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

John S. Anderson M.D.
DIRECTOR

January 23, 1976

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

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 Compatability 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 certification 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:

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

<u>Particulate Matter:</u>

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

<u>Sulfur Dioxide:</u>

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

<u>Nitrogen Oxides:</u>

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

B. Ambient Air Quality Standards: (Montana)

Sulfur Dioxide:

0.02 ppm	(52 ug/m3)	Annual
0.10 ppm	(262 ug/m3)	24 hr.

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

0.25 ppm	(654 ug/m3)	1 hr.

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

Total Suspended Particulates:

75 ug/m3	Annual
200 ug/m3	24 hour

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

Suspended Sulfate:

4 ug/m3	Annual
12 ug/m3	--

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

Sulfuric Acid Mist:

4 ug/m3	Annual
12 ug/m3	--

	(Not to be exceeded over one per cent of the time)	
	30 ug/m3	1 hour
	(Not to be exceeded over one per cent of the time)	
Lead:	5.0 ug/m3	30 day Average
Beryllium	0.01 ug/m3	30 day Average
Fluorides, Total in Air as HF - 1 ppb		24 hour Average

National: (ug/m3)

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

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

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

(A-20)

II.

The water quality standards applicable to Colstrip Units #3 and #4 are Section 69-4801 through Section 69-4827, Revised Codes of Montana, 1947 (Water

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

III.

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

IV.

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

V.

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

VI.

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

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

VII.

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

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

X.

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

XI.

The operation of the scrubber will be controlled by operators in a control room where instruments record the inlet and outlet concentrations of SO^2 and also record the ph of the scrubber system. In the event the outlet concentration increases (above 260 ppm with an inlet concentration of 965 ppm) while the ph drops (below 5.6), the operator can add additional time to bring the ph to proper level and thus reduce the SO^2 outlet concentration, (Grimm, 13-1875). (A-8)

XII.

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

XIII.

The flue gas desulphurization system to be installed at Colstrip Units #3 and #4 and which are presently under construction at Units #1 and #2 may prove to be reliable systems to remove pollutants from the flue gas because Venturi scrubbers have been in operation at other power generating plants and are not a new equipment system (Abrams, 14-1990). The Colstrip modules have improved the design and operating efficiencies over previous modules. (Labrie, 21-2770; Abrams, 14-1944, 1990; Raben, 23-3062). The alkali nature of the fly ash of Rosebud coal contributes to that improvement, (Abrams, 14-2000). In addition, the pilot plant study conducted at Corette generating station, Billings, Montana, confirmed the chemistry of the system, (Abrams, 15-2014; Raben, 33-2931). (Applicants' exhibits, 73 and 74). The particulate removal based upon pilot plant studies is projected within the range of 99.465% to 99.76% and will be enhanced by the utilization of the wash tray and stainless steel pleximesh in the scrubber units. (Abrams, 15-2042, 2045, 15-2034, 2035). Utilization of the wash tray reduced the solid buildup in the demister and improved the particulate removal, as well as SO^2 removal. (Abrams, 15-2124, 2125).

XIV.

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

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

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

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

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

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

The pilot plant tests also substantiate that fluoride emissions from the use of Rosebud coal, which contains 27 PPM, will emit 1.8 pounds per hour, or .227 grams per second, for Units 3 or 4, and .1 gram per second from Units 1 or 2. (Grimm,12-1788, 13-1789, 1790. Applicants' Ex. 74, p. 15.2.1). Beryllium in the coal will be emitted at the rate of .0021 grams per second at 100% load for Units 3 or 4 (DNR Ex. 123), which is equivalent to .0061 grams per second for all four units. (Faith, 43-6240). Lead emissions in the Rosebud coal for Units 3 or 4 will be .0423 grams per second (DNR Ex. 123), which is equivalent to 1.22 grams per second for all 4 units. (Faith 43-6241). For oxides of nitrogen calculated as NO^2 , the emission rate for Units 1 and 2 combined at .7 pounds per million BTU is 4.740 pounds per hour, or 598 grams per second; for Units 3 and 4 combined at .7 pounds per million BTU is 10602 pounds per hour, or 1336 grams per second, and thus for all four units emisssions at .7 pounds per million BTU is 15,342 pounds per hour, or 1934 grams per second. (Faith, 26-346, 3463). The scrubber will reduce 15 to 20 per cent of the oxides of nitrogen emissions. (Abrams, 16-2272). (A-11)

XV.

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

XVI.

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

XVII.

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

XVIII.

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

XIX.

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

XX.

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

XXI.

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

Inversion heights published by Holzworth apply.

XXII.

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

XXIII.

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

XXIV.

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

(1) <u>Sulfur Dioxide</u>.

(a) For Pasquill Methodology:

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

(b) MSU Methodology:

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

(2) Particulate matter.

(a) Using Pasquill Methodology.

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

(b) Using MSU Methodology.

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

(3) Oxides of Nitrogen (Calculated as NO^2).

Pasquill Methodology - Annual.

For Units 1 and 2 are 0.6 micrograms per cubic meter, for Units 3 and 4 are 1.1 micrograms per cubic meter, and for all four 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 Metnod:

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

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

XXV.

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

XXVI.

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

XXVII.

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

XXVIII.

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

(Leffman, 19-2484).

XXIX.

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

XXX.

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

XXXI.

Much of the waste matter from the four units, such as ash from the scrubber and boiler systems, suspended solids, sediment, and other matter, will be disposed of by using water to convey them to their eventual destinations, the disposal ponds. In some instances the wastes will be further processed and clean water will be returned into the system in order to reduce the amount of water used. Waste ash from various systems and some other waste will be first sluiced to temporary retention ponds located in a 40-acre area just south of the plants. These wastes will eventually be moved to the ultimate disposal ponds by slurry pipeline. The first two permanent disposal areas developed will be located approximately 10,000 feet northwest from the plants in Sections 20, 21, 28 and 29, Township 2 North, Range 41 East. During the life of Units 3 and 4, it will be necessary to develop further disposal ponds to be located in Sections 5, 6, 7 and 8, Township 1 North, Range 42 East. After these ponds are filled with waste, they will be dried up, covered with dirt and reclaimed. The first permanent retention pond will contain a surface acreage of approximately 112 acres and it, like all the other retention ponds, will be sealed, using normal construction methods. The first permanent retention pond will have a useful life of approximately six years if the pond is utilized for all four units. Its useful life will be approximately 12 years in the event that it is utilized for the wastes from Units 1 and 2 only. (Labrie, 20-2625-2628, 21-2731-2733; Grimm 12-1701-1712; Berube, 22-2831-2838, 2860-2861, 45-6474-6475, 6527-6530; (Applicants' Ex. 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 approxiately 1,000 cubic feet per second (approximately 448,800 gallons per minute or 724,000 acre feet annually). Lowest flows of water in the Yellowstone River at the point of diversion near Nichols occur during the winter months of December, January and February with the highest flows during the spring month of June. (Labrie, 20-2630; Dunkle, 30A-3903) (Applicants' Ex. 137, 138). (A-36)

XXXIV.

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

XXXV.

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

XXXVI.

The effects of the withdrawal of water from the

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

XXXVII.

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

XXXVIII.

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

XXXIX.

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

XXXX.

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

CONCLUSIONS OF LAW

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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

Colstrip Units 3 and 4.

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

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

Dated this 21st day of November, 1975.

MONTANA BOARD OF HEALTH AND
ENVIRONMENTAL SCIENCES

By ______________________