



State of Idaho

DEPARTMENT OF WATER RESOURCES

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March 4, 2011

C. L. "BUTCH" OTTER
Governor

GARY SPACKMAN
Interim Director

CHARLES E BROCKWAY
BROCKWAY ENGINEERING PLLC
2016 NORTH WASHINGTON ST STE 4
TWIN FALLS IDAHO 83301

RE: Additional Information Request for Permit No: 37-8388

Dear Mr. Brockway:

Thank you for providing the place-of-use image for the recreation and snow melting that I recently requested. I have completed my review of the contents of the file. In spite of multiple supplements provided by Brockway Engineering PLLC staff since the field exam report was submitted in 2008, I have found that little beneficial heat use of the geothermal water has been confirmed.

This right has had a colorful, lengthy and sometimes acrimonious history. Brockway Engineering has expressed some concern that the information I have requested as substantiation of your recommendations, may be unnecessary. Therefore I have taken the opportunity that this letter provides, to summarize my review of the field exam report and the supplements that either you or your staff have provided to the Department since the field exam.

Here is a listing of the information requested and the information received (in standard type) followed by brief summary (in *italics*) of my conclusions relevant to licensing.

- On July 7, 2008, the regional office of IDWR received the Beneficial Use Field Report for a field exam of Permit 37-8388 which was conducted by Brockway Engineering PLLC staff on June 27, 2008.

The development period of the permit has ended. There is evidence that a system utilizing geothermal water is in place. The report recommends a rate based on capacity of the water pumping system rather than on the capacity of heat exchangers. More efficient heat transfer occurs at flows less than exchanger capacity. No volume was recommended.

- In August 4, 2008 correspondence to Brockway Engineering, Pam Skaggs states that she finds the field exam report to be deficient because no annual volume of water used for heating was identified in the report. Additional information is requested. On August 15, 2008 the state office of IDWR received a letter (dated August 13, 2008) addressed to Pam Skaggs and a companion attachment which was dated August 11, 2008. The attachment showed an annual volume of 246.5 AF estimated from monthly control valve settings provided to the examiner by the contractor/operator.

The volume provided appears to be based on estimates of the flow of water through the system. Water flow through the system does not equate to heat beneficially used by the system. Without design or operation values which relate water flow to heat flux, beneficial heat use has not been confirmed nor can it be calculated.

The exam was conducted in the summer. Minimal heat use would have been found at that time. However, the system has been in place for at least one heating season so it may be possible to forensically determine representative heat uses. Although the system is computer monitored, it may not have data acquisition or storage capability. As a designed system, design peak and annual heat use should be available.

- On November 9, 2010, I requested (via email) verification of the domestic use. Domestic had been a permitted use but was not discussed or recommended by the examiner. I also requested a piping diagram/schematic, design or operational temperature settings and confirmation that the spa-pool was air cooled.
- In an email response from Zach Latham dated, November, 17, 2010, Mr. Latham explained the source of the domestic water, restated the temperature range of the geothermal source and referenced an IDWR technical memo (dated December 1, 2008).

The sprinkler irrigation system seen by Department staff in July 2008 will not be covered by the domestic use authorized by this water right permit because no domestic use was found by the examiner. A cold domestic-exempt well supplies domestic water.

The technical memo referenced by Mr. Latham, summarizes the hydrology review completed by IDWR staff and was part of the back-file. The schematic piping diagram available in that memo shows the water route from the source to the residences. It does not provide information at the level of detail needed to estimate the heat losses which are occurring by necessity and/or by design through the whole system.

- On December 27, 2010, Zach Latham provided a copy of the spreadsheet which had been used to estimate the residential space heating requirements for this permit. The spreadsheet had been inadvertently left out of the field exam document package and it shows that the examiner had estimated the space heating requirement to be 54.4 AF.

The spreadsheet-based calculation of geothermal space heating was intended for use by Department staff to estimate heat use at the initial, application stage of a water right process. Although this rough spreadsheet calculation would be allowed if there were no other options, it is not applicable to a system that was carefully designed, recently built and is apparently well maintained and conscientiously operated. The SDRTR system had been in place and in use at least one full year before the exam was conducted. The design heat loads, if not the actual heat loads should have been available at the time of the exam. Therefore more accurate, as-built or as-operated information on this system is expected.

- On February 8, 2011, I requested a revised map/aerial photo and/or shape files showing the places-of-use which were missing from the field exam report. On February 14, 2011, I received an acceptable image showing the locations of all the places-of-use including snow melting and recreation.

The examiner had found uses in locations that did not match the PLSS addressed

locations authorized by the permit but did not provide a comprehensive map showing the uses. The official, legal address for this right is within HES #389. The updated place-of-use shapes provided show that the uses do not extend outside of HES #389. A licensing amendment to correct the place of uses may not be required.

Before issuing a license at a rate and volume which would be significantly less than your recommendations, I am encouraging you to provide additional information in the following areas:

For Space Heating Use

The Department's current expectations for geothermal space heating use calculations may be best illustrated in the engineering report provided by Musgrove Engineering on behalf of SPF Water Engineering for Permit 65-13912 and 65-13913. For your convenience I have enclosed a copy of that report. Equivalent information may be available to you from the firm responsible for the design of the Robbins system.

Alternatively, I have spoken to former Office of Energy Resources staff (now with state office of building safety), who are skilled with RemRate, an energy efficiency and evaluation software package. If you or I can provide him the input parameters, he is willing and authorized to calculate the peak and annual heat loads for the two Robbins residences.

For Recreational Use

The temperature of the water that is discharged to the pool is unknown and it's not clear if the pool receives first use water or spent water cascaded from an upstream use. I am uncomfortable assuming that the spa/pool water temperature is unchanged en route from the source because that temperature, 115 deg F, is higher than health standards allow.

I understand that you have the GEO-Heat Center tools available. The Department has accepted calculations based on those tools in the recent past.

For Snow Melting Use

The temperature of the water that is supplied to the snow melting system is unknown and it's not clear if this system receives first use water or spent water cascaded from an upstream use. It is neither necessary nor economical to design a system which maintains bare pavement conditions at all time. I believe that heat is lost to the piping and ground coincidental to the transportation of the geothermal water through the system. I am uncomfortable assuming that the water temperature for snow melting use is 115 deg F or that the operation is continuous.

The design heat requirements for snow melting may be available to you from the firm responsible for the design of the Robbins system. Neither the design weather conditions nor the desired method of operation nor the desired standards for performance were provided in the exam report.

ASHRAE Guide and Data Book recommends a frequency analysis of snow occurrences over a period of years at the site and that the system be designed to handle a percentage of snowfalls that will occur. A reasonable compromise design allowing for 25 to 50 percent snow cover rather than bare pavement would be an acceptable design in this residential setting.

In conclusion please, submit the following:

- 1) The rate of water used based on the peak heat value put to beneficial use during the development period. You have provided a rate based on water pumping capacity not the heat exchange capacity.
- 2) The total annual volume of water based on actual annual heat loads that occurred during the development period
or
Theoretical engineering calculations of the total annual volume of water used in each of the uses recommended in your exam report.

Administrative Rules state

IDAPA 37.03.02 Beneficial Use Examination Rules 035.02.c.

"If the director determines that a field report is acceptable but that additional information is needed to clarify the field report, he will notify the certified water right examiner in writing of the information required. If the additional information is not submitted within thirty (30) days or within the time specified in the written notice, the priority date of the permit will be advanced one (1) day for each day the information submittal is late. Failure to submit the required information within one (1) year of the date of the department's request is cause for the director to take action to cancel the permit.

Your response including the requested information must be received with the next (30) thirty days, or IDWR will advance the priority date or take action to cancel the permit in accordance with the Beneficial Use Examination Rules.

If you have any questions, please contact me as soon as possible at (208) 287-4946.

Sincerely,



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Enclosure

cc: Jim Speck