

MEMORANDUM

Date: June 02, 2010
To: Water Right File 47-7700
From: medl
Re: license review

This was the first project to come 'on-line' for the Cogeneration-Small Power Production program with Idaho Power in the 1980's. As a pioneer, the Mud Creek/S&S project suffered from a lack of understanding of the unpredictable water source and of an effective water-to-wires engineering plan. Over the years the two power plants have been refitted more than once to improve operational efficiency.

Foreclosure proceedings in 1986, which involved the permit holder, complicated the processing of this right. A few months before the Proof of Beneficial Use date, the 5th District Court awarded permits 47-7700 and 47-7702 to Glaser Land and Livestock. That action was inconsistent with assignments that the Department received. Ownership questions necessitated additional assignments and an extension of the proof due date.

To assist with me in licensing this permit, I created a timeline of all the documentation available to me. I have attached that timeline to this memo.

Applicant

The most recent assignment document conveys this permit and permit 47-7702 (also for hydropower use in the Mud Creek/S&S project) from Zions Leasing Co to HK Hydro LLC.

Steve Harmsen is the representative for and a member of HK Hydro LLC which has its address in Salt Lake City, UT. HK Hydro was not registered as a business in Idaho until earlier this year. Scott Kaster is local (Buhl area) operator of the power plants in this project.

The Federal Energy Regulatory Commission (FERC) approved licensing exempt authorization #4769 for the Mud Creek project on November 20, 1981 to S & S Limited Partnership.

A 35-year Power Sales agreement with Idaho Power Company (IPCo) expires Jan 1, 2017 and that is the date I used for the Directors review condition. I found evidence that the agreement was assigned to Zions Credit Corp in September 1987 but have not confirmed that it is still in effect or that it was assigned to HK Hydro.

Source and POD

An existing irrigation ditch which diverted water from Mud Creek was enlarged and modified in order to add power generation use at two locations. The power canals do not provide significant storage and both power plants are operated as 'run-of-river' plants.

There is evidence that the penstock intakes may have reworked for both plants after proof of beneficial use was submitted but I believe that they are still within a few feet of their pre-proof locations. Southern Region personnel provided the point-of-diversion shape and confirmed that Mud Creek is the only source of water for the upper power plant.

Both plants have similarly designed penstock and overflow structures. Each penstock inlet is built at the termination of a power canal. An overflow weir tops one wing wall of the approach for the penstock intake vault. Water in excess of each powerhouse capacity is returned to Mud Creek through a buried

pipe whose inlet is at the base of the funnel shaped wing wall/overflow weir.

The upper power canal diverts water from Mud Creek at SESE of section 15, Township 9S, Range 14E and conveys the water ~2400 ft before terminating at the overflow weir and upper plant penstock in the SWNW section 14, Township 9S, Range 14E. The intake for the upper plant's penstock is located approximately 73 ft up-elevation from upper powerhouse. Please refer to the attached elevation diagram.

Water Use

Based on the information I was able to collect from the Idaho Public Utilities Commission (IPUC), the best generation year within the development period was 1983 and the best month of generation within that year was October. This system's capacity was dependent on the irrigation season and return flows.

Available generation data does not separate the upper plant generation from the lower plant generation and I do not attempt to divide this license into upper and lower parts. According to a 1988 FERC inspection report, only the upper plant was completed by 1983. That same report stated that the lower plant was not completed until 1984. Although both plants would have been constructed by the time the proof of beneficial use statements for permits 47-7700 and 47-7702 were submitted in 1987, I was not able to confirm that the lower plant was contributing to generation during 1983, the best year of generation within the development period.

The generation capacity stated in a power sales agreement with Idaho Power Company (IPCo) and the FERC authorized capacity for the same time period were not consistent with each other. I found evidence that the installed generator capacity in 1982 exceeded what had been authorized by FERC in 1981. However, that same generation configuration underperformed to the IPCo power sales agreement significantly enough that the contract was amended. The lack of consistency between those two commitments made beneficial use more difficult to resolve. In the end, I used summaries of actual generation data rather than pledged or authorized generation to determine the beneficial use and system capacity.

The FERC authorization required the Mud Creek power plants provide for fish passage and a minimum flow in the Mud Creek channel. The fish passage requirement was eliminated in 1987 probably because irrigation return flow water is not suitable fish habitat. The fish ladder at the upper plant has been abandoned. However, both plants have requirements for maintaining a minimum 5 cfs flow in Mud Creek. I found evidence that a means to automatically provide that flow was not yet installed as late as 6/2/1987. Since then an adequately sized, submerged orifice has been built into the headgate at the upper power canal diversion and can provide the bypass flow requirement for the Mud Creek channel.

The FERC issued an order to amend the exemption #4769, revising the capacity of both the upper and lower plants in July 1988. The amendment was justified by a FERC inspection report from 1987 which stated that significant changes had been made to both facilities. At that time, S & S Limited Partnership was still named as the exemptee but the FERC correspondence of the period was directed to both Zions Credit Corp and HK Hydro.

No vetted water data was available and the number of turbines and their hydraulic capacities at the time that proof was submitted was also unavailable. Evidence of unsafe and unreliable operation also complicated determination of beneficial use. However, I have collected enough evidence to confirm that the permitted rate of 50 cfs was put to beneficial use within the development period for this permit, 47-7700. And I have worked through enough spreadsheet scenarios to evolve one scenario which calculates a volume of water beneficially used. 1983 was the best year for generation during the development period and is the year I chose to analyze for capacity and volume determination.

In order to calculate the capacity, I used a theoretical power equation and back-calculated the average flow based on the average kW produced. A back-calculation from the average kW produced in the month of October 1983 to the flows which were required to produce those kW shows that 50 cfs was

probably available much of the month. The volume set for this license is also based on a back-calculation of average flow from the average of the monthly generation in 1983. I assumed that all the generation was attributable to the upper plant only. (Construction of the lower plant was not complete until 1984) And I assumed that the bypass minimum flow requirement was continually and automatically being satisfied.

Please refer to the attached a spreadsheet for a summation of my analysis.

A beneficial use field exam for both 47-7700 and 47-7702 was conducted by Southern Region personnel in 2005. The field examiner found beneficial use at the two power houses, and confirmed that the required bypass flow was supplied. I do not concur with the field examiners recommendation for associate permit 47-7702. Please refer to that review memo for details.

Place of Use

Power house place-of-use shapes were created by Southern Region staff based on the 2005 field exam. The power house locations conform to maps created in 1981 for neighboring permits.

County taxlot information indicates that the permit holder owns the land at the place-of-use and points of diversion.