

GETTING THE FACTS ON

# Bruce Power and Nuclear Safety Management

**Bruce Power**  
Innovation at work

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## Asset Management

As part of the Government of Ontario's Long-Term Energy Plan (LTEP), Bruce Power is planning to continue operation of Bruce A and Bruce B until 2064.

This includes an Asset Management Plan (AMP) for Units 1 to 8, as an essential part of their continued safe and reliable operation.

Asset Management includes the ongoing maintenance or refurbishment activities necessary to extend the life of components.

Asset Management activities will be executed before, during and after the Major Component Replacement (MCR) outages.

The alignment of the Major Component Replacement (MCR) scope with asset management plans will support Bruce Power's goal for safe and reliable long-term operation.



Asset Management helps ensure Bruce Power maintains its **corporate environmental principles of footprint minimization**, utilizing components to their fullest operating potential.

## Life-Cycle Management Plan

Station engineers have developed a Life-Cycle Management Plan (LCMP) for each unit and associated systems, which clearly map how key pieces of equipment are monitored, maintained, replaced or refurbished over time. These plans are consistent with regulatory standards set by the CNSC. Station engineers maintain and revise the LCMPs as required, defining the key maintenance, refurbishment and replacement activities in a long-term plan for the equipment. The LCMPs are developed based on the most current evidence, and are reviewed and revised as new information becomes available. Plans are approved by the CNSC and will continue to be maintained and executed throughout the MCR program.

## Periodic Safety Review

Bruce Power has conducted a Periodic Safety Review (PSR) as part of its regulatory requirements to support ongoing operations and life-extension activities.

The review looked at criteria of modern codes and standards, and identified gaps.

Bruce Power has developed an Integrated Implementation Plan (IIP), which was submitted to the CNSC on July 19, 2017. If approved by the Commission at the public hearings, the IIP will become part of Bruce Power's licence requirements with the regulator. The expectation is that Bruce Power will demonstrate continuous safety improvements over the next 10 years through practical enhancements of its generating stations.

## Pressure Tubes

Bruce Power is applying for an extension to the total service hours allotted to the pressure tubes in our units, in order to maximize on operating life as MCR progresses. The extension forms part of the licence application and will apply to the 10-year licence period. The company conducts periodic inspections of these pressure tubes in accordance with industry best practice to ensure fitness for service. Furthermore, the company continues to conduct in-depth research to ensure the integrity of the material through refurbishment to end-of-life in 2064. The current industry research and analysis of pressure tube aging is facilitated through the Fuel Channel Assembly Life-Cycle Management and Fitness for Service Program, which supports operation throughout the licence period and beyond. The data is acquired from operating experience, joint industry findings and cooperative work with the CANDU Owners' Group (COG). The CNSC monitors all research of Bruce Power's pressure tubes, as part of its compliance program.



**BRUCE POWER  
MAJOR COMPONENT  
REPLACEMENT**

The Major Component Replacement (MCR) Program will extend the life of the Bruce Power site until 2064 to ensure Bruce Power nuclear continues to provide low-cost electricity for families and businesses for years to come. MCR begins in 2020 with the Unit 6 project, which is scheduled to last 48 months. There are four critical path items on the schedule.

**MCR Critical Path Items**

- Reactor shutdown and de-fuel: 4 months
- Reactor preparations: 5 months
- Reactor retubing and feeder replacement: Approximately 32 months
- Return to service: 7 months

**The reactor retubing and feeder replacement is guided by 7 core principles that will ensure a safe and successful execution:**

- No first-of-a-kind tools
- No first-of-a-kind components
- 24/7 coverage and activity on the reactor face
- All tooling built, tested and production rates verified
- All training on tools/processes complete prior to execution
- Bruce Power support and oversight dedicated to the project
- Quality checks occurring in real-time as the work happens

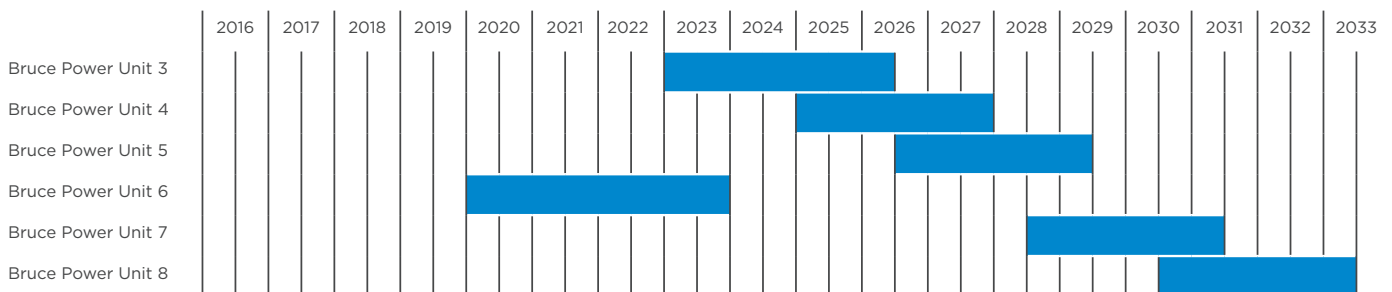
MCR will undergo **6 pressure boundary audits on code activities per year.**

Bruce Power’s MCR program is also **subject to 12 surveillance events per year** to ensure the project is being managed and executed in a manner that promotes reactor, radiological, industrial and environmental safety.

The **Technical Standards and Safety Authority provides a further layer of scrutiny with inspections** of pressure vessels and piping; the same as they do for any industrial facility in Ontario.

The **Electrical Safety Authority provides electrical inspections;** the same as they do for any residential or industrial building in Ontario.

**Bruce Power Refurbishment Schedule**



**Major Component Replacement =**

Fuel channels, steam generators and feeder tubes.



**2020-2036**

Major Component Replacement Units 3-8



**480**

fuel channels and calandria tubes replaced per unit.



**2064**

Operational life of Units 3-8