15th Americas School of Mines
Basics of Mining Accounting – Canada

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Agenda

• Introductions
• The life of a mining operation – Four Phases
  ▪ Introduction
  ▪ Key Accounting Issues
  ▪ Financial Statement Presentation Consideration
• Non-GAAP measures
Introductions

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The Life of a Mining Operation
The Life of a Mining Operation
Four Phases

1) Exploration & Evaluation
   o Searching for and quantifying minerals

2) Development
   o Construction of a mine

3) Production
   o Extraction, processing and sale of minerals

4) Reclamation & Closure
   o Environmental rehabilitation and monitoring
The Life of a Mining Operation
Key Accounting Issues

1) Exploration & Evaluation
   o Capitalize vs. Expense
   o Cut-off between E&E and Development
   o Impairment assessment
   o Functional currency
The Life of a Mining Operation
Key Accounting Issues

2) Development
   o Resource and reserve estimates
   o Capitalization of costs
   o Pre-production activities
   o Cut-off between Development and Production
   o Closure provisions
   o Joint venture ownership structures
The Life of a Mining Operation
Key Accounting Issues

3) Production
   o Deferred costs, PP&E and depreciation
   o Inventory
   o Revenue
   o Functional currency
   o Impairment
   o Closure provisions
The Life of a Mining Operation

Key Accounting Issues

4) Reclamation & Closure
   - Measurement of provisions – IAS 37
   - Expensed costs
Exploration and Evaluation
**Exploration & Evaluation**

**Introduction**

- E&E involves searching for and assessing mineral resources for commercial suitability.
  - Exploratory drilling, trenching and sampling
  - Determination of ore grade and volume of deposit
  - Preparation of feasibility studies
- Entities must determine whether to capitalize or expense costs incurred during E&E.
**Exploration & Evaluation**

Key Accounting Issues

- Capitalize vs. Expense
  - What costs can be/should be recorded as assets?
  - Policy choices and IFRS 6 restrictions
- Cut-off between E&E and Development
- Impairment assessment
  - Specific requirements under IFRS 6
- Functional currency
- Indicators (defined in IAS 21) determining the currency of the entity
**Exploration & Evaluation**

Capitalize vs. Expense

- IFRS 6 allows companies to capitalize E&E costs
  - No expenditures incurred before E&E (e.g., before legal exploration rights)
  - No prescriptive cut-off point; requires judgment
  - No expenditures incurred after E&E
  - Must apply consistent policy
- US GAAP prohibits capitalization of E&E costs until bankable feasibility study complete and permits in place *

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Exploration & Evaluation
Examples of Potentially Capitalized Costs per IFRS 6

- Acquisition of exploration rights
- Topographical, geological, geochemical and geophysical studies
- Exploratory drilling, trenching and sampling
- Activities in relation to evaluating the technical feasibility and commercial viability
- General and administrative activities (policy consideration)
Exploration & Evaluation
Cut-off between E&E and Development

• Usually on completion of bankable feasibility study
• Decision to development made by Board of Directors
• IFRS 6: Upon “technical feasibility and commercial viability of extracting a mineral resource”:
  o Assess for impairment
  o Re-classify as development asset
• US GAAP: not applicable as no costs have yet been capitalized *
Exploration & Evaluation
Impairment Assessment

- IFRS 6 requires consideration of “facts and circumstances”
- An impairment test (under IAS 36) must be performed if:
  - Rights to explore are about to expire
  - No further exploration planned
  - No viable resources and/or costs not fully recoverable
- If impaired, a write-down is recorded
**Exploration & Evaluation**

Impairment Assessment

- Need to consider appropriate Cash Generating Unit (CGU)
- Lowest level at which separately identifiable cash flows exist
- In practice either of :
  - Individual exploration project
  - Exploration project(s) combined with operating assets
Exploration & Evaluation
Functional Currency

- IAS 21: an entity’s functional currency is based on “primary economic environment in which it operates,” determined by:
  - Primary indicators
    - i. Currency influences sales prices
    - ii. Currency of country whose competitive forces and regulations determine sales prices
  - b. Currency influences labour, material and other costs of providing goods
  - Second indicators
    - Currency of funds generated from financing
    - Currency in which receipts of operating activities are retained
**Exploration & Evaluation**

**Functional Currency**

- For E&E projects, no operations exist. Operating entity functional currency is therefore usually determined by the company’s exploration activities.
- For many foreign subsidiaries, this is a major currency, such as USD, CAD or EUR or a local currency.
- Specific consideration needs to be given in a holding company structure to the functional currency of the parent (requires significant judgement).
**Exploration & Evaluation**

Financial Statement Preparation Considerations

- IFRS 6 does not dictate whether to disclose E&E as tangible or intangible assets
  - Some entities treat as PP&E (underlying asset is a physical mineral deposit)
  - Some treat as intangible asset attributed to licenses
- Disclosures include:
  - Accounting policy applied (must be consistent) including judgments made
  - Amounts recognized in F/S as E&E
  - Reconciliation of E&E assets from beginning to end of period
Development
Development
Introduction

• Development consists of activities required to bring the area of interest to production, such as:
  o Further technical, environmental, regulatory and socio-economic studies and consultation
  o Obtaining permits and licenses
  o Acquisition and construction of infrastructure
  o Development of mine plan and reserve estimation
• Initial waste stripping activities often begin in the development phase.
• The Development phase spans from termination of E&E to the beginning of Production.
Development
Key Accounting Issues

• Resource and reserve estimates
  o Definitions and accounting/disclosure implications

• Capitalization of costs
  o What costs are attributable to the mineral resource?
  o What type of costs may be capitalized?

• Pre-production activities
  o Some “operating-like” activities occur before commercial production reached

• Cut-off between Development and Production
  o Determining when to stop capitalizing costs
Development
Key Accounting Issues

• Closure provisions
• Joint venture ownership structures
**Development**  
Resource and Reserve Estimates

- Development of the mine plan requires finalized reserve estimates which also have other implications.
- Classification of ore in an area based on geologic certainty and economic value.
  - **Resource** are identified mineral occurrences with reasonable prospects for eventual economic extractions.
  - **Reserves** are valuable and legally, economically and technically feasible to extract.
Development
Resource and Reserve Estimates

- Categorized by degree of certainty with which quantities can be estimated:
  - Inferred resources
  - Indicated resources
  - Measured resources
  - Probably resources
  - Proven resources (developed or undeveloped)
Development
Resource and Reserve Estimates

• Ore Reserves (the fisherman’s view!):

  **Inferred**
  There is lake in the distance...

  **Measured and indicated**
  You saw something disturbed the surface of the lake – it looked like a fish...

  **Probable**
  There are fish in the lake – you have had some bites, have seen them jumping and heard of others catching them, but have not caught any yet...

  **Probable – undeveloped**
  The fish is on the hook and you can see it but it is still in the water, where they always look bigger...

  **Probable - developed**
  The fish is in the boat – you have weighed it and will keep it for dinner.
Development
Resource and Reserve Estimates

• IFRS has no specific reporting requirements for reserve estimates.
• Most mining companies comment on resource/reserve estimates in F/S, MD&A or Annual Reports.
  o Usually based on NI 43-101 reports
• Reserves often are the basis for depreciation and depletion calculations.
  o Periodic (usually annual) changes in estimates prospectively update calculations
• US GAAP / SEC Industry guide 7 only allows proven and probable reserves to be disclosed.*
Development
Capitalization of Costs

- Development costs for a mine fall within the scope of the PP&E standard, IAS 16.
- Costs to prepare the asset for its intended use, including costs to prepare an asset over an extended time frame in the case of self-constructed assets.
Development
Capitalization of Costs

• Only costs reasonably allocated to the area of interest may be capitalized.
  o All direct costs of development (e.g., plant construction, labour to prepare mine site)
  o Directly attributable indirect costs (e.g., reasonable overhead allocation)
  o Present value of future costs of reclamation
  o Depreciation of assets used to develop mine site

• Some costs are subject to other standards:
  o Directly attributable borrowing cost **must** be capitalized (IAS 23)
  o FX gains/losses **cannot** be capitalized unless part of borrowing cost (IAS 21)
**Development**

Pre-production Activities

- Often a “commissioning period” includes activities generating start-up costs and revenues from sale of small amounts of finished product.
  - These activities form part of the development of the mine
- Start-up costs are capitalized until the asset is “available for use.”
  - Mine is not commissioned until reaching commercial levels of production
  - Capitalization may be inappropriate if pre-production is longer than expected
- Revenue may be deducted from capitalized costs if it is directly attributable to Development of the asset (IAS 16 – Revenue).
Development
Cut-off between Development and Production

• Determined by whether the asset is “available for use”
• In mining, usually when commercial production is achieved
  o Can be difficult to determine
  o Decision usually made by accountants, engineers and metallurgists in concert
  o Based on mine & mill capacities, mineral recovery levels and output
• Capitalization ends, depreciation of plant and other site infrastructure begins
Development
Closure Provisions

• Mine closure plans are typically developed and submitted to government authorities during the development phase.

• Initial measurement of the restoration provision is required (we will discuss further during the ‘closure’ phase).
Development
Joint Venture Ownership Structures

• Joint Ventures are common in the mining industry due to:
  o High capital requirements associated with new projects
  o Increasing number of projects in high risk developing countries
  o Companies looking for strategic investment

• Contractual arrangements whereby two or more parties undertake an economic activity which is subject to “joint control.”

• Joint Control - contractually agreed sharing of the continuing power to determine the entities strategic operating, financing and investing activities (regardless of ownership interest)
Development
Joint Venture Ownership Structures

• Current joint ventures classification under IAS 31 is based primarily on legal form:
  o Jointly controlled entities
    ▪ Interests in a separate entity which controls the asset, incurs the liabilities and expense and earns income
    ▪ Proportionate consolidation or equity method accounting
  o Jointly controlled assets/operations
    • Assets jointly or separately owned, shared output and expenses
    • No separate entity or financial structure
    • Recognize share of joint assets, liabilities, revenues and expenses
Development
Joint Venture Ownership Structures

- New IFRS 11, classification depends on substantive rights and obligations of the parties to the arrangement
  - Joint operations
    - Operators have rights to the assets and obligations for liabilities
    - Can be structured through a separate vehicle but not necessary
    - Recognize share of assets, liabilities, revenues and expenses
  - Joint ventures
    - Venturers have rights to net assets of the arrangement
    - Must be structured through a separate vehicle
    - Equity method accounting for interests in net assets
Development
Joint Venture Ownership Structures

- US GAAP – requires equity accounting for incorporated joint ventures*
Development
Joint Venture Ownership Structures

• Accounting policies: joint venture financial information should be adjusted to conform to the policies of the venturer which is incorporating the information in their own accounts
Development
Financial Statement Preparation Consideration

- Development costs & Mine properties
  - Accounting policy for capitalization, including treatment once Production commences
  - Balances of costs capitalized to date (including projects in Production)
  - Reconciliation of Development assets from beginning to end of period (separating additions, capitalized interest, capitalized restoration provisions, capitalized depreciation)

- Restoration provisions
  - We will address in the closure section
Production
Production
Introduction

- Production, marketing and sale of reserves
- Resource and reserve estimates and mine plan may be periodically updated
- As production continues, mine plans may change and new resource areas may become attractive if:
  - Resource prices increase
  - Cost of extraction decreases
  - Better geological information is obtained
Production
Key Accounting Issues

• Deferred costs, PP&E and depreciation
  o Methods of depreciation
  o Capitalization of development costs after production commences
• Inventory
  o Components of inventory
  o Inventory costs
• Revenue recognition
Production
Key Accounting Issues

• Functional currency
• Impairment
  o Triggering events
  o Impairment tests
• Closure provisions
Production
Methods of Depreciation

- IAS 16 (PP&E) defines depreciation as the systematic allocation of the depreciable amount of an asset over its useful life.
- Depreciable amount based on cost (including cost of dismantling and restoration) and residual value.
- Useful life based on time period or units of production (UoP)
  - Significant components of PP&E depreciated separately
  - Depreciation stops at end of asset’s life, or end of life of mine
  - In practice, mobile equipment often depreciated straight-line, plant and development assets depreciated UoP
    - Straight-line simpler, approximates UoP for equipment operated at full capacity
Production
Methods of Depreciation

• All assets require at least annual reassessment of useful life, often performed in conjunction with resource/reserve estimate updates for UoP. Method of depreciation must be reassessed.

• Any changes are accounted for prospectively
Production
Units-of-Production Method

- Depreciation may be based on:
  - Quantity of material extracted (e.g., shovels, truck loads)
  - Quantity of ore extracted (e.g., mineral property asset, crushers, conveyors)
  - Total output (e.g., smelters, refineries)

- If depreciation based on reserves/resources, the company must choose:
  - Based on proven and probable reserves, or
  - Based on reserves and resources not yet designated as reserves (i.e., measured and indicated)
Production
Units-of-Production Method

• Mixed practices in mining industry, usually based on factors such as future development expenditures, time frame, company’s track record of converting resources into reserves.
**Production**

Development Expenditures in the Production Phase

- IAS 16 (PP&E) requires development costs incurred after production commences to be capitalized, if they contribute to revenue generation.

- Costs in the scope of IAS 16 typically relate to major expansion projects
Production
Waste Stripping in the Production Phase

• Waste stripping will continue during the production phase
• Depending on the mine plan, waste stripping ratios (ration of waste mined to ore mined) may vary significantly over time
• Currently there is wide diversity in accounting practice
• IFRIC 20 provides guidance, effective January 1, 2013, retrospective to January 1, 2012
  o Waste stripping should be allocated between production and developments
  o Amortization of stripping costs should be done on a systematic basis over the benefit received
• US GAAP requires all waste stripping costs to be included as inventorable costs and expensed as related inventory is sold*
Production
Inventory – IAS 2

• Two general components: Product inventories & Stores inventories
• **Product inventories** consist of mine production at various stages:
  - Run of mine ore/stockpiles
  - Low grade stockpiles
  - Work-in-progress (crushed ore, ore undergoing refining processes)
  - Finished goods (concentrates, refined metal)
• **Stores inventories** include supplies and parts used in production:
  - Fuels, reagents, chemicals
  - Safety supplies
  - Replacement parts
**Production**
Product Inventories

- Stockpiles and heap leach volume measurement is an inaccurate science:
  - Variable densities, ore grades and recovery factors
  - Most companies use at least two measurement techniques for comparison
  - Regular measurement by physical surveys often required
**Production**

Product Inventories

- Costing method is typically weighted average cost for product and supplies inventory.
- Joint products and by-products
  - Many mines produce more than one metal
  - Joint products each have a significant relative sales value
  - By-products are secondary products with less importance
  - Requires a “rational and consistent” basis of accounting
Production
Product Inventories

• Joint products
  o Volume weighted allocation
  o Value weighted allocation

• By-products
  o Incremental costs only
Production
Product Inventories

• Product inventory cost includes:
  o Internal labour, mining contractors
  o Costs of consumables, as they are used (fuels, chemicals, etc.)
  o Costs mining equipment
  o Costs of mill operations
  o Reasonable overheads, such as supervisor salaries and routine maintenance
  o Depreciation related to each phase of production
**Production**

Other Inventory Issues

- Inventories carried at lower of cost and net realizable value (NRV)
  - NRV = selling price – costs incurred to sell the product
  - Write-down of inventories is required if NRV < cost
  - Write-down may be reversed if conditions change
**Production**

Revenue

Revenue from the sale of goods shall be recognized when all the following conditions have been satisfied:

- the entity has transferred to the buyer the significant risks and rewards of ownership of the goods;
- the entity retains neither continuing managerial involvement to the degree usually associated with ownership nor effective control over the goods sold;
- the amount of revenue can be measured reliably;
- it is probable that the economic benefits associated with the transaction will flow to the entity; and
- the costs incurred or to be incurred in respect of the transaction can be measured reliably.
Production
Revenue

Provisionally priced sales contracts:

- Risks pass upon shipment/delivery at a preliminary price subject to finalization in a future quotation period (QP) (e.g., sales with final price setting three months out and initial provisional payment)
- Upon meeting all of the requirements for revenue recognition, that revenue should be recognized using the spot price on the date the sale is recognized
- Mark to market through settlement date – the accounts receivable contains an embedded derivative which should be disclosed
Production
Functional Currency

• Recall functional currency is based on:
  o Primary indicators
    ▪ Currency influences sales prices
    ▪ Currency of country whose competitive forces and regulations determine sales prices
    ▪ Currency influences labour, material and other costs of providing goods
  o Secondary indicators
    ▪ Currency of funds generated from financing
    ▪ Currency in which receipts of operating activities are retained

• Once in production, primary indicators and currency receipts are retained in become an important consideration
  o Increased likelihood that USD is the functional currency
**Production**

PP&E Impairment

- Not an annual test, but based on triggering events:
  - Changes to commodity prices, political and regulatory circumstances
  - Increased production costs, including decommissioning & restoration estimates
  - Decreases in reserves
- IAS 36: an asset is impaired if its carrying amount is greater than both its:
  - Value-in-use: usually a discounted cash flow valuation of future benefits from the asset
  - Fair value less costs to sell: amount asset would retrieve in the marketplace
**Production**

PP&E Impairment

- US GAAP impairment - gross undiscounted cash flows are compared to carrying value and, only if less, a fair value measurement is required *
**Production**

Closure Provisions

- During the operating life of the mine regular updates to the restoration provision will be required.
- Regular re-measurement of the restoration provision is required (we will discuss further during the ‘closure’ phase).
Production
Financial Statement Presentation Consideration

- Depreciation/amortization
  - Depreciation methods and useful lives for each class of asset
  - Depreciation for the period and accumulated depreciation at beginning/end
  - Effects of any changes in accounting estimates

- Inventories
  - Based on valuation of production inventories
  - Type and extent of overheads included in cost (not required by IAS 2, but common)
  - Descriptions of inventory types
  - Cost of inventories sold during the period (i.e., cost of sales)
Production
Financial Statement Presentation Consideration

• Impairment
  o Amounts of losses/reversals, with explanations of circumstances/nature of asset
  o Whether recoverable amounts based on VIU or FVLCTS, and basis for calculations

• Restoration provisions
  o We will address in the closure section
Reclamation & Closure

Introduction

• Legal or constructive obligations to decommission assets and restore land.
  o Under IFRS, referred to as “Decommissioning and Restoration Provisions” (DRP)
  o US GAAP terminology: “Asset Retirement Obligations” (ARO)*
• Include activities such as facilities demolition and removal, pit / waste dump remediation and post-closure water management
• Obligations resulting from improper operations not included (e.g., spills)
• Measured and recognized at the time the obligation exists – asset and liability recorded
• Under US GAAP, only legal obligations recorded*
**Reclamation & Closure**

**Measurement of Provisions**

- Measured initially at present value:
  - Present value of best estimate of future cash flows
  - At initial recording, an asset and liability are recorded at equal amounts.

- Assumptions required to calculate present value:
  - Timing and amount of future cash flows (inflation-adjusted)
  - Discount rate (usually risk-free rate)

- **US GAAP measurement**
  - Must use estimate of future costs on a third-party basis
  - Must measure using credit-adjusted risk-free interest rate
Reclamation & Closure
Measurement of Provisions

• Subsequent measurement
  o The restoration provision liability is increased by the discount rate at each quarter, resulting in interest expense.
  o The related asset is amortized over the life of related underlying assets (i.e., until closure), resulting in amortization expense over the period of related revenues.
  o Liability is re-measured for changes in estimate
  o Accretion expense is presented as a financing cost
Reclamation & Closure
Measurement of Provisions

- US GAAP subsequent measurement
  - accretion is presented as an operating cost*
  - liability is only re-measured for changes in cash flow estimates on an incremental basis, creating a ‘layered’ liability*
Reclamation & Closure
Expensed Costs

• Restoration activities not associated with future economic benefits (i.e., a related asset) cannot be capitalized; expense as obligations arise.

• Common for newly arising remediation obligations on closed/dormant mining properties
Reclamation & Closure
Financial Statement Presentation Consideration

• IAS 37 requires disclosure of:
  o Nature of each type of obligation
  o Factors/methods relevant in determining timing of cash flows, where uncertainty exists
  o Methods of discounting
• Movements in provisions must also be disclosed, including:
  o New provisions and adjustments to existing provisions
  o Amounts used/released during the period
  o Interest accrued during the period
Non-GAAP Measures
Non-GAAP Measures

- Not in the financial statements but in the MD&A
  - Main measure is cash costs per unit of production
  - Provides information on the efficiency of the mine
  - Used by investors to make decisions but outside the scope of audit opinion
- Benchmarking
  - Comparability of information across the industry
  - No fixed standard of what has to be included
Questions?
Thank you!

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