

## Risks Associated with Annual CGS Outage

There are risks associated with conducting a refueling outage every year at Columbia Generating Station. These negative impacts have not yet been economically quantified. However, if CGS were on a one year refueling cycle;

- Radiation exposure would increase due to the increased number of outage days and work being done in the plant over a two year period. CGS already is in the fourth quartile relative to the industry for radiation exposure. Both the Nuclear Regulatory Commission and the Institute of Nuclear Power Operations have identified the need for, and have been driving CGS to lower it's radiation exposure average. This was one of the reasons CGS transitioned from a one year refueling cycle to a two year refueling cycle.
- Refueling outages also place plants in higher nuclear safety risk situations due to shutdown and startup evolutions and non-ordinary system alignments
- Shifting CGS to an annual refueling cycle would create a significant challenge to plan and prepare for the next refueling outage. As is the industry norm, preparations for a refueling outage typically must start more than a year before the actual outage start date. This was another reason CGS transitioned from a one year cycle to a two year cycle.
- INPO places significant emphasis on plant operators to be ready to efficiently, and in an error free manner, execute their refueling outages. This objective might be impacted by the inability to properly prepare.
- Since outage planning horizons are longer than 12 months, executing a refueling outage while simultaneously planning and preparing for the next outage would increase organizational pressure and pressure for increased staffing.
- It is anticipated that a shift to a one year cycle would require procedural reviews and changes. In particular the preventative maintenance program would have to be re-sequenced to fit to a different overall schedule; this also applies to technical specification surveillances. These changes could potentially be costly.



## Risks Associated with Annual CGS Outage (continued)

When CGS is on a two year refueling cycle;

- Two year outage cycles allow more preparation time for large complex projects.
- Two year cycles allow more time for fuel, material and equipment procurement, some of which have long lead times.
- There are no plants in the US to our knowledge that currently operate on an annual cycle. All have shifted to 18 or 24 month cycles which is the industry norm.



# Economic Analysis of Annual CGS Refueling Outage

A rough economic analysis was performed based on the difference between a one year refueling budget and a two year refueling budget as reflected in Operating and Maintenance costs.

- The O&M costs are expected to increase around \$75 million per year.

There would be fuel savings associated with refueling each year due to less fuel loaded and more efficient use of the fuel.

- Estimated \$6 million less fuel and \$2 million fuel efficiency per two year period for a savings of \$8 million (\$4 million per year).

A range of forgone revenues were developed to reflect the effect of 30 to 40 fewer days of generation in non-refueling years. The range was based on different market conditions.

- The cost ranges result in \$5 million to \$20 million per year increase.

The total estimated cost increase of the factors listed above results in a range of incremental cost from around \$75 million to \$90 million.



## Analysis of Annual CGS Non-Refueling Outage

Many of the same risks would be present if CGS were simply shut down each year but not refueled. Specific risk include:

- Increased radiation exposure.
- Exposure to higher nuclear safety risk situations due to shutdown and startup evolutions and non-ordinary system alignments.

An economic analysis was not performed for an annual non-refueling CGS outage. However, it is anticipated that there would still be an increase in O&M cost relative to the two year refueling cycle.

- Energy Northwest would most likely perform repairs and maintenance during the time period when CGS was shut down.
- Also, at a variable cost of around \$5/MWh, it is still economic for CGS to operate during most heavy load hours.

Either way – shutting down CGS during the spring run-off or moving to an annual refueling cycle – statistics from this year are persuasive. In 2012, over-generation occurred in only 4% of the hours between April 1 and July 15 – or only 73 hours out of 1,824. In the remaining 1,751 hours its output was used to meet loads in the region or sold as surplus.

- ❖ **Given the safety and reliability risks associated with an annual outage, the economic implications, and the comparatively much higher amount of CGS output relative to the amount of energy oversupply experienced during the past two years, we believe a shift to annual outages is not prudent and therefore will not pursue additional detailed analysis of this alternative operating regime.**



# Financial Disclosure

This information has been made publically available by BPA on July 31,2012 and contains information not reported in agency financial statements.

