

Survey of Mineral Exploration, Deposit Appraisal and Mine Complex Development Expenditures

Reporting guide

Please report on all properties, deposits or mines for which you are the operator in the province or territory covered by this report. All categories of expenditures in Sections 14, 15, 16 and 18 should be reported by the mineral resource development work phase as defined in 12.0 and by the location of activity (whether a mine site or not, also referred to as on- or off-mine-site) as defined in 13.0. Report all costs in Canadian dollars (\$). For more information on specific parameters and study cases, consult the *Guidelines*.

INTENTIONS: Please remember to complete this section, located at the bottom of page 1, by providing your total intentions by mineral resource development work phase (exploration, deposit appraisal, and mine complex development).

ABORIGINAL EMPLOYMENT: Aboriginal means any Indian, Inuit or Métis person who is indigenous to Canada. The number of Aboriginal people employed includes all types of employment (full-time, part-time, seasonal, temporary, etc.).

12.0 Mineral Resource Development Work Phases

1. **Exploration work phase:** the search for, discovery and first delimitation of a previously unknown mineral deposit or the re-evaluation of a sub-marginal or neglected mineral deposit in order to enhance its potential economic interest based on delimited tonnage, grade, and other characteristics. This phase is completed when a deposit has sufficient indicated mineral resources accompanied by a preliminary assessment report (positive scoping study) that justifies additional, more detailed, and costly deposit appraisal work. The expenditures include all field activities and support, including capital, repair and maintenance expenditures,¹ carried out on- or off-mine-site (see 13.0 and footnotes 2 and 3).
2. **Deposit appraisal work phase:** the steps undertaken to bring a delimited deposit by definition drilling, comprehensive tests, and planning to the stage of detailed knowledge required for a feasibility study that will fully justify and support a production decision and all the required financing. The expenditures include all field activities and support costs, including capital, repair and maintenance expenditures,¹ carried out on- or off-mine-site.^{2,3}

3. **Mine complex development work phase:** all work and support activities carried out on a mine site² to define, and gain access to the ore and prepare it for production, as well as to extend the current ore reserves by exploring and appraising the immediate vicinity of the deposits inside the limits described in guideline 12.0 (3), page 3.

The expenditures include all field activities and support, including capital, repair and maintenance expenditures carried out on a mine site² that is in production⁴ or committed to production³ and for related infrastructure and plants, such as pelletizing plants, that are not located at the mine site, but exclude metal smelting and/or refining plants.

13.0 Site of a Producing Mine or Mine Committed to Production

Covers all activities related to mine complex development, including those related to installations and infrastructure located outside the mine site and for exploration or deposit appraisal (guideline 12.0 (3) page 3) directed at an additional mineral deposit SEPARATE from the current mine reserves and located STRICTLY on an existing mine site² that is in production or committed to production.³ This excludes the sites of temporarily or permanently closed mines, and advanced projects not yet committed to production.³

1. Repair and maintenance expenditures apply only to capital assets (construction, machinery and equipment), not to field expenditures.

2. In Québec a MINE SITE corresponds to the area covered by a mining lease or a mining concession. It also includes specific components or infrastructures located outside the mining lease or the mining concession, such as a concentrator, an iron pellet plant and a tailings pond.

3. For a mine site to be COMMITTED TO PRODUCTION, all of the following criteria must be met: (1) the feasibility of developing the deposit(s) at a profit has been established by an exhaustive and complete feasibility study; (2) a formal production decision has been made by the organization; (3) the necessary financing is on hand or has been arranged; (4) all required authorizations and permits have been obtained; and (5) major pieces of production equipment have been purchased or ordered.

4. Exclude mining cost to avoid duplication of operating costs with the *Annual Census of Mines, Quarries and Sand Pits – Establishment Schedule*.

Description of Categories of Expenditures

14.0 Field Surveys and Surface and Underground Work (Includes Field Overhead)

Includes expenditures associated with geoscientific surveys, drilling, rock work, other costs, engineering, economic and feasibility studies, mineral leases, and head office costs related to the project. It includes wages, salaries, fringe benefits, food, accommodation and other services, equipment rentals, all vehicle expenses, transportation costs (for people and equipment), and all related technical activities/services such as planning, data collection, interpretation, evaluation, map making, and reports. The costs reported for each activity should include all work carried out by the project operator and contractors, and all required field supervision and project management. Other costs should be attributed to the field survey and work category they relate to, if feasible. All surveys and work done for environmental purposes should be entered in 15.5. Include all costs related to Canadian projects, whether incurred in Canada or abroad.

14.18 Mineral Leases, Claims, Staking, Line Cutting:

Staking costs and fees (including recording fees), licence and lease applications, renewal fees, legal fees pertaining to mineral leases and claims, and fees paid for assessment work. Fees paid in exchange for unperformed assessment work should be credited to this account upon reimbursement following performance of the work (when applicable). All environment-related costs are excluded.

14.21 Geology and Geochemistry Surveys:

Geology: prospecting, mapping, rock sampling, assaying associated with geological surveys, supervision of drilling programs or rock work, core logging, and all other related work such as geotechnical and mineralogical studies.

Geochemistry: sample collection and supervision in relation to various types of geochemical sampling activities in stream, lake or glacial sediments, soils and rocks, as well as assaying, indicator mineral analysis, and other related activities.

14.22 Ground and Airborne Geophysics:

Airborne, surface, downhole or underground geophysical surveys using magnetic, electromagnetic, induced polarization, radar, gravimetric and other methods, and other related activities. Remote sensing and satellite-imaging activities are also included in this category.

14.5 to 14.8 Drilling

Drilling is reported as “surface” or “underground” and as “diamond drilling” or “other types” (rotary, percussion, reverse circulation, overburden and sonic drilling, etc.). This activity includes all expenditures related to personnel and drill mobilization, site preparation, drilling, moves between drill holes, required mobile and support equipment, and other costs, as well as related sampling and assaying costs, including microdiamond testing and diamond recovery. Large-diameter drilling or reverse-circulation drilling undertaken to obtain large bulk samples, including handling and transportation costs, should be reported here.

14.9 Stripping, Trenching:

Blasting for large surface open cuts, related control sampling and assaying, including microdiamond testing and diamond recovery, and all costs related to large and very large bulk sampling programs collected by these methods, including handling and transportation. For mine complex development projects, report only initial overburden removal.

14.23 Other Rock Work:

Shaft sinking, ramp, drift/crosscut, raise/decline (structure component, see 18.1.1), rock slashing, shallow glory holes, related control sampling and assaying (including microdiamond testing and diamond recovery and excluding pilot work, see 14.14), dewatering (excluding pumping tests, see 14.14), and all costs related to large and very large bulk sampling programs collected by these methods (including handling and transportation).

14.14 Engineering Studies:

All expenditures related to the additional studies, tests, pilot work, and production tests (for mining, sampling plant, mineral processing and/or metallurgy of bulk samples, dewatering/pumping tests, etc.), and all technical feasibility of a mining project.

14.24 Preliminary Assessment, Pre-feasibility and Feasibility Studies

Preliminary Assessment: all expenditures for economic studies (markets, prices, financing, etc.) required to appraise a mining project and establish its initial potential viability, prior to the completion of a preliminary feasibility study.

Pre-feasibility and Final Feasibility Studies: all expenditures related to detailed technical and financial studies required to confirm the project’s profitability and advance it to the mine complex development stage, to obtain all necessary financing, required leases, permits and authorizations excluding environmental permits (15.5) and land access expenditures (16.1).

Description of Categories of Expenditures (cont'd)

15.5 Environment

See Section 18 for the environment-related capital and repair and maintenance expenditures, including protection and mine-site restoration.

Environmental Characterization: all costs of environmental characterization including baseline studies and assessment (preliminary environmental impact studies).

Environmental Assessment and Permits: all costs related to the process of meeting the legal and regulatory requirements or guidelines for environmental assessment and for obtaining permits required for the work program under consideration, including preproduction permits.

Environmental Protection: costs for monitoring (additional to normal practices) and complying with laws, regulations and guidelines related to air emissions, liquid effluents, ground pollution, and wildlife and habitat protection. Environmental fines are included in this category.

Environmental Restoration: all costs of decommissioning temporary installations, reclamation and restoration, as well as monitoring, if required, after specific work has ceased. Include in Section 18 capital, repair and maintenance expenditures related to restoration of permanent installations at the mine complex development phase (including care and maintenance at temporarily closed mines). Exclude mine-site reclamation of mines permanently shut down.

16.1 Socio-economic, Impact and/or Benefits

Agreements:

Land access agreements, permits, and damages, as well as all costs related to establishing impact and benefits agreements, socio-economic agreements, and other requirements for mine complex development and mine production, and the costs of rights of way, damages and permits for exploration and deposit appraisal work, including all associated legal fees, but excluding all environment-related costs.

14.17 Other Field Work Costs:

Expenditures related to surveying and general or overhead costs that could NOT be attributed or prorated to a specific work activity. These expenditures may include such items as office rental, warehouse and storage, radio and telecommunications, and energy costs unrelated to mine production. At the exploration and deposit appraisal phases, these costs may include the temporary construction of camps, access roads and airstrips, other transportation-related facilities, and the care and maintenance of projects on hold and awaiting permits or financing.

14.19 Head Office Including Other Corporated Offices

Costs Directly Related to Projects:

The portion of costs incurred at a head office that is applicable to work on specific mineral development projects. These expenditures may include costs related to exploration, deposit appraisal, and mine complex development, such as administration, management, head office overhead, and legal and any other project-related head office activities that are not already reported in other expenditure categories. No costs related to salaries, fringe benefits, and expenditures related to activities carried out in the field should be charged here (see 14.0). **For a producing mine, avoid duplication of head office costs reported in the *Annual Census of Mines*.**

18.1 Capital Assets

Capital assets for construction, machinery and equipment include expenditures by the company for work performed by contractors or by the company from its own account, such as salaries and wages, materials and supplies, and other charges such as engineering, consulting, and project management fees. Capital expenditures, referring to new assets, new and used assets imported, and the costs for renovation, retrofit, refurbishing, overhauling and rehabilitation, are reported on lines 18.1.1 (non-residential construction excluding lands) and 18.1.2 (machinery and equipment), and the purchase of used assets in Canada is reported on lines 18.1.1.1 (non-residential construction) and 18.1.2.1 (machinery and equipment). New residential construction is reported on line 18.1.3. All capital expenditures related to environmental protection and restoration are included under this category.

18.1.1 Non-residential Construction (Excluding Land):

Total capital expenditures incurred during the year for industrial and commercial construction, marine construction, permanent roads and other transportation-related construction, waterworks, sewage systems, electric power, mining construction (such as shaft structures), other construction or structures (not specified elsewhere), and environment-related construction. All mine development construction investments (structures only) related to "rock work" (14.23) are reported here.

18.1.2 Machinery and Equipment:

Total capital expenditures incurred during the year on all new machinery and tooling, whether for own use or for lease or rent to others. The following subheadings are provided: general machinery and equipment, transportation equipment, computer-assisted process machinery and equipment, conventional process machinery and equipment (non-computer-assisted), other machinery and equipment, and environment-related machinery and equipment costs. Also includes mine development construction investments related to "rock work" (14.23).

Description of Categories of Expenditures (cont'd)

18.1.3 New Residential Construction (Excludes Land):

Declare the value of residential buildings, including expenditures for the residential portions of town plots and multi-use complexes. Please take into account the following exceptions:

- (1) residences without bathrooms or kitchens;
- (2) the non-residential portions of town plots and multi-use complexes; and
- (3) service expenditures.

Expenditures related to these exceptions must be included with the appropriate capital assets (i.e., for non-residential construction).

18.1.4 Purchase of Lands and Option Payments:

Capital expenditures for land should include all costs associated with the purchase of land parcels or mineral rights that are not amortized or depreciated, and property option payments.

18.2 Repair and Maintenance

Non-capitalized **repair and maintenance** expenditures consist of the gross non-capitalized repair expenditures on non-residential buildings, other structures and machinery, the costs of maintaining the restored mine site (care and maintenance), and the routine care of assets, including environmental monitoring of the restored mine site. Exclude costs incurred at permanently closed mines.

18.4.1 Share of (Line 18.3) Environmental Protection and Restoration

Capital and repair and maintenance costs (construction, machinery and equipment) related to environment protection and restoration should be reported as a share of the total capital and repair and maintenance costs. This applies to all work phases of the mineral resource development cycle. The percentage is applied to the sum of lines 18.1.1, 18.1.2, 18.2.1 and 18.2.2.

Guidelines

12.0 Mineral Resource Development Work Phases

1. Exploration Work Phase

Ideally, the exploration phase ends when a newly discovered mineral deposit has first been delimited on a moderately wide drilling grid and a mineral inventory has been carried out to establish its potential economic interest for eventual development. Estimation of a mineral resource shall be justified by the dimensions and the metals and minerals contents and other pertinent characteristics of the deposit. The economic potential that justifies the estimation of a mineral resource should be formally presented in a preliminary assessment study.

2. Deposit Appraisal Work Phase

This phase includes all activities directed essentially at converting mineral resources by definition drilling into measured reserves that can be extracted legally and at a profit. The deposit appraisal phase effectively starts when the operator has the required funds and engages in the detailed geological and technical appraisal stages that initiate deposit appraisal. Clearly, an exploration program does not jump to the deposit appraisal stage as soon as a mineral discovery occurs.

THE FOLLOWING TWO EXAMPLES DESCRIBE EXTREME SITUATIONS.

Limits between exploration and deposit appraisal

A discovery estimated, after a first round of delineation drilling, at 50 000 tonnes grading 2 grams per tonne gold, or 100 000 tonnes at 1.0% copper, may constitute a significant mineral occurrence, but does not normally constitute a mineral deposit of "potential economic interest" (unless it is situated near surface, close to an operating mine). In most cases, additional work done after the discovery of a small mineralized zone does not yet qualify as deposit appraisal and should still be reported as exploration.

At the other end of the scale, a discovery based on a few drill intersections of 60 to 100 metres in length, grading 3% nickel and 2% copper, does not yet constitute a delineated deposit, despite the apparently enormous economic potential. Accordingly, further drilling as part of the exploration phase is required to delimit this mineral discovery and to carry out a first semi-quantitative estimate of its size and mineral content, and a project review is required to plan further, more detailed work and obtain the required budgets.

CONCURRENT DEPOSIT APPRAISAL AND EXPLORATION ACTIVITY

It is customary to continue to search for extensions to, or enlargements of, the deposit on which deposit appraisal has started. As a result, the drilling footage reported as deposit appraisal may include, in addition to the definition drilling, some drilling to extend the size of the known deposit(s). However, surveys and drilling carried out for the discovery or first delineation of new deposits on the same property should continue to be considered as exploration expenditures.

3. Mine Complex Development Work Phase

This phase includes expenditures for mine development activities and investment in construction, and machinery and equipment. Mine development consists of two distinct groups of activities. The first group relates to short- to mid-term objectives: delimiting, detailing and gaining access to the ore and preparing it for production. The second group targets mid- to long-term objectives, i.e., extending the reserves of the mine in production or committed to production in the immediate vicinity of the deposit(s), within the limits defined below.

LIMITS BETWEEN MINE DEVELOPMENT AND MINE-SITE EXPLORATION

The following geometric criteria are proposed to delimit the area where mine-site exploration activity starts:

- a) For a typical stratiform base-metal deposit, mine-site exploration begins 75 metres from the boundary of the known deposit across the structure and 150 metres from each end or at depth along the plane of continuity of the structure.
- b) For gold mines based on planar vein structures, mine-site exploration begins 50 metres across the structure from the boundary of the known deposit and 100 metres along the plane of continuity from the boundary.
- c) For horizontal or sub-horizontal sedimentary deposits, such as coal or potash deposits, larger distances of up to 500 metres from the boundary of the delineated deposits should be used along the plane of the geological structure. Exploration would begin at 100 metres or more perpendicular to the reserves/deposits.

From this perspective, drill programs, geophysical surveys, and other rock work carried out between the boundary of the ore reserves and the area where mine-site exploration activity starts will qualify as mine complex development activity to extend the ore reserves.

Guidelines (cont'd)

DISTINCTION BETWEEN MINE DEVELOPMENT AND MINE-SITE DEPOSIT APPRAISAL

Whenever mine-site exploration activity is successful and a deposit is discovered and first delimited on a moderately wide drilling grid, a deposit appraisal program will be required up to the time at which the feasibility of mining this new zone is confirmed (tonnage, grades and limits) and a commitment to production can be made.

13.0 Site of a Producing Mine: Criteria to Define the Limits of a Mine Site

A mine site is the area that can be accessed and exploited from the current or committed installations. Based on criterion 4) of the mine site definition on page 1, its area and limits are those of the mining lease obtained. The limits and area(s) of the mining site will always be established based on the mining lease obtained, as this permit is meant to meet the operation's needs. In practice, the area and limits are established based on the operational requirements established in the feasibility study. These requirements will vary depending on the type, surface extent, and position (horizontal, inclined, vertical) of the deposit(s), and on the mining methods used. Variations in these deposit/mining parameters contribute to the difficulties of deciding the actual extent of the mine site. Some plants and infrastructure that are essential parts of the mine complex may be located off the mine site, such as roads, docks, airports, or processing and pelletizing plants (Section 12.0 (3), page 1 of the guide).

EXAMPLES OF SPECIFIC SITUATIONS

The following paragraphs establish criteria specific to each situation in order to divide expenditures between "off-mine-site" and "on-mine-site" activities.

a) For multiple deposits or mining sites

For example, BHP Billiton Diamonds Inc.'s Ekati diamond mine plan is currently based on seven kimberlite pipes, but may eventually include other diamond pipes. By definition, a mine site is based on deposits in production or committed to production (page 1). Thus, only the seven pipes covered by the production feasibility study and by the required permits should be considered as part of the mine site at the beginning of production. Each of the other pipes will only become an "adjoining" mine site once the appraisal process has been completed, the environmental permits have been obtained, and a commitment to production has been made for that pipe (page 1). The same criteria will apply to multiple coal or potash deposits, or other metal deposits located in the same geological formation, as well as to mineral leases that will constitute either a complex, extended mine site or multiple independent mine sites.

b) Environmental restoration after production ends

Restoration and care and maintenance expenditures on the site of a temporarily closed mine are considered as being "on-mine-site" in the mine complex development phase. This is required in order to avoid allocating these, very often substantial, costs to the exploration and deposit appraisal phases. Such costs should be allocated in 18.1.1 and 18.1.2 if they represent capital or in 18.2.1 and 18.2.2 if they represent repair and maintenance expenditures.

c) Exploration at an exhausted mine

Exploration carried out by the operator of a mine after the reserves have been mined out but before the site has been closed should be classified as ON-MINE-SITE EXPLORATION.

d) Exploration at the site of a closed mine

Often a mine that was in production will close because of depressed commodity prices. If underground exploration and deposit appraisal are carried out from the underground workings to delineate additional mineralized zones before a decision is made to resume production, these expenditures should be classified as off-mine-site exploration or off-mine-site deposit appraisal.

e) Exploration on a property adjoining a mine

Exploration (or deposit appraisal) work by Company A, the owner of Mine A, is carried out under an option agreement on the property of unrelated Company B, immediately adjacent to the workings of Mine A. Whether Company B or Company A carried out and reported on this work, it should be classified as OFF-MINE-SITE EXPLORATION.

Special Categories of Expenditures

14.5-14.8

14.9

14.14

14.23 Large to Very Large Bulk Sample

"Large to very large bulk sample" is a generic term involving several types and sizes of samples (ranging from hundreds to several tens of thousands of tonnes) and straddles several field work categories. These activities may have one or several legitimate objectives:

- 1) to process mineralized material in a sampling plant to confirm the content of the substance of interest detected and estimated by drilling and other sampling (14.5-14.8, 14.9, and 14.23);
- 2) to devise appropriate mineral processing/metal extraction technology through pilot and full-scale testing, and to determine actual concentrator/extraction plant recovery and loss percentages, as well as total metal content (14.14);
- 3) to establish and evaluate the geotechnical parameters for the design of the mine and the fields, and plan test mining (14.14).

Guidelines (cont'd)

Large to very large bulk samples are normally part of the deposit appraisal phase and are rarely justified at the exploration phase. This may happen mainly for deposits whose mineral distribution is very nuggetty, such as diamond deposits or some gold deposits with very coarse and scattered gold particles, or in deposits of other types with concentration/extraction problems, to establish their potential economic value.

Obtaining a large to very large bulk sample may involve stripping and trenching on surface, drifting, cross-cutting, slashing or stoping work (14.9 and 14.23) or large-diameter drilling (14.5 to 14.8). Sampling costs should therefore be allocated to these specific activities. The handling and transportation costs involved to bring the sample material to the sampling or processing sites should be charged to 14.5 to 14.8 (drilling), 14.9 and 14.23. Sampling plant, mining, and/or processing test work should be charged to 14.14 (engineering). Marketing-related expenditures, such as providing samples to prospective clients for tests or pilot work, should be charged to 14.24 (economic studies).

For statistical purposes, expenditures for bulk sampling and engineering tests should be reported, not taking into account any income received from the sale of the metal(s) or concentrates produced.

ENGINEERING TESTS – EXAMPLE (LINE 14.14)

A Saskatchewan uranium deposit occurs in a porous sandstone rock. The expenditures related to the following tests, which are required to determine the technical feasibility of mining this deposit, should be recorded in the engineering category.

- 1) Well pumping tests were done to determine whether the water table could be drawn down sufficiently to permit mining of the deposit and to determine pumping costs.
- 2) A subsequent test-mining program was designed and carried out to determine:
 - a) the problem that ground water constitutes and ways to solve it;
 - b) the rock mechanics characteristics of any poorly consolidated clay rock that surrounds the deposit; and
 - c) whether a practical mining method can be developed to mine the deposit without exposing the miners to highly radioactive ore, taking into account the low mechanical strength of the rock.

14.24 Preliminary assessment, Pre-Feasibility and Feasibility Studies

The exploration phase ends with the first quantitative deposit inventory that is accompanied by a preliminary assessment study (scoping study) that evaluates and confirms the potential economic interest of the deposit. Hence the operator may undertake a deposit appraisal program assuming that the required funds are readily available. A pre-feasibility study, revised over the course of the work phase, is carried out during deposit appraisal for review and planning purposes. A feasibility study is required to establish the technical feasibility and economic profitability of a mining project and to conclude this phase.

This due diligence review is the first of the five essential criteria (Section 13.0, page 1) needed to establish that the project has entered the mine complex development phase.

14.17 Other Field Work Costs (accommodation, meals, transportation, only if unable to report with the activities mentioned above, and temporary construction, e.g., access roads)

The current set of definitions aims to collect complete and representative expenditures for the various field surveys and work categories carried out. Unless you are unable to prorate the costs, no expenditures that could be attributed to field surveys geology, geochemistry, geophysics (ground and airborne surveys), drilling, stripping/trenching, underground rock work, engineering studies, preliminary assessment, pre-feasibility or feasibility studies, mineral leases, claims, staking, line cutting (14.18), the environment (15.5), socio-economic and impact and benefits agreements (including rights of way and damage costs) (16.1), capital expenditures (18.1), or repair and maintenance (18.2) should be included here. The costs of maintaining projects on hold can be reported on this line.

18.1 Capital Assets

Imported used assets should be reported with new assets because they constitute new acquisitions for the Canadian economy. The costs of refurbishing and upgrading construction, as well as machinery and equipment, must be reported with new assets on lines 18.1.1 or 18.1.2, as required, depending on the situation, to maintain or increase productivity. Used assets purchased in Canada are reported separately because, for National Accounts, they do not constitute new additions to the national asset inventory.

18.2 Repair and Maintenance

Repair and maintenance expenditures are current accounts, not capital assets. They are included in this survey to highlight their contribution to maintain productivity of the capital assets invested in mineral development and mining activity.