

ONTARIO NUCLEAR SAFETY: REFLECTING ON EVENTS IN JAPAN

The events at the Japan nuclear facilities could not be replicated in Ontario for two reasons:

1) Durham's stable geologic location

Ontario's reactors are at two sites on Lake Ontario and one site on Lake Huron where major earthquakes are not expected. Similarly, the Great Lakes are highly unlikely to produce a tsunami that would damage the operations of our nuclear units. They are in a geologically-stable region with a geologically-stable shoreline.

2) Robust design and safety systems of OPG facilities

The Ontario CANDU fleet is built to resist earthquakes stronger than those that seismic studies say are likely to occur in Ontario in one in 1,000 to one in 10,000 years. Ontario nuclear facility equipment and structures are built to meet Canadian Standards Association nuclear seismic standards.

Geological Conditions: Southern Durham Region / Great Lakes

This region has a low to moderate level of seismicity. Over the past 30 years, on average, two to three magnitude 2.5 or larger earthquakes have been recorded in the southern Great Lakes region.

In Canada, reactor sites are geologically screened to ensure they are constructed in a location that is seismically stable. (*Source CNSC*)

CANDU nuclear technology is designed to withstand earthquakes of a magnitude greater than the largest known earthquake for the region where it is being built. "Withstand" means that the reactor has the ability to automatically shut down and cool the core without a release of radiation. (*Source: CNSC*)

As a licensing requirement, nuclear reactors must be qualified to withstand the level of seismic activity that is expected for each individual reactor location. (*Source: CNSC*)

In Canada, nuclear reactor sites are selected to minimize the possibility of external flooding. Nevertheless, as part of an external hazard assessment, the consequences of external flooding are considered in the reactor design to ensure effectiveness of all safety-related systems credited for automatic shutdown and cooling of the reactor. (*Source: CNSC*)

Safety Systems

Two shutdown systems: Each reactor has two shutdown systems that can be operated manually or triggered automatically if there is a problem. In one of the shutdown systems, the unit has rods that, in an emergency, would drop rapidly into the reactor core and shut off the reaction by absorbing neutrons. Each of the stations also has a secondary means of stopping the fission reaction.

Vacuum containment - unique to Ontario CANDU stations: Every reactor is linked to a vacuum building. If steam builds up in a reactor's containment, it flows to the vacuum building. A massive pool of water at the top of the building is then sprayed onto the steam to cool it.

A safety net of redundant power: Ontario's CANDU reactors have considerable redundancy in back-up power supplies. Across the nuclear fleet there is a mix of standby generators, emergency power generators, and auxiliary generators with varying degrees of seismic qualification (back up to the back up).

Over the last several years OPG has invested in upgrades to these systems, and our fire suppression systems, as part of our commitment to ongoing safety improvements.

Trained, regulated, qualified staff: In addition to the robust physical safety systems, there are many human elements to the Ontario nuclear safety program. OPG's training program has been internationally-recognized as a strength.

The Canadian Nuclear Safety Commission provides significant oversight with on-site staff working at the nuclear stations.

Emergency preparedness: All nuclear power plant operators in Canada have well-established and practiced emergency procedures in place that include emergency shut down of the reactors and firefighting. These facilities are inspected regularly by CNSC personnel and emergency drills are evaluated by CNSC teams.