June 1988

MANAGEMENT POLICY

FOR

THE BOISE FRONT GROUND WATER MANAGEMENT AREA

I. GENERAL

A. Introduction

Beneficial use of warm ground water for its heat value is a part of the heritage of the Boise area. Wells were constructed as early as the 1890's to increase the available supply. Policies intended to foster the use of renewable energy resources caused a renewed interest in development of the heat resources in the 1970's. Several significant space heating projects commenced using warm water in the early 1980's, and projects to continue expanding the use are now being pursued.

The recent increase of diversions from the aquifer, however, have been accompanied by decreases in aquifer water levels and pressures. Some reduction in temperature has been measured in at least one of the producing systems. On June 15, 1987, the Idaho Department of Water Resources (IDWR) designated the Boise Front Ground Water Management Area (BFGWMA) to allow increased management of the resource (Figure #1). The continued interest in additional development as represented by applications and undeveloped permits continues to concern some existing users. Several petitions were filed in January 1988, seeking a suspension of processing of applications and a moratorium on further development of undeveloped permits.

The purpose of this draft plan is to summarize the present knowledge of the aquifer and the low temperature geothermal resource, review legal responsibilities and authorities, and to propose a policy to guide IDWR administrative actions.

B. The Aquifer

The Boise area is underlain by three aquifer systems: A shallow cold water system, a deeper cold water artesian system and a still deeper low temperature geothermal artesian system. Not all three aquifers exist in all areas. The low temperature geothermal aquifer system, which is the only aquifer addressed in this plan, is thought to be a fractured media ground water system which

produces hot artesian water from the network of fractures of the Boise Frontal fault system and the fractured, layered rhyolite and interbedded sediments of the Idavada Group, and from fractured zones within the Idaho Batholith.

Several possible models have been suggested to describe the occurrence of warm water in the Boise Front area. While there are differences of opinion concerning details of fault orientation and the degree of interconnection between water producing zones, the basic concept of deep circulation into the Boise Front fault system as a source of heat is common to the various models. The warmest water is found at or near the Front fault in springs and wells at the northeast edge of Boise. Temperatures decrease with distance away from the fault to the south and west apparently because of mixing with cold water sources.

C. Present and Proposed Uses

Until the early 1980's, the principal user of the warm water resource was Boise Warm Springs Water District (BWSWD) which provided the resource principally for the heating of homes. This use consisted of the diversion of approximately 800 acre feet (AF) per year which is discharged to surface drains or sewer lines.

There were, however, other existing uses of the resource which were relatively minor in nature such as the heating of greenhouses. Although there was some variation in the resource prior to 1980, the principal changes became apparent when other users started using the resource.

In approximately 1982 Boise Geothermal Ltd. (BGL) constructed four wells for the purposes of heating buildings in downtown Boise. At approximately the same time, the State of Idaho (state) started heating some state owned buildings. The BGL use is approximately 600 AF per year and the state use is approximately 580 AF per year. The state reinjects the water while BGL does not.

The Veterans Administration well is scheduled for use in 1988. The water will be reinjected. Boise is planning to expand its use of the resource to heat buildings at Boise State University and is looking at the possibility of reinjection.

D. Recent Declines

As a result of the increased use of the aquifer, the maximum recovery level of the water table as measured in a BWSWD well located in NW1/4NE1/4 Section 13, T3N, R2E,B.M. has declined 30 feet from 1983 to 1987. A different well monitored by the BLM has declined approximately 26 feet in

the same time period. The water level in the state wells has not significantly changed and declines in BGL wells are presently unknown.

Present rights to use low temperature geothermal water within the BFGWMA are summarized in Table 1. Also listed in Table 1 are estimates of the present diversion rates and volumes under these rights as reported to IDWR or listed in recent reports. Information is not now available to make this table comprehensive, however, it is apparent that present diversion rates are less than 20% of those authorized by permits or licenses or claimed for existing uses. If all existing rights were fully exercised, the diversion rate and the volume withdrawn from the aquifer would be increased by 3 to 4 times the present rate and volume.

The information in Table 1 suggests that some existing and planned uses do not use the resource primarily for the heat value. The information shown has been compiled from a variety of sources in the department's records including well logs, and written and verbal data which has been submitted to the department. The information is as complete and accurate as is presently known or estimated.

The attached summary showing well construction data (Table 2) shows the known and suspected wells which enter the low temperature geothermal aquifer. Information is not available concerning the construction of all of the wells, but the information available suggests that some wells are not constructed to prevent mixing of the upper cold water aquifer and the low temperature geothermal aquifer. The temperature reported for most of the wells places the resource in the low temperature geothermal resource category as defined in Section 42-230, Idaho Code.

II. STATUTORY REQUIREMENTS AND AUTHORITIES

The following management principles and requirements to be followed by the Director of IDWR are supported by the listed statutory authorities.

A. The resource must be managed as a low temperature geothermal resource where the following provisions apply:

1. "Groundwater" is all water under the surface of the ground whatever may be the geological structure in which it is standing or moving. I.C. Sec. 42-230(a).

2. All ground water having a temperature of greater than eighty-five (85) degrees Fahrenheit and less than two hundred twelve (212) degrees Fahrenheit in the bottom of a well shall be classified and administered as a low temperature geothermal resource pursuant to section

42-233, Idaho Code. I.C. Sec. 42-230 (a)(1).

3. All ground water having a temperature of two hundred twelve (212) degrees Fahrenheit or more in the bottom of a well shall be classified as a geothermal resource pursuant to section 42-4002, Idaho Code, and shall be administered as a geothermal resource pursuant to chapter 40, title 42, Idaho Code. (Emphasis added.) I.C. Sec. 42-230(a)(2).

B. The resource is to be allocated and managed using the doctrine of prior appropriation.

1. The right to the use of low temperature geothermal resources of this state shall be acquired by appropriation. I.C. Sec. 42-233(1).

2. As between appropriators, the first in time is first in right. I.C. Sec. 42-106.

3. The appropriation must be for some useful or beneficial purpose, and when the appropriator or his successor in interest ceases to use it for such purpose, the right ceases. I.C. Sec 42-104.

C. Prior appropriations (other than domestic uses which began prior to July 1, 1978) are to be protected to a reasonable ground water pumping level or artesian pressure and the full economic development of the resource shall not be blocked.

The traditional policy of the state of Idaho, requiring the water resources of this state to be devoted to beneficial use in reasonable amounts through appropriation, is affirmed with respect to the ground water resources of this state as said term is hereinafter defined and, while the doctrine of "first in time is first in right" is recognized, a reasonable exercise of this right shall not block full economic development of underground water resources. Prior appropriators of underground water shall be protected in the maintenance of reasonable ground water pumping levels as may be established by the director of the department of water resources as herein provided. In determining a reasonable ground water pumping level or levels, the director of the department of water resources shall consider and protect the thermal and/or artesian pressure values for low temperature geothermal resources and for geothermal resources to the extent that he determines such protection is in the public interest. All ground waters in this state are declared to be the property of the state, whose duty it shall be to supervise their appropriation and allotment to those diverting the same for beneficial use. This act shall not affect the rights to the use of ground

water in this state acquired before its enactment. (Emphasis added.) I.C. Sec. 42-226.

D. "Mining" of the resource is to be prevented.

Water in a well shall not be deemed available to fill a water right therein if withdrawal therefrom of the amount called for by such right would affect, contrary to the declared policy of this act, the present or future use of any prior surface or ground water right or result in the withdrawing of the ground water supply at a rate beyond the reasonably anticipated average rate of future natural recharge. However, the director may allow withdrawal at a rate exceeding the reasonably anticipated rate of future natural recharge if the director finds it is in the public interest and if it satisfies the following criteria:

1. A program exists or likely will exist which will increase recharge or decrease withdrawals within a time period acceptable to the director to bring withdrawals into balance with recharge.

2. Holders of senior rights to use ground water will not be caused thereby to pump water from below the established reasonable pumping level or levels. (Emphasis added.) I.C. 42-237 a.g.

E. The resource is to be primarily used for its heat value.

Usage of a low temperature geothermal resource primarily for reasons other than heat value is not a beneficial use of the resource, unless the director of the department of water resources exempts the proposed use. I.C. Sec. 42-233(1).

F. The resource may be controlled using the application, permit and license procedure.

All rights to divert and use the waters of this state for beneficial purposes shall hereafter be acquired and confirmed under the provisions of this chapter and not otherwise. And after the passage of this title all the waters of this state shall be controlled and administered in the manner herein provided. Such appropriation shall be perfected only by means of the application, permit and license procedure as provided in this title; provided, however, that in the event an appropriation has been commenced by diversion and application to beneficial use prior to the effective date of this act it may be perfected under such method of appropriation. (Emphasis added.) I.C. Sec. 42-201(1).

G. A drilling permit is required.

Prior to constructing or drilling any well, an owner shall obtain a permit from the director of the department of water resources, to protect the public health, safety and welfare and the environment and to prevent the waste or mixture of any water from a well. I.C. Sec. 42-235.

H. Areas of common ground water supply may be determined.

In connection with his supervision and control of the exercise of ground water rights the director of the department of water resources shall also have the power to determine what areas of the state have a common ground water supply. I.C. Sec. 42-237 a.g.

I. Reasonable pumping levels or artesian pressures and rates of future natural recharge (aquifer yield) may be determined.

To assist the director of the department ofwater resources in the administration and enforcement of this act, and in making determinations upon which said orders shall be based, he may establish a ground water pumping level or levels in an area or areas having a common ground water supply as determined by him as hereinafter provided. I.C. Sec. 42-237 a.g.

J. Ground water management areas, critical ground water areas, areas of drilling concern, and moratoriums on applications and permits may be declared.

1. "Critical ground water area" is defined as any ground water basin, or designated part thereof, not having sufficient ground water to provide a reasonably safe supply for irrigation of cultivated lands, or other uses in the basin at the then current rates of withdrawal, or rates of withdrawal projected by consideration of valid and outstanding applications and permits, as may be determined and designated, from time to time, by the director of the department of water resources. I.C. Sec 42-233a.

2. "Ground water management area" is defined as any ground water basin or designated part thereof which the director of the department of water resources has determined may be approaching the conditions of a critical ground water area. I.C. Sec. 42-233b.

3. The director of the department of water resources may designate as he determines necessary, "areas of drilling concern" on an aquifer by aquifer basis within which drillers must comply with the additional requirements of this section. The director shall designate "areas of drilling concern" to protect public health and to prevent waste or contamination of ground

or surface water because of factors such as aquifer pressure, vertical depth of the aquifer, warm or hot ground water, or contaminated ground or surface waters. I.C. 42-238(7).

4. After notice, to suspend the issuance or further action on permits or applications as necessary to protect existing vested water rights or to ensure compliance with the provisions of chapter 2, title 42, Idaho Code, or to prevent violation of minimum flow provisions of the state water plan. I.C. Sec. 42-1805(7) and Water Appropriation Rule 7.

K. Unauthorized diversions may be prevented.

1. To seek a preliminary or permanent injunction, or both, or a temporary restraining order restraining any person from violating or attempting to violate: a) those provisions of law relating to all aspects of the appropriation of water, distribution of water, headgates and measuring devices; or b) the administrative or judicial orders entered in accordance with the provisions of law. I.C. Sec. 42-1805(9).

2. If the director of the department of water resources finds, on the basis of available information, that a person is diverting water from a natural watercourse or from a ground water source without having obtained a valid water right to do so or is applying water not in conformance with the conditions of a valid water right, then the director of the department of water resources may issue an order directing the person to cease and desist the activity or activities alleged to be in violation of applicable law or of any existing water right. A cease and desist order may direct compliance with applicable law and with any existing water right or may provide a time schedule to bring the person's actions into compliance with applicable law and with any existing water right. I.C. Sec. 42-351(1).

L. Waste and contamination may be controlled.

1. In the administration and enforcement of this act and in the effectuation of the policy of this state to conserve its ground water resources, the director of the department of water resources is empowered to require both flowing and nonflowing wells to be so constructed and maintained as to prevent the waste of ground waters through leaky wells, casings, pipes, fittings, valves or pumps either above or below the land surface. I.C. Sec. 42-237a.

2. Any person owning or controlling an artesian well shall maintain the well to prevent waste or contamination of

ground waters through leaky casings, pipes, fittings, valves, pumps, seals or through leakage around the outside of the casings, whether the leakage is above or below the land surface. I.C. Sec. 42-1601(2).

III. MANAGEMENT GOALS

The goals for management of the BFGWMA are:

A. Protect the existing users under the doctrine of prior rights.

This protection will not consist of total preservation of the artesian pressure and flow rate occurring at the time an existing right was developed and may not be the pressure and rate occurring today. The prior existing users are to be protected by management to assure:

1. An adequate water supply for the beneficial use authorized at a reasonable efficiency of use as determined by the Director.

2. An adequate water temperature as determined by the Director for the use authorized, and

3. An artesian pressure or pumping level adequate to allow the authorized use to continue as determined by the director.

B. Allow full use of the low temperature geothermal resource to maximize public benefit.

Full use of the resource includes:

1. A recognition that the resource is to be used primarily for its heat value.

2. All uses, new and existing, must use the resource with reasonable efficiency to prevent waste of the heat in the resource.

3. Encourage transfers or contracts among existing users to most efficiently use the resource within the limits of existing water rights.

C. Provide clear understandable management policies for the resource.

IDWR's management policies need to be available in written form and available to existing and potential future users of the resource as well as to the public. These policies must:

1. Maintain consistency in IDWR actions,

2. Minimize administrative paper work,

3. Minimize management cost to users and the public, and

4. Provide a reliable basis for actions of both users and IDWR.

D. Stabilize depletions from the aquifer at existing or reasonable rates (whichever is less), until a new equilibrium condition can be accurately predicted. The goals of protection for existing users and for maximizing public benefit from the resource may appear to be in conflict, one seeking to minimize the number of users and the other seeking to maximize development. IDWR must balance these goals to obtain a workable management plan. The key to balance is adequate knowledge of the resource. In particular, IDWR needs reliable estimates of the volume of water the resource can yield, how this volume changes if water levels or pressures are reduced in the aquifer, the effect of reduced water levels or pressures on water temperature, the degree of interconnection between present and future wells, how interconnection can be minimized, and a workable estimate for reasonable pumping (pressure) levels.

Development of this information will be facilitated by the maintenance of stable conditions in the aquifer.

IV. OBJECTIVES TO MEET GOALS

A. Existing Uses

1. Each use will be limited to the lesser of the recorded right, beneficial use being made of the water or sustained historic diversion rate and/or volume.

2. Use with reasonable efficiency will be required.

3. IDWR will require the substitution of cold water resources for existing uses that do not need the heat value of the low temperature geothermal resource, wherever practical.

4. Well and system construction to prevent waste above and and below ground will be required.

5. Reinjection will be required unless it can be shown to the satisfaction of the Director that reinjection is not economically and technically feasible.

6. Uniform monitoring equipment, data collection, and reporting will be required where possible.

7. Diversion and use of water will be administered through the authority in Sections 42-237a.g., 42-311, 42-350 and 42-351, Idaho Code, until a water district can be formed.

8. IDWR will create a water district and appoint a watermaster upon entry of an interim decree in the Snake River Adjudication (or other adjudication) to measure and deliver water to the users.

B. Undeveloped and Partially Developed Permits

1. Permits to use the low temperature geothermal resource for which the full extent of authorized diversion rate, volume and beneficial use has not been diverted and beneficially used may not be further developed until IDWR determines from information submitted that further development will not:

   a) Increase depletions from the aquifer,

   b) Increase pumping lift or decrease pressurefor existing senior users,
   c) Reduce temperature to existing users causing systems operating at reasonable efficiency to no longer operate.

   Permit holders may submit proposed mitigation approved by IDWR to accomplish a), b), and c).

   Further development can only occur if specifically authorized by IDWR after review and approval of development plans and other applicable information.

2. Permits which do not use heat as a primary purpose will be cancelled.

3. Reinjection to the aquifer will be required unless determined by the Director to be unreasonable.

4. All systems will be required to use water and heat with a reasonable efficiency as determined by the Director.

C. Applications

1. Pending and future applications will be rejected unless information is provided by the applicant to demonstrate the use will not cause:

   a) Additional depletion of the aquifer,

   b) An increase in pumping lift or pressure reduction

to existing users or undeveloped permit holders,

c) Temperature to be reduced to present users or undeveloped permit holders below that necessary for a system operating at reasonable efficiency to operate.

Applicants may propose mitigation necessary to accomplish a), b), and c).

2. Protested applications will not be set for hearing unless the Director makes a preliminary determination that a), b) and c) are satisfied or acceptable mitigation has been proposed.

3. The applicant is responsible to provide all existing users and holders of undeveloped permits a copy of the application and supporting information upon request.

4. Applications which do not propose heat as the primary use will be rejected. Exceptions will be considered based upon the following factors:

   a) Reinjection is proposed.
   b) The system is designed to achieve reasonable efficiency.
   c) Only non consumptive uses are proposed.
   d) Water quality will not be impaired.
   e) A reliable practical source of cold water does not exist.

5. Domestic uses (exempted from the filing of a water appropriation permit by Sec. 42-227, Idaho Code) will be authorized only after approval of a drilling prospectus submitted with the required drilling permit.

V. ADMINISTRATIVE ACTIONS REQUIRED TO IMPLEMENT OBJECTIVES

A. Impose a moratorium pursuant to Section 42-1805(7), Idaho Code, and Rule 7 of the Water Appropriation rules on further development of undeveloped permits until IDWR determines further development is authorized.

B. Require uniform monitoring equipment, data collection and reporting where possible.

C. Require existing users to have systems evaluated by a qualified licensed engineer or geologist with a report to IDWR to confirm adequacy of system construction (including wells) to prevent waste and to use water and heat with reasonable efficiency as determined by the Director. The studies shall include an analysis of the

practicality and efficiency of reinjecting all or a portion of water diverted and retrofitting of existing systems. For systems which do not use or need the heat value of the resource, an analysis of the practicality of substituting a cold water source will be required.

D. Issue administrative orders to enjoin unauthorized or excessive use and to require system reconstruction or repair and reinjection.

E. Continue IDWR data collection efforts and seek funding to conduct studies to increase knowledge of aquifer, water, and heat resources.

F. Issue administrative orders to amend licenses and permits within the BFGWMA which show "heating" as a use but which do not take water from the low temperature geothermal aquifer.

G. Require a drilling prospectus to be submitted for review and approval with each drilling permit proposing to construct a well into the low temperature geothermal aquifer or which exceeds a 300 ft depth.

H. Retain designation as a ground water management area rather than revise the designation to a critical ground water area. This will keep in place the authority to require instrumentation, monitoring, reporting and recordkeeping.

I. Require applicants for water appropriation to furnish sufficient technical data and plans to allow a preliminary determination by the Director that water is available, that existing users will not be damaged, and that depletion of the aquifer will not be increased. Applications will not be advertised and protest hearings will not be scheduled until an affirmative preliminary determination is made by IDWR.

J. Develop a complete inventory of wells constructed into the low temperature geothermal aquifer.

Signed this 30th day of June, 1988 in Boise, Idaho.

R. KEITH HIGGINSON, Director