

Keen, Shelley

From: Keen, Shelley
Sent: Thursday, August 30, 2007 3:00 PM
To: 'jbowling@idahopower.com'
Subject: Water Right Licensing

John,

Thanks for your phone message from earlier this week. I'm sorry I missed your call.

IDWR is reviewing Permit 03-7018, which is for 5000 cfs at Brownlee, to determine if a water right license should be issued. Licensing efforts were made in 1985 and 2000 but never finished. We hope to issue a license so that it can be decreed as licensed in the SRBA.

Our task is to confirm that Idaho Power has actually used the 5000 cfs. There are existing water rights totalling 30,000 cfs at Brownlee. To issue this license for 5000 cfs, we need to confirm that 35,000 cfs has been used to generate power.

In 2000 Idaho Power provided power generation and head data for 1997, a good water year, for Brownlee. The data does not seem to have been analyzed, possibly because IDWR did not have efficiency information to use with it. I am wondering if you have either diversion records, in cfs, for Brownlee, or efficiency information that can be used with the 1997 data already provided. If you have diversion records, how do you measure flows?

Please call or email and let me know if you can help.

Sincerely,

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Policy Options**Alternative Energy
Resources by State****Hydropower**

Large hydropower plants such as the Bonneville power plant on the Columbia River provide most of the electricity in the northwestern United States.

Hydropower is the kinetic energy of flowing water. When captured it can be used to power machinery or converted to electricity. Typically, hydropower plants dam a river or stream to store water in a reservoir. When the water is released from the reservoir, it flows through a turbine that causes it to spin and activates a generator to produce electricity. Plants that do not require dams may channel a portion of a river or stream through a small canal that contains a turbine, or they may pump water to a holding area from where it can be released to generate electricity.

Today's hydropower plants range in size from small, local projects that produce several hundred kilowatts to huge dams and reservoirs that generate 10,000 MW or more

and supply energy to millions of people. Hydropower provides a relatively low-cost, renewable source of electricity, and it does not discharge pollutants into the environment.

By the early 1900s, hydroelectric power accounted for more than 40% of the nation's supply of electricity. In the 1940s, hydropower provided about 75% of all the electricity consumed in the West and the Pacific Northwest and about one third of the total United States' electrical energy. With the increase in development of other forms of electric power generation, hydropower's percentage has slowly declined and today provides about one-tenth of the nation's electricity. Still, hydropower is the nation's leading renewable electricity source. It accounts for 76% of the nation's total renewable electricity generation.

Unlike fossil fuel technology, hydropower uses a fuel — water — that is not consumed or depleted in the process. Although there is variation in the amount of flowing water, overall this is an endless, constantly recharging system.

The amount of hydropower resource varies widely among states. To have a viable hydropower resource, a state must have both a large volume of water and a significant change in elevation. For example, states along the lower Mississippi River have a great deal of water, but have little elevational change. For large amounts of electricity to be generated, huge volumes of water must drop from one elevation to a lower one. Thus, mountainous regions with

rushing rivers offer the best potential for hydropower projects.

There are different categories of hydropower facilities: impoundment hydropower, diversion (or "run of the river") hydropower, and pumped storage hydropower. Most are built through federal, state, or local agencies. A few are built by private utilities for commercial use. Many are part of a multipurpose project. That is, in addition to producing electricity, they provide for flood control, water supply, irrigation, transportation, recreation, or wildlife habitat and refuges.

Other sources of hydropower involve ocean waves or tidal changes to generate electricity. These technologies are not as well developed as the more conventional hydropower sources.

Opportunities to increase hydropower generation are available in the United States. Developing new sites can sometimes result in unacceptable environmental damage. However, new hydropower projects do not necessarily require new dams; only 2400 of the nation's 80,000 dams are currently used to generate power. Most of the dams in this country are small flood-control or water-supply structures. Because they are already in place, many can be retrofitted to produce cost-effective electricity with limited environmental effects.

New and emerging technologies can be used to retrofit hydropower facilities to produce additional energy more efficiently without

increasing the size the plant. Small efficiency improvements can have positive benefits for the nation; an improvement of 1% in the efficiency of our nation's hydropower system would increase the annual generation by roughly 3 billion kilowatt-hours. This would be enough additional energy for about 365,000 households and would save the energy equivalent of more than 2 million tons of coal each year.

For all its benefits, hydropower is not free from adverse environmental effects. Dams interrupt the ecology of the natural river system and degrade water quality. Many questions remain unanswered about how to best maintain the economic viability of hydropower while simultaneously protect fisheries and other resources.

Currently, many nonfederal hydropower facilities are being relicensed. This presents an opportunity to reexamine the safety of dams and their effects on water quality and other natural resources. Governmental agencies, utilities, and other organizations are researching ways to protect and restore fisheries and wildlife habitats and retain the dams:

- Install fish ladders to allow fish to migrate upstream to their spawning grounds.
- Modify turbine designs to reduce fish mortality and detrimental effects to water quality; for example, by changing the concentration of dissolved gases).

- Regulate water levels to provide suitable conditions for the downstream migration of young fish and to provide wildlife habitat for waterfowl.

Hydropower is the least expensive source of electricity in the United States, with typical efficiencies of 85%-92% during production. For every kilowatt-hour of electricity produced by hydropower, only \$0.006 is needed to pay for operating and maintaining the plant. Comparable costs are \$0.022/kWh at nuclear plants and \$0.021/kWh at coal plants.

Hydropower is a clean, domestic, and renewable source of energy, and it does not have air pollution impacts. However, some hydropower projects can significantly affect the environment by converting large tracts of land from towns, scenic locations, archaeological resources, fish and wildlife habitat, farmland, grazing, and other uses into vast reservoirs. These losses must be considered when calculating the cost of hydropower.

For further information on the hydropower resources in the United States, visit the Web site of the U.S. Department of Energy's Hydropower Program.

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