

## PRELIMINARY ASSESSMENTS – PHASE 2

# 2-D Seismic Surveys in Sedimentary Rocks



Safety is the first consideration in finding a site for a deep geological repository for Canada's used nuclear fuel.

Between 2012 and 2014, the NWMO used available geoscientific information to begin the process of learning about the geology of potential siting areas. These Phase 1 desktop studies were used to understand the regional geology and sedimentary sequence in the Bruce area and identify whether communities had the potential to satisfy the NWMO's geoscientific site evaluation factors. The results of these desktop studies are available online at [www.nwmo.ca](http://www.nwmo.ca), on websites of local community liaison committees, and in NWMO community offices.

For sedimentary rocks, the next phase of preliminary assessments include a series of geoscientific field studies such as observing general geological features, borehole drilling, and 2D-seismic surveys. Field studies will initially be conducted to advance understanding of the general geology in each community. These activities would be followed by more detailed studies, several years in the future, to understand the geology of potential repository sites identified through technical studies and discussions with the communities.

The scope, location, and timing of field studies will be developed in collaboration with communities.

## 2-D seismic surveys

2-D seismic surveys are conducted in areas with sedimentary rock formations such as those found in Ontario's Bruce County. They are used to generate images of subsurface layers of rock. These studies can show whether layers are continuous or offset by faults.

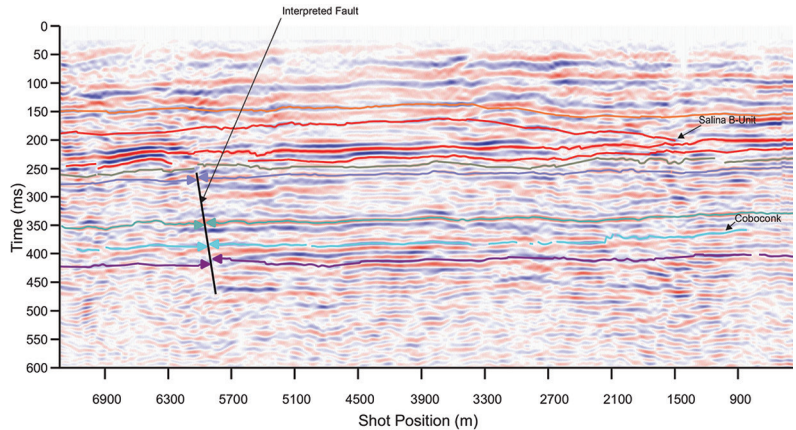
The technique uses sound waves that travel through the ground and are reflected at boundaries between rock layers. A vibroseis truck is used to transmit vibrations into the ground. The vibrations are generated by a vibrating plate that is lowered from underneath the truck and pressed against the ground surface.



Vibroseis trucks are used to conduct 2-D seismic surveys. ▲

Seismic recording devices known as geophones are placed on the ground and connected through a cable. They measure the magnitude and travel time of the vibrations reflected from underneath the surface. The output is a two-dimensional profile of the subsurface showing boundaries of different rock layers and potential locations of any subsurface structure and faults.

2-D seismic surveys generate images that show boundaries of rock layers.



### Impact of vibrations

Ground motion caused by the vibration is generally barely perceptible. The further away you are from the vibrating truck, the less you would feel the vibration. Studies have shown that common household activities such as hammering a nail into a wall would cause more vibration to a house than a typical vibroseis truck operating in the area.

### Access requirements and distance from nearby structures

The survey is conducted along a straight path called a survey line. A typical survey needs a space

about five metres wide along the survey line if it is carried out in an open field. The width of this survey track can be narrower if side roads are used. Lanes of traffic can usually remain open, with people holding signs to control traffic if the shoulder is narrow.

### Duration

About three kilometers of surveys can be completed per day, depending on traffic, site constraints and weather. The number of kilometers to be surveyed will vary depending on the size of potential siting areas.

### Permitting

No provincial permits are required. However, seismic surveying along municipal roadways and county roads requires the municipality's permission. Surveying across private land would require the owners' permission and agreement on access points and survey routes.

## Planning for future studies

Geoscience experts will need several months once 2-D seismic studies are complete to review data and share findings with the community. The findings, along with those from earlier desktop studies and other field studies, will guide the NWMO in working with communities in planning any future studies.

## Site Selection

The NWMO is currently conducting studies to explore the potential suitability to host the project in a number of areas in Ontario, including both crystalline rock sites and sedimentary rock sites. Confirming a safe site will take several years of progressively more detailed technical, scientific, social, cultural and economic studies, as well as engagement with interested communities, First Nation and Métis communities in the area, and surrounding communities.

At this early stage, no specific sites are being considered – only broad areas have been identified for preliminary study. No communities involved in the siting process have made a decision about whether the project is a fit for their area.

## Learn more. Be involved.

NWMO representatives are in the area nearly every month. You can also find us at a number of community events throughout the year.



### For more information, please contact:

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