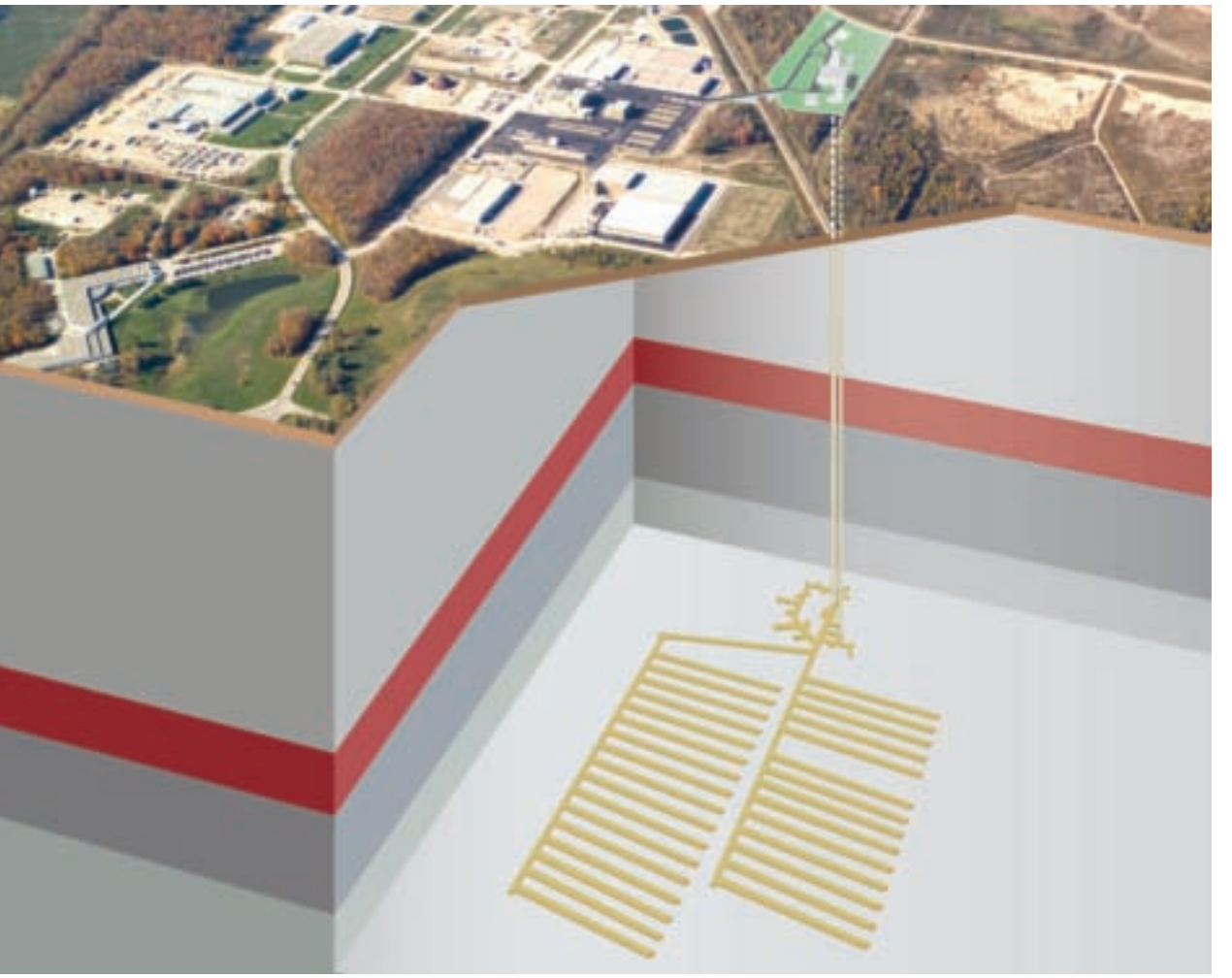
OPG's DEEP GEOLOGIC REPOSITORY PROJECT

For Low & Intermediate Level Waste

KEEPING YOU INFORMED



nwmo
NUCLEAR WASTE MANAGEMENT ORGANIZATION
SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES

ONTARIO POWER GENERATION

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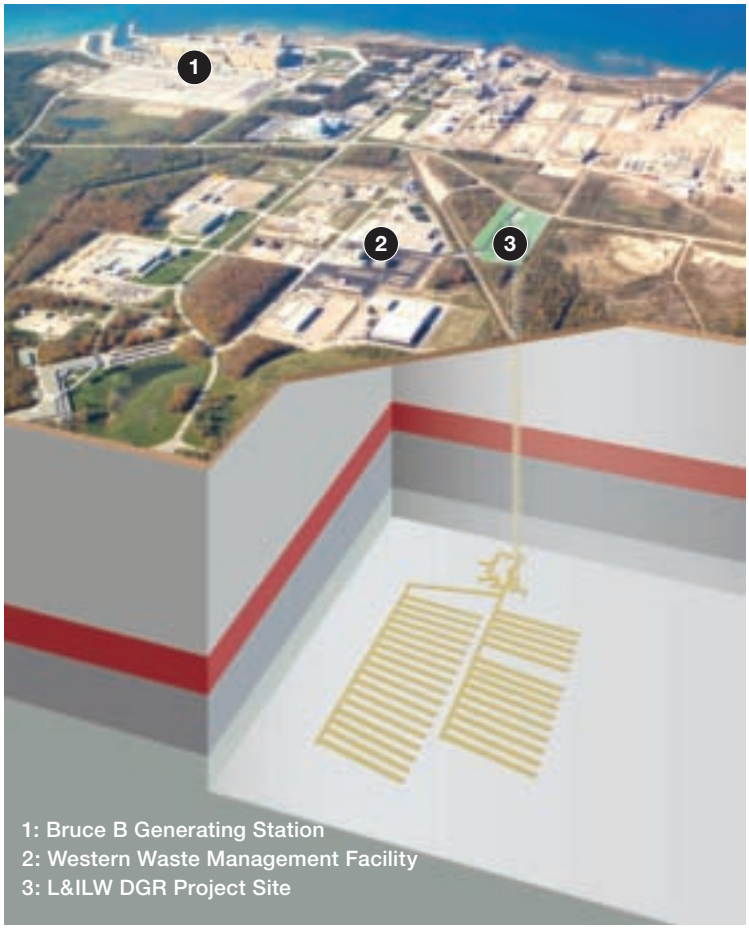
ONTARIO POWER GENERATION (OPG)'s DEEP GEOLOGIC REPOSITORY PROJECT FOR LOW AND INTERMEDIATE LEVEL WASTE (L&ILW DGR)

OPG, with the support of the Bruce County municipalities, is proposing to construct and operate a deep geologic repository for the long-term management of low and intermediate level nuclear waste. The L&ILW DGR would be located on lands adjacent to OPG's Western Waste Management Facility (WWMF) located within the Municipality of Kincardine. The Nuclear Waste Management Organization (NWMO) is managing the regulatory approvals process on behalf of OPG. Numerous opportunities will be provided throughout the regulatory process for citizens to become informed, ask questions and provide comment on the L&ILW DGR, which will only be constructed if it is safe to do so and with regulatory approval and public support.



1: Bruce B Generating Station
2: Western Waste Management Facility
3: L&ILW DGR Project Site


L&ILW DGR surface facilities.


Low level waste emplacement room.


Intermediate level waste emplacement room.

IMPORTANT FACTS ABOUT OPG, NWMO AND THE L&ILW DGR PROJECT

OPG is owned by the people of Ontario, has been generating electricity from nuclear fuel and safely managing the nuclear waste and used nuclear fuel from its operations for more than 40 years. OPG will be the owner, licence holder and operator of the proposed L&ILW DGR.

NWMO is an independent, not-for-profit Canadian company, formed by the nuclear utilities, with specialized expertise in the long-term management of nuclear waste. NWMO is under contract to OPG to manage the L&ILW DGR Project through the regulatory approvals process. NWMO is also, in a completely separate role, implementing Adaptive Phased Management (APM) – an approach for the long-term management of Canada's used nuclear fuel. APM will involve the construction of a deep geologic repository in an informed and willing host community in a location in Canada yet to be determined.

OPG'S L&ILW DGR AND NWMO'S APM WILL CONTINUE TO BE SEPARATE PROJECTS.

Facts about the L&ILW DGR Project:

- The L&ILW DGR is a long-term management facility for **only low and intermediate nuclear waste** from OPG-owned reactors.
- The Municipality of Kincardine passed a resolution in 2004 to request the L&ILW DGR as its preferred option for the long-term management of low and intermediate level nuclear waste based on an independent assessment study that examined several alternatives.
- An extensive regulatory process is one of several mechanisms to ensure safety of the public and the environment.
- The L&ILW DGR is consistent with OPG's long-standing record of safety excellence.
- Geoscientific Site Characterization is providing site specific information that is verifying the suitability of the Bruce nuclear site to host the L&ILW DGR.
- Construction and operation of the L&ILW DGR is fully funded by OPG.
- L&ILW DGR geoscience, safety assessment and engineering/design work programs benefit from independent peer review and oversight.

OPG'S WESTERN WASTE MANAGEMENT FACILITY (WWMF)

- OPG's WWMF, located within the Municipality of Kincardine, has safely managed low and intermediate level nuclear waste since 1974 and can continue in this role whether or not the L&ILW DGR proceeds.
- The WWMF manages all of the low and intermediate level nuclear waste from the Bruce, Pickering and Darlington generating stations. It also manages the low and intermediate level nuclear waste resulting from the previous operation of the now-shutdown Douglas Point reactors at the Bruce nuclear site.
- The WWMF also manages high level nuclear waste from Bruce Power, while Darlington and Pickering have facilities for managing their own high level nuclear waste.
- The L&ILW DGR will provide safe long-term management for all of the low and intermediate level nuclear waste currently managed at the WWMF including waste from the future operation of OPG-owned reactors.

Western Waste Management Facility

1 10 low level storage buildings
2 Waste volume reduction building
3 Transportation package maintenance building
4 In-ground intermediate level storage containers
5 Intermediate level waste quadricells
6 Western used fuel dry storage facility
7 Steam generator storage building
8 Refurbishment waste storage building
9 Low level storage building #11
10 Future low level storage building #12
11 Proposed site of L&ILW DGR

WHAT IS LOW LEVEL NUCLEAR WASTE?

Low level waste is received at the WWMF.

- Low level nuclear waste consists of common industrial items that have become contaminated with low levels of radioactivity during routine clean-up and maintenance at the nuclear generating stations.
- It includes mops, rags, paper towels, temporary floor coverings, floor sweepings, protective clothing and hardware items such as tools.
- It consists of paper, plastics, metal, rubber, cotton and other miscellaneous materials.
- Low level nuclear waste can be safely handled using normal industrial practices and equipment without any special radiation protection.

WHAT IS INTERMEDIATE LEVEL NUCLEAR WASTE?

- Intermediate level nuclear waste requires shielding to protect workers during handling.
- Intermediate level nuclear waste typically includes ion exchange resins and filters used to clean the reactors' water systems.
- Approximately 290 cubic metres of intermediate level nuclear waste is received each year at the WWMF.
- Approximately five per cent of all waste (excluding used fuel) received at the WWMF is intermediate level nuclear waste.

Intermediate level nuclear waste is inserted into an in-ground storage container at the WWMF.

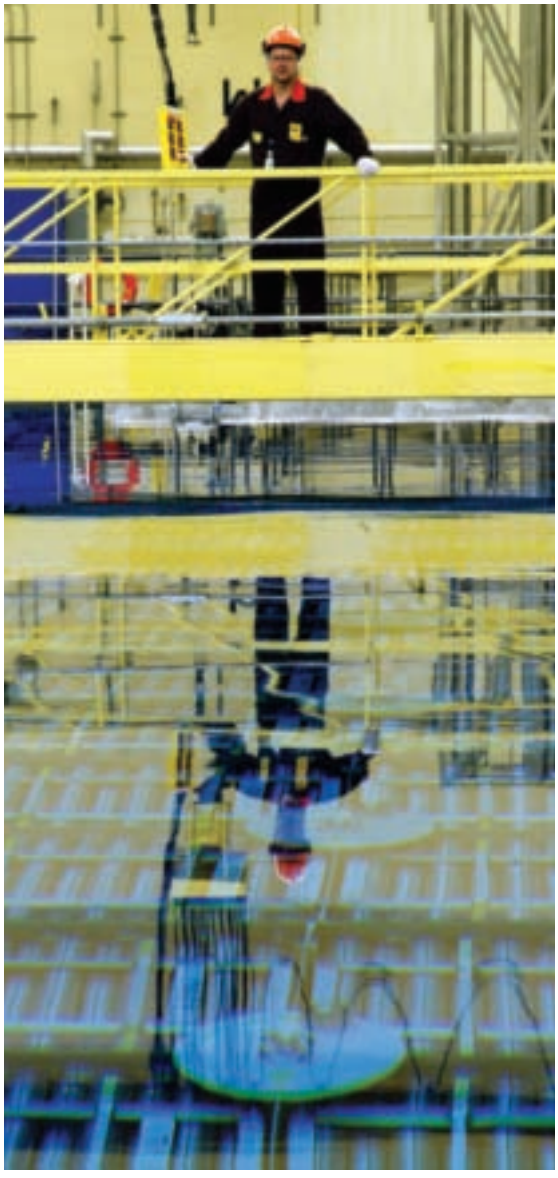
WHAT IS REFURBISHMENT NUCLEAR WASTE?

- Refurbishment waste consists of low and intermediate nuclear waste generated from the refurbishment of nuclear reactors.
- Intermediate refurbishment nuclear waste consists of irradiated core components such as pressure tubes, calandria tubes and end fittings that are safely managed in shielded containers inside a concrete refurbishment waste building.
- Low level refurbishment nuclear waste consists of steam generators that are safely managed in a concrete refurbishment waste building.

WHAT IS HIGH LEVEL NUCLEAR WASTE?

- High level nuclear waste consists of fuel bundles that have been used in the reactors to produce electricity.
- Fuel bundles spend a minimum of 10 years in large, pool-like structures filled with water, called fuel bays, before they are placed in robust dry storage containers made of steel and concrete that provide shielding.
- **Used Fuel will not be placed in the L&ILW DGR.** It is stored on an interim basis at the site where it is generated.
- The NWMO has the responsibility for implementing Adaptive Phased Management – a long-term management approach that is intended to, with collaboration, continuous learning and adaptability, lead to the construction of a geologic repository for all of Canada's used fuel.
- NWMO will seek an informed and willing community, in a location in Canada yet to be determined, to host a centralized deep geologic repository for all of Canada's used nuclear fuel.

NWMO's repository for Canada's used fuel is a separate project from OPG's L&ILW DGR.



FOR MORE INFORMATION ABOUT THE NWMO AND ADAPTIVE PHASED MANAGEMENT, PLEASE VISIT www.nwmo.ca

TRANSPORTATION OF NUCLEAR WASTE

- Low and intermediate level nuclear waste has been transported from the Pickering and Darlington generating stations to the WWMF for more than 40 years.
- Transportation of nuclear waste is regulated by the Canadian Nuclear Safety Commission (CNSC).
- No release of nuclear materials has ever occurred during transportation of the waste.
- OPG has an emergency response plan in place with highly trained responders.
- Training about the transportation of nuclear materials is provided to First Responders all along the transportation routes.
- Used fuel is NOT transported for interim storage but remains at the generating site where it was produced; Pickering, Darlington and Bruce generating stations have their own wet and dry storage facilities for used fuel.

A COMMUNITY PARTNERSHIP

In 2002, the Municipality of Kincardine and OPG signed a **Memorandum of Understanding (MOU)**. The MOU set out terms to assess the feasibility of the long-term management of low and intermediate level nuclear waste at the WWMF located within the Bruce nuclear site.

- Under the MOU, Golder Associates conducted an Independent Assessment Study, which looked at the feasibility of various long-term management options for low and intermediate level nuclear waste at the Bruce nuclear site. It also included a preliminary safety assessment, and took into account information from a study based on existing geological, groundwater and geotechnical information related to the Bruce nuclear site.

- Three options were deemed to be technically feasible, safe and without significant social, economic or environmental impacts: enhanced storage and processing, above-ground concrete vaults and deep geologic repository.

- The Independent Assessment Study compared the options and included consultation with the local community and other stakeholders.

- In 2004, Council for the Municipality of Kincardine requested, by council resolution, the L&ILW DGR over all of the other options, because of its greater safety margin.

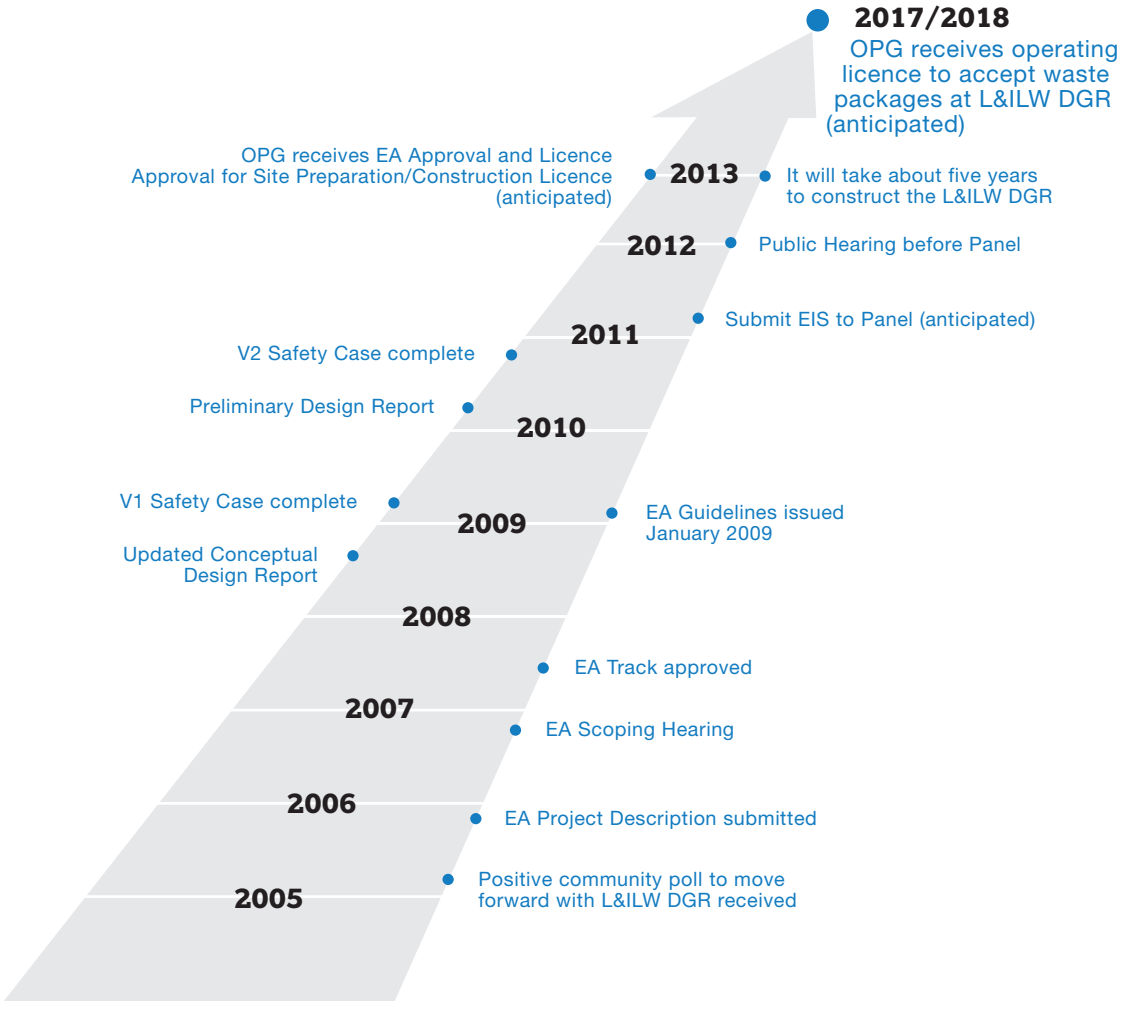
- In 2005, an independent polling of both permanent and seasonal residents was conducted in the Municipality of Kincardine, which showed a majority of residents supported moving forward with the L&ILW DGR.

HOSTING AGREEMENT

Key features

- With the support of the community, OPG will obtain regulatory approvals to construct the L&ILW DGR.
- Kincardine, Saugeen Shores, Huron-Kinloss, Arran-Elderslie and Brockton are to receive $35 million (2004 dollars, inflation protected) paid over 30 years, subject to achieving key milestones:
  – Environmental Assessment Guidelines
  – Environmental Assessment Approval
  – Construction Licence
  – Operating Licence
- The municipalities will choose how to use the funds for the benefit of their communities.
- No used nuclear fuel will be placed in the L&ILW DGR.
- Property Value Protection Plan.

PROJECT SCHEDULE AND REGULATORY PROCESS



FOR MORE INFORMATION ABOUT THE L&ILW DGR REGULATORY APPROVAL PROCESS VISIT www.nuclearsafety.gc.ca OR www.ceaa-acee.gc.ca

L&ILW DGR ENVIRONMENTAL ASSESSMENT (EA) AND LICENCING PROCESS

2005	Regulatory process to obtain a licence to construct a L&ILW DGR began with the submission of the L&ILW DGR Project Description to the Canadian Nuclear Safety Commission (CNSC) who review and approve all nuclear licencing applications. Public engagement program in support of EIS began.
2006	Geoscientific site characterization to verify site conditions began.
2007	L&ILW DGR project was referred to a Joint Review Panel under the *Canadian Environmental Assessment Act* in June by the federal Environment Minister. The Joint Review Panel process will establish a panel of three to consider both the Environmental Impact Statement (EIS) and the applications for site preparation/construction licence(s).
2008	Participant funding awarded to six parties to assist with participation in the public review of draft guidelines for EIS and Joint Review Panel Agreement. Environment minister and CNSC jointly issued draft EIS guidelines and draft Joint Review Panel Agreement in April for public review.
2009	Final guidelines and Joint Review Panel Agreement issued in January.
2010	Work completed to verify the Bruce nuclear site as a suitable location for the L&ILW DGR and to analyze any potential effects on the environment from the L&ILW DGR.
2011	Results from geoscience, engineering and design, safety assessment, environmental field work and communications will be reflected in the EIS to be submitted to the Joint Review Panel along with the Preliminary Safety Report (PSR). EIS and PSR will be available for public review.
2012	The Joint Review Panel will convene a public hearing to hear comments about the EIS from individuals and groups. The panel will make a recommendation to the Minister of Environment on the suitability of the EIS. The environment minister takes panel recommendation/report to Cabinet for the final decision.
2012+	If the EIS is accepted, and following licensing approval by the panel, construction will take about five years. OPG would then seek regulatory approval for an operating licence. The L&ILW DGR is anticipated to be operational in 2018.

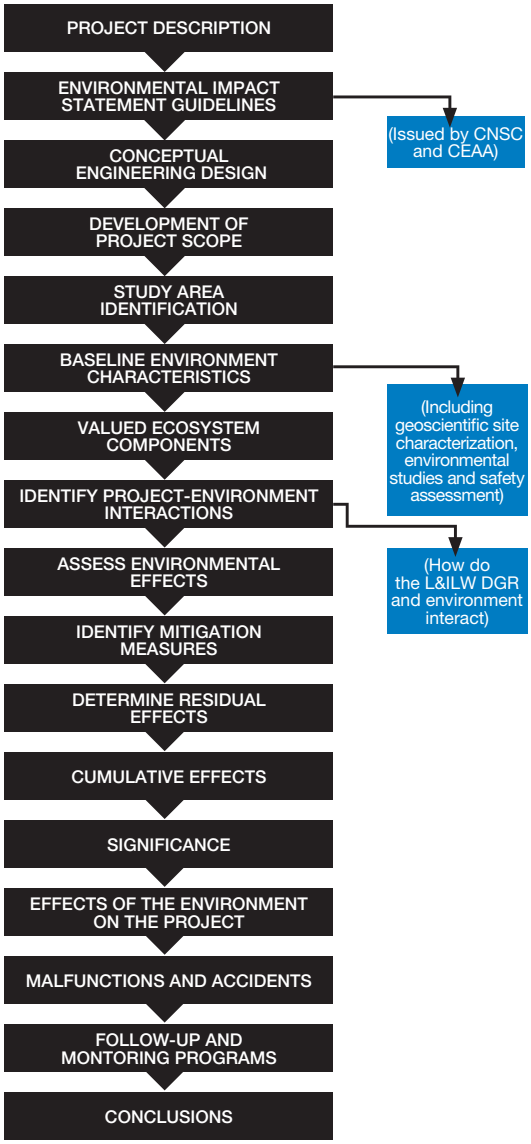
EA METHODOLOGY

Guidelines for the EA, issued by the CNSC and the Canadian Environmental Assessment Agency (CEAA), prescribe exactly what information is required to be contained within the EIS, which will be reviewed by the public and a Joint Review Panel.

The assessment of effects includes a detailed description of the project, specifying project works and activities comprising the project. This description, along with the identification of the Valued Ecosystem Components (VECs), is the basis for consideration of the potential effects of the project. The VECs were identified in the EIS Guidelines and have also been displayed and discussed with community members at L&ILW DGR Project Open Houses in 2007, 2008 and 2009.

For each project activity, the potential interactions with the various components of the environment are identified, and those interactions are carried forward for further evaluation. These interactions are then assessed for the potential for measurable change in the environment. If such potential is identified, further evaluation then takes place to determine whether the effects are adverse. If the assessment of effects indicates a potential adverse effect, mitigation measures are proposed to address the identified potential effect. Residual effects, with the mitigation in place, are then determined.

The following flow chart explains the steps taken in the development of the Environmental Assessment for the L&ILW DGR.

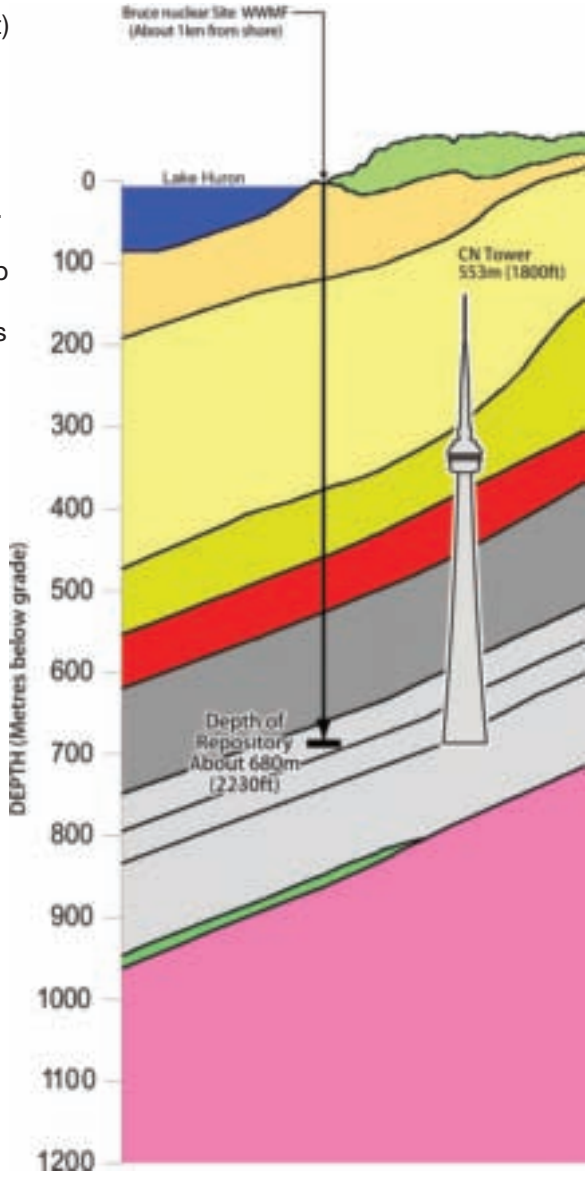


Field studies provided baseline data and were undertaken as part of the EA process for the L&ILW DGR. Studies included: light assessment, water quality sampling, sediment sampling, stream geomorphic studies (physical features of earth's surface), stream aquatic habitat study, amphibian study and surveys of burrowing crayfish, vegetation, basking turtles, breeding birds, meadow voles and the deer population. Public attitude research was also completed as part of the investigations.

OPG'S L&ILW DGR : DEEPER THAN THE CN TOWER IS TALL

Key features

- Constructed about 680 metres (2,230 feet) deep within low permeability limestone in the Cobourg Formation – deeper than the CN Tower is tall.
- Designed to isolate and contain about 200,000 cubic metres of packaged waste.
- A 200-metre-thick (660 feet) protective cap of low permeability shale directly above and low permeability limestone formations at the repository horizon provide multiple natural barriers for the safe management of the waste for many tens of thousands of years and beyond.
- At closure, shafts will be sealed with clay-based and concrete materials.



L&ILW DGR PRELIMINARY ENGINEERING DESIGN ELEMENTS

- Rock excavation will use controlled drill and blast technology.
- Main shaft (6.5-metre finished diameter) will provide personnel access and waste handling to the L&ILW DGR. The ventilation shaft (5-metre finished diameter) will provide exhaust ventilation and a secondary exit for emergency purposes.
- Surface facilities include a Main Shaft Headframe with an adjoining building for waste package receiving and staging, Ventilation Shaft Headframe and Ventilation Shaft Hoist House.
- The main shaft hoist with a capacity of 44-tonnes will move waste packages between the surface and repository levels. A separate hoist will move personnel.
- Low and intermediate level nuclear waste will be managed in separate emplacement rooms excavated in low permeability limestone.
- Underground facilities include a lunchroom, washroom, office, equipment storage area and refuge stations.
- Once filled, a group of emplacement rooms will be closed by a thick wall in adjacent access tunnel.
- The wastes are without value so there is no intent to retrieve them; however, the wastes remain retrievable. As emplacement rooms are filled and isolated, retrieval will still be possible though more difficult.

An example of a drill jumbo creating underground openings in rock.

L&ILW DGR PHASES: SITE PREPARATION, CONSTRUCTION, OPERATIONS, DECOMMISSIONING

Project Factor	Estimated Time	Estimated Work Force	Scope of Phase	Key Phase Activities
Site Preparation Phase	6 months	80 positions	Site preparation begins after receipt of licence and would include clearing about 20 hectares of the L&ILW DGR site and preparing construction laydown areas	- removal of brush and trees and excavation of topsoil for on-site storage - grading of sites including roads, laydown areas, stormwater management area, ditches - paving of roads - set-up of construction trailers and temporary services - installation and operation of fuel depot for construction equipment
Construction Phase	5 years	200 positions	Will include the construction of the surface facilities as well as excavation and construction of access ways to the repository (i.e. shafts) and underground infrastructure	- construction of permanent buildings including two headframe buildings - receipt and set-up of shaft sinking equipment - construction of crossing between WWMF and L&ILW DGR site - construction of main and vent shafts, and access tunnels and emplacement rooms - placement of excavated rock in on-site storage area
Operations Phase	35–40 years	30 positions	Operations include the receipt of waste packages from the WWMF at the staging area in the L&ILW DGR Waste Package Receiving Building and transfer to the shaft for emplacement in the repository	- receipt of disposal-ready waste packages - receipt of waste packages at base of the main shaft - offloading from elevator cage by forklift and transfer of waste packages to emplacement rooms - rail cart transfer of large packages to emplacement rooms - installation of shielding walls on full emplacement rooms - rock bolting and rock wall scaling as required - transfer, operation and maintenance of hoists - maintenance of services such as communications, ventilation and fire protection systems - period of monitoring to ensure facility is performing as expected
Decommissioning Phase	5 years	75 positions	Decommissioning, if approved following an EA, will include the removal of the surface facilities and installation of seals in each of the shafts	- concrete monolith will be installed at the base of the shafts - surface structures will be removed - shafts will be sealed

INTERIM SITE CHARACTERIZATION RESULTS

Six boreholes are positioned outside of the L&ILW DGR footprint to maintain the integrity of the proposed L&ILW DGR site

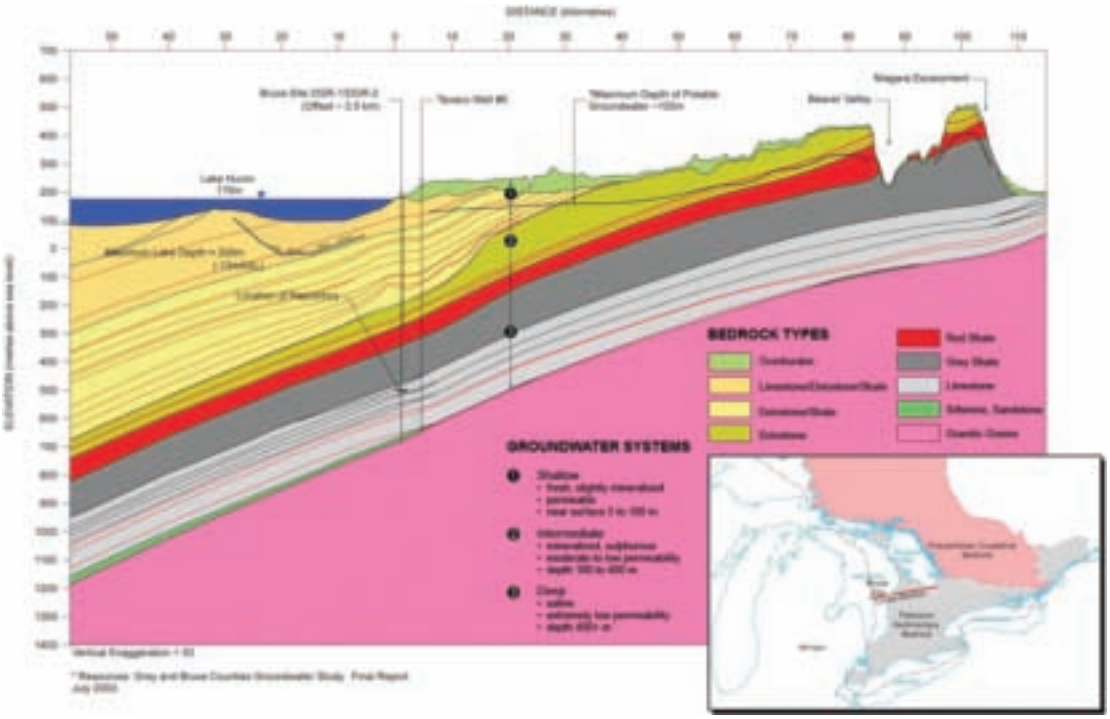
Geoscientific investigations, in support of the existing regional and historical information about the proposed site for the L&ILW DGR, have shown that the geology is:

- predictable
- geomechanically stable
- seismically quiet
- characterized by natural barriers which can isolate and contain the waste
- has low natural resource potential

GEOSCIENCE ATTRIBUTES

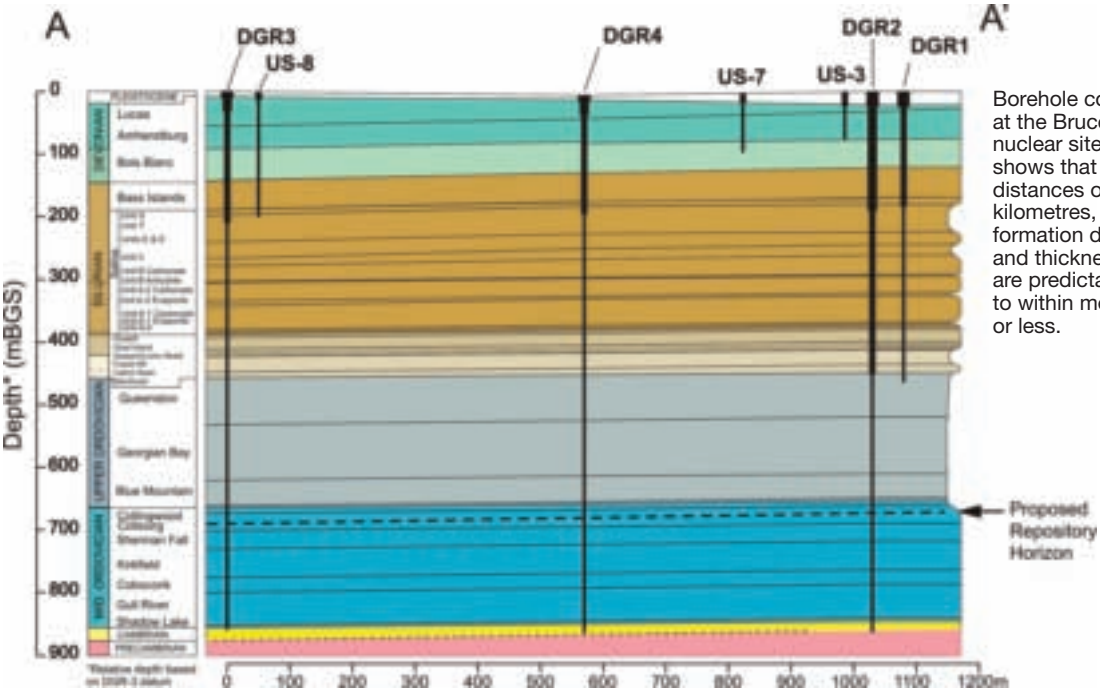
MULTIPLE NATURAL BARRIERS TO PROTECT GROUNDWATER AND SURFACE WATER

- The L&ILW DGR will be sited about 1 kilometre inland from Lake Huron.
- Potable groundwater occurring in the upper 100 metres will be isolated from the L&ILW DGR.
- The L&ILW DGR will be surrounded and overlain by multiple layers of low permeability sedimentary rock, which will provide multiple natural barriers to isolate and contain the waste.
- The only water at the repository depth is ancient and has been trapped within the rock for millions of years. This has been confirmed by a series of scientific tests including the analysis of its salt content, which is many times that of seawater.
- Lake Huron is well isolated from the L&ILW DGR by over 400 metres (1320 feet) of low permeability rock layers.



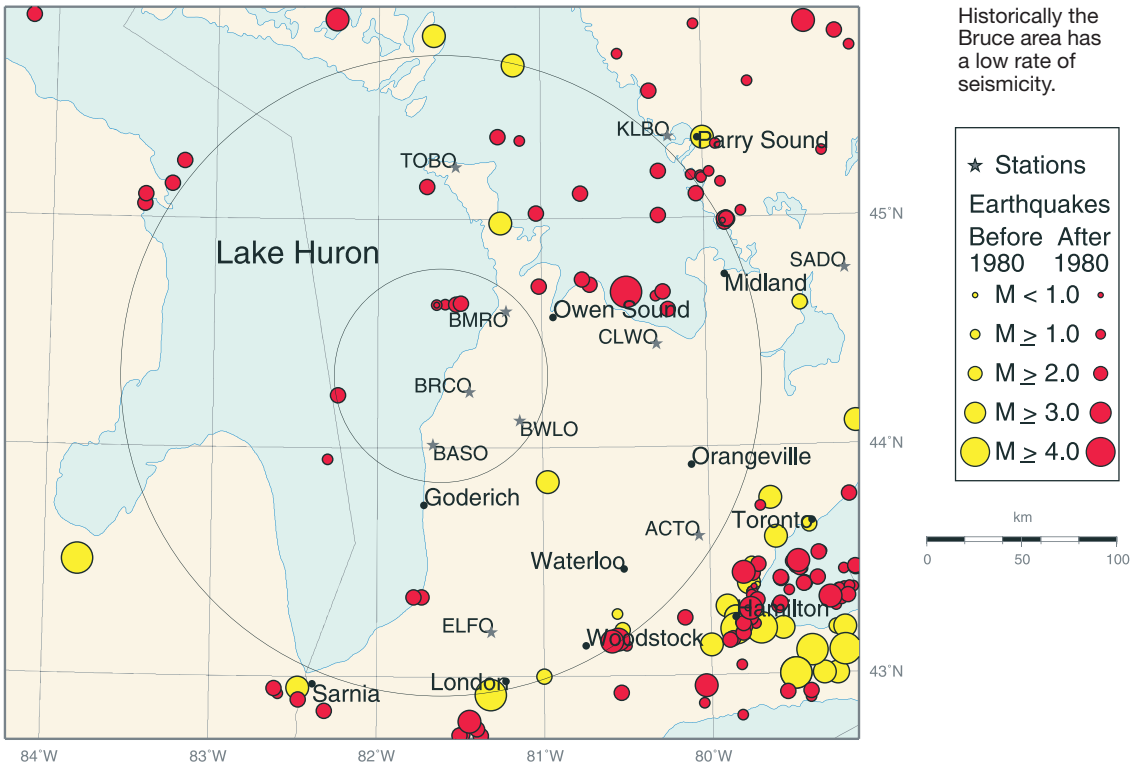
PREDICTABILITY

Examination of drill core obtained during the deep drilling program, as well as a two-dimensional seismic survey and downhole testing, have provided a basis to verify the bedrock stratigraphy beneath the Bruce nuclear site. In total, 34 individual bedrock formations, Cambrian (543 million years old) to Devonian (350 million years old) in age, exist in the 840-metre-thick sedimentary sequence underlying the site. This includes 200 metres of shale that lie above the Cobourg Formation, a clay-rich limestone that will host the proposed L&ILW DGR. Formation contacts and formation thicknesses are predictable over distances of kilometres to within metres or less. The properties of bedrock formations, including rock mass permeabilties, rock matrix porosity, mechanical strength and saline pore fluid composition, also reveal consistency at site scale.



Borehole coring at the Bruce nuclear site shows that at distances of kilometres, the formation depths and thicknesses are predictable to within metres or less.

SEISMICALLY QUIET



Southwestern Ontario and the Bruce region lie within the tectonically stable interior of the North American continent, which is a region characterized by low rates of seismicity. The historic seismicity record over 180 years shows most recorded events have magnitudes that do not exceed M5. As part of the L&ILW DGR project, a network of borehole seismographs was established in the summer of 2007 to allow monitoring of micro-seismicity (M=1) within a 50-kilometre radius of the Bruce nuclear site. Monitoring results through 2009, reported by the Geologic Survey of Canada's Canadian Hazard Information Service, continue to confirm that the Bruce nuclear site is located in a seismically quiet region.

TRANSPORT IS DIFFUSION DOMINATED

Within the bedrock formations that will host and enclose the repository, the groundwater regime appears ancient and has been resilient to external perturbations, such as glaciations, over hundreds of thousands of years. Multi-discipline evidence includes: the predictable nature and lateral extent of the thick and near-horizontally bedded sediments beneath the Bruce nuclear site, the very low rock mass permeabilities measured in the sediments, the consistent brine (300 g/L) composition of pore fluids in the low porosity rock and the distribution of environmental tracers vertically in the sedimentary column that reflect a slowly evolving groundwater system. Numerical simulations illustrate that even under cyclic glacial loading the groundwater system remains in a state in which mass transport is diffusion dominant. This is a very, very slow process and is the preferred situation for long-term waste isolation and containment.

NATURAL RESOURCE POTENTIAL IS LOW

Evaluation of published studies, historical records and the results of the deep drilling program on the Bruce nuclear site strongly suggests that viable commercial oil and gas reserves do not exist beneath or adjacent to the Bruce nuclear site. Commercially viable base metal deposits have not been identified in the study area.

GEOMECHANICALLY STABLE HOST ROCK

An assessment of the geomechanical stability of the L&ILW DGR openings both during operations and at long-term timeframes indicates that the repository will remain safe. A comprehensive set of analyses using the site-specific data reveals that the openings within the Cobourg Formation will be stable during construction and operation. At longer time frames associated with future glacial episodes and possible seismic events, the overlying and underlying formations will provide passive barriers to contain and isolate the waste.

Construction of the cooling water intake tunnel at Darlington in the Cobourg Formation provided evidence that the formation can sustain a stable, dry opening.

GEOSCIENTIFIC SITE CHARACTERIZATION

PHASE ONE

A four-year, stepwise series of scientific investigations began in 2006 to verify the ability of the geology at the Bruce nuclear site to safely isolate and contain low and intermediate level nuclear waste. Phase One included the following test programs:

- 2D seismic reflection survey to image the sedimentary bedrock layers.
- Three low-level seismographs installed at three locations within a 50-kilometre radius of the Bruce nuclear site to monitor low level seismic activity.
- Drilling and coring of vertical boreholes – DGR-1 to 463 metres and DGR-2 to 863 metres – to provide rock core samples for laboratory tests to measure physical and chemical rock properties.
- Downhole geophysical logging of boreholes with various instruments to determine the different layers (formations), rock density and porosity.
- Hydraulic borehole testing to measure permeability of bedrock formations.
- Installation of multi-level groundwater monitoring equipment to allow long-term monitoring of deep groundwater conditions.

PHASE TWO

- Phase Two of the Geoscientific Site Characterization began in April 2008 with the drilling, coring and instrumentation of two additional vertical boreholes, DGR-3 and DGR-4, at separate sites to triangulate the proposed L&ILW DGR site.
- DGR-3 and DGR-4 were drilled to about 860 metres in 2008.
- The drilling and coring of two additional steeply inclined deep boreholes, DGR-5 and DGR-6, were completed early in 2010 with further testing underway in 2010.
- Results from the boreholes provided evidence as to the nature and predictability of the stratigraphic, geochemical and hydrogeologic properties of horizontally-layered limestone and shale rock formations.

Above: Inclined drilling verifies the nature of vertical bedrock structure and its effect on L&ILW DGR implementation.

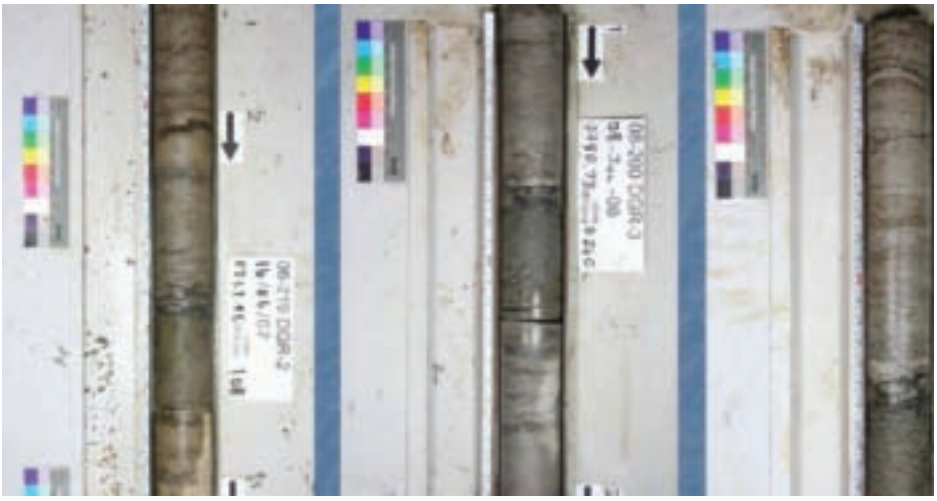
Right: Data from the drilling program supports the original understanding of the geologic attributes beneath the Bruce nuclear site.

BOREHOLE DRILLING, TESTING AND MONITORING

About 1,200 core samples from six deep boreholes have been sent to labs in Canada and internationally to undergo a variety of tests including geomechanical strength, density, geochemical analysis and porosity.

Far left:
Hydraulic testing utilizes specialized equipment to measure the very low permeabilities of the rock layers.

Left:
The installation of multi-level groundwater monitoring systems provides baseline data on existing groundwater systems.



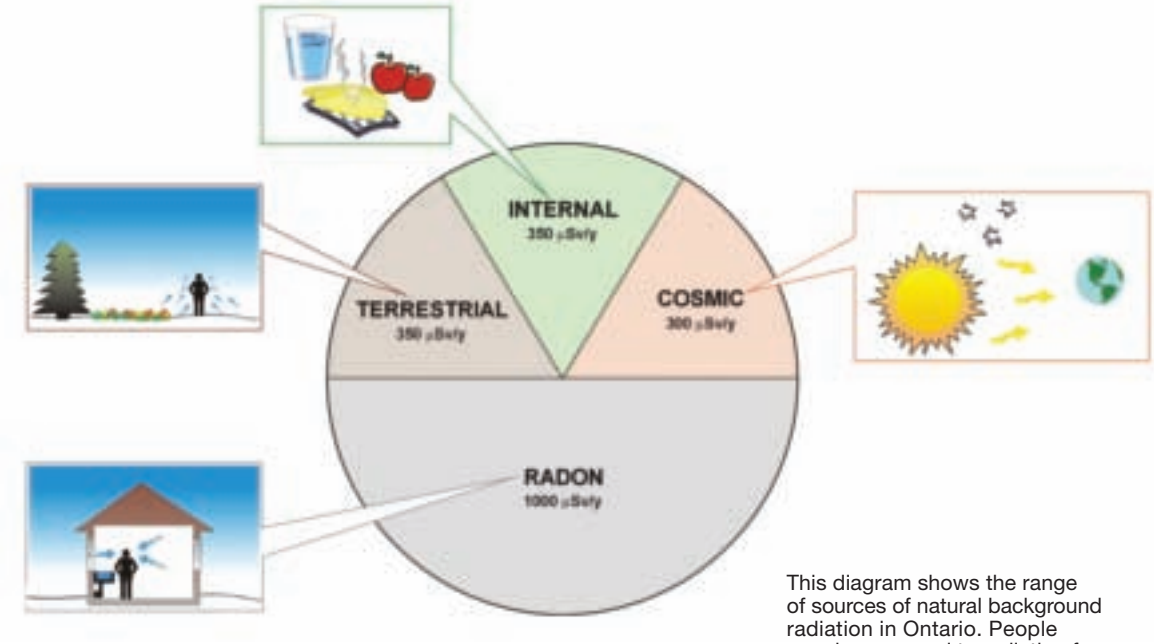
The layer of Bentonite found in core samples from three different boreholes speaks to the consistency of the geologic layers.

Far left: Samples of tiny bits of moisture called pore water, taken from 680 metres, reveal a salinity content that is about nine times that of seawater, which is reflective of the water's long residence time in the rock formations.

Left: Geologists meet to review formation depths in L&ILW DGR boreholes.

RADIATION SAFETY BACKGROUND

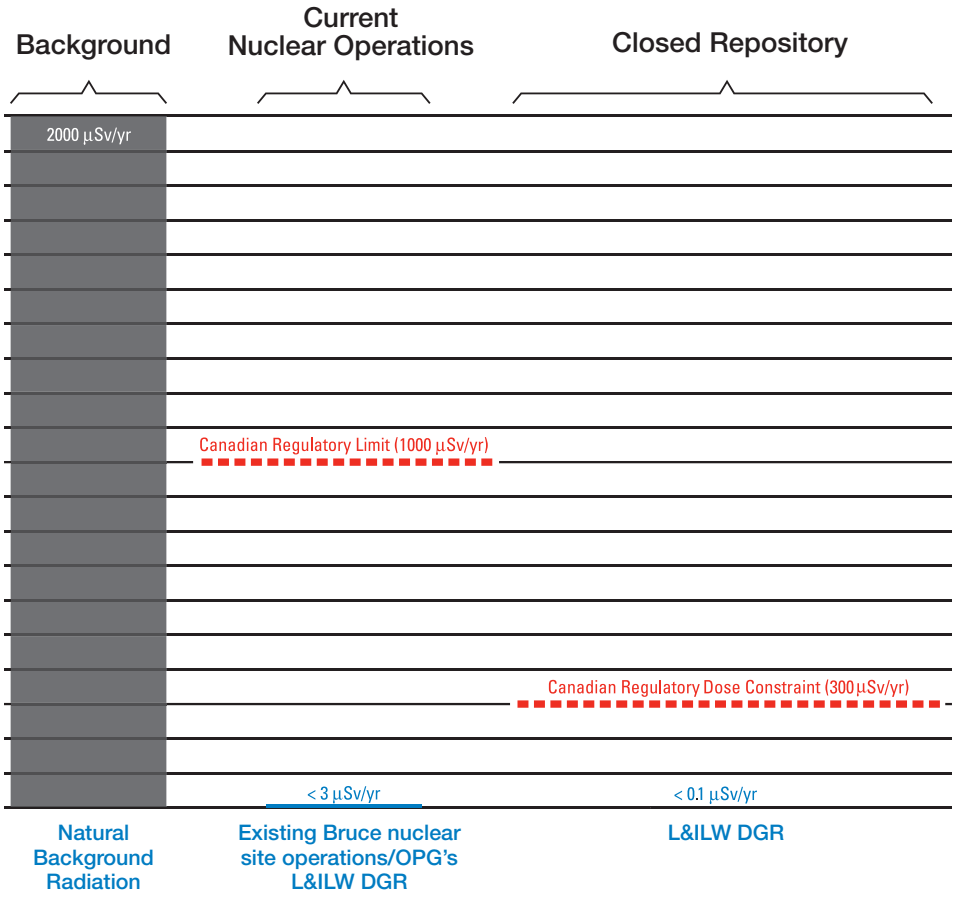
- A sievert is the unit of measure that describes the amount of ionizing radiation received by people. Dose is often expressed in millionths of a Sievert, or microSievert (μSv).
- Natural background radiation averages about 2000 microSieverts per year. This represents the amount of radiation dose that the average person in Canada receives each year from all natural sources.
- Examples of radiation doses from common sources include: standard dental x-rays at 2 – 20 microSieverts, transcontinental flight from Toronto to London at 50 microSieverts, and chest x-rays at 60 – 140 microSieverts depending on the type of x-ray.
- The dose rate to the public from all of the Bruce nuclear site activities, if they lived at the site boundary, would be less than 3 microSieverts per year. Dose rate to the public, living at the site boundary, from the WWMF is less than 0.1 microSieverts per year.



This diagram shows the range of sources of natural background radiation in Ontario. People are also exposed to radiation from human activities such as medical examinations and power generation.

PRELIMINARY SAFETY ASSESSMENT

- The safety assessment of the L&ILW DGR is being completed by a team led by Quintessa Limited, a consulting firm based in the United Kingdom, which specializes in safety assessment of nuclear waste management facilities.
- This chart shows the dose rate estimates for the L&ILW DGR. Maximum estimated doses to humans are well below the international standards and natural background levels.



EVALUATING L&ILW DGR SAFETY

Safety Case Elements

The safety case is based on the geologic site and waste characteristics including:

- The repository will be isolated from surface waters by its depth of about 680 metres.
- There are multiple layers of low permeability rock above the repository.
- The rock formations are 450 million years old. They have remained stable through tectonic events and climate changes during this period, including several ice ages within the past one million years. These rocks are expected to remain stable for at least the next few million years.
- The area is seismically quiet. Large magnitude earthquakes are unlikely and would have little to no impact on the L&ILW DGR.
- The properties of the deep bedrock limit the rate of contaminant movement through the rock to very slow rates.
- Most of the waste volume contains primarily shorter-lived radionuclides, and the radioactivity decreases with time.
- Almost all the radioactivity would decay within or near the repository.

The safety assessment for the L&ILW DGR:

- Analyzes the facility behaviour under normal and accident conditions.
- Quantifies potential impacts on the public and workers.
- Compares the potential impacts with regulatory criteria.

NWMO engineers review a report on L&ILW DGR safety.

INTERIM SAFETY ASSESSMENT RESULTS

OPERATIONAL (PRECLOSURE)

Preclosure covers the start of operations to the closure of the facility with the focus on radiological safety during the handling and storage of low and intermediate level waste packages under normal operations and accident conditions.

Preliminary Results:

- Based on experience from the WWMF operations, small amounts of tritium and carbon-14 are expected to be released from the L&ILW DGR under normal operating conditions, dropping to zero as the L&ILW DGR is decommissioned.
- Public impact is negligible – similar to WWMF (emissions are less than 0.1 per cent of the regulatory limit).
- Accident scenarios including breach of waste package and fire were considered and the preliminary analyses indicate that any radioactivity released from above or below ground accidents is low and will not impact members of the public.

Examples of Safety Features:

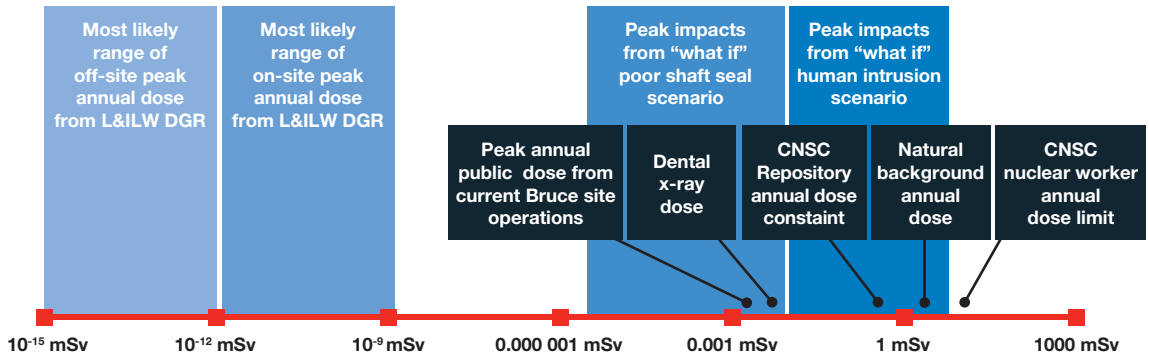
- Waste packages will meet the L&ILW DGR waste acceptance criteria; for example, no surface contamination.
- The intermediate level nuclear waste will be in robust, concrete-and-steel packages.
- The L&ILW DGR will be close to the WWMF, so waste packages do not need to be moved off the Bruce nuclear site.
- All underground construction will be completed prior to the start of waste emplacement.
- The shaft hoist is based on a proven reliable multi-rope Koepe drum design.
- Combustible materials and ignition sources will be minimized.
- Emergency response system includes fire detection and suppression, two shaft exits and underground safety refuge stations.

LONG-TERM (POSTCLOSURE)

The Postclosure Safety Assessment addresses the safety of the repository after the underground facilities have been closed and sealed. It assesses a range of likely and unlikely future outcomes and scenarios through the use of site-specific data and computer modelling to quantify specific outcomes under various scenarios.

Preliminary Results:

- Preliminary safety assessment results indicate there would be little or no impact from the repository in any of these scenarios – low to extremely low dose rates well below regulatory limits.



Interim Safety Assessement calculated impacts where mSv = milliSievert, one thousandth of a Sievert

INTERNATIONAL EXPERIENCE WITH REPOSITORIES

L&ILW DGR IS CONSISTENT WITH INTERNATIONAL BEST PRACTICES

The L&ILW DGR Project has benefited from first-hand visits to long-term management facilities, including those in countries such as Sweden, Finland and the United States. Information learned about surface facilities, repository access, hoisting, lay-out and material handling is being utilized in the design of the L&ILW DGR. Such international collaboration is extremely beneficial in terms of experience, the exchange and analysis of reports, and visits with key personnel.

L&ILW DGR technology is used internationally:

- The Forsmark facility in Sweden opened in 1988 and is located at the Forsmark nuclear power station site. The Swedish underground repository was excavated to a depth of 60 metres in crystalline rock below the bottom of the Baltic Sea.
- The Olkiluoto (VLJ) facility in Finland began operation in 1992 and was excavated to a depth of 70 to 100 metres underground in crystalline rock. It is located near the Olkiluoto nuclear power station.
- The Waste Isolation Pilot Plant (WIPP) located in New Mexico, United States is excavated to a depth of 600 metres in a bedded salt formation and has been operating safely since 1999.

Far Left: Sweden's Forsmark Repository.

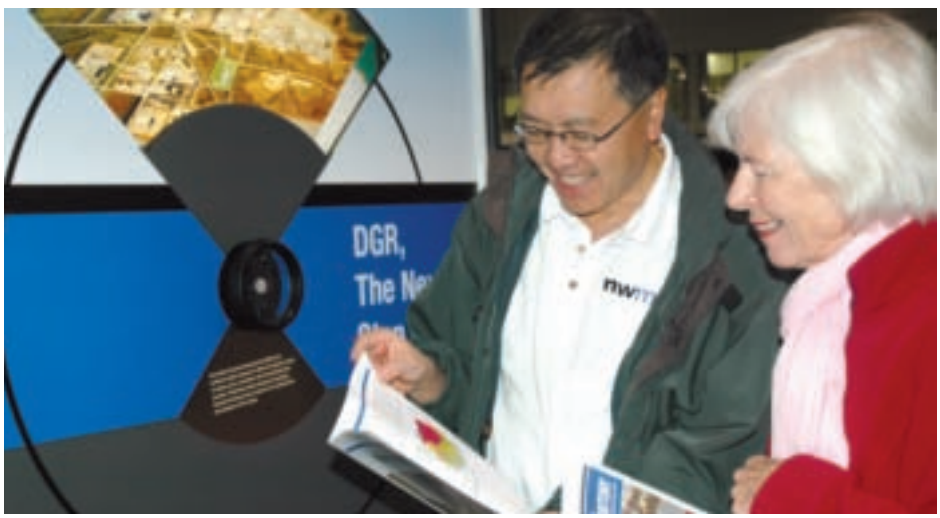
Left: Waste Isolation Pilot Plant in New Mexico.

KEEPING YOU INFORMED

Consultation with the public has continued throughout the six to eight year regulatory process at an intense level through newsletters and publications, open houses, website, speaking engagements, attendance at public events with mobile exhibit, briefings with key stakeholders including municipal, provincial and federal politicians, and media.

Consultation with Aboriginal Peoples

- A Protocol agreement, signed by Saugeen Ojibway Nations (SON), OPG and NWMO in 2009, provides a framework for SON's participation in the regulatory approval process for the L&ILW DGR project.
- Discussions with the Historic Saugeen Métis and the Métis Nation of Ontario are underway for the proposed L&ILW DGR project to facilitate their participation in the regulatory approval process.



Above: Members of the Historic Saugeen Métis learn more about the proposed L&ILW DGR as they examine core samples taken as part of the geoscientific site characterization

Left: The regulatory process provides many opportunities for public engagement and comment

For more information please visit **www.nwmo.ca/dgr**