

MEMORANDUM

Date: October 27, 2011
To: Water Right File 29-13155
From: medl
Re: license review

The field examiner's beneficial use field report is missing the last 2 pages. The partial report is dated September 6, 2006 and the exam was conducted by a water rights field agent from the IDWR Eastern Region. The examiner would have been familiar with the Tovey system as he had previously examined the use of water for right 29-7866 in June 2000.

The partial report was reviewed by other Eastern Region staff members and supplemented with a full field exam report dated May 25, 2007. Neither the field examiner nor the reviewer recommended a volume for this right, and neither are current IDWR employees and so are not readily available to answer questions.

Applicant

The applicant, Mr. DeVere Tovey is deceased but the license will be issued in his name. Clarification of ownership can be done after the license is issued.

Source, Point of Diversion and Point-of-Discharge

The source of water for this right are springs in Harkness Canyon.

The reviewer states that the field examiner described the diversions as perforated pipe which collected the spring water and directed it into a gravity piping system. I believe that only Tovey property is dewatered by diverting and containing these springs.

Upstream of the turbine, the system piping crosses the camping/picnic area where domestic and irrigation taps can draw off some of the water. The penstock to the hydro turbine is the end of the line. Any water remaining in the system enters Harkness Creek where the turbine discharges.

I reviewed and replotted the GPS points for the springs which were provided on the partial field exam report. I found the GPS points agreed well with the map submitted with the application for permit. However, only one of the four authorized points-of-diversion listed on the permit is correct. An amendment will be needed to add a second point-of-diversion in the NESWSW.

The application for permit 29-13784 and the reviewer's narrative statement for this right, specify that the springs for this right also serve licensed water right 29-7866. The number of springs and the locations of the springs are not the same for the three rights. I believe that the points-of-diversion authorized by the licensed right 29-7866 are in error because the field examiner's report for that right is internally inconsistent. The PLSS quarter-quarter addresses for the PODs and POUs do not match the PLSS grid locations and neither the grids nor the addresses match the locations shown on the field examiner's map. A copy of this memo will be placed in the file for 29-7866.

Water Use

The field examiner measured water flow but did not confirm beneficial use of the water for power generation. No record of watts generated was provided and there was no description of distribution wiring or of the power demand.

The partial report from 2006, lists a Harris Turbine, an Ashcroft 0/60 (which I assume is a pressure gage) and 37 psi (which I assume is the reading from the gage). If the pressure at the turbine was 37 psi, the gage reading converts to $37 \times 2.31 = 85.47$ ft of head.

I believe that the turbine was a Pelton wheel type, hydroelectric turbine-generator manufactured by

Harris. The Harris micro turbine can be fit with 1 to 4 nozzles of various sizes to accommodate variation in flow rate. The examiner does not mention the size or the number of nozzles. However, he recorded 3 flow measurements by isolating the flow through each of 3 different valves on the turbine mounting. I believe that the Tovey turbine had only one penstock and that the valves that the examiner isolated are downstream of the penstock. (See the attached image of a Harris 4-nozzle turbine). The valves allow the permit holder to direct the flow through one or more nozzles as the springflow changes with the season. I believe that the examiner measured the same flow through 3 different nozzle sizes. It was incorrect to sum the measurements and to recommend that total as the flow of water put to use. Without knowing the nozzle sizes, I use the maximum flow measured (47.5 gpm or 0.11 cfs) as the basis for my recommendation and volume calculation.

No battery storage or battery recharge is mentioned so I assume that the power would have been used as it was generated similar to accessing the electrical hook-up at a traditional RV campsite. Assuming the conditions at the time of the field exam, a Harris turbine would have provided 400-500 Watts (0.4-.5 kW) of real-time power (see the attached table). 500 Watts of continuous power can operate lights, refrigerator, freezer, pump and entertainment using standard appliances in a battery-inverter system. It would be sufficient power for use in a single RV. It is not sufficient to meet wintertime heating needs for a comfortable stay in an RV parked in this location and it is not sufficient to simultaneously power six RV's as proposed by the domestic water use rights.

Season of Use

It is unlikely that either the flow measured at the time of the exam or the power use that I have assumed, is constant year-round. I have no information to support the Tovey RV camp as a year-round primary residence. But I am willing to recommend a year-round season-of-use consistent with the companion domestic rights.

Internet research yielded an average number of travel days (~35 days) for RV'ers but not an average length of stay per year. I would have preferred to have had some information about the RV habits of the Tovey family.

Place of Use

I understand that the turbine which generated power for this use was portable and moved to the site when needed. The GPS for the place-of-use is adjacent to the picnic/RV parking area described in the exam report and map for 29-7866. Although the hydro turbine may be small enough to be carried to other locations, once licensed the only authorized place-of-use will be in the SWSW.

The place-of-use for this right is at 5500 ft elevation, approximately 4 miles as the crow flies NE of McCammon, Idaho. The Tovey family property is an island of private property surrounded by Caribou-Targhee National Forest or BLM lands. There is no access to a utility's power distribution grid.

According to available Bannock County taxlot information, the entire 40-acre tract, which includes the place-of-use, is owned by DeVere Tovey.

Status and Combined Use

The watermaster has conditionally authorized waiver of the permit condition requiring a measuring device and watermaster control. An order to grant the petition will be needed prior to licensing.

The same system appears to serve water rights 29-7866 and 29-13784. This power right (29-13155) will be term-limited and made subordinate to these two rights and any subsequent rights served by this system. However, as long as either of the two rights listed above are maintained, there could be water in the system sufficient for use in power generation.

Calculations

The volume recommendation is missing from the examiner's report. The volume recommended by the reviewer is based on a total of the 3 measurement and is incorrect.

I recommend a rate based on the maximum flow measurement made by the examiner, 0.11 cfs. I recommend a volume based on continuous use for 200 days of the year. This is the length of the irrigation season in Basin 29 and roughly coincides with the number of days with an average temperature of 45 degrees F. I understand this hydropower system relies on gravity flow through pipe from springs Both be subject to freezing. I also understand that this is an open-air powerplant, mounted on a trailer and may require repositioning between camping trips.

My volume calculation is $(0.11 \text{ cfs}) \times (200 \text{ days}) \times 1.9835 = 43.6 \text{ AF}$