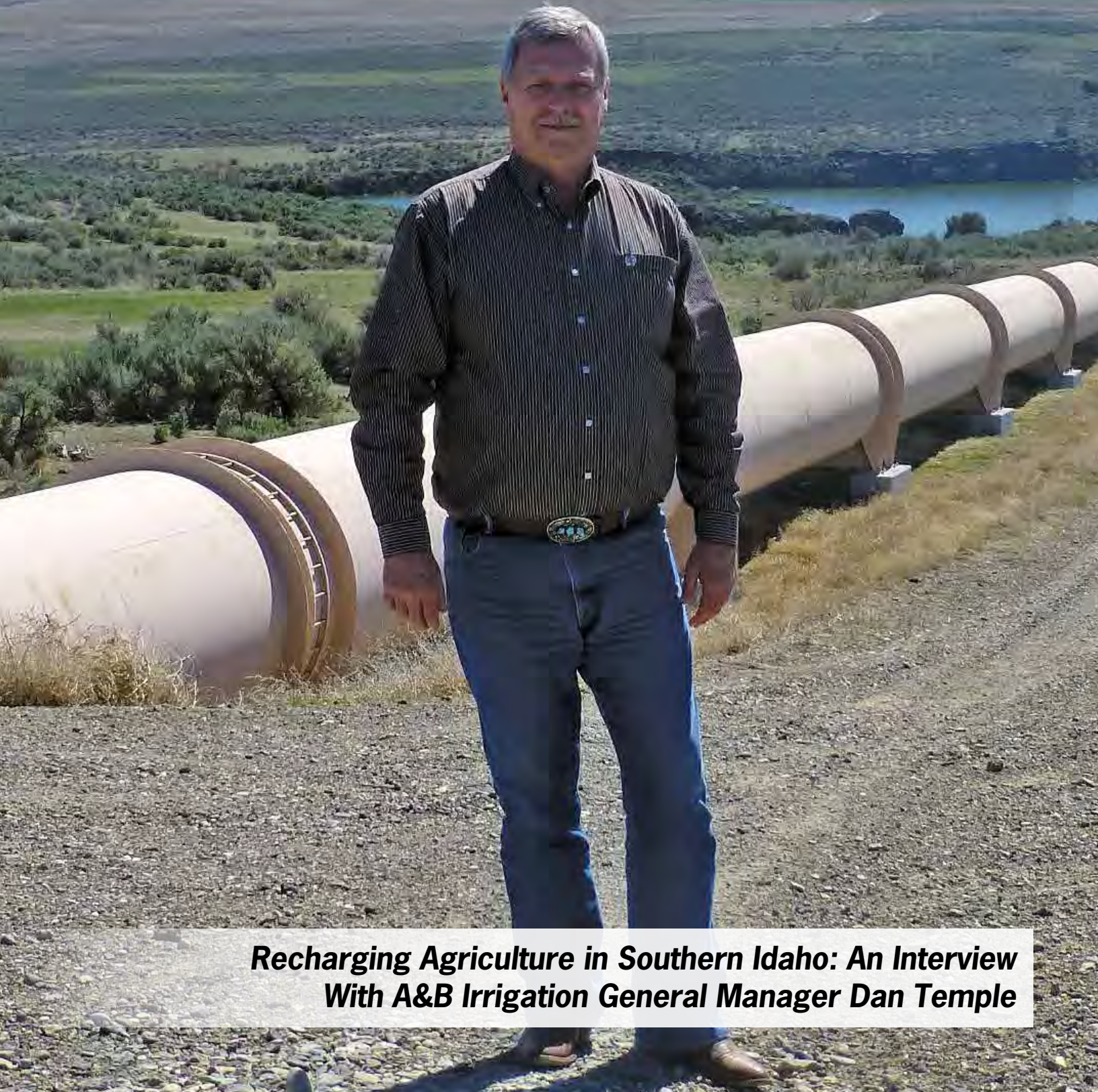


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***Recharging Agriculture in Southern Idaho: An Interview
With A&B Irrigation General Manager Dan Temple***

Hydro Development on the North Side Canal

By Alan Hansten

This month, the North Side Canal Company (NSCC) is finalizing construction on its U Canal low-head hydropower project, which will utilize 1,200 cubic feet per second of water and 20 feet of head to generate 1.28 megawatts of power using eight siphon-type Kaplan turbines supplied by MAVEL Americas from the Czech Republic. NSCC's 100-year irrigation diversion structure was in poor condition—it had been a concern to canal company members for some time. In May 2013, the NSCC board of directors evaluated the situation and determined that the structure needed to be replaced. That decision prompted a two-year planning and construction process that led to the development of the U Canal hydropower plant that will go online this May.

From Vision to Reality: A Timeline

After the board decided in May 2013 to replace the diversion structure, I made a call to CH2M HILL to run a feasibility analysis by June to determine whether NSCC could construct a hydro project at the site in addition to the construction of a new diversion structure (the existing structure had 10 feet of drop and improvements could be made to get an additional 10 feet, if feasible). CH2M HILL presented its feasibility study in June to the board, and after seeing the results, the board members decided that the project was feasible and requested a scope of work for the design of the project. We reviewed and approved the engineering scope of work in July.

By August 20, 2013, we were at 30 percent of the design process, had a concept of how the plant would actually look, and were performing the geotechnical



Aerial shot of the U Canal construction site.



Downstream side of the new facility.

investigation. At that point, we reached out to suppliers to obtain estimates for equipment cost and lead times for manufacturing. In September, we ordered five AquaSystem 2000 Langemann gates from Canada.

During October, we finalized bidding documents and began demolition of the existing structure. We hired a local contractor to perform the blasting of rock, which we then removed to accommodate the new facility. In early November, we filed the notice of intent to construct a hydro facility with the Federal Energy Regulatory Commission and completed the federal process by early January 2014. A special use permit application was also initiated with Jerome County Planning and Zoning.

NSCC selected its general contractor, McAlvain Construction, in mid-November, while NSCC crews were busy finishing the demolition of the site and preparing it for McAlvain. McAlvain began construction activities on the site on December 2. Northwest Farm Credit and Magic Valley Bank were both asked for financing proposals in December that would fund the hydro equipment procurement and installation in 2014 and 2015. The Idaho Power Company was contacted to begin negotiations on energy sales and generator interconnection agreements.

Hydro equipment proposals were received in early February 2014, and a contract was signed with MAVEL Americas to supply eight siphon-type Kaplan turbines. These turbines are an off-the-shelf design by MAVEL that establish a siphon effect flow through the conduit using the turbine initially as a pump. A small vacuum pump is used to evacuate any air inside the top of the

siphon. Once flow is established, the system switches over to a generator. The siphon-type turbine design is simple, cost effective, and fits well within our structure design.

By March 2014, 3,000 cubic yards of concrete had been poured, the five Langemann gates had been installed, and all other equipment and hardware had been mounted. At this stage in the project, the facility was ready to divert water for the 2014 irrigation season.

At the end of April 2014, the negotiations for the energy sales and generator interconnection agreements were complete and ready for the Idaho Public Utilities Commission's review and approval. In May 2014, we hired Jack's Excavating, a local contractor, to build up the upstream embankments an additional 5 feet while the water was in the canal during the irrigation season. We purchased 100,000 yards of material from adjacent landowners and hauled and compacted to raise embankments. Embankment construction was completed toward the end of September 2014. Electrical and mechanical designs were in process through the summer months, and in August, the Idaho Public Utilities Commission approved the energy sales agreement with Idaho Power.

When we dried up the canal in October 2014, NSCC crews began blasting and removing 45,000 cubic yards of basalt rock below the facility to increase the drop 5 feet. RSCI of Boise, Idaho, was hired as the general contractor in October 2014 to install all electro-mechanical equipment and to construct the control building.

We received our draft tubes for the turbines, our turbines in January 2015, and our generators and switch

gear in March 2015. International Water Screens supplied the debris management system and assisted with its installation in January 2015.

As of April 2015, we are currently finishing up the electrical installation, and we hope to begin commissioning the electrical equipment at the end of the month.

A Favorable Environment for Hydro Development

Two regulatory developments helped make the hydro project financially feasible. At the time of our initial consideration of the project, the Idaho Public Utilities Commission had been dealing with the pricing rates for Public Utility Regulatory Policies Act projects. One of the outcomes of the commission's process was a carve out of seasonal rates in which power producers with projects that produce less than 10 average megawatts and generate 55 percent or more of their energy during June, July, and August (generally on irrigation and canal projects)—a time when the Idaho Power Company needs the energy—are paid a premium. NSCC runs water from April through October, with a bulk of energy production occurring during those summer months. Because NSCC qualified for those special rates, the commission's decision made a low-head project more financially viable.

In August 2013, President Obama signed the

Hydropower Regulatory Efficiency Act of 2013 into law. The legislation, first introduced by Representative Cathy McMorris Rodgers (R-WA), waived Federal Energy Regulatory Commission (FERC) license requirements for any conduit hydro facility that uses the hydroelectric potential of a nonfederally owned conduit for electric power generation with a maximum installed capacity of 5 megawatts.

Once that bill became law, there were people filling out the applications and getting them to FERC right out of the gate. I looked at what my peers were doing and followed the dialog on FERC's website. I quickly figured out which applications were getting through and which ones were not. I modeled NSCC's applications on the successful ones to ensure that we did not have any issues. The application process was truly streamlined. I was able to complete the required documentation and had our attorney review it. I submitted the paperwork for that exemption in November 2013. It took 60 days to successfully run through that process.

Running the Numbers

As a canal company, NSCC has a lot of financial flexibility that federal projects do not have. In addition to drawing on our own reserves, we requested loan proposals from our local bank and from Northwest Farm Credit Service to help finance the project.



Debris screens from International Water Screens.



The installed Mavel generators up close.

We knew it was going to cost a certain amount just to replace the irrigation components, so we separated out that value to determine how much the hydro component would add to the total project cost. Our benchmark was to be able to pay for the additional hydro component in 20 years. We also calculated that the hydro component would pay for the entire project in less than 30 years. The numbers worked in favor of developing the hydro component.

Assessing Our Work

Generally, projects are more cost effective when you have a tight schedule. Originally, we had planned for a three-year project, but in November 2013, I reviewed our progress and determined that we could compress the schedule if certain pieces of the puzzle were in place by January for a go-no go decision. In January, we evaluated where we were on the project and decided to charge ahead and plan to be operational in spring 2015. Fortunately, all the cards fell in our favor. To do it, you have to be on your game.

It has been a fast two years. This was my first hydro project as NSCC manager, and I have learned a great deal. You have to plan up front, talk to all the players to get your game plan together, and be ready to manage multiple facets of the project in parallel to make sure things come together when they need to. In our case, construction activities in the two winters could not be delayed since water had to be able to run through the facility by the

start of the next irrigation season. You also need to allow plenty of time for different kinds of things—from negotiating power purchase agreements with utilities to addressing lead time for equipment, since it generally has to be manufactured.

The only snag we really ran up against was the West Coast shipping port slowdown. Our generators were shipped from the Czech Republic. The shipping route went down through the Panama Canal and on to Oakland, California. The generators arrived in port and were held up for a month and a half during the labor dispute. That delayed us, and if that had not happened, we would have been on track to generate power as scheduled. It held up the electrical work, but we were able to accommodate that.

We are looking forward to the completion of this project, and we plan to have an open house the first part of June to allow the community in to see what we have been up to these past two years.

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