



# BC HYDRO PEACE RIVER GENERATING STATIONS PROJECT UPDATES SUMMER 2011

## —RELIABLE POWER FOR 40 YEARS

The Gordon M. Shrum (GMS) Generating Station is a cornerstone of BC Hydro's system. GMS is located next to the W.A.C. Bennett Dam on the Peace River, near Hudson's Hope. Several projects are either underway, or planned to start soon that will renew aging equipment at GMS. A short description and status update of each is included below:

### Project: Units 1 to 5 Turbine Replacement (\$262 million)

#### The need for renewal

The 1960s era turbines in GMS Units 1 to 5 must be replaced to ensure ongoing reliability, availability and operational flexibility of these units which represent 12 per cent of BC Hydro's power production. Another benefit of the project will be an improvement in turbine efficiency and capacity. Modern turbine design will provide an additional 177 gigawatt hours of energy annually with the same water usage. The current maximum capacity per turbine is 261 megawatts. The new turbines will be limited to the current capacity because of other existing equipment capacity constraints and existing water licence limitations. It will ultimately allow the generating units to one day operate at a capacity of 310 megawatts. However, this capacity increase will require additional equipment upgrades, which are not currently planned, and approval from the Ministry of Environment.

#### What's involved?

The first stage of project implementation consists of the design and modelling of a turbine. In July 2010 stage two of the project was awarded to Voith Hydro and the project has now entered the implementation phase. The second stage includes shop fabrication of the turbine followed by site construction, installation and start-up of the turbine. The first turbine unit is expected to be operational in November 2012, and work on the other four units will continue sequentially until all five units are in service by mid 2015. The fabrication of components for the first unit is nearing completion and is expected to be delivered to GMS in March 2012. Work at site to install the first unit will then begin. Manufacturing of components for the second unit is well underway. The turbine components are being manufactured in Canada, Brazil, China, Romania and Italy.

### Project: Units 6, 7 & 8 Rotor Pole Replacement (\$10.5 million) — COMPLETED

The installation of new rotor poles on GMS units 6, 7 and 8 is now complete. The new rotor poles will improve reliability and support the increased generating capacity on units 6, 7 and 8 (see 6 to 8 Capacity Increase project below).

### Project: Units 1-4 Rotor Pole Rehabilitation (\$22 million)

The rotor poles on GMS Units 1 to 4 require rehabilitation to ensure reliability. The project was approved for full implementation in April and a contract to supply the new and refurbished rotor poles was awarded to Andritz Hydro in May 2011. Installations are scheduled to align with work being carried out on the Turbine Replacement project.

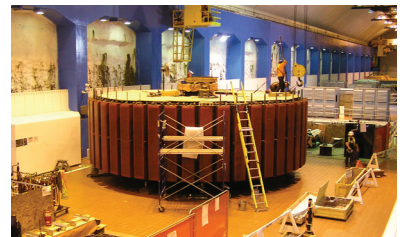
### THE CHALLENGE: A GROWING PROVINCE AND AGING INFRASTRUCTURE

Our province and population continues to grow and so has our need for more electricity.

Meeting current and future demand for electricity in B.C. is the foundation of our planning activities. We are now forecasting that the province's electricity needs will grow by as much as 40 per cent over the next 20 years, due to industrial activity, general economic and population growth, and electrification. It is critical that BC Hydro undertakes capital work to renew and upgrade hydroelectric infrastructure at several facilities.



Units 1-5 Turbine Rehabilitation Project - above is the Runner for the first turbine unit during fabrication in Brazil.



Removal of unit 6 rotor poles as part of the Units 6, 7 & 8 Rotor Pole Replacement project.

### Project: Transformer Replacement (\$31.9 million)

GMS has thirty unit transformers (the device that increases the voltage from low voltage 13,500 volts to high voltage 500,000 volts, to allow transmission over distance). Nine of these transformers will be replaced to ensure the reliability of the plant. Six transformers have been installed to date. A further three will be installed in the third quarter of 2011.

### Project: Units 6-8 Capacity Increase (\$39.1 million)

GMS units 6 to 8 will be refurbished to increase the plant capacity by 90 megawatts by replacing the generator circuit breakers and iso-phase bus. This increase in capacity is allowable within the current water licence. The B.C. Environmental Assessment Office (BCEAO) reviewed the proposed upgrade and confirmed the project would not require an Environmental Assessment Certificate, and may proceed. Work started in 2009 and is expected to be completed by the fall of 2013. One unit is now complete and in service. The manufacturing of components for the second unit is well underway, and installation will begin in September 2011. Installation of the third and final unit will commence in the spring of 2012.

### Project: Station Service Rehabilitation (\$31.1 million)

The station service system provides the power for the plant controls, battery systems, fire systems and all the auxiliary systems necessary to run the plant's generators. Five of the ten generator's controls were upgraded in 2009, and three more were completed in 2010. The final two are scheduled for completion in 2011.

### Powerhouse Crane Upgrade (\$5.7 million)

In 2008 a Crane Technical Review was completed and recommendations were made to improve the reliability and safety of the overhead bridge cranes in the GMS Powerhouse. The Powerhouse Crane Upgrade Project will see both cranes upgraded at GMS. The project scope includes new electrical power and control systems which will improve operation reliability and maintenance safety. The emergency stop circuits and existing hoist breaking system will be replaced to improve response times and safety. Other components to be replaced that will assist with reliability include a new hoist and travel brakes, as well as the design, procurement and uploading of new control programs, and refurbished operator cabs.

The project Request for Proposal was completed in April 2011 and the contract was awarded to Cranium in July 2011. The project is currently in the final design stage. The first crane is expected to be in service in December 2011, and the second in March 2011. The timing of the Powerhouse Crane Project is critical to the success of other key projects planned at GMS. The cranes are required to be operational prior to the commencement of the Unit 1 – 5 Turbine Replacement project and the Units 1-4 Rotor Rehabilitation project, scheduled to begin in April 2012.

## PEACE CANYON PROJECT

### Project: Transformer Replacement (\$4.4 million)

The Peace Canyon Dam and Generating Station (PCN) was completed in 1980. It is located at Hudson's Hope, 23 km downstream of the WAC Bennett Dam. The facility has four generating units producing a maximum capacity of 694 megawatts, using the same amount of water as GMS. The project will see the replacement of one of the large power transformers in the spring of 2012. The old unit will then be turned into a spare unit for PCN. The work is necessary because of a transformer failure in fall 2010.



Phase A Transformer being pulled onto the installation pad after the oiling process.



The iso-phase bus duct in China being prepared for shipment to GMS. This is part of the Capacity Increase project.



Dressed in protective suits, electricians are confirming voltage levels (phase and rotation) across an electrical breaker at GMS. Through these Station Service Panels, power is provided to the GMS Powerhouse.

This update is provided to keep residents of the Peace region informed about upgrades and refurbishments being made to the G.M. Shrum Generating Station. Please contact BC Hydro Community Relations at 250 561 4858, or [bob.gammer@bchydro.com](mailto:bob.gammer@bchydro.com) or BC Hydro Aboriginal Relations at 604 528 2833, or [joanna.mullard@bchydro.com](mailto:joanna.mullard@bchydro.com) for more information on any of the above projects.