



## Weholite facilitates Canadian hydropower project

Hydroelectricity has been used in Canada for more than 100 years and today represents two-thirds of the country's power generation. While hydroelectric power is not a new concept, using large-diameter high density polyethylene pipe to transport water from a source to the generator is relatively new and is helping increase efficiency standards in construction and operation.

At the Wawaitin Generating Station on Kenogamissi Lake located near Timmins, Ontario, OPG (Ontario Power Generation) was conducting a total reconstruction of its hydroelectric plant including the piping system responsible for transporting approximately 40 cubic metres per second through the plant which generates 10 MW of electricity. Including the Wawaitin Generating Station, OPG has a total capacity of more than 21,000 MW, making it one of the largest power generation companies in North America. The entire Wawaitin GS was to be rebuilt for it was at the end of its service life. The new plant will generate 15 MW of electricity, which is enough to power approximately 15,000 households.

The original piping system at the Wawaitin GS site utilized different types of traditional materials, including wood stave and steel. Several different materials for the large diameter pipe were considered to transport water from the Kenogamissi Lake to the plant.

The original design was based on using concrete pipe with a transition to steel to accommodate the higher head pressure closer to the powerhouse. However, cast-in-place concrete requires a lot of man hours to install, can be expensive to maintain and repair, and the rebar used in construction can corrode and cause other problems. With this in mind, KAP (Kiewit-Alarie, A Partnership) made the decision to change the original design to replace the concrete portion with a PE-HD pipe. The specific pipe chosen was Uponor's Weholite, which Kiewit had used before on other hydropower projects in British Columbia.

### **Easy installation**

Weholite is a large-diameter, structured-wall piping product for gravity applications that can be custom-manufactured for low-pressure applications. The pipe combines the raw material properties of PE-HD with structured-wall technology to create a lightweight engineered pipe with excellent loading capacity. It offers properties such as stress-crack resistance, salt water and chemical resistance, cold temperature toughness and the ability to create a leak-free piping system through extrusion welded joints. The pipe can be produced in dimensions up to 3.5 metres making it possible to convey large volumes of water. Pipe lengths are practically only limited by what can be transported by truck.

Weholite has been used in many municipal and industrial applications, including new pipeline and pipeline rehabilitation projects, and offers substantial savings in weight for increased ease of installation and cost effectiveness. This was a key factor in KAP's decision to include approximately 945 metres of DN/ID 3.4 metres Weholite pipe in two parallel lines, according to

**Paul Mongelli**, Site Engineer with Kiewit at the Wawaitin Generating Station Project.

### **Less man hours and equipment**

"This is our first design-build project with OPG," says Mongelli. "We did our homework and decided against using concrete due to several construction and operational benefits of PE-HD. The Weholite pipe can be installed in less man hours and with less equipment so there were significant cost savings during construction. It also offers OPG some nice benefits once the plant is up and running." "The ability to extrusion weld joints is a tremendous benefit of PE-HD pipe," adds Mongelli. "We can typically weld one to two joints per day, resulting in a much improved timeline for this part of the project. And there are no building forms, pouring concrete or drying time. The ability to extrusion-weld the joints greatly reduced the time and manpower needed for the project." Extrusion-welded joints create a leak-free, self-restraint, monolithic pipe structure; the welded joint will also eliminate infiltration into the pipe and exfiltration into the environment. Maintenance benefits also made PE-HD a solid fit for the Wawaitin Generation Station.

**Bruce Mclvor**, Site Representative with OPG says, “We anticipate zero maintenance costs with the PE-HD pipe. Concrete can be expensive to maintain due to rebar corrosion and it’s not as smooth as PE-HD pipe. It also doesn’t corrode like steel pipe. This site has been in operation since 1912 so we’ve seen a little of everything here. We will have a maintenance program in place for the new system, but we’re not planning to have to do much with the Weholite pipe for a long time.”

### **Reducing carbon footprint**

In addition to the facility coming to the end of its service life, OPG was replacing the generating station because of an 18% energy loss with the system due to the 300km of transmission lines the power must travel to get to the grid. “The new system will change the generating station from 25 to 60 Hz allowing connection directly to the local distribution system, eliminating the need to transmit the energy from Timmins to Sudbury. This change will eliminate significant energy losses and free up a transmission corridor,” says Mclvor.

“By refurbishing, upgrading and expanding our hydroelectric capacity across the province, we are diminishing our reliance on burning coal for fuel and plan to stop burning coal altogether by the end of 2014. OPG is committed to reducing its carbon footprint through projects like this one and enjoy the opportunity to work with companies like Uponor and Dow which have similar corporate goals,” adds Mclvor.

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For further information about this project please contact: [nainfra-sales@uponor.com](mailto:nainfra-sales@uponor.com)