Early Exploration Permit Activity Information

Activities That Require an Early Exploration Permit:

- Line cutting that is a width greater than 1.5 metres
- Mechanized stripping of a total surface area of greater than 100 square metres within a 200-metre radius (and below advanced exploration thresholds)
- Excavation of bedrock that removes more than three cubic metres of material within a 200-metre radius
- Use of a drill that weighs more than 150 kilograms

Provincial Standards for Early Exploration

All early exploration activities that require an exploration plan or permit must comply with the Provincial Standards for Early Exploration. There are three parts to these standards:

1. Rules for carrying out exploration plan activities
2. Rules for carrying out exploration permit activities
3. Rules for rehabilitation of exploration plan and exploration permit activities.

For the most up to date information on the rules for carrying out these exploration and rehabilitation activities, please refer to the following links:

- The Mining Act
- Exploration Plans and Exploration Permits Regulation
- Provincial Standards for Early Exploration

Note: an exploration permit does not relieve a proponent from complying with any other requirements with respect to their exploration activities set out under the Mining Act or any other Act.

Ministry of Northern Development and Mines Office Contact Numbers

For more information about early exploration plans and permits, please contact our Mineral Exploration and Development staff at one of the following offices:

Toll Free: 1-888-415-9845

Sudbury: (705) 670-5815

Timmins: (705) 235-1625

Thunder Bay: (807) 475-1123

1. Line Cutting (Greater Than 1.5 Metre Width)

Line cutting, of greater than 1.5 metre width, is done to prepare an area of mineral potential for further geological or geophysical activities. This activity may also be known as “cutting a grid”. A grid is cut to provide known coordinates in an identifiable framework on the ground. Once the grid is cut, further exploration surveys can be carried out such as electromagnetic surveys and soil sampling programs.

A grid consists of evenly spaced, “cut lines” that intersect at right angles. Grid lines are cut using axes, machetes or chainsaws. The lines are accurately located using a global positioning system (GPS), compass bearings and survey transits and are measured and picketed (wood pickets, displaying coordinates, driven into the ground) at specific intervals along their lengths.



Photo 1: Example of line cutting greater than 1.5 metres wide.

Potential Disturbance

Where there is ground cover present, an individual (line-cutter) walks through the bush in a straight line cutting trees and vegetation greater than a 1.5 metre corridor with an axe, machete or chainsaw. Underbrush is cleared along the line and wood pickets are driven into the ground. Coordinates are written on the pickets. The length and spacing of the lines may depend on the type of survey planned as well as the size of the area of interest.

2. Mechanized Surface Stripping

Mechanized surface stripping uses heavy equipment to remove vegetation and soil (overburden) from bedrock. Next, pressurized water pumps and hoses, similar to those used to fight forest fires, may then be used to remove remaining soil and debris from the rock surface. The exposed bare rock can reveal information about the presence of minerals. This information is used to draw geological maps that can inform and guide future exploration.



Photo 2: Stripped area greater than 100 square metres stripped, not yet washed.

Mechanized surface stripping is commonly done when there is not enough exposed bedrock for geologists to examine adequately. Stripping is often used to uncover zones of mineral enrichment identified by geophysical surveys.

Potential Disturbance

Equipment such as bulldozers, backhoes or excavators may be used depending on the amount of soil covering the bedrock. Sometimes forest harvest equipment, such as a chainsaw or skidder may be needed to remove trees prior to stripping. The soil is removed from the bedrock and is set beside the cleared area. The site is usually left to grow back naturally, and in some cases is reseeded. Washing an outcrop requires water to be pumped to the stripped area. The water, which may be drawn from lakes, rivers or streams, is pumped at high pressure to wash away remaining soil.

Access trails may be blazed to provide access to the location for people and equipment.



Photo 3: Backhoe being used to strip overburden.

Provincial Standards for Early Exploration

Surface stripping programs that require an exploration permit must comply with the following requirements while carrying out the activity:

- All stripped overburden must be stockpiled on site in a safe and stable manner, separately from waste rock.

Surface stripping programs that require an exploration permit must comply with the following requirements upon completion of the activity:

- Disturbed overburden must be contoured to a stable angle of repose.
- Stripped areas if not backfilled must be contoured to a stable angle of repose.



Photo 4: Washing outcrop in stripped area.

3. Pitting and Trenching

Pitting and trenching are conducted to get a greater visual understanding of the rock. Heavy equipment is used to remove the surface soil and expose the bedrock (stripping). Trenches or pits are then excavated or blasted into the rock to expose more of the mineralized zones for sampling and testing.



Photo 5: Example of a barrier fence around a pit.



Photo 6: Example of a pit greater than 3 cubic metres.

Potential Disturbance

Pits are shallow holes while trenches are generally longer, linear and of variable depth. Rock and soil removed from the trench or pit is stored on site. Freshly exposed rock samples can then be sent for further testing. Excavation can be either by hand, mechanical digger or by bulldozer on sloping ground.



Photo 7: Example of a linear trench in bedrock greater than 3 cubic metres.

Provincial Standards for Early Exploration

Pitting and trenching programs that require an exploration permit must comply with the following requirements while carrying out the activity:

- Where a pit wall or vertical man-made rock face is greater than three metres in height the following is required:
    - Install a high visibility barrier fence of at least one metre in height, with a setback of at least three metres from the brow of the rock face or pit;
    - Post “Danger Open Pit” signs made of durable waterproof material. These must be posted in suitable locations to warn people about the potential hazard;
    - Pits must be sloped to provide at least one exit ramp;

Pitting and trenching programs that require an exploration permit must comply with the following requirements upon completion of the activity:

- All pit walls or man-made vertical rock faces greater than three metres in height must be backfilled or contoured to a stable angle of repose;
- All pits with walls greater than three metres in height that are not backfilled must be sloped to provide at least one exit ramp;
- Disturbed bedrock must be stockpiled on site in a safe and stable manner.

4. Drilling

Drilling is often critical to mineral exploration. There are several types of drilling that may be used in trying to understand a mineral deposit:

- Diamond drilling, which is able to drill through and extract very hard bedrock, is the most common type of drilling conducted in Ontario. It produces cylindrical samples of rock called core.
- Reverse circulation, or rotary, drilling, which produces rock chips.
- Overburden drilling is conducted to sample glacial deposits.
- Auger drilling is used to sample soils for geotechnical purposes.

Drilling locations are selected (targeted) using the results from previous exploration activities, such as

- Prospecting,
- Geological mapping, and
- Geophysical surveys.

Drilling activities provide samples taken from below the surface. Testing the samples determines the properties of the soil and rocks, including mineral and metal content.



Photo 8: Diamond drill and associated equipment, greater than 150 kilograms in weight.

Diamond drills, often called “rigs”, range in size. An exploration permit is required if the weight of the drill rig is greater than 150 kilograms. These rigs can be the size of a small cabin. They are typically mounted on skids or runners and pulled behind bulldozers or timber skidders.

Diesel and hydraulic motors power most diamond drills. Diamond drilling uses a hollow drilling bit whose surface contains industrial grade diamonds. Drilling produces a long cylinder of rock referred to as core.

Core is stored in specially shaped core boxes. A technician and geologist will then examine the core and make notes on the physical appearance of the rock.

The geologist will also mark sections of the core to be sampled for analysis in a laboratory. The sampled core is cut in half lengthwise. One side is sent to a laboratory for testing while the other is stored as a reference sample. The size of the core and the length of the hole drilled depend on the size of the drill, the type of exploration program and the mineral(s) being analyzed. A diamond-drill hole can range in length from less than a few metres to several thousand metres. The diameter of the core can range from less than 2 centimetres up to 15 centimetres.

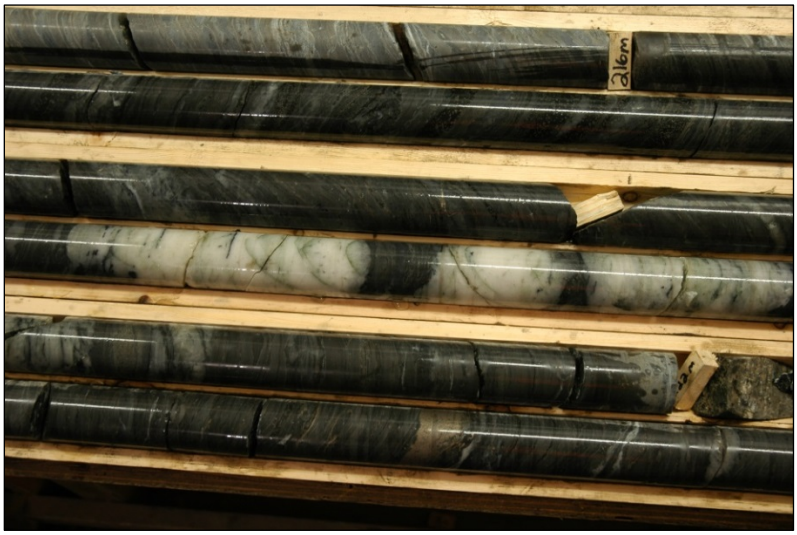


Photo 9: Drill core in boxes. Tags mark distance down the hole.

Potential Disturbance

In order to safely operate a drill rig weighing more than 150 kilograms, a small area, called a “pad”, is cleared. A typical drill pad measures 20 to 40 metres in diameter. Hauling the drill rig through the bush can also leave a rough trail.

Depending on the condition of the terrain, helicopters are sometimes used to gain access to the area, especially in remote areas. The drill rigs are taken apart, flown to the site and reassembled. In order to ensure safety, drill pads for helicopter-supported drilling is typically 40 to 50 metres in diameter.

Diamond drilling uses hollow steel pipes, called “casings”, to drill through overburden,

such as loose soils and materials. The casing is anchored into the bedrock. The drilling is done through the casing, which provides a collar for the drill hole, keeping soil and water from running into the hole.



Photo 10: Drill casing with cap and flag to mark it.

Companies often choose to leave the casing pipes in the ground. These must be marked so that they are visible in all seasons and reduce potential hazard. Leaving casings behind allows companies to deepen the hole at a later date for further drilling or to complete geophysical surveys.

Some types of drilling, including diamond drilling, require pumped water for the drill. The water cools the drill bit, which creates a lot of heat because of friction, and clears the hole of ground-up particles of rock. Water may be pumped from lakes, rivers or streams. The water is pumped through hoses to the drill. Sumps may be dug, which will allow the ground-up rock particles to settle.

In some cases, diamond drilling may take place on frozen water surfaces during the winter or from barges during other seasons. Special rules apply to this type of drilling.

Drill holes made in lake bottoms as well as drill holes on land that produce water, require cementing of the casing, for safety purposes and to control groundwater flow.



Photo 11: Drill hole with casing producing water, before being sealed.

Provincial Standards for Early Exploration

Drilling programs that require an exploration permit must comply with the following requirements while carrying out the activity:

- When a drill rig is removed and taken to a new location the following must occur:
    - Capping and Sealing Drill Holes: a drill hole that produces water (artesian), or encounters an underground mine opening or solution cavities, must be
        - sealed at the surface and into the upper bedrock by grouting the upper 30 metres of bedrock or the entire depth of the hole, whichever is lesser, or
        - capped with a screw-on or bolt on cap
    - Marking Drill Holes – all drill hole locations where casings are not removed must be marked with durable reflective markers that are clearly visible in all seasons.
    - Drill Core: drill core samples must be stored more than 30 metres from any permanent water body or waterway.

Drilling programs that require an exploration permit must comply with all of the above requirements upon completion of the activity and in addition the following requirements:

- Drilling Fluids and Cuttings: all drilling fluids, cuttings and mud left on site must be contained more than 30 metres from any permanent water body or waterway.
- Drill Core: where drill core is left on the exploration site it must be cross-piled in an orderly manner. The height must be less than 1.5 metres and located more than 30 metres from any permanent water body or waterway.



Photo 12: Drill hole with casing marked.



Photo 13: Diamond-drill rig on ice during the winter.