

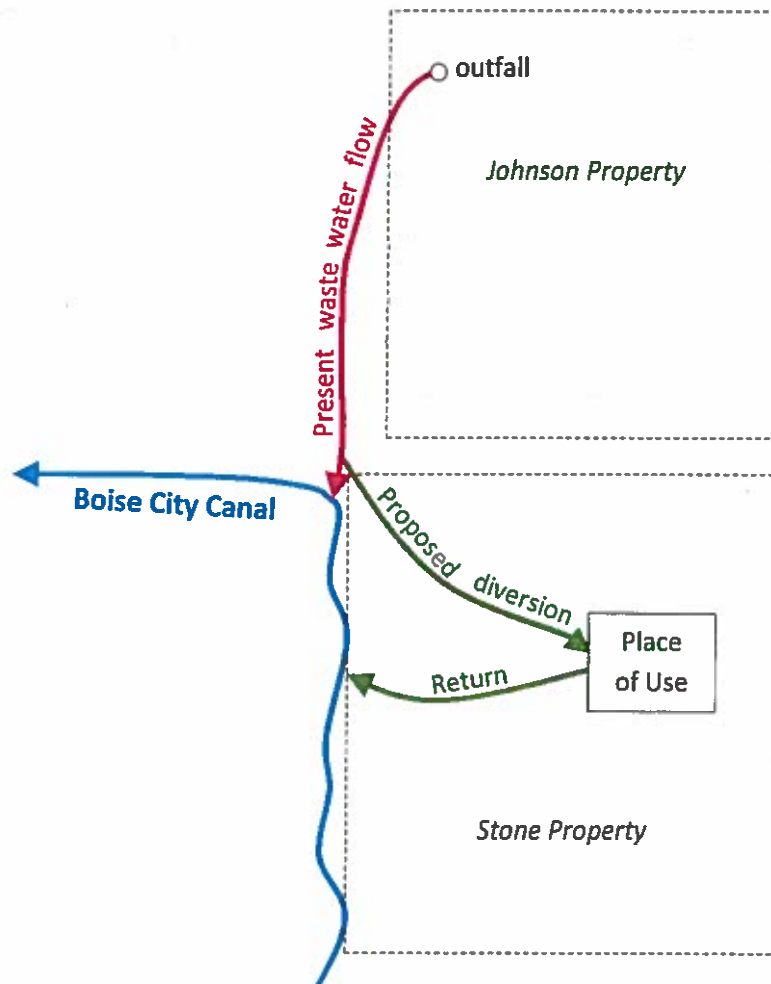
Applicant's Initial Responses to Prehearing Questions

1. Will the proposed application reduce the quantity of water under existing water rights?

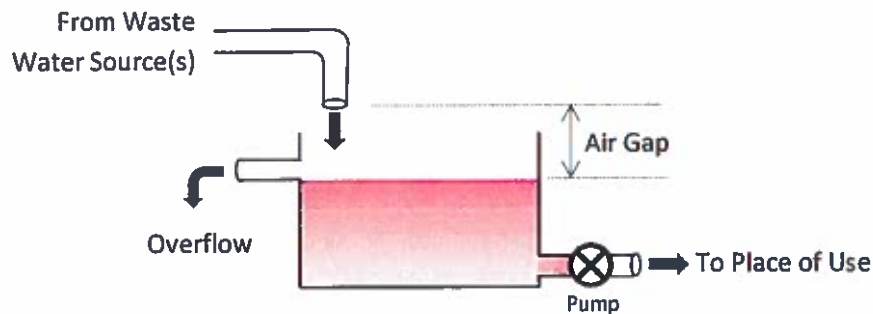
Presently, the water to be appropriated is wasted into the Boise City Canal, as shown on the schematic diagram below.

In the winter, the waste water flows down the (otherwise empty) canal, where it eventually drains into the river. There are no downstream rights that rely on the heat value of this water. During irrigation season, the waste water enters the canal and is delivered for irrigation use.

The application is non-consumptive, and would return all diverted water back to the same section of the canal after extracting some of the residual heat energy. As such, it could not reduce the quantity of irrigation water available under existing rights. The Boise City Canal company has offered its provisional support to this application.



The proposed diversion system would be hydrologically separate from and have no direct connection to the Niznik geothermal well, as shown below. An air gap is a common plumbing arrangement to avoid cross-contamination. As such, the proposed application could not in any way affect the original water right holder, either in terms of temperature, pressure or volume. Because of the hydrologic separation, and the fact that the water is not hot enough to use for direct heating, this application cannot be considered an expansion of the Niznik system.



Because the application could not affect the Niznik well, then it could not affect any of the other ground water right holders in the district.

The applicant is willing to specify, as a condition of his permit, that this system be available for unannounced inspection by the district 63-S watermaster. Further, the applicant is willing to agree to many of the same conditions that are found on water right 63-31999.

To further protect existing rights, the maximum diversion quantity should be limited to that of the original Niznik water right, namely 16.5 AFA.

2. Is the water supply sufficient for the purpose for which it is sought to be appropriated?

Preliminary measurements suggest that there are approximately 5 gallons per minute of water available, at a temperature of about 25°C.

Absolute heat transfer energy, in Joules, is governed by the equation $Q = mc\Delta T$. The available power is this figure divided by time.

m = mass: the flow rate of 5 gallons per minute of water is equal to 316 grams per second.

c = specific heat: the specific heat of water is 4.184 Joules per gram.

ΔT = temperature differential: a heat pump of normal efficiency will be able to extract at least 10°C.

So the available heating energy in one second (i.e. the power) is $mc\Delta T = 316 \times 4.184 \times 10 = 13.2 \text{ kW}$.

The heating needs for the house can best be estimated by looking at the peak monthly gas bill. In 2015, this was 300 therms, equivalent to a heating load of 12kW.

In other words, there is enough heat energy available to heat the house. Any extra heat energy can be used for preheating domestic hot water and for warming outside buildings.

3. Was the application made in good faith or for delay or speculative purposes?

This application was made in good faith, and is time-sensitive. It may qualify for a 30% federal tax credit, which will expire on December 31, 2016. The applicant intends to commence construction on the diversion works as soon as possible, even if the tax credit deadline passes. The applicant owns the property on which the water is to be used, and intends to live there for the foreseeable future. The water would be used for home heating purposes, for which much of the capital infrastructure is already in place.

4. Does the applicant have sufficient financial resources with which to complete the proposed project?

Estimated cost of the initial diversion works:

Pipe: 900 feet of 1.25" polyethylene pipe: \$450

Pump: already owned

Electrical extension: \$100

Measuring device: \$100

40-plate heat exchanger: \$100

Miscellaneous fittings: \$200

Total: \$950

Upon request, the applicant is willing to provide a bank statement showing available funds.

5. Will the proposed use conflict with the local public interest, where local public interest is defined as interests that the people in the area directly affected by a proposed water use have in the effects of such use on the public water resource?

The proposed use will not affect the interests of the people in the area. The only noticeable change to the general public will be a diminution of steam escaping from the storm drain on Catalpa Drive. This steam arises from the wastewater from the Johnson and Niznik properties. It serves no public purpose. It is shown here in November 2016:



Presently, the waste water from the Niznik and Johnson heating systems enters the Boise City Canal, and travels to the Boise River. That section of the river is included on the Idaho 303(d) list of impaired streams for exceedance of temperature standards. To the extent that this proposal will consume some of the wasted heat and reduce the temperature of the effluent, it may help improve the water quality of Boise River. This is in the local public interest.

The proposal is nonconsumptive, and so can not cause any decrease in river or stream flows of interest to the local public.

6. Will the proposed use be contrary to the conservation of water resources within the state of Idaho?

The proposed use is an excellent example of conservation. It proposes to take heat energy that is currently wasted and apply it to a beneficial use. Idaho Code 42-233 states, in part:

Low temperature geothermal resources shall be utilized primarily for heat value and secondarily for the value as water.

This application does not consume any water, and increases the efficiency which the low temperature geothermal resource is used. The water will be more fully used for its heat energy.

7. Will the proposed use adversely affect the local economy of the watershed or local area within which the source of water for the proposed use originates, in the case where the place of use is outside of the watershed or local area where the source of water originates?

The place of use is within 500 feet of the water source.