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Department of Water Resources
STATE OF IDAHO

DEPARTMENT OF WATER RESOURCES

EXAMINATION FEE INFORMATION

1. Permit No. 63-9341

ONE OF THE FOLLOWING BOXES SHOULD BE MARKED TO DESIGNATE YOUR CHOICE:

☒ I choose to have the department make the field examination of this permit; attached is the examination fee. (If this box is marked, complete items 1 thru 8.)

2. Permit Holder: DEPARTMENT OF ADMINISTRATION

3. Post Office Address: STATEHOUSE BOISE, IDAHO
83720 Telephone No. 334 3453

4. Source of Water: GEOHERMAL WELL

5. Extent of Use:

Domestic _____ (No. of households) Stockwater _____ (No. and type of stock)

Irrigation _____ (acres) Other/Remark GEOHERMAL HEATING

6. Total rate &/or volume for which proof is submitted 5.57 cfs _____ acre-feet

7. Show the date water was first diverted and beneficially used under this permit:

8. Person to contact to accompany the department representative during the field examination:

BRIAN J. CHASE ADMINISTRATOR DIVISION
(Name)

OF PUBLIC WORKS 502 N. FOURTH ST. 334-3453
BOISE IDAHO 83720 (Address) (Telephone Number)

☐ I choose to have the field examination conducted by a certified water right examiner. Attached is a statement from the certified examiner I have selected verifying that he has been retained to conduct the examination. (If this box is marked, complete items 1 thru 7.)

9-22-86
Date

[Signature]
Signature of Permit Holder (and title, if appropriate)

FORM DA-18 Rev. 7-1-77
WHITE - State Auditor
GREEN - Paying Agency
YELLOW - Billing Agency
PINK - Retain in Paying Agency
GOLDENROD - Retain in Billing Agency

State of Idaho
Office of State Auditor
INTER-AGENCY BILL

AUDITOR USE

Document No.

Pre Audit

Date

FOR AGENCY USE

7067

Delivery Date	Billing Date
	10/01/86
Agency Code	

Department of Water Resources

TO: (Paying Agency)

ADMINISTRATION
BUILDING SERVICES

FROM: (Billing Agency)

WATER RESOURCES

Department of Water Resources

INSTRUCTIONS:

1. BILLING AGENCY: Prepare 5 copies of DA-18. Complete sections A and B and sign. Detach goldenrod copies and forward rest of form to receiving agency. Yellow copy will be returned to you after this transaction has been processed.
2. PAYING AGENCY: Upon receipt of this form, complete section C. Sign, detach pink copy for your files and forward remaining copies to office of State Auditor. Green copy will be returned to you after form has been processed.
3. NOTE: Inter-agency bills may be used only for charges of materials or services from one agency to another. This form may not be used for intra-agency transfers of adjustment.

A. THIS SECTION CONTAINS THE NAME, PRICE, AND DESCRIPTION OF MATERIALS OR SERVICES SUPPLIED.

Description	Unit	Quantity	Unit Price	Amount
EXAMINATION FEE FOR INVESTIGATION OF DPW'S WATER RIGHTS. A ONE TIME EXPENSE.				225 00
				225 00

B. THIS SECTION PROVIDES FOR AN INTER-AGENCY CREDIT TO THE BILLING AGENCY FOR THOSE ITEMS SHOWN ABOVE.

Line	Program	Acct.	Recpt. Class	Amount	For Agency Use
1	06 20 121	1238	64 90	225 00	

C. THIS SECTION CHARGES THE AMOUNT SHOWN IN SECTION A TO THE PROPER ACCOUNTS INDICATED BELOW.

☐ PARTIAL ☐ FINAL		Encumbrance Reference Number:					
Agency Code	Line	Program	Acct.	Exp. Class	% of Total	Amount	For Agency Use
030000	1	04 02 000	1106	80 90		225 00	7067
TOTAL 100%						225 00	

I hereby certify that the items listed above were furnished to the state agency indicated and that the amounts billed are proper charges.

Signed

(Authorized Agent of Billing Agency)

Signed

(Authorized Agent of Paying Agency)

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
PROOF OF BENEFICIAL USE

RECEIVED
MAY 6 1985

Department of Water Resources

The Idaho Department of Water Resources will consider this form as a statement that the permit holder(s) has completed development under this permit and that water has been applied according to the provisions of the permit for the beneficial use(s) described below:

Permit No. 63-9341

Name(s) of Permit Holder: Department of Administration

Post Office Address: 650 West State Street, Room 100, Boise, Idaho 83720

Telephone No. 334-3380

Source of Water: Geothermal Well

Extent of Use:

Domestic _____ (number of households)

Stockwater _____ (number and type of stock)

Irrigation _____ (acres)

Other/Remarks Geothermal well that provides heat to
the Capitol Mall area.

Indicate the date water was first diverted and beneficially used under this permit: September 1982

Measuring Device: Required? ☐ Yes ☐ No
Installed? ☒ Yes ☐ No

Flow Measurement Port: Required? ☒ Yes ☐ No
Installed? ☒ Yes ☐ No

Person to contact to accompany the Department representative during the field examination:

Sam Hiskey, Building Facilities Supervisor
(Name)

Bureau of Building Svcs, Div. of Public Works 334-2315
(Address) (Telephone Number)

The above information is a true statement of the extent to which the above numbered permit has been developed.

Date

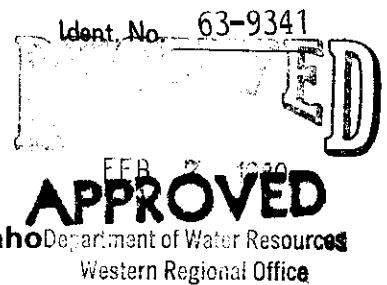
5/1/85

Glenn W. Nichols
Signature of Permit Holder (and Title, if appropriate)
Glenn W. Nichols, Director
Department of Administration

MICROFILMED

2/06/80
Tremblay
Form 202
3/78

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
APPLICATION FOR PERMIT



To appropriate the public waters of the State of Idaho

1. Name of applicant Idaho State Dept. of Administration Phone 334-3380

Post office address Len B. Jordan Building-Boise, Idaho 83720

2. Source of water supply Ground water which is a tributary of N/A

3. Location of point of diversion is NE $\frac{1}{4}$ of NE $\frac{1}{4}$ of Section 10 Township 3N

Range 2E B.M. ADA County, additional points of diversion if any: None

4. Water will be used for the following purposes:

Amount 5.57 for Space Heating purposes from 1/01 to 12/31 (both dates inclusive)
(cfs or acre-feet per annum)

Amount _____ for _____ purposes from _____ to _____ (both dates inclusive)
(cfs or acre-feet per annum)

Amount _____ for _____ purposes from _____ to _____ (both dates inclusive)
(cfs or acre-feet per annum)

Amount _____ for _____ purposes from _____ to _____ (both dates inclusive)
(cfs or acre-feet per annum)

5. Total quantity to be appropriated:

a. 5.57 cubic feet per second and/or b. _____ acre-feet per annum.

6. Proposed diverting works:

a. Description of ditches, flumes, pumps, headgates, etc. N/A

b. Height of storage dam N/A feet, active reservoir capacity N/A acre-feet; total reservoir capacity N/A acre-feet, materials used in storage dam: N/A

Period of year when water will be diverted to storage N/A to N/A inclusive.
20"-150", 12" (150"-1000") (Month/Day) (Month/Day)

c. Proposed well diameter is 8" (1000'-2200') inches, proposed depth of well is 2,200' feet.

7. Time required for the completion of the works and application of the water to the proposed beneficial use is 5 years (minimum 1 year — maximum 5 years).

8. Description of proposed uses:

a. If water is not for irrigation:

(1) Give the place of use of water: NE $\frac{1}{4}$ of NE $\frac{1}{4}$ of Section 10 Township 3N

Range 2E B.M.

(2) Amount of power to be generated: N/A horsepower under _____ feet of head.

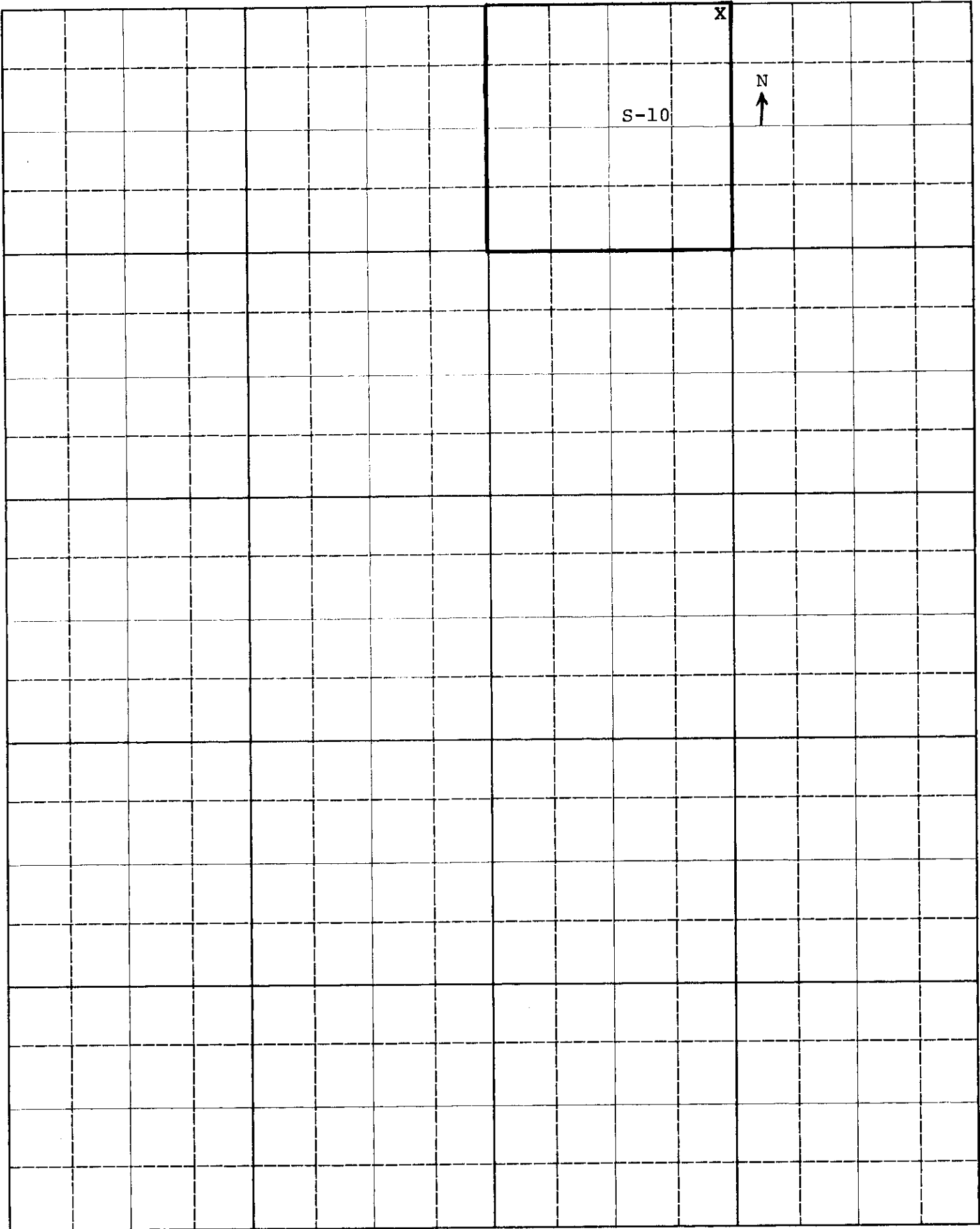
(3) List number of each kind of livestock to be watered N/A

(4) Name of municipality to be served Idaho Capitol Mall, or number of families to be supplied with domestic water N/A

(5) If water is to be used for other purposes describe: To Geothermally space heat the Idaho State Capitol Mall

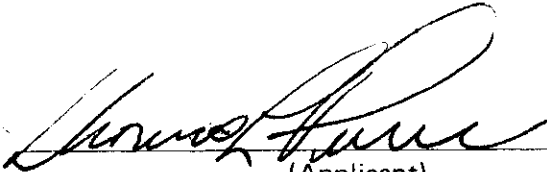
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11. Map of proposed project: show clearly the proposed point of diversion, place of use, section number, township and range number.



Scale: 2 inches equal 1 mile.

BE IT KNOWN that the undersigned hereby makes application for permit to appropriate the public waters of the State of Idaho as herein set forth.


(Applicant)

Thomas L. Purce
Director, Dept. of Administration
State of Idaho

Proposed Priority 2/6/80
Received by jo Date 2/4/80 Time 11:12 A.M.
Preliminary check by GLS Fee \$ 85.00 # 15336
Received by KK Date 1/7/80
Publication prepared by KK Date 2/14/80
Published in Statesman
Publication dates 2/21 + 2/28/80
Publication approved HLLH Date 5/27/80
Protests filed by: _____

Copies of protests forwarded by _____
Hearing held by _____ Date, _____
Recommended for approval denial by DBS

ACTION OF THE DIRECTOR, DEPARTMENT OF WATER RESOURCES

This is to certify that I have examined Application for Permit to appropriate the public waters of the State of Idaho No. 63-9341, and said application is hereby approved.

1. Approval of said application is subject to the following limitations and conditions:

- a. SUBJECT TO ALL PRIOR WATER RIGHTS.
- b. Proof of construction of works and application of water to beneficial use shall be submitted on or before June 1, 19 85.
- c. The rate of diversion, if water is to be used for irrigation under this permit, when combined with all other water rights for the same land shall not exceed 0.02 cubic feet per second for each acre of land.
- d. Other: (1) An access port or other device as specified by the Department shall be installed by the permit holder to provide for the installation of measuring equipment and the determination of the rate of diversion by the Department.
(2) Return flow if discharged to a subsurface system must be authorized by a separate injection well permit, and return flow if discharged to a surface water system shall meet Idaho Water Quality Standards.
(3) Water used under this permit shall be developed in compliance with the conditions given on the Associated Geothermal Permit No. 63-GR-2.

Witness my hand this 10 day of June, 1980.

Billy D. Fleener
Chief, Operations Bureau

**NOW
STARTING
RIGHT
SIDE OF
FILE**

BEFORE THE DEPARTMENT OF WATER RESOURCES
OF THE STATE OF IDAHO

IN THE MATTER OF THE BOISE)
FRONT LOW TEMPERATURE)
GEOTHERMAL RESOURCE GROUND)
WATER MANAGEMENT AREA)
_____)

**FINAL ORDER
EXTENDING MORATORIUM**

WHEREAS, on June 15, 1987, the Director of the Idaho Department of Water Resources (IDWR) designated the Boise Front Low Temperature Geothermal Resource Ground Water Management Area in Ada County, Idaho, due to reported declines in aquifer water levels and water pressure; and

WHEREAS, on June 11, 1988, IDWR issued an order establishing a five (5) year moratorium to prevent further development or additional use of the low temperature geothermal water resource (resource); and

WHEREAS, on July 7, 1998, IDWR advised the users of the resource that IDWR was reviewing the need for the moratorium and whether it should be modified or extended. IDWR requested written comments on the nature of the action IDWR should take in connection with the expiring moratorium; and

WHEREAS, six (6) parties submitted written comment to IDWR. All major users supported extending the moratorium for an additional five (5) years.

NOW THEREFORE, pursuant to Section 42-1805(7), Idaho Code, and IDAPA Rule 37.03.08055 (Water Appropriation Rule 55), IT IS HEREBY ORDERED that:

(1) The order dated June 10, 1988 which established a moratorium on further development and additional use of the low temperature geothermal water resource in the Boise Front Ground Water Management area is extended.

(2) The provisions of this order are effective for five (5) years from the date issued unless rescinded or modified by order of a court of competent jurisdiction or unless rescinded or modified by order of the Director.

Dated this 1st day of September, 1998.



KARL J. DREHER
Director

Idaho Department of Water Resources

Open File Report

**PRODUCTION HISTORY
FOR THE STATE OF IDAHO
CAPITOL MALL GEOTHERMAL SYSTEM
1983-1994**



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INTRODUCTION

The State of Idaho Capitol Mall geothermal system has operated in downtown Boise since 1982. The system supplies about ninety percent of the heat required for nine buildings, including the State Capitol. The primary components of the system are: 1) a production well, 2) heat exchangers, 3) underground delivery and collection pipes, and 4) an injection well. Production, temperature and system operation data have been recorded manually on Daily Logs since May, 1983. In 1991, the Department of Administration-Building Services made this data available through computer Trend Logs which capture information every six hours. The Idaho Department of Water Resources has compiled the Daily Logs and Trend Logs from 1983-1994.

Purpose and Scope

The purpose of this report is to publish a complete record to date of the geothermal production history for the State of Idaho Capitol Mall geothermal system. This report presents annual and monthly production totals, daily discharges, average monthly discharges, maximum monthly discharges and maximum monthly supply temperatures. The data in this report were compiled from the handwritten Daily Logs, the computer Trend Logs and previously published reports. Data are presented using Julian year dates.

The data in this report were used by the Idaho Department of Water Resources for the water right licensing of the State of Idaho geothermal production well in 1995.

Previous Studies

Several papers and reports describe either the development of the Capitol Mall geothermal system or document some of the production history (Mink, 1976; Anderson, 1981; Anderson and Kelly, 1981; Worbois, 1982; Berkeley Group Inc., 1990; Higginson, 1987; Waag and Wood, 1987; Boise Warms Springs Water District, 1989; Montgomery, 1992; Dansart and others, 1994; Montgomery Watson, 1994). Prior to this report, the most complete production history was presented in the Berkeley Group, Inc. (1990) report which contains records of annual production from 1982 through June 1989. The Montgomery (1992) and Montgomery Watson (1994) reports contain some production data for 1990 and 1991.

Well-Numbering System

The well-numbering system used in this report is identical to the system used by the U.S. Geological Survey (USGS) in Idaho (Figure 1). The system indicates the location of wells within the official rectangular subdivision of the Public Land Survey System (PLSS) with reference to the Boise baseline and meridian. The first two segments of the number designate the township and range. The third segment gives the section number followed by three or four letters and a number. The letters indicate the $\frac{1}{4}$ section (160 acre tract), $\frac{1}{4}$ - $\frac{1}{4}$ section (40 acre tract), $\frac{1}{4}$ - $\frac{1}{4}$ - $\frac{1}{4}$ section (10 acre tract), $\frac{1}{4}$ - $\frac{1}{4}$ - $\frac{1}{4}$ - $\frac{1}{4}$ section (2.5 acre tract),

and the serial number of the well within the tract. Quarter sections are lettered A, B, C, and D in counterclockwise order beginning in the northeast quarter of the section. Successively smaller tracts are lettered in the same manner. For example, well 04N 01E 04CDA1 corresponds to the PLSS location: NE $\frac{1}{4}$, SE $\frac{1}{4}$, SW $\frac{1}{4}$, Section 4, Township 4 North, Range 1 East, and it was the first well inventoried by the USGS in that tract.

Acknowledgements

The author would like to thank several people who helped compile the data for this report. Monty Leinberger and Bill Hudson, Idaho Department of Administration-Building Services and Tom Markland, Idaho Department of Lands, provided copies of the Daily Logs for the State Geothermal system. Cody Kinney, Idaho Department of Water Resources (IDWR), entered the data from the Daily Logs into computer spreadsheets. Wayne Haas, Hal Anderson, Paul Castelin and Steve Lester (all employees at IDWR) provided technical review for this report. I appreciate all of your efforts in this project.

GEOTHERMAL DEVELOPMENT IN BOISE

In late 1890, investors from the Boise Water Works Company decided to drill a hot water well in a swampy area about two and a half miles east of Boise. This tract of land was swampy because of seepage from natural geothermal springs. By early 1891, two geothermal wells (now known as Boise Warm Springs Water District (BWSWD) #1 and #2) had been successfully completed (Figure 2).

In May, 1892, the Boise Natatorium, a 15,000 square foot structure which included a 65 x 125 foot geothermal swimming pool, was open for business. In the same year, the Artesian Hot and Cold Water Company (which had purchased the Boise Water Works Company in 1891) began supplying geothermal water to private residences and businesses along Warm Springs Road. The Natatorium remained in business until 1934. From 1892 until the 1970's, there was no significant exploration for geothermal resources in the downtown Boise area.

In the early 1970's, the State of Idaho began expanding the Capitol Mall office complex. Rising heating costs prompted Governor Cecil Andrus to request a study of the Boise geothermal resources. The study, conducted by the U.S. Energy Research and Development Administration, recommended a pilot project. Consequently, the heating system for the State Health Laboratory on Penitentiary Road was converted to geothermal space heating in 1977. The State of Idaho realized the cost-saving benefits immediately. By 1979, the State was ready to take the next step in geothermal heating.

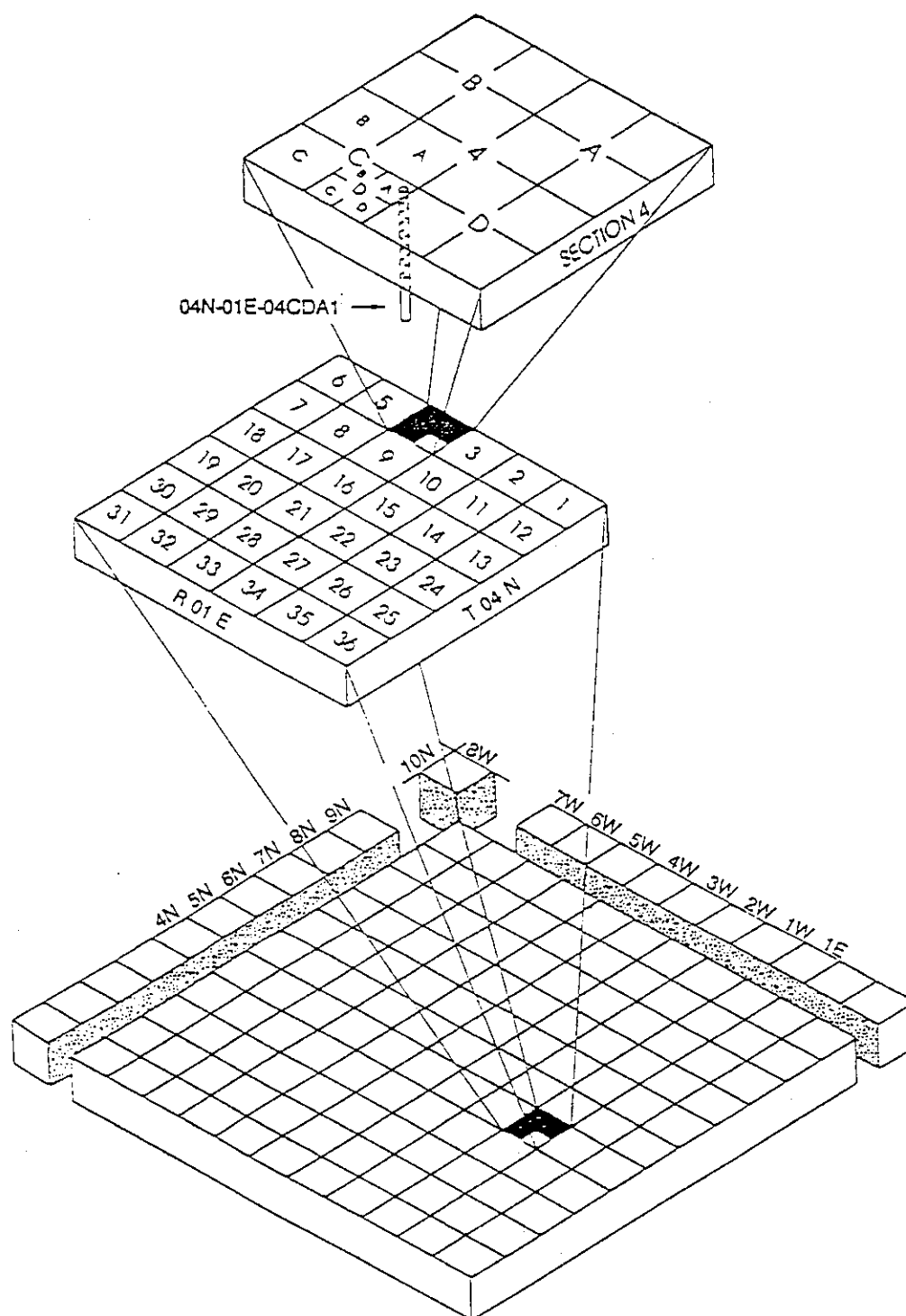


Figure 1. Well-numbering system.

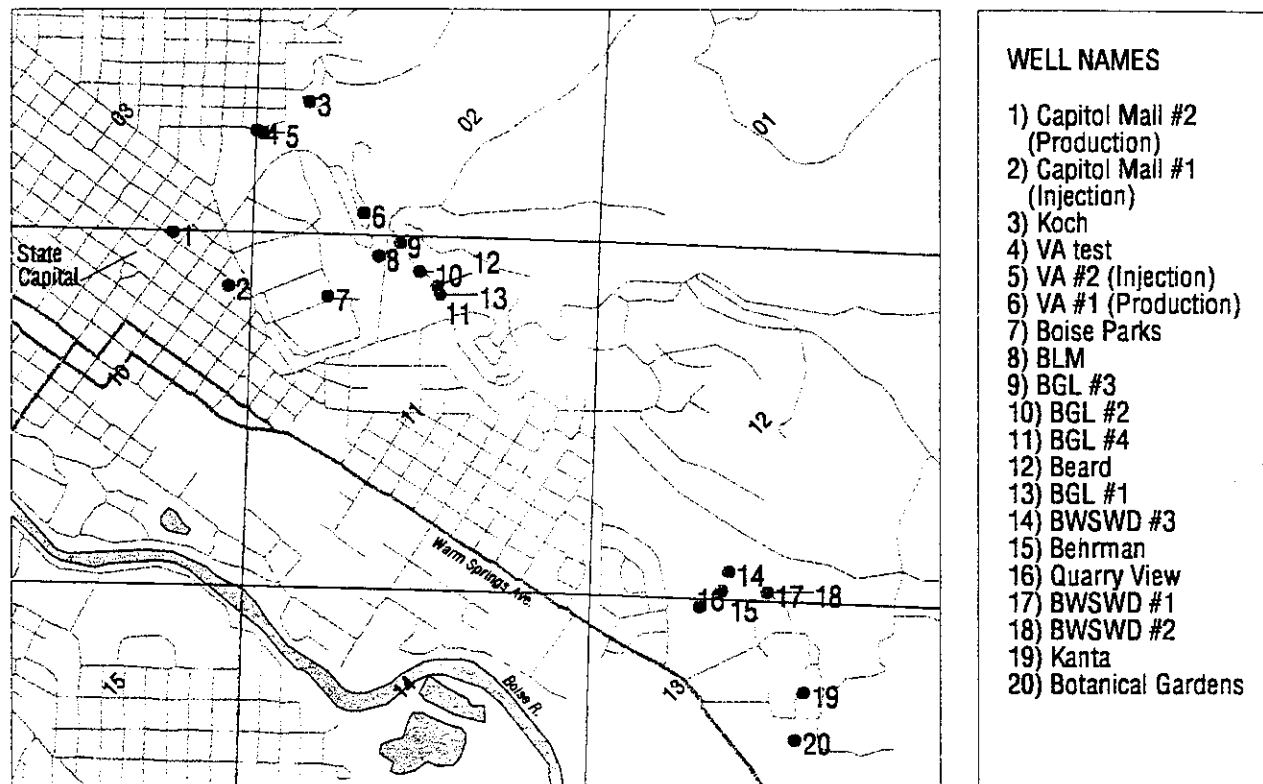


Figure 2. Location map of geothermal wells in the downtown Boise and Boise Warm Springs Water District areas. The map area is within Township 3 North, Range 2 East. The numbers appearing diagonally are the section numbers.

In 1981, the Capitol Mall #1 and #2 wells were completed to the east and northeast of the State Capitol, respectively (Figure 2). Capitol Mall #1 (03N 02E 10AADA1) is 2,152 feet deep and is used as the injection well. Capitol Mall #2 (03N 02E 11AABB1) is 3,030 feet deep and is the production well. Capitol Mall #2 is capable of flowing at over 900 gallons per minute. The original water temperature for Capitol Mall #2 was 160° Fahrenheit. By 1982, nine buildings in the Capitol Mall complex were being heated by the geothermal resource (Figure 3).

In the early 1980's, Boise Geothermal Limited drilled four production wells and the Veterans Administration drilled a test well followed by a production and an injection well (Figure 2). In 1988, the City of Boise purchased Boise Geothermal Limited.

In the mid 1980's, water levels in the Bureau of Land Management (BLM) observation well, located east of the Capitol Mall wells (Figure 4), began declining rapidly. In 1987, IDWR created the Boise Front Low Temperature Geothermal Resource Ground

Water Management Area because of the declining water levels. Further development of the geothermal resource was discontinued in the Management Area. Since 1987, water levels in the BLM well have ceased declining (Figure 4).

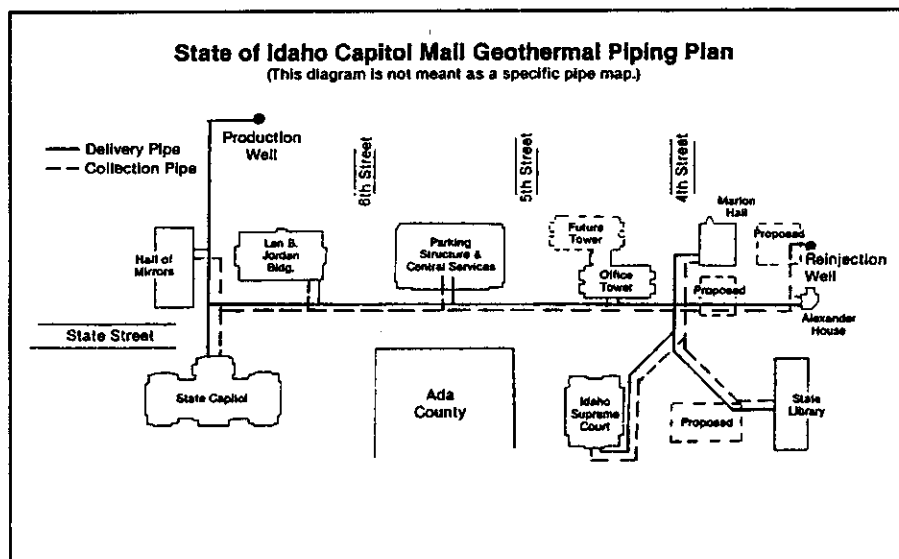


Figure 3. State of Idaho Capitol Mall geothermal piping plan (from Worbois, 1982).

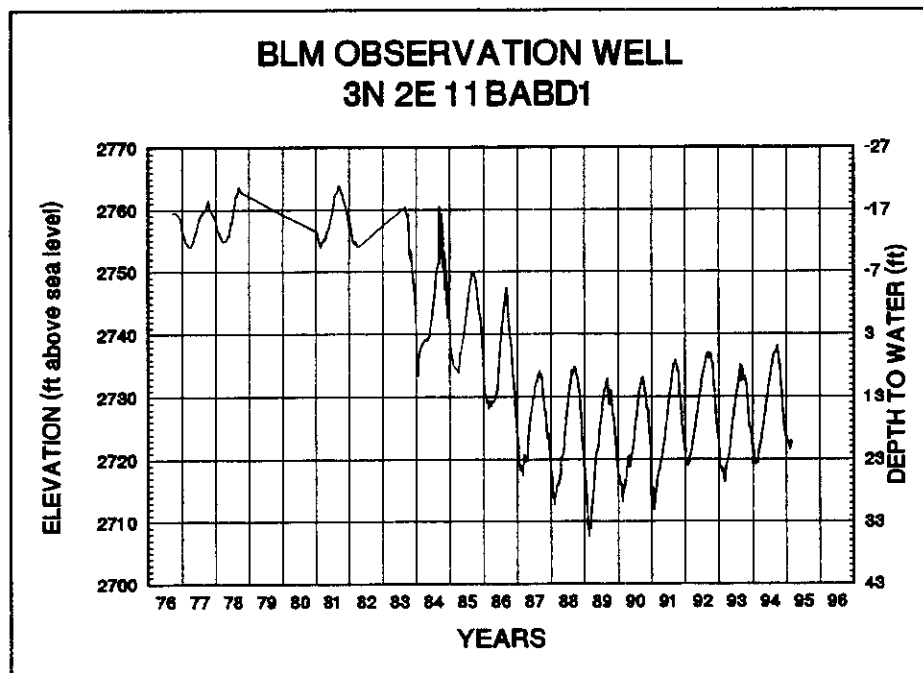


Figure 4. Hydrograph for the BLM observation well (03N 02E 11BABD1).

CAPITOL MALL DATA

Data are collected in two formats for the Capitol Mall system. The first format is handwritten Daily Logs on which discharge, temperature, pressure and other system operations are recorded. Data have been entered on Daily Logs since May, 1983. The Berkeley Group, Inc. (1990) report noted that the Daily Log data usually reflect higher than average discharges because the readings are taken during peak flow times (i.e. 5:00 - 8:00 a.m.). Data from the Daily Logs were entered into computer spreadsheet files at IDWR.

The second format is Trend Logs where data are recorded every six hours using a computer system. Data have been recorded on Trend Logs since 1991. Unfortunately, Trend Logs for 1991 and 1992 are incomplete primarily due to data capture mistakes by the author. Trend Log data for 1993 are considered to be complete. Trend Log data for 1994 are incomplete because the flowmeter was not working for several months.

The raw data from both the Daily Logs and the Trend Logs were used to calculate and graph annual and monthly production, daily and monthly discharges and average monthly supply temperatures.

Annual Production

Annual production for the State Geothermal system was obtained using three sources: 1) Berkeley Group Inc. (1990) report, 2) Daily Logs, and 3) Trend Logs. The Berkeley Group Inc. (1990) report used calculated average flowrates instead of the flowrates reported on the Daily Logs. In this study, the annual production totals using the Daily Logs (1983-1994) were calculated by multiplying each daily discharge reading (in gallons per minute) by 1,440 to obtain a daily volume, and summing the daily volumes. The annual production totals for the Trend Logs were calculated by computing an average discharge for each day, multiplying each average daily discharge by 1,440 to produce a daily volume, and summing the daily volumes. Table 1 lists the reported and calculated annual production totals for 1983-1994. Low values in 1983, 1990, 1991, 1992 and 1994 are caused by missing data. Figure 5 shows the range in annual production for 1983-1994.

Additional calculations were performed on the data for 1993 because of the differences between the annual production calculations from the Trend and Daily Logs (1993 was selected because the Trend Log data in that year was considered to be the more complete than the Trend Log data collected in 1991, 1992 and 1994). The maximum daily discharge was extracted from each set of four daily readings from the Trend Logs. The maximum daily discharge was multiplied by 1,440 to obtain a maximum daily volume. The sum of the maximum daily volumes was 240.4 million gallons essentially equal to the annual production calculated from the Daily Logs (240.2 million gallons). This result confirms the Berkeley Group Inc. (1990) assertion that the values from the Daily Logs are too high because they were recorded during peak production times.

Table 1. Annual production for the Capitol Mall geothermal system, 1983-1994 (in millions of gallons).

Year	Berkeley Group Inc. (1990)	Daily Logs	Trend Logs
1983	79.1	65.8	
1984	204.8	169.5	
1985	196.4	187.5	
1986	188.6	179.7	
1987	N/A	148.6	
1988	212.6 ^a	122.7	
1989	106.3 ^a	155.6	
1990		83.4	
1991		159.4	43.6
1992		136.3	75.3
1993		240.2	180.3
1994		167.9	96.3

^a Estimated from Totalized value of 3.10×10 gallons for the period from January, 1988 through June, 1989 (Berkeley Group Inc. (1990)).

Monthly Production

Figure 6 shows the total monthly production for 1983 to 1994 as calculated from the Daily and Trend Logs. Monthly production ranged from 0 to 30.5 million gallons. Appendix A lists the monthly production data.

Daily Discharges

Figures 7 through 18 show the daily discharge readings from the Daily Logs for 1983-1994. The average daily discharge readings from the Trend Logs for 1991-1994 are included in Figures 15-18. The X axis for each figure is incremented by Julian days in the respective calendar year (Day 1 = January 1; Day 365 = December 31)

Daily discharges fluctuate from about 600 to 800 gallons per minute during the peak heating season (approximately days 1-90 and 300-365), to about 300-500 gallons per minute during the non-peak heating season (approximately days 91-180 and 240-299), to 0-300 gallons per minute during the summer (approximately days 181-239). Clearly, some years have more complete data than other years. Figures 9, 10, and 17 appear to be the most complete. Therefore, the annual production as calculated from the Daily and Trend Logs may be the most accurate for 1985, 1986 and 1993 (Table 1).

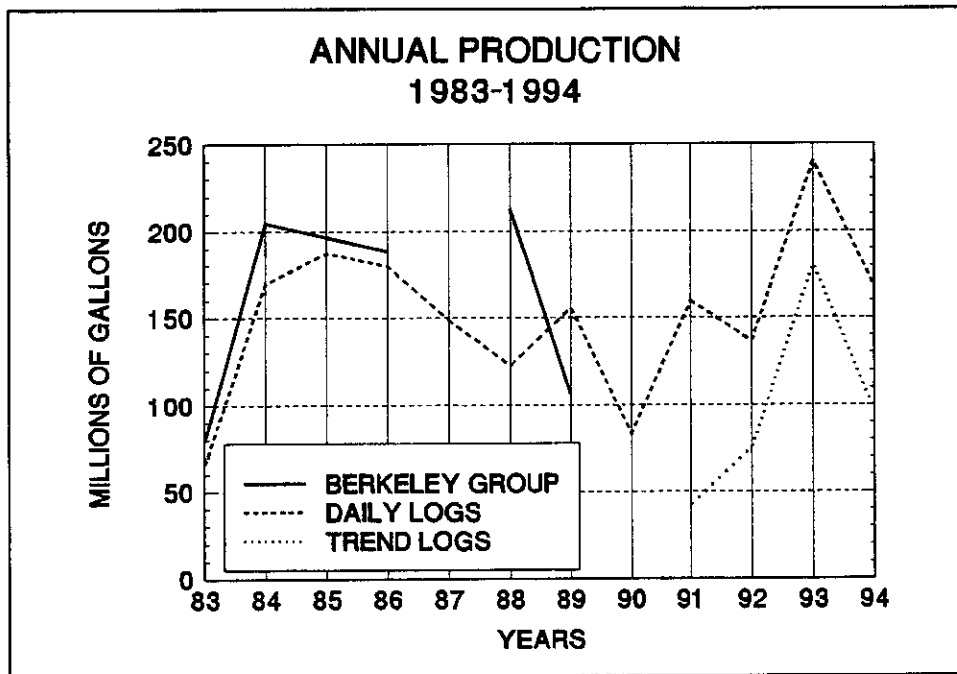


Figure 5. Annual production for the Capitol Mall geothermal system, 1983-1994.

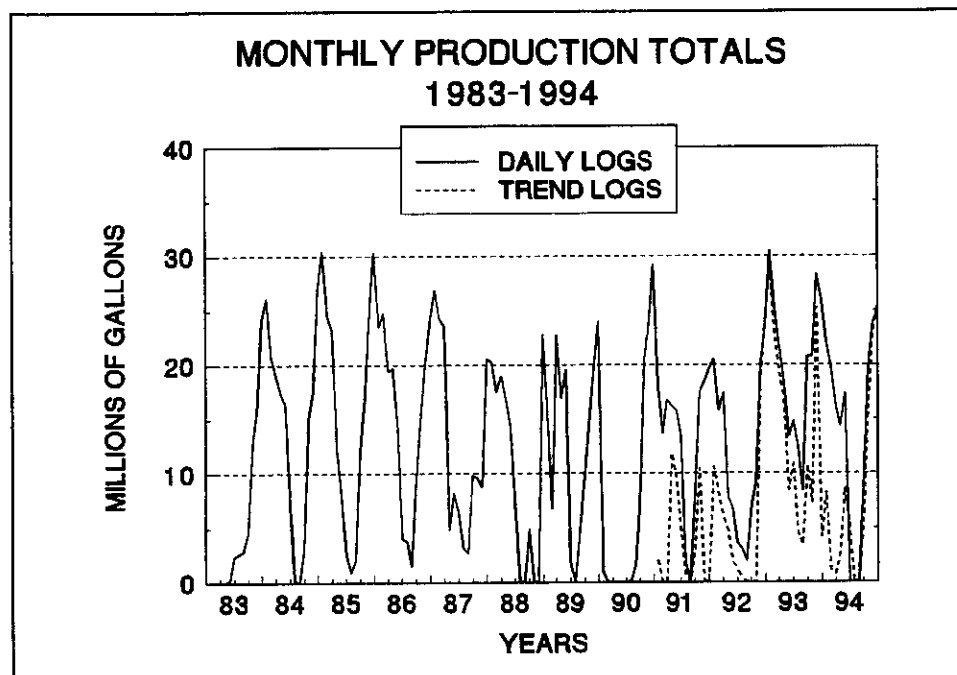


Figure 6. Monthly production for the Capitol Mall geothermal system, 1983-1994.

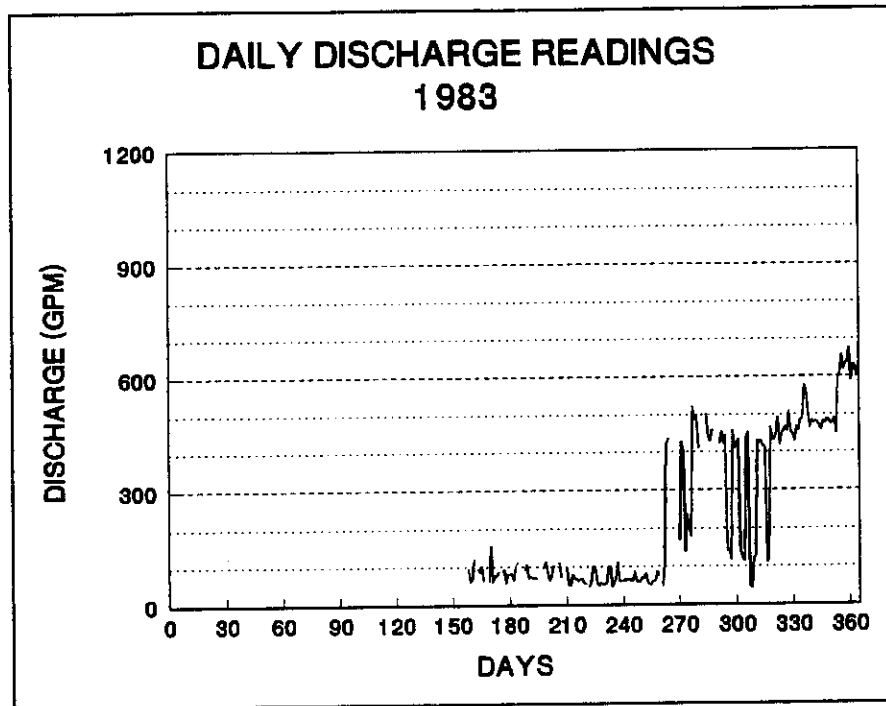


Figure 7. Daily discharge readings for the Capitol Mall geothermal system, 1983.

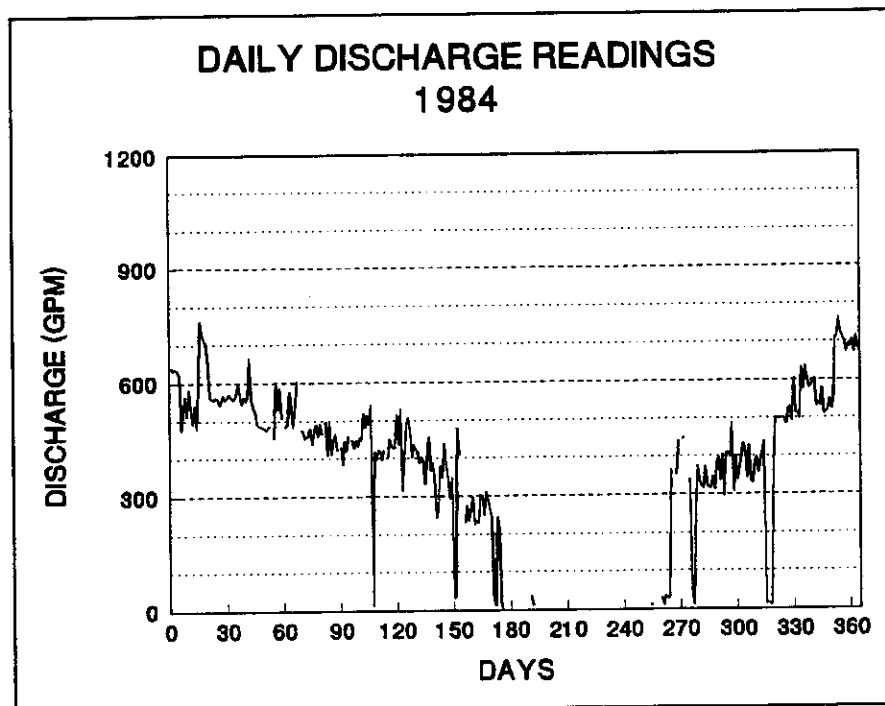


Figure 8. Daily discharge readings for the Capitol Mall geothermal system, 1984.

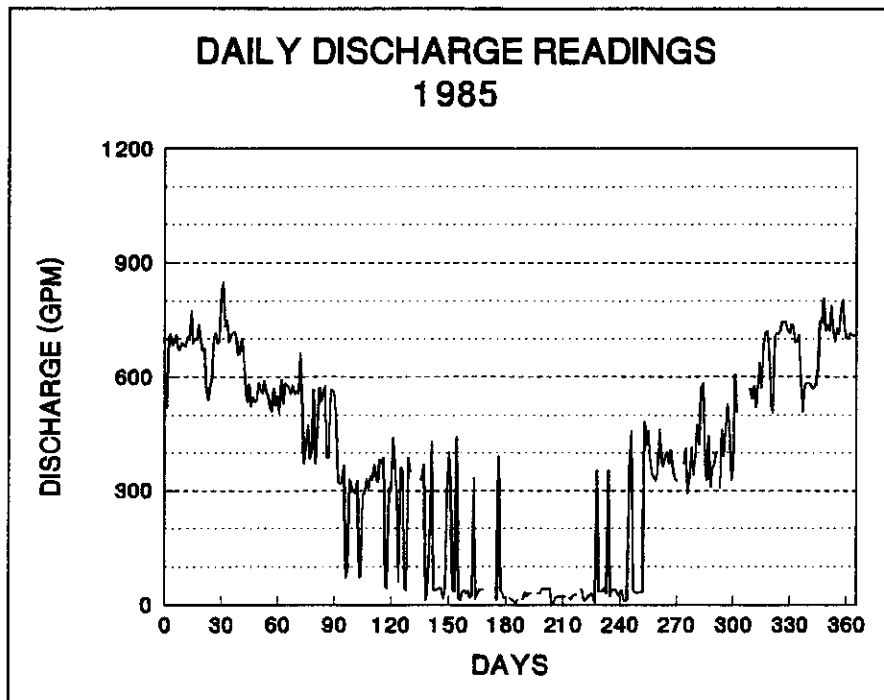


Figure 9. Daily discharge readings for the Capitol Mall geothermal system, 1985.

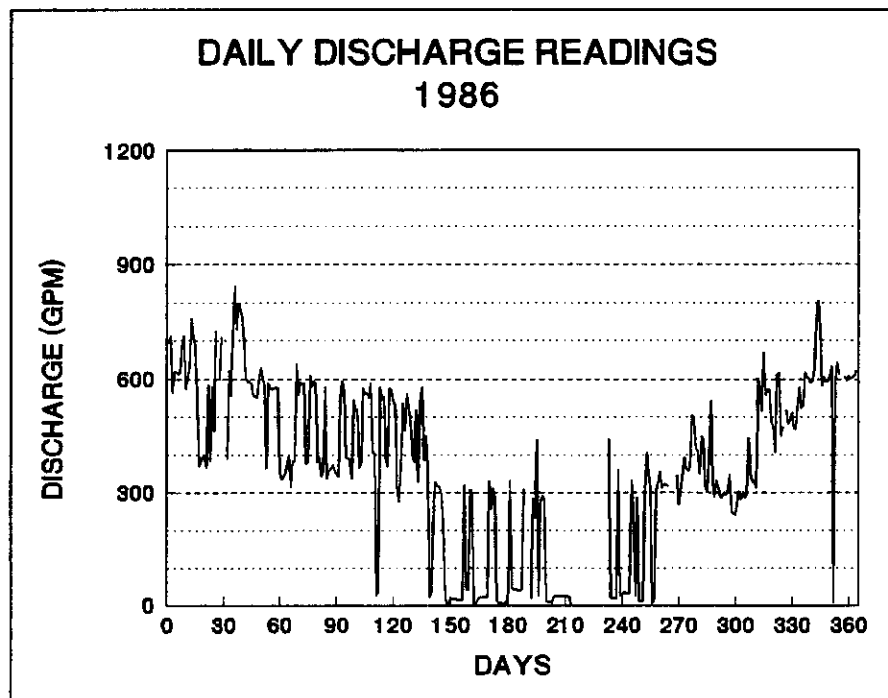


Figure 10. Daily discharge readings for the Capitol Mall geothermal system, 1986.

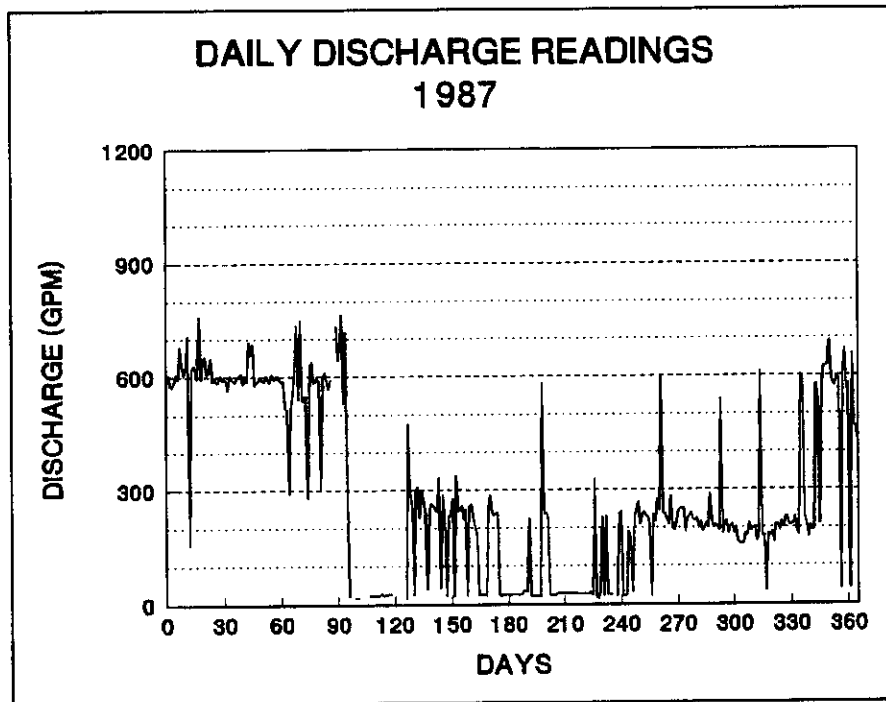


Figure 11. Daily discharge readings for the Capitol Mall geothermal system, 1987.

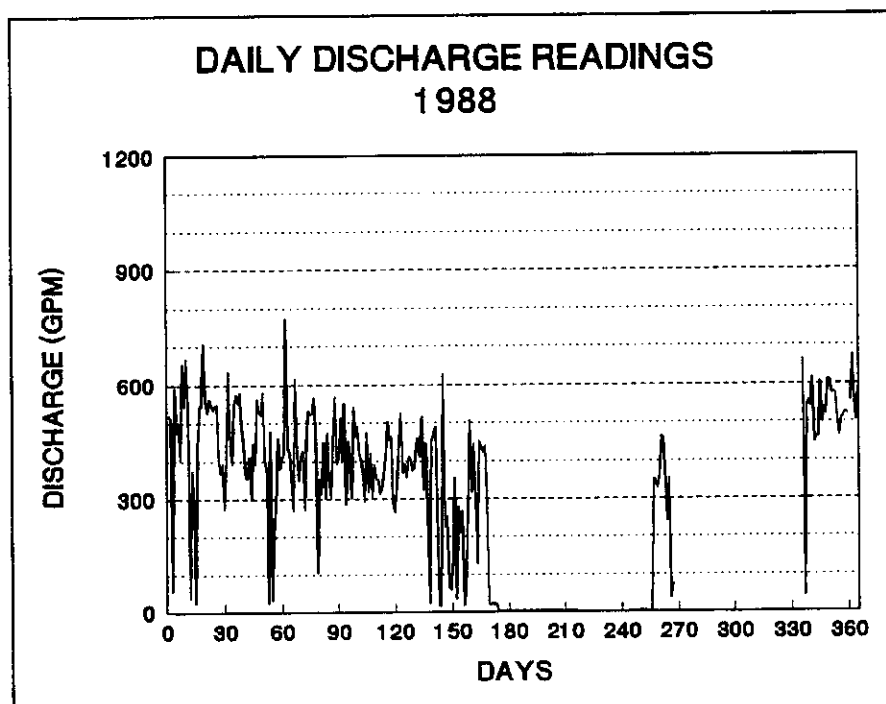


Figure 12. Daily discharge readings for the Capitol Mall geothermal system, 1988.

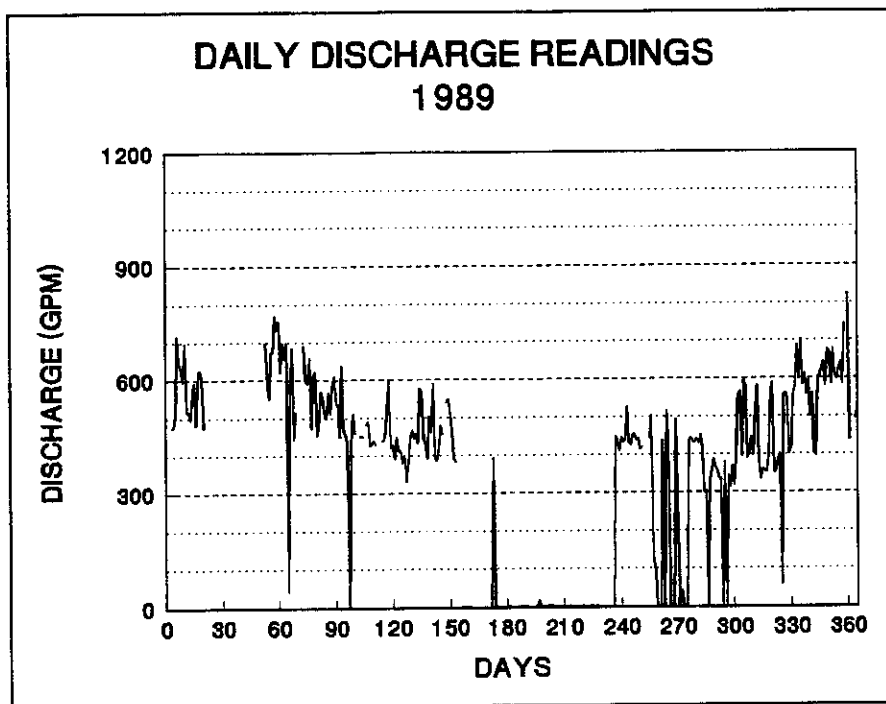


Figure 13. Daily discharge readings for the Capitol Mall geothermal system, 1989.

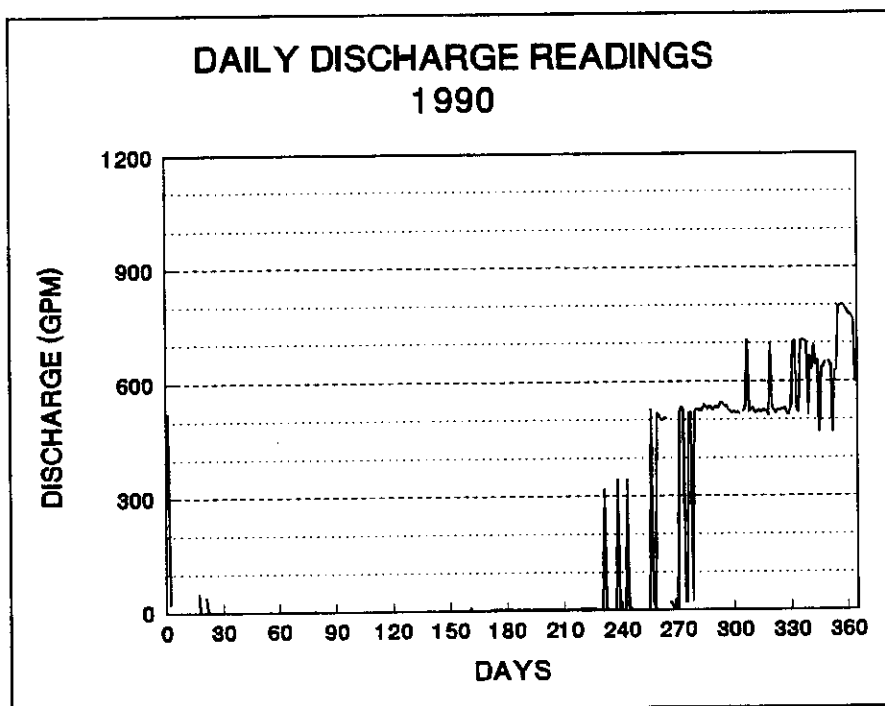


Figure 14. Daily discharge readings for the Capitol Mall geothermal system, 1990.

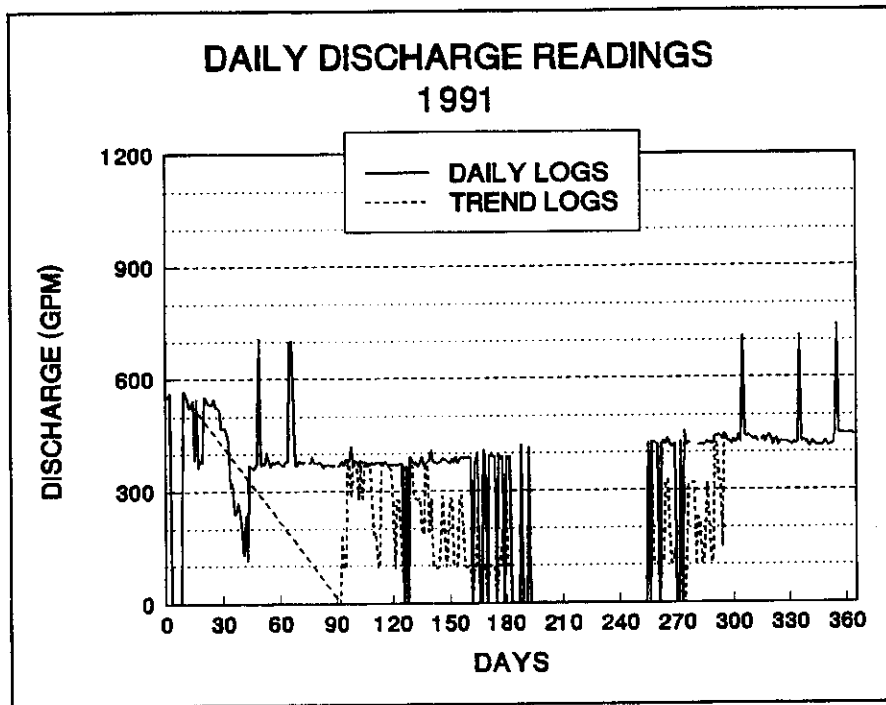


Figure 15. Daily discharge readings for the Capitol Mall geothermal system, 1991.

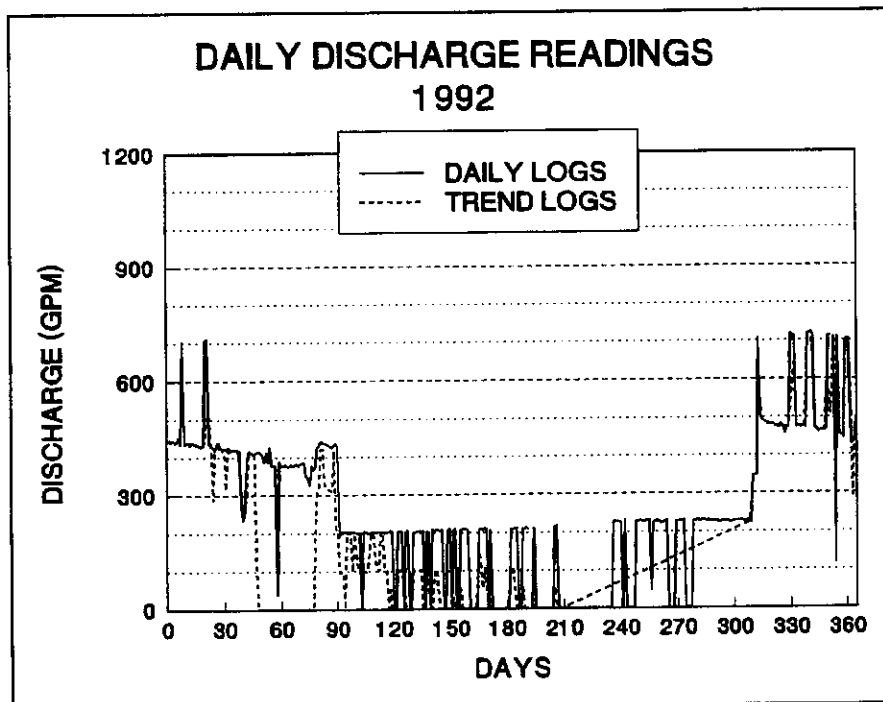


Figure 16. Daily discharge readings for the Capitol Mall geothermal system, 1992.

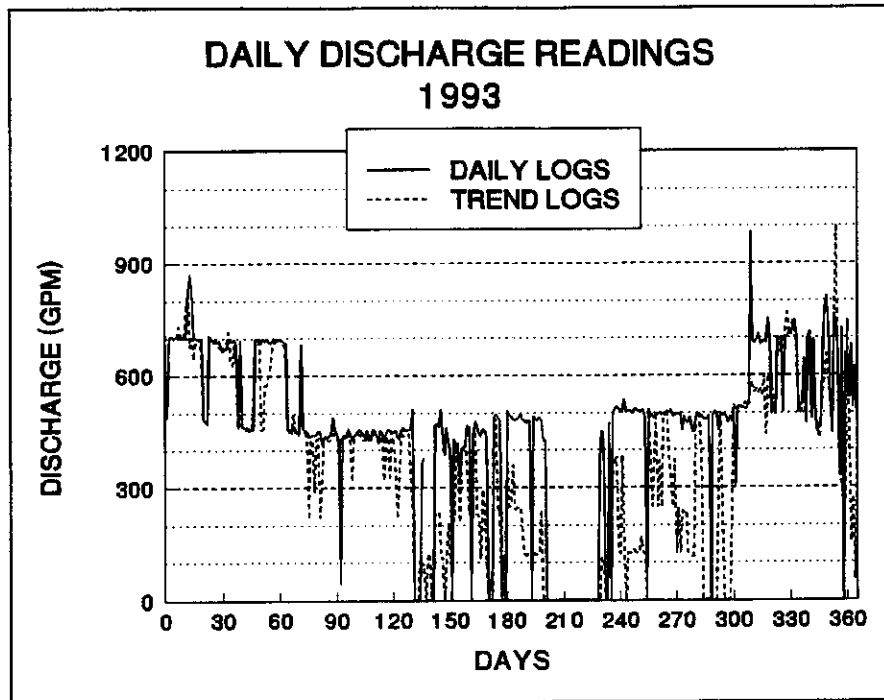


Figure 17. Daily discharge readings for the Capitol Mall geothermal system, 1993.

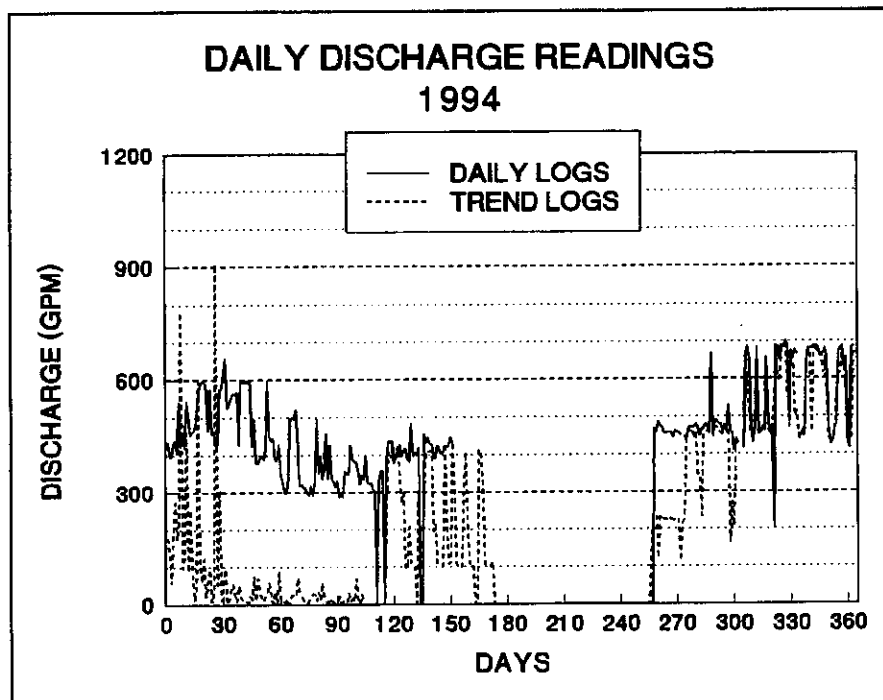


Figure 18. Daily discharge readings for the Capitol Mall geothermal system, 1994.

Monthly Discharges

The average monthly discharges ranged from 0 to 683 gallons per minute (Figure 19). Maximum monthly discharges were about 800-850 gallons per minute (Figure 20). The highest discharge rate was 982 gallons per minute in November, 1993.

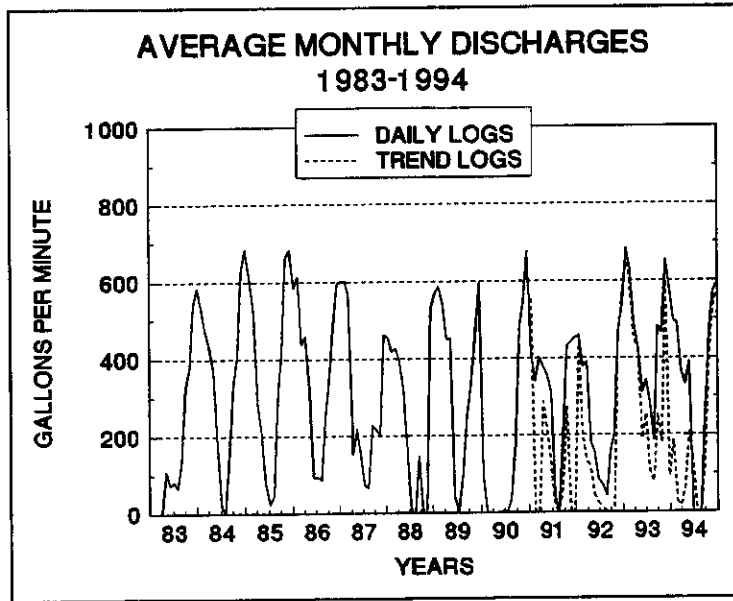


Figure 19. Average monthly discharges for the Capitol Mall geothermal system, 1983-1994.

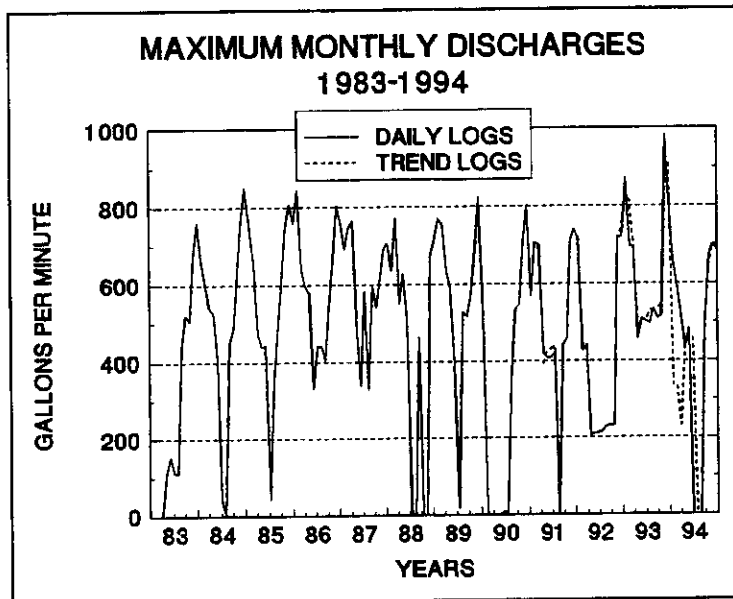


Figure 20. Maximum monthly discharges value for the Capitol Mall geothermal system, 1983-1994.

Supply Temperatures

Figure 21 shows a decline of about 5° Fahrenheit in the maximum monthly supply temperatures from 1983 to 1994. The decline may have been caused by a gradual thermal breakthrough related to nearby reinjection in Capitol Mall #1.

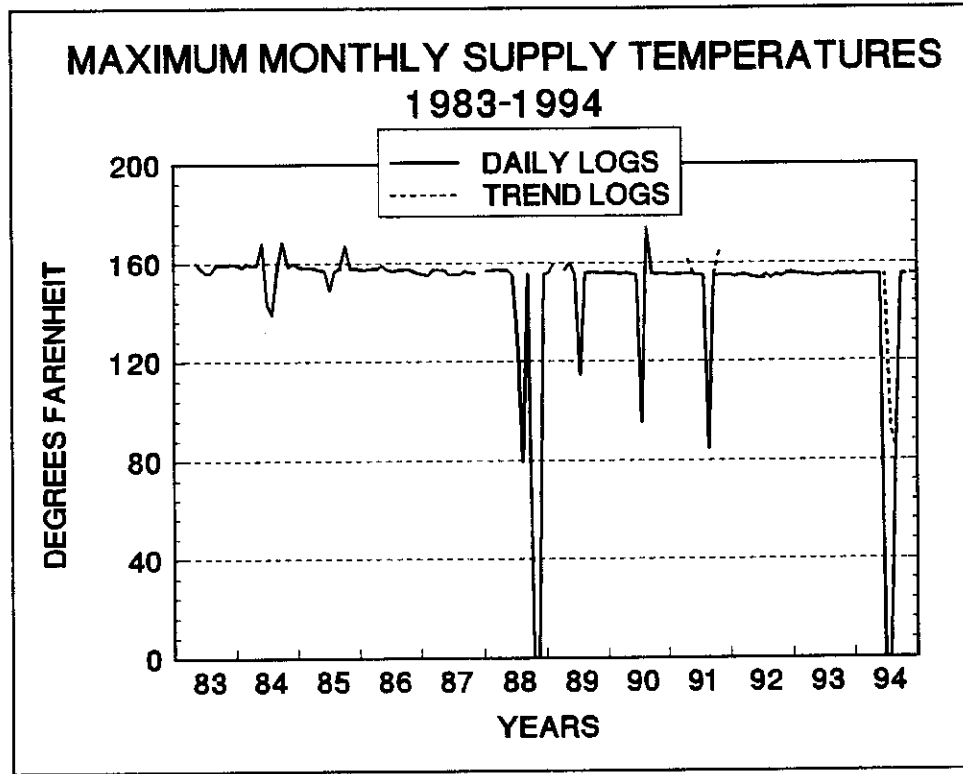


Figure 21. Maximum monthly supply temperatures for the Capitol Mall Geothermal system, 1983-1994.

CONCLUSIONS AND RECOMMENDATIONS

The State of Idaho Capitol Mall geothermal system heats nine buildings in the Capitol Mall complex. The system has been in operation since 1982. Annual production was computed to range from 65.8 to 240.2 million gallons during the time period from 1983 to 1994 (no records could be found for 1982). The computed value of 240.2 million gallons (1993 Daily Logs) is too high because the calculation is based on peak daily discharges as opposed to average daily discharges. The computed value of 65.8 (1983 Daily Logs) is too low because of missing data. Based on all of the data, the annual geothermal production for the Capitol Mall system probably ranged from 160 to 205 million gallons. A credible average annual production cannot be calculated because data records for several years are incomplete. The highest monthly production was 30.5 million gallons in January, 1985. The highest average monthly discharge rate was 683 gallons per minute in January, 1985. The maximum discharge rate was 982 gallons per minute in November, 1993. The maximum monthly supply temperature decreased about 5° Fahrenheit from 1983 to 1994.

Continued and improved monitoring is critical for the Capitol Mall system as well as for the other geothermal systems in the downtown Boise and Boise Warm Springs Water District areas. Efforts should be expanded to prevent data gaps caused by equipment failure and data capture mistakes.

REFERENCES

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- Worbois, D., 1982, Glad to be in hot water-geothermal development in Boise, Idaho, 1890-1983: Parker Printing Company, 13 p.

APPENDIX A.

MONTHLY PRODUCTION FOR THE CAPITOL MALL GEOTHERMAL SYSTEM			
Year	Month	Production in gallons (Daily Logs)	Production in gallons (Trend Logs)
1983	January	NA	
	February	NA	
	March	NA	
	April	NA	
	May	158,400	
	June	2,441,952	
	July	2,688,192	
	August	2,914,128	
	September	4,604,400	
	October	12,642,192	
	November	16,281,360	
	December	24,102,864	
1984	January	26,069,904	
	February	20,765,808	
	March	19,024,992	
	April	17,335,728	
	May	16,408,368	
	June	6,986,448	
	July	97,488	
	August	NA	
	September	3,192,336	
	October	15,059,952	
	November	17,584,416	
	December	26,996,400	
1985	January	30,486,960	
	February	24,515,280	
	March	23,126,976	
	April	12,104,352	
	May	8,037,360	
	June	2,485,584	
	July	862,272	
	August	2,048,112	
	September	12,060,864	
	October	16,672,032	
	November	24,705,648	
	December	30,388,752	

MONTHLY PRODUCTION FOR THE CAPITOL MALL GEOTHERMAL SYSTEM			
Year	Month	Production in gallons (Daily Logs)	Production in gallons (Trend Logs)
1986	January	23,485,392	
	February	24,713,568	
	March	19,460,448	
	April	19,732,608	
	May	14,113,584	
	June	4,015,440	
	July	3,804,912	
	August	1,478,448	
	September	9,465,696	
	October	15,321,888	
	November	20,062,944	
	December	23,996,448	
1987	January	26,843,760	
	February	24,236,496	
	March	23,514,048	
	April	4,835,088	
	May	8,163,936	
	June	6,458,832	
	July	3,140,352	
	August	2,680,992	
	September	9,832,147	
	October	9,590,400	
	November	8,711,136	
	December	20,545,056	
1988	January	20,283,552	
	February	17,454,528	
	March	18,954,576	
	April	16,864,272	
	May	14,381,712	
	June	7,103,664	
	July	74,592	
	August	6,336	
	September	4,873,104	
	October	NA	
	November	NA	
	December	22,732,272	

MONTHLY PRODUCTION FOR THE CAPITOL MALL GEOTHERMAL SYSTEM			
Year	Month	Production in gallons (Daily Logs)	Production in gallons (Trend Logs)
1989	January	15,411,024	
	February	6,759,648	
	March	22,694,400	
	April	16,857,936	
	May	19,484,352	
	June	1,701,792	
	July	88,128	
	August	4,557,024	
	September	9,763,344	
	October	14,638,896	
	November	19,700,064	
	December	23,902,704	
1990	January	909,648	
	February	NA	
	March	NA	
	April	NA	
	May	NA	
	June	53,056	
	July	65,808	
	August	1,499,184	
	September	7,517,088	
	October	20,564,640	
	November	23,629,680	
	December	29,185,344	
1991	January	18,211,392	1,989,104
	February	13,621,968	NA
	March	16,704,288	NA
	April	16,199,136	11,787,606
	May	15,713,712	9,509,605
	June	13,411,872	4,903,862
	July	1,765,296	454,892
	August	NA	1,989,104
	September	8,554,608	3,061,955
	October	17,361,648	10,468,839
	November	18,400,752	NA
	December	19,489,824	NA

MONTHLY PRODUCTION FOR THE CAPITOL MALL GEOTHERMAL SYSTEM			
Year	Month	Production in gallons (Daily Logs)	Production in gallons (Trend Logs)
1992	January	20,499,696	10,557,900
	February	15,725,808	8,175,694
	March	17,325,360	5,995,368
	April	7,840,944	4,797,475
	May	6,790,896	1,874,974
	June	3,606,912	1,055,038
	July	3,049,776	381,575
	August	1,955,376	NA
	September	6,929,136	NA
	October	9,161,136	NA
	November	19,996,992	18,264,697
	December	23,412,816	24,173,503
1993	January	30,446,640	29,216,599
	February	25,213,968	22,915,361
	March	21,644,208	19,416,082
	April	18,493,589	16,610,861
	May	13,382,352	8,429,695
	June	14,780,160	10,848,560
	July	12,329,568	4,561,290
	August	8,352,144	3,359,905
	September	20,727,792	10,691,201
	October	20,737,296	7,234,027
	November	28,243,440	25,207,402
	December	25,850,160	21,795,714
1994	January	22,115,808	8,284,003
	February	19,691,136	1,007,734
	March	16,226,640	683,525
	April	14,303,952	2,681,849
	May	17,355,456	8,656,128
	June	NA	5,155,506
	July	NA	NA
	August	NA	NA
	September	9,947,088	5,374,422
	October	19,640,160	16,083,684
	November	23,774,112	23,009,472
	December	24,817,680	25,344,295

MEMORANDUM

DATE: November 24, 1995
TO: File 63-09341
FROM: Shelley W. Keen (SWK)
RE: Meeting with right holder

=====

On November 21, 1995, I met with Larry Osgood, Public Works Division Administrator, and Mike Sheely, Deputy Attorney General assigned to the Department of Administration, to discuss the status of right 63-09341. My role was to explain the information contained in the water right file and to explain IDWR's implementation of Idaho water law.

IDWR has completed its field examination and has solicited a licensing amendment to correct the place of use for the right. Once the amendment is received, IDWR can license the right.

The Department of Administration is concerned about the annual diversion volume limit of 613.8 AF (200 million gallons) proposed for the right. Larry Osgood told me that 200 million gallons is less than has been actually diverted during recent cold years, such as 1993. His statement is supported by data evaluated by Ken Neely of IDWR. I explained that water right licenses are based on actual diversions and beneficial use that occurred prior to submission of the proof of beneficial use statement. For this right, proof was submitted in 1985. The 200 million gallon figure is based on Ken Neely's analysis of data from that period.

Mr. Osgood is not anxious to sign the licensing amendment unless the license will recognize diversions of at least 215 million gallons per year. He is precluded from covering the additional volume with a new appropriation by the establishment of the Boise Front Groundwater Management Area. Mr. Osgood suggested that IDWR give this right additional consideration on the basis of public interest and/or as a "municipal" right. He also believes the right deserves extra consideration because of its non-consumptive nature.



PHILIP E. BATT
Governor
PAMELA J. AHRENS
Director

Stat of Idaho

Department of Administration

650 West State Street
P.O. Box 83720
BOISE, ID 83720-0003
Telephone (208)334-3382 or FAX (208)334-5315
www.state.id.us

RECEIVED
NOV 29 1995
Department of Water Resources

November 28, 1995

Shelley Keen
Water Management Division
Department of Water Resources
1301 N. Orchard
Boise, ID 83706-2237

Re: Department of Administration - Ground Water License

Dear Mr. Keen:

Larry Osgood and I wanted to take this opportunity to thank you for meeting with us recently with respect to the Department of Administration's application for ground water licensure in the capitol mall geographic area. We appreciated the explanation which you provided regarding the Department of Water Resource's evaluation of Administration's application.

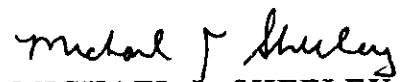
As we discussed during the course of the meeting, the Department of Administration's water usage in the capitol mall geographic area is not a typical or traditional type of consumptive usage. As you are aware, the Department's principal usage of the water is that of heating state buildings. The ground water is not consumed to any great extent by reason of the fact that the Department injects the water back into the aquifer following its heating cycle. This means of heating state buildings in the capitol mall area results in annual savings to the state in excess of \$200,000. Based upon the nature of the Department's usage, it seems somewhat inequitable to consider its application in the same context as those applicants whose water usage actually reduces the amount of water in the aquifer. The Department is hopeful that its application be given due consideration in light of the unique circumstances of its water usage.

The Department desires that the licensure process can be concluded in the near future. I would be glad to undertake any necessary action to expedite this

Shelley Keen
Water Management Division
Department of Water Resources
November 28, 1995
Page 2

process. If you have any questions, please feel free to contact me. Again, thank you for the assistance which you provided.

Sincerely,


MICHAEL J. SHEELEY
Deputy Attorney General

cc: Larry Osgood, Administrator, Division of Public Works

M E M O R A N D U M

DATE: October 4, 1995

TO: File 63-09341

FROM: Shelley W. Keen *SWK*

RE: Phone call to Mike Jones

=====

This morning I called Mike Jones at Dept. of Administration to see how he is proceeding on getting the assignment and/or amendment to move right 63-09341 toward licensing. He informed me of a number of things.

- The agreement being negotiated with the City of Boise to share this well will not be completed. The city backed out of the deal.
- The Dept. of Administration is contemplating assigning the permit to the Dept. of Lands, which owns the land the right was developed on.
- He will pursue getting the Dept. of Administration and the Dept. of Lands together to finalize the water right.

Mike Shewly
334-4547

Annual Production

Annual production for the State Geothermal system was obtained using three sources: 1) Berkeley Group Inc. (1990) report, 2) Daily Logs, and 3) Trend Logs. The Berkeley Group Inc. (1990) report used calculated average flowrates instead of the flowrates reported on the Daily Logs. In this study, the annual production totals using the Daily Logs (1983-1994) were calculated by multiplying each daily discharge reading (in gallons per minute) by 1,440 to obtain a daily volume, and summing the daily volumes. The annual production totals for the Trend Logs were calculated by computing an average discharge for each day, multiplying each average daily discharge by 1,440 to produce daily volumes, and summing the daily volumes. Table 1 lists the reported and calculated annual production totals for 1983-1994. Low totals in 1990, 1991, and 1994 are caused by equipment or data capture failures. Figure 5 shows the range in annual production for 1983-1994.

Table 1. Annual production for the Capitol Mall geothermal system, 1982-1994 (in millions of gallons).

Year	Berkeley Group Inc. (1990)	Daily Logs	Trend Logs
1982	N/A	N/A	
1983	79.1	N/A 65.8	
1984	204.8	N/A 169.5	up to 3 months of data missing for these two annual figures
1985	196.4	187.5	
1986	188.6	179.7	
1987	N/A	148.6	
1988	212.6 ^a	122.7	
1989	106.3 ^a	155.6	
1990		83.4	
1991		159.4	43.6
1992		136.3	75.3
1993		240.2	180.3
1994		167.9	96.3

^a Estimated from Totalized value of 3.10×10 gallons for the period from January, 1988 through June, 1989 (Berkeley Group, Inc. (1990)).



State of Idaho

DEPARTMENT OF WATER RESOURCES

1301 North Orchard Street, Statehouse Mail, Boise, Idaho 83720-9000

Phone: (208) 327-7900 FAX: (208) 327-7866

PHILIP E. BATT
GOVERNOR

KARL J. DREHER
DIRECTOR

June 28, 1995

STATE OF IDAHO
DEPT OF ADMINISTRATION
DIV OF PUBLIC WORKS
502 N 4TH ST
BOISE ID 83720-0072

RE: WATER RIGHT NO. 63-09341

Dear Water Right Holder(s):

The above referenced water right is in the process of being licensed. However, before the license can be issued, your permit must be amended to correspond with the project as it has actually been developed.

The enclosed Application for Amendment contains information that will be included on the license when it is issued. The amendment reflects a change in the location of the place(s) of use, adding the NWNE, Section 10, to the NENE, Section 10 already listed on the permit. Please review carefully and if you concur, sign the amendment and return with the \$50.00 filing fee within 14 days.

The last page of the Application for Amendment form contains a list of CONDITIONS/REMARKS proposed for the license when it is issued. These conditions/remarks may be modified upon further administrative review.

If you do not concur, or if you have any questions about this information, please contact me as soon as possible. My telephone number is (208) 327-7946.

Sincerely,

Shelley Walter Keen
Water Rights Supervisor

SWK:rl

Enclosure

cc: Mike Jones, Deputy A.G., Dept of Admin.

MEMORANDUM

TO: SHELLY KEEN

FROM: STEVE LESTER 

DATE: JUNE 26, 1995

RE: LICENSE RECOMMENDATIONS FOR PERMIT 63-09341

License recommendations have been revised for this right based on Ken Neely's draft report, attached. Ken is now revising the draft to produce an open file final report on this system. It is my understanding that his revisions are mostly cosmetic and will not change the report results.

This memo summarizes the current license recommendations based on a combination of 1987 exam report and Ken's 1995 report. Note that the draft report includes an update via fax of 6-23-95 from Ken Neely to me; we discussed his updated information and incorporated it into the license recommendations.

Grossly speaking, the normal system operation is about 800 gpm and about 200 million gallons per year. Peak rates of around 980 gpm have been noted. The annual production value that Ken has most confidence in is 180.3 million gallons $\pm$ 10%. Various annual production values are found due to different methods of data collection, different averaging etc. scenarios, different types of assumptions and/or errors introduced by data collection, maintenance problems, climate factors (heating demand), and so forth.

Due to all of this (see Ken for a better and more thorough explanation), the rate of flow value used is 982 gpm and annual production of 180.3 million gallons with a 10% margin of error is used (up to 198.3 million gallons, rounded off to 200 million for most overall reasonable interpretation).

Point of Diversion:	no change from 1987 exam.
Place of Use:	no change from 1987 exam.
Beneficial Use:	heat 9 buildings - adds Alexander House to 1987 report - original permit does not specify number of buildings to heat.
Rate of flow:	2.19 cfs (982 gpm) ¹ .
Diversion Volume:	613.8 af (200 million gallons) where $V_r = 200 / 325,850 = 613.8 \text{ af}$ $V_d = 2.19 \times 365 \times 1.9835 = 1585.5 \text{ af}^2$

¹My previous suggestion @ using Admin. Memo #23 to resolve rate of flow question appears n/a since now have best data can obtain on well usage.

²See next page of memo for additional method to calculate V_d .

Amendments: no change from 1987 exam; adds P/U in NWNE.

Conditions: measuring device ok per draft report.

return flow via Injection Well Permit 63-W-17, formerly 63-GR-2; appears conditions of inj. well permit are met as also required by water right.

SRBA: claim A63-09341 needs to be modified per letter sent to permit holder, copy attached.

Boise Front GWMA: permit developed by 1985 (proof b.u.) prior to moratorium on new development issued in 1988 for Boise Front low temp. geothermal wells so BFGWMA restrictions n/a to licensing; heat value used, water re-injected, some temperature degradation has occurred.

NOTES

1) Nine buildings instead of eight per original exam is a clarification of uses actually on-line by 1987 exam and therefore does not add a new unit to system after field exam.

2) An alternate method can be used to calculate diverted volume whereby flow rates per season are used instead of using maximum flow rate all year. The alternative route is based on page 9 of the draft report. I used average flow rate values, e.g. 700 gpm for 600-800 gpm flow, for number of days indicated in the report. Calculations are shown below.

$$V_d = \left[\frac{(1.56 \times 157)}{\text{cfs}} + \frac{(.89 \times 150)}{\text{days}} + \frac{(.33 \times 58)}{\text{days}} \right] \times 1.9835 = 788.6 \text{ af}$$

For either method, V_r still selected since less than V_d .

3) Rate of flow recommendation does not include 10% margin since it is based on raw data points versus grouped data analyzed for volume values.

4) Please contact me for any questions regarding steps used in this revised license recommendation.



State of Idaho
DEPARTMENT OF WATER RESOURCES

Western Region, 2735 Airport Way, Boise, Idaho 83705-5082 - (208) 334-2190
FAX (208) 334-2348

PHILIP E. BATT
GOVERNOR

KARL J. DREHER
DIRECTOR

June 26, 1995

Mr. Mike Despot, Bureau Chief
State of Idaho
Division of Public Works
502 N. Fourth St.
Boise, ID 83720

**RE: ADJUDICATION CLAIM NO. A63-09341 - CAPITOL MALL
GEOTHERMAL WELL**

Dear Mr. Despot:

Enclosed please find a draft copy of revised Snake River Basin Adjudication Claim No. A63-09341, which was filed to protect water right Permit No. 63-09341. The department is in the midst of licensing the permit based on substantial data collected since the 1980's.

The adjudication claim should be amended (no fee required) to match the license recommendations that have been made. In this manner, the license to be issued and the recorded adjudication claim will match and will result in a fully licensed water right and an adjudication claim protecting the water right.

The items to be changed on the claim are shown on the attached copy. To allow me to amend the claim, please review the information and initial and date it. I will prepare a final amended claim for your notarized signature based on your written response.

Your reply to me within two weeks will facilitate licensing of this right. Thank you for your help in this matter. Please contact me at 334-2190 if you have any questions.

Sincerely,

Steve Lester
Water Right Supervisor

Enclosure

c: Tom Markland, Idaho Department of Lands

IN THE DISTRICT COURT OF THE FIFTH JUDICIAL DISTRICT OF THE STATE OF IDAHO,
IN AND FOR THE COUNTY OF TWIN FALLS

IN RE THE GENERAL ADJUDICATION
OF RIGHTS TO THE USE OF WATER FROM
THE SNAKE RIVER BASIN WATER SYSTEM.

CIVIL CASE NUMBER: 39576

Ident. Number: A63-09341
Date Received: 9/13/1989
Receipt No: T014112
Received By: _____

DRAFT

COPY FOR
YOUR FILES

NOTICE OF CLAIM TO A WATER RIGHT
ACQUIRED UNDER STATE LAW

COPY FOR
YOUR FILES

1. Name: STATE OF IDAHO
Address: DIV. OF PUBLIC WORKS
502 N. FOURTH ST.
BOISE, ID

208-334-3453

83720

2. Date of Priority: FEB 6, 1980

3. Source: GROUNDWATER

Trib. to:

(4.) Point of Diversion:

Township	Range	Section	1/4 of 1/4 of 1/4	Lot	County
03N	02E	3/0	SW NW SE NE		ADA

5. Description of diverting works:
GEOTHERMAL WELL, VARIED SIZE CASING TO 3,030 FEET

(6.) Water is used for the following purposes:

Purpose	From	To	C.F.S. ^{2.19} (or)	A.F.A.
HEATING	01/01	12/31	5.570	

(7.) Total Quantity Appropriated is:
~~5.570~~ ^{2.19} C.F.S. (and/or)

A.F.A.

8. Total consumptive use is

Acre Feet Per Annum.

(9.) Non-irrigation uses:

GEOTHERMALLY SPACE HEAT IDAHO STATE CAPITOL MALL FOR 9 BLDGS.

(10.) Place of Use:

Township	Range	Section	1/4 of 1/4	Lot	Use	Acres
03N	02E	10	NE NE NW NE		HEAT	

11. Place of use in counties: ADA

12. Do you own the property listed above as place of use? YES

13. Other Water Rights Used:
NONE

14. Remarks:

15. Basis of Claim: PERMIT

Claim amended to agree with licensing recommendations for Permit 63-09341. License to be issued based on IDWR gen-fik report now being finalized. This 1995 technical review of well data shows that maximum use has been 2.19 cfs (982 gpm) and 613.8 acre feet per annum (6200 million gallons per year).

Water is re-injected into separate well (Injection well permit # 63-W-17, formerly labeled 63-GR-2).

63-09341

KEN NEELY'S TECHNICAL ANALYSIS
OF FLOW/VOLUME DATA FOR
STATE GEOTHERMAL WELL, 1983-1994

- Draft open-file Report
- 6-23-95 fax by Ken e Revisions of data conclusions
- suggests $cts = 2.19$ (982 gpm)
 $ata = 613.8$ (c 200 million gallons year)
- for field exam revision

JL
6/26/95

06/23/95

14:23

21 208 327 7866

ID WATER RESOURS --- WESTERN

001/005



State of Idaho

DEPARTMENT OF WATER RESOURCES

1301 North Orchard Street, Statehouse Mall, Boise, Idaho 83720-9000

Phone: (208) 327-7900 FAX: (208) 327-7866

PHILIP E. BATT
GOVERNOR

KARL L. DREHER
DIRECTOR

RECEIVED

JUN 26 1995

Department of Water Resources

TRANSMITTAL COVER SHEET

FAX NUMBER: (208) 327-7866

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TO: Steve Lester

FROM: Ken Neely

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CONTACT: Ken Neely 327-5455 IF YOU DO NOT RECEIVE ALL THE PAGES

THANK YOU

M E M O R A N D U M

June 23, 1995

To: Steve L.
From: Ken N.
Re: State Geothermal

Cody finished entering the Daily Log data for 1993 and 1994, and I did the calculations for those years. Wouldn't you know it, there were two significant changes in the maximum values.

First, the highest annual production was 240.2 million gallons in 1993 based on the Daily Logs. The annual production for 1993 (computer Trend Logs) is only 180.3 million gallons. Recall that the Trend Logs calculations are based on average daily values (the average of 4 readings each day). Using Lotus, I extracted the maximum of the 4 values for each day in 1993 from the Trend Logs and multiplied that value by 1440 to get a total volume for each day. When I summed these values, guess what I got: 240.4 million gallons!! So, it indicates to me that the value from the Daily Logs is probably too high because it is the maximum value for each day. The annual production calculated from daily averages from the computer Trend Logs is the more realistic number. *volume ±10%* Therefore, of all the numbers on page 7 (Table 1), I have the most confidence in the annual production for 1983 (180.3 million gallons) from the Trend Logs. The Berkeley Report (1990) had four years with annual values higher than 180 million gallons, but I can not vouch for these values because I do not calculate them myself; they were just copied from their report. *Note*

Second, the highest "reasonable" discharge value was 982 gallons per minute in November, 1993 (based on the Daily Logs). Our photocopy of the Daily Log for this month is very clear, so unless the person recording it made a mistake, it looks like a good number. However, discharges over 800 gallons are rare.

I am incorporating 1983 and 1984 data into the report, but I don't expect that these values will be on the high end.

Thanks for reviewing the report and catching those mistakes.

per discussion with
KEN after I received
this FAX:

180.3 mg ±10% is best est.
annual production

982 gpm ok max rate

reprint these changes into Green
revision memo

INTRODUCTION

The State of Idaho Capitol Mall geothermal system has operated in downtown Boise since 1982. The system supplies about ninety percent of the heat required for nine buildings, including the State Capitol. The primary components of the system are: 1) a production well, 2) heat exchangers, 3) underground delivery and collection pipes, and 4) an injection well.

Production, temperature and system operation data have been recorded manually on Daily Logs since May, 1983. In 1991, the Department of Administration-Building Services began collecting this data using computer Trend Logs which capture information every six hours. The Idaho Department of Water Resources downloads the Trend Log data periodically via a telephone modem link.

The lowest and highest annual production totals for the Capitol Mall system from 1983-1994 were 79.1 (1983) and 240.3 (1993) million gallons. The highest monthly production was 30.5 million gallons in January, 1985. The highest average monthly discharge was 683 gallons per minute in January, 1985. The maximum discharge rate was 982 gallons per minute in November, 1993. The maximum monthly supply temperature declined about 5° Fahrenheit between 1983 and 1994.

Purpose and Scope

The purpose of this report is to publish a complete record to date of the geothermal production history for the State of Idaho Capitol Mall system. This report presents annual and monthly production totals, daily discharges, average monthly discharges, maximum discharges, and average monthly supply temperatures. The data in this report were compiled from the handwritten Daily Logs, the computer Trend Logs and previously published reports. Annual data is presented in calendar years.

The data in this report was used by the Idaho Department of Water Resources and the Idaho Department of Lands for the water right licensing of the State Geothermal well in 1995.

Previous Studies

Several papers and reports describe either the development of the Capitol Mall geothermal system or document some of the production history (Mink, 1976; Anderson, 1981; Anderson and Kelly, 1981; Worbois, 1982; Berkeley Group Inc., 1990; Higginson, 1987; Waag and Wood, 1987; Boise Warms Springs Water District, 1989; Montgomery, 1992; Dansart and others, 1994; Montgomery Watson, 1994). Prior to this report, the most complete production history was presented in the Berkeley Group, Inc.

Annual Production

Annual production for the State Geothermal system was obtained using three sources: 1) Berkeley Group Inc. (1990) report, 2) Daily Logs, and 3) Trend Logs. The Berkeley Group Inc. (1990) report used calculated average flowrates instead of the flowrates reported on the Daily Logs. In this study, the annual production totals using the Daily Logs (1983-1994) were calculated by multiplying each daily discharge reading (in gallons per minute) by 1,440 to obtain a daily volume, and summing the daily volumes. The annual production totals for the Trend Logs were calculated by computing an average discharge for each day, multiplying each average daily discharge by 1,440 to produce daily volumes, and summing the daily volumes. Table 1 lists the reported and calculated annual production totals for 1983-1994. Low totals in 1990, 1991, and 1994 are caused by equipment or data capture failures. Figure 5 shows the range in annual production for 1983-1994.

Table 1. Annual production for the Capitol Mall geothermal system, 1982-1994 (in millions of gallons).

Year	Berkeley Group Inc. (1990)	Daily Logs	Trend Logs
1982	N/A	N/A	
1983	79.1	N/A	
1984	204.8	N/A	
1985	196.4	187.5	
1986	188.6	179.7	
1987	N/A	148.6	
1988	212.6 ^a	122.7	
1989	106.3 ^a	155.6	
1990		83.4	
1991		159.4	43.6
1992		136.3	75.3
1993		240.2	180.3
1994		167.9	96.3

^a Estimated from Totalized value of 3.10×10^9 gallons for the period from January, 1988 through June, 1989 (Berkeley Group, Inc. (1990)).

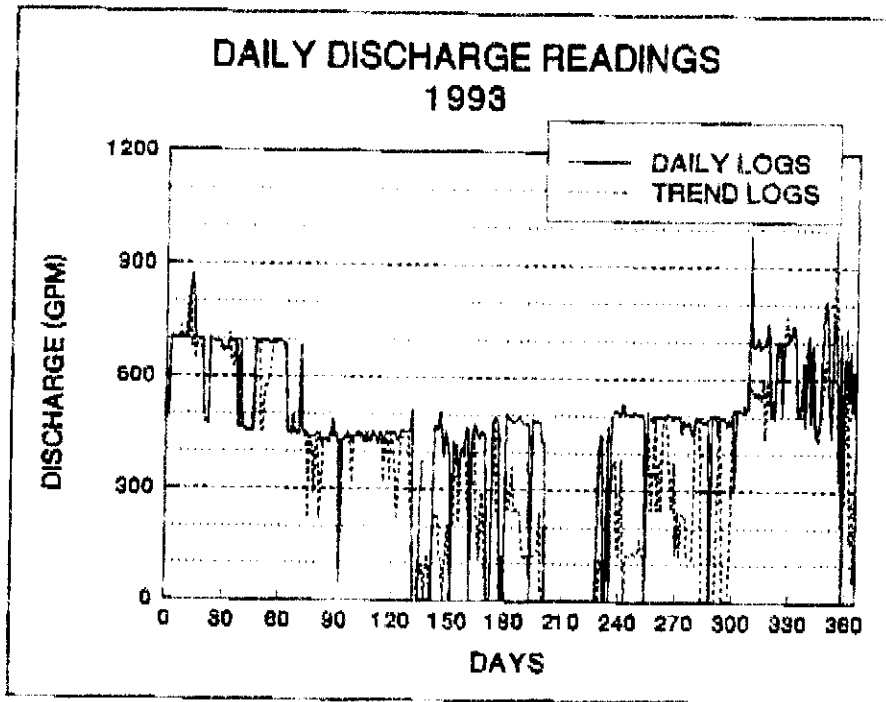


Figure 17. Daily discharge readings for the Capitol Mall geothermal system, 1993.

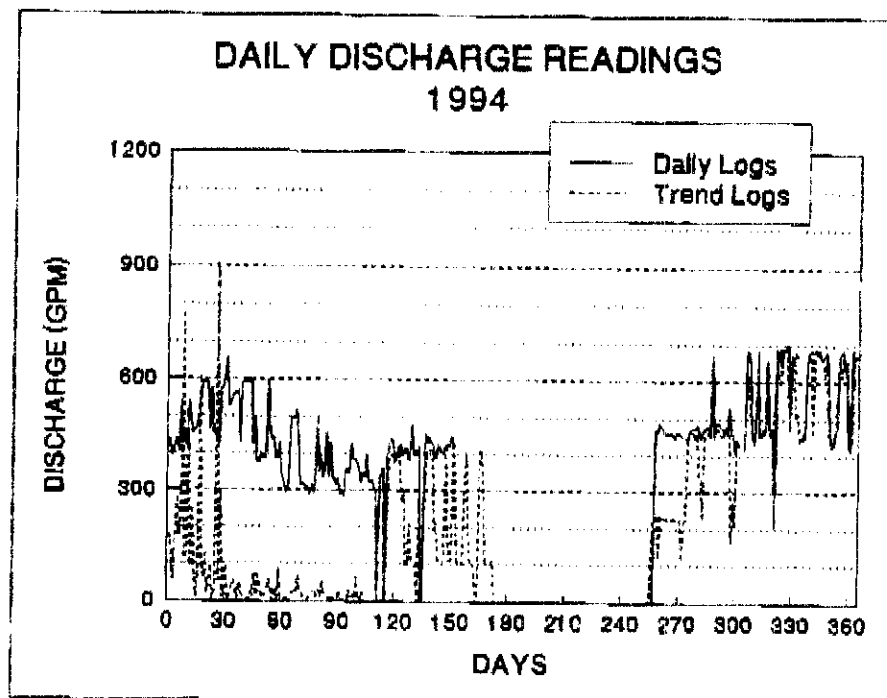


Figure 18. Daily discharge readings for the Capitol Mall geothermal system, 1994.

From: DWR80::SLESTER 23-JUN-1995 10:52:32.35
To: DWR01::KNEELY
CC: SLESTER
Subj: CAPITOL MALL GEOTHERMAL SYSTEM - DRAFT REPORT

I had a chance to review & use your draft report, Ken, regarding the licensing field exam recommendations for right no. 63-09341 as we have discussed. I will include the draft copy with field report being forwarded to S.O. for licensing with a note that final version of open-file report is being completed.

Just a couple of minor corrections noted in draft:

Page 4 - production well legal is T3N, S.10 and injection well legal is also T3N.

Page 9 - refers to Fig. 7, 8, 15 and then to trend logs 1985, 1987, 1993; should be 1986 instead of 1987 (re Fig. 8)?

For license recommendations, I will use your values of 850 gpm and 212.6 million gallons per year for heating 9 buildings.

Thanks for everything you have done on this, Ken. Your fine work is much appreciated in this and other projects.

- Steve

DRAFT

- See Final OPEN FILE
Report, in process
now - 82 6/23/95

PRODUCTION HISTORY
FOR THE STATE OF IDAHO
CAPITOL MALL GEOTHERMAL SYSTEM
1983-1994

by
Kenneth W. Neely

Idaho Department of Water Resources
Boise, Idaho

May, 1995

for licensing
63-09341

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INTRODUCTION

The State of Idaho Capitol Mall geothermal system has operated in downtown Boise since 1982. The system supplies about ninety percent of the heat required for nine buildings, including the State Capitol. The primary components of the system are: 1) a production well, 2) heat exchangers, 3) underground delivery and collection pipes, and 4) an injection well.

- uses
well

Production, temperature and system operation data have been recorded manually on Daily Logs since 1982. In 1991, this data also began to be recorded using computer Trend Logs which capture information every six hours. The Idaho Department of Water Resources downloads the Trend Log data periodically via a telephone modem link.

Annual production for the Capitol Mall system from 1982-1994 ranged from 79.1 (1983) to 212.6 (1988) million gallons. The highest monthly production was 30.5 million gallons in January, 1985. The highest average monthly discharge was 683 gallons per minute in January, 1985. The maximum discharge rate was 850 gallons per minute in January, 1985 and November, 1993. The maximum monthly supply temperature declined about 5° Fahrenheit between 1985 and 1994.

- production
vol/mes

Purpose and Scope

The purpose of this report is to publish a complete record of the geothermal production history for the State of Idaho Capitol Mall system. This report presents annual and monthly production totals, daily discharges, average monthly discharges, maximum discharges, and average monthly supply temperatures. The data in this report were compiled from the handwritten Daily Logs, the computer Trend Logs and the previously published reports. Annual data is presented in calendar years.

The data in this report was used by the Idaho Department of Water Resources and the Idaho Department of Lands for the water right licensing of the State Geothermal well in 1995.

Previous Studies

Several papers and reports describe either the development of the Capitol Mall geothermal system or document some of the production history (Mink, 1976; Anderson, 1981; Anderson and Kelly, 1981; Warbois, 1982; Berkeley Group Inc., 1990; Higginson, 1987; Waag and Wood, 1987; Boise Warms Springs Water District, 1989; Montgomery, 1992; Dansart and others, 1994; Montgomery Watson, 1994). Prior to this report, the most complete production history was presented in the Berkeley Group, Inc. (1990) report which contains records of annual production from

- notes by JZ 6/23/95

1982 through June 1989. The Montgomery (1992) and Montgomery Watson (1994) reports contain some production data for 1990 and 1991.

Well-Numbering System

The well-numbering system used in this report is identical to the system used by the U.S. Geological Survey (USGS) in Idaho (Figure 1). The system indicates the location of wells within the official rectangular subdivision of the Public Land Survey System (PLSS) with reference to the Boise baseline and meridian. The first two segments of the number designate the township and range. The third segment gives the section number followed by three or four letters and a number. The letters indicate the $\frac{1}{4}$ section (160 acre tract), $\frac{1}{4}$ - $\frac{1}{4}$ section (40 acre tract), $\frac{1}{4}$ - $\frac{1}{4}$ - $\frac{1}{4}$ section (10 acre tract), $\frac{1}{4}$ - $\frac{1}{4}$ - $\frac{1}{4}$ - $\frac{1}{4}$ section (2.5 acre tract), and the serial number of the well within the tract. Quarter sections are lettered A, B, C, and D in counterclockwise order beginning in the northeast quarter of the section. Successively smaller tracts are lettered in the same manner. For example, well 04N 01E 04CDA1 corresponds to the PLSS location: NE $\frac{1}{4}$, SE $\frac{1}{4}$, SW $\frac{1}{4}$, Section 04, Township 4 North, Range 1 East, and it was the first well inventoried by the USGS in that tract.

Acknowledgements

The author would like to thank several people who helped compile the data for this report. Tom Markland, a geologist with the Idaho Department of Lands, provided copies of the Daily Logs. Cody Kinney, a secretary with the Idaho Department of Water Resources (IDWR), entered the data from the Daily Logs into computer spreadsheets. Steve Lester, a water right agent and Paul Castelin, a geologist and section manager, both with IDWR, provided technical review for this report. I appreciate all of your efforts in this project.

GEOHERMAL DEVELOPMENT IN BOISE

In late 1890, investors from the Boise Water Works Company decided to drill a hot water well in a swampy area about two and a half miles east of Boise. This tract of land was swampy due to the seepage of natural geothermal springs. By early 1891, two geothermal wells (now known as BSWD #1 and #2) had been successfully completed (Figure 2). In May, 1892, the Boise Natatorium, a 15,000 square foot structure which included a 65 x 125 foot geothermal swimming pool, was open for business. In the same year, the Artesian Hot and Cold Water Company (which had purchased the Boise Water Works Company in 1891) began supplying geothermal water to private residents and business along Warm Springs Road. The Natatorium remained in business until 1934. From 1892 until the 1970's, there was no significant exploration for geothermal resources in the downtown Boise area.

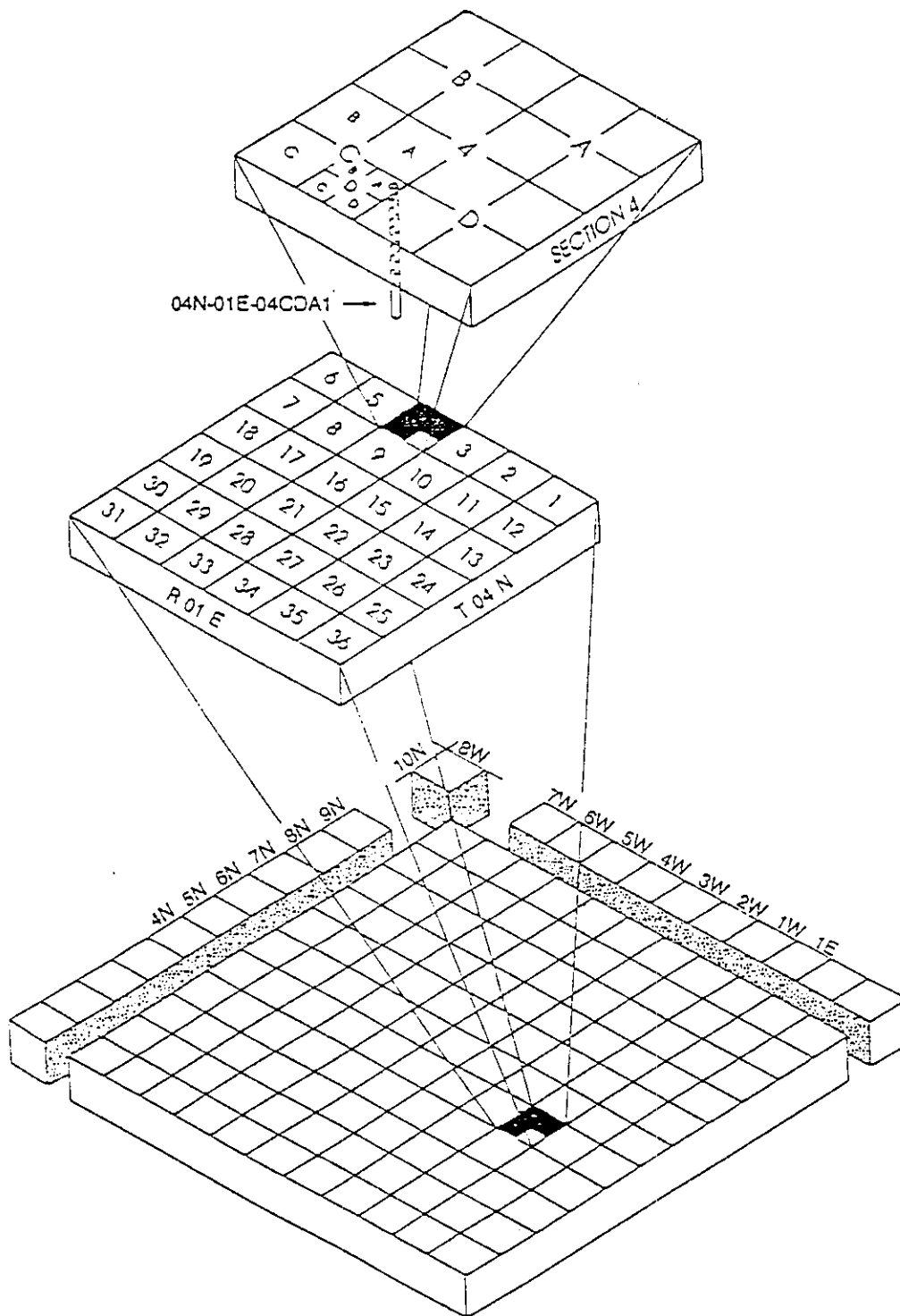


Figure 1. Well-numbering system.

In the early 1970's, the State of Idaho began expanding the Capitol Mall office complex. Rising heating costs prompted Governor Cecil Andrus to request a study of the Boise geothermal resources. The study, conducted by the U.S. Energy and Development Administration, recommended a pilot project. Consequently, the heating system for the State Health Laboratory on Penitentiary Road was converted to geothermal in 1977. The State of Idaho realized the cost-saving benefits immediately. By 1979, the State was ready to take the next step in geothermal heating.

In 1981, the Capitol Mall #1 and #2 wells were completed to the east and north of the State Capitol, respectively (Figures 2). Capitol Mall #1 (04N 02E 10AADA1) is 2,152 feet deep and is used as the injection well. Capitol Mall #2 (04N 02E 14AABB1) is 3,030 feet deep and is the production well. Capitol Mall #2 can flow at over 800 gallons per minute. The original water temperature for Capitol Mall #2 was 160° Fahrenheit. By 1982, nine buildings in the Capitol Mall complex were being heated by the geothermal resource (Figure 3).

In the early 1980's, the City of Boise (also called Boise Geothermal Limited (BGL)) drilled four production wells and the Veterans Administration drilled a test well followed by a production and an injection well (Figure 2).

Declining water levels caused by the additional production caused the Idaho Department of Water Resources (IDWR) to create the Boise Front Low Temperature Geothermal Resource Ground Water Management Area in 1987. Further development of the geothermal resource was restricted in the Management Area. Since 1987, water levels in the BLM observation well, located northeast of the Capitol Mall wells, have ceased declining (Figure 4).

Currently, the City of Boise and the State of Idaho are negotiating an agreement which would transfer the State's production to the City's well field. Under this agreement, the City would use the State's injection well for disposing both the City's and State's geothermal water after the heat has been extracted.

NNNNNNNE
S. 10 T3 N R26

P/D

Norm Young,
P.H.I. Review

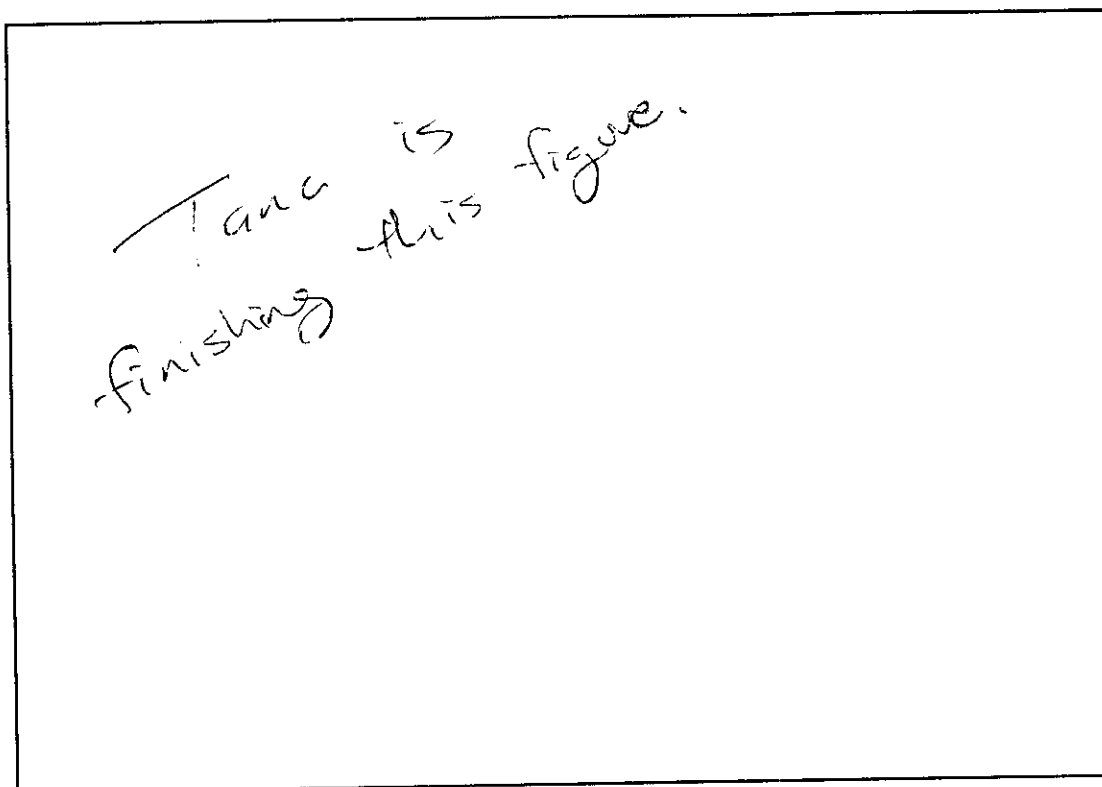


Figure 2. Location map of ~~the select~~ geothermal wells in the downtown Boise and Boise Warm Springs Water District areas.

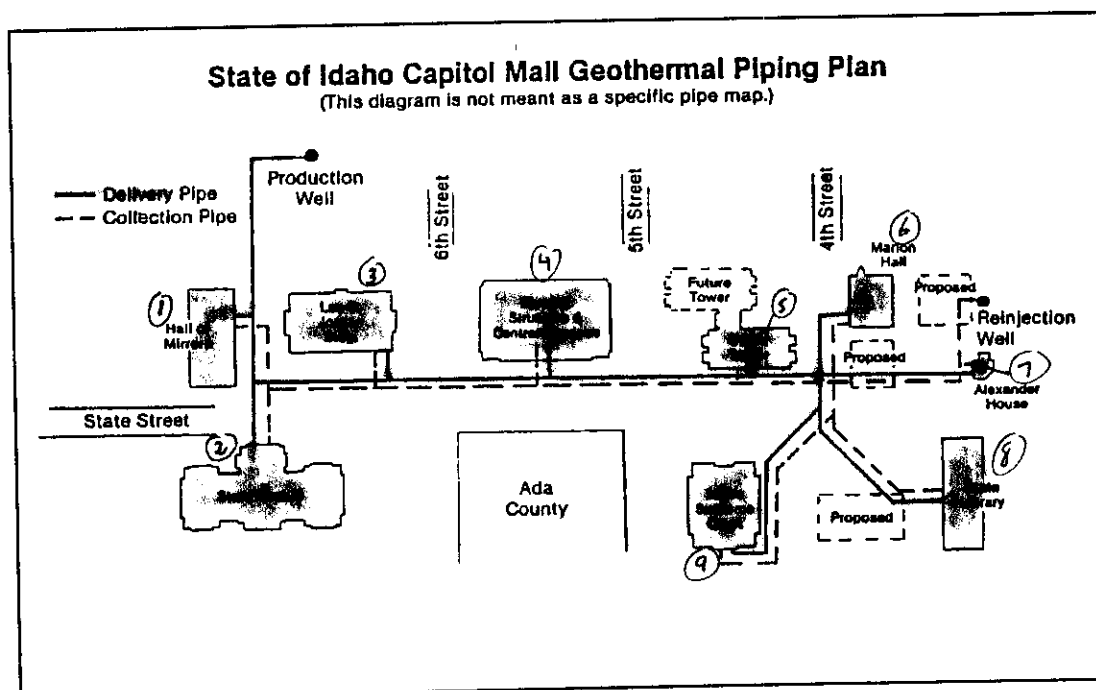


Figure 3. State of Idaho Capitol Mall geothermal piping plan (from Worbois, 1982).

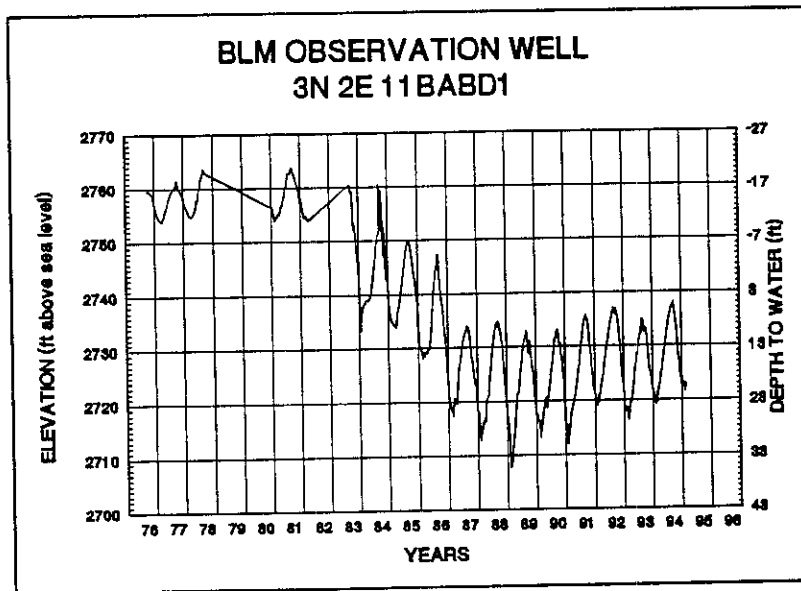


Figure 4. Hydrograph for the BLM observation well (03N 02E 11BBD1).

CAPITOL MALL DATA

Data are collected in two formats for the Capitol Mall system. The first format is hand-written Daily Logs on which discharge, temperature, pressure and other system operations are recorded. Data have been entered on Daily Logs since October 1983. The Berkeley Group, Inc. (1990) report noted that the Daily Log data usually reflect higher than average discharges because the readings are taken during peak flow times (i.e. 5:00 - 8:00 a.m.). Data from the Daily Logs for the period 1985-1994 were entered into computer spreadsheet files at IDWR; Daily Logs from 1983 and 1984 could not be located.

The second format is the Trend Logs that record data every six hours using a computer system. Data have been recorded on Trend Logs since 1991. Unfortunately, Trend Logs for 1991 and 1992 are incomplete due to a variety of reasons. Trend Log data for 1993 are considered to be complete. Trend Log data for 1994 are incomplete because the flowmeter meter was not working during several months.

The raw data from both the Daily Logs and the Trend Logs were used to calculate and graph annual and monthly production, daily and monthly discharges and average monthly supply temperatures.

- Data collection

Annual Production

Annual production for the State Geothermal system was obtained using three sources: 1) Berkeley Group Inc. (1990) report, 2) Daily Logs, and 3) Trend Logs. The Berkeley Group Inc. (1990) report used calculated average flow rates instead of the flowrates reported on the Daily Logs. In this study, the annual production totals using the Daily Logs (1985-1994) were calculated by multiplying each daily discharge reading by 1,440 - *minutes per 24 hrs.* to obtain a daily volume, and summing the daily volumes (The Daily Logs prior to 1985 could not be located). The annual production totals for the Trend Logs were calculated by computing an average discharge for each day, multiplying the average daily discharge by 1,440 to produce a daily volume, and summing the daily volumes. Table 1 lists the reported and calculated annual production totals for 1983-1994. Low totals in 1990, 1991, and 1994 are caused by equipment or data capture failures. Figure 5 shows the range in annual production for 1983-1994.

Table 1. Annual production for the Capitol Mall geothermal system, 1982-1994 (in millions of gallons).

Year	Berkeley Group Inc. (1990)	Daily Logs	Trend Logs
1982	N/A	N/A	
1983	79.1	N/A	
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1985	196.4	187.5	
1986	188.6	179.7	
1987	N/A	148.6	
1988	212.6 ^a - PEAK VALUE	122.7	
1989	106.3 ^a	155.6	
1990		83.4	
1991		159.4	43.6
1992		136.3	75.3
1993			180.3
1994			96.3

^a Estimated from Totalized value of 3.10×10 gallons for the period from January, 1988 through June, 1989 (Berkeley Group, Inc. (1990)).

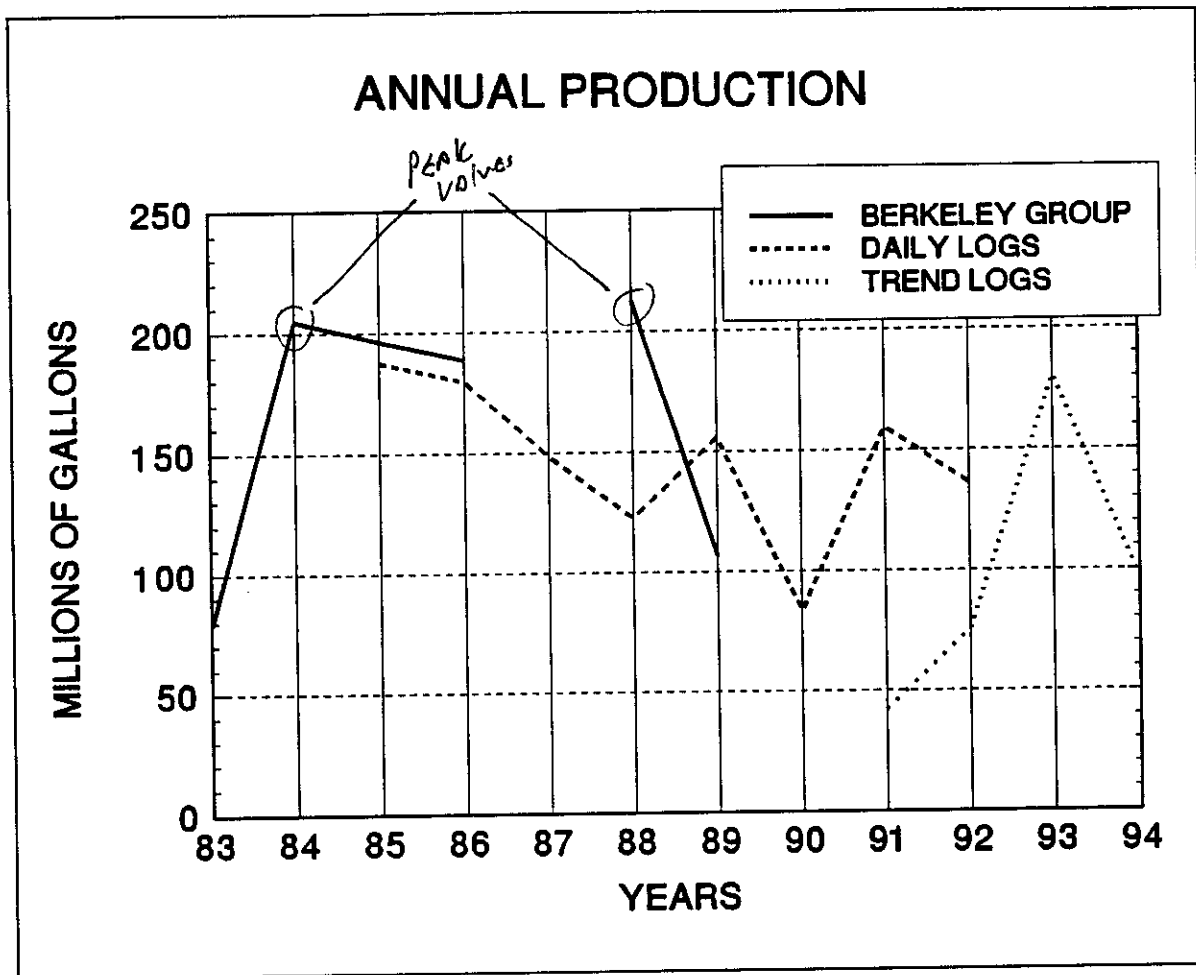


Figure 5. Annual production for the Capitol Mall geothermal system, 1983-1994.

Monthly Production

Figure 6 shows the total monthly production for 1985-1994 as calculated from the Daily Logs and Trend Logs. Monthly production ranges from 0 to 30.5 million gallons. Appendix A lists the monthly production data.

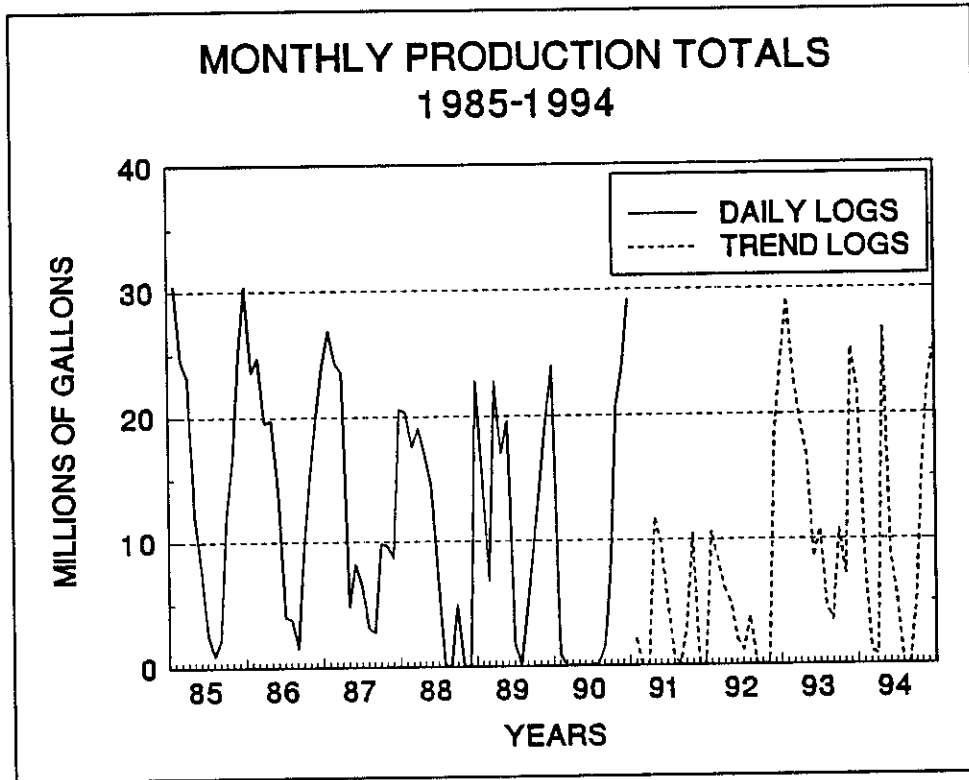


Figure 6. Monthly production for the Capitol Mall geothermal system, 1985-1994.

Daily Discharges

Figures 7 through 16 show the daily discharge readings from the Daily Logs for 1985-1994. The average daily discharge readings from the Trend Logs for 1991-1994 are included in Figures 13-16.

Daily flowrates fluctuate from about 600 to 800 gallons per minute during the peak heating season (approximately days 0-90 and 300-365), to about 300-500 gallons per minute during the non-peak heating season (approximately days 91-180 and 240-299), to 0-300 gallons per minute during the summer (approximately days 181-239). Clearly, some years have more complete data than other years. Figures 7, 8, and 15 appear to be the most complete. Therefore, the annual production as calculated from the Daily and Trend Logs may be the most accurate for 1985, 1987 and 1993 (Table 1).

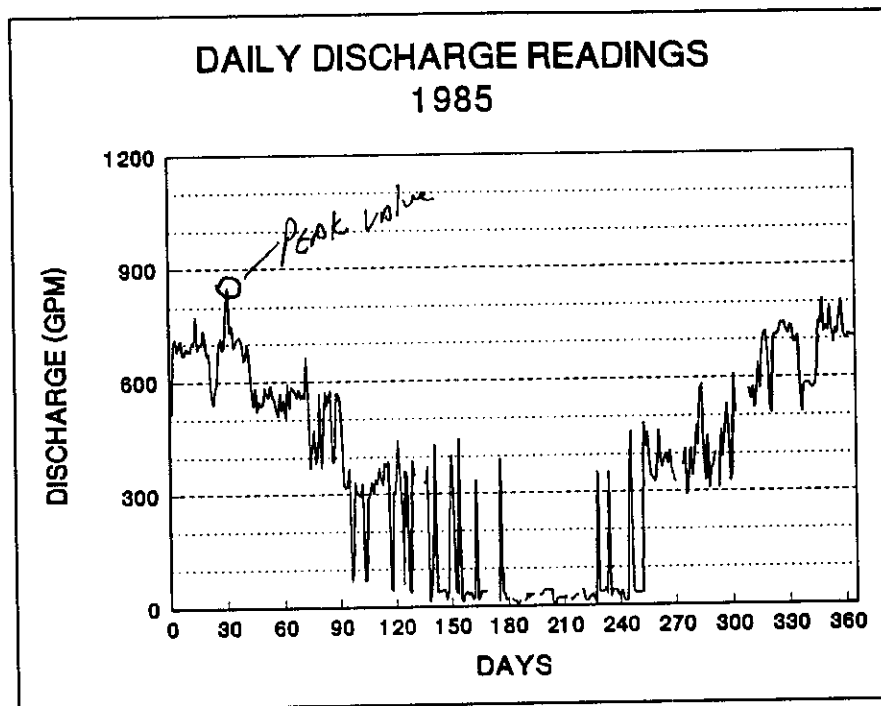


Figure 7. Daily discharge readings for the Capitol Mall geothermal system, 1985.

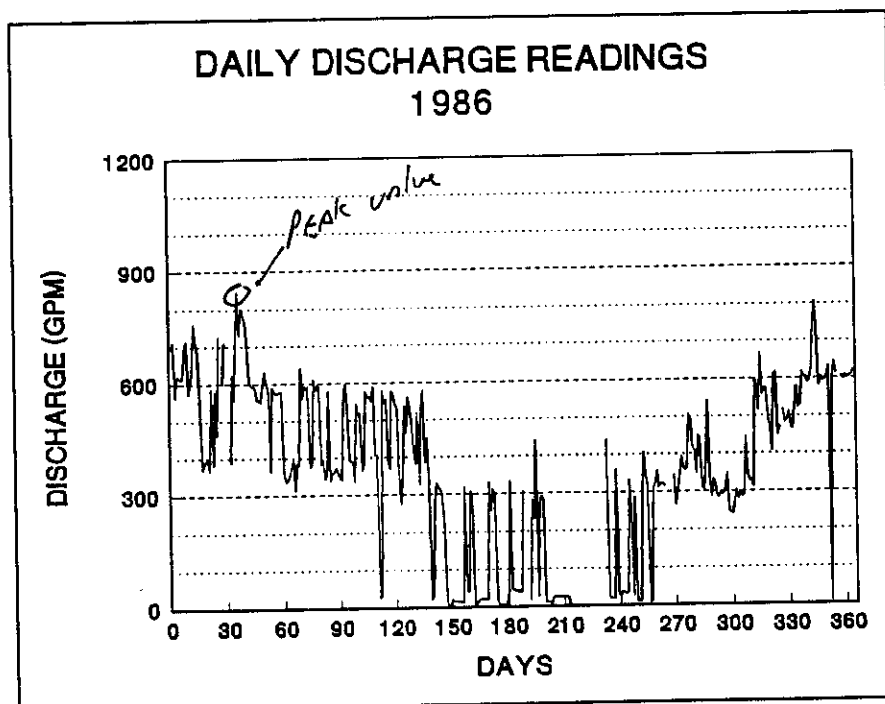


Figure 8. Daily discharge readings for the Capitol Mall geothermal system, 1986.

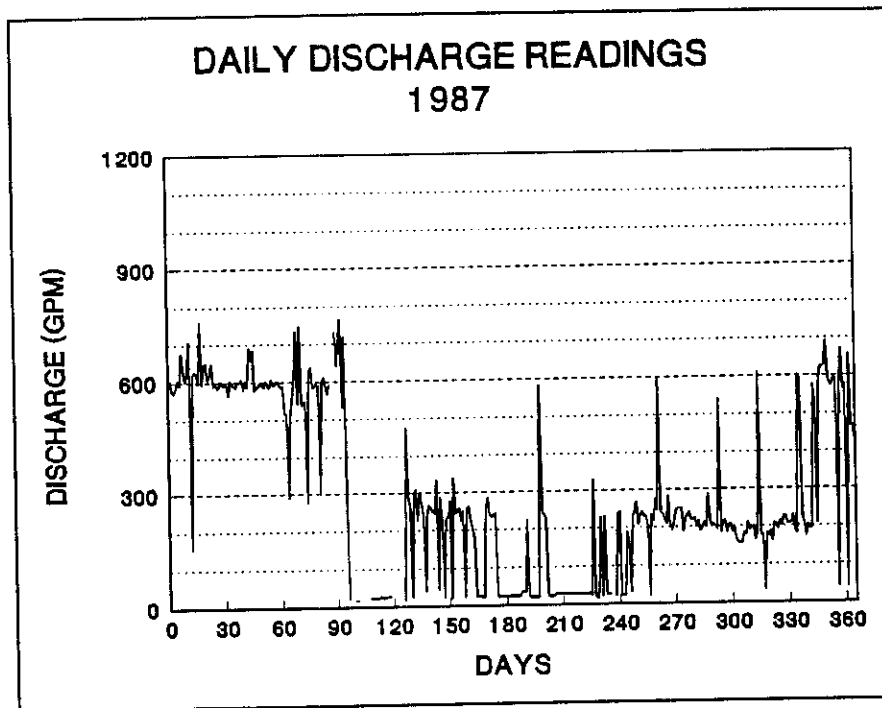


Figure 9. Daily discharge readings for the Capitol Mall geothermal system, 1987.

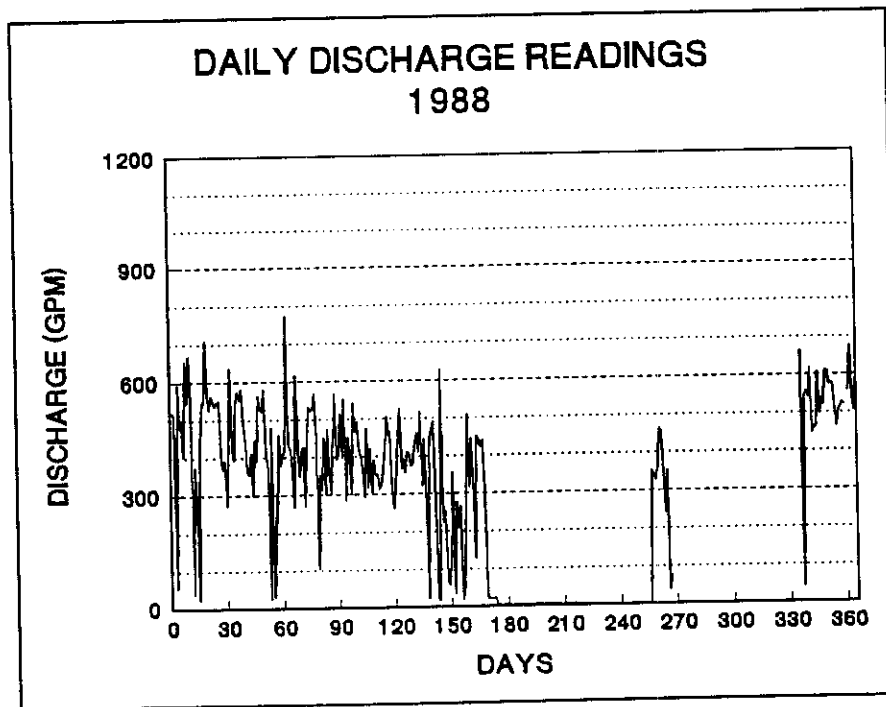


Figure 10. Daily discharge readings for the Capitol Mall geothermal system, 1988.

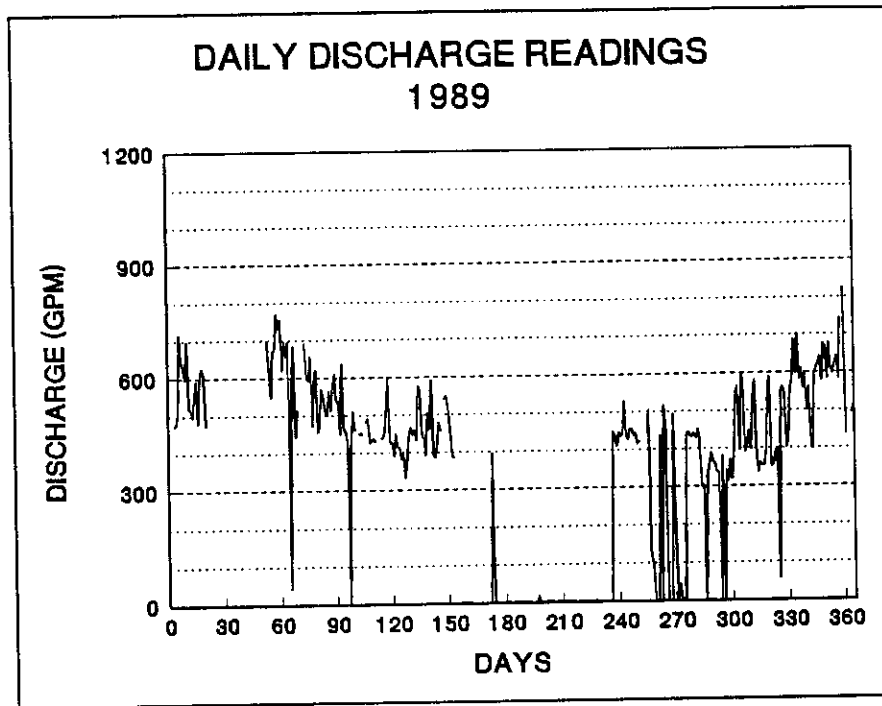


Figure 11. Daily discharge readings for the Capitol Mall geothermal system, 1989.

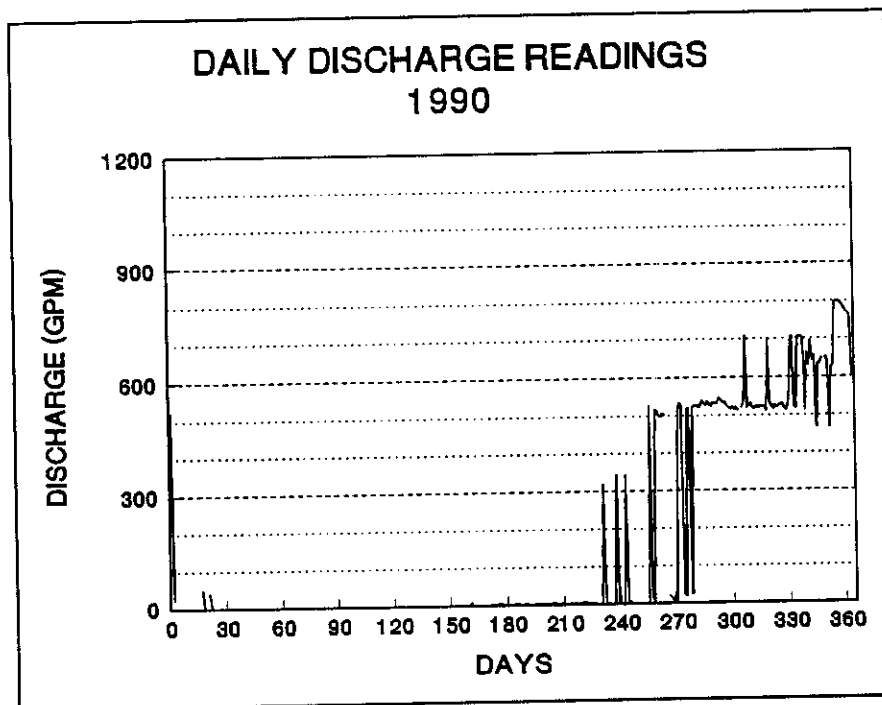


Figure 12. Daily discharge readings for the Capitol Mall geothermal system, 1990.

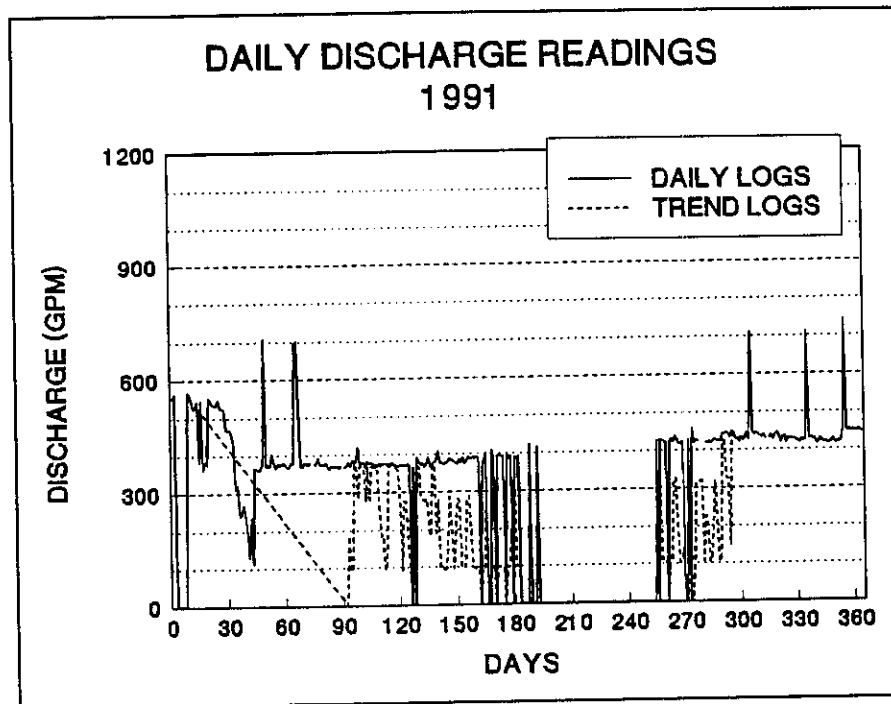


Figure 13. Daily discharge readings for the Capitol Mall geothermal system, 1991.

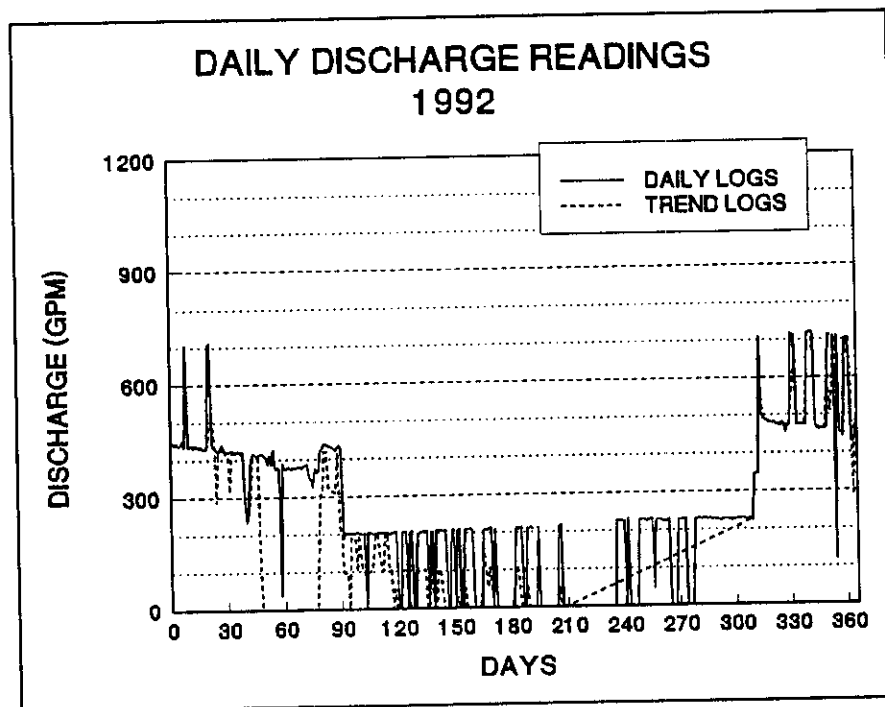


Figure 14. Daily discharge readings for the Capitol Mall geothermal system, 1992.

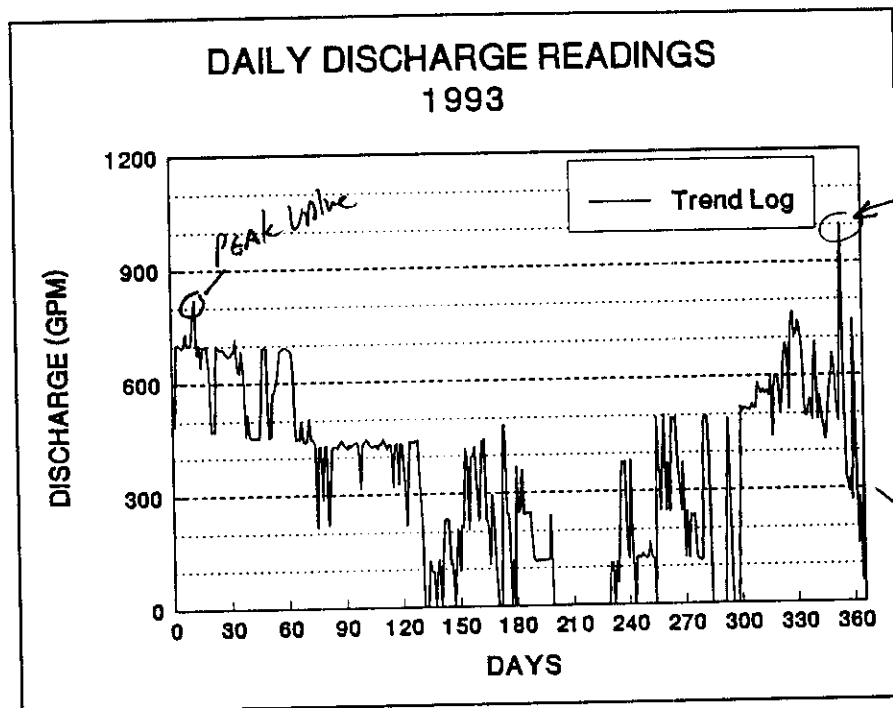


Figure 15. Daily discharge readings for the Capitol Mall geothermal system, 1993.

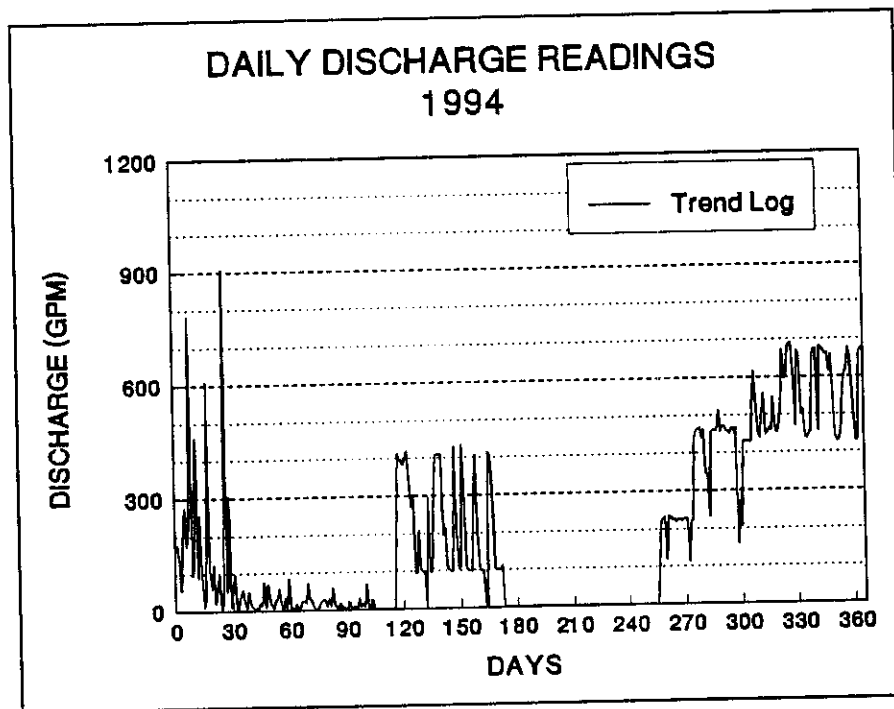


Figure 16. Daily discharge readings for the Capitol Mall geothermal system, 1994.

questionable data < day 120 - flowmeter malfunction,
repaired @ day 120,
per author

Monthly Discharges

The average monthly discharges ranged from 0 to 683 gallons per minute for 1985-1994 (Figure 17). Maximum monthly discharges were about 800 gallons per minute (Figure 18) with the highest rate being 850 gallons per minute in January, 1985 and November, 1993).

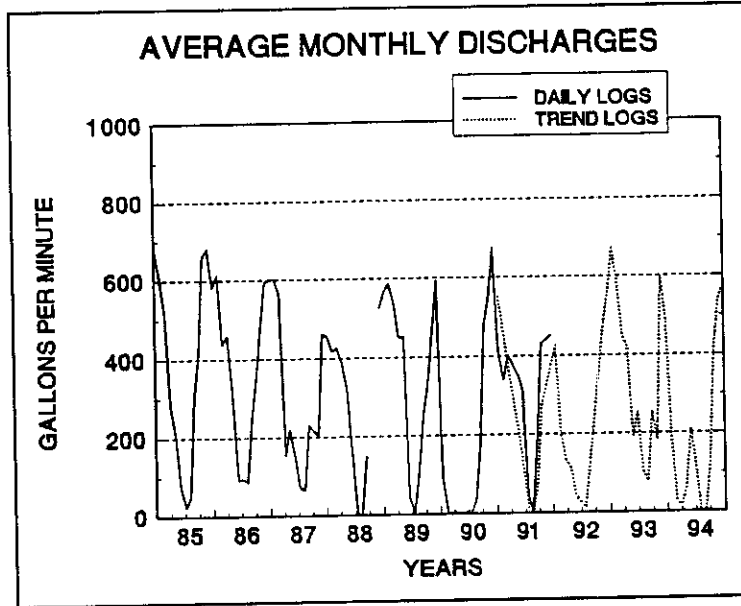


Figure 17. Average monthly discharges for the Capitol Mall geothermal system, 1985-1994.

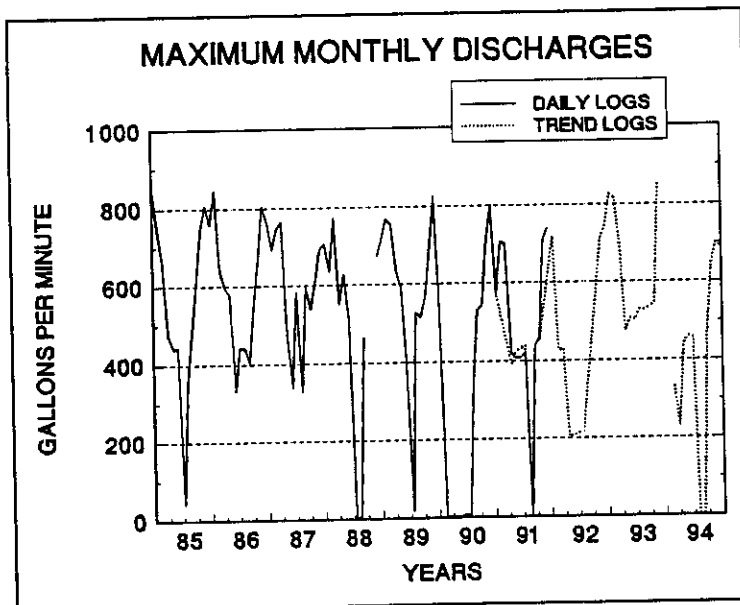


Figure 18. Maximum monthly discharges value for the Capitol Mall geothermal system, 1985-1994.

Temperatures

Figure 19 shows a decline of about 5° Fahrenheit in the maximum monthly supply temperatures from 1985 to 1994. The decline is probably related to thermal breakthrough caused by nearby reinjection in Capitol Mall #1.

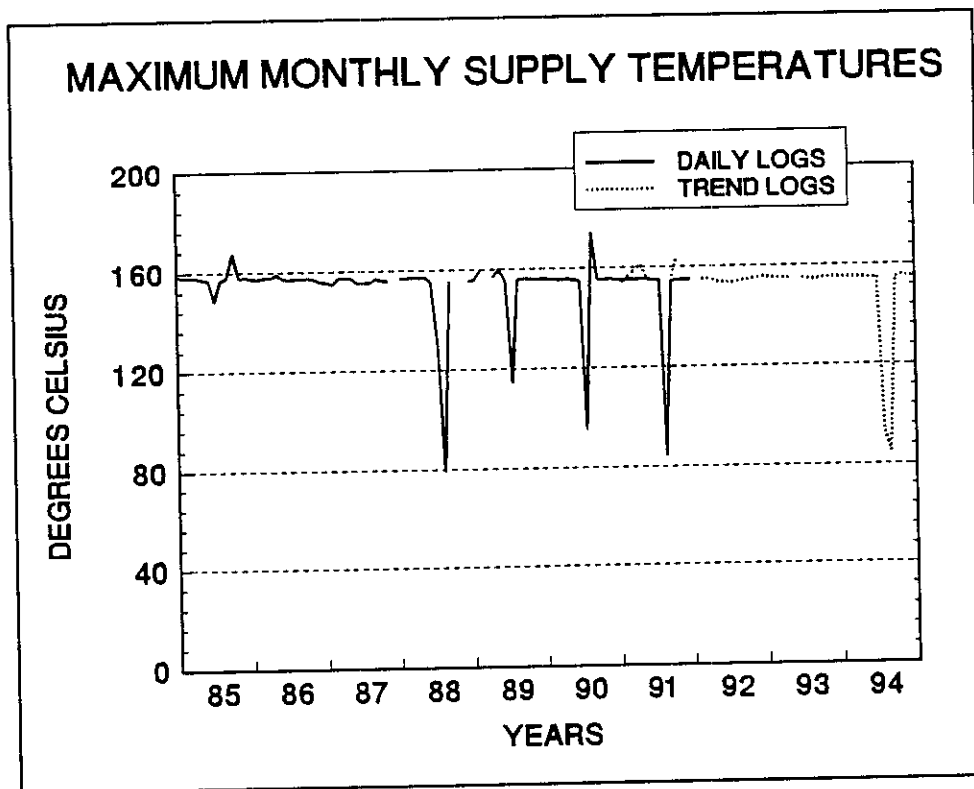


Figure 19. Maximum monthly supply temperatures for the Capitol Mall Geothermal system, 1985-1994.

CONCLUSIONS AND RECOMMENDATIONS

Hot ground water from the State of Idaho Capitol Mall geothermal system is used to heat nine buildings in the Capitol Mall complex. Annual production ranged from 79.1 to 212.6 million gallons during the time period from 1983 to 1994. The average annual production can not be calculated because the data records are incomplete. In general, geothermal production for this system is probably 150 to 200 million gallons a year with the maximum monthly production being about 30 million gallons. Peak discharge is probably 850 gallons per minute. The maximum monthly supply temperature has decreased about 5° Fahrenheit from 1985 to 1994.

Continued and improved monitoring is critical for the Capitol Mall system as well as for the other geothermal systems in the downtown Boise and Boise Warm Springs Water District areas. Efforts should be expanded to prevent data gaps caused by equipment failure. In the event that the Capitol Mall production is transferred to the City of Boise well field, a computer Trend Log system should be installed at the production wells.

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APPENDIX A.
MONTHLY PRODUCTION FOR THE CAPITOL MALL GEOTHERMAL SYSTEM

Year	Month	Production in gallons (Daily Logs)	Production in gallons (Trend Logs)
1985	January	30,486,960	
	February	24,515,280	
	March	23,126,976	
	April	12,104,352	
	May	8,037,360	
	June	2,485,584	
	July	862,272	
	August	2,048,112	
	September	12,060,864	
	October	16,672,032	
	November	24,705,648	
	December	30,388,752	
1986	January	23,485,392	
	February	24,713,568	
	March	19,460,448	
	April	19,732,608	
	May	14,113,584	
	June	4,015,440	
	July	3,804,912	
	August	1,478,448	
	September	9,465,696	
	October	15,321,888	
	November	20,062,944	
	December	23,996,448	
1987	January	26,843,760	
	February	24,236,496	
	March	23,514,048	
	April	4,835,088	
	May	8,163,936	
	June	6,458,832	
	July	3,140,352	
	August	2,680,992	
	September	9,832,147	
	October	9,590,400	
	November	8,711,136	
	December	20,545,056	

Year	Month	Production in gallons (Daily Logs)	Production in gallons (Trend Logs)
1988	January	20,283,552	
	February	17,454,528	
	March	18,954,576	
	April	16,864,272	
	May	14,381,712	
	June	7,103,664	
	July	74,592	
	August	6,336	
	September	4,873,104	
	October	NA	
	November	NA	
	December	22,732,272	
1989	January	15,411,024	
	February	6,759,648	
	March	22,694,400	
	April	16,857,936	
	May	19,484,352	
	June	1,701,792	
	July	88,128	
	August	4,557,024	
	September	9,763,344	
	October	14,638,896	
	November	19,700,064	
	December	23,902,704	
1990	January	909,648	
	February	NA	
	March	NA	
	April	NA	
	May	NA	
	June	53,056	
	July	65,808	
	August	1,499,184	
	September	7,517,088	
	October	20,564,640	
	November	23,629,680	
	December	29,185,344	

Year	Month	Production in gallons (Daily Logs)	Production in gallons (Trend Logs)
1991	January	18,211,392	1,989,104
	February	13,621,968	NA
	March	16,704,288	NA
	April	16,199,136	11,787,606
	May	15,713,712	9,509,605
	June	13,411,872	4,903,862
	July	1,765,296	454,892
	August	NA	1,989,104
	September	8,554,608	3,061,955
	October	17,361,648	10,468,839
	November	18,400,752	NA
	December	19,489,824	NA
1992	January	20,499,696	10,557,900
	February	15,725,808	8,175,694
	March	17,325,360	5,995,368
	April	7,840,944	4,797,475
	May	6,790,896	1,874,974
	June	3,606,912	1,055,038
	July	3,049,776	381,575
	August	1,955,376	NA
	September	6,929,136	NA
	October	9,161,136	NA
	November	19,996,992	18,264,697
	December	23,412,816	24,173,503
1993	January		29,216,599
	February		22,915,361
	March		19,416,082
	April		16,610,861
	May		8,429,695
	June		10,848,560
	July		4,561,290
	August		3,359,905
	September		10,691,201
	October		7,234,027
	November		25,207,402
	December		21,795,714

Year	Month	Production in gallons (Daily Logs)	Production in gallons (Trend Logs)
1994	January		8,284,003
	February		1,007,734
	March		683,525
	April		2,681,849
	May		8,656,128
	June		5,155,506
	July		NA
	August		NA
	September		5,374,422
	October		16,083,684
	November		23,009,472
	December		25,344,295



State of Idaho

DEPARTMENT OF WATER RESOURCES

Western Region, 2735 Airport Way, Boise, Idaho 83705-5082

(208) 334-2190
FAX (208) 334-2348

PHILIP E. BATT
GOVERNOR

R. KEITH HIGGINSON
DIRECTOR

3/21/95

NOTES - GEOTHERMAL WELLS in BOISE FRONT GWMA

STATE OF IDAHO

PERMIT 63-09341

Capitol Mall WELL & Bldgs., Heating

- Examined 7-23-87, SRBA claim A63-09341 filed, can now proceed with licensing.
- Will hold exam report 30 days (to 4/21/95) to allow state to submit add'l. data for revised license recommendations.
- Tentative license recommendations: 1.79 cfs 1/1-12/31 1031 AFA (803 gpm) $\rightarrow$ ($\approx$ 336 M. gallons/yr.)
- May need to revise volume (AFA) figure per heating beneficial use analysis (re: Admin. Memo #23 Appl. Processing).
- Suggest: amend permit in licensing process ~~to~~ to show well on or near QQQ line S.2 SWSSE / S.10 NWNENE.
- Will also mean amending SRBA claim to agree with license recommendations (pld, cfs, volume).
- Injection Well Permit 63-W-17 defines limit of what/how can inject to separate well near 4th & State St.
- Will need to modify 63-W-17 if/or obtain another I.W. Permit if increase/change injection operation.
- Adding New Bldgs to the production well - Options:
 - 1) Analyze if new uses fall within limits of permit (need data @ total ft² heated etc. per Ad. Memo #23).
 - 2) New right not feasible per moratorium on new rights in Boise Front GWMA.
 - 3) Change existing right that allows use elsewhere, move this use to new bldgs. to come on-line (re: transfer or amendment process).

3/21/95
Pg 2

City of Boise

Permit 63-09139 ~ 4 wells c Military Reserve,
Includes Heating

Development initiated mid-1983, not completed (re pending Ext. of Time) when mid-1988 Boise Front GWMA moratorium on additional heating development was enacted. " extends through 1998 at this time.

Additional development beyond 6/10/1988 (moratorium) cannot occur unless specifically authorized by IDWR.

Permit 63-09138 ~ 3 wells c Camelback Park,
Includes Heating

Similar status as 63-09139, falls within same "heating moratorium".

Also has pending Ext. of Time

Without add'l. analysis, it is not clear it can heat more bldgs. with any geothermal wells in Boise Front GWMA. The issue centers on the details not yet provided to IDWR for analysis.

- Steve Lester
IDWR Western Region



State of Idaho
DEPARTMENT OF WATER RESOURCES

1301 North Orchard Street, Statehouse Mail, Boise, Idaho 83720-9000
Phone: (208) 327-7900 FAX: (208) 327-7866

CECIL D. ANDRUS
GOVERNOR

R. KEITH HIGGINSON
DIRECTOR

RECEIVED
MAY 7 1991

Department of Water Resources
Western Regional Office

RECEIVED

JUN 26 1995

Department of Water Resources

May 6, 1991

State of Idaho
Bureau of Building Services
State House Mail
Boise, Idaho 83720

Re: Injection Well Permit No. 63-W-17

Dear Injection Well Permittee:

Enclosed is the approved permit for your injection well. Note the expiration date on the permit of January 1, 1997. The permit must be renewed at that time.

Please note the conditions of operation set forth in Attachments I and II.

If you have any questions, please call John McLeod in the State office at 327-7950.

Sincerely,

Lotwick Reese, P.E., Manager
Groundwater Protection Section

Enclosure

✓CC: Rob Whitney--IDWR Western Region

for licensing
63-09341

Application No. 63-W-17

63-ER-2

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

RECEIVED
APR 30 1987

APPLICATION FOR PERMIT TO
TO CONSTRUCT ☐ MAINTAIN ☒ Department of Water Resources
AN INJECTION WELL

Under the Provisions of Title 42, Chapter 39 of the Idaho Code

I. GENERAL INFORMATION FOR ALL INJECTION WELLS

1. Facility Name and Location

Name STATE OF IDAHO - Bureau of Building Services
Street Address STATEHOUSE
City BOISE State ID Zip 83720

2. Name and Address of Legal Contact (owner, where owner is operator, or operator)

Name SAME AS ABOVE ☒ Owner ☒ Operator
Street Address _____
City _____ State _____ Zip _____
Phone No. (include area code) (208) 334-2315 or 2126

3A. Location of Well

NE 1/4 of NE 1/4 of NE 1/4, Section 10, Township 3 NS,
Range 2 EN, B.M., ADA County
Subdivision Name _____, Block _____, Lot _____

3B. Is facility located on Indian lands: Yes ☐ No ☒

4A. Injection Well Classification (check one)

1. ☐ Well depth is less than or equal to 18 feet below land surface (shallow injection well).
2. ☒ Well depth is greater than 18 feet below land surface (deep injection well).

4B. Deep Injection Well Classification (check all items which apply)

1. ☐ Well injects or will inject hazardous wastes or radioactive wastes (Class IV well).
2. ☐ Well injects nonhazardous and nonradioactive fluids into or above drinking water source (Class V(a) well).
3. ☐ Well injects nonhazardous and nonradioactive fluids below all current or future drinking water sources (Class V(b) well).
4. ☒ Well returns groundwater to the subsurface after water has passed through a closed-loop heat exchange unit (Class V(c) well).

II. TECHNICAL DATA, CLASS V(c) INJECTION WELL

1A. Description of injection well

Well Bore: Diameter 11 Inches Depth 2152 Feet

Casing: Diameter 16 3/4 Inches Depth 118 Feet

Perforation depth: from _____ to _____ Feet

Surface seal: No ☐ Yes ☒ Type Cement Depth 1640 Feet

Secondary casing, if applicable:

Diameter 8 9/8 Inches

Initial Depth 340 Feet Terminal depth 1640 Feet

Seal type Cement Packer depth N/A Feet

Well log available: No ☐ Yes ☒ (attach) On File

Date constructed 1980

1B. Driller's name and address Hiddleston Drilling

Note: Copy of well log must accompany notice of completion of construction for all new wells.

2. Distance to nearest domestic well _____ miles

Direction from disposal well _____

Depth to groundwater _____ Feet

3. Frequency of Discharge: Continuous ☐ Seasonal ☒ Intermittent ☐

4. Maximum Average Weekly Rate of Injection 600 GPM Maximum Capacity 750 GPM

Any request to treat any document or portion thereof as a trade secret as defined under Chapter 8, Title 48, Idaho Code shall be made at the time said document is submitted to the Department. The person making the request shall stamp or otherwise mark each page or item on a page, to which the request applies, with the word "confidential."

Be it known that the undersigned (owner/operator) hereby makes Application for Permit to Construct or Maintain an Injection Well. The above information is true and correct to the best of my knowledge.

4/24/87
Date

WM. F. Shields
Signature and Title

WM. F. SHIELDS
Chief, Bureau of Building Services

III. ACTION OF THE DEPARTMENT OF WATER RESOURCES

I have examined Application No. 63 - W - 17
and said application is hereby Approved subject
to the attached conditions.

Witness my hand this 6 day of May, 19 91.

Stuart A. Reed
Official, Idaho Department of Water Resources

Groundwater Protection Manager
Title

FOR DEPARTMENT USE ONLY

Received by [Signature] Date 4-30-87 Checked by [Signature] Fees 5000
Receipted by [Signature] Date _____ Receipt No. 0 K.
Notice of completion of construction received by _____ Date _____
Field inspection completed by _____ Date _____
Permission to operate granted by _____ Date _____
Notice of abandonment received by _____ Date _____
Abandonment completed _____ Inspected by _____ Date _____

STATE OF IDAHO

DEPARTMENT OF WATER RESOURCES

ATTACHMENT II: SPECIAL CONDITIONS AND REQUIREMENTS PERTAINING
TO CONSTRUCTING, MODIFYING, OPERATING AND/OR
ABANDONING AN INJECTION WELL.

63-W-17 (63-GR-2)

June 1987

1. This well shall be used in accordance with applicable rules and standards found in Drilling for Geothermal Resources Rules and Regulations and Construction and Use of Injection Wells Rules and Regulations.
2. Records shall be kept for both the injection well and the production well. You shall record and report monthly to the Department of Water Resources:
 - Quantities produced and injected.
 - Temperature of fluids produced and injected, including maximum and minimum temperatures.
 - Pressures at both wells. If the injection pressure exceeds 100 psi at any time, notify this Department immediately.
3. If any unexplained changes in temperature, pressure or volumes occur, notify the Department of Water Resources immediately.
4. The injected fluid shall be only the geothermal fluid from 63-GR-3, unless previously approved by the Department of Water Resources in writing.
5. The Department of Water Resources may require that the integrity of the annular cement and well casing be established by surveys (logs, downhole cameras or packer tests) as may be needed.
6. Monitoring and water quality samples may be required if any problems are suspected.
7. Should the use of the well lead to degradation of the quality of the groundwater, this permit may be cancelled.
8. This permit shall expire on May 30, 1997. If use of the well is desired beyond this date, a new application must be filed.

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

RECEIVED
MAR - 4 1988
SEE 6/28/85
MEMO - JL
Water Resources

A. GENERAL INFORMATION

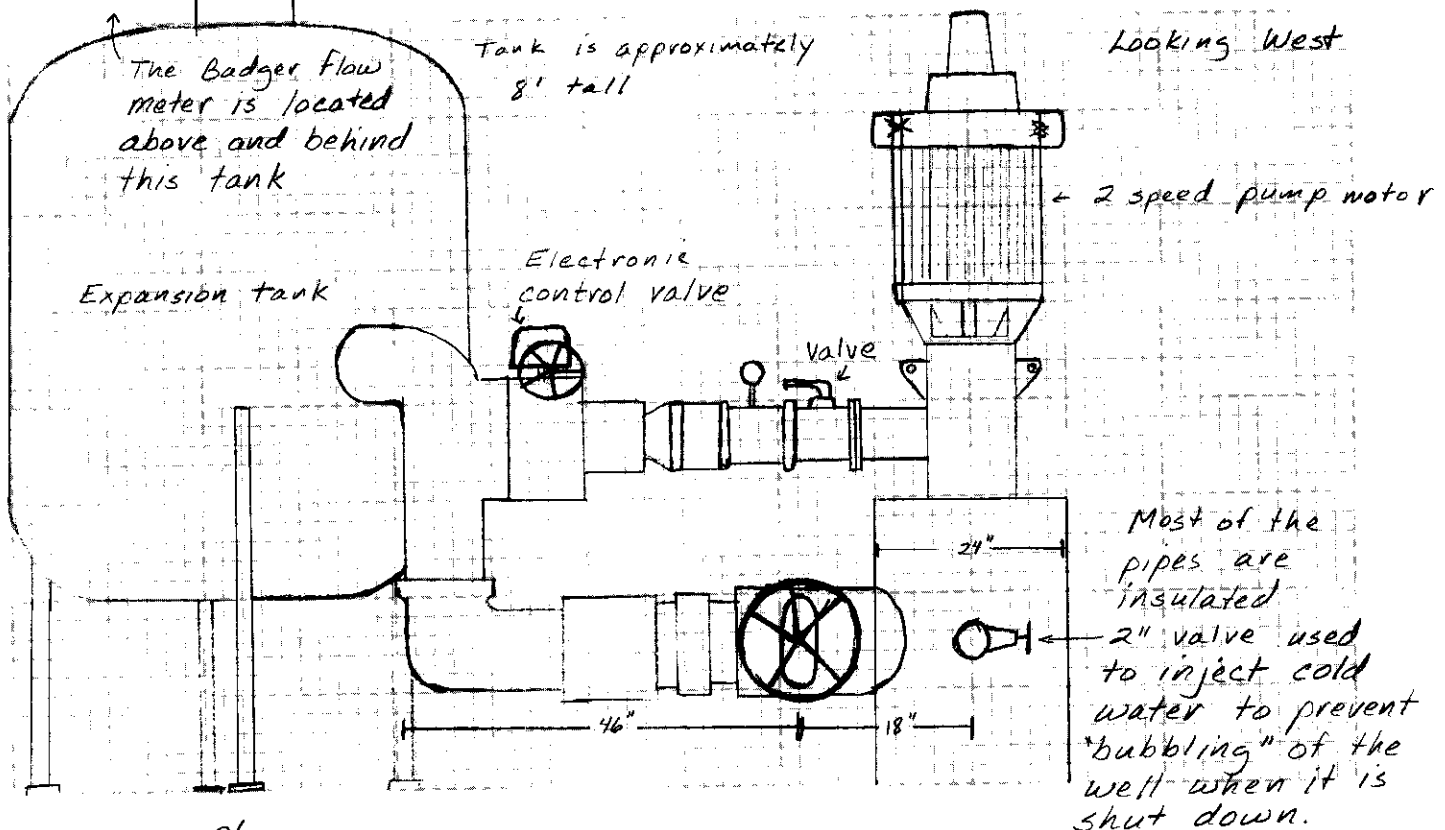
Permit No. 63-9341
1. Owner: Idaho State Dept. of Administration Phone No. 334-3380
Current Address: Statehouse Boise, ID 83720
2. Accompanied by: Sam Hiskey EXAM. DATE: 7-23-87
Address: Bureau of Building Services Phone No. 334-2315
Relationship to Permit Holder: Building Facilities Supervisor
3. Source: Groundwater tributary to _____
(Geothermal)

B. OVERLAP REVIEW

1. Other water rights with same place of use: 63-5073 & 63-9215
☒ Copies Attached
2. Other water rights with same point of diversion: NONE
☐ Copies Attached ☐ Copies of Field Exam's Attached

C. SYSTEM DESCRIPTION

1. Diversion System Diagram: Indicate all major components and distances between components. Indicate weir size/ditch size/pipe i.d. as applicable. ☒ Alternative diagram attached also



Scale: 1" = 2'

2. ☒ Copy of U.S.G.S. Quadrangle Attached Showing location(s) of point(s) of diversion and place(s) of use (required).
☒ Photo of Diversion and System Attached (required for all but single household domestic groundwater, and stockwater).
☐ Aerial Photo Attached (required for irrigation of 10 acres or more).

System Description (continued)

3. **Narrative:** Description (As operating at time of measurement. Indicate pressure, number of sprinklers, etc.)

The system has a geothermal well 3030' deep with 20" casing from 0 to 130', 12" casing from 2 - 1260' and 8" casing from 1220 to 2550'. From 2555' to 3030' it is uncased. The well had a natural artesian flow between 900 ~~to~~ to 1000 gpm at the time it was drilled. Hot water from the well is used to heat 8 buildings in the Capitol Mall with

☒ See Remarks on page 4 for continuation

4.

Well or Diversion Identification No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size
	G.E.	40/17.8	FVJ616250	Peerless	241693

*Code to correspond with No. on map and aerial photo

5. **Point(s) of Diversion:**

Ident. No.	Gov't. Lot	1/4	1/4	1/4	Sec.	Twp.	Rge.	County	Method of Determination/Remarks
			NE	NE	10	3N	2E	Ada	Topographic Map

6. **Place(s) of Use:**

Indicate Method of Determination Topographic Map

Twp.	Rge.	Sec.	NE 1/4				NW 1/4				SW 1/4				SE 1/4				Totals
			NE 1/4	NW 1/4	SW 1/4	SE 1/4	NE 1/4	NW 1/4	SW 1/4	SE 1/4	NE 1/4	NW 1/4	SW 1/4	SE 1/4	NE 1/4	NW 1/4	SW 1/4	SE 1/4	
3N	2E	10	X	X															

Do not use this space

Do not use this space

D. FLOW MEASUREMENTS

☐ Additional Data Sheets Attached

1.

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date
Badger Flow Meter	Electronic Transmitter	Badger	unknown	unknown	4"	

2. Measurements:

The Badger flow meter has an electronic transmitter linked to Building Services computer terminal. The gpm flowing through the system is then displayed on the terminal screen along with other information on operation of the system.

E. FLOW CALCULATIONS

☐ Additional Computation Sheets Attached

1. Measured Method: Maximum observed flow from available logs was 803.3 gpm on 12-10-86. The flow at 2:18 pm on 7-23-87 was 156.8 gpm with the pump on low speed. Allow 1.79 cfs
2. Alternate Method for Checking Purposes:
- * Artesian Flow $40 \times 8.8 \times 0.8 = 6.12 \text{ cfs}$
 $* 0 + 2.3(20)$

F. PUMP EFFICIENCY DATA (Optional)

Discharge Pressure: _____ psi x 2.31 = _____ ft (1); Dynamic pumping level: _____ ft (2)
 Total Head: (1) + (2) = _____ (3) ; Flow rate: _____ cfs (4)

Water HP: (3) x (4) ÷ 8.8 = _____ (5)
 Meter Input KW: 3.6 x _____ KH x _____ CTR or _____ MULT x _____ PTR x _____ N/ _____ T = _____ (6)
 Meter Input HP: (6) x 1.34 = _____ (7)
 Panel Input KW: _____ Ave PF x _____ Ave Volts x _____ Ave Amps x .001732 = _____ (6)
 Panel Input HP: (6) x 1.34 = _____ (7) Efficiency: (5)/(7) x 100 = _____ %

G. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation:

$V_{I.R.} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) = \text{N/A}$
 $V_{D.R.} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation Season}) \times 1.9835 = \text{_____}$
 $V = \text{Smaller of } V_{I.R.} \text{ and } V_{D.R.} = \text{_____}$

2. Volume Calculations for Other Uses:

~~N.A.~~ Heating $1.79 \times 365 \times 1.9835 = 1296 \text{ AF/ANN.}$
 OR 3 mths (JUN, JULY, AUG) AT .35 cfs (summer months)
 $+ 9 \text{ mths AT } 1.79 \text{ cfs} = .35 \times 1.98 \times 92 \text{ DYS} = 63.8$
 $+ 1.79 \times 1.98 \times 273 \text{ DYS} = 967.6$
 1031.3 AF/ANN.
 $+ 1031.3 < 1296$

H. REMARKS AND OVERLAP REVIEW ANALYSIS

either water to water heat exchangers (Capitol Building, Hall of Mirrors, ~~Lea B. Jordan~~ Supreme Court Building, State Library Building and the Towers Office Building), or with water to air heat ~~ex~~ exchangers (Central Services, Lea B. Jordan Building, and the Public Works Building). Before being injected back into the ground through ~~to~~ the 2150' injection well, the domestic hot water supply is preheated to 120° F. The injection well has a 10 H.P. and a 150 H.P. pump. 63-9215 has not been developed as described on the permit. 63-5073 is not connected to this system nor heats any of the Capitol Mall buildings.

I. RECOMMENDATIONS

1. Recommended Amounts

Beneficial Use	Period of Use		Rate of Diversion Q (cfs)	Annual Volume V (afa)
	From	To		
Heating	1-1	12-31	1.79	N.A. 1031 AF/Ann
Totals:			1.79	N.A. 1031

2. Recommended Amendments

- ☐ Change P.D. as reflected above ☐ Add P.D. as reflected above ☐ None
☐ Change P.U. as reflected above ☒ Add P.U. as reflected above ☐ Other

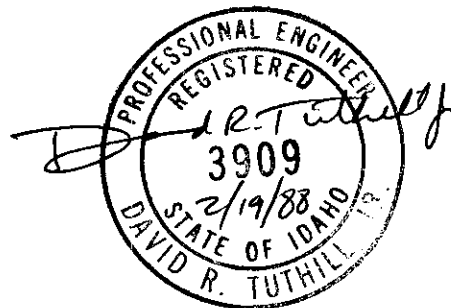
J. AUTHENTICATION

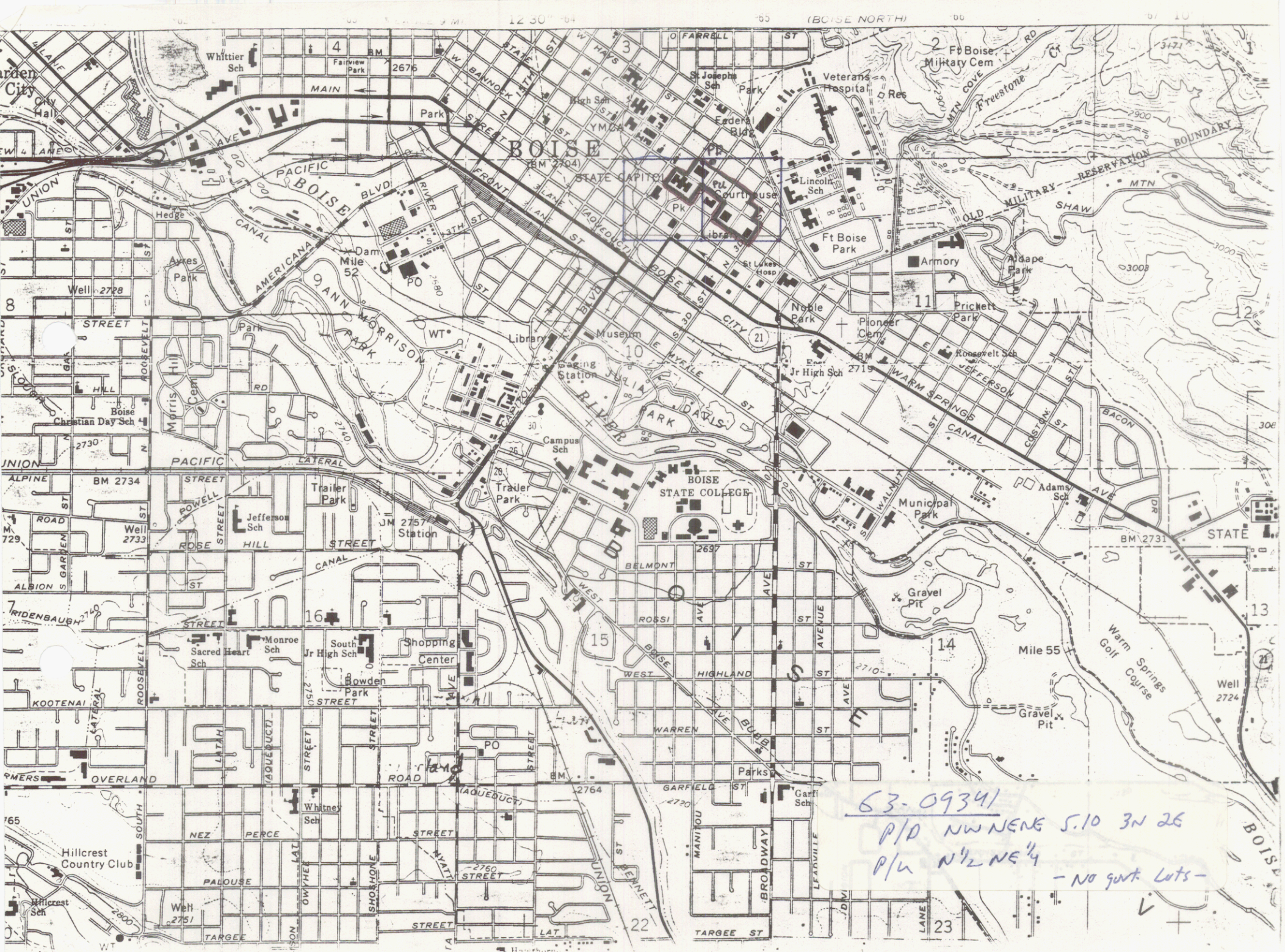
Field Examiner's Name Carter Fritschle
Signature Carter Fritschle *11/13/88*
Certification Date _____
Field Report Preparation Date 7-23-87

CONSULTANT SEAL

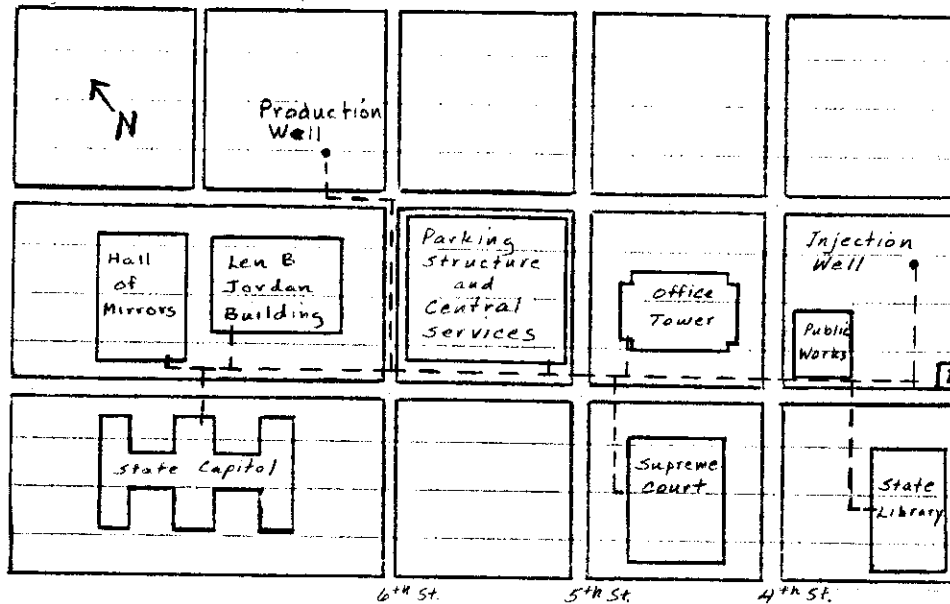
K. Licensing recommendation shall be prepared by an Idaho Department of Water Resources employee on a computer printout attached hereto.

SEE 6/28/95 Memo with
REVISED LICENSE RECOMMENDATIONS
-JL





Capitol Mall Area



Washington St.

State St.

6th St.

5th St.

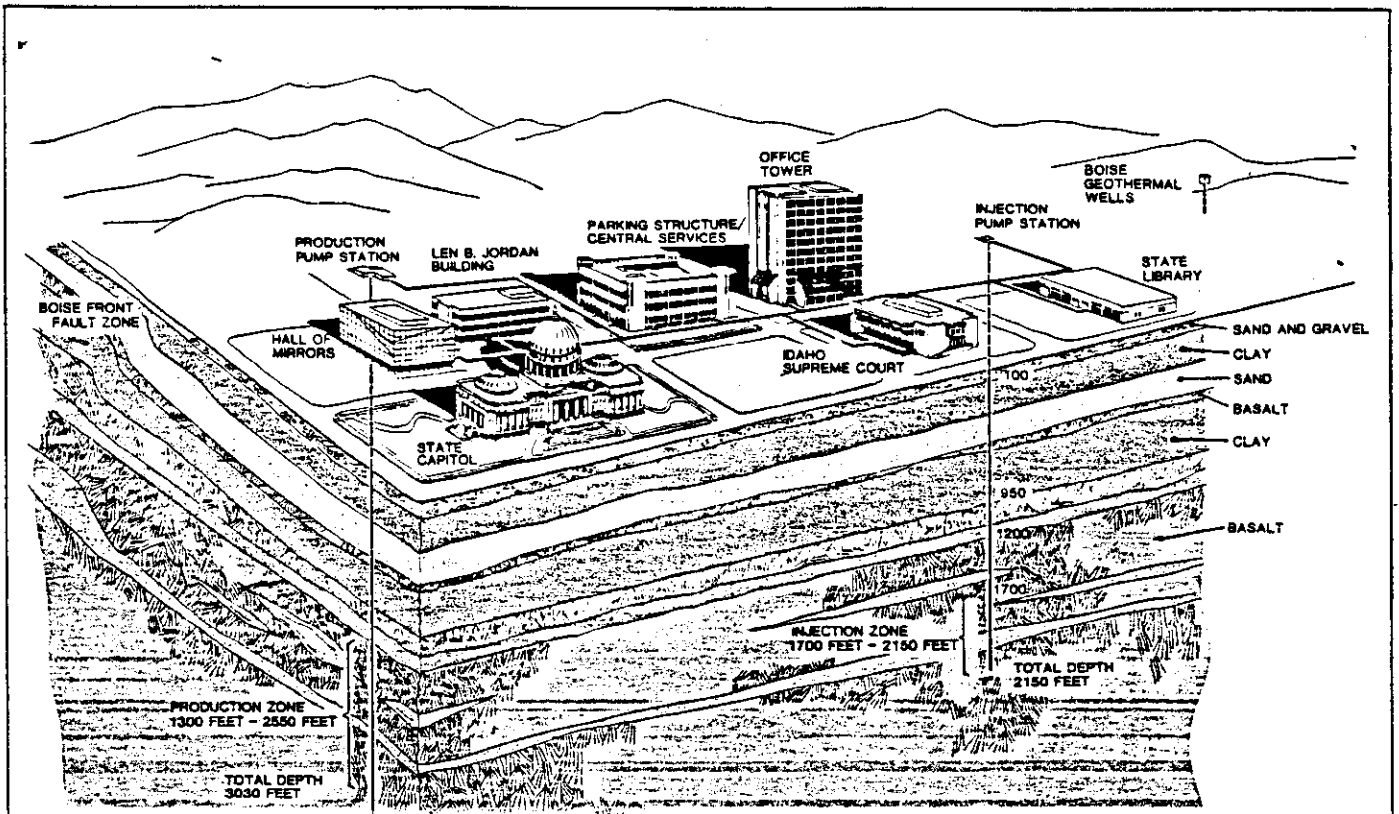
4th St.

Approximate Scale 1" = 400'

plus Alexander House per KN 1995 Report

SL 6/23/95

----- Dashed lines indicate the approximate route of the pipelines (They follow the "Tunnel" under the Capitol Mall)



The Public Works Building has been added to the system

63-09341

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30
days after the completion or abandonment of the well.

1. WELL OWNER

Name State of Idaho, Department of
Natural ResourcesAddress Boise, Idaho

Owner's Permit No. _____

7. WATER LEVEL

Static water level flow feet below land surfaceFlowing? ☒ Yes ☐ No G.P.M. flow _____

Temperature _____ ° F. Quality _____

Artesian closed-in pressure _____ p.s.i.

Controlled by ☒ Valve ☐ Cap ☐ Plug

2. NATURE OF WORK

Well #2 Capitol Mall

☒ New well ☐ Deepened ☐ Replacement☐ Abandoned (describe method of abandoning)

8. WELL TEST DATA

Unknown

☐ Pump☐ Bailer☐ Other

Discharge G.P.M.

Draw Down

Hours Pumped

3. PROPOSED USE

Geothermal

☐ Domestic ☐ Irrigation ☐ Test ☒ Other (specify type)☐ Municipal ☐ Industrial ☐ Stock ☐ Waste Disposal or
Injection

4. METHOD DRILLED

☐ Cable ☒ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 14 3/4 inches Total depth 1286 feetCasing schedule: ☒ Steel ☐ ConcreteThickness 20 inches Diameter 8 inches From 138 feet330 inches 12 inches 0 feet 1260 feet250 inches 8 inches 1220 feet 2550 feet

_____ inches _____ inches _____ feet _____ feet

_____ inches _____ inches _____ feet _____ feet

Was casing drive shoe used? ☒ Yes ☐ NoWas a packer or seal used? ☒ Yes ☐ NoPerforated? ☒ Yes ☐ NoHow perforated? ☒ Factory ☐ Knife ☐ TorchSize of perforation 1/8 inches by 3 1/2 inches

cuts p/rounds From To

16 perforations 1300 feet 1420 feet24 perforations 1420 feet 1460 feet16 perforations 1460 feet 1606 feet24 1606 2558Well screen installed? ☒ Yes ☒ No

Manufacturer's name _____

Type _____ Model No. _____

Diameter _____ Slot size _____ Set from _____ feet to _____ feet

Diameter _____ Slot size _____ Set from _____ feet to _____ feet

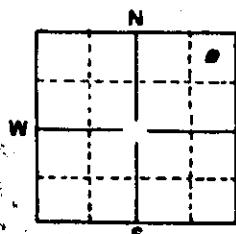
Gravel packed? ☐ Yes ☒ No Size of gravel _____

Placed from _____ feet to _____ feet

Surface seal depth 40' Material used in seal ☒ Cement grout☐ Puddling clay ☐ Well cuttingsSealing procedure used ☐ Sherry pit ☒ Temporary surface casingpumped ☐ Overbore to seal depth

6. LOCATION OF WELL

Sketch map location must agree with written location.



Subdivision Name _____

Lot No. _____ Block No. _____

County AdaNE 1/4 NE 1/4 Sec. 10, T. 3 N/S, R. 2 E/W

9. LITHOLOGIC LOG

Hole Diam.	Depth		Material	Water Yes
	From	To		
<u>24</u>	<u>0</u>	<u>40</u>	Top soil fill	
<u>20</u>	<u>40</u>	<u>81</u>	Sand gravel & cobbles	
<u>20</u>	<u>81</u>	<u>130</u>	Silty sand & coarse sand	
<u>14 3/4</u>	<u>130</u>	<u>151</u>	Clay w/ silt & sand	
	<u>151</u>	<u>178</u>	Sand coarse & clean	
	<u>178</u>	<u>300</u>	Sand granitic & clay	
	<u>300</u>	<u>764</u>	Clay silty	
	<u>764</u>	<u>935</u>	Basalt w/clay & sand	
	<u>935</u>	<u>1005</u>	Sand w/qtz clean	
	<u>1005</u>	<u>1088</u>	Basalt w/clay	
	<u>1088</u>	<u>1170</u>	Sand qtz w/clay	
	<u>1170</u>	<u>1266</u>	Basalt w/clay	
<u>9 7/8</u>	<u>1266</u>	<u>1553</u>	Clay & sand w/basalt chips	
	<u>1553</u>	<u>1635</u>	Volcanics w/clay	
	<u>1635</u>	<u>1655</u>	Sand coarse	X
	<u>1655</u>	<u>1690</u>	Clayey sand & clay	
	<u>1690</u>	<u>1730</u>	Sand w/granitics	X
	<u>1730</u>	<u>1775</u>	Clay soft gritty	
	<u>1775</u>	<u>1793</u>	Sand coarse volcanic	X
	<u>1793</u>	<u>2190</u>	Volcanic rock silicious	X
	<u>2190</u>	<u>2220</u>	Clay gritty	
	<u>2220</u>	<u>2240</u>	Sand & clay	
	<u>2240</u>	<u>2267</u>	Sand granitic cemented	
	<u>2267</u>	<u>2290</u>	Sandstone & clay	
	<u>2290</u>	<u>2435</u>	Sand granitic & volcanic	X
	<u>2435</u>	<u>2510</u>	Clay some sand	
	<u>2510</u>	<u>2950</u>	Volcanic rock glassy	X
	<u>2950</u>	<u>3030</u>	Volcanic rock soapstone	X
			TD	

10.

Work started 6-29-81 finished 9-4-81

11. DRILLERS CERTIFICATION

Firm Name Holman Drilling Corp. Firm No. 101
E. 3410 Ninth Ave.Address Spokane, WA 99202 Date 3-1-81Signed by (Firm Official) Arnold E. Holman
and(Operator) Arnold E. Holman

63- 9341



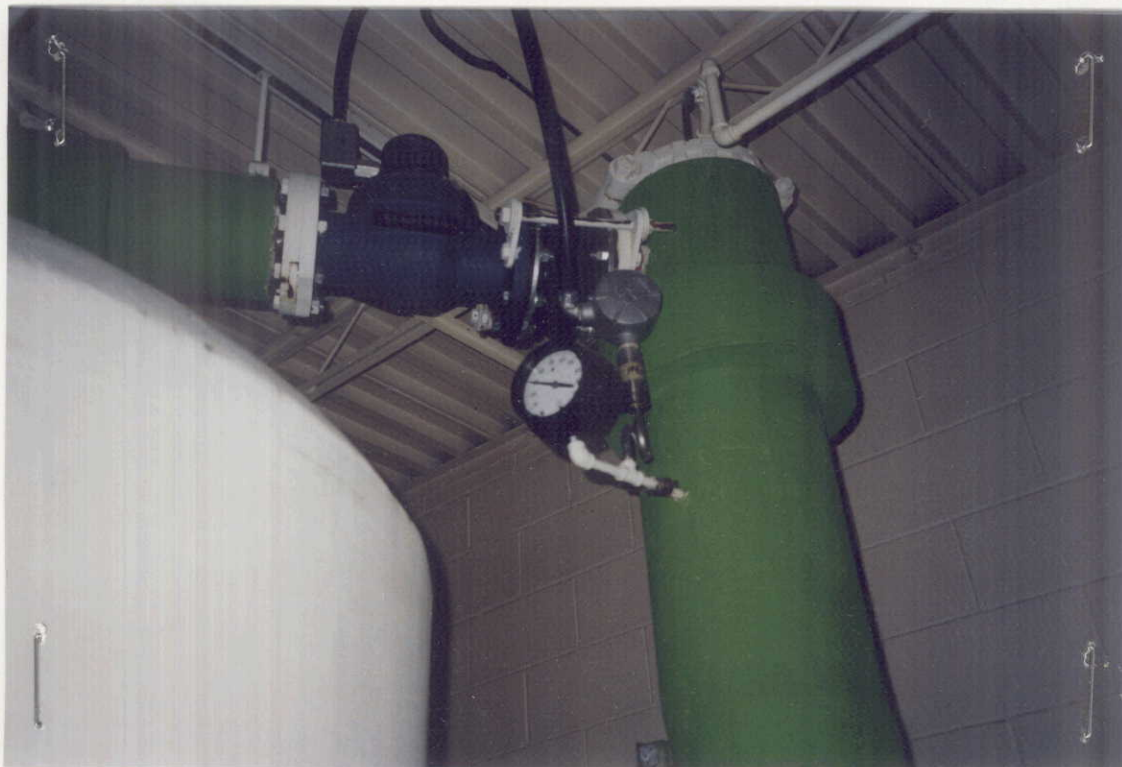
P.D. The
production
well pump
station.
Looking North-
west



The injection
well pump
station,
Looking East.

63-9341

P.D. Inside production
pump station.
Looking south.



Badger flow
meter (inaccessible
except by ladder)
in southwest
corner of the
building.

From: DWR01::DWR80::SLE. JR 15-JUN-1995 08:22: .03
To: DWR01::JJOHNSON
CC:
Subj: PERMIT 63-09341

Jim: Ken Neely & I have been working on this (mostly Ken, actually). He prepared an open file report on data @ this well to help me make final exam recommendations for flow & volume. I have draft of this report & Ken is finalizing.

I have strived to give this high priority but have been distracted by Water District things & Moratorium backlog processing that will just not be denied. My goal is to forward file to S.O. by end of next week based on Ken's draft report -- no need to wait for final version since it will be available at S.O. anyway.

Hope this takes care of your/Norm's question. Let me know if need more info.

thanks

MEMORANDUM

To: Jim Johnson
From: L. Glen Saxton 
RE: INQUIRY FROM NORM YOUNG
Date: June 13, 1995

Norm asked me today to check into the status of issuing a license for the low temperature geothermal water well used by the state in the Capital Mall complex. I don't know the number or the location of the file.

Apparently Steve Lester has conducted a field examination of the use. The license is needed since the state and the city of Boise are in the process of entering an agreement concerning the use of the hot water.

Please respond directly to Norm, since I will be away from the office for several days. Thanks.

MEMORANDUM

TO: JIM JOHNSON
FROM: NORM *Ney*
SUBJECT: LICENSING OF PERMIT 63-09341
DATE: April 5, 1995
=====

Phil Rassier met with Clive Strong and attorneys from the Department of Lands and the Department of Administration to discuss the proposed agreement that would transfer production from the State's wells to the City of Boise's wells and convert the State's wells to injection wells. One result of the meeting was a request for issuance of the license on the State's permit to be expedited. Please work with Steve Lester to get the license prepared, within the next two weeks, if possible.

I spoke with S. Lester last week. He will complete the exam and forward it to me ASAP.

*SWK
4-17-95*

Not done as of 5/25/95

From: DWR80::SLESTER 22-MAR-1995 09:23:36.69
To: DWR03::NYOUNG, DWR01::PRASSIER, DTUTHILL
CC: SLESTER
Subj: LICENSE RECOMMENDATION 63-09341

This file has just received considerable attention due to State & City work regarding adding additional buildings to heating network. It occurs to me that in finalizing the license recommendations, we need to add another layer of analysis regarding the rate of flow and/or volume.

Current recommendations include 1.79 cfs based on records shown to examiner in 1987 exam, and 1031.3 afa based on 3 months @ .35 cfs plus 9 months @ 1.79 cfs (these factors incorporate the "volume required" component, which is less than the "volume diverted" component; the lesser value is recommended).

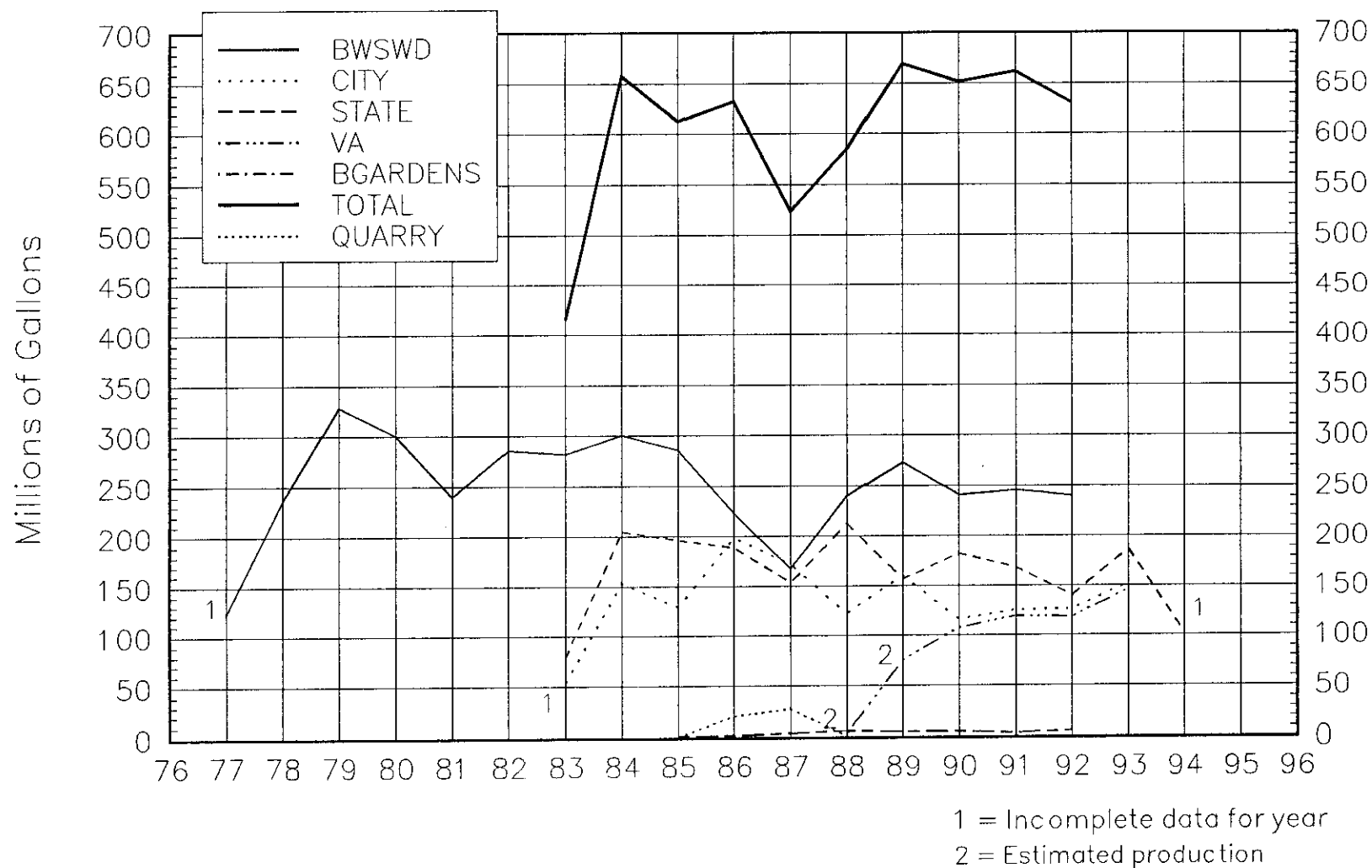
I suggest that the exam include use of Admin. Memo #23 @ Heating to determine the required rate of flow necessary to heat the 8 units found in the 1987 exam -- I understand that these same bldgs. still make up the entire use from the well in question so this revised analysis will still be current. Such analysis might or might not result in adjusted rate & volume limits for the license.

I will proceed with this step unless anyone thinks this is not appropriate. This type of analysis can be blended with any additional data that can be supplied by the parties regarding the heating of other bldgs. as is being discussed at this time.

*use actual measurement records
such as attached*

Nag

BOISE FRONT GEOTHERMAL SUPPLIERS ANNUAL PRODUCTION



MEMORANDUM

TO: File 63-9341

FROM: Sharla

DATE: March 21, 1991

RE: Returned Field Exam

On this date, the field exam report for the above referenced file was returned to the region. According to the date proof of beneficial use was filed for this right, an adjudication claim is needed and has not yet been filed.

The region will solicit the claim and based upon response, either the field exam will be returned with the claim after being reviewed by the region for discrepancies, or the right will be disallowed in the Director's Report for failure of the holder to submit the claim.

62-9341

June 21, 1988

CERTIFIED MAIL

G. Anna Barker, Administrator
Division of Public Works
Statehouse Mail
Boise, ID 83720

Dear Ms. Barker:

RE: BOISE FRONT - ORDER ESTABLISHING A MORATORIUM

Enclosed is an order establishing a moratorium in connection with further development of the warm water aquifer in the Boise Front Low Temperature Geothermal Ground Water Management Area.

The moratorium has been ordered pursuant to the authority of Section 42-1805(7), Idaho Code, and Rule 7 of the Department's Water Appropriation Rules and Regulations.

Objections to entry of the order shall be considered by the department under the provisions of the department's adopted Rules of Practice and Procedure and applicable law. Objections must be filed within fifteen (15) days of the date of this letter.

Sincerely,

NORMAN C. YOUNG
Administrator

Encl: 1

BEFORE THE DEPARTMENT OF WATER RESOURCES
OF THE
STATE OF IDAHO

IN THE MATTER OF THE BOISE)
FRONT LOW TEMPERATURE)
GEOTHERMAL RESOURCE GROUND)
WATER MANAGEMENT AREA)
_____)

ORDER
ESTABLISHING
A MORATORIUM

On June 15, 1987, the Director of the Idaho Department of Water Resources (IDWR) designated the Boise Front Low Temperature Geothermal Resource Ground Water Management Area (Boise Front) in Ada County due to reported declines in aquifer water levels and pressure. On January 22, 1988, Boise Warm Springs Water District (BWSWD) petitioned IDWR to:

1) Establish a moratorium on further development pursuant to Section 42-1805(7), Idaho Code, and Rule 7 of the Department's Water Appropriation Rules and Regulations,

2) Designate the Boise Front as a critical ground water area pursuant to Section 42-233(a), Idaho Code, and

3) To stop further development in the Boise Front pursuant to management authority provided by Sections 42-233(b) and 42-237(b), Idaho Code.

The IDWR staff has reviewed the present status of use and development of the low temperature geothermal resource in the Boise Front area and based upon this staff review, the Director has determined that:

1) Water levels or pressures in the Boise Front continue to decline at an estimated rate of six (6) to seven (7) feet per year in all or part of the Boise Front.

2) Pending applications and undeveloped permits could increase the annual withdrawal from the aquifer several fold if developed.

3) Protection of existing rights require additional management of the resource.

4) A moratorium on further development which will increase the rate of depletion from the Boise Front is required to insure compliance with the provisions of Chapter 2, Title 42, Idaho Code.

5) Additional hydrogeologic data is needed to adequately

evaluate the characteristics of the aquifer to prevent over appropriation of the resource, to stabilize depletions and to adequately assess the potential of long term declines.

6) By maintaining a ground water management area designation, the Director is authorized to require right holders to report withdrawals of ground water and other information to determine the ground water supply and its usage.

7) The Director is charged with the protection of existing water rights while allowing reasonable use of the resource.

8) Section 42-1805(7), Idaho Code, and Rule 7 of the Water Appropriation Rules and Regulations provide for the establishment of a moratorium on further development.

NOW, THEREFORE, pursuant to Section 42-1805(7), Idaho Code, and Rule 7 of the Water Appropriation Rules and Regulations, it is hereby ORDERED in connection with the Boise Front Low Temperature Geothermal Resource Ground Water Management Area designed on June 15, 1987 that:

1. Effective with the date of entry of this order, further development or additional use pursuant to undeveloped or partially developed permits is prohibited until the permit holder shows to the satisfaction of the Director that further development or additional use: a) will not increase depletions from the aquifer; b) will not increase pumping lift or decrease pressure to existing prior users; and c) will not reduce temperature to existing users causing systems operating at reasonable efficiency to no longer operate.

2. Pending and future applications will be rejected unless information is provided to demonstrate the use: a) will not cause additional depletion of the aquifer; b) will not increase pumping lift or pressure reduction to existing users or undeveloped permit holders; and c) will not reduce the temperature of the resource to existing users or undeveloped permit holders below the temperature necessary for a system operating at reasonable efficiency to operate.

3. The Director retains the designation of the Boise Front as a Ground Water Management Area and DENIES the petition of the Boise Warm Springs Water District to designate the Boise Front a Critical Ground Water Area.

4. The provisions of this order are effective upon issuance and remain effective for a period of five (5) years unless rescinded, modified or extended by subsequent order of the Director.

5. Service and publication of this order shall be made in accordance with the provisions of Rule 7 of the Water

Appropriation Rules and Regulations.

6. Any person aggrieved by this order shall be entitled to a hearing before the Director for the purpose of contesting the order. A request for hearing must be filed with the Director within fifteen (15) days after receipt of a copy of the order by certified mail, or within fifteen (15) days after completion of the publication of the order for three (3) consecutive weeks in a newspaper of general circulation, whichever is earlier. The hearing shall be conducted in accordance with the provisions of Chapter 52, Title 67, Idaho Code, and the rules of Practice and Procedure of the Department of Water Resources.

Dated this 10TH day of JUNE, 1988.


R. KEITH HIGGINSON
Director



63-9215
State of Idaho
DEPARTMENT OF WATER RESOURCES
STATE OFFICE, 450 W. State Street, Boise, Idaho

CECIL D. ANDRUS
Governor

A. KENNETH DUNN
Director

Mailing address:
Statehouse
Boise, Idaho 83720
(208) 334-4440

August 3, 1987

G. Anne Barker, Administrator
Division of Public Works
State of Idaho
Room 125
Len B. Jordan Bldg.
Boise, ID 83720

RE: Monitoring of the Boise Geothermal
Groundwater System

Dear Ms. Barker:

The enclosed order is being sent to you because of the Department's concern about the Boise Geothermal System. By collecting uniform and consistent data from the major users, a better understanding of the System will be known and management alternatives of the system can more properly be considered.

You and the other major users are required to develop a program for accurate monitoring and record keeping. The Department is willing to meet with you to discuss possible equipment selection and questions you may have.

If you have questions or comments, please contact John Carlson (phone 334-4406) of this Department.

Sincerely,

John E. Saxton for

L. GLEN SAXTON, Chief
Operations Bureau

LGS:ldt(GP5-1.60)

Enclosure

CC: IDWR - Western Region

BEFORE THE DEPARTMENT OF WATER RESOURCES
OF THE
STATE OF IDAHO

IN THE MATTER OF A COMPREHENSIVE)
MONITORING PROGRAM IN THE BOISE)
FRONT LOW TEMPERATURE GEOTHERMAL)
RESOURCE GROUND WATER MANAGEMENT)
AREA)
_____)

ORDER REQUIRING
MONITORING AND
RECORD KEEPING

This matter having come before the Director of the Department of Water Resources (Department) as a result of reported water level declines of the Boise Front Low Temperature Geothermal Resource Ground Water Management Area, and the need for a comprehensive monitoring system, the Director finds, concludes and orders as follows:

FINDINGS OF FACT

1. The Director of the Department has the responsibility to administer the ground water basins of the State to protect prior rights yet allow full economic development.
2. The Boise Front Low Temperature Geothermal Resource Ground Water Management Area was designated by the Director on June 15, 1987.
3. A preliminary study performed by Boise State University on several wells in a portion of the management area indicates that the resource may be limited and that significant declines in water levels in pumped and monitored wells within the system are occurring.

CONCLUSIONS OF LAW

1. Section 42-226, Idaho Code, declares all ground waters to be the property of the State, and charges the State with supervising the appropriation and allotment of the same so that early appropriation of underground water are protected in the maintenance of reasonable groundwater pumping levels.

2. Section 42-233b, Idaho Code, authorizes the Director of the Department of Water Resources to require all water right holders within a designated ground water management area to report withdrawals and other necessary information for the purpose of assisting him in determining water usage and available ground water supplies.

ORDER

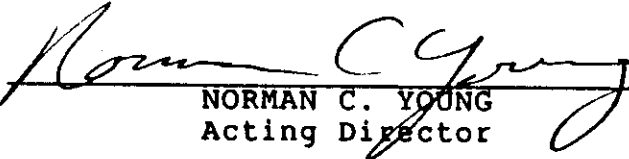
NOW, THEREFORE, IT IS HEREBY ORDERED that the State of Idaho, Division of Public Works shall install and maintain equipment and forward to the Department on a monthly basis the following information:

1. Continuous withdrawal rate and withdrawal volume amounts.
2. Continuous casing pressure and/or drawdown measurements on production and injection wells.
3. Temperature of withdrawn and injected fluids on a daily basis.

IT IS FURTHER ORDERED that within thirty (30) days of this Order the Division of Public Works shall submit a written proposal to the Department for review and approval describing a

monitoring program and equipment to be used and/or installed to
comply with this order.

Dated this 29th day of July, 1987.


NORMAN C. YOUNG
Acting Director



State of Idaho
DEPARTMENT OF WATER RESOURCES
WESTERN REGION, 450 W. State Street, Boise, Idaho

JOHN V. EVANS
Governor

A. KENNETH DUNN
Director

63-9341
STATE OF IDAHO
DEPT. OF ADMINISTRATION
C-200 R. JORDAN BUILDING #100
BOISE, ID 83720

Mailing address:
Statehouse
Boise, Idaho 83720
(208) 334-2190

September 4, 1986

EXAMINATION FEE REMINDER

Dear Permit Holder:

Earlier this year you were mailed a certified letter by our state office, which described a new law related to your water right permit. The water right permit to which this law applies is identified by the number at the top of the mailing label above. The purpose of this letter is to act as a reminder of the new law and to warn you that your permit is now losing priority daily.

As described in the certified letter, House Bill 671 enacted by the 1986 Idaho Legislature requires payment of a fee before this Department can conduct the field examination needed to issue a license confirming use of water under the permit. As an alternative to submitting the fee, the Department will accept a field examination report completed by a certified water right examiner from the private sector. The certified letter described the procedure for selecting the latter alternative, whereby you initially notify us regarding which water right examiner you have selected, and provide a statement from the examiner as verification.

The date of priority of your water right permit is now being delayed one day for each day the response is late. Also, if the fee or completed field examination report are not submitted within a year from the sixty-first day after the certified letter was mailed, the permit may be lapsed and rendered invalid. The fee, or notice that a private field examination will be conducted, should be submitted as soon as possible if you wish to maintain your permit in a valid status.

Enclosed please find an Examination Fee Information Sheet, with the License Examination Fee Schedule printed on the back. This sheet should be submitted if either the fee payment option or the private examination option is selected. If you have questions or desire assistance in this matter, please feel free to contact this office.

Sincerely,

David R. Tuthill Jr.

David R. Tuthill, Jr. P.E.
Manager, Western Regional Office

Enclosure



STATE OF IDAHO

DEPARTMENT OF WATER RESOURCES

STATE OFFICE, 450 W. State Street, Boise, Idaho

JOHN V. EVANS
Governor

A. KENNETH DUNN
Director

63-9341
STATE OF IDAHO
DEPT. OF ADMINISTRATION
LEN B. JORDAN BUILDING #100
BOISE, ID 83720

Mailing address:
Statehouse
Boise, Idaho 83720

138937

April 30, 1986

CERTIFIED MAIL

EXAMINATION FEE NOTICE

Dear Permit Holder:

Department records show that proof of beneficial use has been submitted for the above-referenced permit, but that a field examination has not yet been conducted to determine the extent of beneficial use of the water for licensing purposes.

House Bill 671 (effective April 4, 1986) enacted by the 1986 Idaho Legislature requires the payment of a fee before this department can conduct the field examination needed to issue a license confirming use of water under the permit. This letter is notification that the license examination fee is due within sixty (60) days of the date of this letter. The examination fee information sheet (enclosed) must be returned with the fee.

As an alternative to submitting the fee, the department will accept a field examination report completed by a certified water right examiner from the private sector. If you choose to have the examination done by a certified water right examiner, you need not submit the license examination fee to the department, but you must within sixty (60) days of the date of this letter return to the department, the examination fee information sheet showing appropriate information together with a statement from the certified examiner to verify that you have retained a certified examiner to conduct the field examination. If you choose this alternative, a completed field examination report must be submitted within one year of the date of this letter. You cannot later change your decision to use this alternative and submit the fee needed for the department to conduct the field examination, but you may change to another certified examiner.

Certified water right examiners are licensed engineers, geologists, or land surveyors certified by the department to conduct water right examinations. The procedure for certifying examiners results from the recently enacted HB 671 and is being developed at this time. A listing

of certified water right examiners will be available from this department when examiners have been certified.

If your permitted use, in fact, has already been examined by the department and you have not asked to have the examination repeated, the fee requirement is not applicable to your permit. If you believe this is the case, please contact the department.

The license examination fee is to be based on the amount of water you indicate you have developed, as listed in item 6 on the examination fee information sheet. The amount of water on which the examination fee is based can be less than the permitted amount, if less water has been diverted and beneficially used. The licensed amount of water, however, will not exceed the amount you claim on the examination fee information sheet. The enclosed license examination fee schedule shows a listing of applicable fees.

FAILURE TO SUBMIT WITHIN THE SIXTY (60) DAY PERIOD, THE FEE OR THE STATEMENT THAT A CERTIFIED EXAMINER HAS BEEN RETAINED TO MAKE THE FIELD EXAMINATION, WILL BE CAUSE TO ADVANCE THE PRIORITY OF THE PERMIT ONE DAY FOR EACH DAY THAT THE FEE SUBMITTAL IS LATE.

FAILURE TO SUBMIT THE FEE OR THE COMPLETED FIELD EXAMINATION REPORT WITHIN A YEAR WILL BE CAUSE TO CONSIDER THE PROOF OF BENEFICIAL USE TO BE INCOMPLETE AND TO LAPSE THE PERMIT.

The attached examination fee information sheet and the fee may be submitted to the following department offices.

Northern Region

Idaho Dept. of Water Resources
4055 Government Way
Coeur d'Alene, ID 83814
Phone: 765-4639

Eastern Region

Idaho Dept. of Water Resources
150 Shoup Ave., Suite 15
Idaho Falls, ID 83401
Phone: 525-7161

Southern Region

Idaho Dept. of Water Resources
1041 Blue Lakes Blvd. North
Twin Falls, ID 83301
Phone: 734-3578

Western Region

Idaho Dept. of Water Resources
450 W. State St., (Third Floor)
Boise, ID 83720
Phone: 334-2190

Sincerely,



L. GLEN SAXTON
Chief, Operations Bureau

Enclosures

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
Western Region

Statehouse
Boise, Idaho 83720
(208) 334-2190

OCTOBER 10, 1985

DEPT. OF ADMIN. STATE OF IDAHO
STATEHOUSE
ROOM 100
BOISE ID 83720

RE: Permit No. 63-9341

Dear Permit Holder:

We acknowledge receipt of your statement submitted as proof of beneficial use for the above referenced permit.

Before a license can be issued, a field examination must be made by a representative of this department.

A field examiner will contact you to arrange to examine your system.

If you have any questions regarding the field examination, please contact this office by phone at 334-2190 or in person in the third floor State Towers Building, 450 West State Street, Boise.

Sincerely,
s/Judy Pense
Secretary

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

STATEHOUSE
BOISE, IDAHO 83720
(208) 334-4440
CERTIFIED MAIL

138851

STATE OF IDAHO
DEPT. OF ADMINISTRATION
LEN B. JORDAN BUILDING
BOISE, ID 83720

PROOF DUE NOTICE

MARCH 31, 1985

DEAR PERMIT HOLDER:

ONE OF THE CONDITIONS OF APPROVAL OF YOUR WATER PERMIT NO. 63-9341 WAS THAT PROOF OF THE EXTENT OF YOUR BENEFICIAL USE MUST BE SUBMITTED TO THIS OFFICE ON OR BEFORE JUNE 01, 1985. (SEE LAST PAGE OF YOUR APPROVED PERMIT OR YOUR LAST APPROVED EXTENSION REQUEST). ENCLOSED IS A FORM WHICH MAY BE USED TO SUBMIT THE REQUIRED PROOF.

IF YOU HAVE NOT FULLY COMPLETED YOUR PROJECT, AND YOU OR A PREVIOUS OWNER OF THIS PERMIT HAVE NOT RECEIVED A PRIOR EXTENSION OF TIME, YOU MAY REQUEST AN EXTENSION OF TIME IF THE DELAY IS FOR REASONABLE CAUSE AS PROVIDED IN SECTION 42-204, IDAHO CODE. IF YOU HAVE BEEN PREVENTED FROM PROCEEDING BY A GOVERNMENTAL AGENCY OR BY LITIGATION, MORE THAN ONE EXTENSION OF TIME CAN BE GRANTED. AN EXTENSION OF TIME REQUEST FORM IS ENCLOSED FOR YOUR CONVENIENCE.

EITHER THE BENEFICIAL USE FORM OR A REQUEST FOR AN EXTENSION OF TIME MUST BE RECEIVED BY THIS DEPARTMENT ON OR BEFORE THE ABOVE DESCRIBED PROOF DUE DATE. IF NEITHER IS RECEIVED, THE DEPARTMENT WILL SEND YOU A LAPSE NOTICE. WITHIN SIXTY (60) DAYS OF THE MAILING OF THE LAPSE NOTICE, THE PERMIT WILL NO LONGER BE OF ANY FORCE NOR EFFECT.

SINCERELY,

RITA FLECK
SECRETARY/RECORDS MANAGER

ENCLOSURES

MICROFILMED

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

STATEHOUSE
BOISE, IDAHO 83720
(208) 334-4440

STATE OF IDAHO
DEPT. OF ADMINISTRATION
LEN B. JORDAN BUILDING
BOISE, ID 83720

JUNE 18, 1980

RE: PERMIT NO. 63-9341

DEAR PERMIT HOLDER:

ENCLOSED IS A COPY OF YOUR APPROVED APPLICATION FOR PERMIT. WE DIRECT YOUR ATTENTION TO THE CONDITIONS OF APPROVAL ON THE FOURTH PAGE.

BE SURE TO NOTE THE SPECIAL CONDITION REQUIRING YOU TO INSTALL A MEASURING DEVICE, OR AN ACCESS PORT TO PROVIDE FOR THE INSTALLATION OF MEASURING EQUIPMENT BY THE DEPARTMENT. ENCLOSED PLEASE FIND A LIST OF MEASURING DEVICE OPTIONS, AND SPECIFICATIONS FOR THE INSTALLATION OF THE ACCESS PORT.

WE HAVE ENCLOSED A FORM ENTITLED "MAKING PROOF OF BENEFICIAL USE". PLEASE READ THE INSTRUCTIONS CAREFULLY SINCE YOU MUST TAKE FURTHER ACTION TO DEVELOP THIS PERMIT INTO A LICENSE.

SINCERELY,

DAVID R. TUTHILL, JR., P.E.
SUPERVISOR, WATER ALLOCATION SECTION

ENCLOSURE

MICROFILMED



STATE OF IDAHO

DEPARTMENT OF HEALTH AND WELFARE

DIVISION OF ENVIRONMENT - 801 Reserve Street - Boise, ID 83702

MEMORANDUM

TO: David Shaw
FROM: Frank Keller
DATE: March 6, 1980
SUBJECT: Permit No. 63-9342 - Capitol Mall Hot Water Well

This department has no objections to the approval of this permit.

A handwritten signature in cursive script that reads "Frank Keller".

Frank Keller
Environmental Engineer

FK/ap

RECEIVED

MAR 10 1980

Department of Water Resources
Western Regional Office

MICROFILMED

O.K. H.H.

Notice is hereby given that the following applications have been submitted for permit to appropriate the public waters of the State of Idaho:

Source: GROUNDWATER
Date Filed: 02/06/1980
Amount: 5.57 CFS
Diversion Point: NENE Sec 10 T 03N
R 02E, ADA Co.
Use: HEATING (5.57 CFS) from
01/01 to 12/31
Place of Use: NENE Sec 10 T 03N RE
02E

Source: GROUNDWATER
Date Filed: 02/12/1980
Amount: 0.20 CFS
Diversion Point: NENW Sec 24 T 03N

STOCKWATER (0.02 CFS) from 01/01
to 12/31
IRRIGATION (0.14 CFS) from 03/15
to 11/15

If issued, the permits will be subject to all prior water rights. Protests against the granting of any permit must be filed with the Director of the Idaho Department of Water Resources, 92 S. Cole Road, Boise, Idaho 83709 on or before MARCH 10, 1980.

3724

two insertions, beginning with the
issue of February 21, 1980, and ending with the
issue of February 28, 1980.

Cheryl K. Rehwaft

Subscribed and sworn to before me this 19th

day of May, 1980.

Harold Eugene

Notary Public for Idaho, Residing at Boise, Idaho

RECEIVED

Department of the Interior
Bureau of Land Management
Office of the Director
Washington, D.C. 20250

MICROFILMED

63-9341-

STATE OF IDAHO

DEPT. OF ADMINISTRATION, LEN B. JORDAN BUILDING, BOISE, ID 83720

Source: GROUNDWATER

Date Filed: 02/06/1980

Amount: 5.57 CFS

Diversion Point: NENE Sec 10 T 03N R 02E, ADA Co.

Use: HEATING (5.57 CFS) from 01/01 to 12/31

Place of Use: NENE Sec 10 T 03N R 02E

MICROFILMED