OPG's DEEP GEOLOGIC REPOSITORY PROJECT

For Low & Intermediate Level Waste

Keeping You Informed

September 2010

PRELIMINARY RESULTS OF EA ARE AVAILABLE FOR PUBLIC DISCUSSION

NWMO to host open houses to discuss environmental assessment

Ontario Power Generation (OPG)'s proposed Deep Geologic Repository (DGR) Project for the long-term management of low and intermediate level nuclear waste (L&ILW) at the Bruce nuclear site is the subject of an environmental assessment (EA) process, which began late in 2005 with the submission of the project description. After more than four years of investigations, studies and analyses, preliminary results of the assessment of the effects of the DGR Project on the environment are being presented to the public for discussion.

In summary, the potential residual effects identified include:

- Small increase in air emissions at Bruce nuclear site during all DGR project phases;
- Increase in noise levels during site preparation, construction and decommissioning;
- Loss of some Eastern White Cedar trees on DGR project site;
- Reduced flow in the north railway ditch;
- Increase in quantity of stormwater flow at the Interconnecting Road on the Bruce nuclear site;

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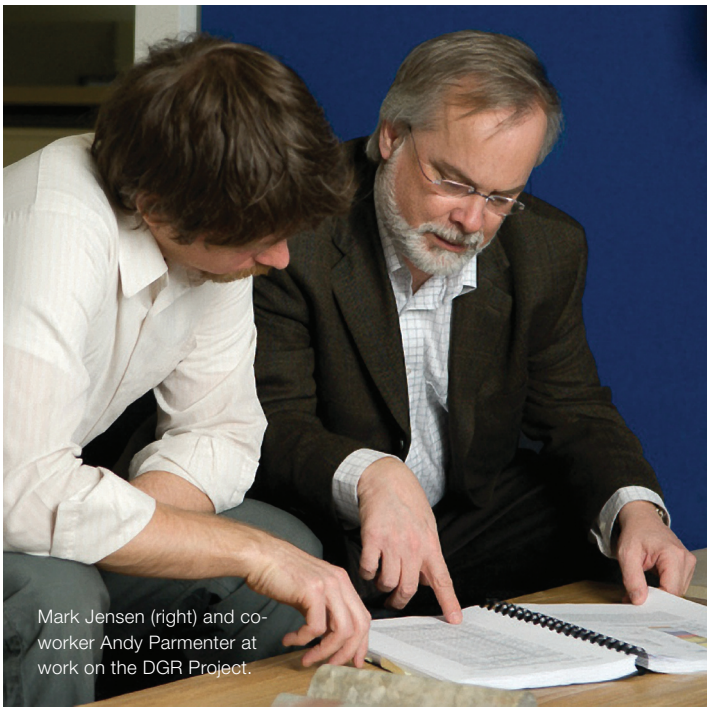
DGR EXHIBIT MAKES THE ROUND OF SUMMER EVENTS

Summer engagement activities for the DGR mobile exhibit included the Kincardine Scottish Festival where this future heavy events participant checked his form with a piece of limestone core taken from beneath the Bruce nuclear site.

FOUR-YEAR INVESTIGATION OF GEOLOGY BENEATH THE BRUCE NUCLEAR SITE FOR DGR SUCCESSFULLY COMPLETED

The field studies for the geoscientific site characterisation of Ontario Power Generation (OPG)'s proposed Deep Geologic Repository (DGR) Project for low and intermediate level waste (L&ILW) were completed at the end of June. Mark Jensen, Director of Low and Intermediate Level Waste Repository Geoscience for NWMO, discusses the results of the four-year program designed to verify the suitability of the geology beneath the Bruce nuclear site to safely isolate and contain low and intermediate level nuclear waste.



Mark Jensen (right) and co-worker Andy Parmenter at work on the DGR Project.

Q: Why is geology so important to the safety case for OPG's proposed DGR for L&ILW?

A: The geologic conditions beneath the Bruce nuclear site must be able to provide a stable and secure environment to prevent impacts on surface and groundwater resources. The geologic column of sedimentary rock beneath the site is approximately 840 metres thick and comprises 34 near horizontally-layered bedrock formations. As envisioned, the repository would be constructed within the clay-rich Ordovician age (450 million-year-old) limestone Cobourg Formation at a depth of approximately 680 metres. A 200-metre-thick layer of low permeability shale provides a protective cap directly above the DGR horizon, which is enclosed with low permeability limestone layers. Together, the low permeability limestone and shale layers provide multiple natural barriers to safely isolate and contain the L&ILW. In fact, the permeability of the bedrock layers is so low that contaminants would move very slowly in the subsurface – a situation that appears to have existed for geologic periods of time despite past glacial and geologic events. The geotechnical properties of the Cobourg Formation are favorable for excavation and it must be noted that the DGR will be located in an area of low seismic activity (see story on page four). Combined, the attributes of the geology beneath the Bruce nuclear site contribute to the understanding and assurance of long-term DGR safety.

Q: From a geologic point of view, why was the Bruce nuclear site chosen for further investigation as a site for the DGR?

A: The decision to conduct further investigations of the Bruce nuclear site as a future host for the DGR was made on the basis of existing historical and regional information about the Bruce area and Southwestern Ontario as well as the consensus of a body of Canadian and international geoscientists.

An initial Geotechnical Feasibility Study was conducted in the fall of 2002 by Golder Associates, which provided evidence from past exploratory oil and gas drilling in the Bruce region and elsewhere in the province. This study supported an understanding of the suitability of the Ordovician age (450 million-year-old) bedrock formations beneath the Bruce nuclear site to isolate and contain L&ILW.

A second review was conducted by the University of Bern, Switzerland in 2004 that looked more broadly at the sedimentary rock formations in Southwestern Ontario. The studies utilized an approach to document and prioritize a list of geoscience/characteristics called FEPCAT (Features, Events, Processes Catalogue) based on decades of international geoscience research in the area of nuclear waste management. It identified the geology of southern Ontario as promising for nuclear waste management purposes.

The geologic setting at the Bruce nuclear site consistently demonstrated favourable attributes necessary for the

long-term management of nuclear waste. The information available before site-specific investigations began, allowed for the development of a conceptual model of the site's geology, which served as a basis to develop and implement the site characterisation program.

Q: What was done to ensure and verify that the geology beneath the Bruce nuclear site will safely isolate and contain L&ILW for tens of thousands of years and beyond?

A: The Geoscience program was conducted as a four-year, stepwise program that was designed, under the guidance of the International Geoscience Review Group (four geoscientists with extensive experience in international nuclear waste management programs who provided peer review and oversight), to answer specific questions, or tenets, regarding the suitability of the Bruce nuclear site to host the proposed DGR. Questions were posed about the stability and predictability of the sediments beneath the site, the ability of the bedrock formations to protect water resources and prevent environmental impacts, the potential for the occurrence of natural resources that might lead to future exploration, seismic activity and the ability of the geology to allow for the safe excavation of openings in the bedrock to implement the DGR.

The Geoscientific Site Characterisation Plan addressed these and other issues. This program described coordinated activities such as deep drilling, borehole and laboratory testing and borehole instrumentation, which were designed to test the conceptual understanding of the geology underlying the Bruce nuclear site.

The work program conducted to date has seen the successful completion of six deep boreholes that intersected more than 4.7 km of sedimentary rock and obtained more than 3.8 km of rock core from beneath the site. The field and laboratory testing was conducted under a quality assurance program and has involved a variety of Canadian and International groups selected because of specialized skills.

Q: After almost four years of geoscientific investigations at the Bruce nuclear site, what can you tell us about the geology as it relates to the safety case for the DGR?

A: Site characterisation activities at the Bruce nuclear site began in fall 2006. The field work for the geoscientific site characterisation was completed by the end of June 2010. The results from the laboratory and field testing are favorable and provide strong evidence that the DGR concept can be safely implemented. The sedimentary sequence beneath the Bruce nuclear site is 840 metres thick and is comprised of 34 bedrock formations that range in age from 543 million years (Cambrian) to 385 million years (Devonian). The depth, thickness and orientation of these bedrock layers show remarkable consistency across the site – with formation contacts predictable to within metres or less at distances of more than a kilometre. At the repository horizon the bedrock formations have extremely low permeabilities and the pore fluids are extremely saline – many times more saline than seawater – indicative of an ancient groundwater system, which isn't mixing with the drinking water found in the upper 100 metres. The mechanical strength of the rock, particularly within the limestone Cobourg Formation in which the proposed DGR would be excavated, exceeds that understood from regional investigations at the onset of site investigations. The installation of seismography and monitoring of micro-seismicity is proving consistent with the region's assigned low seismic hazard rating.

The site-specific data set, perhaps the best gathered in Canada in such low permeability rocks, is providing strong evidence that the bedrock formations proposed to host and enclose the repository are stable and have remained so for geologic periods of time. Perhaps most important now is that we have the necessary site information to confirm the ability of the sedimentary bedrock formations to isolate and contain the L&ILW nuclear waste for time periods of 100,000 years and beyond. This information strongly supports the DGR safety case in terms of the existence of multiple natural barriers, a stable groundwater system over periods of geologic time and a resilient deep groundwater regime in which contaminant transport would occur at extremely slow rates preventing impact to surface or groundwater resources.

Q: How has the DGR benefited from international expertise and best practices?

A: The investigation of sedimentary rocks, such as those at Bruce nuclear site, for long-term radioactive waste management purposes has been on-going internationally for more than a decade. The experience gained and lessons learned from this have been of significant benefit to the DGR Project. For example, with respect to characterisation studies we've been able to apply tried and tested techniques from many international programs, including:

- specialized hydraulic borehole testing methods for low permeability sediments developed by Sandia National Laboratories during the licensing of the Waste Isolation Pilot Plant in New Mexico;
- laboratory techniques to characterize the chemistry of pore fluids within the rock core samples obtained during drilling developed at the University of Bern, Switzerland, for the French and Swiss programs in the Callovo-Oxfordian and Opalinus shale formations; and
- techniques to estimate the diffusive properties of limestone and shale developed at the Paul Scherrer Institute in Switzerland.

The DGR Project has also benefitted from collaborative international research in areas such contaminant mobility, sub-surface excavation and rock mass response, and glacial ice-sheet erosion rates to mention a few examples. While Canadian geoscientists have played a principal role in the Bruce nuclear site investigations, the ability to access international expertise and experience has made important contributions to the success of the DGR site characterisation and Geosynthesis work programs.

EA conducted in a thorough, traceable, stepwise manner

(continued from page 1)

- Loss of some habitat quantity and quality for Redbelly Dace, Creek Chub, Burrowing Crayfish and Variable Leaf Pondweed;
- Air and noise emissions may result in a temporary loss of enjoyment of property for those in near proximity to the DGR Project during construction and decommissioning; and
- Positive socio-economic effects for the local and regional areas because of an increase in employment, income, business activity, and municipal revenue during all of the phases.

Residual effects, after further evaluation, were not considered significant.

These results were arrived at through the application of a thorough, traceable, step-wise assessment process. Potential interactions between the DGR Project and the environment were assessed and screened for measurable change on the environment and adverse effects on the Valued Ecosystem Component (VEC)s – components of the environment which are valued or sensitive and have the potential to be affected by the DGR Project. VECs are identified by scientists, the regulator, the proponent and the public. Where necessary, mitigation measures were proposed to reduce or eliminate an adverse effect and the effect was then reassessed with mitigation in place. For example, in the case of the increase in dust and vehicle emission levels at the Bruce nuclear site, proposed mitigation will include the implementation of dust control measures and quality maintenance practices to ensure transportation and vehicle equipment are in good condition. Residual adverse effects (those that would remain after reasonable mitigation measures were put in place) were assessed relative to a number of criteria including length of effect, geographic extent of effect and reversibility of effect to determine whether or not the residual effect was significant.

Monitoring programs are proposed to verify the predictions made in the assessment and to confirm whether mitigation measures were effective. For example, ambient monitoring of air quality will take place during construction of the DGR and air quality monitoring for the DGR's ventilation system will take place during operations to ensure there aren't any adverse effects from the DGR Project on air.

Possible effects on the environment as a result of the DGR Project were looked at in conjunction with other projects to see if there were any potential cumulative effects; no cumulative effects were identified.

Detailed information about the Preliminary Results for the DGR Project will be available at the series of fall open houses listed below:

DATE	LOCATION	TIME
September 27, 2010	Colonial Motel, 235 Goderich Street, Port Elgin	4:00 – 8:00 pm
September 28, 2010	Ripley Huron Community Centre, 17 Queen Street, Ripley	4:00 – 8:00 pm
September 29, 2010	Best Western Governor's Inn, 791 Durham Street, Kincardine	4:00 – 8:00 pm
September 30, 2010	Victoria Jubilee Hall, 111 Jackson Street S, Walkerton	4:00 – 8:00 pm
October 4, 2010	Chesley Fire Hall, Bruce Rd. 10, (North end of Chesley)	4:00 – 8:00 pm
October 5, 2010	Bayshore Community Centre, 1900 3rd Avenue E, Owen Sound	4:00 – 8:00 pm
October 6, 2010	County of Bruce, Public Library Building, 578 Brown Street, Wiarton	4:00 – 8:00 pm

EARTHQUAKES WILL NOT IMPACT LONG-TERM SAFETY OF DGR

One of the most frequently asked questions about Ontario Power Generation (OPG)'s proposed Deep Geologic Repository (DGR) Project for the long-term management of low and intermediate level nuclear waste (L&ILW) is "What about earthquakes?" A 5.0 Magnitude earthquake on June 23, which originated about 56 kilometres north of Ottawa added even more interest to the discussion. Given the recent profile of seismicity in the media, here are some key facts:

- Southwestern Ontario and, in particular, the Bruce region are located within an area characterized by low levels of seismicity;
- Historic seismicity records show that in over 180 years of observation there have been no recorded earthquakes in the Bruce region with a magnitude greater than five;
- The network of three seismographs established in 2007 within a 50-kilometre radius of the Bruce nuclear site to monitor low-level seismicity continues to confirm the site is located in a seismically quiet region;
- A Seismic Hazard Assessment of the Bruce nuclear site, as part of the site characterisation for the DGR, considered the influence of earthquakes on the site ranging from 5.25 – 7.5 Magnitude. The assessment concluded that earthquakes will not impact the safe operation or long-term ability of the DGR to safely isolate and contain the L&ILW.

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ONTARIO POWER GENERATION

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