II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF BIG SANDY CONSERVATION DISTRICT TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a)).

1. The Big Sandy Conservation District is a public entity organized and operated under the State Conservation District's Act (Mont. Code Ann. § 76-15-101, et seq.) and is a qualified reservant pursuant to Mont. Code Ann. § 85-2-316. (Bd. Exh. 18-A, p. 2.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY THE BIG SANDY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

2. The Big Sandy Conservation District has applied to reserve an annual amount of 46,188 acre feet of water to be diverted at a maximum rate of 300 cfs to provide irrigation for 3 projects totaling 19,901 acres. (Bd. Exh. 18-A, p. 4-12.) The purpose of the reservation is to reserve water that will be put to beneficial use by district cooperators (individual landowners and lessees) within the district. The locations, amounts of water requested, sources of water, and acreage of the individual projects applied for are as set forth in the application filed by the Big Sandy Conservation District.

3. The Big Sandy Conservation District seeks to reserve water for future irrigation. (Bd. Exh. 18-A, p. 5.) Irrigation is a beneficial use as defined by ARM 36.16.102(3.) (Bd. Exh. 40, p. 248.)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY THE BIG SANDY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

4. The Big Sandy Conservation District has established a need for the reservation pursuant to 36.16.107B (2) based on the following:

a) Water use in the Missouri basin and existing water rights together with new permits could leave little water available for future use by the District. A priority date of July 11, 1985 allows water use by the District. Furthermore, the potential exists for conflict with downstream states over water use in the Missouri basin (Bd. Exh. 18-A, pg. 6 and 7.)

b) The districts desires to improve long-term planning for its water use and there are at present economic constraints to near term development on a permit by permit basis. If water were not reserved, it could be appropriated by competing uses in Montana or down-stream states (Bd. Exh. 40, p. 248.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY BIG SANDY CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. The Big Sandy Conservation District has established methodologies used in determining the amounts requested. The water-use efficiencies associated with the diversionary uses are reasonable. (Bd. Exh. 18-A, p. 8-12; Bd. Exh. 3; Bd. Exh. 2) as required by ARM 36.16 107B(3.)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY BIG SANDY CONSERVATION DISTRICT IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4)).

6. To be in the public interest, the expected benefits of a reservation should be reasonably likely to exceed the costs. Stated another way, the net benefits of a reservation must be greater than zero. The benefit/cost test may be stated in a formula, as follows:

Net Benefits = Direct Benefits + Indirect Benefits - (Direct Costs + Indirect Costs.)

(DFWP Exh. 31, Duffield Dir., p. 4.)

7. In general, the benefits and costs of irrigation projects in this proceeding are as follows:

Direct Benefits:	Irrigation Crop Revenues
Indirect Benefits:	Maintaining and improving agricultural economic base
Direct Costs:	Irrigation System Capital, Operations, Maintenance and Energy Costs
Indirect Costs:	Foregone instream uses Fish and Wildlife Recreation

Hydropower
Water quality
Economic opportunity costs to parties other than the reservant

8. In order to determine the efficient or optimal allocation of water that yields the highest net benefits, the value per acre-foot of water for irrigation for each project should be compared to the value of that water for instream uses, which include hydropower generation, fish and wildlife, recreation, and water quality. The use with the highest value passes the benefit/cost test. (Bd. Exh. 41, p. 38; DFWP Exh. 31, Duffield Dir., p. 6.)

9. The direct benefits of water for irrigation was determined by DNRC, based on a detailed analysis of each project. (Bd. Exh. 41, p. 35.) For each project, DNRC estimated net present values for 300 scenarios, accounting for variability in future crop prices, production costs and crop yields for each proposed project. (Bd. Exh. 41, p. 35.) The irrigation benefits for each project are the median value today of 70 years of returns, less costs. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., p. 10.) The benefits of each project on an acre-foot basis are set forth in the Final Environmental Impact Statement in Table B-1 under consumptive value method 3.

10. Several assumptions which are favorable to irrigation were made by DNRC in determining the value of water for the proposed projects. (Tubbs Cross, Tr. Day 3, p. 247.)

11. DNRC assumed that the most profitable crop, alfalfa, would be grown on all the acres to be developed, although DNRC's surveys indicated farmers would grow alfalfa on only 65% of the lands to be irrigated. (Tubbs Cross, Tr. Day 3, p. 260.)

12. DNRC assumed that the highest attainable yields would be obtained, based on the assumption that each farmer would have an incentive to use the best management practices. (Tubbs Cross, Tr. Day 3, p. 252.)

13. DNRC assumed water would be available at least eight years out of ten, which is considered the minimum necessary for a profitable irrigation operation. (Tubbs Cross, Tr. Day 3, p. 254.)

14. DNRC assumed that alfalfa prices would not be depressed on account of an additional 150,000 acres of irrigated alfalfa production. (Tr. Day 3, Tubbs Cross, p. 253.)

15. Overall the estimations and calculations made by DNRC are accurate and reasonable. (Roger Perkins Cross, Tr. Day 2, p. 13.) The method used by DNRC to calculate irrigation values is proper. (MPC Exh. 4, Bucher Dir., p.3)

16. The consumptive use values of water for irrigation must also take into account appropriate assumptions concerning the amount of water diverted that will return to the source. (Bd. Exh. 41, p. 38 and App. B.)

17. DNRC initially assumed a 50% return flow from irrigation to the source in calculating irrigation benefits. (DFWP Exh. 31, Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3.)

18. This assumption is not valid for this proceeding, as it would overestimate the value of projects using efficient sprinkler systems and underestimate the value of flood irrigation projects. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh. 31, Duffield Dir., p. 11.)

19. Estimates of water consumed by each project derived by DNRC's Missouri River water availability model provide the most reasonable estimates of water consumed and return flows. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3.)

20. The model considers crop water requirements and irrigation efficiencies for each project. In addition, no return flows are assumed for 65 proposed irrigation projects located on higher benchlands. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., pp. 8-9; DFWP Exh. 31, Duffield Dir., p. 11.)

21. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but do exist. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., pp 15-16.)

22. The direct benefits as calculated by DNRC do not adequately take into account certain indirect benefits of the irrigation projects including community stability, growth of agricultural production and maintaining a diverse and healthy rural economy. Although these benefits cannot be quantified they are substantial. (Walkin H. Ranch Exhibit 1.)

23. Recreation values per acre-foot of water were calculated as follows using the contingent valuation method of valuing non-market goods.

Subbasin	July-August	Rest of Year
Headwaters	$35.00	$8.23
Upper Missouri	$19.46	$4.76
Marias/Teton	$ 5.81	$1.63
Middle Missouri	$ 5.81	$1.63

(Bd. Exh. 41, p. 38; Bd. Exh. 41, p. 92; DFWP 31, Duffield Dir., p. 32.)

24. Nonmarket valuation methods must be used to value water for recreation. (DFWP Exh. 31, Duffield Dir., p. 29.)

25. As calculated recreational value is determined on the basis of impacts that would reduce instream flow basin wide. (DFWP Exh. 31, Duffield Dir., p. 36.) Based on the relative priority of the DFWP reservation in this proceedings the impacts to recreation will be minor or insignificant and the dollar amount of those impacts cannot be quantified in comparison to this application.

26. Each acre-foot of water consumed in agricultural use reduces the output of hydroelectric facilities along the Missouri River. The place of irrigation use effects the amount of electrical output reduced. In general the higher in the basin the water is consumed the greater the loss of hydroelectric output. (MPC Exh. 3, Gruel, p. 12; Bd. Exh. 40, p. 230.)

27. After a review of all factors, hydropower values in the Big Sandy Conservation District were found to be $7.54 per acre-foot of water. This figure takes into account power generated in Montana, not power generated downstream. (See Bd. Exh. 40, Table 6-43.)

28. Although higher hydropower values are shown in the Final Environmental Impact Statement at p. 39, these hydropower losses include hydropower generated down river and out of the state of Montana. The hydropower losses also do not take into effect the fact that a substantial amount of water left instream is lost to evaporation. (Bd. Exh. 40, p. 42.) The reduction in hydropower loss is also offset in a substantial but unquantifiable amount by the indirect benefits of encouraging economic diversity and economic health of rural areas by allowing further agricultural uses of water.

29. Taking into account all values and costs, a comparison of project benefits to hydropower costs per acre-foot of water for each project proposed by the district is as follows:

PROJECT	VALUE	COST	NET VALUE
BSS-2	-8.23	7.54	-15.76
BS-31	3.00	7.54	-4.54
BS-32	3.72	7.54	-3.82

30. Based on this analysis, the expected net benefits of none of the projects exceed costs of that project.

31. No reasonable alternatives to the projects that have reservations granted were identified that had greater net benefits.

III. CONCLUSIONS OF LAW

1. Big Sandy Conservation District is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the Big Sandy Conservation District application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the Big Sandy Conservation District has been established. Specifically, the Conservation District has established that there is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The methodologies and assumptions used by the Big Sandy Conservation District are suitable and accurate. Big Sandy Conservation District has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Big Sandy Conservation District has not established that its water reservation is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. The Board may grant, deny, modify or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

7. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. The reservation application of Big Sandy Conservation District is denied.