand actual cubic feet of incoming flue gas, (Grimm, 12-1719, 14-1913; Raben, 23-3010), in the entire system is used to remove the sulfur oxides, particulate matter, fluorides, (Grimm, 13-1787, 1788), oxides of nitrogen, (Abrams, 16-2272), lead, beryllium and other trace elements, (Grimm, 12-1720), (DNR Exhibit, 123), (Applicants' Exhibit, 74). A constant velocity of flue gas flow into the throat of the Venturi regardless of the boiler load is maintained by the use of the plumb bob to insure constant outlet grain loading of particulate matter (Grimm, 12-1719; Abrams, 15-2071). The velocity of the flue gas going through the mist eliminator should be maintained at 8.7 feet per second at full load and 7.5 feet per second at average load of 80% to prevent plugging of the demister, (Abrams, 15-2075, 2076; Grimm, 14-1896), (Applicants' Exhibit, 74). (A-5) **A, C**

IX.

The system is designed without any by-pass, (Grimm, 13-1853), so that all flue gas from the boiler will be treated in the scrubber modules when the plant is in operation and thus meet emission standards, (Grimm,14-1965). A by-pass is a means of ducting the flue gas around the scrubber modules in the event the modules become inoperable and by its use the flue gas passes untreated to the stack, (Grimm, 14-1933, 1947). (A-6) **A, C**

X.

Scaling in the scrubber is deterred by: (1) proper control of ph through injection of lime as additional alkali substance to absorb sulfur dioxide and (2) recycle of the liquor which provides

seed crystals of calcium sulphate with the fly ash as precipitation sites for calcium sulphate so as to prevent the super-saturation of calcium sulphate in the recycled liquor, (Grimm, 14-1836, 1912; Raben, 23-2996, 2999). The recycle tank of the system is a holding tank which catches the slurry from the downcomer. It holds the volume of slurry for eight minutes, which is equivalent to providing contact with the liquor of each individual particle of fly ash for ten hours, (Abrams, 14-2001). Thus the slurry is desupersaturated, i.e., the solids of calcium sulfate resulting from absorption of so2 will deposit on the nucleus of the calcium sulfate and fly ash existing in the slurry. The effluent or waste, which is insoluble, is placed in separate holding tank for ten minutes to complete the reaction and then is pumped to a retention final disposal pond where the solids settle. The remaining clear liquor from the pond is returned to the system. The percentage of suspended solids in the slurry liquor at 12%, will help avoid scaling of the unit, (Abrams, 15-2073, 2075). (A-7) **A, C**

XI.

The operation of the scrubber will be controlled by operators in a control room where instruments record the inlet and outlet concentrations of so2 and also record the ph of the scrubber system. In the event the outlet concentration increases (above 260 50 ppm with an inlet concentration of 965 ppm) while the ph drops (below 5.6 6.0), the operator can add additional time to bring the ph to proper level and thus reduce the so2 outlet concentration, (Grimm, 13-1875). (A-8) **A, C**

XII.

The emission control system for Colstrip Units #3 and #4 is the best suited for the Colstrip plants because it makes use of the alkalinity nature of the fly ash found in the Rosebud coal and thus reduces dependence upon additional lime injection, (Grinun, 14-1964). **A, C**

XIII.

Chemical control of the scrubber system should be maintained at a ph of 5.0 to 5.6 (Grimm, 13-1867), to prevent scale, i.e., crystals of calcium sulfate and calcium sulfite, (Applicants' Exhibit 74, p. 3-2). A liquid to gas ratio of 33, i.e., 33 gallons of liquid per thousand actual cubic feet of incoming flue gas, (Grimm, 12-1719, 14-1913; Raben, 23-3010), in the entire system is used to remove the sulfur oxides, particulate matter, fluorides, (Grimm, 13-1787, 1788), oxides of nitrogen, (Abrams, 16-2272), lead, beryllium and other trace elements, (Grimm, 12-1720), (DNR Exhibit, 123), (Applicants' Exhibit, 74). A constant velocity of flue gas flow into the throat of the Venturi regardless of the boiler load is maintained by the use of the plumb bob to insure constant outlet grain loading of particulate matter (Grimm, 12-1719; Abrams, 15-2071). The velocity of the flue gas going through the mist eliminator should be maintained at 8.7 feet per second at full load and 7.5 feet per second at average load of 80% to prevent plugging of the demister, (Abrams, 15-2075, 2076; Grimm, 14-1896), (Applicants' Exhibit, 74). (A-5) **A, C**

"XIV.

Pilot plant tests project that SO2 emissions from Units 1, 2, 3 and 4 3 and 4, will have an outlet concentration under "worst"' coal conditions of 1% sulfur (965 PPM) of 260 50 PPM, at 100% load, with a ph of 5.6 6.5 and liquid to gas ratio of 33. (Abrams, 15-2144, 2145). With outlet concentration for sulfur dioxide under "worst" coal conditions of 1% sulfur at 260 50 PPM, and based upon the units running at 100% load, the emissions for sulfur dioxide would then be:

Units 3 or 4: 4633 761pounds per hour or 96 585 grams per second;

Units 1 or 2: 2071 pounds per hour or 250 grams per second.

(Applicants' E . 64 and 65; Grimm 13-1794, 1795, 1801; Applicants' Ex. 61 and 62; Berube 8-1117, 1120,23 1121, 1124)

Emissions for particulate matter for Units 1 or 2 is 184 pounds per hour, or 46 grams per second combined, and for Units 3 or 4 is 408 pounds per hour each, or 103 grams per second combined. (Berube 9-1130, 1134).

The pilot plant tests also substantiate that fluoride emissions from the use of Rosebud coal, which contains 27 PPM, will emit 1.8 pounds per hour, or .227 grams per second, for Units 3 or 4, and .1 gram per second from Units 1or 2. (Grimm,12-1788,.13-1789, 1790. Applicants' Ex. 74, p. 15.2.1). Beryllium in the coal will be emitted at the rate of .0021 grams per second at 100% load for Units 3 or 4 (DNR Ex. 123), which is equivalent to .0061 grams per second for all four units. (Faith, 43-6240). Lead emissions in the Rosebud coal for Units 3 or 4 will be .0423 grams per second (DNR Ex. 123), which is equivalent to 1.22 grams per second for all 4 units. (Faith 43-6241). For oxides of nitrogen calculated as NO2, the emission rate for Units 1 and 2 combined at .7 pounds per million BTU is 4.740 pounds per hour, or 598 grams per second; for Units 3 and 4 combined at .7 pounds per million BTU is 10602 pounds per hour, or 1336 grams per second, and thus for all four units emissions at .7 pounds per million BTU is 15,342 pounds per hour, or 1934 grams per second. (Faith, 26-346, 3463). The scrubber will reduce 15 to 20 per cent of the oxides of nitrogen emissions. (Abrams, 16-2272). (A-11)" **A,C**

"XV.
The fuel to be used in Units #3 and #4 will be Rosebud seam coal from the Colstrip area. (Berube 7-902). It will be mined from areas designated C, D, and E, shown on Exhibits 52, 53, 140 and 141. (Berube 8-1027-1029; Rice 28-3635- 3636, 3640-3641). Based upon Certificate amendment in 2014, Units 3&4 are also allowed to utilize Rosebud seam coal mined from areas A, B, F and G, such coal having been shown to be of substantially the same or better quality for emissions control related purposes." **A,C**

"XVI.
The results of analyses of all the core hole, samples, made by commercial testing laboratories, and which provide information necessary to properly specify equipment for Units #3 and #4 are included in Applicants' Ex. 53A and 53B, (Berube 7-908, 912, 913). The composition of the coal was considered to estimate the quantities of ash and sulfur dioxide that would enter the boiler, leave the boiler, and enter any pollution control equipment. (Berube, 8-1041, 1042). **A, C**

XVII.
The values of the basic composition of the coal that should be considered for the emissions control system, including averages, maximums and minimums proper for design of the equipment are included in Applicants' Exh. 54. Berube 8-1042, 1043). This information is an instruction for the equipment supplier and not a description of the coal in the coal field. The value of 1% sulfur is a maximum for design purposes because it represents the maximum value of sulfur that the pollution control equipment will have to contend with in operation. (Berube 8-1044-1046). It is the maximum value of sulfur authorized by this Board for certification purposes. A,C

XIX.
The flue gas desulphurization system to be installed at Colstrip Units #3 and #4 and which are presently under construction at Units #1 and #2 may prove to be reliable systems to remove pollutants from the flue gas because Venturi scrubbers have been in operation at other power generating plants and are not a new equipment system (Abrams, 14-1990). The Colstrip modules have improved the design and operating efficiencies over previous modules.(Labrie, 21-2770; Abrams, 14-1944, 1990; Raben, 23-3062). The alkali nature of the fly ash of Rosebud coal as does the addition of dolomitic hydrated lime contributes to that improvement, (Abrams, 14-2000). In addition, the pilot plant study conducted at Corette generating station, Billings, Montana confirmed the chemistry of the system, (Abrams, 15-2014;Raben, 33-2931). (Applicants' exhibits, 73 and 74).

The particulate removal based upon pilot plant studies is projected within the range of 99.465% to 99.76% and will be enhanced by the utilization of the wash tray and stainless steel pleximesh in the scrubber units. (Abrams, 15-2042, 2045, 15-2034, 2035). Utilization of the wash tray reduced the solid buildup in the demister and improved the particulate The estimated capital cost of the system is $151,614,000.00, which is equivalent to $108.30 per kilowatt (Applicants' Ex. 108A), and this represents the least expensive and most economical system for Units #3 and #4. (Leffman 20-2410). The operation costs of Units 3 and 4 are also the- most economical of all other systems and will operate at an estimated cost of $1,030,000.00 per year. (Applicants' Ex. 108B). **A, C, E**

XX.

A dispersion model is used to predict maximum ground level conce11trations. A dispersion model is a mathematical equation which indicates the change in concentrations of various pollutants in different positions downwind. Tall stacks effect the ground level concentrations of pollutants which come from the plant. In most models, the basic characteristics include: (l) the stack and emission parameters; (2) the plume rise equations; (3) the dispersion (spread of the plume) equations; and (4) the diffusion equation which calculate the ground level concentrations (Gelhaus 38-5068). Meterology in the Colstrip area must be considered to determine whether the peak or maximum concentrations as computed by any model will in fact occur since air pollution is very closely related to the atmosphere and the changes of the atmosphere. (Crow, 25-3318, 3320, 3333, 3334, 43-6149). **C**

XXI.

For predicting maximum ground level concentrations for Units #3 and #4, one model used Briggs plume rise equation (Applicants' Ex. 66), Hillsmeyer-Gifford plume spread classified by the Pasquill method and the Gaussian dispersion equations; Maximum concentrations were determined by multiplying the highest relative concentrations by projected emission rates. (Applicants' Ex. 67 and121). Inversion heights published by Holzworth apply. **C**

XXII.

Meterological data for the Colstrip area was gathered by the Earth Science Department of Montana State University over a two-year period under a research grant funded by Montana Power Company and in conjunction with the Department of Health and Environmental Sciences. (Heimback 24-3062; Applicants' Ex. 76, Part I and Part II; Ex.76-B). Another dispersion model was developed by the Montana State University personnel who conducted the meteorological study. (Heimback 24-3090, 3092) (Applicants' Ex. 76 D, E, F and G). **C**

XXIII.

In applying the MSU model, predictions for downwind distances of less than, or egul to, 2.3 kilometers applicants divided by a factor of two. (Heimbach 24-3093, 45-6452, 6470) (Applicants' Ex. 183, p. 166). All calculations using the MSU model were made assuming an inversion at the top of the plume height for one hour concentrations, this being a worst case condition for an emission situation. **C**

"XXIV.

Based on the meterology data, the modeling calculations, and applicants' assumptions, the expected maximum (peak) ground level concentrations for the following pollutants are:

(1) Sulfur Dioxide.

(a) For Pasquill Methodology:

Maximum one hour ground-level concentrations for all four Units are 405 micrograms per cubic meter. The maximum three hour ground-level concentrations for Units 3 and 4 are 120 micrograms per cubic meter and for all four Units are 194 micrograms per cubic meter. The maximum annual ground-level concentration for Units 3 and 4 are 0.9 micrograms per cubic meter and for all four units are 1.4 micrograms per cubic meter.

(b) MSU Methodology:

Maximum one-hour ground-level concentrations for all four Units are 256 micrograms per cubic meter. Maximum three-hour ground-level Concentrations for Units 3 and 4 are 100 micrograms per cubic meter, and for all four Units are 156 micrograms per cubic meter. Maximum 24-hour ground-level concentrations for Units 3 and 4 are 40 micrograms per cubic meter and for all four Units are 63 micrograms per cubic meter.

(2) Particulate matter.

(a) Using Pasquill Methodology. '

The maximum annual ground-level concentrations of particulate for Units l and 2 are .05 micrograms per cubic meter. For Units 3 and 4 are 0.07 micrograms per cubic meter, and for all four Units are 0.11 micrograms per cubic meter. The maximum 24-hour ground-level concentrations of particulate for Units 1 and 2 are 0.9 micrograms per cubic meter, for Units 3 and 4 are 1.3 micrograms per cubic meter, and for all four Units are 2.1 microgram per cubic meter.

(b) Using MSU Methodology.

The maximum 24-hour ground-level concentrations of particulate for Units 3 and 4 are 3.7 micograms per cubic meter, and for all four Units are 5.9 micrograms per cubic meter.

(3) Oxides of Nitrogen (Calculated as N02).

Pasquill Methodology - Annual.

For Units 1 and 2 are 0.6 micrograms per cubic meter, for Units 3 and 4 are 1.1 micrograms per cubic meter, and for all four Unit s are 1.7 micrograms per cubic meter.

(4) Sulfates:

(a) Pasquill Methodology:

Maximum one-hour ground-level concentrations for all four Units are 0.1 micrograms per cubic meter. Maximum 24-hour ground-level concentrations for all four Units are 0.4 micrograms per cubic meter. Maximum annual ground-level concentrations for all four Units are 0.2 micrograms per cubic meter.

(b) MSU Methodology:

Maximum one hour ground-level concentrations for all four Units are 7.8 micrograms per cubic meter. Maximum 24-hour, ground-level concentrations for all four Units are 1.1 micrograms per cubic meter.

(5) Fluorides:

(a) Pasquill Method:

Maximum •24-hour ground-level concentrations for all four Units are 0.01 parts per billion.

(b) MSU Method:

Maximum 24-hour ground-level concentrations for all four Units are 0.03 parts per billion.

(6) Beryllium:

(a) Pasquill Methodology:

For all four Units the 24-hour concentration would be .000084 micrograms per cubic meter. The 30 day value could not be greater.

(b) The corresponding calculation for MSU methodology is.00026 micrograms per cubic meter.

(7) Lead:

(a) For Pasquill methodology, all four Units, 24--hour concentration could be .00168 micrograms per cubic meter. The 30-day value would be less.

(b) The corresponding calculation for MSU methodology would be .0045 micrograms per cubic meter." **B**

XXV.3

Colstrip Units 3 and 4 will project two ~~525~~ 692-foot stacks and will project compliance with all applicable standards. **A, C**

XXVI.

Generally there are four steps, in the development of a power plant pollution control system. The first step is bench scale, which is what the applicants did at the Corette Station. The next step is a pilot plant, which will provide for the testing of the Units, coming to 25 times the size of the unit tested at the Corette Station. The next step would be a prototype of a demonstration unit. The last step would be a commercial unit in operation. (Raben 23-2967). (0-119) **A, C**

XXVII.

The criteria established by the National Academy of Engineers are generally accepted. They require 90% or greater sulfur oxide recovery, 90% availability of a reliable system, one year of commercial demonstration on a 100 megawatt unit or larger, and economic feasibility for operation based upon sufficient data. **A, C**

XXVIII.

Colstrip Unit #1 would produce useful information to be incorporated into Units 3 and 4 for consideration of the proper pollution control there to be installed. (Crow, 26-3427; Grimm 14-1921). (0-125). Colstrip #1 is presently available for observation and evaluation. (Leffman, 19-2484). **A, C**

XXIX

A closed loop water system (a system which does not discharge effluents from the plants downstream or into other waters) was adopted for Colstrip Units 1-4 so that there would be no discharge from the plants into the Yellowstone River or other state waters. (Labrie 20-2627, 45-6444-6446). **A, C**

XXX.

The surge pond is located approximately one mile northwest of the plants and comprises approximately 160 acres. When filled it will hold approximately one billion gallons of water or 2800 acre feet. It contains 19 days' storage of water at summer withdrawal rates for Units 1-4 and 26 days' storage of water for winter withdrawal rates for the four units. (Grinun, 12-17 01,13-18347 Labrie, 2072630; Berube, 22-2831-2832; McMillan, 43-6177-6184, 6227; Applicants' Exhibits 51, 175.) (A-31) **A, C**

XXXII.

Maximum water consumption for Colstrip Units 1, 3 and 4, running at full or 100% load will be reached during the summer months of July and August of each year at the rate of approximately 56.12 cubic feet per second (approximately 25,187 gallons per minute or 40,631 acre feet annually). (Labrie, 20-2629-2630 Berue, 22-2839 2842; Applicants' Exhibit 50B). (A-33). **A, C**

XXXIII.

The lowest historical daily flow of water in the Yellowstone River at the location of Nichols is approximately 1,000 cubic feet per second (approximately 448,800 gallons per minute or 724,000 acre feet annually). Lowest flows of water in the Yellowstone River at the point of diversion near Nichols occur during the winter months of December, January and February with the highest flows during the the spring month of June. (Labrie, 20-2630; Dunkle, 30A-3903) (Applicants' Ex. 137, 138). (A-36) **A, C**

XXXIV.

Because of the storage capacity of the surge pond and the historical flows of water on r4cord in the Yellowstone River, it will not be necessary for the Applicants to withdraw water from the Yellowstone River for use in their Colstrip Units when the river is flowing water at Nichols less than 1,500 cubic feet per second (673,000 gallons per minute or 1,086,000 acre feet per year). (Labrie-, 20-2630). (A-38) **A, C**

XXXV.

Dissolved solid concentrations in the Yellowstone River increase downstream and decrease with increased flow. Suspended sediment in the Yellowstone River also varies with flow, but in a manner opposite to the dissolved solid concentrations; that is, suspended sediment increases with

increasing flow. In general, water quality is best in the Yellowstone River at high flow periods in the more upstream locations, but sediment detracts from this quality at high flow periods, particularly at downstream locations. (Dunkle, 29-3822-3823; Botz,39-5222-5223). (A-42) **A, C**

XXXVI.
The effects of the withdrawal of water from the Yellowstone River for utilization at Colstrip Units 1-4 as proposed by the applicants does not appear to be significant. (Dunkle, 29-3824-3826; Willems, 38-5157; Botz, 39-5229-5231). **A, C**
XXXVII.
The impact of the withdrawal of water from the Yellowstone River for utilization at Colstrip Units 1-4 as proposed by the Applicants upon the water quality of the Yellowstone River will be insignificant and will not cause a violation of any of the standards applicable to the Yellowstone River. (Willems, 38-I5157). (A-4 6) **A, B, C**

XXXVIII.
The impact of Colstrip Units 1-4 upon surface water quality outside of the Yellowstone River will be insignificant and will not violate any applicable standards. (Botz, 39-5223-5227; Willems, 38-5157-5158). (A-4 7) **A, B, C**
XXXIX.
The various ponds which will be used for storage of water in the evaporation and disposal of water and waste materials emanating from Colstrip Units 1-4 will have seepage not anticipated to impair the quality of the ground water in the area. (Northern Plains Ex.2, 3A; Berube, 22-2831-2839; Grimm, 44-6370-6376). **A, B, C**
XXXX.
The applicants were aware of the generalized statement of the non-degradation standards both in the Montana State implementation Plan and the statutes and regulation of the Department of Health and Environmental Sciences and the Board of Health and Environmental Sciences in the State of Montana. The applicants knew that it would be necessary to resolve the highest state of the art in their pollution control system. (Berube, 10-1392, 1393) (2-144). **B, C**

Conclusions of Law From Before the Board of Health and Environmental Sciences

1. The applicants' will utilize only coal from the Rosebud seam. It will at no time exceed 1% inlet sulfur content. Daily testing of the coal and sulfur content will be required to effect that control." **B**

2. The operation of the air quality system in Colstrip #1 will be closely monitored by the Department of Health and Environmental Sciences and the applicants. The data therefrom is to be interpreted by the Department as to the effectiveness of such system of control of air quality. This monitoring will be continuous during the construction of Units #3 and #4. In the event Colstrip #1 violates the compliance standards during its operation and performance, certification of Colstrip Units #3 and #4 will be suspended pending the implementation of modifications in Colstrip Units 1, 2, 3 and 4 to bring the units into compliance. **B, C**

3. The certification with conditions herein set forth does not constitute a waiver of any of the requirements of the Clean Air Act, the Water Pollution Control Act, or the implementation plan, including the necessity of obtaining a permit in accordance with the rules and regulations implemented under Section. 69-3911, R.C.M. 1947. B, C
4. Any compliance modifications required during the operations of Colstrip Units 1 or 2 will be installed in Colstrip Units 3 and 4. **C**

5. No water will be withdrawn from the Yellowstone River when the Yellowstone River is flowing at Nichols less than 1,500 cubic feet per second. Daily testing will be required during periods of low water. **B, C**
6. All ponds, surge ponds, settling ponds and impoundments shall be properly sealed. They shall be monitored for seepage, including the installation of test wells to determine the extent of ground water pollution, and the necessities of correction therefore. **B, C.**