

Water News

Hydropower Development and Rural Jobs Act

This issue of the Wyoming Water Development Office newsletter is primarily dedicated to the subject of small scale hydropower. August 9, 2013 brought about some exciting changes with the Presidential signing of the *Bureau of Reclamation Small Conduit Hydropower Development and Rural Jobs Act*. The bill was introduced by U.S. Senator John Barrasso (R-Wyo.) and Jim Risch (R-ID), and amends the Reclamation Project Act of 1939 to authorize the Secretary of the Interior, (acting through the Bureau of Reclamation), to contract for the development of small conduit hydropower at Bureau facilities. The *Hydropower Regulatory Efficiency Act* was signed into law as well and amends Section 405 of the Public Utility Regulatory Policies Act of 1978. These two acts pave the way for increased evaluation and development of clean, renewable power resources. The first act deals with existing Bureau of Reclamation conduits, waterways and canals and the second act applies to most small hydropower applications. Wyoming has over 121 Bureau of Reclamation sites where small hydropower units could be considered; the most of any state followed only by Oregon with 68 sites. The acts primarily reduce the bureaucratic red tape associated with permitting and developing these kinds of projects, most of which would be small scale developments – micro-hydro generators – typically defined as “small conduit

hydropower generating 5 megawatts or less”. Foreseeably most of these projects will produce 1 or less megawatts and will be private/public partnerships with the energy produced most likely remaining local. The red tape will be reduced by means of applying a categorical exclusion by the Bureau of Reclamation regarding the National Environmental Policy Act of 1969 (NEPA). According to a press release by Barrasso’s office there are over 40,000 miles of federal canals throughout the West that may potentially be eligible for hydropower development. The Small Conduit Hydropower Development and Rural Jobs Act bill was endorsed by the

explore and develop options for greater energy independence on a broader spectrum. The development of hydropower is economically smart in several ways; not only is it a means to developing rural jobs, but the lands available have already been through the federal environmental review process as well, thus eliminating the need for costly studies. Hydropower is a much more reliable source of energy, far less variable than wind energy. A declaration of the act states that “nothing in this Act shall alter or impede the delivery and management of water for original project purposes,” with the intention of not obstructing the flow of water from its originally intended use. Wyoming is ideally situated for Hydropower development; in addition to our water resources we have large elevation changes which are conducive to hydropower production according to Doug Hall, a former Idaho National Laboratory technical water lead who worked extensively on a study of potential hydropower projects across the county. The following article discusses hydropower studies that have been conducted in the state as well as some issues facing current and future development of hydropower.



Dual jet system, 14kW

Family Farm Alliance, the National Water Resources Association, the Association of California Water Agencies, American Public Power Association, the Colorado River Energy Distributors Association and the Agri-Business Council of Arizona.

The need for clean energy is a given, but now we will be able to employ more of rural America and at the same time

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The newsletter is available online at (<http://wwdc.state.wy.us/newsletter/>)



Hydropower Studies in Wyoming

The Wyoming Water Development Commission (WWDC) has funded and participated in hydropower studies dating back as far as 1984. Studies completed previously have been sponsored by irrigation districts and municipalities. Irrigation districts have focused their attention on existing drop structures within their canal systems that could potentially provide power generation. Municipalities have studied alternatives including existing dams, existing pressure reducing valve (PRV) locations, river diversions, and existing water transmission lines within the water system. The WWDC fully funded all of these feasibility studies and continues to fund hydropower studies. Currently, there is one ongoing study and two applications for studies in 2014. Upon completion of the WWDC feasibility studies, sponsors may seek further funding, in the form of loans, from the State Loan and Investment Board.

In 2003, there were five studies conducted for both municipalities and irrigation districts. These studies included both canal and conduit alternatives. The common theme for the irrigation districts involved the construction of conduits at drop structures with power generating turbines at the bottom of the conduits. The municipal alternatives included an existing pipeline within the water system; the replacement of a PRV with a turbine; dam outlets; and a diversion from a river into a pipeline with the water being discharged back into the same river. None of the alternatives

for any of the projects were found to be feasible at that time. In 2008, another irrigation district canal drop structure was studied and was found not to be feasible. The most recent study, to be completed this year, focuses on existing dams. Each has hydropower potential but neither has been found to be feasible under current conditions. When looking at these individual studies, and seeing the array of alternatives that have been explored, there is a continuing theme of the projects not being practical.

When determining the feasibility of a hydropower project several factors go into making the decision of whether the project should be pursued. These factors include available flow and timing of that flow, cost of construction, operation and maintenance, repair and replacement of components, cost for operators, permitting, mitigation of environmental issues, costs to connect to the power grid, and the price a power company will pay for the power generated. The price paid for power is known as the avoided cost, which is what it would cost the power company to generate the power themselves. The power company avoids the cost of producing the power, hence avoided cost. In each project described above, the avoided cost was not high enough to make the project feasible. This single factor is the main reason none of the aforementioned projects have been proposed for construction. It should be noted that there are two additional factors that play an important role in determining feasibility because of their impact on revenue and associated costs. In the

case of canal alternatives, power can only be generated during the irrigation season when the canals are running water. This limits power generation to April through October in most cases. Where dams have been considered, there are flow availability and timing issues as well as environmental issues that may add to overall costs and/or show a fatal flaw in the project. These three components generally prove a project practical or not, with the avoided cost being the major deciding factor.

However, there are cases where hydropower projects have been successful in Wyoming. The Shoshone Irrigation District has a very successful project that saves the district's members roughly \$11 per acre in yearly assessments due to the profit from power generation. The project also generates enough revenue to pay into a replacement fund every year. This project was built in 1983 and took 10 years to pay off. The turbines generate power from about April 15th to October 15th which coincides with the irrigation season. From conversations with the district manager, he noted that the most important factor in the success of their project, and all other projects, is the price of the avoided cost for the power. This district was able to negotiate a favorable rate that allowed the project to be constructed. Power companies may be willing to pay more than their avoided cost under certain circumstances. This confirms the findings of the WWDC feasibility studies that the avoided cost or the negotiated rate paid for power is the key factor for

small generation facilities.

In order for hydropower projects to be feasible the avoided cost, at this time, needs to be around \$0.08 per kilowatt hour or greater. Currently the avoided cost offered is roughly \$0.04 per kilowatt hour. If clean energy is going to be a priority in the state, and the nation, affordable rates will need to be paid for power from small generators and/or more incentives provided for these projects.

“Determining the feasibility of a hydropower project includes several determining factors:

- Available flow
- Timing of flow
- Cost of construction, operation & maintenance
- Repair and replacement
- Permitting mitigation
- Costs to connect to power grid
- Avoidable cost



WWDC/SWC Summer Meeting & Tour

Mid-August found the WWDC and the Select Water Committee in the beautiful Sierra Madres near Baggs, Wyoming. In attendance were all of the Wyoming Water Development Commissioners (WWDC) as well as the majority of the Select Water Committee (SWC) of the Legislature. Wednesday, August 21 started with a workshop that generated several items that would result in further discussion during Friday's meeting.

Thursday the group embarked on a picturesque tour of the surrounding area. A visit to High Savery Dam is always impressive to first time visitors as well as the long, but rewarding scenic route to the dam. The tour made several stops during the day to different projects including portions of the ongoing weather modification project. Several members of the public joined the tour as we made our way back to Savery for a dinner at the

Little Snake River Museum. The summer meeting concluded Friday afternoon. The next meeting will be held in Casper, WY, November 6-8, 2013.



West Tullis Weather Modification Ground Generator

News from the Water Resources Data System (WRDS)

2013 WWDO Public Water System Survey

Every two years WWDO and WRDS conduct a survey of public water systems in Wyoming (<http://wwdc.state.wy.us/surveys/surveys.html>). This survey provides important information for use in WWDO's funding decisions and aids in prioritizing the funds available for projects ranging from feasi-

bility studies to project construction. This information also allows public water systems to compare operational challenges, water rates, and conservation measures with others around the state.

The 2013 WWDO PWS Survey is currently underway with final results to be made available shortly after completion in October 2013. This past May, 207 public water system entities were sent survey questionnaires with 62.3% (129 entities) responding as of September 1st. Of the entities that

have responded, 74 (57.4%) have come from entities that responded to the 2011 survey; 11 (8.5%) have come from new entities; and 44 (34.1%) are from entities that responded previously, but not to the 2011 survey. Additionally, when comparing the 2009, 2011 and 2013 surveys, Average Residential Tap Fees and Average Residential Base Water Rates have shown a cost increase: Average Residential Tap Fees [\$1,372.37 (2009); \$1,490.73 (2011); \$1,561.62 (preliminary 2013)] and Aver-

age Residential Base Water Rates [\$23.85 (2009); \$24.16 (2011); \$31.60 (2013 preliminary results)]. For information regarding the 2013 WWDO Public Water System Survey please contact Michelle Ogden, WRDS Project Coordinator (mogden1@uwyo.edu, 307-766-2741) or Phil Ogle (phil.ogle@wyo.gov, 307-777-7626).

Wyoming State Engineer's Office to Host Green River Basin Water Users Meeting on October 10th in Rock Springs

Wyoming State Engineer Patrick Tyrrell invites all interested members of the public to attend a water users meeting concerning Green River Basin water on October 10th at Western Wyoming Community College, 4:00 p.m. in the Lecture Hall, Room 1302 in the College Building, 2500 College Drive in Rock Springs.

Tyrrell will review the

announcement by the Bureau of Reclamation on August 16th that Lake Powell's water release during water year 2014 will be 7.48 million acre-feet (maf), based on the operational determination provisions of the 2007 Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead (2007 Interim

Guidelines).

Tyrrell will address the Basin-wide implications of continued drought conditions during the meeting. If the current trends continue, there is a better than 50% chance Lake Mead will create a shortage declaration in water year 2016.

In addition Barry Lawrence and Harry LaBonde, WWDO, will make a presentation at the

meeting concerning the Commission's ongoing weather modification research project. They will also include a discussion of options available to Wyoming for an operational weather modification program in the Green River Basin. For additional information, please contact the State Engineer's Office at 307-777-6151.



**WYOMING WATER
DEVELOPMENT OFFICE**

6920 Yellowtail Road
Cheyenne, WY 82009
Phone: 307-777-7626
Fax: 307-777-6819

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Calendar of Water Events

Oct. 1, Nov. 5, Dec. 3 2013,
Jan.7, Feb.4 2014 - Wyo-
ming Water Forum, SEO
Conference Room

October 10, 2013 - Green
River Basin Water Users
Meeting, Western Wyoming
College, Rock Springs, WY

October 15-17, 2013 - Inter-
state Council on Water Poli-
cy, Annual Meeting, Denver,
CO

October 21-24, 2013 - Wyo-
ming Water Association and
Upper Missouri Water Users
Joint Meeting/Tour - Sheri-
dan, WY

November 4-8, 2013 - Wyo-
ming Board of Control
Meeting, Cheyenne, WY

November 6-8, 2013 -
WWDC/SWC joint meeting,
Casper, WY

November 5-7, 2013 - Mis-
souri River Recovery Im-
plementation Committee
meeting, Omaha, NE

November 19, 2013 - Bear
River commission meeting,
Salt Lake City, UT

December 2-6, 2013 -
Level III Project Hearings,
various state sites

December 5, 2013 -
Yellowstone River Com-
pact Commission meeting,
Cody, WY

December 31, 2013 - Small
Water Project Program
Applications Due to
WWDO office, Cheyenne,
WY

January 8-10, 2014 -
WWDC/SW joint meeting,
Cheyenne, WY

January 9, 2014 - Belle
Fourche Compact meeting,
Hulett, WY

February 10, 2014 - Legis-
lative Session starts, Chey-
enne, WY

February 11-13, 2014 -
Missouri River Recovery
Implementation Commit-
tee, Kansas City, MO

March 6-8, 2014 - WWDC
meeting, Cheyenne, WY

May 5-8, 2014 - WWDC
consultant selection inter-
views

June 4-5, 2014 -
WWDC/SWC joint meeting,
Cheyenne, WY

August 20-22, 2014 -
WWDC/SWC joint meet-
ing/Tour, TBA