



The Mineral Exploration Process: Part I of a Six-Part Series

Mineral Exploration: Essential to Discovering Economic Mineral Deposits

The mineral exploration process is the first step in the discovery of economic mineral deposits that are required to provide the raw materials needed to manufacture countless products essential for our everyday lives. Mineral exploration is the Research and Development arm of the mining industry that provides onsite scientific information on the presence, quantity and quality of the mineral deposits that are the building blocks for the clean energy transition process. This paper outlines the basic steps of the mineral exploration process.

I. Initial Steps

- A. Review existing geologic information and data such as:
 - a. Published and proprietary reports
 - b. Existing drillhole data
 - c. Aerial and satellite imagery
 - d. Initial environmental reviews
- B. Develop initial exploration plan utilizing:
 - a. Field mapping
 - b. Rock sampling
 - c. Soil sampling
 - d. Geophysical surveys
 - e. Environmental surveys

II. Develop and Permit a Drilling Program

- A. Compile and analyze data from Initial Steps
 - a. Build a three-dimensional geologic picture of the mineral resource area
 - b. Develop mineral potential maps.
 - c. Complete environmental reviews and surveys to support the necessary permit applications.
 - d. Develop preliminary drilling program maps and objectives.
 - e. Initiate preliminary outreach with stakeholders and communities.
 - f. Secure necessary funding for the proposed drilling project.
- B. Obtain required federal, state, and county permits prior to any ground disturbance.
(Although Notice-level activities on BLM-administered land do not require a permit, the proponent is still required to show how unnecessary and undue (UUD) degradation will be prevented and must post financial assurance.)

- a. Layout proposed drill hole locations based on most prospective geology and necessary environmental and cultural reviews and clearances.
- b. Send materials from the drill holes to an assay laboratory to ascertain presence or absence of the mineral(s) sought.
- c. If drilling yields positive results, secure permits to authorize drilling of additional holes to better define the geology and potential ore deposit (size, grades, etc.).

Exploration ground disturbance activities cannot commence prior to providing agencies with financial assurance and completing any required notification or permitting processes

The most common approval processes on Bureau of Land Management administered lands are:

- **Notice-Level Exploration:** operations are those where the level of disturbance is 5 acres or less and requires notification to BLM prior to commencing any work. An operator must show how UUD will be prevented and must provide financial assurance for the proposed disturbance.
- **Exploration Plan:** operations are those that create greater than 5 acres of disturbance and which require submittal of an exploration plan and National Environmental Policy Act (NEPA) analysis.

On U.S. Forest Service lands, an Exploration Plan is always required, regardless of the disturbance level.

Exploration is only the initial step in defining an ore deposit. This step alone can take as many as five to twenty or more years and cost hundreds of millions of dollars. Defining a mineable ore deposit is a time-consuming and expensive process with no assurance of success. The National Research Council/National Academy of Sciences' 1999 report entitled "Hardrock Mining on Federal Lands"¹, determined the odds to be one in one thousand that a single deposit will become a mine. Every exploration project is taking on astronomical risks in the expectation of success.

The next paper in this series will discuss defining the mineral resource and determining its economic viability through the development of a feasibility study addressing mining and processing parameters while also reviewing environmental concerns.

About WMC

WMC is a grassroots organization with over 200 members nationwide. Our members work in all sectors of the mining industry including hardrock and industrial minerals, coal, energy generation, manufacturing, transportation, and service industries. We hold annual Washington, D.C. Fly-Ins to meet with members of Congress and their staff, and federal land management and

¹ Hardrock Mining on Federal Lands, page 24, <https://nap.nationalacademies.org/catalog/9682/hardrock-mining-on-federal-lands>

regulatory agencies to discuss issues of importance to both the hardrock and coal mining sectors. For more information about WMC, visit our website at www.wmc-usa.org.