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THE MONTANA POWER COMPANY
GENERAL OFFICES: 40 EAST BROADWAY, BUTTE, MONTANA 59701 - TELEPHONE 406 / 723-5421

LEGAL DEPARTMENT

MELVYN M. RYAN
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ROBERT P. CANNON
JAMES P. HARRINGTON
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August 25, 1976

Mr. Ted Doney
Counsel for Montana Department of Natural
Resources and Conservation
32 South Ewing
Helena, MT 59601

RE: Colstrip 3 & 4 Certificate

Dear Ted:

Enclosed please find the signed original of the
"Agreement to Comply", which is included as part of
the Certificate for Colstrip 3 & 4 and associated
facilities.

Sincerely,

JOHN W. ROSS

cc: w/enclosures
Board Members

RECEIVED

AUG 26 1976

MONT. DEPT. OF NATURAL
RESOURCES & CONSERVATION

1
2
3 AGREEMENT TO COMPLY

4 We, the undersigned Applicants for a Certificate of
5 Environmental Compatibility and Public Need for the proposed
6 Colstrip Units 3 and 4, being fully advised of the premises,
7 do hereby agree, as a condition subsequent to the issuance of
8 said Certificate, to comply fully and completely with the
9 spirit and intent of the Utility Siting Act of the state of
10 Montana, as set forth in Section 70-801, et. seq., Revised
11 Codes of Montana, 1947, as amended, and in addition thereto
12 with the Conditions set forth and contained in the Findings
13 of Fact and Conclusions of Law made by the Board of Health
14 and Environmental Sciences of the state of Montana and the
15 Conditions set forth and contained in the Decision of the
16 Board of Natural Resources and Conservation of the state of
17 Montana, and further agree to cooperate fully with the
18 Department of Natural Resources and Conservation and the
19 Department of Health and Environmental Sciences insofar as
20 the Conditions attached to said Findings of Fact and Decision.

21 ATTEST:

22 *Melvin H. Hays*
23 *Notary Public*

THE MONTANA POWER COMPANY

24 BY

Joseph A. McElwain
25 DATED 8/19/76

26 PUGET SOUND POWER AND LIGHT COMPANY

27 BY

W. W. Eick
28 DATED 7/29/76

29 PORTLAND GENERAL ELECTRIC COMPANY

30 BY

Frank D. Harren
31 DATED 8/2/76
32

1 ATTEST:

2 J. P. Buckley

THE WASHINGTON WATER POWER COMPANY

BY W. Harding

DATED August 13, 1976

5 [Signature]

PACIFIC POWER AND LIGHT COMPANY

BY G. E. Doreman

DATED August 6, 1976

AB

Carl Davis
Hearings Examiner

CERTIFICATE OF SERVICE

I, CARL M. DAVIS, do hereby certify that on the 22nd day of July, 1976, true copies of the Findings of Fact, Conclusions of Law, Opinion, Decision, Order, Recommendations, Certificate of Environmental Compatibility and Public Need and a copy of the proposed Agreement to Comply were personally served on each of the following named persons:

Mr. Steve Brown
Legal Division
Dept. of Health
1424 9th Avenue
Helena, Montana 59601

Mr. Jack Peterson
Attorney at Law
McCaffery and Peterson
27 West Broadway
Butte, Montana 59701

Mr. William H. Bellingham, Edq.
Moulton, Bellingham, Longo & Mather
200 Securities Building
P.O. Box 1016
Billings, Montana 59101

Mr. Ted J. Doney, Chief Legal Counsel
D.N.R. & C.
32 South Ewing Street
Helena, Montana 59601

Mr. Peter Michael Meloy, Esq.
Suite 307, Horsky Block
Sixth and Last Chance Gulch
Helena, Montana 59601

Mr. Leo Graybill, Esq.
Graybill, Ostrem, Warner & Crotty
400 First Nat. Bk. Building
Great Falls, Montana 59401

That copies of the above documents were duly mailed on July 23, 1976, postage prepaid to each of the following persons:

Mr. James Goetz, Esq.
15 South Tracy
Bozeman, Montana 59715

Mr. Benjamin W. Hilley
Hilley & Loring
Attorneys at Law
1713 Tenth Avenue South
Great Falls, Montana 59405

Mr. Richard A. Baenen
Wilkinson, Cragun & Barker
Attorneys at Law
The Octagon Building
1735 New York Avenue N.W.
Washington, D.C. 30006

Case M. Davis

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STATE OF MONTANA
BEFORE THE BOARD

OF
NATURAL RESOURCES AND CONSERVATION

* * * * *

In the Matter of the Application of)
The Montana Power Company, Puget)
Sound Power and Light Company,)
Portland General Electric Company,)
The Washington Water Power Company,)
and Pacific Power and Light Company)
for a Certificate of Environmental)
Compatibility and Public Need for)
the Proposed Colstrip Units 3 and 4)

FINDINGS OF FACT, OPINION,
DECISION, ORDER
AND RECOMMENDATIONS

* * * * *

Pursuant to the Utility Siting Act of the State of
Montana as set forth in Section 70-801, et. seq., Revised Codes
of Montana, 1947, as amended, (now cited as the Montana Major
Facility Siting Act, and hereinafter referred to as "Siting
Act"), The Montana Power Company, Puget Sound Power and Light
Company, Portland General Electric Company, The Washington
Water Power Company, and Pacific Power and Light Company
(hereinafter referred to as "Applicants") filed, on June 6,
1973, with the Montana Department of Natural Resources and
Conservation (hereinafter referred to as "Department") an
Application for a Certificate of Environmental Compatibility
and Public Need for the proposed Colstrip Units 3 and 4, and
filed contemporaneously therewith a Petition for Waiver of
Time Requirements as set forth in Section 70-806 of the Siting
Act and a filing fee of \$1,232,930. The Applicants also filed
with the Department Applicant's Environmental Analysis of the
proposed project and related facilities entitled "Colstrip
Generation and Transmission Project" said Environmental
Analysis being dated November, 1973, prepared by the
Environmental Systems Department of Westinghouse Electric

1 Corporation.

2 The Department, pursuant to Section 70-807 and 70-816
3 of the Siting Act conducted an intensive study over a period of
4 600 days of the above mentioned Application and issued its
5 Draft Environmental Impact Statement in November, 1974 against
6 granting the Application. Subsequent to the issuance of the
7 Draft Environmental Impact Statement by the Department, the
8 Department conducted a series of public meetings to gain in-
9 put from the public at large with regard to the proposed
10 project and the analysis thereof contained in the Draft
11 Environmental Impact Statement. On or about January 21, 1975,
12 the Department released its Final Environmental Impact State-
13 ment on the proposed project containing its recommendations
14 against granting the Application and transmitted the same to
15 the Board of Natural Resources and Conservation (hereinafter
16 referred to as "Board").

17 The Board, upon the receipt of the recommendations
18 from the Department, and after due and deliberate consideration,
19 issued an Order dated January 24, 1975, wherein the Board deemed
20 that the matter before it, the Application for a Certificate of
21 Environmental Compatibility and Public Need for the proposed
22 Colstrip Units 3 and 4, submitted by the Applicants, would be
23 considered a contested case as the same is defined in the
24 Montana Administrative Procedure Act, Section 82-4201, et. seq.,
25 Revised Codes of Montana, 1947, as amended. Subsequent to the
26 issuance of said Order, the Board issued Orders on February 7,
27 1975, and February 14, 1975, pertaining to matters of procedure
28 to be followed particularly to the methods of discovery and
29 determining the burden of proof.

30 The Board further ordered that the hearing would
31 commence on March 10, 1975 at Bozeman, Montana and notice of
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1 the time and place of said hearing was duly given to all parties
2 and published in daily newspapers throughout Montana to adequately
3 inform the public. On March 10, 1975, the Board of Natural
4 Resources and Conservation hearing commenced at which time
5 Motions were presented to the Board by the opponents to the
6 Application to continue the hearing until May 13, 1975, to afford
7 the parties time to complete discovery procedures, and objec-
8 tions were made to a Board member serving as Hearings Examiner.
9 On April 17, 1975, the Board continued the hearing until April 21,
10 1975, and on April 10, 1975, Carl M. Davis was appointed by the
11 Board as Hearings Examiner to preside over the public hearing
12 phase of the proceedings.

13 Following a pre-trial conference with the parties,
14 the Hearings Examiner, by Order dated April 15, 1975, directed
15 the proceedings to reconvene on April 21, 1975, at Helena,
16 Montana.

17 By letter dated April 10, 1975, the Director of the
18 Department of Health and Environmental Sciences notified the
19 Board that said Department of Health and Environmental Sciences
20 certified that the proposed facility will not violate state and
21 federally established water quality standards but that they did
22 not certify that the proposed facility will not violate state
23 and federally established air quality standards and implementa-
24 tion plans.

25 On April 18, 1975, the Northern Plains Resource Council
26 filed Cause 38934 in the District Court of Lewis and Clark County,
27 Montana and a Writ of Prohibition was served upon the Board and
28 the Hearings Examiner directing them to desist and refrain from
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1 any further proceeding until further order of the court and
2 further directing them to appear in court on April 22, 1975.
3 Following said hearing the court, on April 29, 1975 quashed
4 the Writ of Prohibition thereby allowing the hearing to
5 continue and ordered the Board of Health and Environmental
6 Sciences to hold a hearing to determine whether the certificate
7 required by Section 70-801 (1) (h), Revised Codes of Montana,
8 1947, as amended, should be issued.

9 The hearing reconvened in Helena on May 5, 1975 and
10 Motions by the opponents to the Application for further
11 continuances were presented and granted by the Hearings Exami-
12 ner continuing the hearings until May 20, 1975.

13 On May 9, 1975, the Northern Cheyenne Tribe, Inc.
14 filed an application for a Writ of Prohibition in the District
15 Court of Lewis & Clark County, Cause No. 39000. This matter
16 was heard by the court on May 19, 1975 and judgment entered
17 on the same date dismissing the application.

18 The public hearing before this Board formally
19 commenced on May 20, 1975 and continued until June 5, 1975
20 at which time the hearing before the Board of Health and
21 Environmental Sciences was commenced with Carl M. Davis
22 serving as Hearings Examiner. The hearing before the Board
23 of Health and Environmental Sciences consumed a total of 53
24 hearing days and concluded on September 15, 1975 with 53
25 witnesses having testified. After having studied the
26 testimony and exhibits, and the Findings of Fact submitted by
27 the parties, the Board of Health and Environmental Sciences
28 heard oral arguments by counsel, visited the site of the
29 proposed facilities and rendered its decision on November 21,
30 1975, and issued its^{conditional} certification, pursuant to Section 70-810
31 (h) of the Siting Act.

32

1 On July 23, 1975, at the conclusion of Applicants'
2 case in chief in the Health Hearing, the opponents to the
3 Application moved to dismiss the Applicants' proceedings for
4 certification together with a Motion to continue further
5 hearings until the Board of Health ruled upon the Motions.
6 The Motion to continue the Health Hearing was denied on
7 July 24, 1975. The opponents to the Application filed in
8 the District Court of the First Judicial District, Cause No.
9 39228, an application for a Writ of Prohibition or Mandate
10 commanding the Board of Health and Environmental Sciences
11 and the Hearings Examiner to cease and refrain from further
12 proceedings until further order of said court or to show cause
13 to said court on July 28, 1975 why said Board should not be
14 permanently restrained from further proceedings until the
15 Board had ruled upon opponents' Motion to Dismiss.

16 On July 25, 1975 the Supreme Court of the State of
17 Montana granted Applicants' application for a Writ of Super-
18 visory Control and directed the District Court to either
19 withdraw its Writ of Prohibition against the hearings
20 continuing or, in the alternative, to appear before the
21 Supreme Court on July 28, 1975. On July 28, 1975, the Supreme
22 Court heard the matter and at the conclusion of said hearing
23 directed that the Writ of Prohibition be set aside and that
24 the hearings proceed forthwith.

25 On July 24, 1975, the opponents of the Application
26 filed a Motion with the Board of Natural Resources and Con-
27 servation requesting that the hearings before the Board be
28 continued until such time as the Board of Health and
29 Environmental Sciences had issued its certification. After
30 hearing all parties the Board granted the Motion.

1 Carl M. Davis, acting in his capacity as Hearings
2 Examiner for the Board issued an Order dated December 10, 1975
3 reconvening the Board's hearing on January 19, 1976 at Helena,
4 Montana, and in addition set forth certain procedures to be
5 followed by all parties to the proceedings regarding the
6 presentation of direct testimony and cross-examination.
7 Notice of the time and place of said hearing was served upon
8 all parties to the proceedings and published in daily news-
9 papers throughout the state of Montana in order to adequately
10 inform the public of the same. The Department and the
11 Northern Plains Resource Council, both parties to the pro-
12 ceedings, filed Motions with the Board, moving the Board to
13 terminate its hearing on the basis that the Montana Board of
14 Health and Environmental Sciences had not certified, or had
15 miscertified, that the proposed Colstrip Units 3 and 4 would
16 meet applicable air and water quality standards. After hear-
17 ing held, said Motion was denied.

18 The reconvened hearing commenced on January 19, 1976
19 and was concluded on March 30, 1976 with a total of 255 wit-
20 nesses having testified including 132 public witnesses. The
21 entire transcript of all the proceedings in both the Board of
22 Health hearing and the Board of Natural Resources hearing,
23 including copies of the exhibits received into evidence, were
24 served upon each member of the Board of Natural Resources and
25 Conservation, together with parties' proposed Findings of
26 Fact.

27 The Board, having visited and inspected the proposed
28 facilities on two occasions, and after due and timely notice
29 being served and published, heard oral arguments on May 19
30 and 20, 1976 by all parties who were present and desired to
31 present arguments.

32

The Board, having personally inspected the site, read the record of the proceedings, the proposed Findings of Fact of the parties and heard the arguments of counsel and public parties and having duly considered the same and being fully advised in the premises announced in a regularly scheduled and noticed meeting on June 24, 1976, that they were each ready to act upon the application. A motion to approve the application to construct Colstrip Units 3 and 4 and associated facilities and to grant applicants a Certificate of Environmental Compatibility and Public Need, subject to certain stated conditions, was seconded and carried with four members voting in favor of the motion and three members voting against the said motion.

A majority of the Board having approved granting the application, the Board herewith makes its Findings of Fact and Conclusions of Law, together with its Decision, Opinion, Order and Recommendations:

FINDINGS OF FACT

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. Also Findings Numbers 9 through 20.

SECTION 70-810 (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.

SECTION 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.

SECTION 70-810 (e)

CONSISTENT WITH REGIONAL PLANS

4. That there is a distinct lack of regional or state-wide 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 inter-connected 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.

1 SECTION 70-810 (f)

2 STATE AND LOCAL LAWS

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

6
7 SECTION 70-810 (g)

8 PUBLIC INTEREST, CONVENIENCE AND NECESSITY

9 6. That the facilities as proposed will serve the
10 public interest, convenience and necessity.

11
12 SECTION 70-810 (h)

13 AIR AND WATER CERTIFICATION

14 7. That the Board of Health and Environmental Sciences,
15 of and for the State of Montana, is the duly authorized agent
16 empowered to determine whether or not the facilities as pro-
17 posed will violate state and federally established air and water
18 quality standards and implementation plans.

19 8. That the Board of Health and Environmental Sciences,
20 has, after a hearing held pursuant to notice, certified to the
21 Board of Natural Resources and Conservation that the facilities
22 as proposed will not violate state and federally established air
23 and water quality standards and implementation plans, a duly
24 certified copy of the Board of Health's Findings of Fact, Con-
25 clusion of Law and hereto, marked as Exhibit "A" for identifi-
26 cation, and by this reference fully and completely incorporated
27 herein and made part hereof.

28
29 SECTION 70-816 (1)

30 ENERGY NEEDS

31 9. That the collective loads and resources forecast

1 by the Applicants, excluding Colstrip Units 3 and 4, covering
2 peak for the years 1975-1976 through 1985-1986, shows a collec-
3 tive surplus of peak until 1982-1983, at which time a deficit of
4 855 megawatts is forecast. A deficit continues for each year
5 thereafter with the greatest deficit being 2,536 megawatts in
6 1985-1986. Even with Colstrip Units 3 and 4 on line, a collective
7 deficit of 281 megawatts is forecast in 1984-1985 and 1,295 mega-
8 watts in 1985-1986. (Hofacker, NR 13, 1939-1947; App. Exs. 3C,
9 3D, 4C, 4D, 5B, 5C, 7B, 7C; Knight, NR 14, 2284-2286; App. Exs.
10 18B, 18D; Nogle, NR 15, 2453-2456; App. Exs. 20A, 20B; Bredemeier,
11 NR 16, 2602-2604; App. Exs. 19A, 19B; Lisbakken, NR 17, 2867-
12 2872, 2874-2877; App. Exs. 21B, 21C, 21E and 21G.)

13 10. That the collective loads and resources forecast
14 by the Applicants, excluding Colstrip Units 3 and 4, covering
15 average energy for the years 1975-1976 through 1985-1986, shows
16 a collective surplus of energy for the years 1976-1977 and 1977-
17 1978, with deficits indicated for all other years, with the
18 greatest deficit being 1764 megawatts for the year 1982-1983.
19 Even with Colstrip Units 3 and 4 on line, they forecast a col-
20 lective deficit in average energy in four (4) out of the six (6)
21 years commencing with 1980-1981, the greatest deficit in any one
22 year being 723 megawatts in 1982-1983. (Hofacker, NR 13, 1939-
23 1942, 1945-1948; App. Exs. 3C, 3E, 4C, 4E, 6B, 6C, 8B, 8C; Knight,
24 NR 14, 2284-2286; App. Exs. 18B, 18C; Nogle, NR 15, 2453-2456;
25 App. Exs. 20 20B; Bredemeier, NR 16, 2603-2605, App. Exs. 19,
26 19C, Lisbakken, NR 17, 2867-2872, 2874-2877; App. Exs. 21B, 21D,
27 21F, 21H.)

28
29 SECTION 70-816 (1) (a)

30 GROWTH

31 11. That available load growth information for the

1 Applicants' systems supports their forecast covering future
2 load growth for both peak and average energy. (Hofacker, NR 13,
3 1963; Knight NR 15, 2436-2437; Nogle, NR 16, 2567; Bredemeier,
4 NR 16, 2629-2630; Lisbakken, NR 17, 2937-2940; Gregg, NR 47,
5 9388-9390.)

6 12. That the Pacific Northwest Utilities Conference
7 Committees, West Group Forecast of power loads and resources,
8 dated March 1, 1976, covering the period from July, 1976 to June
9 1987, forecasts an annual rate of growth for the West Group of
10 utilities of approximately 5.1 percent insofar as peak is con-
11 cerned, and 4.8 percent insofar as energy is concerned. (Gold-
12 hammer, NR 44, 8915; App. Exs. 240H.)

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

20 14. That the future consumptive use of electricity
21 by the customers of the Applicants involves a degree of un-
22 certainty; however, the historical projections of past trends to
23 forecast future load demands, while reliable in the past, may
24 fall short of the actual consumptive growth demand in the future.
25 (Hofacker, NR 6, 1092-1108, NR 7, 1111-1122; Knight, NR 14,
26 2283-2284; Nogle, NR 15, 2457-2459; Bredemeier, NR 16, 2605-
27 2606; Lisbakken, NR 17, 2867-2870; Anderson, NR 18, 2954-2956,
28 2970-2979; Coldiron, NR 20, 3358-3366; NR 49, 9826.)

29 15. That Montana Rural Electric Cooperatives serve
30 a large portion of the Montana agricultural community, that they
31 are facing severe electrical energy shortages by virtue of their
32

1 increased consumptive demand and by the curtailment of electrical
2 energy supply by the Bonneville Power Administration and the
3 Bureau of Reclamation above their existing contract demand limits.

4 The BPA delivers power to satisfy a substantial por-
5 tion of Montana's electric power needs. BPA sold about half of
6 the electrical energy consumed within the state of Montana from
7 1970-1974. Only one-fifth of the amount supplied by BPA to
8 Montana was generated in Montana and the balance, four-fifths,
9 was generated at projects located in the states of Washington,
10 Idaho and Oregon. During 1975, total sales to BPA customers in
11 Montana averaged 474 megawatts, much of which is delivered by
12 transmission facilities owned by The Montana Power Company.

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

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

27 The Bureau of Reclamation also serves cooperatives in
28 Montana and other cooperatives receive power from generating
29 plants in North Dakota. Montana's rural cooperatives east of
30 the Continental Divide receive approximately one-half of their
31 energy supplies from 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 2½ 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.

1 and the growth rate for the next ten years is expected to con-
2 tinue to increase at an even faster rate. This increasing use of
3 electricity is stimulated by decreasing availability and increasing
4 costs of oil and propane.

5 Park Electric Cooperative customers have more than
6 doubled in the past seven years and Park Electric has experienced
7 a total average increase of 65% in load growth from 1970-1975.

8 Despite encouragement to its customers to conserve
9 electricity, Sun River Electric Cooperative rural residential
10 loads increased over 12% last year.

11 The average annual increase in total kilowatt hour
12 sales of the Yellowstone Valley Electric Cooperative for the
13 past five years has been 12%. Some of this increase in power
14 consumption is due to new customers, but the average usage per
15 customer has also increased, partly because of electric heating
16 and irrigation.

17 Big Horn Electric Cooperative's annual average increase
18 has been 8.5% over the past twenty years, and electricity for
19 irrigation has increased 140% during the last five years.

20 McCone Electric Cooperative has experienced a load
21 growth of 7.4% during 1974 and a 10.1% increase in 1975.
22 (Siring, NR 27, 4730-4731; Rader, NR 25, 4469; Pike NR 30, 5548-
23 5550, Pike Exhibit "A"; Hanson, NR 29, 5113; Follensbee, NR 32,
24 5084-5085; Gregg, NR 47, 9394-9395; Wilderson, NR 29, 5279-5280;
25 Berberet, NR 29, 5321-5322; Rader, NR 25, 4470; Sept, NR 26, 4583-
26 4584; Zahller, NR 36, 6909-6910; Pile, NR 31, 5902-5903; Casterline
27 NR 35, 6719.)

28 16. That the Montana Department of Natural Resources
29 did not make a complete, thorough independent study and analysis
30 of the consumptive electrical energy growth patterns and future
31 electrical energy supply potential of and for the Montana Rural
32

1 Electrical Cooperatives in the preparation of its Draft and
2 Final Environmental Impact Statement on the Application. (Wicks,
3 NR 30, 5695-5697.)
4

5 SECTION 70-816 (1) (b)

6 ALTERNATIVE SOURCES OF ENERGY

7 17. That the Montana Power Company, since the early
8 1960's, as a matter of company policy, has been a net importer of
9 approximately 20 percent of its electricity requirements from other
10 utility companies. Even with Colstrip Unit 1 on line, the com-
11 pany is importing approximately 15 percent of its peak resources
12 and approximately 13 percent of its average energy resources in
13 the current year, 1975-1976. (O'Connor, NR 1, 233-234; Hofacker,
14 NR6, 1088-1089, NR 13, 1947; Goldhammer, NR 17, 2751.)

15 18. Pacific Power's load and resource forecast for its
16 Montana System shows that approximately 85% of its peak require-
17 ment must be imported from outside the state. Excluding Colstrip
18 Units 3 and 4, the forecast shows that it is necessary to import
19 117 mw in 1980-1981 to meet the peak load. By 1985-1986, the
20 imports would increase to 179 mw. With Colstrip Units 3 and 4 on
21 line, these imports are reduced to 47 mw in 1980-1981 and to 39 mw
22 in 1985-86. (Lisbakken, R 17-2874-2877; App. Exs. 21C, 21E, 21G.)

23 19. Pacific Power's load and resource forecast for its
24 Montana system shows that approximately 95%-98% of its average
25 energy requirements must be imported from outside the state.
26 Excluding Colstrip Units 3 and 4, the forecast shows that it is
27 necessary to import 65 mw in 1980-1981 to meet the average energy
28 load. By 1985-1986 the imports would increase to 93 mw. With
29 Colstrip Units 3 and 4 on line, these imports are reduced to 26
30 mw in 1980-1981 and to zero mw in 1981-1982 and thereafter through
31 1985-1986. If the forecast is extended, it would show that for
32

1 this year and thereafter imports would need to be commenced again.
2 (Lisbakken, NR 17-2874-2877; App. Exs. 21D, 21F, 21H.)

3 20. That the lead time necessary to put on line a
4 coal-fired steam generating unit in the state of Montana is ap-
5 proximately nine to ten years. Included in the foregoing esti-
6 mate is time for the selection of a site location and for the
7 accumulation of meteorological data (air, temperature, weather,
8 etc.), time for the obtaining of a permit under the Montana
9 Utility Siting Act and time for placing orders for the materials
10 and for building the plant. (Hofacker, NR 8, 1333; Labrie, NR
11 13, 2094.)

12 21. That during the time that Colstrip Units 3 and 4
13 were under consideration by the Applicants, there were not
14 available and desirable any other alternative sources of energy
15 which were as feasible, suitable and reasonable as the generation
16 to be produced from Colstrip Units 3 and 4. There is still no
17 available, alternative source of energy to meet projected load
18 growth demands available to the Applicants. (O'Connor, NR 1, 241-
19 242, NR1, 245-248, 251-253, NR4, 727-735; Hofacker, NR8, 1316-
20 1317, NR 10, 1630-1634, 1638, 1641-1642; Labrie, NR 13, 2080-
21 2087, 2089-2100, 2103-2104, NR 14, 2184-2189, 2192-2207, NR 25-26,
22 4492-4498, NR 45, 9092-9093; Knight, NR 14, 2286-2295; Nogle,
23 NR 15, 2463; Bredemeier, NR 16, 2607; Lisbakken, NR 17, 2871, 2877;
24 Goldhammer, NR 17, 2745-2746, 2748-2749, 2751-2752, 2821-2831;
25 Hanson, NR 29, 5113, 5116; App. Exs. 16, 17, 227, 228, 229, 230,
26 231, 267, 267A, 267B.)

27
28 SECTION 70-816 (1) (c)

29 ALTERNATIVE SOURCES OF ENERGY IN LIEU OF PROPOSED FACILITY

30 22. That prior to the time that the decision was made
31 by the Montana Power and Puget Power to build Colstrip Units 1 and

1 2, more than ten possible sites in the state of Montana were con-
2 sidered for the location of the generation plant by Montana
3 Power. Many siting studies were prepared and much research and
4 investigation accomplished by the company which considered econ-
5 omic, environmental and other factors involved, applicable to the
6 prospective locations. The eventual choice was Colstrip which
7 was considered to have the most advantages. Once this site was
8 selected and money spent to develop it, the Colstrip site also be-
9 came the logical place for the constuction of Units 3 and 4. This
10 decision was based upon the same reasons why Colstrip was selected
11 for Units 1 and 2 as well as the fact that the site had already
12 been developed for Units 1 and 2. (Labrie, NR 13, 2080-2084, 2094-
13 2095, NR 45, 9085, App. Exs. 14, 16, 16 267, 267A, 267B.)

14 23. That prior to the time that it was decided to make
15 application for Colstrip Units 3 and 4, Montana Power and the
16 other applicants made various studies, investigations and research
17 concerning the availability and desirability of alternative
18 sources of energy in lieu of the coal-fired steam generating
19 plants planned for Colstrip, Montana. Among the alternatives
20 considered were the following: the constuction and operation of
21 alternative generation sources such as hydroelectric, nuclear, oil
22 and gas, coal gasification or liquefaction, solar, geothermal,
23 magnetohydrodynamics and wind; not building additional generation;
24 building smaller units; and building the plant in another location.
25 Upon the basis of the foregoing research, it was decided that
26 coal-fired steam generating plants located at Colstrip such as
27 Units 3 and 4, were the lowest cost alternative and otherwise best
28 choice available to meet the Applicants' power needs in the future
29 and would result in the lowest cost to their customers. (See
30 citations for Finding No. 19.)

31

32

-17-

1 24. That it is more economical to generate power at
2 Colstrip, Montana, using coal-fired steam plants, as is contem-
3 plated with Colstrip Units 3 and 4, and transmit this power to
4 the service areas of the Applicants and the Pacific Northwest
5 over existing and proposed transmission lines rather than ship
6 coal by railroad from the Colstrip area to alternate power gen-
7 eration plants located in Montana or in the Pacific Northwest
8 and transmit this power over transmission lines to the Applicants'
9 service areas and to the Pacific Northwest. (Hofacker, NR 7,
10 1161-1208; Labrie, NR 13, 2081-2085, NR 26, 4494; Bredemeier, NR
11 16, 2714-2718; Pettibone, NR 19, 3058-3071; Woodley, NR 27, 4629-
12 4631, 4659-4689, NR 46, 9298; App. Exs. 12, 22, 214, 229, 232,
13 232A, 232B.)

14 25. That generally speaking a large power generating
15 plant, all other things being equal, costs less to build per unit
16 of capacity than a small plant and larger plants per unit of cap-
17 acity are less costly to operate than small ones. The foregoing
18 truism is known as "economies of scale." Prior to the decision
19 to build Colstrip Units 3 and 4, various alternatives of larger
20 plants vs. small plants were considered. (Labrie, NR 13, 2085-
21 2090, 2092-2094; Noble, NR 16, 2571-2573; App. Ex. 17.)
22

23 SECTION 70-816 (1) (d)

24 PROMOTIONAL ACTIVITIES

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

1 SECTION 70-816 (1) (e)

2 SOCIALLY BENEFICIAL USES

3 27. That the power to be produced from Colstrip Units
4 3 and 4 will be used, directly and indirectly, for socially ben-
5 efitial purposes, namely: to allow for the development and ex-
6 pansion of municipal waste water and sewage treatment facilities,
7 (Montstien, NR 25-26, 4571-4575; Hansen, NR 31, 5874-5879); to
8 allow for the development and expansion by the agricultural com-
9 munity of sprinkler irrigation, (Hansen, NR 31, 5876; Johnson, NR
10 27, 4725; Eddleman, NR 31, 5884-5885); to allow for the increased
11 development and expansion of those industries which heretofore
12 have adversely affected both the human and natural environment by
13 allowing said industries to install and operate air and water
14 quality control devices, which will require substantial amounts of
15 electrical energy, in order to comply with air and water qual-
16 ity standards and regulations, (Hearst, NR 27, 4692; Potts, NR 30,
17 5405-5406); to allow for the continued expansion of research in
18 the field of alternative energy sources, (Gregg, NR 47, 9394-9395)
19 and to allow for the maintenance and preservation of a progressive
20 rather than a regressive society, (Hamrell, NR 28, 1917; Christ-
21 man, NR 28, 4912; Martin, NR 28, 4920-4921; Gilligan, NR 28, 4924;
22 Robinson, NR 28, 4891; Halderman, NR 28, 4896; Howe, NR 28, 4900;
23 Charette, NR 31, 5759; Harris, NR 31, 5764; Pine, NR 33, 6179-6180;
24 Fontaine, NR 31, 5757; Pile, NR 31, 5901; Brown NR 48, 9684; Cox
25 NR 26, 4514; Gross, NR 27 4669).

26
27 SECTION 70-816 (1) (f)

28 CONSERVATION ACTIVITIES

29 28. That conservation activities can be effective
30 in decreasing electrical power demands for a period of time if such
31 conservation activities are engaged in by the public at large, the

1 business, industrial and agricultural communities and the producers
2 of electrical power. However, conservation activities, in and of
3 themselves, will not materially and significantly reduce the de-
4 mand for electrical power. (O'Connor, NR2, 279-281; Hofacker, NR
5 13, 1951; Knight, NR 14, 2288-2289; Nogle, NR 15, 2456-2457;
6 Bredemeier, NR 16, 2606; Lisbakken NR 17, 2870; Goldhammer, NR 17,
7 2747-2748, 2841-2842; Gregg, NR 47, 9405.)

8
9 SECTION 70-816 (1) (g)

10 RESEARCH ACTIVITIES

11 29. That all of the Applicants have in the past, and
12 are now, participating in research activities to develop more
13 efficient methods of energy generation and to develop methods of
14 minimizing the environmental impact of energy generation and trans-
15 mission facilities.

16
17 SECTION 70-816 (2)

18 LAND-USE IMPACTS

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

22
23 SECTION 70-816 (2) (a)

24 AREA OF LAND REQUIRED AND ULTIMATE USE

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

1 SECTION 70-816 (2) (b)

2 CONSISTENCY WITH LAND USE PLANS

3 32. That no area-wide state or regional land-use plan
4 or plans exist so as to compare the consistency of the facility
5 as proposed with such plan or plans. (Labrie, NR 13, 2109; Cumins,
6 NR 48, 9620.)
7

8 SECTION 70-816 (2) (c)

9 CONSISTENCY WITH NEARBY LAND-USE

10 33. That the facility as proposed, specifically the
11 site of the proposed Colstrip Units 3 and 4, is consistent with the
12 general land-use in and around Colstrip proper; however, an in-
13 consistency of land-use does exist in that the regional land-use
14 patterns are predominantly agriculturally oriented. (Labrie, NR 13,
15 2109-2110.)

16 34. That the inconsistency between the specific land-
17 use of the site of the proposed Colstrip Units 3 and 4 and the
18 regional agriculturally oriented land-use is compatible.
19

20 SECTION 70-816 (2) (d)

21 ALTERNATIVE USES OF THE SITE

22 35. That in view of the existence of Colstrip Units
23 1 and 2, which units are contiguous and adjacent to the site for
24 the proposed Colstrip Units 3 and 4, any alternative use of the
25 site would not be within the realm of achieving the highest and
26 best use of the land area involved. (Labrie, NR 13, 2109-2110.)
27

28 SECTION 70-816 (2) (e)

29 IMPACT ON POPULATION

30 36. That impact on the population already in the area
31 will be minimal in view of the fact that Colstrip Units 1 and 2
32

1 are a reality. The accumulative effect of the proposed Colstrip
2 Units 3 and 4, together with the existing Units 1 and 2, on the
3 population already in the area will not be significant.

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

7 38. That the impact of availability of energy from
8 the proposed facility on the growth patterns and population dis-
9 persal will be a benefit and not a detriment to the population in
10 the immediate locality, the state of Montana and the Pacific
11 Northwest in general.

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

1 SECTION 70-816 (2) (f)

2 GEOLOGIC SUITABILITY OF SITE AND ROUTE

3 40. That the geologic suitability of the site and route
4 for the facility as proposed was taken into account and considered
5 insofar as design characteristics are concerned. (Labrie, NR 13,
6 2113; Zobel, NR 24, 4199.)

7 41. That considering the geologic suitability of the
8 proposed corridor, from Colstrip to Hot Springs, with regard to
9 the potential seismic activity, together with the transmission
10 line design criteria indicates no problem from earth tremors will
11 be encountered: (Labrie, NR 13, 2113; Zobel, NR 24, 4214.)

12
13 SECTION 70-816 (2) (g)

14 SEISMOLOGIC CHARACTERISTICS

15 42. That the frequency and magnitude of seismic ac-
16 tivity in the Colstrip area is minimal. (Labrie, NR 13, 2113.)

17 43. That the design of the proposed facility, speci-
18 fically the site for the proposed Colstrip Units 3 and 4, has
19 considered the seismology of the area. (Labrie, NR 13, 2113.)

20 44. That the proposed corridor within which the trans-
21 mission facility will be located to transmit the power generated
22 by the proposed Colstrip Units 3 and 4 is located in geographic
23 areas, portions of which have been known to have a higher fre-
24 quency of occurrence and magnitude of seismic activity than the
25 Colstrip site itself.

26 45. That the geologic suitability of the proposed cor-
27 ridor insofar as seismic activity is concerned was taken into ac-
28 count in the selection of the site for the facility as proposed.
29 (Labrie, NR 13, 2113.)

1 SECTION 70-816 (2) (h)

2 CONSTRUCTION PRACTICES

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

9
10 SECTION 70-816 (2) (i)

11 EXTENT OF EROSION, SCOURING, WASTING OF LAND

12 47. That the construction and reclamation practices of
13 the Applicants safeguards and ensures that a minimum of erosion,
14 scouring and wasting of land, both at the site of the proposed
15 facility and as a result of the fossil fuel demands of the facil-
16 ity, will result. The Montana Reclamation Act will govern the
17 mined areas. (Labrie, NR 13, 2110-2111, 2114-2115; Hodder, NR 27,
18 4541; Wahlquist, NR 22, 3819.)

19
20 SECTION 70-816 (2) (j)

21 CORRIDOR DESIGN AND CONSTRUCTIONS PRECAUTIONS

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

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

1 50. That some construction precautions to be followed
2 during the installation of the transmission facilities have been
3 proposed by the Applicants (Zobal, NR24,4202, 4210-4211), but that
4 these guidelines need to be assembled and clearly stated in a
5 Construction Guidelines document for the State of Montana.

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

10 The power generated at Colstrip will be transmitted
11 over two parallel 500 KV transmission lines starting at Colstrip
12 and terminating at Hot Springs, Montana, with switching stations
13 located at Colstrip and at or near Broadview and Helena, Montana.
14 At Broadview will be installed 500 KV buses to tie the two lines
15 together. The line terminals will be equipped with three cycle
16 circuit breakers and high speed relaying to rapidly interrupt and
17 isolate faulty line sections together with series compensation and
18 line reactors of adequate size to satisfy the requirements for
19 power transfer capability and voltage regulation. Also planned is
20 the installation of transformation from 500 KV to 230 KV to allow
21 Montana Power Company to tie into its present 230 KV grid system
22 as well as the intertie south to Yellowtail Dam and other utilities
23 in Wyoming. Near Helena, there will be a switching station con-
24 sisting of circuit breakers, series capacitors, line reactors,
25 relays and communications. The two 500 KV lines will be tied
26 or bussed together at this station. The terminal at Hot Springs,
27 Montana, was selected because Bonneville Power Administration (BPA)
28 has a 500 KV station at that location. BPA will wheel the power
29 from Hot Springs west for three Applicant utilities: Washington
30 Water Power, Puget Sound Power & Light, and Portland General El-
31 ectric and Pacific Power and Light will receive its power at
32

1 Hot Springs for use in Northwestern Montana.

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

6 Construction will be long span construction which en-
7 pairs of
8 visions approximately four/structures per mile and thus visual ex-
9 posure is minimized. Also, the lines will be located to avoid as
10 much as possible population centers and residences. The structures
11 as planned are "see through" structures and thus appearance is
12 minimized. Alternatives of aluminum, wood and welded steel were
13 studied and rejected due to cost and environmental considerations.

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

21 The Mallard 795 conductor with four conductor bundle
22 configuration was selected over other alternatives. This conductor
23 meets strength requirements and results in lower noise levels be-
24 cause of its larger size. The load and corona losses expected
25 are 72.5 kilowatts (KW) per mile per line at a line loading of 750
26 megawatts (MW) and 103.6 KW per mile per line at a line loading of
27 900 MW. These line losses are well within acceptable limits.

28 Operating experience through 1973 of over 11,000 miles
29 of 500 KV transmission in the United States and 2600 miles of ex-
30 perience by BPA through 1975 demonstrate that extra high voltage
31 (EHV) lines can be designed and operated with minimum adverse ef-
32 fects 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 a 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 arc 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-of-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 an 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.

1 Ozone produced by corona on transmission lines cannot
2 be measured under field conditions due to the minute amounts pro-
3 duced, their rapid dispersal and ambient levels which vary widely.
4 No violation of the photochemical or ozone standard will occur
5 from the operation of the switching stations or transmission lines.

6 The location and design of each tower structure will
7 meet or exceed all requirements for strength and electrical con-
8 ductor clearance above ground in accordance with the National
9 Electric Safety Code, which has been adopted to insure protection
10 of the public health and safety. The Colstrip line clearances will,
11 in every instance, exceed the criteria of such codes. (Zobel,
12 NR 24, 4212-4216; Ender, NR 25, 4369-4375, 4378, 4422; Faith, BH
13 43, 6236-6238; Mueller, BH 36, 4826-4827; Wilkerson, NR 29, 3283.)

14
15 SECTION 70-816 (2) (k)

16 SCENIC IMPACTS

17 52. That minimal adverse scenic impact will occur
18 from the constuction of Colstrip Units 3 and 4.

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

26
27 SECTION 70-816 (2) (1)

28 EFFECTS ON NATURAL SYSTEMS, WILDLIFE, PLANT LIFE

29 54. That the effects of the facility as proposed on the
30 natural systems, wildlife and plant life will not be significant.
31 (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.)

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, NR 13, 2111; Schmechel, NR 22, 2875-2876; Wahlquist, NR 22, 3802, 3804; Zobel, NR 24, 4204.)

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.

SECTION 70-816 (2) (o)

PUBLIC RECREATION PLAN FOR THE PROJECT

57. That the Applicants have proposed an adequate at the Colstrip townsite, public recreation plan/ 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.)

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.)

1 SECTION 70-816 (2) (q)

2 OPPORTUNITIES FOR JOINT USE OF WASTE HEAT FROM FACILITY

3 59. That there is no opportunity for joint use of
4 the waste heat from the facility as proposed by other energy
5 intensive industries. (Labric, NR 13, 2111.)

6 SECTION 70-816 (3)

7 WATER RESOURCES IMPACTS

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

17 SECTION 70-816 (3) (a) and (b)

18 HYDROLOGIC STUDIES

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

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

26 SECTION 70-816 (3) (c)

27 COOLING TOWER EVALUATION

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

1 SECTION 70-816 (3) (d)

2 INVENTORY OF EFFLUENTS

3 64. That the effluents emanating from Colstrip 1-4
4 are not anticipated to impair the quality of the ground and surface
5 water of the area and will not violate applicable standards, how-
6 ever careful monitoring of seepage and complete sealing of sludge
7 ponds will ensure that water quality of the area is not degraded.
8 (BHES - Findings XXXV-XXXIX).

9 SECTION 70-816 (3) (e)

10 HYDROLOGIC STUDIES OF EFFECTS ON RECEIVING WATERS

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

17 SECTION 70-816 (3) (f)

18 RELATIONSHIP TO WATER QUALITY STANDARDS

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

22 SECTION 70-816 (3) (g)

23 EFFECTS ON WATER USED BY OTHERS

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

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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 effect on the plants, animals, wildlife, fish or vegetation in the areas directly and indirectly effected by such withdrawals. (Dunkle, BH 29, 3824-3826; Willems, BH 38, 5157; Botz, BH 39, 5229-5231; Martin, NR 45, 9055, Exhibit "A".)

SECTION 70-816 (3) (i)

EFFECTS ON UNIQUE ECOSYSTEMS; e.g., WETLANDS

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 45, 9055; App. Ex. 208, Exhibit "A".)

SECTION 70-816 (3) (j)

MONITORING PROGRAMS

70. That seepage from the surge ponds will be monitored by observation wells which will be constructed at appropriate sites around said ponds. (McMillan, 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, 6191-6194, Exhibit "A".)

SECTION 70-816 (4)

AIR QUALITY IMPACTS

72. 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

1 water quality are concerned, has, after hearing duly noticed and
2 held, issued twenty-one (21) pages of Findings of Fact regarding
3 air and water resources and impacts which Findings of Fact and
4 Conclusions of Law are fully and completely incorporated and
5 adopted herein. (Exhibit "A".)

6 SECTION 70-816 (4) (a)

7 METEROLOGY

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

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

20 SECTION 70-816 (4) (b)

21 TOPOGRAPHY

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

26 SECTION 70-816 (4) (c)

27 STANDARDS IN EFFECT AND PROJECTED

28 76. That the standards in effect and projected for
29 emissions for the proposed facility are the New Source Performance
30 Standards, Title 40, Chapter One, Part 60, Code of Federal Regu-
31 lations, Section 60.40, et. seq; Section 16-2.14 (1)-S 14082
32 Montana Administrative Code, and that no different standards are

1 projected to apply to the proposed Colstrip Units 3 and 4. In
2 adopting federal primary standards, the Clean Air Act of 1970
3 required that for each pollutant there exists a threshold level
4 or margin of safety below which harmful human health effects
5 do not occur. The current 24-hour federal primary ambient standard
6 for sulfur dioxide is 365 micrograms per cubic meter (ug/m^3)
7 (1.14 ppm), while the Montana standard is 265 ug/m^3 or 0.10 ppm.
8 The available epidemiologic data establishes a threshold between
9 300 ug/m^3 and 500 ug/m^3 and thus the federal and Montana standards
10 protect public health. The federal annual standard is 80 ug/m^3
11 (0.03 ppm) for sulfur dioxide and Montana is more stringent, being
12 0.02 ppm or 52 ug/m^3 . No significant increase in morbidity
13 results from long term exposure to SO_2 concentrations below the
14 federal standard and with the Montana standard a greater margin
15 of safety is included. The federal primary standard maximum
16 24-hour level for particulate matter is 260 ug/m^3 while Montana
17 is 200 ug/m^3 not to be exceeded for more than one per cent of
18 the days a year. Epidemiologic data supports a threshold between
19 300 and 375 ug/m^3 . Thus the federal and Montana standards are well
20 below such level and are adequate to protect public health.
21 The federal and Montana annual primary ambient air quality for
22 particulate matter is 75 ug/m^3 . The data which supports the
23 threshold level suggests a safety factor of at least 33%. While
24 there is no sulfate federal standard, the Montana sulfate standards
25 are set to protect public health. Further as to sulfates, there
26 is no scientific basis at present for assigning any public health
27 risk to sulfate levels presently measured in western United States.
28 Further, the adoption of new source performance standard which
29 govern Colstrip #3 and #4 set by the Environmental Protection
30 Agency is set to insure that the ambient air quality standards are
31 not violated. The federal secondary 3 hour standard of 1300

32

1 ug/m³ not to be exceeded more than one per year is sufficient
2 to protect public welfare which includes effects on soils, water,
3 crops, vegetation, man-made materials, animals, wildlife, weather,
4 visibility and climate, damage to and deterioration of property,
5 and hazards to transportation, as well as effects on economic
6 values and on personal comfort and well being. The federal
7 secondary standard for particulates is 60 ug/m³, annual arithmetic
8 mean and 150 ug/m³, maximum 24-hour concentration not to be
9 exceeded more than once per year. In addition, the Montana long
10 term and short term standards apply to public welfare. The
11 Montana fluoride standards cited in these findings are also
12 applicable to public welfare. All standards which are in effect
13 are sufficient to protect public welfare. (Brandt, NR 46, 9174-
14 9176; Colucci, BH 44, 6291-6293; App. Ex. 275.)

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

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

23 79. That the best available control technology is
24 synonymous with the highest state of the art and is that tech-
25 nology specifically designed to the specific site constraints
26 which include the nature of the coal being burned, the meteorolo-
27 gy of the area, the evaporative potential, the available ash
28 disposal site and the available water, together with economic
29 considerations. (Grimm, BH 45, 8986-8987.)

1 SECTION 70-816 (4) (d)

2 EMISSIONS AND CONTROLS, (i) - (v)

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

10 SECTION 70-816 (4) (e)

11 RELATIONSHIP TO PRESENT AND PROJECTED AIR QUALITY

12 81. That the Board of Health and Environmental Sciences
13 considered the relationship of expected maximum ground level
14 concentrations of the pollutants therein specified and found in
15 its Finding of Fact No. XXIV, incorporated herein by this reference,
16 that the same were within the standards in effect and projected
17 for Colstrip 3 & 4, which said standards are set forth in Finding
18 76 herein.

19 82. That while there will be no emissions of sulfuric
20 acid as such emitted directly from the proposed facilities,
21 sulfuric acid can subsequently occur under certain conditions
22 by the conversion of sulphur dioxide to sulfuric acid by
23 oxidation and hydrolysis. That because of the arid climate and
24 basic soils of the Colstrip area of southeastern Montana, the
25 occurrence of and effects of sulfuric acid mists, if any, will
26 be minimal. (Berube, BH 8, 1021, BH 9, 1248-1249; Abrams, BH 46,
27 6600, 6603; Faith, BH 5, 580, 584; Northern Cheyenne Exhibit 2.)

28 83. That the plumes from the proposed Colstrip plants
29 will not increase the ozone or photo chemical oxidant ground
30 level concentrations or background levels. (Colucci, BH 44,
31 6259.)

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

5 85. That while no acid percipitation or other toxic
6 substances are expected to be created or developed from the oper-
7 ation of the proposed facility, and no significant change in the
8 pH of the precipitation in the Colstrip area will occur (Edmonds,
9 BH 21,3514), stringent monitoring of air pollutants will warn
10 of exceptions to these expectations, and careful sludge disposal
11 will alleviate possible water contamination problems.

12 SECTION 70-816 (4) (f)

13 MONITORING PROGRAM

14 86. That the Applicants have selected eleven (11)
15 primary and secondary sites to monitor ground level concentra-
16 tions in and around the proposed facility. (Grimm, BH 12,
17 1739-1740; App. Ex. 112.)

18 87. That the operation of the air quality system in
19 Colstrip Unit 1 will be closely monitored by the Department of
20 Health and Environmental Sciences and the Applicants and the
21 data gathered therefrom will be interpreted by the Department
22 of Health and Environmental Sciences as to the effectiveness
23 of the air quality control systems installed thereon. (Exhibit "A")

24 SECTION 70-816 (5)

25 SOLID WASTES IMPACT

26 88. That waste materials from scrubber units and
27 boilers will be conveyed to sealed ash disposal ponds and eventu-
28 ally dried and the disposal ponds reclaimed. (Labrie, BH 20,
29 2065-2628, BH 21, 2731-2733; Grimm, BH 12, 1701-1702; Berube, BH
30 22, 2831-2838, 2860-2861, BH 45, 6474-6475, 6527-6530; App. Exs.
31 50A, 51.)

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1 SECTION 70-816 (5) (a)

2 SOLID WASTE INVENTORY

3 89. That all effluents from seepage from the waste
4 disposal ponds have been analyzed (Northern Plains Resource
5 Council Exhibit 3A; Grimm, BH44, 6370-6376), and to insure
6 no adverse effects on the area the waste disposal ponds will be
7 sealed and monitoring wells installed.

8 SECTION 70-816 (5) (b)

9 DISPOSAL PROGRAM

10 90. That the ash and sludge disposal program pro-
11 jects temporary retention ponds located in a 40-acre area just
12 south of the plants and then the wastes are slurred to permanent
13 disposal ponds. The first two permanent disposal areas developed
14 (112 and 147 acres each) will be located 10,000 feet northwest of
15 the plants in Section 20, 21, 28 and 29, T2N, R41E. A third
16 pond is proposed in Sections 5,6,7 and 8, T1N, R42W. When these
17 ponds are filled, they will be dried up, covered with soil and
18 reclaimed. (Labrie, BH 20, 2625-2628, BH 21, 2731-2733;
19 Grimm, BH 12, 1701-1702; Berube, BH 22, 2831-2838, 2860-2861,
20 BH 45, 6474-6475, 6527-6530; App. Exs. 50A, 51.)

21 SECTION 70-816 (5) (c)

22 RELATIONSHIP OF DISPOSAL PRACTICES
23 TO ENVIRONMENTAL QUALITY CRITERIA

24 91. That the disposal ponds will not impair the
25 quality of the ground or surface water of the area or violate
26 any applicable standards. (Berube, BH 22, 2831-2839; McMillan,
27 BH 43, 6178-6234; Botz, BH 39, 5223-5227; Willems, BH 38, 5157-
28 5158.)

29 SECTION 70-816 (5) (d)

30 CAPACITY OF DISPOSAL SITES TO
31 ACCEPT PROJECTED WASTE LOADINGS

32 92. That all three permanent ponds will service the
37 year life of the plant. (Labrie, BH 20, 2625-2628, BH 21,
2731-2733.)

1 SECTION 70-816 (6) (a) - (d).

2 RADIATION IMPACTS

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

10 SECTION 70-816 (7) (a)

11 NOISE IMPACTS - CONSTRUCTION PERIOD LEVELS

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

19 SECTION 70-816 (7) (b)

20 OPERATIONAL LEVELS

21 95. That after the units are operating, additional
22 noise reducing features will be added as required to meet all
23 standards. (Labrie, NR 13, 2111-2113.)

24 SECTION 70-816 (7) (c)

25 RELATIONSHIP OF PRESENT AND PROJECTED NOISE LEVELS
26 TO EXISTING AND POTENTIAL STRICTER NOISE STANDARDS

27 96. That all present standards will be complied with
28 and no potential stricter noise levels are known. (Labrie, NR
29 13, 2111-2113.)

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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.)

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1 specified by the State Board of Health and Environmental Sciences,
2 and that every feasible engineering means be taken by the
3 Applicants to minimize such seepage.

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

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

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

21 g. That the Applicants, at their expenses, shall in
22 cooperation with both the Montana Department of Health and Environ-
23 mental Sciences and the Tribal Council of the Northern Cheyenne
24 Tribe, construct, maintain and operate an air quality monitoring
25 station on the Northern Cheyenne Reservation as part of the total
26 air quality monitoring program, and further that the Applicants
27 shall compile, collect and furnish all of the results of said
28 monitoring station on a periodic basis to the Department of
29 Health and Environmental Sciences and to the Tribal Council of
30 the Northern Cheyenne Tribe.

31 h. That all monitoring programs heretofore instituted
32 in regard to Colstrip Units 1 and 2, and in the Application pro-

1 posed, be implemented and instituted so as to provide a continual
2 flow of factual data insofar as air, surface and ground water are
3 concerned.

4 i. That the Applicants enter into a written agree-
5 ment with the Board of Health and Environmental Sciences for the
6 payment of the monitoring facilities and operation thereof
7 required by said Board in their certification heretofore issued,
8 and for any further monitoring required in the conditions set
9 forth herein by the State Board of Natural Resources and Con-
10 servation.

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

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

27 l. That relative to the transmission facilities:

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

31 2. The Applicants shall develop a set of
32 construction Guidelines which must be approved by this Board, and

1 they must do so and receive approval before transmission line
2 construction commences. This recognizes that the Colstrip-
3 Broadview segment is covered by previous Conclusions from this
4 Board, relative to the 230 KV line. However, whatever must be
5 done to upgrade that segment to 500 KV must comply with the
6 Construction Guidelines. These Construction Guidelines must
7 not only stipulate construction practices which will minimize
8 environmental damage, but must also cover the reclamation of
9 unavoidably or accidentally damaged land or water resources. As
10 part of the contracts or sub-contracts relative to transmission
11 line construction, the Applicants shall stipulate compliance with
12 the Construction Guidelines, and a performance bond shall be
13 required covering not only construction aspects but also
14 reclamation aspects. Details of the Bonding shall be set forth
15 in the Construction Guidelines.

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

24 4. The final location of the center line of the
25 right-of-way of the Transmission line is subject to the future
26 approval of this Board. Specific means and procedures shall be
27 worked out with this Board for the approval process. The
28 selection of the final center-line location shall as far as
29 possible avoid skylining, will skirt bases of hills, will avoid
30 closely paralleling main highways, will avoid crossing irrigation
31 or potential irrigation lands except on property boundaries, will
32 cross roads and streams directly rather than obliquely, and will

1 otherwise minimize the impact of those lines.

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

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

16 m. That the conditions set forth in pp 22 and 23
17 in the Findings of Fact of the State Board of Health and Environ-
18 mental Sciences of the State of Montana are hereby fully and
19 completely incorporated as conditions herein.

20 n. That the Applicants make every effort, and report
21 periodically to the State Board of Health and Environmental
22 Sciences on those efforts, to continually increase the efficiency
23 of the air pollution control system, by adopting or adapting
24 new technology.

25 Dated this 22nd day of July, 1976.

26
27 MONTANA BOARD OF NATURAL
28 RESOURCES AND CONSERVATION

29 By /s/ JOSEPH W. SABOL
30 CHAIRMAN

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1 and has certified that the said facilities will not violate
2 state and federal standards and implementation plans, subject to
3 the conditions contained in attached Exhibit "A". The Findings
4 of Fact and Conclusions of Law contained in Exhibit "A" are con-
5 clusive on all questions related to the satisfaction of state and
6 federal air and water quality standards.

7
8 DECISION

9 Pursuant to the requirements of the Act, based on the
10 entire record of the hearings before this Board and the Board of
11 Health and Environmental Sciences, the Findings of Fact and Con-
12 clusions of Law and the Opinion hereinabove set forth, the Board
13 makes and issues its Decision, to-wit; it is hereby declared that
14 the Decision of the Board of Natural Resources and Conservation
15 is to grant the Certificate of Environmental Compatability and
16 Public Need to the Applicants for the proposed Colstrip Units 3
17 and 4 and associated facilities, pursuant to their Application,
18 subject, however, to the conditions set forth in its Conclusions
19 of Law.

20 This decision was reached by four of the seven members
21 of the Board in a regularly scheduled meeting. The three members
22 of the Board who did not vote for certification may file dissenting
23 opinions as a part of the record in these proceedings.

24
25 ORDER

26 NOW, THEREFORE, it is herby ordered by the Board of
27 Natural Resources and Conservation that a Certificate of Environ-
28 mental Compatibility and Public Need shall be issued to the Ap-
29 plicants for the proposed Colstip Units 3 and 4 and associated
30 facilities forthwith subject to the conditions set forth in the
31 Board's Conclusions of Law.

1 All of the proposed findings submitted by the parties
2 to these proceedings that are consistent with the Board's findings
3 of fact herein shall be deemed adopted by the Board and all other
4 proposed findings are hereby rejected.

5 IT IS FURTHER ORDERED that a copy of these findings
6 of fact, conclusions of law, opinion, decision and order be
7 filed with the Montana Department of Natural Resources and
8 Conservation, and made available for public inspection and
9 copying;

10 AND IT IS FURTHER ORDERED that the time for appeal
11 from the Board's decision shall commence running on the date of
12 the adoption and execution of the within and foregoing.

13 DATED this 22nd day of July, 1976.

14 MONTANA BOARD OF NATURAL
15 RESOURCES AND CONSERVATION

16 By /s/ JOSEPH W. SABOL
17 CHAIRMAN

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1 plants may be located considering the requirements of the Act, and
2 that such energy facility siting study be completed within two (2)
3 years of this date.

4 7. That the Western Energy Company make application to
5 the Department of State Lands of the state of Montana to mine and
6 remove the McKay seam of coal simultaneously with the mining and
7 removal of the Rosebud coal seam and cease covering said McKay
8 seam of coal with overburden without any attempt to extract the
9 same.

10 8. That the utility companies doing business in this
11 state implement and carry out or participate significantly in a
12 research program to determine the effects of high voltage trans-
13 mission lines on the human and natural environment.

14 9. That the utility companies doing business in this
15 state and the appropriate state agencies give consideration to
16 revising the amount and method of payment for utility right-of-
17 ways and specifically consider an on-going annual payment in lieu
18 of the present method of a single cash payment, and that the ap-
19 propriate state agencies propose legislation to the Legislature to
20 that effect.

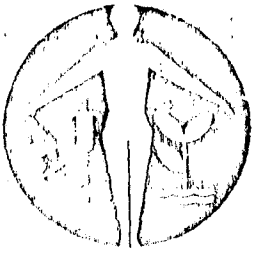
21 10. That we recommend to the Montana Department of
22 Revenue that it deny "new industry" tax classification for the
23 Colstrip Units 3 and 4.

24
25 DATED this 22nd day of July, 1976.

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27 MONTANA BOARD OF NATURAL
28 RESOURCES AND CONSERVATION

29
30 By /s/ JOSEPH W. SABOL
31 CHAIRMAN

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-51-



Department of Health and Environmental Science
STATE OF MONTANA HELENA, MONTANA 59601

John S. Anderson M.D.
DIRECTOR

January 23, 1976

RECEIVED

JAN 28 1976

MONT. DEPT. OF NATURAL
RESOURCES & CONSERVATION

Mr. Joe Sabol, Chairman
Board of Natural Resources &
Conservation
32 South Ewing
Helena, Montana 59601

Dear Mr. Sabol:

Enclosed is a copy of the Board of Health and Environmental Science's conditional certification of Colstrip units 3 and 4. This certification is made pursuant to Section 70-810 (L), R.M.C. 1947, of the Major Facility Siting Act which requires the duly authorized air and water quality agencies to certify that a proposed facility will not violate state and federal standards and implementation plans. Please consider this letter and the enclosed transcript, Findings of Fact and Conclusions of Law as the official notice of certification to the Board of Natural Resources and Conservation.

Best Regards.

Sincerely,

John Bartlett, Chairman
Board of Health & Environmental
Sciences

JB/SB/slo

Enclosure

cc: Carl Davis	Steve Brown
Jack Peterson	Jim Goetz
Bill Bellingham	Benjamin W. Hilley
Leo Graybull	George Pring
Arden Shenker	Mike Meloy
Don McIntyre	

EXHIBIT "A"

EXHIBIT "A"

BEFORE THE BOARD OF NATURAL RESOURCES AND CONSERVATION
AND BOARD OF HEALTH AND ENVIRONMENTAL SCIENCES

In the Matter of the Application of The Montana
Power Company, Puget Sound Power and Light Company,
Portland General Electric Company, Washington Water
Power Company, and Pacific Power and Light Company,
for a Certificate of Environmental Compatibility
and Public Need relative to Colstrip #3 and #4.

FINDINGS OF FACT AND
CONCLUSIONS OF LAW

The above-entitled matter came on regularly for
hearing on June 5, 1975, before the Hearings Examiner,
Carl M. Davis, duly appointed by and acting on behalf
of the Board of Health and Environmental Sciences
of the State of Montana, on the matter of the certifica-
tion that the proposed facility will not violate State
and Federally established standards and implementation
plans, as provided in §70-810(h), R.C.M. 1947. The
applicants and the opponents to the application appeared
by and through their counsel of record, and public
witnesses appeared in person; witnesses were sworn
and evidence come up, both oral and documentary was
introduced, and thereafter the Board of Health and
Environmental Sciences heard arguments of counsel on
November 7 and 8, 1975; and having fully considered
the evidence and arguments of counsel, makes the following
Findings of Facts and Conclusions of Law:

FINDINGS OF FACT

I.

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

A. Emissions:

1 New Source Performance Standards (Title 40,
2 Chapter 1, Part 60, Code of Federal Regulations, Section
3 60.40, et seq.):

4 Particulate Matter:

- 5 (1) No discharge to exceed 0.18 g per million cal
heat input being 0.10 lb. per million BTU; and,
6 (2) Exhibit greater than 20% opacity except that a
maximum of 40% opacity shall be permissible for
7 not more than two (2) minutes in any hour. Where
the pressure of uncombined water is the only reason
8 for failure to meet the requirements of this
paragraph, such failure will not be a violation
9 of this section.

10 Sulfur Dioxide:

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

12 Nitrogen Oxides:

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

15 B. Ambient Air Quality Standards: (Montana)

16 Sulfur Dioxide: 0.02 ppm (52 ug/m3) Annual
0.10 ppm (262 ug/m3) 24 hr.
17 (Not to be exceeded for more than
one per cent (1%) of the time)
18
0.25 ppm (654 ug/m3) 1 hr.
19 (not to be exceeded for more than one
hour in any four consecutive days at
20 same receptor point)

21 Total Suspended Particulates:

22 75 ug/m3 Annual
200 ug/m3 24 hour

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

25 Suspended Sulfate:

26 4 ug/m3 Annual

27 12 ug/m3 --

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

30 Sulfuric Acid Mist:

31 4 ug/m3 Annual

32 12 ug/m3 --

1		(Not to be exceeded over one per cent		
2		of the time)		
3		30 ug/m3		1 hour
4		(Not to be exceeded over one per		
5		cent of the time)		
6	Lead:	5.0 ug/m3		30 day
7	Beryllium	0.01 ug/m3		Average
8	Fluorides, Total in Air as HF - 1 ppb			30 day
				Average
9	<u>National:</u>	(ug/m3)		24 hour
				Average
10	Sulfur Dioxide	Annual	<u>Primary</u>	<u>Secondary</u>
11		24 hour	80	--
12		(Not to be exceeded more	365	
13		than once a year)		
14		3 hour	--	1300
15	Particulates:	Annual	75	60
16		24 hour	260	150
17		(Not to be exceeded more		
18		than once a year)		
19	Photochemical Oxidants (Ozone):	160 (.08 ppm)	--	
20		(Not to be exceeded more		
21		than once per year)		
22	Nitrogen Oxides:	Annual	--	100
23	C. For Class II significant deterioration standards			
24	allowable increase applicable to Units 3			
25	and 4 only: (ug/m3)			
26	Sulphur Dioxide	Annual		15
27		24 hour		100
28		3 hour maximum		700
29	Particulates:	Annual		10
30		24 hour maximum		30

31 (A-20)

32 II.

33 The water quality standards applicable to

34 Colstrip Units #3 and #4 are Section 69-4801 through

35 Section 69-4827, Revised Codes of Montana, 1947 (Water



1 Pollution), and Section 69-4901 through Section 69-
2 4908, Revised Codes of Montana, 1947 (Public Water
3 Supply). The applicable water quality regulations
4 of the State of Montana pertaining to this portion of
5 the hearing are found in Section 16-2.14(10)-S14480, entitled
6 "Water Quality Standards", pp. 16-375.2 through 16-393.8,
7 Vol. 2, Title 16, Health and Environmental Sciences of
8 the Montana Administrative Code. The foregoing water
9 quality standards found in the Montana Administrative
10 Code pertain only to surface water; ground water standards
11 have not yet been adopted by the Board of Health and Envir-
12 onmental Sciences. There are no federal water quality
13 statutes, rules, regulations, standards or laws which
14 are applicable to this hearing. (A-43)

15 III.

16 Under the foregoing Montana Administrative Code, the
17 Yellowstone River drainage from the Billings water supply
18 intake to the North Dakota state line, with the exception
19 of various tributaries listed in the code, has a water
20 use classification of B-D3 (Department of Health's Exhibit
21 27; Section 16-2.14(10)-S14480(4), p. 16-387, Vol. 2,
22 Title 16 of the Montana Administrative Code. (A44)

23 IV.

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

31 V.

32 The components that make up each individual module

1 include: dampers, so the modules can be isolated for
2 maintenance, (Grimm, 12-1718), the Venturi plumb bob
3 section, (Grimm, 12-1719), the absorption vessel with
4 counter current absorption sprays and agitated integral
5 recycle tank, (Grimm, 12-1721, 1722, 14-1936), (Appli-c
6 cants' Exhibit 109); the Koch or wash tray to remove
7 entrained scrubber sludge from the flue gas, (Grimm,
8 12-1723, 1726), Applicants' Exhibit 110); demisters
9 that separate entrained moisture from the flue gas,
10 (Grimm, 12-1727, 1729), Applicants' Exhibit 111), a
11 stainless steel fleximesh, (Abrams 15-2138); flue gas
12 reheater to reheat the scrubbed gases to 175° Fahrenheit,
13 (Grimm, 12-1729, 1730), equipped with a soot blower
14 to remove fly ash deposits, (Grimm, 14-1950), and the
15 dry induced draft fan which pulls the flue gas through
16 the scrubber system by a suction or vacuum process.
17 (Grimm, 12-1730). For operation purposes, access ports
18 for observation into the scrubber will be provided to
19 allow the operator to observe any build-up of solid
20 deposits, (Grimm, 14-1935). (A2)

21 VI.

22 The Venturi scrubber system captures the fly ash
23 present in the flue gas, (Grimm, 12-1745). The fly
24 ash results from the burning of the coal, (Grimm, 12-
25 1720), and contains alkali material of calcium and magne-
26 sium which absorbs the sulfur dioxide, (Grimm, 12-1720,
27 1745). The fly ash is recovered in the Venturi section
28 and drops to the recycle tank, which holds 12% per centum
29 quantity of suspended solids so as to eliminate scaling
30 of the system, (Grimm, 12-1746). The resulting water/
31

1 fly ash alkaline slurry is recycled through the Venturi
2 and the counter current absorption spray section to
3 effect sulfur dioxide removal. (Grimm, 12-1717, 1720).
4 (A3)

5 VII.

6 The flue gas enters the Venturi at the preheaters
7 outlet, (Grimm, 12-1717). The pressure drop in the
8 throat of the Venturi is governed by the plumb bob and
9 it restricts the flue gas stream so that the velocity
10 of the flue gas, when increased, mixes with the liquor
11 (water or recycled slurry) which is thus atomized.
12 The atomized liquor drops contact the particulate in
13 the flue gas and enlarges the fine particulate because
14 of the deposition of the atomized particles of liquor.
15 Thus the higher the velocity of the gas through the
16 throat of the Venturi, the higher atomization and more
17 removal of fine particulate takes place. (Abrams, 15-
18 2026). The flue gas passes into the absorber sections
19 where the wash tray and demister remove entrained scrubber
20 sludge and water droplets. (Grimm, 12-1726, 1727, 13-
21 1828). Then, upon leaving the absorber section, it
22 passes through the reheater section which heats the
23 gases above their dew point to a temperature of 175°
24 Fahrenheit, (Grimm, 12-1730). This reheating protects
25 the induced draft fan from contact with a wet gas,
26 thus keeping it dry and the heated gas gives the plume
27 more buoyancy (Grimm, 12-1730, 13-1842; Raben, 23-3013).
28 Waste scrubber sludge is continually bled from the system
29 at a rate proportionate to the boiler load and removed
30 fly ash. (A4)

VIII.

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)

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

1 untreated to the stack, (Grimm, 14-1933, 1947). (A-
2 6)

3 X.

4 Scaling in the scrubber is deterred by: (1) proper
5 control of ph through injection of lime as additional
6 alkali substance to absorb sulfur dioxide and (2) recycle
7 of the liquor which provides seed crystals of calcium
8 sulphate with the fly ash as precipitation sites for
9 calcium sulphate so as to prevent the super-saturation
10 of calcium sulphate in the recycled liquor, (Grimm,
11 14-1836, 1912; Raben, 23-2996, 2999). The recycle tank
12 of the system is a holding tank which catches the slurry
13 from the downcomer. It holds the volume of slurry for
14 eight minutes, which is equivalent to providing contact
15 with the liquor of each individual particle of fly ash
16 for ten hours, (Abrams, 14-2001). Thus the slurry is
17 desupersaturated, i.e., the solids of calcium sulfate
18 resulting from absorption of SO_2 will deposit on the
19 nucleus of the calcium sulfate and fly ash existing
20 in the slurry. The effluent or waste, which is insoluble,
21 is placed in a separate holding tank for ten minutes
22 to complete the reaction and then is pumped to a retention
23 pond where the solids settle. The remaining clear liquor
24 from the pond is returned to the system. The percentage
25 of suspended solids in the slurry liquor at 12%, will
26 help avoid scaling of the unit, (Abrams, 15-2073, 2075).
27 (A-7)

28 XI.

29 The operation of the scrubber will be controlled
30 by operators in a control room where instruments record
31

1 the inlet and outlet concentrations of SO² and also
2 record the ph of the scrubber system. In the event
3 the outlet concentration increases (above 260 ppm with
4 an inlet concentration of 965 ppm) while the ph drops
5 (below 5.6), the operator can add additional time to
6 bring the ph to proper level and thus reduce the SO²
7 outlet concentration, (Grimm, 13-1875). (A-8)

8 XII.

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

14 XIII.

15 The flue gas desulphurization system to be installed
16 at Colstrip Units #3 and #4 and which are presently
17 under construction at Units #1 and #2 may prove to be
18 reliable systems to remove pollutants from the flue
19 gas because Venturi scrubbers have been in operation
20 at other power generating plants and are not a new equip-
21 ment system (Abrams, 14-1990). The Colstrip modules
22 have improved the design and operating efficiencies
23 over previous modules. (Labrie, 21-2770; Abrams, 14-
24 1944, 1990; Raben, 23-3062). The alkali nature of the
25 fly ash of Rosebud coal contributes to that improvement,
26 (Abrams, 14-2000). In addition, the pilot plant study
27 conducted at Corette generating station, Billings, Montana,
28 confirmed the chemistry of the system, (Abrams, 15-2014;
29 Raben, 33-2931). (Applicants' exhibits, 73 and 74).
30 The particulate removal based upon pilot plant studies
31

1 is projected within the range of 99.465% to 99.76% and
2 will be enhanced by the utilization of the wash tray
3 and stainless steel pleximesh in the scrubber units.
4 (Abrams, 15-2042, 2045, 15-2034, 2035). Utilization
5 of the wash tray reduced the solid buildup in the demister
6 and improved the particulate removal, as well as SO²
7 removal. (Abrams, 15-2124, 2125).

8 XIV.

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

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

19 Units 1 or 2: 2071 pounds per hour or 260 grans per second.

20 (Applicants' Ex. 64 and 65; Grim 13-1794, 1795,
21 1801;

22 Applicants' Ex. 61 and 62; Berube 8-1117, 1120,
23 1121, 1124)

24 Emissions for particulate matter for Units 1 or
25 2 is 184 pounds per hour, or 46 grams per second combined,
26 and for Units 3 or 4 is 408 pounds per hour each, or
27 103 grams per second combined. (Berube 9-1130, 1134).

28 The pilot plant tests also substantiate that fluoride
29 emissions from the use of Rosebud coal, which contains
30 27 PPM, will emit 1.8 pounds per hour, or .227 grams
31 per second, for Units 3 or 4, and .1 gram per second

1 from Units 1 or 2. (Grimm, 12-1788, 13-1789, 1790. Appli-
2 cants' Ex. 74, p. 15.2.1). Beryllium in the coal will
3 be emitted at the rate of .0021 grams per second at
4 100% load for Units 3 or 4 (DNR Ex. 123), which is equiv-
5 alent to .0061 grams per second for all four units.
6 (Faith, 43-6240). Lead emissions in the Rosebud coal
7 for Units 3 or 4 will be .0423 grams per second (DNR
8 Ex. 123), which is equivalent to 1.22 grams per second
9 for all 4 units. (Faith 43-6241). For oxides of nitrogen
10 calculated as NO_2 , the emission rate for Units 1 and
11 2 combined at .7 pounds per million BTU is 4.740 pounds
12 per hour, or 598 grams per second; for Units 3 and 4
13 combined at .7 pounds per million BTU is 10602 pounds
14 per hour, or 1336 grams per second, and thus for all
15 four units emissions at .7 pounds per million BTU is
16 15,342 pounds per hour, or 1934 grams per second. (Faith,
17 26-346, 3463). The scrubber will reduce 15 to 20 per
18 cent of the oxides of nitrogen emissions. (Abrams,
19 16-2272). (A-11)

20 XV.

21 The fuel to be used in Units #3 and #4 will be
22 Rosebud seam coal from the Colstrip area. (Berube 7-
23 902). It will be mined from areas designated C, D and
24 E, shown on Exhibits 52, 53, 140 and 141. (Berube 8-
25 1027-1029; Rice 28-3635-3636, 3640-3641).

26 XVI.

27 The results of analyses of all the core hole samples,
28 made by commercial testing laboratories, and which provide
29 information necessary to properly specify equipment
30 for Units #3 and #4 are included in Applicants' Ex.
31 53A and 53B, (Berube 7-908, 912, 913). The composition
32

1 of the coal was considered to estimate the quantities
2 of ash and sulfur dioxide that would enter the boiler,
3 leave the boiler, and enter any pollution control equipment.
4 (Berube, 8-1041, 1042).

5 XVII.

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

19 XVIII.

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

23 XIX.

24 The estimated capital cost of the system is \$151,614,000.00,
25 which is equivalent to \$108.30 per kilowatt (Applicants'
26 Ex. 108A), and this represents the least expensive and
27 most economical system for Units #3 and #4. (Leffman
28 20-2410). The operation costs of Units 3 and 4 are
29 also the most economical of all other systems and will
30 operate at an estimated cost of \$1,030,000.00 per year.
31 (Applicants' Ex. 108B).

1 XX.

2 A dispersion model is used to predict maximum ground
3 level concentrations. A dispersion model is a mathematical
4 equation which indicates the change in concentrations
5 of various pollutants in different positions downwind.
6 Tall stacks affect the ground level concentrations of
7 pollutants which come from the plant. In most models,
8 the basic characteristics include: (1) the stack and
9 emission parameters; (2) the plume rise equations; (3)
10 the dispersion (spread of the plume) equations; and
11 (4) the diffusion equation which calculate the ground
12 level concentrations. (Gelhaus 38-5068). Meterology
13 in the Colstrip area must be considered to determine
14 whether the peak or maximum concentrations as computed
15 by any model will in fact occur since air pollution
16 is very closely related to the atmosphere and the changes
17 of the atmosphere. (Crow, 25-3318, 3320, 3333, 3334,
18 43-6149).

19 XXI.

20 For predicting maximum ground level concentrations
21 for Units #3 and #4, one model used Briggs plume rise
22 equation (Applicants' Ex. 66), Hillsmeyer-Gifford plume
23 spread classified by the Pasquill method and the Gaussian
24 dispersion equations. Maximum concentrations were deter-
25 mined by multiplying the highest relative concentrations
26 by projected emission rates. (Applicants' Ex. 67 and
27 121).

28 Inversion heights published by Holzworth apply.

29 XXII.

30 Meterological data for the Colstrip area was gathered
31 by the Earth Science Department of Montana State University
32

1 over a two-year period under a research grant funded
2 by Montana Power Company and in conjunction with the
3 Department of Health and Environmental Sciences. (Heimbach
4 24-3062; Applicants' Ex. 76, Part I and Part II; Ex.
5 76-B). Another dispersion model was developed by the
6 Montana State University personnel who conducted the
7 meteorological study. (Heimbach 24-3090, 3092) (Applicants'
8 Ex. 76 D, E, F and G).

9 XXIII.

10 In applying the MSU model, predictions for
11 downwind distances of less than, or equal to, 2.3 kilometers
12 applicants divided by a factor of two. (Heimbach 24-
13 3093, 45-6452, 6470) (Applicants' Ex. 183, p. 166).
14 All calculations using the MSU model were made assuming
15 an inversion at the top of the plume height for one
16 hour concentrations, this being a worst case condition
17 for an emission situation.

18 XXIV.

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

23 (1) Sulfur Dioxide.

24 (a) For Pasquill Methodology:

25 Maximum one hour ground-level concentrations
26 for all four Units are 405 micrograms per cubic meter.
27 The maximum three hour ground-level concentrations for
28 Units 3 and 4 are 120 micrograms per cubic meter and
29 for all four Units are 194 micrograms per cubic meter.
30 The maximum annual ground-level concentration for Units
31 3 and 4 are 0.9 micrograms per cubic meter and for all
32

1 four units are 1.4 micrograms per cubic meter.

2 (b) MSU Methodology:

3 Maximum one-hour ground-level concentrations
4 for all four Units are 256 micrograms per cubic meter.
5 Maximum three-hour ground-level concentrations for Units
6 3 and 4 are 100 micrograms per cubic meter, and for
7 all four Units are 156 micrograms per cubic meter.
8 Maximum 24-hour ground-level concentrations for Units
9 3 and 4 are 40 micrograms per cubic meter and for all
10 four Units are 63 micrograms per cubic meter.

11 (2) Particulate matter.

12 (a) Using Pasquill Methodology.

13 The maximum annual ground-level concentrations
14 of particulate for Units 1 and 2 are .05 micrograms
15 per cubic meter. For Units 3 and 4 are 0.07 micrograms
16 per cubic meter, and for all four Units are 0.11 micrograms
17 per cubic meter. The maximum 24-hour ground-level concen-
18 trations of particulate for Units 1 and 2 are 0.9 micro-
19 grams per cubic meter, for Units 3 and 4 are 1.3 micrograms
20 per cubic meter, and for all four Units are 2.1 micrograms
21 per cubic meter.

22 (b) Using MSU Methodology.

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

27 (3) Oxides of Nitrogen (Calculated as NO_2).

28 Pasquill Methodology - Annual.

29 For Units 1 and 2 are 0.6 micrograms per cubic
30 meter, for Units 3 and 4 are 1.1 micrograms per cubic
31

meter, and for all four Units 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,

1 the 24-hour concentration would be .00168 micrograms
2 per cubic meter. The 30-day value would be less.

3 (b) The corresponding calculation for MSU
4 methodology would be .0045 micrograms per cubic meter.

5 XXV.

6 Colstrip Units 3 and 4 will project two 525-foot
7 stacks and will project compliance with all applicable
8 standards.

9 XXVI.

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

19 XXVII.

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

26 XXVIII.

27 Colstrip Unit #1 would produce useful information
28 to be incorporated into Units 3 and 4 for consideration
29 of the proper pollution control there to be installed.
30 (Crow, 26-3427; Grimm 14-1921).. (O-125). Colstrip
31 #1 is presently available for observation and evaluation.
32

1 (Leffman, 19-2484).

2 XXIX.

3 A closed loop water system (a system which does
4 not discharge effluents from the plants downstream or
5 into other waters) was adopted for Colstrip Units 1-
6 4 so that there would be no discharge from the plants
7 into the Yellowstone River or other state waters. (Labrie
8 20-2627, 45-6444-6446).

9 XXX.

10 The surge pond is located approximately one mile
11 northwest of the plants and comprises approximately
12 160 acres. When filled it will hold approximately one
13 billion gallons of water or 2800 acre feet. It contains
14 19 days' storage of water at summer withdrawal rates
15 for Units 1-4 and 26 days' storage of water for winter
16 withdrawal rates for the four units. (Grimm, 12-1701,
17 13-1834; Labrie, 20-2630; Berube, 22-2831-2832; McMillan,
18 43-6177-6184, 6227; Applicants' Exhibits 51, 175.) (A-
19 31)

20 XXXI.

21 Much of the waste matter from the four units, such
22 as ash from the scrubber and boiler systems, suspended
23 solids, sediment, and other matter, will be disposed
24 of by using water to convey them to their eventual destinations,
25 the disposal ponds. In some instances the wastes will
26 be further processed and clean water will be returned
27 into the system in order to reduce the amount of water
28 used. Waste ash from various systems and some other
29 waste will be first sluiced to temporary retention ponds
30 located in a 40-acre area just south of the plants.
31 These wastes will eventually be moved to the ultimate
32

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. 50A, 51.) (A-32)

XXXII.

Maximum water consumption for Colstrip Units 1, 2, 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)

XXXIII.

The lowest historical daily flow of water in the Yellowstone River at the location of Nichols is approxi-

1 ately 1,000 cubic feet per second (approximately 448,800
2 gallons per minute or 724,000 acre feet annually).
3 Lowest flows of water in the Yellowstone River at the
4 point of diversion near Nichols occur during the winter
5 months of December, January and February with the highest
6 flows during the spring month of June. (Labrie, 20-
7 2630; Dunkle, 30A-3903) (Applicants' Ex. 137, 138).
8 (A-36)

9 XXXIV.

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

18 XXXV.

19 Dissolved solid concentrations in the Yellowstone
20 River increase downstream and decrease with increased
21 flow. Suspended sediment in the Yellowstone River also
22 varies with flow, but in a manner opposite to the dissol-
23 ved solid concentrations; that is, suspended sediment
24 increases with increasing flow. In general, water quality
25 is best in the Yellowstone River at high flow periods
26 in the more upstream locations, but sediment detracts
27 from this quality at high flow periods, particularly
28 at downstream locations. (Dunkle, 29-3822-3823; Botz,
29 39-5222-5223). (A-42)

30 XXXVI.

31 The effects of the withdrawal of water from the
32

1 Yellowstone River for utilization at Colstrip Units
2 1-4 as proposed by the applicants does not appear to
3 be significant. (Dunkle, 29-3824-3826; Willems, 38-
4 5157; Botz, 39-5229-5231).

5 XXXVII.

6 The impact of the withdrawal of water from the Yellow-
7 stone River for utilization at Colstrip Units 1-4 as
8 proposed by the Applicants upon the water quality of
9 the Yellowstone River will be insignificant and will
10 not cause a violation of any of the standards applicable
11 to the Yellowstone River. (Willems, 38-5157). (A-46)

12 XXXVIII.

13 The impact of Colstrip Units 1-4 upon surface water
14 quality outside of the Yellowstone River will be insigni-
15 ficant and will not violate any applicable standards.
16 (Betz, 39-5223-5227; Willems, 38-5157-5158). (A-47)

17 XXXIX.

18 The various ponds which will be used for storage
19 of water in the evaporation and disposal of water and
20 waste materials emanating from Colstrip Units 1-4 will
21 have seepage not anticipated to impair the quality of
22 the ground water in the area. (Northern Plains Ex.
23 2, 3A; Berube, 22-2831-2839; Grimm, 44-6370-6376).

24 XXXX.

25 The applicants were aware of the generalized statement
26 of the non-degradation standards both in the Montana
27 State Implementation Plan and the statutes and regulations
28 of the Department of Health and Environmental Sciences
29 and the Board of Health and Environmental Sciences in
30 the State of Montana. The applicants knew that it would
31 be necessary to resolve the highest state of the art
32 in their pollution control system. (Berube, 10-1392,
1393) (O-144).

CONCLUSIONS OF LAW

The Board concludes, based upon the testimony, and the exhibits in the record before it, that the proper procedure for it is to grant conditional certification for Colstrip Units 3 and 4 subject to possible suspension thereof.

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.

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.

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.

4. Any compliance modifications required during the operations of Colstrip Units 1 or 2 will be installed in

1 Colstrip Units 3 and 4.

2 5. No water will be withdrawn from the Yellowstone
3 River when the Yellowstone River is flowing at Nichols
4 less than 1,500 cubic feet per second. Daily testing
5 will be required during periods of low water.

6 6. All ponds, surge ponds, settling ponds, and
7 impoundments shall be properly sealed. They shall be
8 monitored for seepage, including the installation of test
9 wells to determine the extent of ground water pollution,
10 and the necessities of correction therefor.

11 Dated this 21st day of November, 1975.

13 MONTANA BOARD OF HEALTH AND
14 ENVIRONMENTAL SCIENCES

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16 BY John W. Bartlett
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STATE OF MONTANA
BEFORE THE BOARD
OF

NATURAL RESOURCES AND CONSERVATION

In the Matter of the Application of)
The Montana Power Company, Puget)
Sound Power and Light Company,)
Portland General Electric Company,)
The Washington Water Power Company,)
and Pacific Power and Light Company)
for a Certificate of Environmental)
Compatibility and Public Need for)
the Proposed Colstrip Units 3 and 4)

CERTIFICATE OF
ENVIRONMENTAL COMPATIBILITY
AND PUBLIC NEED

* * * * *

PURSUANT to the Utility Siting Act of the State of
Montana, as set forth in Section 70-801, et. seq., Revised Codes
of Montana, 1947, as amended, (now cited as the Montana Major
Facility Siting Act), and specifically Section 70-811 thereof;
and

FURTHER, pursuant to those certain Findings of Fact,
Conclusions of Law, Opinion, Decision, Order and Recommenda-
tions, heretofore made by the Board of Natural Resources and
Conservation on the 22nd day of July, 1976, a copy of said
Findings of Fact, Conclusions of Law, Opinion, Decision, Order
and Recommendations being attached hereto, marked as Exhibit "A"
for identification, and by this reference fully and completely
incorporated herein;

THE BOARD OF NATURAL RESOURCES AND CONSERVATION OF
THE STATE OF MONTANA hereby grants the application for a
Certificate of Environmental Compatibility and Public Need filed
herein for the location, construction and operation of Colstrip
3 and 4 and associated transmission facilities, subject, how-
ever, to compliance by the Applicants with state and federal
laws pertaining thereto and with the conditions set out and
contained in the Findings of Fact and Conclusions of Law of the

1 State of Montana Board of Natural Resources and Conservation and
2 the State of Montana Board of Health and Environmental Sciences,
3 incorporated herein as Exhibits "A" and "B" respectively,
4 provided that this Certificate will be effective only upon
5 each of the Applicant's executing the statement attached hereto
6 agreeing to comply with said conditions.

7 In granting this Certificate, the Board conducted
8 extensive hearings, considered all of the evidence, and a
9 majority thereof found:

10 1. That there is a need for the proposed facilities to
11 meet the increasing demands for electricity; that the proposed
12 facilities' location, construction and operation under the
13 conditions imposed by this certification will produce a minimal
14 adverse environmental impact, upon both the natural environment
15 and the citizens of this state, after giving due consideration
16 to the state of available technology, and having found no
17 economically feasible alternatives available to meet such needs.

18 2. That this certification will neither unreasonably
19 deplete or degrade the natural resources of the state of Montana
20 nor will it degrade the environmental life support systems of
21 the state of Montana; that it will enable the state to maintain
22 and improve a clean and healthful environment for present and
23 future generations.

24 3. That any adverse environmental impacts and other
25 problems and objections raised by other agencies, state and
26 federal, or other interested groups, were duly considered and
27 will be resolved or mitigated by compliance with the existing
28 state and federal laws, monitoring of environmental effects and
29 the other conditions imposed herein contained in Exhibits "A"
30 and "B" hereto attached.

31 DATED this 22nd day of July, 1976.

32 /S/ JOSEPH W. SABOL

Joseph W. Sabol, Chairman
Board of Natural Resources and Conservation

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AGREEMENT TO COMPLY

We, the undersigned Applicants for a Certificate of Environmental Compatibility and Public Need for the proposed Colstrip Units 3 and 4, being fully advised of the premises, do hereby agree, as a condition subsequent to the issuance of said Certificate, to comply fully and completely with the spirit and intent of the Utility Siting Act of the state of Montana, as set forth in Section 70-801, et. seq., Revised Codes of Montana, 1947, as amended, and in addition thereto with the Conditions set forth and contained in the Findings of Fact and Conclusions of Law made by the Board of Health and Environmental Sciences of the state of Montana and the Conditions set forth and contained in the Decision of the Board of Natural Resources and Conservation of the state of Montana, and further agree to cooperate fully with the Department of Natural Resources and Conservation and the Department of Health and Environmental Sciences insofar as the Conditions attached to said Findings of Fact and Decision.

ATTEST:	THE MONTANA POWER COMPANY
_____	BY _____
	DATED _____
	PUGET SOUND POWER AND LIGHT COMPANY
_____	BY _____
	DATED _____
	PORTLAND GENERAL ELECTRIC COMPANY
_____	BY _____
	DATED _____

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ATTEST:

THE WASHINGTON WATER POWER COMPANY

BY _____

DATED _____

PACIFIC POWER AND LIGHT COMPANY

BY _____

DATED _____