

Briefing Note

Issue:

The OPG Board of Directors approved a recommendation by OPG management to extend the nominal life of the Pickering B units instead of refurbishing them at this time.

Summary:

On November 19, 2009, the OPG Board of Directors approved taking initiatives to extend the nominal life of the Pickering units (referred to as Continued Operations), and not to refurbish the Pickering B units at this time.

In providing this recommendation to the Board, OPG management assessed the technical, regulatory, financial, and schedule implications of the options.

OPG Decision Framework:

The recommendation by OPG management was based on analyses of several factors, namely:

- cost effectiveness
- technical feasibility based on plant condition
- regulatory impacts, and
- schedule

The outcome of the analyses of each of these factors is provided below:

Cost Effectiveness:

- Significant investments would be required to mitigate regulatory risks associated with extending the life of the units beyond 2016. The costs would result from the need to perform increased maintenance and inspections.
- The refurbished units retain a significant risk of less than optimal performance post refurbishment.
- Comparative analysis showed that operating costs for the units would be high relative to industry standards due to design complexity.

- The complexity of the plant results in more people being required to operate it when compared to the industry at large.
- The cost to refurbish the units would be approximately \$10.7 billion, or \$2 billion per unit plus a contingency.
- This compares to 2008 estimates for refurbishment of Bruce power units at \$1.7 billion per unit, and Point LePreau at \$1.1 billion.
- The cost of all electricity produced over the life of the refurbished units was estimated to be about 9.6 cents per kilowatt hour.
- By comparison, estimates for electricity costs produced by refurbished Darlington units show less than 8 cents per kilowatt hour.
- Cost benefit analysis showed that little safety improvement would have been derived as a result of investing 100 M dollars would result in little safety improvement.

Technical feasibility based on plant condition:

- The plant design, in addition to being complex, the units are small and include a large number of components relative to today's designs. Pickering B units are nominally 515 MW, compared to Darlington at 881 MW, or new build designs at approximately 1,000 MW or larger.
- There exists high potential for discovery of defects which could make refurbishment unfeasible.

Regulatory impacts:

- As an older design, the Pickering B units do not meet modern standards. For example, whereas modern plants may contain dual safety trains, the Pickering unit safety units are typically single trains. This has the potential to present regulatory challenges in the future. This would result in significant ongoing regulatory scrutiny.
- The CNSC requirement to review as built plant standards versus modern standards every ten years results in the potential need for significant plant upgrades in the future.
- The ability to continue to operate for 30 years in a targeted population growth area (as defined by the Province of Ontario) also carries the potential for significant regulatory sanction in response to public intervention.

Schedule impacts:

- Shutting the Pickering B units down for refurbishment at their end of nominal life would result in a significant impact on the overall availability of OPG's fleet to meet power demands at a time when a number of the Province's units would also be shut down for refurbishment.
- The time frame for the shut down of the Pickering units would overlap with the shut down of both the Darlington and Bruce units due to the need to procure steam new generators. Steam generator procurement requires a 5-6 year lead time.

Background:

- Pickering B units (5 – 8) were initially placed in service in 1983 – 1986 with a nominal life expectancy of 30 years based on pressure tube life.
- The current predicted nominal end of service life is 2014 – 2016 for the units
- OPG, in response to a government directive of 2006, began the assessment of the feasibility of refurbishing existing nuclear plants as well as the environmental assessment of the impacts of refurbishing Pickering B.
- The feasibility studies on Pickering B have progressed significantly allowing OPG management to develop an improved understanding of the regulatory requirements, environmental impacts, scope of the project and refurbishment costs.
- OPG management has explored the Continued Operation of the Pickering B units for an additional 4 years beyond their current nominal operating lives and is of the view that continued operation is possible with additional investments
- Realization of this option would be of significant benefit to Ontario's electricity system during the 2014 – 2020 period when significant refurbishments will be occurring across the fleet.

MEI Staff Position

- After discussing OPG's rationale and review of the decision making framework, MEI staff concurred with OPG on their decision to continue to operate the Pickering B units and not refurbish them at this time.
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