

Exploratory Drilling Factsheet #2

Exploratory Boring Regulation and Construction

Since 1966, Minnesota has leased state-managed lands for mineral exploration. As interest in exploration grows, the Department of Natural Resources (DNR) remains committed to providing Minnesotans with clear, science-based information. These fact sheets explain how exploratory drilling is conducted in Minnesota, outline the environmental safeguards in place, and summarize the state laws and regulations that guide the process. They are designed to support informed conversations about exploratory drilling grounded in data, state law, and sound natural resource management practices.

How is exploration drilling regulated?

Exploration drilling in Minnesota is subject to strict regulations overseen by the DNR and the Minnesota Department of Health (MDH). Both agencies monitor exploration drilling to ensure compliance with Minnesota's exploratory boring laws, MN Rule 4727 and MN Statute 103I. Explorers must follow all applicable laws, including those for threatened and endangered species, wetlands, and water quality. On state lands, explorers must also follow the conditions prescribed by the DNR. To ensure compliance, all drill sites, regardless of land ownership, are inspected. After drilling, the explorer must submit a report to MDH detailing how the boring was constructed and sealed.



What do explorers need to do before they drill?

Before drilling, explorers must secure legal access to the land, obtain all necessary licenses and registrations required by law, and obtain any other required authorizations. When exploring on state lands, companies must obtain a state mineral lease and submit an exploration plan to the DNR. The DNR posts exploration plan summaries online within five business days of receipt, sends GovDelivery notification of receipt of a new exploration plan out to all interested parties, and has 20 calendar days to review the plan for any special features, such as trout streams or threatened and endangered species. Based on review from special feature experts, tribal governments, surface administrators, and other input the DNR creates a set of conditions, recommendations, and informational items the company must agree to before receiving drilling authorization. Finally, anyone drilling an exploratory boring must submit a notice to both MDH and DNR at least 10 days before drilling begins.

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How are drill sites constructed?

Before a drill rig can be moved onto a site, the area must be prepared, which involves constructing a drill pad. A drill pad is a temporary, leveled area constructed to support the drilling rig, equipment, and operations during drilling. The average drill pad is 70 feet by 70 feet, although its size and construction vary depending on the season, terrain, and type of drilling, with the goal of minimizing surface disturbance and ensuring worker safety.

In summer, site preparation typically involves clearing brush and, in some cases, trees. In winter, crews pack snow and ice to form a stable pad that reduces disturbance to underlying vegetation. To further reduce surface impacts, composite mats may be used to line trails or pads to protect vegetation and soils, especially in wetland areas.

On upland sites, temporary excavations called sumps may be dug to contain cuttings and drilling fluids. Cuttings, the equivalent of rock sawdust, is created when the diamond bit drill cuts through the bedrock. Drilling fluids are the water and additives used to cool and clear the drill as it cuts. Drilling fluids are regulated by MDH and must meet all drinking water safety standards. Dug sumps are typically 10 by 6 by 6 feet, though size depends on the needs of the drilling program. Dug sumps must contain all drilling fluids and cuttings during drilling and constructed to prevent stormwater runoff and overflow. Dug sumps are not allowed in wetlands. Instead, explorers use containerized systems to collect and remove all materials off-site to dug sumps on nearby uplands.

What is the drilling process?

Once the drill site is prepared, a drill rig is brought in, positioned, and aligned with the planned borehole. As the borehole is drilled, steel casing is installed from the surface down into the bedrock to protect groundwater and surrounding sediments. Rock core or other samples are extracted from the borehole and boxed for transportation. Once drilling is complete, the boring is sealed from the bottom to the surface using cement or other MDH-approved grouts. Then, the drill site and access trails are reclaimed to restore the area vegetation.

Drilling often requires the use of water and additives; both must be safe for drinking water. The same additives used to drill exploratory borings are also used to drill domestic wells.

To minimize surface impact, explorers may reuse existing borings to drill deeper or use a wedge to redirect the drill bit to drill at an angle off the parent hole. Explorers may extend their time spent on site to conduct downhole surveys to map the subsurface or test physical properties of the rock at depth.

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How are drill sites inspected?



MDH and DNR work together to ensure all drill sites comply with state regulations. Sites are typically inspected multiple times during active drilling, immediately after drilling, and again later to evaluate revegetation. Additional inspections may be conducted based on site conditions and the progress of reclamation.

Inspectors observe roads and trails leading to the site, the drill site, and the boring. They check for numerous items, such as whether registrations are posted, proper sump functionality (containment of all drilling fluids and cuttings), approved drilling fluids, and general housekeeping. After drilling is complete, inspectors check for proper sealing of the borehole, site grading, and the success of reclamation.

If an issue is found, the company is notified and must correct it immediately. DNR continues to monitor the site and conduct follow-up inspections until the site meets all regulatory requirements.

Why are there pipes sticking out of the ground? How are borings sealed?

These "pipes" are temporarily sealed exploratory borings. Borings must be sealed, either temporarily or permanently, within 30 days of completion. Explorers may choose to temporarily seal borings to allow for future testing, which can reduce the need for additional drilling. A common method for temporarily sealing a boring is a casing extension, where a sealed pipe extends from bedrock to 4-5 feet above ground. This completely enclosed system prevents debris and water from entering the borehole. Temporary seals can remain in place up to 10 years. Eventually, all borings must be permanently sealed by cementing or grouting the entire borehole from the bottom to within two feet of the surface. The top two feet may be filled with cement, grout, or native soils.

How are drill sites reclaimed?

After drilling is complete, the explorer must reclaim the site. Drill sites are temporary and often revegetate naturally within one or two growing seasons. If soil or vegetation was impacted, reseeding may be required. Cuttings settle to the bottom of the sump before being covered by the originally displaced soils. Sumps are filled and graded to match the surrounding landscape and all borings are sealed, either permanently or temporarily. Any berms created during site construction are leveled, and ruts are repaired. The goal is to return the area as close as possible to its natural condition.

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Drill Site May 2022 – note the use of composite mats that minimize soil disturbance.



Same Drill Site August 2022 – note the temporarily sealed borings.

Recommended sources of information on mineral exploration:

For more information and additional factsheets:

https://www.dnr.state.mn.us/lands_minerals/metallic_nf/regulations.html

DNR websites on mineral exploration:

https://www.dnr.state.mn.us/lands_minerals/metallic_nf/explore.html

U.S. Department of Agriculture, U.S. Forest Service. *Final Environmental Impact Statement: Federal Hardrock Mineral Prospecting Permits Project, Superior National Forest*. May 2012.

https://eplanning.blm.gov/public_projects/nepa/75057/100003/121171/SNF_Fed_Hardrock_Pros_Permits_FEIS.pdf