



Massive Wire Sawing Project at Hydroelectric Dam

Joint Effort for Two CSDA Contractors

The Red Rock Hydroelectric Project is a massive project, started in 2014 with completion set for 2019, that will help supply energy to meet the ever growing needs of the customers served by the Missouri River Energy Services (MRES) along the Des Moines River. This new hydroelectric facility is being completed at the existing Red Rock Dam on the river about two and a half miles southwest of Pella, Iowa. When the project is completed, the Red Rock Hydroelectric Project (RRHP) will be the second largest hydroelectric generating facility in the state of Iowa and a significant addition to renewable energy. It will supply energy to nearly 18,000 homes.

For the first 18 months of the project, crews from the general contractor, Ames Construction, performed the civil and underground work at Red Rock Dam prior to the start of the retrofitting work. This initial construction, which started in August 2014, included earthwork, rock excavation and concrete pours for soil stabilization. In February 2016, the project's focus shifted to construction of the powerhouse.

The powerhouse encases the generators, rotor shafts and turbine blades as well as the powerhouse controls. The turbine blades are attached to the generators by the vertical shafts and are rotated by water flowing from the intake structure, through the penstocks (21-foot-diameter pipelines), into the spiral case and finally through the wicket gates, spinning the turbine blades and returning to the river via the draft tube. The wicket gates act as a throttle to control the speed of the rotors. Installation of the owner-furnished turbine assemblies has also begun.

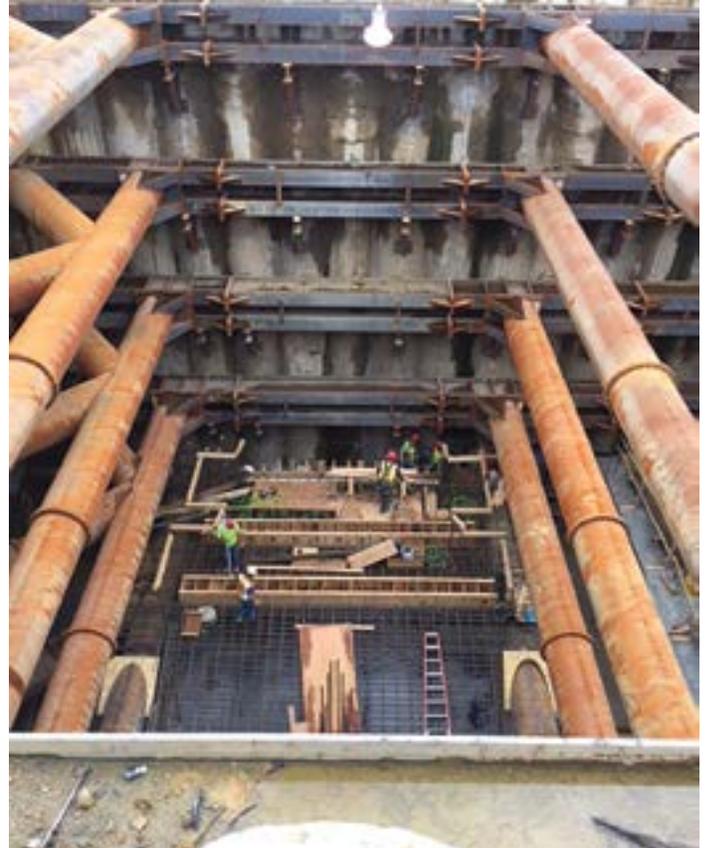
This aerial view of the RRHP shows work downstream, including the new powerhouse.



Two 21-foot-diameter penstock pipes will connect the powerhouse structure to the intake structure on the reservoir side of the dam. The steel penstock liner will be embedded in concrete and feed the powerhouse with 14,000 cubic feet of water—equivalent to 2,456 standard bathtubs full—per second.

Two CSDA contractors, Cutting Edge Services and Advanced Concrete Sawing joined forces in 2015 and were awarded the three year job at Red Rock Dam to drill and wire saw several large openings as needed to run lake water into the new intake structure and through the two 2 new penstocks into the new powerhouse below the dam. This is quite a massive undertaking and will continue into 2019.

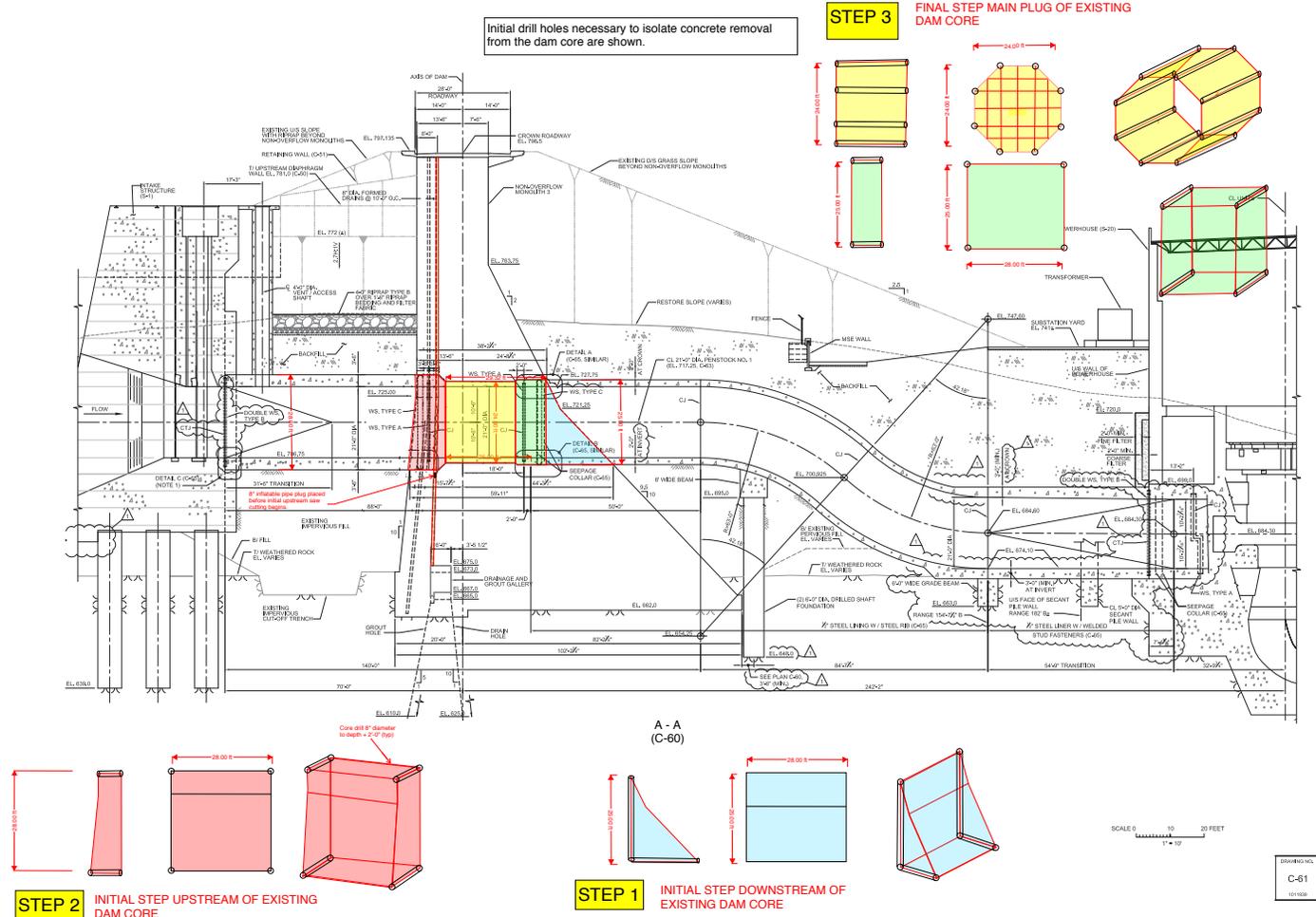
Included in this job are six openings measuring 28 feet wide by 40-80 feet-tall through 5-foot-diameter secant wall and four initial cavities cut into the downstream and upstream faces of the dam, each 28 feet square by 8 feet deep. A pair of 25-foot octagonal passageways through the center core of the dam, each 25 feet deep, make up the final phase of the project. The diagram of the project shows the three main pieces of the drilling and sawing work through the dam. Step 1 (diagram) shows the downstream cavity work in the dam core. Step 2 (diagram) shows the upstream cavity work in the dam core. Step 3 (diagram) shows the final cuts in the dam core including the octagonal passageways.



This photo shows the secant piles and temporary steel holding back the lake.

This drawing shows the three phases of cutting required for each penstock penetrating the dam.

ATTACHMENT A1 - PENSTOCK 1





Above: Operators core drilling 8-inch-diameter holes into the face of the dam.
Below: 15-milimeter wire was pushed into the holes and then smaller diameter wire was used to make the vertical back cuts.

Most of drilling for the wire holes is being done with Husqvarna hi-cycle drills while the wire sawing is being done with a pair of Diamond Products WS 50 hi-cycle wire saws.

In 2016, the two contractors completed initial wire cuts and blade cuts to allow for the construction of the intake structure. In 2017, the 28-foot-wide by 60-foot-high opening through the Unit 1 secant wall at the Power House and the initial cavity into the downstream face of the dam were completed. And now in 2018, Cutting Edge and Advanced Concrete Sawing will complete a majority of the work, leaving the 25-foot octagon passages for 2019.

There have been interesting constraints along the way on this project. To begin with, the difficulty was making large cuts in steps and working around heavy shoring as needed to preserve integrity of the dam. In addition, a future challenge will be underwater cutting the secants holding back the lake, after the intake structure is completed.

“This was one of the most extensive projects that I have ever undertaken,” said Tim Beckman, President of Cutting Edge Services, “and required the collaboration of my colleague Bennett Jones of Advanced Concrete Sawing.” “Ames Construction selected us because of our innovative techniques and our flexibility of working with the precision steps needed to protect the





Looking downstream into the Unit 1 penstock.

dam,” he added. “In addition, this project has and will continue to require a very large resource base that only our two companies together were able to provide,” said Bennett Jones, President of Advanced Concrete Sawing.

As CSDA contractors win contracts for more and more massive infrastructure projects, like this one, undertaken over multiple years, it shows the value of collaboration between contractors in the sawing and drilling industry and strengthens the notion that CSDA can help provide

many of the opportunities for contractors to meet their colleagues and form lasting friendships and professional unions to win contracts of this scope. When this job is completed, 18,000 homes will have electricity provided by a facility that was retrofitted, in no small part, due to the work provided by two sawing and drilling contractors.

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COMPANY PROFILE

Cutting Edge Services was founded in 1997 and is headquartered in Batavia, Ohio. Owner Tim Beckman helped pioneer a construction wire sawing business in Chicago in 1983 after borrowing his first wire saw from a Knoxville, Tennessee quarry operation. Cutting Edge mobilizes operators and specialized equipment worldwide providing services in diamond wire cutting, drilling and precision removal. Also offered are robotic demolition, hydraulic splitting and diamond blade sawing. Just one of the infrastructure markets served is the hydroelectric/locks and dams market like Red Rock.

RESOURCES

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Advanced Concrete Sawing, headquartered in St. Paul, Minnesota was started by Bennett Jones 18 years ago and services five states in the Upper Midwest. Advanced specializes in flat sawing, core drilling, slab sawing, wall sawing, wire sawing and curb cutting. In addition, robotic demolition, slurry removal and GPR scanning are provided. Advanced Concrete employs 20 operators and runs 16 trucks.

Advanced Concrete Sawing

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