

## PRELIMINARY ASSESSMENTS – PHASE 2

# 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.

Before initiating fieldwork activities, 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 South Bruce area and identify whether the area 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 website of the community liaison committee, and in the NWMO community office.

For sedimentary rocks in the South Bruce area, the next phase of preliminary assessments include a series of geoscientific field studies such as borehole drilling and seismic surveys.

# Seismic surveys

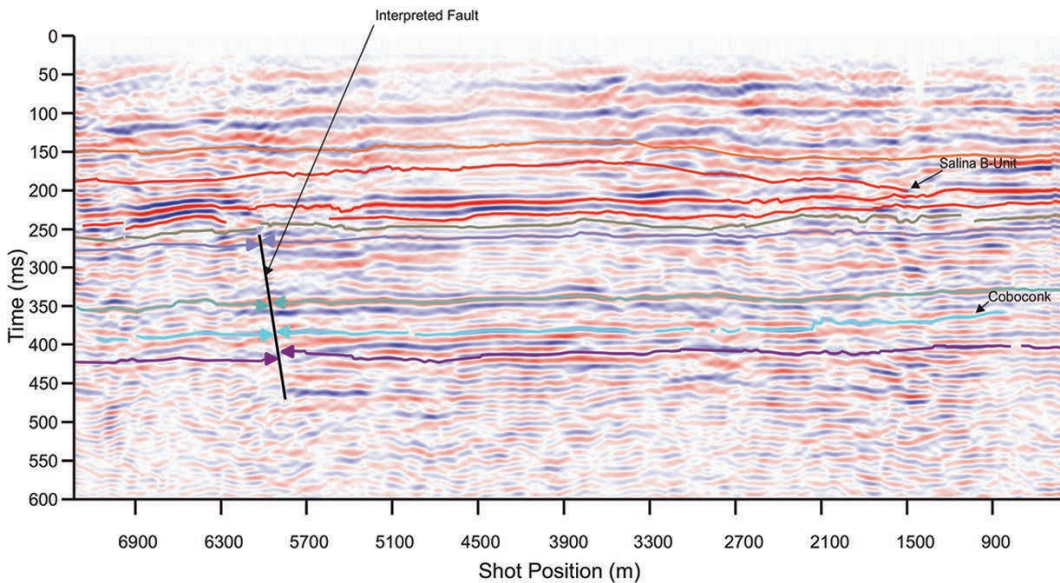
Seismic surveys (3D or 2D) can be conducted in areas with sedimentary rock formations such as those found in South Bruce. They use similar principles to medical ultrasound (sonography) for imaging the human body. The surveys are used to generate images of subsurface layers of rock. These studies can 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 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 profile of the subsurface showing boundaries of different rock layers and potential locations of any subsurface structure and faults.



▲ Data from a seismic survey that generates images that show boundaries of rock layers.

### Impact of vibrations

Ground motion caused by the vibration is generally barely perceivable. 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 kilometres of surveys can be completed per day, depending on traffic, site constraints and weather. The planned seismic surveys in the South Bruce area are expected to be completed within a few months. Number of kilometres to be surveyed will depend on the distance between the source lines and will vary depending on the final survey design.

### 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.

## About the project

The NWMO is responsible for implementing Canada's plan for the safe, long-term management of used nuclear fuel. The plan involves constructing a deep geological repository in which to contain and isolate the used fuel. We are currently conducting studies to explore the potential suitability to host the project in two of areas in Ontario, including a crystalline rock site and sedimentary rock site. 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.

## Learn more. Be involved.

Visit us at our Learn More Centre in Teeswater. You can also find us at a number of community events throughout the year.



### For more information, please contact:

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