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**Mining — Vocabulary —**  
**Part 4:**  
**Prospecting and exploration**

*Exploitation minière — Vocabulaire —*  
*Partie 4: Prospection et exploration*

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## Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. [www.iso.org/directives](http://www.iso.org/directives)

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 82, *Mining*.

A list of all parts in the ISO 22932 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html)

## Introduction

### 0.1 General

The ISO 22932 series has been prepared in order to standardize and to coordinate the global use of technical terms and definitions in mining, for the benefit of the experts working on different types of mining activities.

The need for the ISO 22932 series arose from the widely varying interpretation of terms used within the industry and the prevalent use of more than one synonym.

A geological study is generally carried out in the following four main stages: reconnaissance, prospecting, general exploration and detailed exploration (for definition of each stage see below). The purpose of the geological study is to identify mineralization, to establish continuity, quantity, and quality of a mineral deposit, and thereby define an investment opportunity.

### 0.2 Reconnaissance

A reconnaissance study identifies areas of enhanced mineral potential on a regional scale based primarily on results of regional geological studies, regional geological mapping, airborne and indirect methods, preliminary field inspection, as well as geological inference and extrapolation.

The objective is to identify mineralized areas worthy of further investigation towards deposit identification. Estimates of quantities should only be made if sufficient data are available and when an analogy with known deposit of similar geological character is possible, and then only within an order of magnitude.

### 0.3 Prospecting

Prospecting is the systematic process of searching for a mineral deposit by narrowing down areas of promising enhanced mineral potential.

The methods utilized are outcrop identification, geological mapping, and indirect methods such as geophysical and geochemical studies. Limited trenching, drilling, and sampling may be carried out.

The objective is to identify a deposit which will be the target for further exploration. Estimates of quantities are inferred, based on interpretation of geological, geophysical and geochemical results.

### 0.4 General exploration

General exploration involves the initial delineation of an identified deposit. Methods used include surface mapping, widely spaced sampling, trenching and drilling for preliminary evaluation of mineral quantity and quality (including mineralogical tests on laboratory scale if required), and limited interpolation based on indirect methods of investigation.

The objective is to establish the main geological features of a deposit, giving a reasonable indication of continuity and providing an initial estimate of size, shape, structure and grade. The degree of accuracy should be sufficient for deciding whether a prefeasibility study and detailed exploration are warranted.

### 0.5 Detailed exploration

Detailed exploration involves the detailed three-dimensional delineation of a known deposit achieved through sampling, such as from outcrops, trenches, boreholes, shafts and tunnels.

Sampling grids are closely spaced such that size, shape, structure, grade, and other relevant characteristics of the deposit are established with a high degree of accuracy. Processing tests involving bulk sampling may be required.

A decision whether to conduct a feasibility study can be made from the information provided by detailed exploration.

[SOURCE: Controller General Indian Bureau of Mines]

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# Mining — Vocabulary —

## Part 4: Prospecting and exploration

### 1 Scope

This document specifies the commonly used terms in mine prospecting and exploration. Only those terms that have a specific meaning in this field are included.

### 2 Normative references

There are no normative references in this document.

### 3 Terms and definitions

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

#### 3.1

#### Prospecting

##### 3.1.1

##### **aeromagnetic prospecting**

airborne magnetic prospecting technique of *geophysical exploration* (3.2.8) of an area using an airborne *magnetometer* (3.1.1.1) to *survey* (3.6) that area

[SOURCE: Reference [1], modified — "airborne magnetic prospecting" has been added as a term.]

##### 3.1.1.1

##### **magnetometer**

instrument for measuring magnetic intensity

Note 1 to entry: In ground *magnetic prospecting* (3.1.8.6), magnetometer is an instrument for measuring the vertical magnetic intensity.

Note 2 to entry: In *airborne magnetic prospecting* (3.1.1), magnetometer is an instrument for measuring the total magnetic intensity. Also, an instrument used in magnetic observatories for measuring various components of the magnetic field (3.8.4) of the Earth.

Note 3 to entry: Magnetometer is sensitive instrument for detecting and measuring changes in the Earth's magnetic field, used in *prospecting* (3.1.1.0) to detect *magnetic anomalies* (3.1.2.10) and magnetic gradients in rock formations.

[SOURCE: Reference [1], modified — Notes 1, 2 and 3 to entry were originally part of the definition.]

### 3.1.2

#### **anomaly**

geological feature, especially in the subsurface, distinguished by geological, geophysical, or geochemical means, which is different from the general surroundings and is often of potential economic value

EXAMPLE A magnetic anomaly (3.1.2.10).

[SOURCE: Reference [1], modified — EXAMPLE was originally part of the definition.]

#### 3.1.2.1

##### **botanical anomaly**

local increase above the normal variation in the chemical composition, distribution, ecological assemblage, or morphology of plants, indicating the possible presence of an *ore deposit* (3.10.31) or anthropomorphic contamination

[SOURCE: Reference [1]]

#### 3.1.2.2

##### **geochemical anomaly**

secondary anomaly

concentration of one or more elements in rock, soil, sediment, vegetation, or water that is markedly higher or lower than background

Note 1 to entry: The term may also be applied to hydrocarbon concentrations in soils.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

#### 3.1.2.3

##### **gravity anomaly**

difference between the observed value of gravity at a point and the theoretically calculated value

Note 1 to entry: It is based on a simple gravity model, usually modified in accordance with some generalized hypothesis of variation in subsurface density as related to surface topography.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

#### 3.1.2.4

##### **ground geophysical anomaly**

geophysical *anomaly* (3.1.2) that is mapped instrumentally at the surface of the ground

[SOURCE: Reference [1]]

#### 3.1.2.5

##### **hydrochemical anomaly**

anomalous patterns of elements contained in ground or surface water

[SOURCE: Reference [1]]

#### 3.1.2.6

##### **hydromorphic anomaly**

*anomaly* (3.1.2) where the dynamic agents are aqueous solutions, which brought the elements to the site of *deposition* (3.10.12)

[SOURCE: Reference [1]]

#### 3.1.2.7

##### **intense anomaly**

*anomaly* (3.1.2) whose elemental values rise sharply to one or more well-defined peaks

[SOURCE: Reference [1]]

**3.1.2.8****isanomalic line**

line of equal value of an *anomaly* (3.1.2)

[SOURCE: Reference [1]]

**3.1.2.9****isostatic anomaly**

difference between the observed value of gravity at a point after applying to it the isostatic correction and the normal value of gravity at the point

[SOURCE: Reference [1]]

**3.1.2.10****magnetic anomaly**

variation of the measured magnetic pattern from a theoretical or empirically smoothed magnetic *field* (3.8.4)

[SOURCE: Reference [1]]

**3.1.2.11****nonsignificant anomaly**

DEPRECATED: false anomaly

*anomaly* (3.1.2) that is superficially similar to a *significant anomaly* (3.1.2.15) but is unrelated to ore

[SOURCE: Reference [1]]

**3.1.2.12****optical anomaly**

optical properties apparently at variance with optical rules

EXAMPLE Anisotropy in isotropic minerals, such as birefringent diamond; biaxiality in uniaxial minerals, such as quartz; and erratic variation in birefringence near optical absorption bands, e.g. some epidote minerals.

[SOURCE: Reference [1], modified — EXAMPLE was originally part of the definition.]

**3.1.2.13****primary anomaly**

*anomaly* (3.1.2) formed by primary dispersion

[SOURCE: Reference [1]]

**3.1.2.14****regional anomaly**

more localized departures in the Earth's *field* (3.8.4) from the values that would be predicted if the field were to originate with a single magnet oriented along the magnetic axis

[SOURCE: Reference [1]]

**3.1.2.15****significant anomaly**

*anomaly* (3.1.2) that is related to ore and that can be used as a guide in *exploration* (3.2.5)

[SOURCE: Reference [1]]

### 3.1.3

#### **biochemical prospecting**

biogeochemical prospecting

geochemical *exploration* (3.2.5) based on the chemical analysis of systematically sampled plants in a region, to detect biological concentrations of elements that might reflect hidden orebodies

Note 1 to entry: The root systems of trees are powerful *sampling* (3.1.12.6) mechanisms that represent samples of solutions from a large volume of earth. Much of the mineral content from these solutions is found in the leaves. Analysis of leaves may serve as a guide to prospectors

Note 2 to entry: The trace-element content of one or more plant organs is most often measured.

[SOURCE: Reference [1], modified — Notes 1 and 2 to entry were originally part of the definition.]

### 3.1.4

#### **botanical prospecting**

*prospecting* (3.1.10) in which differences in plant growth or plant family serve as a clue to the presence of metals beneath barren rock or a covering of sand and gravel

[SOURCE: Reference [1]]

### 3.1.5

#### **electrical prospecting**

*prospecting* (3.1.10) that makes use of three fundamental properties of rocks

Note 1 to entry: Three fundamental properties of rocks are as follow:

- 1) resistivity or inverse conductivity: this governs the amount of current that passes through the rock when a specified potential difference is applied;
- 2) electrochemical activity with respect to electrolytes in the ground;
- 3) dielectric constant: this is the basis of the *self-potential method* (3.2.11).

Note 2 to entry: This gives information on the capacity of a rock material to store electric charge, and it shall be taken into consideration when high-frequency alternating currents are introduced into the earth, as in inductive prospecting techniques. Electrical methods are more frequently used in searching for metals and minerals than in exploring for petroleum, mainly because most of them have proved effective only for shallow *exploration* (3.2.5).

[SOURCE: Reference [1], modified — Notes 1 and 2 to entry were originally part of the definition.]

#### 3.1.5.1

##### **magnetotelluric method**

*electrical prospecting* (3.1.5) technique based on an application of telluric currents in which the magnetic field (3.8.4) induced by the alternations in earth currents would be measured simultaneously with the voltage fluctuations between electrodes at the surface

[SOURCE: Reference [1]]

### 3.1.6

#### **geobotanical prospecting**

visual study of plants, their morphology, and their distribution as indicators of such things as soil composition and depth, bedrock lithology, the possibility of orebodies, and climatic and ground-water conditions

[SOURCE: Reference [1]]

**3.1.7****geochemical prospecting**

geochemical exploration

method of mineral *exploration* (3.2.5) based on the systematic measurement of the chemical properties of rocks, soils, river sediments, waters, etc.

[SOURCE: BS 3618-3:1971]

**3.1.7.1****readily extractable metal**

content of a metal that can be extracted from weathered rock, overburden, or stream sediment, by weak chemical reagents

[SOURCE: Reference [1]]

**3.1.7.2****reliability of method**

probability of obtaining and recognizing indications of an orebody or mineralized district by the method being used

Note 1 to entry: Reliability depends not only on whether a readily detectable target exists and how effective the *exploration* (3.2.5) method is in locating it, but also on the extent to which the *anomaly* (3.1.2) is specifically related to ore and the extent to which it is possible that non-significant anomalies may confuse the interpretation

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

**3.1.8****geophysical prospecting**

making and interpretation of certain physical measurements to obtain information on the subsurface and surface geological structures

**3.1.8.1****air shooting**

technique of applying a seismic pulse to the ground by detonating explosive charges in the air, in *seismic prospecting* (3.1.8.14)

[SOURCE: Reference [1]]

**3.1.8.2****anodic zone**

zone of electropositive potential, in the electrical *self-potential method* (3.2.11) of *geophysical prospecting* (3.1.8), if the chemical composition of the soil or subsoil is such as to give electrical polarization

[SOURCE: Reference [1]]

**3.1.8.3****arc shooting**

method of refraction *seismic prospecting* (3.1.8.14) in which the variation of travel time (velocity) with azimuth from a shot point is used to infer geologic structure

Note 1 to entry: The term also applies to a refraction spread placed on a circle or a circular arc with the centre at the shot point.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

**3.1.8.4****Bouguer gravity**

gravity values after latitude, elevation and Bouguer corrections have been applied

Note 1 to entry: Used in the gravitational method of *geophysical prospecting* (3.1.8).

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

### 3.1.8.5

#### **bursting time**

maximum difference in time lag between the bursting of the earliest and latest detonators in a series, in *seismic prospecting* (3.1.8.14)

[SOURCE: Reference [1]]

### 3.1.8.6

#### **magnetic method**

magnetic prospecting

*geophysical prospecting* (3.1.8) method that maps variations in the magnetic field (3.8.4) of the Earth that are attributable to changes of structure or magnetic susceptibility in certain near surface rocks

Note 1 to entry: Sedimentary rocks generally have a very small susceptibility compared with igneous or metamorphic rocks, and most magnetic surveys (3.6) are designed to map structure on or within the basement, or to detect magnetic minerals directly.

Note 2 to entry: Most magnetic prospecting is now carried on with airborne instruments

[SOURCE: Reference [1], modified — Notes 1 and 2 to entry were originally part of the definition.]

### 3.1.8.7

#### **noise**

<seismic prospecting> all recorded energy not derived from the explosion of the shot

Note 1 to entry: Sometimes loosely used for all recorded energy except events of interest.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

### 3.1.8.8

#### **normal field**

smoothed value of a magnetic field (3.8.4) component as derived from a large-scale survey (3.6), worldwide or of continental scope, in *magnetic prospecting* (3.1.8.6)

Note 1 to entry: The normal field of the Earth varies slowly with time, and maps of it are as of a certain date.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

### 3.1.8.9

#### **profile**

data recorded from one shot point by a number of groups of detectors, in *seismic prospecting* (3.1.8.14)

[SOURCE: Reference [1]]

### 3.1.8.10

#### **reference seismometer**

detector placed to record successive shots under similar conditions, to permit overall time comparisons, in *seismic prospecting* (3.1.8.14)

Note 1 to entry: Used in connection with the shooting of wells for velocity.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

### 3.1.8.11

#### **reflection**

returned energy (in wave form) from a shot that has been reflected from a velocity discontinuity back to a detector; the indication on a record of reflected energy, in *seismic prospecting* (3.1.8.14)

[SOURCE: Reference [1]]

**3.1.8.12****refraction method**

*seismic method* (3.1.8.13) of *geophysical prospecting* (3.1.8)

[SOURCE: Reference [1]]

**3.1.8.13****seismic method**

*geophysical prospecting* (3.1.8) method based on the fact that the speeds of transmission of shock waves through the Earth vary with the elastic constants and the densities of the rocks through which the waves pass

[SOURCE: Reference [1]]

**3.1.8.14****seismic prospecting**

method of *geophysical prospecting* (3.1.8) in which vibrations are set up by firing small explosive charges in the ground or by other artificial sources

Note 1 to entry: Precise measurements of the resulting waves are taken, from which the nature and extent of underlying strata are revealed.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

**3.1.8.15****seismic reflection method**

*geophysical prospecting* (3.1.8) technique in which the structure of subsurface formations is mapped by making use of the times required for a seismic wave (or pulse), generated in the Earth by a near-surface explosion of dynamite or by other artificial sources, to return to the surface after *reflection* (3.1.8.11) from the formations themselves

[SOURCE: Reference [1]]

**3.1.8.16****seismic shooting**

method of *geophysical prospecting* (3.1.8) in which elastic waves are produced in the Earth by the firing of explosives or by other means

[SOURCE: Reference [1]]

**3.1.9****gravity prospecting**

mapping of the force of gravity at different places with a *gravimeter* (3.1.12.1) (gravity meter) to determine differences in specific gravity of rock masses, and, through this, the distribution of masses of different specific gravity

[SOURCE: Reference [1]]

**3.1.9.1****network**

pattern or configuration of stations, often so arranged as to provide a check on the consistency of the measured values, in *surveying* (3.6) and *gravity prospecting* (3.1.9)

[SOURCE: Reference [1]]

**3.1.9.2****regional**

contributions to the observed anomalies due to density irregularities at much greater depths than those of the possible structures, the location of which was the purpose of the *survey* (3.6), in *gravity prospecting* (3.1.9)

[SOURCE: Reference [1]]

### 3.1.9.3

#### **residual gravity**

portion of a gravity effect remaining after removal of some type of *regional* (3.1.9.2) variation; usually the relatively small or local *anomaly* (3.1.2) components of the total or observed gravity *field* (3.8.4), in *gravity prospecting* (3.1.9)

[SOURCE: Reference [1]]

### 3.1.9.4

#### **noise**

<gravity and magnetic prospecting> disturbances in observed data due to more or less random inhomogeneities in surface and near-surface material

[SOURCE: Reference [1]]

### 3.1.10

#### **prospecting**

search for outcrops or surface exposure of *mineral deposit* (3.10.28)

[SOURCE: Reference [1]]

### 3.1.11

#### **radioactivity prospecting**

*exploration* (3.2.5) for radioactive minerals utilizing various instruments, generally a Geiger counter or scintillation counter, by measuring the natural radioactivity of earth materials

[SOURCE: Reference [1]]

### 3.1.12

#### **reconnaissance**

part of *exploration* (3.2.5) for the purpose of identifying enhanced mineral potential on a regional scale

EXAMPLE An engineering *survey* (3.6) in preparing for triangulation of a region.

Note 1 to entry: Reconnaissance is based on:

- results of regional geological studies, regional geological mapping;
- preliminary field inspection;
- indirect methods such as airborne and others;
- geological interference and extrapolation.

Note 2 to entry: Reconnaissance aims at to identify mineralized areas worthy of further investigation towards mineral deposit.

#### 3.1.12.1

##### **gravimeter**

instrument which measures variations in the density of underlying rocks

[SOURCE: BS 3618-3:1971]

#### 3.1.12.2

##### **pilot sampling**

reconnaissance sampling

taking of preliminary samples of a *mineral deposit* (3.10.28) to study its mode of occurrence and its detailed structure

[SOURCE: Reference [1]]

**3.1.12.3****reconnaissance map**

map incorporating the information obtained in a *reconnaissance* (3.1.12) *survey* (3.6) and data obtained from other sources

[SOURCE: Reference [1]]

**3.1.12.4****reconnoiter**

make a *reconnaissance* (3.1.12) of; especially to make a preliminary *survey* (3.6) of an area for military or geologic purposes

[SOURCE: Reference [1]]

**3.1.12.5****remote sensing**

acquisition and interpretation of airborne or satellite images of the surface using infrared and visible wavelengths of light

[SOURCE: Reference [1], adapted]

**3.1.12.6****sampling**

gathering of specimens of soils, water, sediments, vegetations, ore or wall rock for appraisal of an orebody

Note 1 to entry: Since the average of many samples may be used, representative sampling is crucial. term is usually modified to indicate the mode or locality; e.g. *hand sampling* (3.1.12.6.1), mine sampling, and channel sampling.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

**3.1.12.6.1****hand sampling**

one of the major breakdowns in ore *sampling* (3.1.12.6) that includes grab sampling, trench or channel sampling, fractional selection, coning and quartering, and pipe sampling

Note 1 to entry: These methods are used in sampling small batches of ore, etc.

[SOURCE: Reference [1], modified — Notes 1 and 2 to entry were originally part of the definition.]

**3.1.12.7****tectonometer**

apparatus used on the surface to obtain knowledge of the structure of the underlying rocks

[SOURCE: BS 3618-3:1971]

**3.2****Exploration****3.2.1****detailed exploration**

final exploration

detailed investigation of a coal or mineral area on which a preliminary report was favourable

Note 1 to entry: The final exploration of an area may involve a costly *biting* (3.3.4) program, *survey* (3.6), and *sampling* (3.1.12.6).

[SOURCE: Reference [1], modified — Notes 1 and 2 to entry were originally part of the definition.]

### 3.2.2

#### **direction-finding method**

electromagnetic *exploration* (3.2.5) methods in which one determines the direction of the magnetic field (3.8.4) associated with the currents

[SOURCE: Reference [1]]

### 3.2.3

#### **electromagnetic method**

group of electrical *exploration* (3.2.5) methods in which one determines the magnetic field (3.8.4) that is associated with the electrical current through the ground

[SOURCE: Reference [1]]

### 3.2.4

#### **Eltran method**

electrical *exploration* (3.2.5) method in which an electrical transient is sent into the Earth and the change in shape of this transient is studied

[SOURCE: Reference [1]]

### 3.2.5

#### **exploration**

search for coal, mineral, or ore by

- geological surveys (3.6);
- *geophysical prospecting* (3.1.8) (may be ground, aerial, or both);
- *geochemical prospecting* (3.1.7)
- *borehole* (3.3.2) and trial pits; or
- surface or underground headings, drifts, or tunnels

Note 1 to entry: Exploration aims at locating the presence of economic *deposits* (3.10.12) and establishing their nature, shape, and grade, and the investigation may be divided into *general exploration* (3.2.7) and *detailed exploration* (3.2.1).

[SOURCE: Reference [1], adapted]

### 3.2.6

#### **galvanic electromagnetic method**

electrical *exploration* (3.2.5) methods in which an electric current is introduced in the ground by means of contact electrodes and in which one determines the magnetic field (3.8.4) that is associated with the current

[SOURCE: Reference [1]]

### 3.2.7

#### **general exploration**

preliminary exploration

investigation carried out along certain broad features of a coal or mineral area, with the object of deciding whether the proposition is such as to warrant a detailed or *final exploration* (3.2.1), which is often costly

[SOURCE: Reference [1]]

**3.2.8****geophysical exploration**

exploring for minerals or mineral fuels, or determining the nature of Earth materials by measuring a physical property of the rocks and interpreting the results in terms of geologic features or the economic *deposits* (3.10.12) sought

Note 1 to entry: Physical measurements may be taken on the surface, in *borehole* (3.3.2), or from airborne or satellite platforms

[SOURCE: Reference [1], modified — Notes 1 and 2 to entry were originally part of the definition.]

**3.2.9****inductive method**

electrical *exploration* (3.2.5) method in which electric current is introduced into the ground by means of electromagnetic induction and in which the magnetic *field* (3.8.4) associated with the current is determined

[SOURCE: Reference [1]]

**3.2.10****resistivity method**

electrical *exploration* (3.2.5) method in which current is introduced into the ground by two contact electrodes and potential differences are measured between two or more other electrodes

[SOURCE: Reference [1]]

**3.2.11****self-potential method**

spontaneous-potential method

electrical *exploration* (3.2.5) method in which one determines the spontaneous electrical potentials (spontaneous polarization) that are caused by electrochemical reactions associated with clay or metallic *mineral deposit* (3.10.28)

[SOURCE: Reference [1]]

**3.3****Boring****3.3.1****air flushing**

circulation of air through the *drilling* (3.1.3) apparatus during *drilling* (3.1.3) to cool the *bit* (3.5.3) and to remove the cuttings from the hole

[SOURCE: BS 3618-3:1971]

**3.3.2****borehole**

hole of any predetermined diameter and length formed in any geological formation or manmade material by *drilling* (3.1.3)

Note 1 to entry: Investigations carried out in such a hole can be to recover rock, soil or water samples from a specified depth or to carry out in-situ tests and measurements.

**3.3.3****borehole logging**

determination of the physical, electrical and radioactive properties of the rocks traversed by a *borehole* (3.3.2)

[SOURCE: BS 3618-3:1971]

**3.3.4**

**boring**

cutting or *drilling* (3.1.3) of a hole for blasting, water infusion, *exploration* (3.2.5), or water or combustible gases drainage

[SOURCE: Reference [1]]

**3.3.5**

**gamma ray log**

record obtained in *borehole* (3.3.2) logging of the radioactive emission of the rocks traversed by a borehole

[SOURCE: BS 3618-3:1971]

**3.3.6**

**laterolog**

record obtained in *borehole* (3.3.2) logging of the electrical resistivity of the rocks traversed by a borehole

[SOURCE: BS 3618-3:1971]

**3.3.7**

**microlog**

record obtained in *borehole* (3.3.2) logging of the porosity of the rocks traversed by a borehole

[SOURCE: BS 3618-3:1971]

**3.3.8**

**neutron log**

record obtained in *borehole* (3.3.2) logging of the combined hydrogen in the rocks traversed by a borehole

[SOURCE: BS 3618-3:1971]

**3.3.9**

**Schlumberger log**

records obtained from instruments developed by the Schlumberger brothers for use in *borehole* (3.3.2) logging

Note 1 to entry: Such records are the *gamma ray log* (3.3.5), *laterolog* (3.3.6), *microlog* (3.3.7) and *neutron log* (3.3.8).

[SOURCE: BS 3618-3:1971, modified — Note 1 to entry was originally part of the definition.]

**3.3.10**

**caving**

rock fragment which falls from the sides of a *borehole* (3.3.2)

[SOURCE: BS 3618-3:1971]

**3.3.11**

**collar**

mouth of a *borehole* (3.3.2)

[SOURCE: BS 3618-3:1971]

**3.3.12**

**deviation**

wandering of a *borehole* (3.3.2) from its intended course

[SOURCE: BS 3618-3:1971]

## 3.4 Drilling

### 3.4.1 bentonite

special form of thixotropic clay used in the composition of *drilling* (3.1.3) mud

[SOURCE: BS 3618-3:1971]

### 3.4.2 calyx drilling

method of rotary drilling using a toothed cutting *bit* (3.5.3) or chilled shot

[SOURCE: BS 3618-3:1971]

### 3.4.3 circulating fluid

fluid pumped into a *borehole* (3.3.2) through the *drill stem* (3.5.1.8), the flow of which cools the *bit* (3.5.3), washes away the cuttings from the *bit* (3.5.3), and transports the cuttings out of the borehole

[SOURCE: Reference [1]]

### 3.4.4 core

cylindrical section of rock, usually 5 cm to 10 cm in diameter and up to several meters in length, taken as a sample of the interval penetrated by a *core bit* (3.5.3) and brought to the surface for either geologic examination or laboratory analysis

[SOURCE: Reference [1]]

### 3.4.5 core drilling

method of rotary drilling in which a *core* (3.4.4) is recovered

Note 1 to entry: Core drilling is performed with hard cutters, usually with annular diamond rebar, and pipes for the extraction of the drill core.

Note 2 to entry: Core drilling is performed from the surface to find orebodies and in underground mines to find out how the orebody extends.

### 3.4.6 counter flush boring

reversed flush boring

method of *core drilling* (3.4.5) in which the *circulating fluid* (3.4.3) passes down the *borehole* (3.3.2) and returns up the inside of the rods, providing continuous recovery of the *core* (3.4.4)

[SOURCE: BS 3618-3:1971]

### 3.4.7 deflection

intentional alteration of the course of a *borehole* (3.3.2) in *directional drilling* (3.4.8)

[SOURCE: BS 3618-3:1971]

### 3.4.8 directional drilling

<before drilling> art of *drilling* (3.1.3) a *borehole* (3.3.2) wherein the course of the hole is planned before *drilling* (3.1.3)

Note 1 to entry: Such holes are usually drilled with rotary equipment and are useful in *drilling* (3.1.3) divergent tests from one location, tests that otherwise might be inaccessible, as controls for fire and wild wells, etc.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

### 3.4.9

#### **directional drilling**

<during drilling> *drilling* (3.1.3) in which the course of a *borehole* (3.3.2) is controlled by *deflection wedges* (3.5.23) or other means

Note 1 to entry: The technique of directional drilling is used:

- a) to deflect a deviated borehole back on to course;
- b) to deflect a borehole off course, either to bypass an obstruction in the hole or to take a second *core* (3.4.4).

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

### 3.4.10

#### **drilling rate**

overall rate of advancement of the *borehole* (3.3.2)

[SOURCE: BS 3618-3:1971]

### 3.4.11

#### **monkey drift**

small drift driven in for *prospecting* (3.1.10) purposes, or a cross-cut driven to an airway above the gangway

[SOURCE: Reference [1]]

### 3.4.12

#### **mud flush drilling**

method of *drilling* (3.1.3) in which a mud of controlled physical properties is used as the *circulating fluid* (3.4.3)

[SOURCE: BS 3618-3:1971]

### 3.4.13

#### **penetration rate**

actual rate of penetration of *drilling* (3.1.3) tools

[SOURCE: BS 3618-3:1971]

### 3.4.14

#### **prove**

ascertain the character of the strata by *boring* (3.3.4) or tunneling

[SOURCE: BS 3618-3:1971]

### 3.4.15

#### **rathole**

hole drilled alongside a *borehole* (3.3.2) to accommodate the *kelly* (3.5.37) during rod changing

[SOURCE: BS 3618-3:1971]

### 3.4.16

#### **rope drilling**

system of percussive drilling in which the *drill string* (3.5.31) is suspended at the end of a long rope

[SOURCE: BS 3618-3:1971]

**3.4.17****round trip**

operation of withdrawing the *drill rod* (3.5.30), *bit* (3.5.3), among other things, from the hole, of the extracting *core* (3.4.4), replacing rods and *bit* (3.5.3) and resuming *drilling* (3.1.3)

[SOURCE: BS 3618-3:1971]

**3.4.18****sludge**

rock cuttings produced by the drill *bit* (3.5.3)

[SOURCE: BS 3618-3:1971]

**3.4.19****spudding**

operation, in *rope drilling* (3.4.16), of *boring* (3.3.4) through the subsoil at the start of a hole

[SOURCE: BS 3618-3:1971]

**3.4.20****turbo drilling**

system of *drilling* (3.1.3) in which the *bit* (3.5.3) is directly driven by a turbine at the bottom of the hole

[SOURCE: BS 3618-3:1971]

**3.5****Machinery****3.5.1****auger**

earth auger

tool, developed from the Archimedean screw, used for *soil sampling* (3.1.12.6) or the *drilling* (3.1.3) of shallow holes

Note 1 to entry: See [Figure 1](#).

[SOURCE: BS 3618-3:1971]



Figure 1 — Auger

**3.5.1.1**

**auger bit**

hard steel or tungsten-carbide-tipped cutting teeth used in an *auger* (3.5.1) run on a torque bar or in an *auger-drill head* (3.5.29) run on a continuous-flight auger

[SOURCE: Reference [1]]

**3.5.1.2**

**auger boring**

either hole or the process of *drilling* (3.1.3) a hole using *auger* (3.5.1) equipment

[SOURCE: Reference [1]]

**3.5.1.3**

**auger hole**

hole drilled with a power-driven *auger* (3.5.1)

[SOURCE: Reference [1]]

**3.5.1.4**

**breast auger**

*auger* (3.5.1) supported by a breastplate against a miner's body

Note 1 to entry: Used for *drilling* (3.1.3) holes in soft coal.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

**3.5.1.5**

**bucket auger**

short helical *auger* (3.5.1) incorporating a steel tube to help hold the cuttings on the auger during withdrawal from the drill hole

[SOURCE: Reference [1]]

**3.5.1.6**

**cleanout auger**

cleanout jet auger

*auger* (3.5.1) equipped with water-jet orifices designed to clean out collected material inside a driven pipe or *casing* (3.5.5) before taking soil samples from strata below the bottom of the casing

[SOURCE: Reference [1]]

**3.5.1.7**

**closed-spiral auger**

soil *sampling* (3.1.12.6) *auger* (3.5.1) made by spirally twisting a flat steel ribbon to form a tube like, hollow-centre, corkscrew like device

[SOURCE: Reference [1]]

**3.5.1.8**

**drill stem**

auger stem

long rod used in *rope drilling* (3.4.16) to increase the weight acting on the *bit* (3.5.3)

[SOURCE: Reference [1]]

**3.5.1.9**

**earth borer**

*auger* (3.5.1) for *boring* (3.3.4) into the ground, working in a cylindrical box to retain the cut earth until the tool is withdrawn

[SOURCE: Reference [1]]

**3.5.1.10****fuse auger**

instrument for regulating the time of burning of a fuse by removing a certain portion of the composition

Note 1 to entry: It has a movable graduated scale that regulates the depth to which the *auger* (3.5.1) should penetrate.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

**3.5.1.11****hand auger**

screw-like tool much like a large carpenters' *bit* (3.5.3) or a short cylindrical container with cutting lips attached to a rod operated by hand, and used to bore shallow holes and obtain samples of soil and other relatively unconsolidated near-surface materials

Note 1 to entry: Compare with *auger* (3.5.1).

[SOURCE: Reference [1]]

**3.5.1.11.1****hurdy-gurdy drill**

*hand auger* (3.5.1.11) used to drill a *borehole* (3.3.2) in soft rock or rock material, such as soil, clay, coal, etc.

[SOURCE: Reference [1]]

**3.5.1.12****power earth auger**

mechanically operated *auger* (3.5.1) for exploring and testing *deposit* (3.10.12) that is not very hard

Note 1 to entry: The *drilling* (3.1.3) *rig* (3.5.46) may be mounted on a lorry or on continuous tracks when greater depths may be reached.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

**3.5.1.13****ship auger**

*auger* (3.5.1) having a simple spiral (helical) body and a single cutting edge, with or without a screw on the end without a spur at the outer end of the cutting edge, used to obtain soil samples in sticky material

[SOURCE: Reference [1]]

**3.5.2****bailer**

tube, fitted with a valve at its base, which is lowered into a *borehole* (3.3.2) to remove cuttings and water

[SOURCE: BS 3618-3:1971]

**3.5.2.1****dump bailer**

liquid dump bailer

*bailer* (3.5.2) used in *borehole* (3.3.2)-cementation work, provided with a valving device that empties the contents of the *bailer* (3.5.2) (cement) at the bottom of a borehole

[SOURCE: Reference [1]]

### 3.5.3

**bit**  
device that may be attached to, or is, an integral part of a drill string and is used as a cutting tool to bore into or penetrate rock or other materials by utilizing power applied to the bit percussively or by rotation

Note 1 to entry: See under the following types of *bit*; bevel wall, bottom discharge, bull nose, *casing* (3.5.5), *casing shoe* (3.2.10), chilled shot, chopping, concave, cross, cruciform, diamond, drag, face discharge, fir tree, fishtail, bond set, impregnated, non- *core* (3.4.4), *pilot* (3.5.44), plug, reaming, *reaming shell* (3.5.45), roller rock, rose, sintered, *spudding* (3.4.19), under reaming, wallscrapper, wedge reaming, wedge rose.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

#### 3.5.3.1

##### **bevel wall bit**

diamond coring *bit* (3.5.3) with its inner walls tapered to house a split ring *core* (3.4.4) lifter

Note 1 to entry: See [Figure 2](#).



Figure 2 — Bevel wall bit

[SOURCE: BS 3618-3:1971]

#### 3.5.3.2

##### **bottom discharge bit**

type of diamond coring *bit* (3.5.3) designed to prevent erosion of the *core* (3.4.4) by the flushing water

Note 1 to entry: The inner tube of the *core barrel* (3.5.18) is extended to protect the core, and the flushing water after passing down the annular space between the inner and outer tubes, is discharged inside the *bit* (3.5.3) near to the cutting face.

[SOURCE: BS 3618-3:1971]

#### 3.5.3.3

##### **casing bit**

diamond set or tungsten carbide tipped rotary *bit* (3.5.3) designed to bore out an annulus slightly larger than the *casing* (3.5.5)

Note 1 to entry: It is withdrawn before the casing is inserted.

[SOURCE: BS 3618-3:1971, modified — Note 1 to entry was originally part of the definition.]

#### 3.5.3.4

##### **chilled shot bit**

flat surfaced *bit* (3.5.3) used with hardened steel shot to drill rock by a milling action

[SOURCE: BS 3618-3:1971]

**3.5.3.5****chisel bit**

percussive-type, rock-cutting *bit* (3.5.3) having a single, chisel-shaped cutting edge extending across the diameter and through the centre point of the *bit* (3.5.3) face

Note 1 to entry: See [Figure 3](#).



**Figure 3 — Chisel bit**

Note 2 to entry: Also called chisel-edge *bit* (3.5.3); chisel-point; Swedish *bit* (3.5.3).

[SOURCE: Reference [1]]

**3.5.3.5.1****chopping bit**

*chisel bit* (3.5.3.5) used in rotary drilling to break up dropped *core* (3.4.4) or broken rock

[SOURCE: BS 3618-3:1971]

**3.5.3.5.2****spudding bit**

heavy *chisel bit* (3.5.3.5) used in percussive drilling to drill through sub soil

[SOURCE: BS 3618-3:1971]

**3.5.3.6****concave bit**

tungsten carbide drill *bit* (3.5.3) for percussive *boring* (3.3.4)

[SOURCE: Reference [1]]

**3.5.3.7****diamond bit**

rotary *bit* (3.5.3) using diamonds as the cutting media

[SOURCE: BS 3618-3:1971]

**3.5.3.8****drag bit**

rotary *bit* (3.5.3) which has two or more cutting blades or wings with hard faced cutting edges

Note 1 to entry: Various types are the two wing, three wing, fishtail and *pilot* (3.5.44) *bit* (3.5.3).

[SOURCE: BS 3618-3:1971, modified — Note 1 to entry was originally part of the definition.]

### 3.5.3.9

#### face discharge bit

type of *diamond bit* (3.5.3.7) of similar design to that of the *bottom discharge bit* (3.5.3.2)

Note 1 to entry: The flushing water passes down the annular space between the inner and outer tubes of the *core barrel* (3.5.18) and is discharged through holes in the face of the *bit* (3.5.3) without washing against the *core* (3.4.4).

[SOURCE: BS 3618-3:1971, modified — Note 1 to entry was originally part of the definition.]

### 3.5.3.10

#### fishtail bit

rotary *bit* (3.5.3) used to drill soft formations

Note 1 to entry: The blade is flattened and divided, the divided ends curving away from the direction of rotation. It resembles a fishtail.

Note 2 to entry: Also called *drag bit* (3.5.3.8).

[SOURCE: Reference [1]]

### 3.5.3.11

#### handset bit

rotary *bit* (3.5.3) in which diamonds are set in cavities drilled in the surface of the *bit* (3.5.3)

[SOURCE: BS 3618-3:1971]

### 3.5.3.12

#### impregnated bit

*bit* (3.5.3) in which small whole diamonds and fragments of diamond are located at random throughout a sintered matrix

Note 1 to entry: As the matrix wears down, new, sharp diamond points are exposed; hence, the *bit* (3.5.3) is used until the *crown* (3.5.21) is consumed entirely.

[SOURCE: BS 3618-3:1971, modified — Note 1 to entry has been added.]

### 3.5.3.13

#### plug bit

noncore bit

non-coring diamond-set *bit* (3.5.3) which can be in the form of a bull nose *bit* (3.5.3), *pilot* (3.5.44) *bit* (3.5.3) or *concave bit* (3.5.3.6)

[SOURCE: BS 3618-3:1971]

### 3.5.3.14

#### reaming bit

rotary *bit* (3.5.3) used to enlarge the diameter of a *borehole* (3.3.2)

[SOURCE: BS 3618-3:1971]

### 3.5.3.15

#### roller rock bit

four cutter bit

three cone bit

two cone bit

rotary *bit* (3.5.3) fitted with two or more hardened steel or tungsten carbide tipped rollers of cylindrical or conical form

[SOURCE: BS 3618-3:1971]

**3.5.3.16****rose bit**

rotary *bit* (3.5.3) used to mill through steel objects lost in a *borehole* (3.3.2)

[SOURCE: BS 3618-3:1971]

**3.5.3.17****sintered bit**

rotary *bit* (3.5.3) in which diamonds are located in a predetermined pattern at the surface of a sintered matrix

[SOURCE: BS 3618-3:1971]

**3.5.3.18****under reaming bit**

expanding *bit* (3.5.3) used to enlarge the diameter of the hole below the *casing* (3.5.5) to allow the casing to be lowered further down the *borehole* (3.3.2)

[SOURCE: BS 3618-3:1971]

**3.5.3.19****wallscrapper bit**

rotary *bit* (3.5.3) used to enlarge the diameter of a *borehole* (3.3.2)

[SOURCE: BS 3618-3:1971]

**3.5.3.20****wedge reaming bit**

tapered or bull nose rotary *bit* (3.5.3) used to restart *drilling* (3.1.3) after a *deflection wedge* (3.5.23) has been fitted into a *borehole* (3.3.2)

[SOURCE: BS 3618-3:1971]

**3.5.3.21****wedge rose bit**

rotary *bit* (3.5.3) used to mill off part of the top ring of a *deflection wedge* (3.5.23)

[SOURCE: BS 3618-3:1971]

**3.5.4****caliper**

instrument used in conjunction with a *microlog* (3.3.7) which, when lowered down a *borehole* (3.3.2), measures and records the internal diameter throughout its depth

[SOURCE: BS 3618-3:1971]

**3.5.5****casing**

special steel tubing welded or screwed together and lowered into a *borehole* (3.3.2) to prevent entry of loose rock, gas, or liquid into the borehole, to prevent loss of circulation liquid into porous, cavernous, or crevassed ground

[SOURCE: Reference [1]]

**3.5.5.1****flush coupled casing**

*casing* (3.5.5) joined with a coupling which has the same outside diameter as the casing, but has two male threaded ends

**3.5.5.2****flush joint casing**

*casing* (3.5.5) with a male thread at one end and a female thread at the other; no coupling is used

### 3.5.6

#### **casing drive hammer**

drive hammer

monkey

weight used to drive the *casing* (3.5.5) down a *borehole* (3.3.2)

[SOURCE: BS 3618-3:1971]

### 3.5.7

#### **casing drive head**

drive head

*collar* (3.3.11) screwed to the top of the column of the *casing* (3.5.5) to prevent the casing from being damaged by the impact of the *drive hammer* (3.5.6)

[SOURCE: BS 3618-3:1971]

### 3.5.8

#### **casing drive shoe**

drive shoe

hardened steel shoe screwed to the lower end of the *casing* (3.5.5) to protect the casing when it is driven down a hole by percussive means

[SOURCE: BS 3618-3:1971]

### 3.5.9

#### **casing jar hammer**

jar hammer

*drive hammer* (3.5.6) used to extract the *casing* (3.5.5)

[SOURCE: BS 3618-3:1971]

### 3.5.10

#### **casing shoe**

diamond set rotary *bit* (3.5.3) screwed to the end of the *casing* (3.5.5)

Note 1 to entry: It clears the way for the casing and is normally left in the *borehole* (3.3.2).

[SOURCE: BS 3618-3:1971, modified — Note 1 to entry was originally part of the definition.]

### 3.5.11

#### **standpipe**

surface casing

first length of the *casing* (3.5.5) inserted in a *borehole* (3.3.2)

[SOURCE: BS 3618-3:1971]

### 3.5.12

#### **bracehead**

tiller

long handle used to turn the *drill string* (3.5.31) in percussive drilling

[SOURCE: BS 3618-3:1971]

### 3.5.13

#### **bull wheel**

reel used in *rope drilling* (3.4.16) to accommodate the *boring* (3.3.4) rope by which the *bit* (3.5.3) is suspended in the hole

[SOURCE: BS 3618-3:1971]

**3.5.14****calf wheel**

reel used in *rope drilling* (3.4.16) to accommodate the rope by which the *casing* (3.5.5) is raised or lowered

[SOURCE: BS 3618-3:1971]

**3.5.15****cathead**

auxiliary general-purpose winch associated with a *drilling* (3.1.3) *rig* (3.5.46)

[SOURCE: BS 3618-3:1971]

**3.5.16****circulating pump**

mud pump

slush pump

pump used to circulate mud or water through the *drilling* (3.1.3) column

[SOURCE: BS 3618-3:1971]

**3.5.17****clinometer**

inclinometer

instrument used to determine the amount and direction of *deviation* (3.3.12) of a *borehole* (3.3.2) from the vertical

[SOURCE: BS 3618-3:1971]

**3.5.18****core barrel**

hollow cylinder attached to a specially designed *bit* (3.5.3) and which is used to obtain and to preserve a continuous section, or *core* (3.4.4), of the rocks penetrated in *drilling* (3.1.3)

[SOURCE: Reference [1]]

**3.5.19****core lifter**

spring clip at the base of the *core barrel* (3.5.18) which grips the *core* (3.4.4), enabling it to be broken off and brought out of the hole

[SOURCE: BS 3618-3:1971]

**3.5.20****core picker**

cylinder with flat internal springs used to recover dropped *core* (3.4.4)

[SOURCE: BS 3618-3:1971]

**3.5.21****crown**

part of a *bit* (3.5.3) which contains the cutting diamonds

[SOURCE: BS 3618-3:1971]

**3.5.22****crown block**

pulley block mounted at the top of a *derrick* (3.5.24) from which the *travelling block* (3.5.55) is suspended

[SOURCE: BS 3618-3:1971]

3.5.23

**deflection wedge**

whipstock

wedge-shaped tool inserted in a *borehole* (3.3.2) to direct the *bit* (3.5.3) along a prescribed course

[SOURCE: BS 3618-3:1971]

3.5.24

**derrick**

framework over a *borehole* (3.3.2), used primarily to allow lengths of *drill rod* (3.5.30) to be added to the *drilling* (3.1.3) column

[SOURCE: BS 3618-3:1971]

3.5.25

**dip meter**

instrument used to record the amount and direction of the dip of strata exposed in the sides of a *borehole* (3.3.2)

[SOURCE: BS 3618-3:1971]

3.5.26

**double core barrel**

*core barrel* (3.5.18) with an inner tube to hold the *core* (3.4.4)

Note 1 to entry: The inner tube does not rotate during *drilling* (3.1.3), thereby giving a better core recovery.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

3.5.27

**draw work**

hoist

winch used in rotary drilling to raise and lower the *drilling* (3.1.3) column and *casing* (3.5.5)

[SOURCE: BS 3618-3:1971]

3.5.28

**drill collar**

heavy *drill rod* (3.5.30) attached to the top of the *core barrel* (3.5.18) to minimize *deviation* (3.3.12) of the hole and to increase the thrust on the *bit* (3.5.3) at the start of the hole

Note 1 to entry: A drill collar is usually of nearly the same outside diameter as the bit or core barrel on which it is used. Not to be confused with *guide rod* (3.5.36).

[SOURCE: BS 3618-3:1971, modified — Note 1 to entry has been added.]

3.5.29

**drill head**

swivel head

assembly which applies the *drilling* (3.1.3) pressure and rotation to the *drill rod* (3.5.30)

[SOURCE: BS 3618-3:1971]

3.5.30

**drill rod**

length of rod coupled together forming the *drilling* (3.1.3) column, to the end of which the either *core barrel* (3.5.18) or *bit* (3.5.3) are attached

[SOURCE: BS 3618-3:1971]

**3.5.31****drill string**

string of tools commonly used in *rope drilling* (3.4.16), namely, rope socket, *sinker bar* (3.5.51), *sliding jar* (3.5.52), *drill stem* (3.5.1.8) and *drill bit* (3.5.3)

[SOURCE: BS 3618-3:1971]

**3.5.32****drilling column**

column of *drill rod* (3.5.30) to the end of which either the *core barrel* (3.5.18) or *bit* (3.5.3) are attached

[SOURCE: BS 3618-3:1971]

**3.5.33****drive rod**

splined rod in the *drill head* (3.5.29) of a diamond *drilling* (3.1.3) apparatus, by means of which pressure and rotation are applied to the column of *drill rod* (3.5.30)

[SOURCE: BS 3618-3:1971]

**3.5.34****fishing**

searching for and attempting to recover, by the use of specially prepared tools, a piece or pieces of drilling equipment (such as sections of pipe, cables, or casting) that have become detached, broken, or lost from the *drill string* (3.5.31) or have been accidentally dropped into the hole

**3.5.34.1****fishing pike**

sharp-pointed *fishing tool* (3.5.34.5) which is intended to fit into the axial flushing hole of the extension rod

**3.5.34.2****fishing pike extension**

extension piece for a pointed tool used for recovering lost *drill rods* (3.5.30) or other equipment from a drill hole

**3.5.34.3****fishing rod string**

string of rods put together specifically for recovering rod or tubes lost down the hole

**3.5.34.4****fishing tap**

threaded conical device lowered into a drill hole and threaded into a detached *drill string* (3.5.31) as a means of recovering it

**3.5.34.5****fishing tool**

tool used to recover objects lost or stuck down a *borehole* (3.3.2), such as a length of rods remaining in the hole after the drill column has broken

EXAMPLE Beech, dart, recovery top, spear, spring dart.

[SOURCE: BS 3618-3:1971, modified — EXAMPLE was originally part of the definition.]

**3.5.35****geophone**

instrument used for detecting the passage of sound waves through the strata

Note 1 to entry: It is a seismic detector that produces a voltage proportional to the displacement, velocity, or acceleration of ground motion, within a limited frequency range.

[SOURCE: BS 3618-3:1971, modified — Note 1 to entry has been added.]

### 3.5.36

#### **guide rod**

heavy *drill rod* (3.5.30) coupled to and having the same diameter as a *core barrel* (3.5.18) on which it is used

Note 1 to entry: It gives additional rigidity to the core barrel and helps to prevent *deflection* (3.4.7) of the *borehole* (3.3.2).

Note 2 to entry: Also called “*core* (3.4.4)-barrel rod” and “oversize rod”.

Note 3 to entry: Compare with *drill collar* (3.5.28).

[SOURCE: Reference [1]]

### 3.5.37

#### **kelly**

grief stem

rod attached to the top of the drill column in rotary drilling

Note 1 to entry: It passes through the rotary table and is turned by it, but is free to slide down through it as the *borehole* (3.3.2) deepens.

[SOURCE: BS 3618-3:1971, modified — Note 1 to entry was originally part of the definition.]

### 3.5.38

#### **lifting bail**

link by which the water swivel is suspended

[SOURCE: BS 3618-3:1971]

### 3.5.39

#### **Marsh funnel**

funnel used to measure the viscosity of *drilling* (3.1.3) mud

Note 1 to entry: It consists of a copper funnel, about 30 cm long with a 15 cm diameter at the top, that has a 10-mesh screen over half its diameter to remove debris and a 6 mm diameter exit tube at the bottom through which the rate of flow is timed. It takes 26 s for a quart of clean water to flow through and correspondingly longer for muds of greater viscosity.

Note 2 to entry: Gel strength is measured by comparing the rate of flow of freshly agitated mud with that of mud that has been allowed to remain quiescent for 10 min.

[SOURCE: Reference [1], modified — Notes 1 and 2 to entry were originally part of the definition.]

### 3.5.40

#### **mud balance**

instrument used to measure the density of *drilling* (3.1.3) mud

[SOURCE: BS 3618-3:1971]

### 3.5.41

#### **off take**

rod stand

setout

length of *boring* (3.3.4) rods unscrewed and detached at the top of a *borehole* (3.3.2)

[SOURCE: BS 3618-3:1971]

**3.5.42****overshot assembly**

device which is passed down the inside of the *drill rod* (3.5.30) to extract the inner tube of a *wire line core barrel* (3.5.58) and bring it to the surface

[SOURCE: BS 3618-3:1971]

**3.5.43****penetrometer**

instrument which automatically records the depth of *drilling* (3.1.3) and the *penetration rate* (3.4.13)

[SOURCE: BS 3618-3:1971]

**3.5.44****reaming pilot**

pilot

smooth bar used to guide a *reaming bit* (3.5.3.14) or *casing bit* (3.5.3.3) in the hole

[SOURCE: BS 3618-3:1971]

**3.5.45****reaming shell**

cutting cylinder, fitted between the *bit* (3.5.3) and the *core barrel* (3.5.18) or *casing* (3.5.5), used to maintain the diameter of the *borehole* (3.3.2)

Note 1 to entry: The outside wall may be set with diamonds or hard metal.

[SOURCE: BS 3618-3:1971, modified — Note 1 to entry was originally part of the definition.]

**3.5.46****rig**

complete equipment used for *drilling* (3.1.3) a *borehole* (3.3.2)

[SOURCE: BS 3618-3:1971]

**3.5.47****sand reel**

reel on which the *bailer* (3.5.2) rope is wound

[SOURCE: BS 3618-3:1971]

**3.5.48****sediment tube**

sludge barrel

cylindrical container fitted above the *core barrel* (3.5.18) to catch the coarse cuttings which tend to fall back to the bottom of the hole

[SOURCE: BS 3618-3:1971]

**3.5.49****shearmeter**

instrument used to measure the gel strength of *drilling* (3.1.3) mud

[SOURCE: BS 3618-3:1971]

**3.5.50****single-tube core barrel**

simplest *core barrel* (3.5.18), having only a single cylindrical tube

[SOURCE: BS 3618-3:1971]

**3.5.51**

**sinker bar**

heavy rod used to increase the snatching effect of the *sliding jar* (3.5.52) in *rope drilling* (3.4.16)

[SOURCE: BS 3618-3:1971]

**3.5.52**

**sliding jar**

sliding joint used in *rope drilling* (3.4.16) to apply a snatch to the *bit* (3.5.3) at each upward stroke

[SOURCE: BS 3618-3:1971]

**3.5.53**

**slip**

tool used at the mouth of a *borehole* (3.3.2) to grip the *drill rod* (3.5.30) or the *casing* (3.5.5), as these are being inserted or withdrawn

[SOURCE: BS 3618-3:1971]

**3.5.54**

**split core barrel**

type of *core barrel* (3.5.18) which can be opened longitudinally to remove the *core* (3.4.4)

[SOURCE: BS 3618-3:1971]

**3.5.55**

**travelling block**

pulley block which hangs below the *crown block* (3.5.22) and is used for lifting the *drilling* (3.1.3) column

[SOURCE: BS 3618-3:1971]

**3.5.56**

**walking beam**

rocking beam

beam used to impart a reciprocating movement to the *drilling* (3.1.3) column in percussive drilling

[SOURCE: BS 3618-3:1971]

**3.5.57**

**weight indicator**

instrument which records the weight of the column of rods suspended from the *boring* (3.3.4) rope

[SOURCE: BS 3618-3:1971]

**3.5.58**

**wire line core barrel**

double tube *core barrel* (3.5.18), the inner tube of which can be removed to extract a *core* (3.4.4) without withdrawing the *drill rod* (3.5.30)

[SOURCE: BS 3618-3:1971]

**3.6**

**Survey**

**3.6.1**

**base station**

observation point used in *geophysical surveys* (3.6.4) as a reference, to which measurements at additional points can be compared

[SOURCE: Reference [1]]

**3.6.2****fixed-electrode method**

*geophysical surveying* (3.6.4) method used in the self-potential system of *prospecting* (3.1.10), in which one electrode remains stationary while the other is grounded at progressively greater distances from it

Note 1 to entry: The method indicates a mineral body directly beneath the greatest *anomaly* (3.1.2) and has been extensively and successfully used.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

**3.6.3****flight pattern**

planned flying route used in an aeromagnetic *survey* (3.6) or in another airborne *geophysical survey* (3.6.4)

[SOURCE: Reference [1]]

**3.6.4****geophysical survey**

*exploration* (3.2.5) of an area in which geophysical properties and relationships unique to the area are mapped by one or more geophysical methods

[SOURCE: Reference [1]]

**3.6.5****resistivity profile**

*geophysical survey* (3.6.4) using the *resistivity method* (3.2.10) which in an assembly of electrodes spaced at a constant distance is moved along *profiles* (3.1.8.9), resulting in lateral variations in resistivity being shown

Note 1 to entry: In favourable terrain, the test shows the existence of faults that have thrown strata of different resistivity against each other; similar relationships result in the detection of an anticline, a syncline, or an underground channel.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

**3.6.6****terrain correction**

correction applied to observed values obtained in *geophysical surveys* (3.6.4) in order to remove the effect of variations in the observations due to the topography near observation sites

[SOURCE: Reference [1]]

**3.7****Economic geology****3.7.1****blocking out**

delimitation of an orebody on three sides in order to develop it, i.e., to make estimates of its mass and quality

[SOURCE: Reference [1]]

**3.7.2****dead**

economically valueless area, in contrast to a quick area or ore

[SOURCE: Reference [1]]

### 3.7.3

#### **economic geology**

application of geologic knowledge and theory to the search for and the understanding of economically exploitable *mineral deposit* (3.10.28)

Note 1 to entry: These applications can consist of the study and analysis of geological bodies and materials that can use profitably by humans.

Note 2 to entry: These materials can be fuels, metallic minerals, non-metallic minerals, water and geothermal resources (3.8.11).

### 3.7.4

#### **feasibility study**

studies gathering together the information that is required for a decision whether and how to proceed further

Note 1 to entry: A study of this kind may vary from a preliminary estimate of mill cost to a very complete *survey* (3.6) that may include a market analysis, mining plan with ore grades and mining cost, metallurgical testing, process development, plans for the mill, cash flow analysis, etc.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

## 3.8

### **Resource**

#### 3.8.1

##### **conservation**

act of conserving, preserving, guarding, or protecting; keeping in a safe or entire state; using in an effective manner or holding for necessary uses, as *mineral resources* (3.8.11)

[SOURCE: Reference [1]]

#### 3.8.2

##### **demonstrated resource**

sum of a *measured resource* (3.8.10) plus an *indicated resource* (3.8.8)

[SOURCE: Reference [1]]

#### 3.8.3

##### **depletion**

act of emptying, reducing, or exhausting a natural *resource* (3.8.11)

Note 1 to entry: In mining, specifically, said of ore *reserves* (3.9.8).

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

#### 3.8.4

##### **field**

region or area that possesses or is characterized by a particular *mineral resource* (3.8.11)

EXAMPLE Goldfield, coalfield.

[SOURCE: Reference [1], modified — EXAMPLE was originally part of the definition.]

#### 3.8.5

##### **hypothetical resource**

*undiscovered resource* (3.8.16) that is similar to known mineral bodies that may be reasonably expected to exist in the same producing district or region under analogous geologic conditions

Note 1 to entry: If *exploration* (3.2.5) confirms its existence and reveals enough information about its quality, grade, and quantity, it will be reclassified as an *identified resource* (3.8.6).

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

### 3.8.6

#### identified resource

*resource* (3.8.11) whose location, grade, quality, and quantity are known or estimated from specific geologic evidence

Note 1 to entry: An identified resource includes economic, marginally economic, and subeconomic components. To reflect varying degrees of geologic certainty, these economic divisions can be subdivided into *measured resource* (3.8.10), *indicated resource* (3.8.8), and *inferred resource* (3.8.9).

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

### 3.8.7

#### indicated ore

ore for which mass and grade are computed from information similar to that used for *measured resource* (3.8.10), but the sites for inspection, measurement, and *sampling* (3.1.12.6) are farther apart or otherwise less adequately spaced

Note 1 to entry: The degree of assurance is high enough to assume continuity between points of observation.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

### 3.8.8

#### indicated resource

*resource* (3.8.11) from which the quantity and either grade or quality are computed from information similar to that used for a *measured resource* (3.8.10), but the sites for inspection, *sampling* (3.1.12.6), and measurement are farther apart or are otherwise less adequately spaced

Note 1 to entry: The degree of assurance, although lower than that for measured resource, is high enough to assume continuity between points of observation.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

### 3.8.9

#### inferred resource

*resource* (3.8.11) from which estimates are based on an assumed continuity beyond either measured or *indicated resource* (3.8.8), for which there is geologic evidence

Note 1 to entry: Inferred resource may or may not be supported by samples or measurements.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

### 3.8.10

#### measured resource

*resource* (3.8.11) from which the quantity is computed from dimensions revealed in outcrops, trenches, workings, or drill holes; either grade or quality are computed from the results of detailed *sampling* (3.1.12.6)

Note 1 to entry: The sites for inspection, sampling and measurement are spaced so closely and the geologic character is so well defined that size, shape, depth and mineral content of the resource are well established.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

### 3.8.11

#### resource

concentration of naturally occurring solid, liquid, or gaseous material in or on the Earth's crust in such form and amount that economic extraction of a commodity from the concentration is currently or potentially feasible

[SOURCE: Reference [1]]

### 3.8.12

#### **resource characterization**

determination of the shape, size, quality, quantity, and variability of the geologic entity and the limits of variable geologic features, so as to provide the information for synthesis of commonly subtle features into an accurate, predictive description of the *resource* (3.8.11) environment

[SOURCE: Reference [1]]

### 3.8.13

#### **restricted resource**

part of any *resource* (3.8.11) category that is restricted from extraction by laws or regulations, but otherwise meets all the requirements of a *reserve* (3.9.8)

[SOURCE: Reference [1]]

### 3.8.14

#### **speculative resource**

*undiscovered resource* (3.8.16) that may occur either in known types of *deposit* (3.10.12) in favourable geologic settings where mineral discoveries have not been made, or in types of deposit as yet unrecognized for their economic potential

Note 1 to entry: If *exploration* (3.2.5) confirms its existence and reveals enough information about its quantity, grade, and quality, it will be reclassified as an *identified resource* (3.8.6)

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

### 3.8.15

#### **subeconomic resource**

part of an *identified resource* (3.8.6) that does not meet the economic criteria of *reserve* (3.9.8) and *marginal reserve* (3.9.5)

[SOURCE: Reference [1]]

### 3.8.16

#### **undiscovered resource**

*resource* (3.8.11), the existence of which is only postulated, comprising *deposits* (3.10.12) that are separate from *identified resource* (3.8.6)

Note 1 to entry: An undiscovered resource may be postulated in deposit of such grade and physical location as to render it economic, marginally economic, or subeconomic. To reflect varying degrees of geologic certainty, undiscovered resources may be divided into *hypothetical resource* (3.8.5) and *speculative resource* (3.8.14).

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

## 3.9

### **Reserves**

#### 3.9.1

##### **developed reserve**

ore blocked out

ore that has been exposed on three sides and for which mass and quality estimates have been made; ore essentially ready for mining

Note 1 to entry: Compare with *proved reserve* (3.9.7).

[SOURCE: Reference [1]]

**3.9.2****economic depletion**

reduction in the value of a *mineral deposit* (3.10.28) as the *minerals reserve* (3.9.8)

[SOURCE: Reference [1]]

**3.9.3****inferred reserve base**

in-place part of an *identified resource* (3.8.6) from which *inferred reserves* (3.9.8) are estimated

Note 1 to entry: Quantitative estimates are based largely on knowledge of the geologic character of a *deposit* (3.10.12) for which there may be no samples or measurements

Note 2 to entry: The estimates are based on an assumed continuity beyond the *reserve base* (3.9.9), for which there is geologic evidence.

[SOURCE: Reference [1]]

**3.9.4****life of mine**

time in which, through the employment of the available capital, the *ore reserve* (3.9.8)—or such reasonable extension of the *ore reserve* as conservative geological analysis may justify—will be extracted

[SOURCE: Reference [1]]

**3.9.5****marginal reserve**

part of the *reserve* (3.9.8) base that, at the time of determination, borders on being economically producible

Note 1 to entry: Its essential characteristic is economic uncertainty. Included are *resources* (3.8.11) that would be producible, given postulated changes in economic or technologic factors.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

**3.9.6****probable reserve**

area of coal or mineral believed to lie beyond the *developed reserve* (3.9.1) but not yet proven by development

[SOURCE: Reference [1]]

**3.9.7****proved reserve**

proved ore

*ore deposit* (3.10.31) that has been reliably established as to its volume, mass, and quality by approved *sampling* (3.1.12.6), valuing, and testing methods supervised by a suitably qualified person

Note 1 to entry: The proved reserve is the overridingly important asset of a mine, and by its nature is a wasting one from the start of exploitation unless it is increased by further development.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

**3.9.8****reserve**

assured mineral

mineral reserve

estimate within specified accuracy limits of the valuable metal or mineral content of a known *deposit* (3.10.12) that may be produced under current economic conditions and with present technology

Note 1 to entry: That part of the *reserve base* (3.9.9) that could be economically extracted or produced at the time of determination.

Note 2 to entry: The term reserve does not necessarily signify that extraction facilities are in place and operative.

Note 3 to entry: Reserves include only recoverable materials; thus, terms such as extractable reserves and recoverable reserves are redundant and are not a part of this classification system

[SOURCE: Reference [1], modified — Notes 1, 2 and 3 to entry were originally part of the definition.]

### 3.9.9

#### reserve base

part of an *identified resource* (3.8.6) that meets specified minimum physical and chemical criteria related to current mining and production practices, including those for grade, quality, thickness, and depth

Note 1 to entry: The *reserve* (3.9.8) base is the in-place demonstrated (measured plus indicated) *resource* (3.8.11) from which reserves are estimated.

Note 2 to entry: The reserve base includes those *resources* (3.8.11) that are currently economic (reserve), marginally economic [*marginal reserve* (3.9.5)], and some of those that are currently subeconomic (*subeconomic resource* (3.8.15)).

[SOURCE: Reference [1], modified — Notes 1 and 2 to entry were originally part of the definition.]

### 3.9.10

#### triangular method

method of ore *reserve* (3.9.8) estimation based on the assumption that a linear relationship exists between grade difference and the distance between all drill holes

[SOURCE: Reference [1]]

### 3.10

#### Deposit

#### 3.10.1

##### abyssal deposit

*deposit* (3.10.12) of the deep sea, accumulating in depths of more than 1,500 fathoms (2,7 km of water)

Note 1 to entry: These deposits comprise the organic oozes, various muds, and red clay of the deepest regions.

[SOURCE: Reference [1]]

#### 3.10.2

##### beach deposit

concentrations of mineral formed by the grinding action of a natural force (wind, wave, or frost) and the selective transporting action of tides and winds

[SOURCE: Reference [1]]

#### 3.10.3

##### bedded deposit

blanket deposit

*mineral deposit* (3.10.28) that is found parallel with the stratification of sedimentary rocks and usually of contemporaneous origin

Note 1 to entry: The term is used to describe layer-like *deposit* (3.10.12) of replacement origin.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

**3.10.4****biochemical deposit**

precipitated *deposit* (3.10.12) resulting directly or indirectly from vital activities of an organism, such as bacterial iron ore or coralline limestone

[SOURCE: Reference [1]]

**3.10.5****biomechanical deposit**

*deposit* (3.10.12) due to the detrital accumulation of organic material, as in the cases of limestones and coal

[SOURCE: Reference [1]]

**3.10.6****commercial deposit**

*deposit* (3.10.1) of oil, gas, or other minerals in sufficient quantity for production in paying quantities

[SOURCE: Reference [1]]

**3.10.7****contact deposit**

*mineral deposit* (3.10.28) between two unlike rocks

Note 1 to entry: The term is usually applied to an orebody at the contact between a sedimentary rock and an igneous rock.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

**3.10.8****contact-metasomatic deposit**

*deposit* (3.10.12) formed by high-temperature magmatic emanations along an igneous contact

[SOURCE: Reference [1]]

**3.10.9****continental deposit**

sedimentary *deposit* (3.10.12) laid down on land or in bodies of water not directly connected with the ocean, as opposed to a marine deposit; a glacial, fluvial, lacustrine, or eolian deposit formed in a nonmarine environment

[SOURCE: Reference [1]]

**3.10.10****debris deposit**

refuse from hydraulic mining operations, tailings

[SOURCE: Reference [1]]

**3.10.11****deep-seated deposit**

*ore deposit* (3.10.31) formed at an estimated depth of 12,000 ft. (3,66 km) or more, at temperatures ranging from 300°C to 575°C

Note 1 to entry: The *deposits* (3.10.12) are commonly tubular or veinlike in form, though some are irregular in shape.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

### 3.10.12

#### **deposit**

*mineral deposit* (3.10.28) or *ore deposit* (3.10.31) used to designate a natural occurrence of a useful mineral, or an ore, in sufficient extent and degree of concentration to invite exploitation

[SOURCE: Reference [1]]

### 3.10.13

#### **deposit type**

class representing all the recognized *mineral deposits* (3.10.28) that are defined by physical and genetic factors that can be consistently differentiated from those of other classes

[SOURCE: Reference [1]]

### 3.10.14

#### **detrital deposit**

minerals that have been released by weathering and later have been transported, sorted, and collected by natural agencies into a valuable *deposit* (3.10.12)

Note 1 to entry: Such minerals are usually of high specific gravity and are resistant to abrasion and weathering. Examples are gold, diamonds, platinum, tin (cassiterite), monazite, magnetite, and ilmenite, these last two being the common constituents of black sand

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

### 3.10.15

#### **disseminated deposit**

magmatic disseminated ore deposit

type of *mineral deposit* (3.10.28) in which the minerals occur as small particles or veinlets scattered through the country rock

[SOURCE: Reference [1]]

### 3.10.16

#### **emanation deposit**

*ore deposit* (3.10.31) of gaseous magmatic origin

[SOURCE: Reference [1]]

### 3.10.17

#### **estuarine deposit**

sedimentary *deposit* (3.10.12) laid down in the brackish water of an estuary, characterized by fine-grained sediment (chiefly clay and silt) of marine and fluvial origin mixed with a high proportion of decomposed terrestrial organic matter;

Note 1 to entry: The estuarine deposit is finer grained and of more uniform composition than a deltaic deposit.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

### 3.10.18

#### **hydrothermal deposit**

*mineral deposit* (3.10.28) that originated from hot, ascending aqueous solutions derived from a magma

Note 1 to entry: Compare with *hypothermal deposit* (3.10.20).

[SOURCE: Reference [1]]

### 3.10.19

#### **hypobatholithic deposit**

*mineral deposit* (3.10.28) found in a deeply eroded mass of intrusive rock with few roof pendants remaining

[SOURCE: Reference [1]]

**3.10.20****hypothermal deposit**

said of a hydrothermal *mineral deposit* (3.10.28) formed at high temperatures and pressures

Note 1 to entry: Compare with *hydrothermal deposit* (3.10.18).

[SOURCE: Reference [1]]

**3.10.21****intermediate vein zone deposit**

*deposit* (3.10.12) thought to have been formed at a depth ranging from 4,000 ft. to 12,000 ft. (1,2 km to 3,7 km) below the surface and at a temperature between 175° C and 300° C

Note 1 to entry: Such a deposit may take the form of a fissure vein, a series of parallel fissures called a sheeted zone, a replacement of the wall rock of fissures, or a large *disseminated deposit* (3.10.15).

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

**3.10.22****magmatic deposit**

magmatic ore deposit

*ore deposit* (3.10.31) formed by magmatic segregation, generally in mafic rocks and layered intrusions, as crystals of metallic oxides or from an immiscible sulfide liquid

[SOURCE: Reference [1]]

**3.10.23****magmatic injection deposit**

straight magmatic *mineral deposit* (3.10.28) (*ore deposit* (3.10.31)), the formation of which has often been ascribed to injection into the older country rock of liquefied crystal differentiates, of residual liquid segregations, or of immiscible liquid separations and accumulations

[SOURCE: Reference [1]]

**3.10.24****marginal deposit**

magmatic segregation at the bottom and periphery of an intrusive rock

[SOURCE: Reference [1]]

**3.10.25****marginal ore deposit**

*deposit* (3.10.12) near the lower limit of commercial workability

[SOURCE: Reference [1]]

**3.10.26****mesothermal deposit**

*mineral deposit* (3.10.28) formed at moderate temperature and pressure, in and along fissures or other openings in rocks, by *deposition* (3.10.12) at intermediate depths, from hydrothermal fluids

Note 1 to entry: Mesothermal deposit is believed to have formed mostly between 175° C and 300° C at depths of 1,220 m to 3,660 m.

[SOURCE: Reference [1], modified — Note 1 to entry was originally part of the definition.]

**3.10.27****metamorphic deposit**

*ore deposit* (3.10.31) that has been subjected to great pressure, high temperature, and alteration by solutions

Note 1 to entry: It may have become warped, twisted, or folded, and the original minerals may have been rearranged and recrystallized