

Performance Report for the Darlington Refurbishment Project

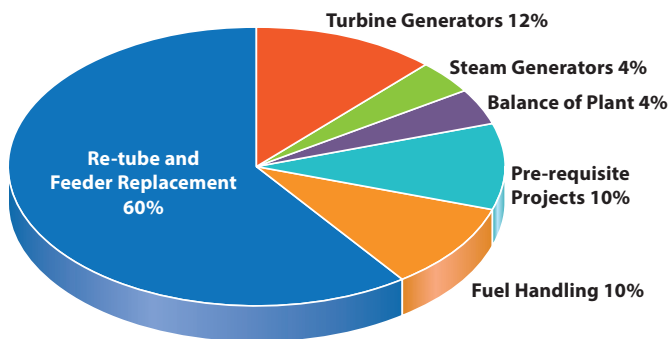
As part of our commitment to keep you informed, this report tracks the performance of Ontario Power Generation’s (OPG’s) Darlington Refurbishment project in the areas of safety, cost and schedule as well as significant accomplishments and progress during the first half of 2015.

Our work in 2015 is focused on two key areas: getting the site infrastructure ready; and preparing very detailed schedules and cost estimates for all the work packages so that we can have a final budget and estimate ready by year-end. A project of this scale and complexity always has some areas where performance is better than others, but our overall program health at mid-year 2015 is good. We are progressing work according to plan and staying within the approved budget. The details are below.

Other items of interest:

- Almost 2,000 people toured the reactor mock-up training area as part of the second annual Darlington Refurbishment Open Doors event held in early June. Bus tours of the Darlington site were added this year, providing a view into the significant amount of site preparation work currently underway;
- The site preparation work has ramped up significantly with more than 1,000 contractors working on the site, and nine key projects scheduled for completion this year, including the new Refurbishment Project Office; and
- OPG has established a Nuclear On-Boarding Centre at the Darlington Energy Complex in Clarington. This one-stop shop for contractor training, safety briefs and work orientation prior to starting work at OPG’s Nuclear sites is another example of how we are finding ways to be more efficient.

Major Work Packages



Darlington Refurbishment is made up of many individual projects of various scales and size. Six major project work packages are:

- **Re-tube and Feeder Replacement (“RFR”):** This work includes the removal and replacement of pressure tubes, calandria tubes and feeders in each reactor. This is the largest work package and is the core to the success of refurbishment. It represents the majority of the refurbishment critical path schedule.
- **Turbine Generators:** This consists of inspections and repairs of the four turbine generator sets and the replacement of analog control systems with new digital control systems.
- **Fuel Handling:** This involves the defueling of the reactor and refurbishment of the fuel handling equipment.
- **Pre-requisite Projects:** These are the numerous smaller scale projects on the Darlington site required to execute refurbishment and/or extend Darlington station life.
- **Steam Generators:** This includes mechanical cleaning, water lancing, installation of access ports and inspection work on all Steam Generators.

- **Balance of Plant:** This work consists of a number of smaller projects to replace or repair components on the reactor side of the unit (such as heavy water and cooling systems) and on the conventional side of the unit (such as electrical system, piping and valve work).

Key Milestones Achieved



Optimization of Steam Generator primary side cleaning process.

- Manufacturing of the prototype tool set for the Re-tube & Feeder Replacement project is now complete. Tool testing is also complete and performance has shown significant improvement from prior refurbishments.
- To date the reactor mock-up has produced approximately \$20M in quantified savings and many other benefits against a cost of \$38M. If we reduce a day of work off of 20 different work tasks, the mock-up essentially pays for itself. The greatest benefit of the mock-up is increased productivity in the field.

For more information, go to www.opg.com/darlingtonrefurb

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Overall Program Health



Darlington Refurbishment is currently in the Definition, Planning and Preparation Phase ahead of first unit execution starting in October 2016. The Overall Program Health remains good.

Cost



Cost – The total cost of the Definition Planning Phase, which began in 2010 and ends at the end of 2015, is forecast to be \$2.7 Billion. To date, actual costs are \$1.8 Billion, slightly below plan mainly due to delays in planned work. For major projects, the goal is to have actual costs match the planned expenditures.

Schedule



Schedule – The program remains on track to begin the first unit refurbishment in October 2016. While some of the major work packages are tracking behind schedule due to delays in completing engineering or contracting, or challenges in field execution, OPG is managing these to ensure key project dates are met.

Safety



Safety – The All Injury Rate measures the number of workplace injuries per 200,000 hours worked. Our All Injury Rate continues to be at zero for 2015. Contractors have experienced some safety related events, OPG has required corrective actions be put in place. Since 2008, Darlington Refurbishment has worked over 2,400 days without a Lost-Time Injury.

Pre-requisite Projects



A number of Pre-requisite Projects are needed to support the execution of refurbishment and to support the extended life of Darlington. Four have been completed and are in-service; ten others are on track; and four are facing schedule delays. These delays are being managed, and all in-service dates are on track to meet the need dates of Refurbishment. See attached map for full status.

Refurbishment Project Status

Re-tube and Feeder Replacement



The Re-tube and Feeder Replacement project continues to track well. Manufacturing of the initial tool set for the Re-tube & Feeder Replacement project is now complete. Tool testing is complete and tool performance has shown significant improvement from prior refurbishments. The detailed cost estimate and schedule for Execution Phase Re-tube & Feeder Replacement work has been received and is undergoing detailed reviews by OPG.

Turbine Generators



Manufacturing of the new digital Turbine Generator control system equipment and Turbine Generator parts are underway. The plant engineering work required to integrate new equipment within the plant is nearing completion. Review of the detailed cost estimate and schedule for Unit 2 is complete. Detailed cost estimates and schedules for the remaining subsequent units have been submitted to OPG for review.

Steam Generators



The Steam Generator tube inner diameter cleaning process has been optimized to maximize effectiveness. All detailed engineering work related to this bundle has been completed ahead of program milestone.

Fuel Handling



The Irradiated Fuel Bay heat exchangers have been replaced. Commissioning of the defueling equipment began in June at the Pressure Test facility in Peterborough. The cost estimates and technical basis for the work are progressing. Contract awards for the Main Trolley, Power Track and Auxiliary Refurbishment are underway.

Balance of Plant Work



The Balance of Plant work program, which includes a number of smaller projects, continues to progress detailed design and execution phase planning. The target remains to complete all design work with minimal exceptions by August 2015.

Legend

Excellent	Marginal	Status Holding	Trending Degredation	Trending Improvement
Good	Poor			