

The Exploration Essentials

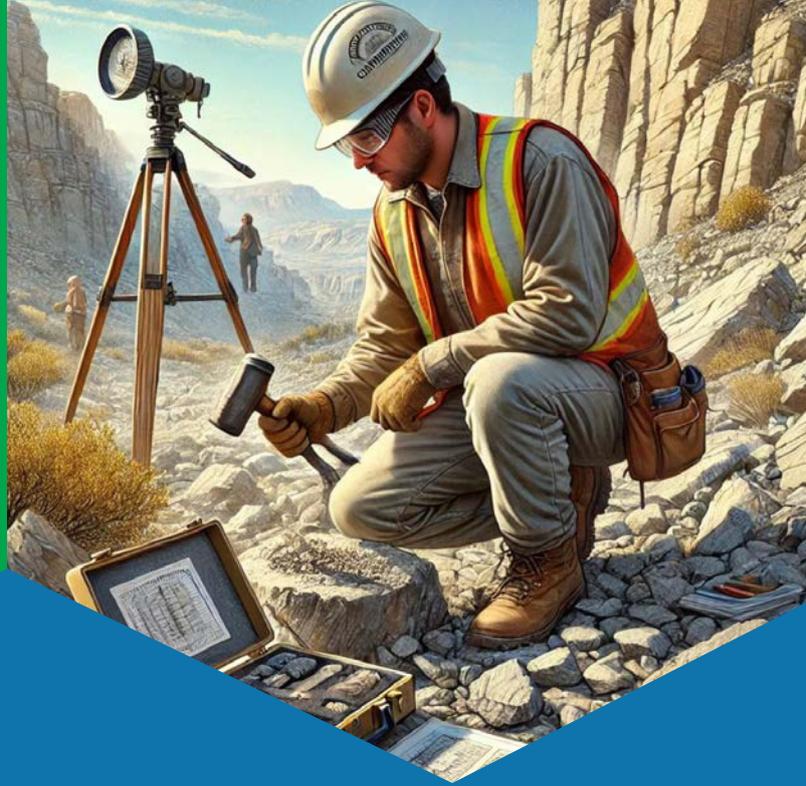
Quick answers to your natural resource exploration questions



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What is rock chip sampling?



Rock chip sampling is a fundamental field technique used in the early stages of metals exploration to quickly assess the mineralization potential of an area. It involves collecting small pieces of rock from the surface, outcrops, trenches, or even drill cores.

These samples are then analysed to determine the content of valuable minerals or metals, such as gold, copper, silver, and others. The process helps geologists identify and delineate areas of potential economic interest for more detailed exploration and evaluation.

Here are key points about rock chip sampling:

- 1. Collection:** Samples are typically collected manually using hammers and chisels to chip off pieces of exposed rock. The locations from where samples are collected are carefully recorded using GPS devices to accurately map the sample sites.
- 2. Analysis:** Collected samples are sent to laboratories for geochemical analysis. The lab tests determine the concentration of metals and other elements in the rock. This information is used to evaluate the potential for economic mineralization.
- 3. Mapping and Targeting:** The results from rock chip sampling are often used in conjunction with geological mapping, geophysical surveys, and other exploration techniques to refine exploration targets. High-grade samples may indicate the presence of a mineralized system, guiding further exploration efforts such as drilling.
- 4. Pros and Cons:** Rock chip sampling is a cost-effective and rapid method for obtaining preliminary geological information about an area. However, it is a surface sampling method and may not provide a complete picture of subsurface mineralization. Therefore, it is typically used in the early exploration phases to guide more detailed and expensive exploration methods like drilling.

Rock chip sampling is crucial in the exploration process, offering initial insights into the mineral composition of an area and helping to prioritize targets for more in-depth exploration.

What is geological mapping?



Geological mapping in metals exploration is a fundamental and crucial process used to understand and document the geology of an area where potential mineral resources, such as metals, might be found.

This process involves several key activities and objectives:

- 1. Field Mapping:** Geologists visit the area of interest to record geological features visible at the Earth's surface. This includes noting the types of rocks present, their age, the presence of any mineralization (the process by which minerals accumulate in a rock), and structural features like faults and folds. These observations help in understanding the geological environment and the potential for metal deposits.
- 2. Sampling:** While mapping, geologists often collect rock, soil, and sediment samples for further analysis. These samples can provide direct evidence of metal content and can help in determining the potential for an economically viable mineral deposit.
- 3. Geophysical Surveys:** These surveys measure variations in physical properties of the Earth's subsurface that may indicate the presence of metal deposits. Techniques include magnetic, gravity, electromagnetic, and seismic surveys. These methods can help map the subsurface geology without the need for immediate drilling.
- 4. Geochemical Analysis:** Analyzing the chemical composition of rock, soil, and water samples can reveal the presence of anomaly concentrations of metals, indicating potential deposits.
- 5. Interpretation and Modeling:** The data collected from field mapping, sampling, geophysical, and geochemical analyses are compiled and interpreted. Geological maps and models are created to visualize the distribution of rocks and minerals below the surface, helping to guide exploration strategies and identify targets for drilling.
- 6. Drilling:** Based on the findings from geological mapping and other exploration activities, drilling is often conducted to obtain subsurface samples.

What is soil sampling?



Soil sampling in gold exploration programs serves several critical purposes, making it a fundamental step in the exploration process.

The main goal of soil sampling is to identify areas with potential gold mineralization by detecting trace amounts of gold and associated pathfinder elements that can lead to discovering new gold deposits. Here's how soil sampling contributes to gold exploration:

- 1. Anomaly Identification:** Soil samples are analyzed for gold and other geochemical markers that indicate the presence of mineralization beneath the surface. These anomalies can guide further exploration activities.
- 2. Cost Efficiency:** Compared to drilling, soil sampling is a less expensive initial exploration method. It allows for the broad coverage of large areas at a lower cost, helping to prioritize areas for more expensive drilling programs.
- 3. Target Generation:** By mapping the geochemical trends from soil samples, geologists can delineate prospective targets for gold. This process involves comparing concentrations of gold and pathfinder elements against background levels to identify anomalies.
- 4. Pathfinder Elements:** In addition to gold, soil samples are analyzed for elements like arsenic, antimony, mercury, and others that are often found in association with gold deposits. The presence of these elements can indicate the potential for gold mineralization even when gold itself is not detected in high concentrations.
- 5. Stratigraphic and Structural Insights:** Soil geochemistry can provide clues about the geological setting, including the presence of fault systems, alteration zones, and the stratigraphy of the area, which are crucial for understanding the distribution of gold mineralization.
- 6. Baseline Environmental Data:** Initial soil sampling can also establish baseline environmental conditions before mining. This data is essential for planning, environmental impact assessments, and ensuring compliance with regulatory requirements.

In essence, soil sampling is a vital tool in the early stages of gold exploration, offering a cost-effective method to narrow down the search area for more detailed exploration through drilling and trenching, ultimately increasing the chances of discovering economically viable gold deposits.

What is trenching?



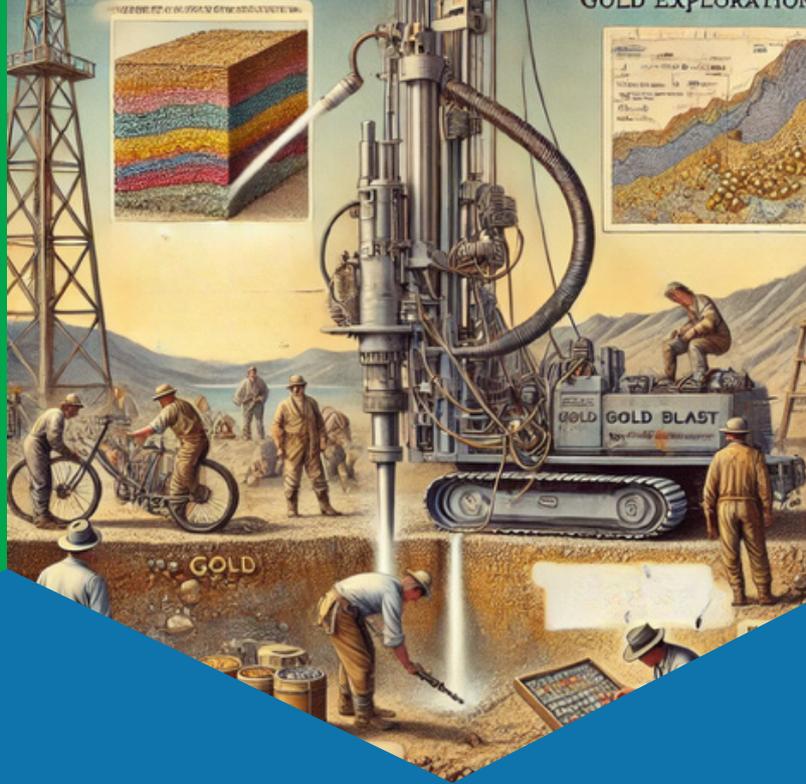
Trenching in gold exploration programs serves as a critical step between preliminary surface sampling (e.g., soil geochemistry) and the more expensive and invasive drilling phase.

Its main purposes include:

- 1. Detailed Sampling:** Trenching provides direct access to bedrock, allowing geologists to take more detailed and continuous samples of the subsurface. This helps in more accurately mapping the mineralization at surface levels and can identify gold-bearing structures or veins that are not detectable by surface sampling alone.
- 2. Stratigraphic and Structural Mapping:** Through trenching, geologists can observe and map geological structures, lithologies, and alteration zones directly. This detailed mapping is crucial for understanding the controls of mineralization and can guide the placement of drill holes.
- 3. Verification of Geophysical Anomalies:** Trenching can be used to ground-truth anomalies identified through geophysical surveys, such as magnetic, electromagnetic, or resistivity anomalies, to determine if these anomalies are associated with gold mineralization.
- 4. Bulk Sampling:** In some cases, trenching is used to collect bulk samples for metallurgical testing, which helps in assessing the potential recovery rates of gold and understanding the mineral processing characteristics of the ore.
- 5. Cost-Effective Exploration:** Trenching is a relatively low-cost exploration method compared to drilling, especially in areas where the bedrock is near the surface. It allows for a more targeted and informed drilling campaign, potentially saving significant amounts of money by avoiding unnecessary or poorly targeted drill holes.
- 6. Environmental and Regulatory Compliance:** Trenching can also help in assessing the environmental impact of potential mining operations by providing early-stage information on overburden characteristics and groundwater levels.

Trenching, when used effectively, enhances the understanding of the subsurface geology and the spatial distribution of gold mineralization, thereby refining exploration targets and increasing the efficiency of subsequent drilling programs.

What is Rotary Air Blast (RAB) drilling?



Rotary Air Blast (RAB) drilling in gold exploration programs is a type of drilling method used for initial exploration and evaluation of potential gold-bearing ground.

This technique involves using a pneumatic hammer to drive a drill bit into the ground, with compressed air used to lift the resultant cuttings to the surface for analysis. The benefits of RAB drilling include its ability to quickly and cost-effectively sample large areas, providing early-stage geological insights into the presence of gold and other minerals.

RAB drilling is particularly useful for identifying mineralization trends and defining targets for more detailed follow-up drilling, such as reverse circulation (RC) or diamond drilling. It is suited for exploration in areas with soft to moderately hard geology and can reach depths of up to 100 meters or more, although its effectiveness diminishes with increasing depth and in harder rock types.

The advantages of air rotary drilling, which encompasses techniques like RAB, include the rapid penetration rate, efficient removal of drill cuttings, reduced risk of contamination (since the drilling process uses air instead of water or drilling fluids), and the ability to obtain continuous samples of the subsurface lithology. These aspects are crucial for early-stage exploration where the goal is to assess the potential of a site with minimal environmental impact and cost.

However, it's important to note that while RAB drilling provides valuable information about surface and near-surface mineralization, it is generally considered a preliminary exploration tool. Results from RAB drilling are used to guide more precise and deeper drilling methods that can provide a detailed understanding of the geology and potential ore bodies present in the exploration area.

What is Reverse Circulation (RC) drilling?



Reverse Circulation (RC) drilling is a widely used drilling technique in gold exploration programs that offers a balance between speed and depth, situated between open-hole drilling and more detailed diamond drilling.

This method employs a dual-tube system, where compressed air is used to circulate the drill cuttings up through the inner tube, keeping them free from contamination by not contacting the outer formation of the hole. RC drilling is versatile, being effective in both soft formations using roller and blade bits, and in harder rock with percussion drilling.

The method is particularly valued for its efficiency in sample collection and the reduced risk of contamination, ensuring that the samples are representative of the subsurface geology. This is crucial for the accurate assessment of potential gold deposits. RC drilling has been successfully used in various geological settings, including the complex, gold-fertile corridors of the Egina Gold Camp in Pilbara, Western Australia, highlighting its utility in identifying gold mineralization within structurally complex regions .

The application of RC drilling in projects like the Córrego do Sítio Mines in Brazil demonstrates its effectiveness in optimizing drilling efficiency, converting reserves, and bringing assurance to mine production plans, especially in deposits characterized by multi-narrow veins with a high nugget effect. Quality controls implemented during drilling campaigns, such as duplicate analysis and validation with diamond drilling holes, further enhance the reliability of the data obtained through this method .

RC drilling, with its capability for rapid penetration and minimal environmental impact, continues to be a critical tool in the exploration and development of gold deposits, enabling explorers to quickly and accurately assess the potential of their projects.

What is diamond drilling?



Diamond drilling is a core drilling technique used extensively in gold exploration programs to obtain a detailed geological sample of the subsurface.

A diamond-encrusted drill bit is used to cut a cylindrical core of rock, which is then analyzed for mineral content, geological structure, and other characteristics. This method allows for precise examination of the composition and properties of potential gold-bearing ore bodies, providing valuable information for exploration and mining decisions.

For more detailed information, you can visit the [Wikipedia page on Exploration Diamond Drilling](#).

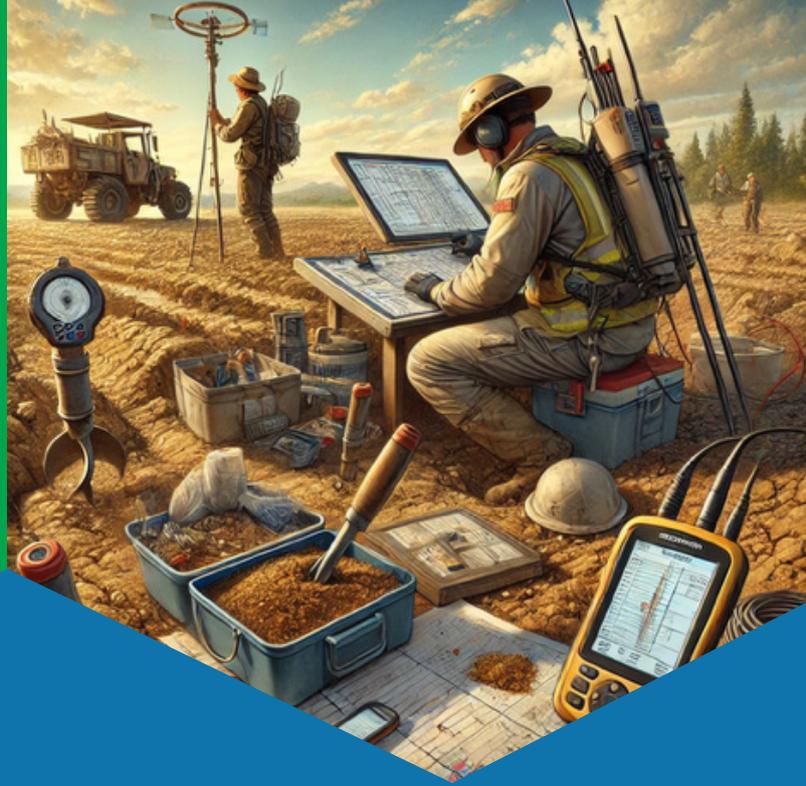
What is airborne geophysics?



Airborne geophysics in metal exploration programs involves using aircraft to carry instruments that measure variations in Earth's magnetic field, gravity, electromagnetic fields, and radiation.

These measurements help in identifying subsurface geological formations and anomalies indicative of mineral deposits, including metals. By covering large areas quickly and providing data that can guide further exploration efforts on the ground, airborne geophysics is a cost-effective and efficient method for initial exploration phases, enhancing the understanding of geological structures without direct contact with the ground.

What is ground geophysics?



Ground geophysics in metal exploration programs involves direct contact with the Earth's surface to measure its physical properties, such as magnetic, electrical, and gravitational fields.

This method helps in detecting and mapping subsurface mineral deposits. Ground geophysics provides detailed, localized data, complementing broader surveys like airborne geophysics. It's crucial for refining targets before drilling, offering a more precise understanding of geological structures and the potential location and size of metal deposits.

What is fire assay?



Fire assay for metal composition involves crushing and grinding the sample, mixing it with fluxes, and heating it in a furnace to melt it.

The molten material separates into layers, with the dense metal collecting at the bottom, often in the form of a button. This metal is then weighed to determine the concentration of precious metals like gold and silver in the original sample. This method is highly accurate and is considered the gold standard for assaying precious metals.

What is the JORC code?



The JORC Code refers to the Australasian Code for Reporting of Exploration Results, Mineral Resources, and Ore Reserves.

It is a professional code of practice that sets minimum standards for the public reporting of minerals exploration results, mineral resources, and ore reserves. The JORC Code was established in 1989 and is regularly updated, with the most recent version being from 2012 (and amendments in subsequent years).

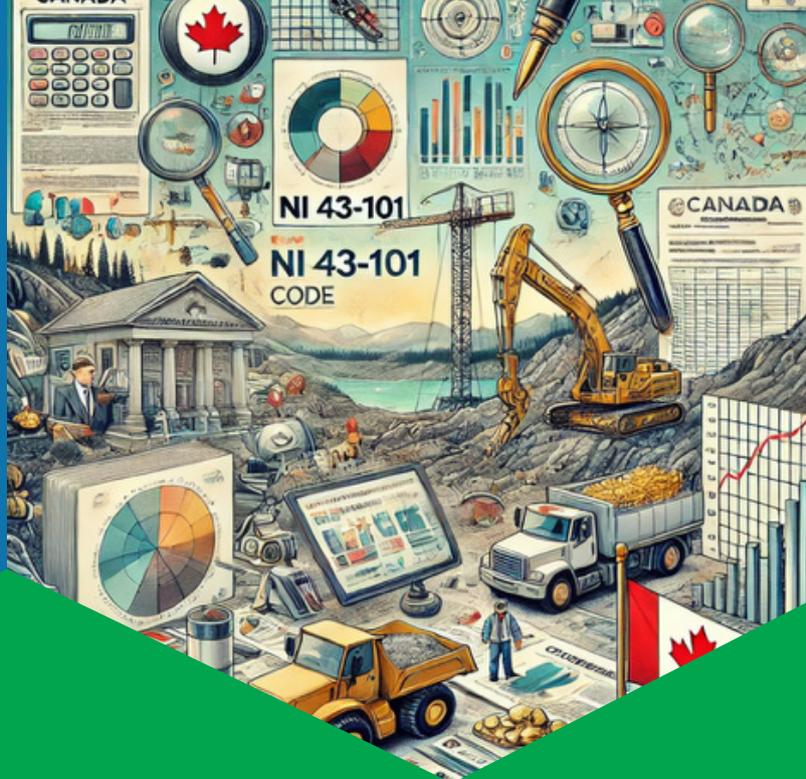
The Code is named after the Joint Ore Reserves Committee (JORC) which is sponsored by the Australasian Institute of Mining and Metallurgy (AusIMM), the Australian Institute of Geoscientists (AIG), and the Minerals Council of Australia (MCA). It is widely accepted and used in countries outside of Australasia, particularly by companies listed on the Australian Securities Exchange (ASX), as well as in other stock exchanges around the world.

The main objectives of the JORC Code are to ensure that reporting of exploration results, mineral resources, and ore reserves is transparent, consistent, and accurate. This helps provide a clear basis for investment decisions by accurately representing the findings and uncertainties associated with mineral exploration and development.

The Code requires that public reports are based on work that is substantiated by a Competent Person, who is defined as a minerals industry professional with relevant qualifications, experience, and standing. Reports must disclose the grade, tonnage, and other relevant data in a manner that is understandable to investors and stakeholders, while also detailing the level of uncertainty associated with the reported figures.

The principles of the JORC Code are based on transparency, materiality, and competence, ensuring that all relevant information is reported in a clear, concise, accurate, and unbiased manner.

What is the NI 43-101 code?



The National Instrument 43-101 (NI 43-101) is a regulatory standard for the disclosure of scientific and technical information about mineral projects within Canada.

Adopted by the Canadian Securities Administrators (CSA) in 2001, NI 43-101 sets out the requirements for reporting on mineral exploration, mineral resources, and mineral reserves. Its primary goal is to ensure that the information disclosed is accurate, reliable, and follows consistent standards, thereby protecting investors and providing them with a basis to make informed investment decisions.

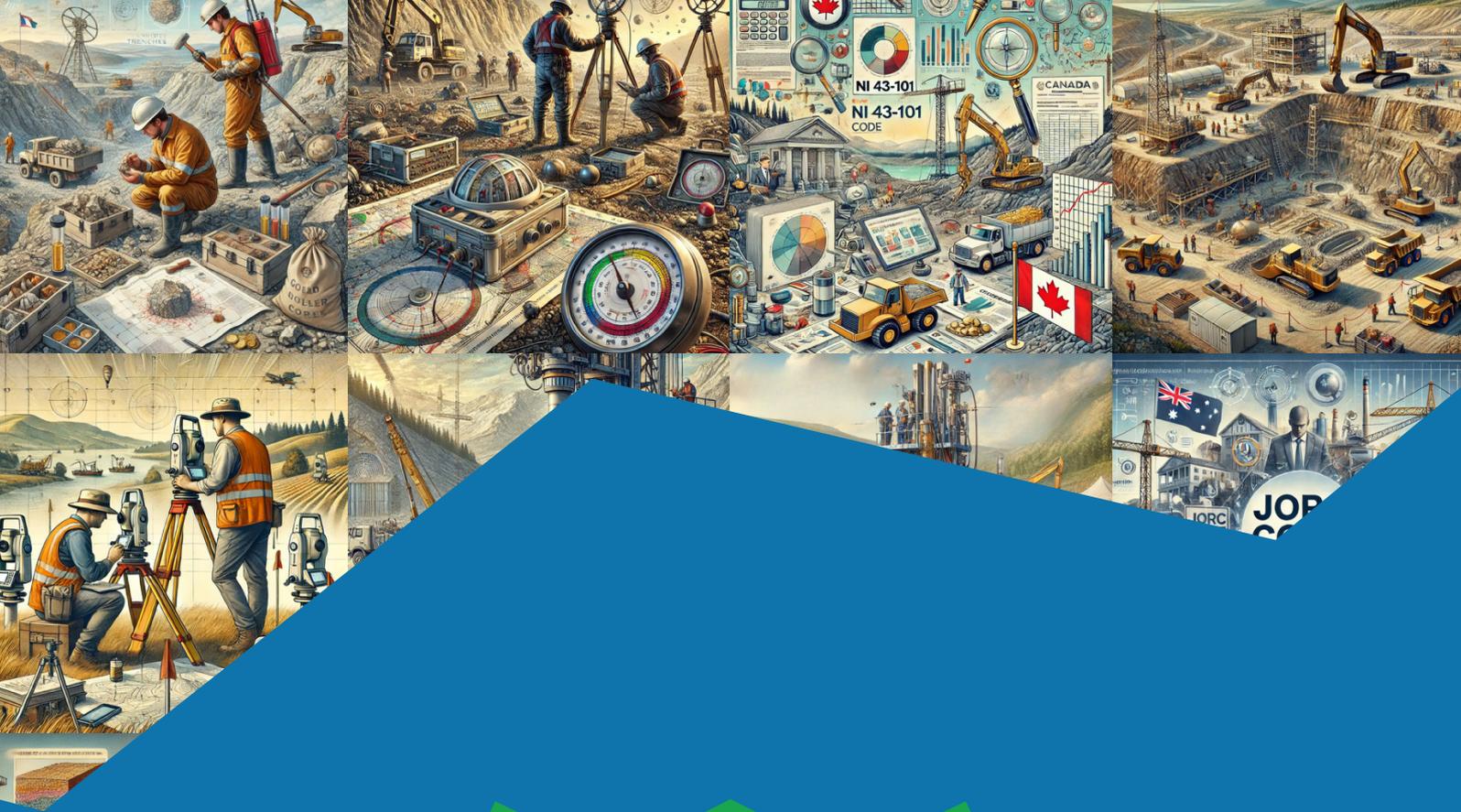
Key aspects of NI 43-101 include:

1. Qualified Person (QP): The standard requires that information pertaining to mineral projects be prepared by or under the supervision of a "Qualified Person." A QP is defined as an individual who is an engineer or geoscientist with at least five years of experience in mineral exploration, mining, or mineral project assessment, and a member in good standing of a professional association.

2. Technical Reports: Companies must file a technical report to support the disclosure of exploration results, mineral resources, or mineral reserves. These reports provide detailed information about the project, including the geological setting, exploration data, sampling methods, quality assurance and control, estimation methods for resources and reserves, economic analysis, and other relevant data.

3. Standards for Disclosure: NI 43-101 specifies how companies should disclose scientific and technical information, requiring clear, transparent, and standardized presentation of exploration results, mineral resources, and mineral reserves. This includes the use of specific terminology and definitions to ensure consistency and comparability of data.

4. Public Disclosure: All scientific and technical information about mineral projects made public by issuers (e.g., in press releases, investor presentations, websites) must comply with NI 43-101 standards. This includes the requirement for a QP to approve the disclosure.



OUT OF THE GROUND

Quick answers to your natural resource exploration questions

Out of the Ground was created with the simple objective of helping all involved in the junior resource sector to; identify, analyse, evaluate and protect investments.

Simplifying jargon, highlighting key data and cutting through the racket.

Out of the Ground is here to support you.

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