# CITY OF BOISE
# GEOTHERMAL INJECTION WELL PROJECT
# JUNE 1998 UPDATE

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## BACKGROUND

In 1998, the city of Boise signed a Cooperative Agreement with the Department of Energy which provides $870,000 for the construction of an injection well for the city's geothermal heating system. The goal of the project is to hydraulically replenish the geothermal aquifer the city shares with the Boise Warm Springs Water District, the Veterans Administration hospital, and the state of Idaho Capital Mall buildings, and to reduce the discharge of spent geothermal water to the Boise River. If the injection well is successful, the moratorium that limits the geothermal production for the city's system could be lifted and the city could expand the city-owned geothermal heating district.

The first milestone of the Agreement was to jointly conduct a study of the aquifer with the Boise Warm Springs Water District (BWSWD) per the city's agreement with BWSWD. The study produced a model of the geothermal aquifer which predicated overall positive benefits if the spent geothermal fluid is injected back to the aquifer.

As a result of the recommendation of the modeling studies under the DOE agreement, the city attempted to negotiate an intertie of city and Capital Mall geothermal systems. This was thought to be a mutually desirable arrangement where the city would deliver its warmer geothermal water to the Capital Mall system in exchanger for the use of the Capital Mall wells for injection for both systems. This arrangement would have saved the cost and risk of drilling an additional well and allowed the DOE funds to be used for other system enhancements. Negotiations with the state began in December 1993, with tentative agreement in June 1994; but ultimately, negotiations failed and were terminated in August 1995.

Efforts were then refocused on drilling a new injection well for the city's system. RFPs for engineering design work were advertized in August with design work begun by Montgomery Watson in December 1995. A separate RFP for developing the DOE's Environmental Assessment was advertized in October 1995 and awarded in January 1996 to Power Engineers.

Montgomery Watson completed a Phase I design report in March 1996 discussing five possible injection well locations and it was the impetus to conduct a seismic survey to provide a geological basis for selecting an injection well site. After a seismic survey was completed during April and May of 1996, a preferred injection well site was selected and a Draft Environmental Assessment was published in July. Due to concern by the state of Idaho of adverse effects on their Capital Mall geothermal heating system, the environmental clearance process was delayed approximately 15 months, with DOE finally issuing a "Finding of No Significant Impact" in November of 1997.

A contract for drilling the injection well was then advertized and opened in December of 1997, the contract awarded to Holman Drilling of Spokane, Washington in January of 1998, and drilling of the well actually began in February. The well was completed in April to a total depth of 3,200 ft with better than anticipated results. We were thrilled to find that the well, with a little encouragement by air lifting water out of the casing for a couple of minutes, began flowing under artesian pressure. The well flows at about 900 gallons per minute (gpm) at a temperature of 168$^{o}$F. An injection test was also conducted. Utilizing our supply water from the existing geothermal wells, we were able to inject 1,800 gpm for several hours. The final analysis of the well characteristics is still being conducted to determine the ultimate capacity. This well should meet our needs for many years to come. The hydraulics are such that under existing operating conditions, we will be able to inject into this well using normal system operating pressures (we will not need an auxiliary pump).

## RECENT PROGRESS

With the basic well capacity determined, the final design of the pipeline connecting to the geothermal heating system, the well house, and injection pump is being completed and will be constructed this summer. It is anticipated to have the injection well in service for the 98-99 heating season.

## SEISMIC MONITORING

An issue that was raised during the process of obtaining an injection well permit from the Idaho Department of Water Resources (DWR) was the possibility of causing seismic activity with injection. According to the literature, the probability of causing seismic activity appears to be low; but, since the injection well is being developed in a heavily populated area (within four blocks of downtown Boise), IDWR is requiring some basic seismic monitoring be conducted by the city, for at least the first few years of the operation of the injection well.