

# On Site

*People building for People.*

## Reaching Milestones at Keeyask Generating Station



*A look inside the Keeyask powerhouse. Project construction includes a seven-unit powerhouse, seven-bay spillway, three zoned rockfill dams, two earthfill dykes, and cofferdams to reroute the river.*

At a remote construction camp on the banks of Manitoba's lower Nelson River, the primary structures of the **695 MW Keeyask Generating Station Project** have taken shape. Nearly 1,000 km north of Winnipeg, our Team of BBE Hydro Constructors LP (*Bechtel, Barnard and EllisDon*) reached a major milestone with the completion of the spillway this fall. Our Team has turned the structure over to the *Keeyask Hydropower Limited Partnership (KHLP)* for gate installation. KHLP is a collaborative effort between Manitoba Hydro and four Partner First Nations: Tataskweyak Cree Nation and War Lake First Nation (acting as the Cree Nation Partners), York Factory First Nation, and Fox Lake First Nation. Once the gates are installed, our Team will possess the structure again to divert the river into the spillway for the next phase of river management. In the powerhouse complex, crews placed approximately 58,500 m<sup>3</sup> of concrete between March and November. The year's primary focus included completing the service bay, north transition, and Units 1, 2, and 3 of the powerhouse and intake. In the service bay, crews reached a milestone when they completed structural steel to erect the 240-ton overhead cranes. Crews constructing the powerhouse intake recently completed Unit 2 Lift 9 of the lower headblock, which will allow the steel structure to be erected on the upstream side of Units 2 and 3. The project's earthworks operation placed approximately 1.15 million m<sup>3</sup> of summer embankment material this season. Crews completed the north dam to the critical elevation of 152.5 m near the powerhouse, while the south dam crew completed leveling embankment within the spillway cofferdam. At the central dam, crews completed approximately 500 m of embankment to full design height. As focus shifts to winter work, crews on the south side of the river have started excavation of the first zoned impervious core section of the south dyke. Planning for an even busier 2018 season is well underway, with significant craft ramp up set to begin in March.

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## notables

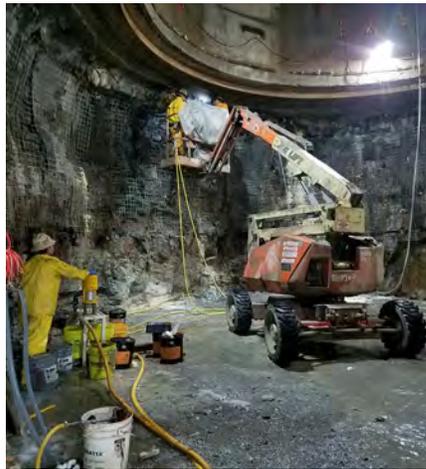
On Oct. 5, Barnard and joint venture partner *Bessac* entered into a contract with *Silicon Valley Clean Water (SVCW)* for the Gravity Pipeline Progressive Design-Build Project. Barnard Bessac JV will work with design engineer *Arup* and SVCW to advance the design of a gravity pipeline to be constructed by TBM tunneling method from its current 10 percent to 60 percent.

On Dec. 4, Barnard entered into a contract with *Southern California Edison* for the West of Devers Upgrade Project. Under this EPC Contract, Barnard will remove and replace 184 circuit miles of existing 220 kV transmission lines with new double-circuit 220 kV transmission lines in San Bernardino and Riverside counties. Construction includes installation of 386 lattice steel towers, 83 tubular steel poles, and approximately 5.9 million feet of conductor.

Barnard appeared in *Engineering-News Record's* 2017 Top 400 Sourcebook released in early October. Our rankings include: #1 in Hydroplants; #6 in Petroleum Pipelines; #7 in Water Supply; and #8 in Power Transmission and Distribution.

## Making Progress at Lake Mead

Serving the Southern Nevada area, where the main concern is the decreasing water level of Lake Mead, the area's primary water source, the *Southern Nevada Water Authority (SNWA)* is dedicated to providing continued delivery of water to its more than 2 million users. To assist in this effort, Barnard is installing 144-inch aqueduct pipe to transport the pumped water from the intake to nearby existing water treatment facilities. On the **Lake Mead Discharge Aqueduct Project**, crews have completed all controlled low strength material (CLSM) and native backfill operations for the Project and successfully performed hydrostatic testing for the 1,800 LF of 144-inch low lift aqueduct pipe. Additionally, the Team has repaved the River Mountain Loop Trail that traverses the site, and it has reopened to the public. With site restoration and punch list items in progress, Barnard anticipates achieving Project completion by the



Crews perform post-excavation grouting in the access shaft.

end of the year. On the **Lake Mead Low Lake Level Pumping Station Project**, crews have completed the walls on both low lift valve vault structures and are working to complete the high lift valve vault. The Team is also preparing for the construction of the 58-foot-diameter, 48-foot-tall concrete surge tank. Meanwhile, underground crews have completed the drain holes and applied the final layer of fiber reinforced shotcrete to the forebay top heading, in addition to completing the pre-excitation grouting of the future forebay stub tunnel and post-excitation grouting of the access shaft. Focus has now turned to preparing for the excavation of the forebay bottom bench and the final 30 feet of the access shaft.

## Widows Creek wraps up 2017 Work

At the **Widows Creek Main Ash Pond and Dredge Cell Final Closure Project**, Barnard crews continue capping and covering the *Tennessee Valley Authority's* 400-acre main ash pond and dredge cell at the retired Widows Creek Fossil Plant in Stevenson, Alabama. In the main ash pond, crews continue to haul and place cover soil and structural fill. The Team has now hauled over 470,000 CY of borrowed material to the main ash pond for a total of 930,000 CY of borrowed material hauled on the Project as of early December. Subcontractor *Environmental Specialties International, Inc.* has surpassed the 7 million SF mark for LLDPE liner installation in the main ash pond and continues placing liner and composite ahead of cover soil crews. With the Bermuda Sod season at an end, subcontractor *TennesSeed Erosion Control, LLC* finished the year having installed 80 acres of sod in the main ash pond. TennesSeed also completed tying sod into the dredge cell perimeter roads, sumps, and ditches before the dormant season set in. Culvert and pipe crews have installed over 1,800 LF of 36-inch HDPE pipe and 4-foot by 8-foot precast box culverts, and approximately 13,000 LF of 10-inch geocomposite collector pipe. Our concrete crew achieved major progress in cast-in-place concrete headwall construction, preparing the site for stormwater releases as areas are complete. Road surfacing crews have placed aggregates on both the dredge cell and the main ash pond roads, marking a final step in completing each drainage area and releasing stormwater.

## C-44 Reservoir Advances through Hurricane Season

Despite the effects of heavy rains and hurricanes, the **C-44 Reservoir Project, Contract No. 2** in South Florida has achieved notable progress across multiple scopes of work. Along the 3,500-acre reservoir's 9.2-mile perimeter, toe trench drain excavation continues to advance. Functioning as a primary seepage control system, the toe trench drain will provide a safeguard to ensure the longevity and integrity of the reservoir's 30-foot-high earthen embankment. At the downstream toe of the embankment, crews have started installing the toe trench two-stage filter beneath the embankment's foundation. A critical component of the embankment's safety, this filter will allow groundwater to flow freely through a combination of granite drain sand and a perforated HDPE drain pipe surrounded by granite 57 stone wrapped in geotextile fabric. In November, subcontractor *McDonald Construction* began excavating the 10,000-LF distribution canal. Crews continue to make steady progress with foundation excavation and embankment placement, moving closer to the project's total 8 million CY of earthen embankment. Barnard is constructing this *HDR*-designed Project for the *South Florida Water Management District* in partnership with the *U.S. Army Corps of Engineers*. When completed, the C-44 Reservoir will capture runoff from Lake Okeechobee and send it to the adjacent Stormwater Treatment Area (STA). The STA site will cleanse the runoff water through a settling process before releasing it to the C-44 canal and into the St. Lucie Estuary on Florida's east coast.

## Improving Natural Gas Transmission Systems at PG&E

For nearly five years, Barnard Pipeline, Inc. (Barnard) has participated in *Pacific Gas and Electric Company's* (PG&E's) Gas Transmission Construction Alliance Program. As an Alliance Partner, Barnard helps PG&E plan and estimate work focused on improving the safety and reliability of PG&E's gas transmission system. Our work also includes conducting natural gas pipeline construction, testing, valve replacement, and integrity management services. Recently, our Team completed the R-407 Project following the exposure of a 30-foot section of 36-inch transmission line across Petroleum Creek in Northern California. The Project took place in an environmentally sensitive area and involved the replacement and relocation of 303 feet of pipeline under Petroleum Creek, in addition to the preparation of an extensive streambed remediation plan. As part of the pipeline relocation, Barnard excavated over 6,000 CY of material, and fabricated and hydro-tested the new piping. Once Barnard completed the gas clearance successfully, the line was repacked, anchored with concrete mats, backfilled, and compacted. Barnard then re-contoured the streambanks of Petroleum Creek and installed rock slope protection (RSP) along the re-contoured banks to ensure bank stability and prevent future erosion. The R-407 project was another successful transmission line upgrade that increased safety within the community.



Crews armor Petroleum Creek with ½-ton RSP and concrete mats.

## Meet Our New Employees



**Corey Down,**  
Project Engineer  
B.T., Construction Management  
SUNY Delhi  
Initially an intern with our PG&E Team in Northern California, Corey recently joined the Team full-time.



**Kevin Kiefer,**  
Project Engineer  
B.T., Construction Management  
SUNY Delhi  
After interning with our Widows Creek Team in Alabama, Kevin recently joined the Team full-time.

# BARNARD

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## Muskrat Falls RCC Update



*Crews continue to place RCC on the Muskrat Falls North Dam as the end of the 2017 construction season approaches.*

Barnard Pennecon LP crews at the **Muskrat Falls North and South Dams Project** continue to place roller-compacted concrete (RCC) on the North Dam using the drive-on/drive-off method. *Muskrat Falls Corporation's (Nalcor Energy's)* 40-meter-high, 46-meter-long North Dam is now over 40 percent complete and has reached an elevation of 15.29 meters. The Project's remoteness requires shipment of the RCC materials from distant locations: fly ash is transported from Turkey and the cement is hauled from Quebec. Given the challenging procurement logistics, the short timeframe of construction since RCC placement commenced on July 28, and Labrador receiving greater than average rainfall in the summer and fall, the crew has made a significant feat. Crews have also completed the earthen embankment South Dam, which spans 325 meters in length and 20 meters in height.

## Wedding Bells

**Jarek Arneson** and **Natalie Caporuscio** were married on Sept. 9 in San Clemente, California.

**Dawn Dobson** and **Shawn Markman** were married on Oct. 5 in Bozeman, Montana.

## Barnard's "Next Generation"

Baby boy born to **Ely** and **AJ Johnson**. **Sawyer Maurice Elwin Johnson** was born on Sept. 22 weighing 8 lbs. 8 oz.

Baby boy born to **Jarod Johnson** and **Carin Seim**. **Andrew Knight Johnson** was born on Nov. 8 weighing 7lbs. 9oz.

Baby boy born to **Chris** and **Erin Zbitnoff**. **Luka John Zbitnoff** was born on Nov. 18 weighing 6 lbs. 15 oz.

Baby boy born to **Jevin** and **Katie Wallander**. **Soren Gregory Wallander** was born on Dec. 1 weighing 7 lbs. 5 oz.

Baby girl born to **T.J.** and **Carlee Williams**. **Thea Marie Williams** was born on Nov. 25 weighing 4 lbs. 15 oz.