OPG's Deep Geologic Repository for Low and Intermediate Level Radioactive Waste: Recent Progress

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Frank King
Director
Repository Development and Safety

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OPG's Nuclear Waste – LLW

- Wastes from 20 reactors on 3 sites
- Includes contaminated clothing, rags, plastic, mops, tools, paper, etc.
- Low activity
- 5,000-6,000 m^3 generated per year
- Compaction/incineration
- 2,000-3,000 m^3 stored per year
- Currently 60,000 m^3 in storage

OPG's Nuclear Waste – ILW

- Includes contaminated resins, filters, reactor core components, etc.
- Higher activity, longer lived
- 200 m^3 generated per year
- Currently 8,500 m^3 in storage

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OPG's Western Waste Management Facility

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Deep Geologic Repository Project Past Activities

April 2002:	Memorandum of Agreement signed with Municipality of Kincardine, host for the Bruce Nuclear Site
April 2004:	Study of Options for long-term management of OPG's L&IL waste at the Bruce Nuclear Site completed
April 2004:	Community Council selects Deep Geologic Repository (DGR) option
October 2004:	DGR Hosting Agreement signed
January 2005:	Community Poll taken

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L&IL Waste Options Study

- Joint study with community started Fall 2002
- Considered three options:
  - Enhanced processing and long-term storage
  - Near-surface concrete vault disposal facility
  - Deep geologic repository
- Involved engineering, safety and socio-economic studies, international visits, and public consultation activities
- In April 2004 Municipal Council passed a resolution endorsing the Deep Geologic Repository as its preferred option, based on safety considerations

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Community Hosting Agreement

- Negotiated in the period May-October 2004
- Features:
  - Community support for construction of Deep Geologic Repository for OPG's L&IL Waste (no used reactor fuel)
  - Payments to Municipality of Kincardine and adjacent communities totaling $35M Cdn ($30M US) over 30 years (amount increases if new reactors built)
  - Provision for new jobs
  - Property value protection plan
- Conditional on positive community poll

Hosting Agreement – Community Consultation

- November 2004 until start of community polling
- Opened storefront on main street of Kincardine, 3 days/wk, staffed by OPG and Kincardine (usually mayor or councillor)
- Ads in local newspapers
- Brochures mailed to all households in Kincardine
- Presentations to councils of surrounding communities
- Presentations to MPs, MPPs
- Presentations to interested organizations

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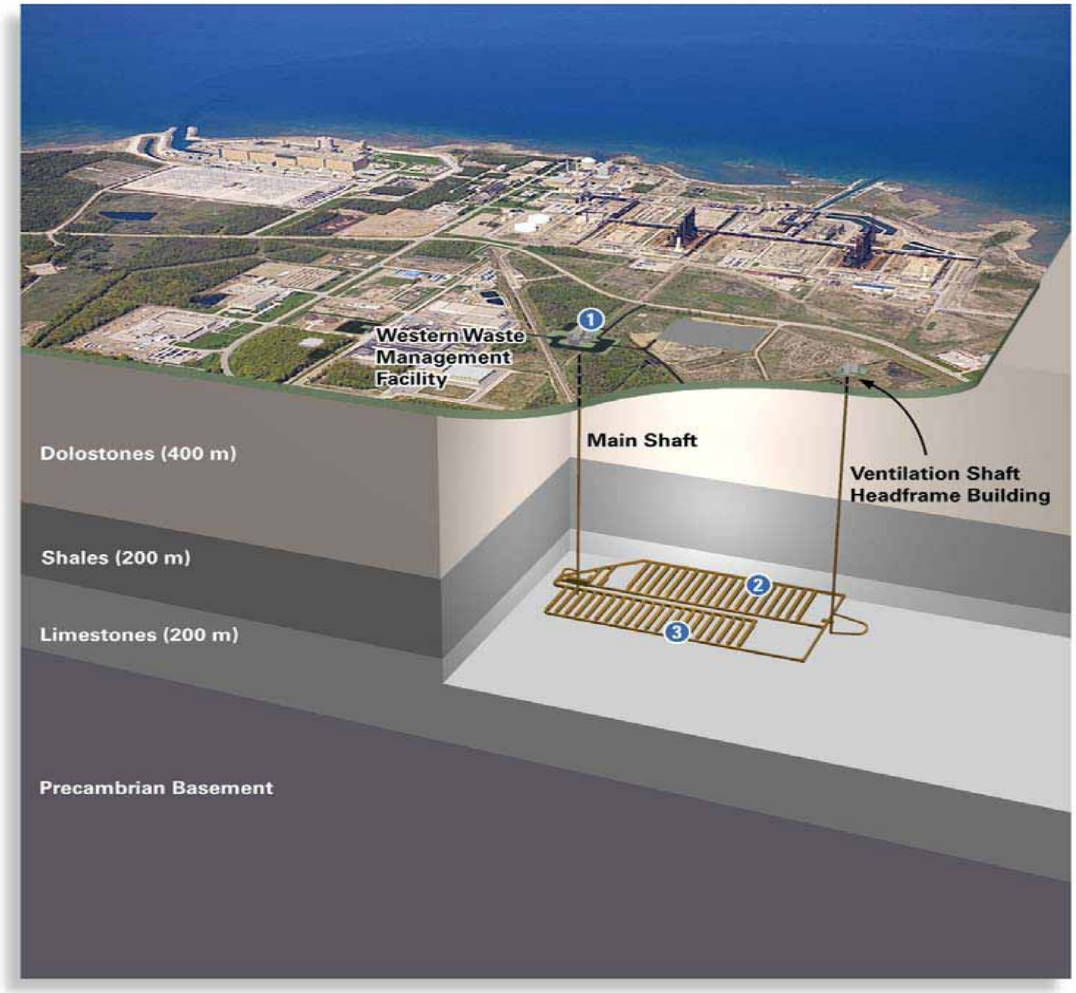
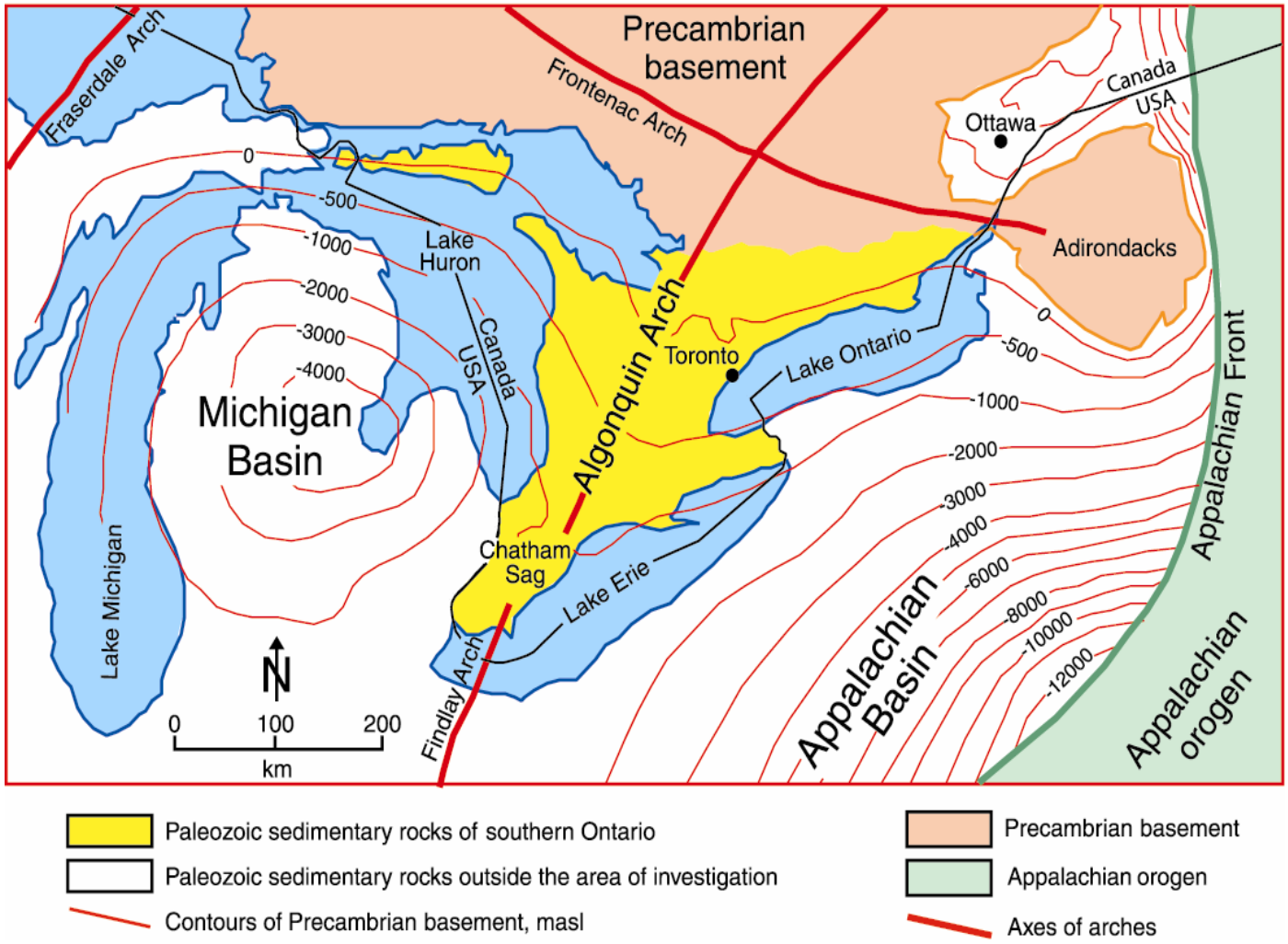
Community Poll

- Held January 2005
- Every household in the Municipality of Kincardine was phoned and everyone 18 years old and older was asked if they supported the Deep Geologic Repository proposal
- Seasonal residents were sent mail ballots
- Result was:
  - 60% Yes
  - 22% No
  - 13% Neutral, 5% Don't know/No Answer
- 72% of eligible residents participated

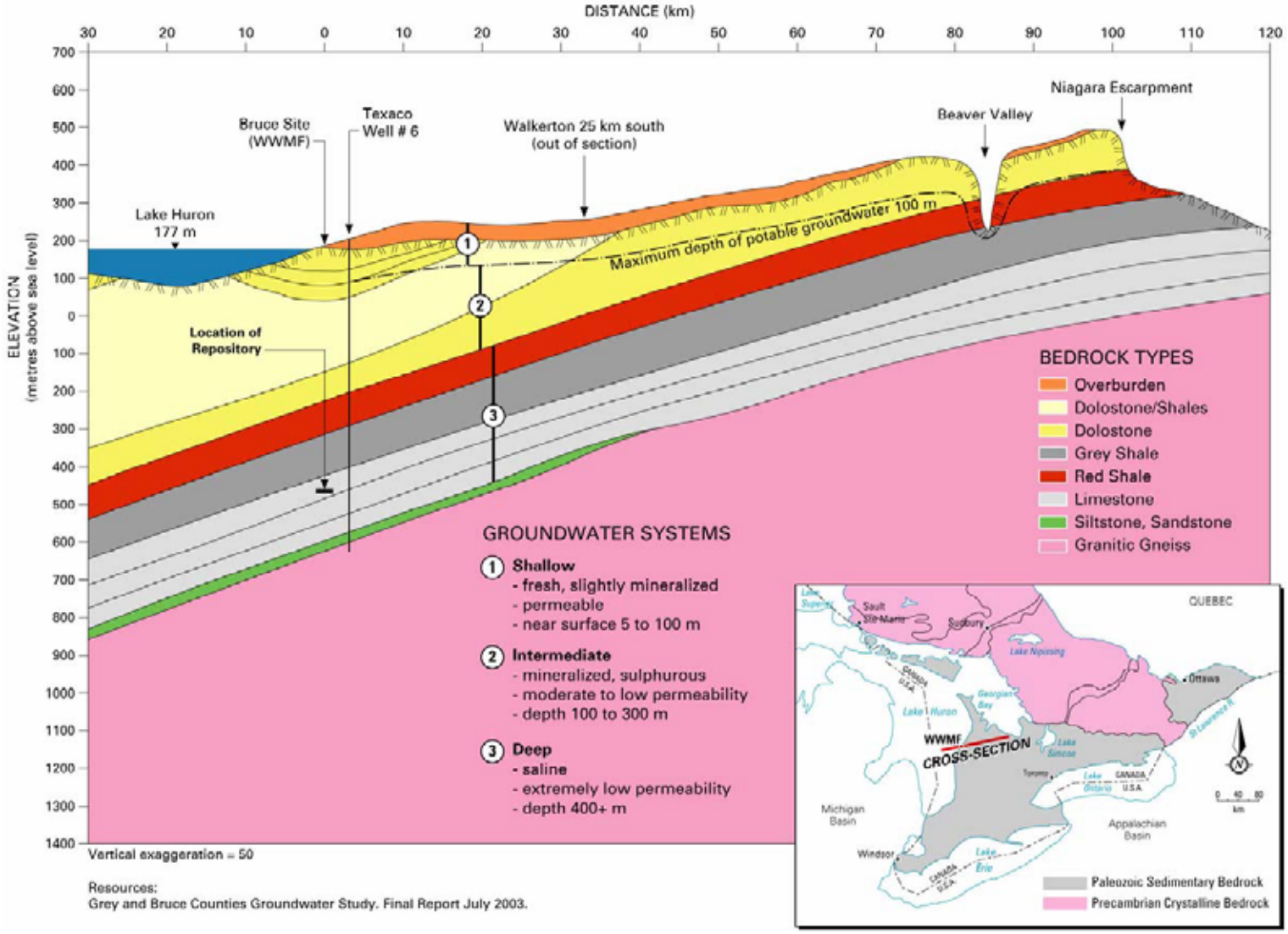
Proposed Deep Geologic Repository



Geologic Setting



Geologic Setting



Resources:
Grey and Bruce Counties Groundwater Study. Final Report July 2003.

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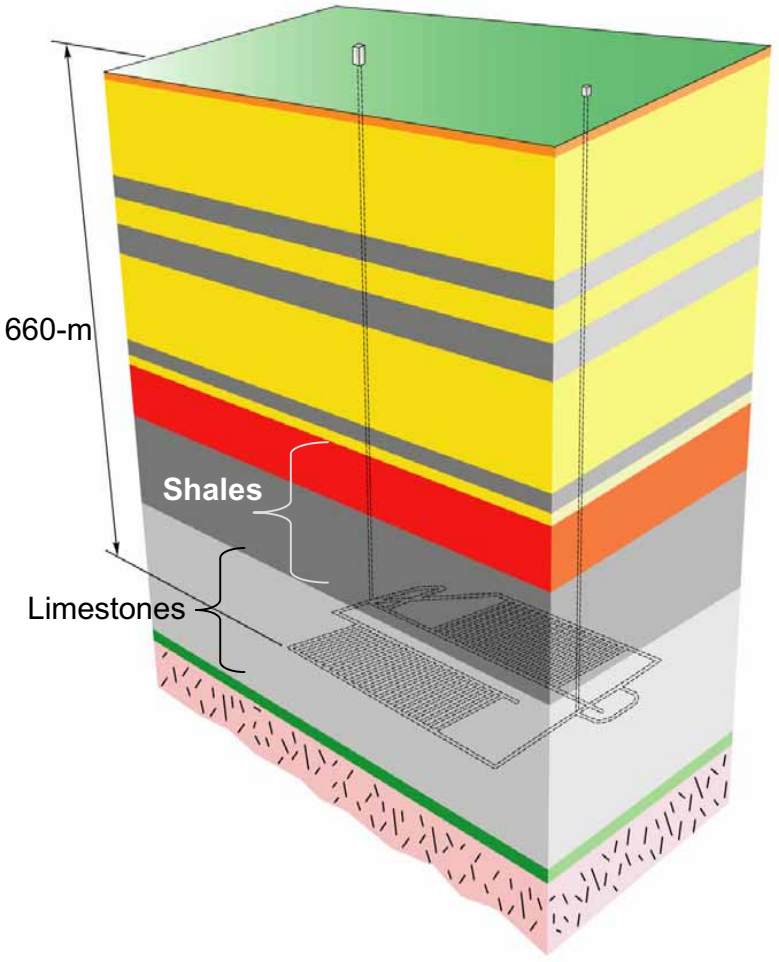
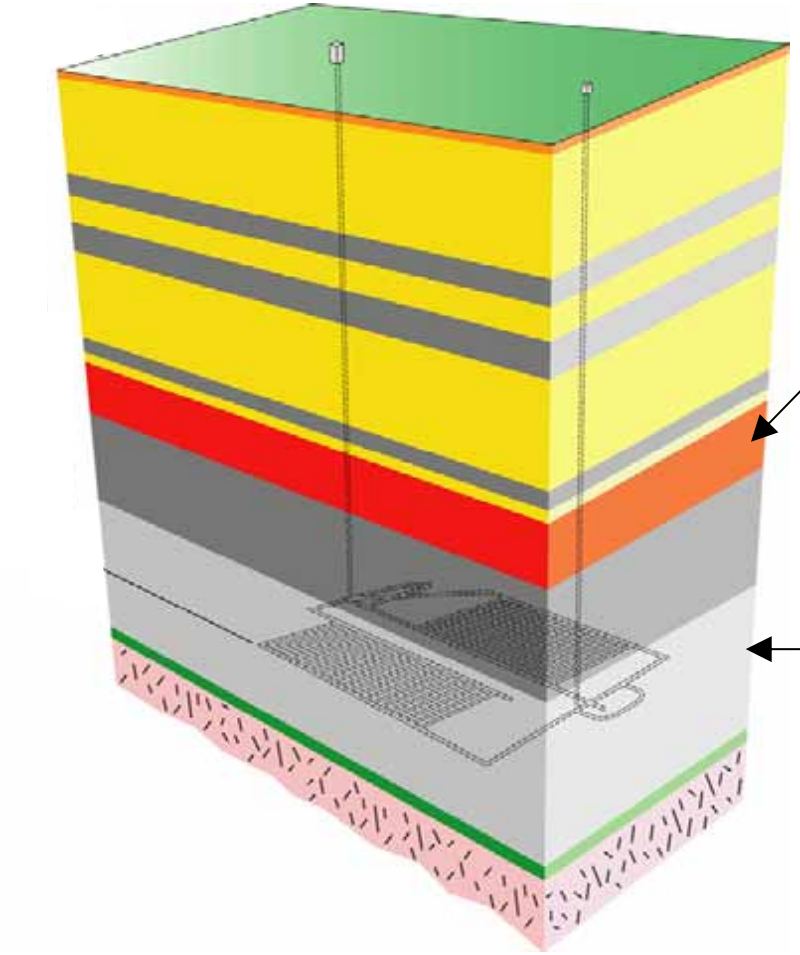
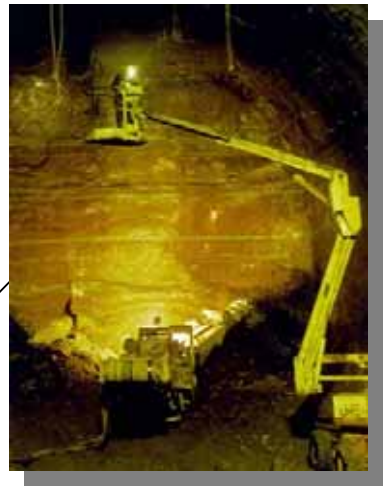
Bruce Nuclear Site Conceptual Geosphere Model



- Argillaceous Limestones
- Ordovician age (450 million years old)
- Thickness 200 m/depth 660 m
- Structurally simple, undeformed
- Extremely low permeability (~10^{-19} m^2)
- Saline groundwaters (100-200 g/L)
- Overlying Shale is ~200/m thick
- Groundwater is stable/old (million years)
- Survived multiple glaciations
- Shallow groundwater resources isolated
- Mass transport diffusion controlled

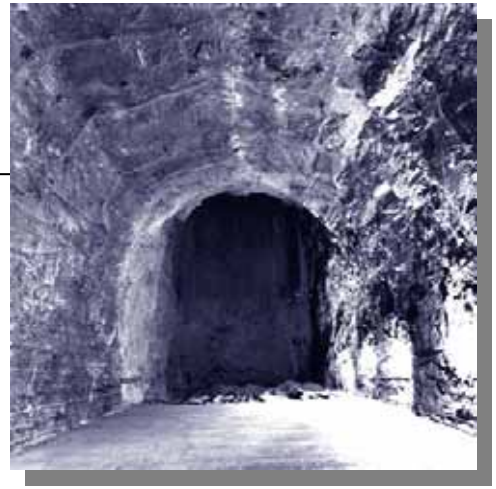
OPG Experience in Various Rock Formations





- Niagara development exploratory tunnel (red shale)

- 10km, 14m dia. tunnel under construction



Darlington Cooling Water Intake Tunnel (limestone)

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Key Elements of Safety Case

- Rock is old and stable
- Geology and hydrology are predicable at repository depth
- Deep ground waters are old and are isolated from surface waters
- Solute transport is diffusion controlled
- Natural events will not disrupt the repository
- Gases generated will remain in the rock
- Repository is safe from human intrusion
- Repository can be built and operated using proven technologies

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Environmental Assessment Status

- EA currently under way in accordance with Canadian Environmental Assessment Act
- CNSC is lead regulatory agency
- Consulting company hired to conduct technical studies
- CNSC public hearing to seek views on EA scope and track (comprehensive or panel) to be held in Kincardine on October 23, 2006
- Submittal of EA Study Report to CNSC scheduled for December 2008

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Geoscientific Site Characterization Status

- Geoscientific Site Characterization Plan (GSCP) was developed in period June 2005 – February 2006
- Geoscience Review Group established (Canada, France, Switzerland, USA)
- Site Characterization lead contractor hired
- 2D seismic survey to be conducted in September 2006
- Drilling of two onsite boreholes to start November 2006
- A descriptive geosphere model report based on onsite investigations is scheduled to be available in late 2007
- Additional boreholes to be drilled to support construction licensing

Geosynthesis Status

- Consultant to be hired to prepare Geosynthesis report
- Geosynthesis report will integrate results of:
  - Site geoscientific characterization program
  - Regional geologic, hydrogeologic, geomechanics and hydrogeochemical studies
  - Site-specific geochemical, geomechanical and hydrogeologic modeling
  - Long term climate change modeling
- Geosynthesis report will provide a multi-faceted, reasoned argument why the site is geologically ideal
- Geosynthesis report scheduled to be available mid-2008

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Engineering Status

- Current conceptual design developed in 2003/2004
- Engineering company hired to update conceptual design
- Particular areas for review and development:
  - Shaft versus ramp repository access
  - Concept for shielding intermediate level wastes
  - Waste room design
  - Underground waste handling
  - Room seal and shaft seal design
- Updated conceptual design scheduled to be available in late 2007

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Safety Assessment Status

- Preliminary post-closure safety assessment done in 2003/2004 showed very low public doses
- Two different consulting companies hired to conduct pre-closure and post-closure safety assessments
- Generally IAEA ISAM methodology to be followed
- Safety to be assessed in accordance with CNSC Regulatory Guide G-320
- Pre- and post-closure safety assessment reports are scheduled to be available in early and mid-2008 respectively

Community Communications Status

- OPG has long history of working in partnership with the Bruce community – channels of communication are well-established
- Extensive communications over last four years on DGR
- These will continue via:
  - Key stakeholder briefings
  - Community events, open houses, media events
  - Newsletters, advertising, etc.

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Summary

- Regulatory approvals phase of OPG's Deep Geologic Repository project is fully underway
- Specialist consulting companies have been hired and technical studies are in progress
- Next major milestone is submission of the EA Study Report in late 2008
- EA approval to be followed by construction licensing
- Earliest predicted in-service date is 2017

See www.opg.com/dgr for more information