Financial reporting in the mining industry*

International Financial Reporting Standards
June 2007
The mining industry is one of the world’s most global industries. Many countries now require companies to prepare their financial statements in accordance with International Financial Reporting Standards (IFRS). Regulatory bodies in many other countries are converging national standards with IFRS. The move to adopt or harmonise with IFRS has advanced the transparency and comparability of financial statements around the world.

This edition of ‘Financial reporting in the mining industry’ describes the financial reporting implications of IFRS across a number of areas selected for their particular relevance to the mining industry.

The International Accounting Standards Board (IASB) has formed an Extractive Activities working group; however, formal guidance on many issues facing mining companies is unlikely to be available for some years.

Other developments taking place are the ongoing convergence with US GAAP and interest from the Securities and Exchange Commission (SEC) in how US GAAP should be applied to the mining industry.

This publication does not describe all IFRSs applicable to mining entities. The ever-changing landscape means management should conduct further research and seek specific advice before acting on any of the more complex matters raised.

PricewaterhouseCoopers remains committed to the mining industry. For more information or assistance, please do not hesitate to contact your local office or one of our specialist mining partners.

Hugh Cameron
Global Mining Leader
PricewaterhouseCoopers
<table>
<thead>
<tr>
<th>Contents</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreword</td>
<td>1</td>
</tr>
<tr>
<td>Contents</td>
<td>3</td>
</tr>
<tr>
<td>Introduction</td>
<td>5</td>
</tr>
<tr>
<td>1 Mining overview</td>
<td>7</td>
</tr>
<tr>
<td>2 Exploration and evaluation</td>
<td>11</td>
</tr>
<tr>
<td>3 Development</td>
<td>17</td>
</tr>
<tr>
<td>4 Production</td>
<td>21</td>
</tr>
<tr>
<td>5 Mineral resources and reserves</td>
<td>25</td>
</tr>
<tr>
<td>6 Depreciation and amortisation</td>
<td>29</td>
</tr>
<tr>
<td>7 Impairment</td>
<td>37</td>
</tr>
<tr>
<td>8 Inventories</td>
<td>47</td>
</tr>
<tr>
<td>9 Closure and environmental liabilities</td>
<td>55</td>
</tr>
<tr>
<td>10 Revenue</td>
<td>61</td>
</tr>
<tr>
<td>11 Foreign currency</td>
<td>67</td>
</tr>
<tr>
<td>12 Financial instruments</td>
<td>71</td>
</tr>
<tr>
<td>13 Taxation and royalties</td>
<td>79</td>
</tr>
<tr>
<td>14 Joint ventures</td>
<td>85</td>
</tr>
<tr>
<td>15 Business combinations</td>
<td>91</td>
</tr>
<tr>
<td>16 Empowerment transactions</td>
<td>97</td>
</tr>
<tr>
<td>17 Leasing</td>
<td>99</td>
</tr>
<tr>
<td>18 Non-GAAP measures</td>
<td>103</td>
</tr>
<tr>
<td>19 First-time adoption</td>
<td>107</td>
</tr>
<tr>
<td>Appendix 1 Example disclosures</td>
<td>110</td>
</tr>
<tr>
<td>Appendix 2 Glossary</td>
<td>114</td>
</tr>
<tr>
<td>Appendix 3 Contact us</td>
<td>116</td>
</tr>
</tbody>
</table>
Introduction

Why is this publication needed?


The need for this publication has arisen due to:

• the absence of an extractive industries standard under IFRS;
• the adoption of IFRS by mining entities across a number of jurisdictions, with overwhelming acceptance that applying IFRS in this industry will be a continual challenge; and
• ongoing transition projects in a number of other jurisdictions, for which companies can draw on the existing interpretations of the industry.

Who should use this publication?

This publication is intended for:

• executives and financial managers in the mining industry, who are often faced with alternative accounting practices;
• investors and other users of mining industry financial statements, so they can identify some of the accounting practices adopted to reflect unusual features unique to the industry; and
• accounting bodies, standard-setting agencies and governments throughout the world interested in accounting and reporting practices and responsible for establishing financial reporting requirements.

What is included?

Included in this publication are issues that we believe are of financial reporting interest due to:

• their particular relevance to mining entities; and/or
• historical varying international practice.

Since the 1999 publication, the mining industry has not only experienced the transition to IFRS, it has also seen:

• continued increase in its exposure to sophisticated financial instruments and transactions; and
• an increased focus on mine closure liabilities, including environmental and restoration liabilities.

This publication has a number of chapters designed to cover the main issues raised.

PricewaterhouseCoopers’ experience

This publication is based on the experience gained from the worldwide leadership position of PricewaterhouseCoopers in the provision of accounting services to the mining industry. This leadership position enables PricewaterhouseCoopers’ International Mining Industry Group to make recommendations and lead discussions on international standards and practice.

The IASB has asked a group of national standard-setters to undertake a research project that will form the first step towards the development of an acceptable approach to resolving accounting issues that are unique to upstream extractive activities. The primary focus of the research project is on the financial reporting issues associated with reserves and resources. An advisory panel has been established to provide advice throughout the research project. PwC participates in the advisory panel.

We support the IASB’s project to consider the promulgation of an accounting standard for the extractive industries; we hope that this will bring consistency to all areas of financial reporting in the extractive industries. The mining industry is arguably one of the most global industries, and international comparability would be welcomed.

We hope you find this publication useful.
1 Mining overview
Mining overview

Mining activities begin with the exploration and evaluation of an area of interest. If the exploration and evaluation is successful, a mine can be developed, and commercial mining production can commence.

The phases before production begins can take a long time and cost a lot of money. The appropriate accounting treatment of the money spent is therefore essential. However, before we examine the accounting implications of the phases of operations, we need to define the phases. There are five common terms that describe the different phases of a mine’s operations, although other terms are sometimes used.

1.1 Phases of operations

1.1.1 Phase 1 – exploration

‘Exploration’ means the search for resources suitable for commercial exploitation. It includes:
- researching and analysing an area’s historic exploration data;
- conducting topographical, geological, geochemical and geophysical studies; and
- exploratory drilling, trenching and sampling.

1.1.2 Phase 2 – evaluation

‘Evaluation’ means determining the technical feasibility and commercial viability of a mineral resource. It includes:
- determining volume and grade of deposits;
- examining and testing extraction methods and metallurgical or treatment processes; and
- surveying transportation and infrastructure requirements, and conducting market and finance studies.

The evaluation stage usually produces a feasibility study that identifies proved or probable reserves and leads to a decision to develop a mine.

1.1.3 Phase 3 – development

‘Development’ means establishing access to and commissioning facilities to extract, treat and transport production from the mineral reserve, and other preparations for commercial production. It may include:
- sinking shafts and underground drifts;
- permanent excavations;
- constructing roads and tunnels; and
- advance removal of overburden and waste rock.

1.1.4 Phase 4 – production

‘Production’ means the day-to-day activities of obtaining a saleable product from the mineral reserve on a commercial scale. It includes extraction and any processing before sale.

1.1.5 Phase 5 – closure and rehabilitation

Closure occurs after mining operations have ceased and includes restoration and rehabilitation of the site.

1.2 Distinguishing between the phases

The points at which one phase ends and another begins are important when accounting for the costs of each phase. The phases often overlap, and sometimes several phases may occur simultaneously. It is not always easy, therefore, to determine the cut-off points for costs between the various phases.

1.2.1 Phases 1 & 2 – exploration and evaluation

The costs of exploration are for discovering mineral resources; the costs of evaluation are for proving the technical feasibility and commercial viability of any resources found.

Correct allocation of exploration and evaluation costs may be important when making capitalisation and write-off decisions – for example, if exploration expenditure is written off while evaluation expenditure is capitalised.

1.2.2 Phases 2 & 3 – evaluation and development

The cut-off point is once the technical feasibility and commercial viability of extracting the mineral resource has been determined; this is usually upon completion of a bankable feasibility study (BFS) and when a decision to develop has been made by the directors, usually based on the BFS.

The BFS:
- establishes the technical feasibility of the project;
- establishes the availability of financing;
- identifies the existence of markets or long-term contracts for the product; and
• decides whether or not the mine should be developed.

The distinction between the two phases is particularly relevant if an entity’s accounting policy for evaluation costs is to expense as incurred and for development costs to be capitalised. It is also important because the provisions of IFRS 6 Exploration for and Evaluation of Mineral Resources only apply to exploration and evaluation expenditure, not development expenditure.

The main costs of the evaluation stage relate to planning and feasibility studies; development costs relate to gaining access to the resources after the decision has been made to develop the mine. The date on which legal title was acquired may also be relevant when determining the cut-off point between evaluation and development.

Once a company has decided to proceed with a mine, any more exploration or evaluation expenses are usually treated as development costs. Any capitalised exploration and evaluation costs are transferred into development costs.

1.2.3 Phases 3 & 4 – development and production

Determining the cut-off point between the development and production phases is rarely simple. However, it is often the most important cut-off point when accounting for mining entities, because the change to production means that costs can no longer be capitalised and should be treated as operating expenses.

Assets must be ‘available for use’ before they can be depreciated. It is generally accepted that, for mining entities, assets are ‘available for use’ when commercial levels of production are achieved. This does not necessarily coincide with technical commissioning of certain plant items.

Determining when commercial levels of production have been achieved is not straightforward. The decision is usually made after discussions between the accountants, engineers and metallurgists, and may be based on a range of criteria, such as:

• a nominated percentage of design capacity for the mine and mill;

• mineral recoveries at or near expected levels; and

• the achievement of continuous production or other output.

In each case, the percentages and levels of recovery are nominated well before they occur. These factors need to be reconsidered in the event of any significant delays in development or if pre-determined commercial levels of production cannot be achieved due to external factors.

Furthermore, development often continues after production has begun, such as:

• stripping costs in an open-pit mine where removal of overburden occurs before production; and

• where waste/ore ratios move temporarily out of line with the life-of-mine ratio.

Similar examples occur in underground mining operations with the extension of a shaft or major underground excavations. The associated costs are capitalised when development occurs.

1.2.4 Phases 4 & 5 – production and closure

A mine’s operational life is considered to end either when the ore body is depleted or when the mine is closed for other reasons and the normal ore feed to the plant stops or production ceases.

The likely costs of the closure phase include:

• employee severance costs;

• restoration; and

• rehabilitation and environmental expenditure.
2 Exploration and evaluation
2 Exploration and evaluation

The accounting treatment of exploration and evaluation expenditure can have a fundamental impact on the financial statements of a mining entity, particularly for junior mining companies with no producing assets. IFRS 6 Exploration for and Evaluation of Mineral Resources was issued in December 2004 because the IASB recognised that IFRS should include specific guidance on the treatment of such costs. This chapter considers the treatment of such expenditure under the IASB Framework for the Presentation of Financial Statements ('the IASB Framework'). It then examines the alternative accounting treatments that can be applied under IFRS 6.

2.1 The IASB Framework

The IASB Framework defines an asset as 'a resource controlled by the entity as a result of past events and from which future economic benefits are expected to flow to the entity'. It states that an asset should be recognised when:

- it is probable that future economic benefits will flow to the entity (which can be through commercial exploitation of a mineral deposit, or sale of exploration/mining rights); and
- the asset has a cost or value that can be measured reliably.

In the case of exploration and evaluation expenditure, 'control' exists where the entity has a legal right to explore the specified area and exploit any mineral deposits within it. This applies where the entity already owns the mining rights or has the power to obtain them in the future. The cost of any asset can be measured reliably using the actual expenditure incurred. However, not all exploration and evaluation expenditure meets the requirement that future economic benefits must be probable (ie, more likely than not).

2.1.1 Identifying areas of interest

In determining the treatment of exploration and evaluation expenditure under the IASB Framework, an entity has to determine the 'unit' to which costs should be allocated. Within the mining industry, the most common approach is to allocate costs between areas of interest. This involves identifying the different geological areas that are being examined and tracking separately the costs incurred for each area. It is common for an area of interest to contract in size over time as work progresses towards the identification of individual mineral deposits.

At the point in time when economic viability is established, an area of interest will normally comprise a single mine or deposit.

2.1.2 Exploration expenditure

Some expenditure may be incurred before any legal rights to explore the area of interest have been obtained. Any such expenditure normally has to be expensed. The IFRS 6 definition of exploration and evaluation expenditure only applies to expenditure incurred after the entity has obtained the legal rights to explore in a particular area.

Exploration expenditure is often made in the hope (rather than the expectation) that there will be future economic benefits. Success rates tend to be low. It is difficult for an entity to demonstrate that the recovery of exploration expenditure is probable. As a result, exploration expenditure has to be expensed if the IASB Framework is applied. However, this does not mean that all exploration expenditure is written off under the IASB Framework. For example, it may be appropriate to recognise an asset in respect of exploration activities:

- around an existing mine, where the entity has substantial knowledge about the mineral deposit and has constructed the infrastructure and/or processing facilities needed to exploit the additional resources that it expects to find; or
- in an area with a proven history of return on the amounts spent.

2.1.3 Evaluation expenditure

Evaluation activities are further advanced than exploration and are therefore more likely to meet the criteria for recognising an asset. However, each project needs to be considered on its merits. The amount of evaluation work required before the entity can conclude that a viable mine exists, and hence a future economic benefit is probable, can vary according to the particular circumstances of each area of interest. Factors to be considered include:

- the entity's existing level of knowledge about the area of interest and the extent to which the infrastructure assets and processing facilities needed to exploit the mineral deposit already exist. This will depend on whether the evaluation activity relates to:
Financial reporting in the mining industry

- a greenfield site (one where the entity does not have any mineral deposits that are already being mined or developed); or
- a brownfield site (one adjacent to a mineral deposit that is already being mined or developed); or
- extension drilling for a mineral deposit that is already being mined or developed;

- the scale of the project’s estimated net present value and the sensitivity of the net present value to changes in the key assumptions. This will depend on the nature and quality of the mineral deposit, and also the extent of the up-front capital costs needed to develop the mine;
- the availability of the funding needed to undertake the project. This can be a major issue for smaller mining entities;
- the level of risk associated with the project, including political risk and operational risk;
- the existence of any barriers that might prevent the project from proceeding (such as securing water supplies, obtaining environmental approvals or developing the required technology); and
- management’s experience and track record.

The studies that are produced during the evaluation phase (such as pre-feasibility studies and final feasibility studies) typically include an estimated net present value (based on the projected future cash flows) and a risk assessment setting out:

- the potential range of any key parameters (including commodity price, production grade, production rate, capital costs, operating costs, recoveries, currency exchange rates and development schedule);
- the impact of fluctuations in these parameters on the economic viability of the project (as measured by the net present value); and
- other key parameters such as legal, permit and environmental risks.

Each successive study generally costs more to produce and generates more detailed and reliable technical and financial data.

A final feasibility study is often needed before the entity can demonstrate that future economic benefits are probable. All the costs incurred in preparing the final feasibility study need to be expensed if the IASB Framework is applied. Some mining entities have adopted a policy under which all expenditure on individual exploration and evaluation projects is expensed until a final feasibility study has been completed – presumably to introduce a degree of objectivity into the treatment of such costs.

There are also many situations where a final feasibility study is not required to demonstrate economic feasibility; the entity should, in these situations, capitalise all (or some) of the costs incurred in compiling the final study. This view is supported by the fact that many of the codes in use around the world to estimate a mining entity’s reserves and resources do not require the preparation of final feasibility study before resources can be designated as proved and probable reserves.

2.2 IFRS 6

Under IFRS 6, a mining entity has to determine an accounting policy specifying which expenditures on exploration and evaluation activities will be recorded as assets and then apply that policy consistently. In determining the policy it wishes to apply, management:

- can decide to apply the IASB Framework (and/or the pronouncements issued by other standard-setters). If so, it has to follow the principles outlined above; or
- can disregard the requirements of the IASB Framework and also the pronouncements issued by other standard-setters, under an exemption from the requirements of paragraphs 11 and 12 of IAS 8 Accounting Policies, Changes in Accounting Estimates and Errors. However, the policy it adopts must still be relevant and reliable.

This exemption means that mining entities may retain the accounting policies they have applied previously even if those policies do not comply with the IASB Framework.

Note: the exemption is temporary pending a comprehensive review of the accounting practices used by entities engaged in the exploration for and evaluation of mineral resources.

2.2.1 Alternative policies

As a result of IFRS 6, a mining entity can capitalise expenditure earlier than would be allowed under the IASB Framework. At one extreme, this means it can decide to recognise all exploration and evaluation expenditure as
an asset even if the outcome is highly uncertain. This policy is common among junior mining companies with no major producing assets where exploration and evaluation expenditure is ongoing and for which an outcome has not yet been determined. At the other extreme, an entity can decide to expense all exploration and evaluation expenditure (bearing in mind that IFRS 6 does not apply to expenditure incurred after the technical feasibility and commercial viability of extracting a mineral resource has been established. This is treated instead as development expenditure – see Chapter 3.) There are a variety of policies that can be adopted between these two extremes.

Practice also varies in relation to the treatment of the amounts payable to third parties to acquire exploration licences. Some entities capitalise these costs even if the subsequent expenditure incurred in relation to those licences is expensed, on the basis that they can expect to recover the acquisition cost through resale. Others treat such acquisition costs on the same basis as any other exploration and evaluation expenditure on the same area of interest – so that the costs are expensed if the viability of the mine has not yet been established and the other expenditure is being expensed as incurred.

2.2.2 Changes of accounting policy

Once an entity has adopted an accounting policy for exploration and evaluation expenditure under IFRS, it should be applied consistently. It can only change that accounting policy if the change makes the financial statements either:

- more relevant to the economic decision-making needs of users and no less reliable; or
- more reliable and no less relevant.

Reliability has to be evaluated using the factors described in IAS 8. These include prudence and neutrality.

The above test cannot be met if the new policy is less consistent with the IASB Framework than the existing policy. This means, for example, that an entity that initially decides to expense all exploration and evaluation expenditure cannot subsequently change to a policy under which all such expenditure is capitalised.

The same applies to an entity adopting IFRS for the first time. On first-time adoption of IFRS, an entity cannot select an accounting policy that is less consistent with the IASB Framework than its existing policy under national GAAP.

2.2.3 Types of exploration and evaluation costs

IFRS 6 includes some examples of the types of expenditure that might be included in the measurement of exploration and evaluation assets, as follows:

- acquisition of rights to explore;
- topographical, geological, geochemical and geophysical studies;
- exploratory drilling;
- trenching and sampling; and
- activities involved in evaluating the technical feasibility and commercial viability of extracting mineral resources. This includes the costs incurred in determining the most appropriate mining/processing methods and developing feasibility studies.

The depreciation on items of plant and equipment used in the activities described above (for example, drill rigs) also represents exploration and evaluation expenditure. Any such depreciation is treated on a consistent basis with the entity’s other exploration and evaluation expenditure. It may need to be carried forward as an asset.

IFRS 6 does not provide any guidance on the treatment of general and administration overheads that are directly attributable to exploration and evaluation activities (such as the costs of running a central exploration office), other than to say that mining entities will need to determine a policy on the treatment of such costs. It is therefore possible to expense all such costs as a matter of policy, or they can be allocated to individual projects and then accounted for on the same basis as the other costs incurred on those projects.

An entity that is involved in a single exploration project, for example, and has no producing mines might decide that its general and administration expenses should all be allocated to that project.

2.2.4 Acquisition of property, plant and equipment

Irrespective of whether exploration and evaluation is carried forward as an asset, any items of plant and equipment used for exploration and evaluation are capitalised within property, plant and equipment and depreciated over their useful lives (see Chapter 6).
2.3 Impairment

Irrespective of the accounting policy adopted for the measurement and recognition of exploration and evaluation costs, IFRS 6 introduces an alternative impairment-testing regime for recognised exploration and evaluation assets that differs from the requirements set out in IAS 36 Impairment. IFRS 6 requires a mining entity to assess exploration and evaluation assets for impairment only when facts and circumstances suggest that the carrying amount of an asset may exceed its recoverable amount. Examples include:

- the entity’s right to explore the area has already expired or will expire in the near future with no expectation of renewal;
- no further exploration or evaluation expenditure in the area is planned or budgeted (or the amounts are de minimis);
- no commercially viable deposits have been discovered, and the decision has been made to discontinue exploration or evaluation in the area; and
- sufficient work has been performed to indicate that the carrying amount of the expenditure carried forward as an asset will not be fully recovered, even though a viable mine has been discovered.

The application of these impairment requirements is particularly important for mining entities that have decided to recognise all exploration and evaluation expenditure as an asset; they might be carrying significant amounts on the balance sheet in respect of projects for which the outcome is highly uncertain.

Once an impairment trigger has been identified, the impairment assessment is performed in accordance with IAS 36 – except that mining entities are allowed to group exploration and evaluation assets with producing assets for the purposes of impairment testing, as long as they establish an accounting policy for this. The only limit is that each cash-generating unit (or group of cash-generating units) to which an exploration and evaluation asset is allocated for the purposes of impairment testing should not be larger than the segments determined under IAS 14 Segment Reporting/IFRS 8 Operating Segments.

The policy adopted by a mining entity can have a significant impact on whether impairment charges are recognised on exploration and evaluation assets. For example: a mining entity has two producing mines (A and B), which are separate cash-generating units, and two exploration sites (C and D). Management receives a geological survey showing significant downward revisions to the reserve estimates at site C. These assets all sit within the same segment. At one extreme, management could decide to consider the exploration site by itself (in which case it would be fully impaired). At the other extreme, it could decide to group the exploration site with the two producing mines (in which case there may be no impairment at all). The more common practice in the mining industry is to determine whether exploration assets are impaired without allocating them to producing mines, except where an exploration site would share infrastructure assets and/or processing facilities with the mine.

Reversals of impairment losses can be recognised in respect of exploration and evaluation expenditure where this is justified by a change of circumstances. However, it is not possible to reinstate exploration and evaluation expenditure that has previously been expensed, even if a decision is subsequently made to proceed to development.

2.4 Disposals of exploration and evaluation projects

An entity that disposes of its interest in an exploration and evaluation project recognises the resulting gain or loss through profit or loss. Gains arising from such disposals will form part of ‘other income’.

Exploration and evaluation assets that are available for sale and for which a sale is highly probable are accounted for in accordance with IFRS 5 Assets Held for Sale and Discontinued Operations. Any such assets are recorded at the lower of their previous carrying amount and fair value less costs to sell.

2.5 Presentation and disclosure

IFRS 6 recognises that some exploration and evaluation assets are intangible (for example, drilling rights) and others are tangible (for example, drilling rigs). However, the IASB did not wish to decide whether exploration and evaluation assets should be classified as tangible or intangible. Some entities take the view that exploration and evaluation assets form part of property, plant and equipment because the underlying asset is a tangible asset (ie, the mineral deposit). Others have concluded that any assets recognised
in respect of exploration and evaluation expenditure must be attributed to the relevant exploration/mining licence(s) and recognised as an intangible asset.

Exploration and evaluation disclosures include:

- the accounting policy applied in respect of exploration and evaluation expenditure, including the policy for allocating exploration and evaluation assets to cash-generating units for impairment purposes;
- the amounts recognised in the financial statements in respect of exploration and evaluation activities (including the amounts of assets, liabilities, income, expense, operating cash flows and investing cash flows); and
- a reconciliation of the amounts carried forward as exploration and evaluation assets at the beginning and end of the period – including expenditure capitalised during the period, transfers to development, amounts written off and impairments.

The policy followed in respect of exploration and evaluation expenditure will require significant judgement for many entities. They will need to determine whether expenditure should be carried forward as an asset or evaluate whether an impairment loss has arisen or both. The financial statements must disclose the judgements that have been applied.
3 Development
3 Development

3.1 Which types of cost should be capitalised?

3.1.1 Direct and indirect costs

Costs must provide future benefits to the entity in order to be capitalised. The only development costs that should be capitalised are costs directly attributable to an area of interest or those that can be reasonably allocated to an area of interest including:

- the purchase price, including any duties and any non-refundable taxes;
- costs directly related to bringing the asset to the location and condition for intended use; and
- the present value of the initial estimate of the future costs of dismantling and removing the item and restoring the site on which it is located, where such obligations arise when the asset is acquired or constructed.

Allocation of expenditure includes direct and indirect costs. Indirect costs are included only if they can be directly attributed to the area of interest. General or administrative overheads relating to the whole entity, rather than to specific phases of operations, are expensed as incurred.

3.1.2 Depreciation

Depreciation is usually recognised in the income statement. However, where the future economic benefits embodied in an asset are absorbed in producing other assets, the depreciation charge constitutes part of the cost of the other asset and is included in its carrying amount.

Depreciation of property, plant and equipment used in the development of a mine should be capitalised as part of the development cost, together with all other direct costs of development.

3.1.3 Borrowing costs

Under IAS 23 (revised 1993) Borrowing Costs, management can elect to capitalise interest on borrowings (as distinct from equity capital) that are directly attributable to the acquisition, construction or production of qualifying assets. IAS 23 (revised March 2007), effective for annual periods commencing on or after 1 January 2009, removes the option to expense borrowing costs with respect to such capital expenditure and requires capitalisation.

Mining companies usually use equity financing before developing the mine, so it is not common to capitalise interest as part of the cost of an exploration or evaluation asset. These phases of operations are usually funded by share issues, particularly for smaller exploration entities. Care needs to be taken to ensure that any shares issued are correctly classified as equity and/or financial liabilities.

If an entity can directly attribute borrowing costs to the creation, construction or production of a qualifying asset, IAS 23 allows borrowing costs to be capitalised into the cost of the asset, including interest on bank overdrafts and borrowings. Only actual borrowing costs incurred can be capitalised.

A qualifying asset is an asset that takes a long time to be made ready for its intended use or sale. It includes development and construction expenditure.

When viewing borrowing costs as directly attributable to the creation of a qualifying asset, management should consider the following factors:

- specific and general borrowing costs that would have been avoided if the expenditure on the qualifying asset had not been made;
- capitalisation of interest begins when the expenditure and borrowing costs are being incurred;
- capitalisation of interest stops when most of the activities needed to start operating the mine are completed, and also during any extended delays in the development or construction of the mine; and
- where funds are borrowed specifically for the purpose of constructing a qualifying asset, only net interest is capitalised, with interest from temporary investment of surplus borrowed funds offset against interest paid on borrowings.

3.1.4 Foreign exchange gains and losses

When development is funded by borrowings in a foreign currency, IAS 21 The Effects of Changes in Foreign Exchange Rates requires any foreign exchange gain or loss to be recognised in the income statement unless they are regarded as adjustments to interest costs, in which case they can be capitalised as borrowing costs in accordance with IAS 23.
Financial reporting in the mining industry

3.1.5 Hedging costs

The cost of hedging capital projects can only be capitalised as part of the asset when the hedge instrument qualifies for hedge accounting in accordance with IAS 39 Financial Instruments: Recognition and Measurement (see Chapter 12).

3.2 Production during the development period

It is not uncommon in the mining industry for there to be a long commissioning period, sometimes over 12 months, during which production is gradually increased towards design capacity. The accounting treatment for revenues and costs incurred during the commissioning period is critical in these situations.

IFRSs are drafted on the assumption that expenditure is attributable to a specific purpose. In mining companies, expenditure is often incurred that generates saleable production and, at the same time, forms an essential part of the development of the mine.

To regard all costs (and associated revenues) incurred during the commissioning period as operating items, and report a large trading loss, ignores the reality that a substantial proportion of the costs incurred will deliver future economic benefit. These costs would be incurred even if the entity was removing waste material rather than ore.

3.2.1 Start-up costs

Pre-production costs are typically capitalised until the asset is ‘available for use’ (ie, when commercial levels of production are capable of being achieved – see Chapter 4). However, as stated above, pre-production costs can only be capitalised if they are directly attributable to bringing the asset to the condition necessary for it to be capable of operating in the manner intended by management.

Capitalisation may be inappropriate if the pre-production phase is longer than expected or the mine has major problems during the start-up phase. Operating losses arising from an asset that does not operate as planned (for example, an inability to operate at planned capacity) are not capitalised into the cost of the asset. Management should also consider the asset’s carrying value for possible impairment.

In those situations where revenue from saleable material is recognised in the income statement, judgement needs to be applied to determine which costs incurred during the commissioning period are directly attributable to developing the operating capability of the mine and those that represent costs of producing saleable material.

The accounting policy adopted for start-up costs must reflect their economic substance, be applied on a consistent basis and be adequately disclosed in the financial statements.

3.2.2 Pre-production revenue

Revenue from saleable material produced during the testing phase is typically deducted from capitalised costs in accordance with IAS 16 paragraph 17(e).

Deduction is only appropriate if it can clearly be shown that the production of the saleable material is directly attributable to bringing the asset to the condition necessary for it to be capable of operating in the manner intended by management. Otherwise, such revenue (and the costs of producing the saleable material) should be recognised in the income statement.

3.3 Presentation and disclosure

3.3.1 Development expenditure

Development expenditure disclosures include:
- accounting policy, including treatment of development expenditure after commercial production has commenced;
- balance of development and construction expenditure capitalised;
- amounts capitalised on projects yet to reach commercial production; and
- reconciliation of costs to prior year, including expenditure incurred during the period, transfers and impairments.

3.3.2 Mine properties

Mine properties' disclosures include:
- accounting policy, including amortisation/depreciation (see Chapter 6);
- quantum of mine properties carried forward;
- amounts capitalised on projects yet to reach commercial production; and
- reconciliation of carried-forward amounts from prior years, including expenditure, transfers, depreciation/amortisation and impairments.
3.3.3 Capitalised interest

Capitalised interest disclosures include:
- accounting policy, including treatment of foreign exchange differences; and
- amount of interest capitalised during the period.
4 Production
4 Production

There are many issues facing mining entities in the production phase of operations. One of the most significant is determining when a mining operation is considered to be in production.

4.1 When does the production phase start?
Determining when development ends and production starts is complex. This is often the most important cut-off point when accounting for mining entities, because the change from development activity to production activity means that costs are no longer capitalised and depreciation of the asset commences.

The cut-off point between development activity and production activity is determined by whether the asset is ‘available for use’. For mining entities this is generally accepted to be when commercial levels of production are achieved. This does not necessarily coincide with technical commissioning of certain plant items.

Determining when commercial levels of production have been achieved is not straightforward. The decision is usually made after discussions between the accountants, engineers and metallurgists and may be based on a range of criteria, such as:

- a nominated percentage of design capacity for the mine and mill;
- mineral recoveries at or near expected levels; and
- the achievement of continuous production or other output.

In each case, the percentages and levels of recovery should be nominated well before they actually occur. These factors need to be reconsidered in the event of any significant delays in development or if pre-determined commercial levels of production cannot be achieved due to external factors.

Furthermore, development often continues after production has begun. For example:

- stripping costs in an open-pit mine where removal of overburden occurs before production; and
- where waste/ore ratios move temporarily out of line with the life-of-mine ratio.

Similar examples occur in underground mining operations with the extension of a shaft or major underground excavations.

4.2 Accounting for production expenditure
Production expenditure is the specific cost of producing the saleable product on a commercial scale and includes all extraction and treatment costs. This includes depreciation and amortisation (see Chapter 6), and transport and similar costs incurred before the point of sale (see Chapter 10).

Accounting for production costs in the mining industry is similar to the manufacturing industry. Some specific issues from the production phase are set out below; the other major area of environmental and restoration costs is addressed in Chapter 9.

4.3 Development expenditure in the production phase

4.3.1 Future benefits
IAS 16 Property, Plant and Equipment requires subsequent expenditure on assets to be capitalised where future benefits are expected, if it contributes to the future revenue-earning capability of the mining operation.

Development costs incurred during the production phase are therefore capitalised and amortised to match the benefits derived from the expenditure. This can often become complex in practice.

Mining entities use different accounting treatments on issues such as whether:

- variations between the actual stripping ratio in an open-pit mine and the life-of-mine average stripping ratio are deferred or expensed; and
- extension of underground shafts or major haulage-ways are deferred or expensed, all or in part.

4.3.2 Deferred stripping expenditure
If a mine’s actual stripping ratio (the ratio of waste material to ore extracted/saleable production) is higher than the expected average stripping ratio, less ore is being produced (and less revenue), with a greater proportion of cost in removing waste and overburden.

When stripping costs fluctuate significantly, a portion of the waste removal costs may be attributable to future production; the alternative of treating all waste removal costs as a current-year production cost ignores the reality that
a proportion of the costs incurred will deliver future economic benefit, representing development costs incurred to gain access to the orebody.

The residual stripping costs that represent future economic benefit can be capitalised in the balance sheet as a ‘deferred stripping cost’. The amount capitalised is subsequently amortised to the income statement when the actual stripping ratio falls below the expected average stripping ratio.

It is important to note that a liability cannot be recognised in respect of deferred stripping.

Key to this accounting practice is the assumption that stripping costs will be equalised over time and that accurate estimates can be made of the expected average stripping ratio over the relevant area. If there is significant uncertainty, we would not recommend capitalisation of deferred stripping costs. In addition, changes in mine plan clearly warrant reconsideration of any amounts previously capitalised.

4.4 Major overhauls and maintenance

Overhauls of equipment mean renewing or refurbishing equipment to extend its useful life or increase its productive capacity. Major overhauls are those that have a significant effect on the life or productive capacity of the equipment.

4.4.1 Renewal or reconditioning costs

Under IAS 16, renewal or reconditioning costs (including internal and external expenditure) that extend the life of the equipment or increase capacity are capitalised because future benefits will flow to the mining entity.

If these costs are capitalised, the depreciation rate must be reviewed to ensure that it takes into account the asset’s increased useful life or capacity. Management should also consider whether the requirement to renew or recondition the asset indicates that the asset is potentially impaired.

Repairs that do not extend an asset’s useful life or increase its productive capacity are expensed.

4.4.2 Components

The cost of an asset should be allocated at initial recognition to its significant parts. Each part is then depreciated separately over its useful life (ie, to the next planned replacement), which may be shorter than the useful life of the remaining part of an asset (for example, material for lining a furnace). Separate parts that have the same useful life and depreciation method can be grouped together to determine the depreciation charge.

4.5 Care and maintenance

Mining operations are sometimes suspended because a change in circumstances – such as a lack of sales contracts, depressed prices or changes in exchange rates – has made production or further development uneconomical.

Instead of shutting down and abandoning the property, operations and development are curtailed and the mine is placed on a ‘care-and-maintenance’ basis. This can happen in the development phase or after production has started.

Putting a mine on ‘care and maintenance’ is an impairment indicator. An impairment test should be carried out and an impairment loss recognised if the carrying amount of the cash-generating unit exceeds the recoverable amount.

4.5.1 Accounting for ongoing expenditure

During a period of care and maintenance, expenditures are still incurred but usually at a lower rate than when the mine is operating. A lower rate of depreciation for tangible non-current assets is also usually appropriate due to reduced wear and tear. Management should consider depreciation to allow for deterioration, but depreciation on a units-of-production basis would no longer normally be appropriate. Management should also ensure that assets are not carried at greater than their expected long-term recoverable amount.

The length of the closure and the associated care and maintenance expenditure may be estimated for depreciation and impairment purposes. However, it is not appropriate to establish a provision for the entire estimated expenditure of the care and maintenance period; all care and maintenance expenditure is expensed as incurred.

4.6 Accounting for subsidies

Subsidies received are commonly treated as a recovery of the capitalised costs. They are credited to the relevant asset accounts if they relate to specific assets. IAS 20 Accounting for Government Grants and Disclosures of Government Assistance states that government grants related to assets are presented in the
balance sheet, either by accounting for the grant as deferred income or by deducting it from the cost of the asset.

In both cases, the grants are recognised in the income statement in the same period as the related costs that they are intended to compensate. This means that government assistance for long-term projects is not taken directly to equity.

4.7 Presentation and disclosure

Management should disclose the following items for activities in the production phase:

Production costs to disclose:

• how the entity determines whether commercial production has commenced;
• cost of product sold and operating expenses;

• selling, general, administrative and other expenses;
• depreciation and amortisation;
• finance costs;
• exploration expenditure; and
• royalty expenditure.

Stripping costs to disclose:

• accounting policy; and
• movements in any ‘deferred stripping’ asset.

Care and maintenance to disclose:

• accounting policy; and
• carrying amounts of assets under care and maintenance.
5  Mineral resources and reserves
5 Mineral resources and reserves

Mineral resources and reserves are the source of the value generated by mining entities needed to deliver future production. They are the most important economic asset for a mining entity: its financial strength depends largely on the scale and quality of its resources and reserves. Resources and reserves are also the source of future cash inflows from sale of minerals and they provide the basis for acquiring funds through borrowings and additional equity financing.

IAS 16 Property, Plant and Equipment excludes application to mineral reserves. The IASB is considering the accounting treatment for mineral resources and reserves as part of its Extractive Activities project. In the absence of a specific standard, mining entities usually recognise mineral resource and reserve assets on the balance sheet at historical cost.

Even under the historical cost concept, reserves and resources have a pervasive impact on a mining entity’s financial statements, namely the:

- annual charge for depreciation and amortisation (see Chapter 6);
- calculation of deferred stripping adjustments (see Chapter 4);
- determination of impairment charges (see Chapter 7);
- expected timing of future decommissioning and restoration, termination and pension benefit cash flows (which impacts on the discounted value of those obligations) (see Chapter 9);
- allocation of the purchase price in business combinations (see Chapter 15);
- capitalisation of exploration and evaluation costs (see Chapter 2); and
- accounting for financial instruments (see Chapter 12).

5.1 Defining a mineral resource

Deposits of minerals are often located deep beneath the earth’s surface and are often irregular in shape, making them difficult to measure. The relative quality or percentage of mineral content of ore may also vary throughout a single deposit. Estimating mineral resources is therefore a matter of considerable technical difficulty and uncertainty. It typically involves an assessment of the geological confidence of the deposit and the economic viability of extraction of the ore.

Geologists measure and classify the resources. There is currently no global standard used by geologists for the measurement and classification of resources and reserves.

The Committee for Mineral Reserves International Reporting Standards (CRIRSCO), a group of representatives of the national organisations responsible for developing mineral reporting codes, is bringing national mineral resource and reserve definitions into line with their international reporting template.

At present the national codes used to define mineral resources vary and have differences that hamper the comparison of the resource figures disclosed by different mining entities.

An entity should apply its definition of resources and reserves consistently and disclose the policy applied in the financial statements.

5.2 Resources versus reserves

Mineral resources and reserves are categorised based on the level of geological confidence. This is illustrated in the diagram opposite, taken from the CRIRSCO international reporting template. The distinction between mineral resources and reserves is based on the economic viability of extraction (as opposed to geological confidence):

- resources are an identified mineral occurrence with reasonable prospects for eventual economic extraction;
- reserves are the economically mineable part of a resource where appropriate assessments demonstrate that economic extraction can reasonably be justified.

Explanations of the different categories of resources and reserves are provided in the Glossary (see Appendix 2).

Most national codes take some or all of the following matters into account in their measurement and classification of resources and reserves:

- the grade (the relative quality or percentage of mineral content) in various parts of the mineral resource;
- continuity of geology between samples;
- the proportion of the mineral resource that will be extracted (allowing for the partially offsetting factors of dilution and non-recovery);
- future commodity prices;
future exchange rates;
future production costs;
future capital expenditure; and
technological changes.

All assumptions are important if there is any doubt about operating at profitable levels.

Information about the characteristics of mineral resources and reserves tends to expand as the development progresses. Expectations of future mineral prices and production costs also vary as a result of changes in economic and technological factors. Estimates of resources may therefore fluctuate during the life of a mine. Entities should update the resource estimations at least annually.

5.3 Presentation and disclosure

Local listings requirements and national codes provide for minimum disclosure of mineral resources and reserves. IAS 1 Presentation of Financial Statements requires the disclosure of key assumptions and other key sources of estimation uncertainty. Given that they have a pervasive impact, this normally requires disclosure about mineral resource and reserve estimates – for example:

• mineral resource and reserve estimates:
  – methodology used; and
  – key assumptions;
• the sensitivity of carrying amounts of assets and liabilities to the mineral resource and reserve estimates used;
• the range of reasonably possible outcomes within the next financial year in respect of the carrying amounts of the assets and liabilities affected; and
• an explanation of changes made to past mineral resource and reserve estimates, including changes to underlying key assumptions.
6 Depreciation and amortisation
6 Depreciation and amortisation

Chapter 3 analyses the factors that determine whether the costs incurred by a mining entity should be capitalised or expensed. This chapter deals with the periodic depletion of the amounts capitalised through depreciation and amortisation. References in this chapter to depreciation include the amortisation of intangible assets because the principles are identical.

6.1 Key definitions

IAS 16 Property, Plant and Equipment and IAS 38 Intangible Assets define depreciation and amortisation as the systematic allocation of the depreciable amount of an asset over its useful life. For this purpose:

- depreciable amount is defined as ‘the cost of an asset or other amount substituted for cost, less its residual value’;
- residual value is defined as ‘the estimated amount that an entity would obtain from disposal of the asset, after deducting the estimated costs of disposal, if the asset was already of the age and condition expected at the end of its useful life’; and
- useful life is defined as ‘the period over which an asset is expected to be available for use by an entity, or the number of production units or similar expected to be obtained from the asset by an entity’.

Many commentators regard the goodwill that arises from business combinations in the mining industry as a ‘wasting asset’ (given that all mines have a finite life). However, IFRS 3 Business Combinations states that goodwill cannot be amortised. The goodwill attributable to mining operations is tested for impairment annually. This means that it will often be charged through a mining entity’s income statement in the form of periodic impairment losses. This is addressed in more detail in Chapter 15.

6.2 Depreciable amount

Mining entities can elect to revalue individual classes of property, plant and equipment, but in practice this is rare. The depreciable amount for most assets is based on cost, adjusted to reflect subsequent depreciation and impairment charges.

For depreciation purposes, the cost of an asset includes the cost of dismantling and removing it at the end of its useful life and restoring the site.

The residual value of an asset is determined based on today’s prices – ie, it cannot be adjusted to reflect anticipated future inflation. In addition, residual values are reviewed at the end of each annual reporting period. Any change to the residual value of an asset (including the impact of current-year inflation) is accounted for on a prospective basis as a change in estimate – ie, prior-period depreciation charges are not adjusted. The requirement to reassess residual values annually has little impact on assets with a low residual value (which is often the case for mining assets) or where inflation is low. However, it can have a significant impact on the pattern of depreciation for assets with a large residual value in countries with high inflation. In such cases, the benefits flowing from inflationary increases to the residual value are weighted towards the later years of the asset’s useful life.

Depreciation is charged even if an asset’s current fair value exceeds its carrying amount. No depreciation is charged if the residual value (in today’s prices) exceeds the carrying amount. For many industries, land is not depreciated because its value tends to increase over time, and it has an unlimited useful life. This is not always the case for land held by mining entities. The price paid by a mining entity to acquire land, including the buffer land around the mine site, often includes a significant premium that will no longer apply once the mining operation has ceased. In such cases, either the land is depreciated to its expected residual value over the life of the mining operation, or the premium is attributed to the mineral resources and depreciated accordingly.

There may be some assets for which the life of the mine is much shorter than the economic life of the asset (this is explained in more detail below). In such cases, the useful life of the asset for depreciation purposes reflects the life of the mine rather than its own economic life (assuming the asset will not be transferred to another mining operation within the same entity). Its residual value also reflects the expected age and condition of the asset when it is due to be sold.

6.3 Useful life

The useful life of mining assets is determined as either the period of time over which the asset is expected to be used, or the number of production units expected to be obtained through using it.
The following factors have to be considered when determining the useful life of an asset:

- the expected usage of the asset. This is assessed by reference to its expected capacity or physical output (such as the size of the mineral resource to be mined);
- the expected physical wear and tear. This depends on operational factors such as the number of shifts for which the asset is to be used, the repair and maintenance programme, and the care and maintenance of the asset while idle;
- technical or commercial obsolescence arising from changes or improvements in production, or from changes in the market demand for the output. The latter factor might be relevant where, for example, a mine is re-opened during a period of high prices but is expected to close again when prices fall; and
- legal or similar limits, such as the expiry dates of mining leases.

The important point to note is that the useful life is gauged by the expected usage of the asset by the entity, not simply by the asset’s economic life. The useful life of many assets in the mining industry is fixed by the expected life of the mine rather than the economic life of the asset. The useful life of plant and equipment often does not extend beyond the life of the mine due to the fixed nature of many items of plant and equipment (such as concentrators and smelters) and the remote locations in which mining operations are typically based. Assets will be of no use at the mine site once the resources have been exhausted, and often it is not practical to move them to another mine site.

A mining entity might choose to replace certain assets before they reach the end of their economic life. The useful life should reflect the expected pattern of replacement. A common example of this concerns haul trucks, which are regularly replaced to avoid significant downtime for repairs and maintenance.

A change to the useful life of an asset can arise because of:

- a change to the expected economic life of the asset (where this is shorter than the life of the mine);
- a change to the expected life of the mine (for assets with a useful life that are restricted by the life of the mine); or
- a change to the expected pattern of asset replacement.

Estimates of the remaining useful lives of assets should be reassessed at least annually. This is commonly carried out at an entity’s year-end as part of the exercise to update the estimates of mineral reserves/resources. However, the useful lives of assets may need to be updated earlier than this. Examples of situations where reassessment of an asset’s useful life is necessary before the year-end include:

- the discovery of additional reserves/resources that will extend the size of the existing mine or enable the plant and equipment to be used to process the output from a new mine nearby;
- changes in economically recoverable resources as a result of previously unforeseen changes in costs or recoveries. For example, grades are much lower than expected or there is a major pit-wall failure;
- a significant change to the mine plan, such as a decision to develop an underground mine below an existing open-pit mine; and
- a major technological development that is expected to accelerate the replacement of major items of plant and equipment.

It is important to reassess the useful lives of assets that have a shorter life than the mine, not just the expected life of the mine.

Any changes to the useful life of an asset are accounted for prospectively from the date of the change in estimate so as not to affect the depreciation charges in prior periods or in the earlier part of the current period (ie, prior to the change in estimate). Changes to reserve/resource estimates at the end of a year will not impact depreciation charges until the following period. This is why it is important to update the reserve/resource estimates promptly if there is a clear trigger.

It is also important to remember that a significant decrease in mineral reserves/resources will not only increase the depreciation charge going forward, but may also indicate an impairment (this is addressed in more detail in Chapter 7).
6.4 Depreciation methods

There are several different methods for depreciating property, plant and equipment (and amortising intangible assets). The most common are:

- the units-of-production method, in which the charge reflects the pattern of production over the asset’s useful life;
- the straight-line method, which results in equal annual charges over the asset’s useful life; and
- the diminishing balance method, which results in a decreasing charge over the useful life of an asset.

The depreciation method used must reflect the pattern in which the asset’s future economic benefits are expected to be consumed by the entity.

6.4.1 Units-of-production method

The units-of-production method is conceptually the most appropriate depreciation method for many of the assets held by a mining entity. For example, it will apply to:

- the amounts capitalised in respect of the mineral property (comprising the cost of acquiring the property, any amounts transferred from exploration and evaluation, and mine development costs) where the consumption of the economic benefits is directly linked to the amounts extracted from the deposit each period;
- items of plant and equipment that are subject to considerable wear and tear during production (such as crushers and concentrators) where the consumption of economic benefits is linked to the level of production (either throughput or output); and
- any intangible assets for which the consumption of value is linked to production or sales. This could apply to any contracts that are recorded separately from the mineral resources in a business combination.

In applying the units-of-production method, a suitable basis needs to be determined for calculating the depreciation charge. There are several possibilities:

- total quantity of material extracted from the mine (including waste): this is appropriate for depreciating equipment such as shovels and draglines where the level of wear and tear is based on the volume extracted from the mine, irrespective of whether it represents ore or waste;
- total quantity of ore extracted from the mine: this is appropriate for depreciating the cost of the mineral property itself (although if grades vary significantly from one period to another, the depreciation should be linked to the quantity of mineral recovered from the ore, not simply the quantity of ore extracted). It might also be suitable for depreciating equipment that is used in the early stages of processing, such as crushers and conveyors where wear and tear is linked to the ore throughput;
- total output: this is appropriate for depreciating plant and equipment that is involved in the latter stages of processing (such as smelters and refineries) where the volume of throughput (and hence wear and tear) is closely linked to the quantity of valuable output.

For assets with an economic life that is shorter than the mine life, these calculations need to be performed using the estimated productive capacity of the individual asset (or component), not the estimated capacity of the mine as a whole. In practice, many mining entities depreciate all or most of their plant and equipment on a straight-line basis, which is the simplest method to apply. This should be considered on a case-by-case basis. However, where equipment is operated at full capacity throughout its economic life, the straight-line method is unlikely to give a materially different result from the units-of-production method. The straight-line method is also acceptable if production levels are not expected to fluctuate considerably from one period to another.

6.4.2 Straight-line method

There will be some assets held by mining entities for which the straight-line method provides the best measure of the consumption of economic benefits. This applies to assets that depreciate evenly over time, rather than according to the level of production (for example, buildings and infrastructure assets such as power lines).

6.4.3 Diminishing balance method

The diminishing balance method is not used very often. It is only appropriate if the consumption of the future economic benefits associated with the useful life of an asset decreases over time. The economic benefits for most mining assets are consumed either evenly over the useful life or at a rate that depends on their use.
6.4.4 Annual review of depreciation method

IAS 16 requires the depreciation method applied to each asset to be reviewed at least at each financial year-end. If there has been a significant change in the expected pattern of consumption of future economic benefits, the depreciation method should be amended to reflect the changed pattern. Any such change is accounted for on a prospective basis.

Mining entities that apply the straight-line method on the basis that production is not expected to fluctuate significantly over time should review this assumption regularly.

6.5 Determining the reserve/resource base

Determining which resources are taken into account when calculating depreciation charges can have a significant impact on the calculation. This applies to all depreciation methods, not just the units-of-production method, because the resource base will affect the mine life used to calculate straight-line depreciation charges (or diminishing balance). The reserve/resource base selected needs to be considered in conjunction with any necessary costs to be incurred in order to extract part of those reserves/resources (see Section 6.9) in determining the amortisation charge for the period.

Explanations of the different categories of resources and reserves are provided in the Glossary (see Appendix 2).

6.5.1 Proved and probable reserves

A lot of mining entities only take into account proved and probable reserves when calculating the depreciation charges for mining assets. This means that all inferred resources are excluded, together with any indicated and measured resources that have not yet been deemed economically recoverable.

This approach is conservative and is acceptable in most situations. The only exception is where the proved and probable reserves do not provide a realistic indication of the useful life of the mine (and related assets). For example, management is confident that further resources will be converted into reserves and is approaching economic decisions affecting the mine on this basis, but has chosen to delay the work required to designate them formally as reserves. This situation is rare, but it can arise.

6.5.2 Resources not yet designated as reserves

Some mining entities adopt a more flexible policy for determining the appropriate reserve/resource base for each mine, depending on the type of mineral and the characteristics of the deposit. It is difficult to justify including inferred mineral resources in the depreciation base, given that the tonnage, grade and mineral content can only be estimated with a low level of confidence. For some deposits, however, it may be considered reasonable to take account of indicated and measured mineral resources that have not yet been classified as reserves. This might help to ensure the depreciation charges reflect management’s best estimate of the useful life of the assets.

This can be particularly important where a mineral property has been acquired as part of a business combination and a significant amount has been attributed to the fair value of resources not yet designated as reserves. In such cases, it would not be appropriate to calculate depreciation on the aggregate value of the mineral property using only the proven and probable reserves. There are two alternative approaches that are acceptable under IFRS:

- take the additional resources into account when calculating the depreciation charges, where this can be justified using the criteria summarised below (and keep it under regular review); or
- separate the value of the resources not yet designated as reserves from the rest of the value of the mineral property. Depreciation is charged on the mineral property using proved and probable reserves and no depreciation is charged on the value attributed to the additional resources. Impairment tests are performed instead following the guidance in IFRS 6 Exploration for and Evaluation of Mineral Resources.

Management should take care when including non-reserve material in the depreciation base. The key consideration is the degree of confidence that the resources will be converted into reserves. Some specific factors to consider include the:

- entity’s track record in converting resources into additional reserves and thereby extending the life of the mine;
• reasons why the additional work required to convert the resources into reserves has not been undertaken. For example, it may be that the identification of additional reserves would not impact production planning for the next few years;
• type of deposit - some bulk commodity deposits, such as coal and iron ore, have large additional resources that it is highly probable will be converted into reserves because of the nature of the deposit;
• relevant timeframe for carrying out the work necessary to convert the resources into reserves - for example, if this work is scheduled to take place in the near future, it will be easier to justify including the additional resource in the depreciation base;
• extent to which variations in the chemical or physical characteristics of the ore could play a significant role in determining whether it is economic to extract and process the additional resources;
• entity’s preliminary assessment of the net present value of the non-reserve material, and the sensitivity of that assessment to changes in key variables such as commodity prices; and
• extent to which further development expenditure would be needed to access the resource.

6.5.3 Changes to the reserve/resource base
Most entities update their resource and reserve estimates at least annually. The determination of reserve/resource estimates involves a lot of judgement, including an assessment of factors such as future commodity prices and production costs (see Chapter 5). Movements in commodity prices and production costs affect the economic viability of extraction and the classification of mineral resources/reserves. As an entity’s knowledge about a deposit will increase over time, it is almost inevitable that reserve/resource estimates will fluctuate during the life of a mine.

In most cases, changes in the reserve/resource estimates will be accounted for prospectively as a change in estimate, as would any other change to the useful life of an asset. It is possible, however, that the work undertaken to update reserve/resource estimates will indicate there was an error in how the prior-year estimates were calculated. If this situation arises and the error has a material effect on the financial statements, the prior-year comparatives are adjusted in accordance with the requirements of IAS 8 Accounting Policies, Changes in Accounting Estimates and Errors.

The type of exploration and evaluation work that will trigger a change to the depreciation base will vary according to whether any non-reserve material is included in calculating depreciation, as follows:
• if depreciation is calculated using proved and probable reserves, the charges will be affected by work undertaken to convert resources into reserves (or the downgrading of reserves into resources) even if there is no change to the aggregate resource base;
• if depreciation is calculated using non-reserve material, the charges will be affected by the identification of additional resources, not the conversion of resources into reserves.

6.6 Identifying components
Each part of an item of property, plant and equipment that represents a significant portion of the total cost of the asset is depreciated separately. The only exception to this concerns the significant parts of an asset that have the same useful life and depreciation method, as these may be grouped together when determining the depreciation charge.

This requirement can create complications for mining entities, as there are many assets that include components with a shorter useful life than the asset as a whole. For example:
• the individual pot linings in an aluminium smelter have to be replaced on a regular basis. This means the costs incurred in re-lining each pot need to be recorded separately and depreciated over the expected useful life of a new lining. In addition, when a pot is re-lined, the residual carrying amount of the previous lining has to be expensed. It is not acceptable to accrue the expected cost of re-lining a pot over the period during which the current lining is in use; and
• the costs incurred in constructing the infrastructure for a mine (or group of mines) should be disaggregated to ensure that each component is depreciated using an appropriate depreciation method (for example, units-of-production or straight-line) and an appropriate useful life. For example, a port facility that serves several different mines is depreciated
using aggregate throughput from all of the mines. The separate railway lines for each mine that link them to the port are depreciated according to the life of the relevant mine.

### 6.7 When to start depreciation

Depreciation commences when the asset is first available for use (i.e., when it is in the location and condition necessary for it to be capable of operating in the manner intended by management). This means that depreciation does not necessarily commence when the asset is first put into use because it might undergo testing and commissioning before it is capable of operating at commercial levels (i.e., in the manner intended by management).

Judgement may be required in deciding when to start depreciation of the mineral property itself. It is common for some valuable material to be extracted from the deposit while the mine is still being developed (for example, when overburden is being removed or an underground shaft is being constructed). In some cases, production is ramped up over an extended period of time. Some mining entities commence depreciation when the volumes being extracted are more than de minimus, but it is more common to wait until the development activities have reached a point where the mine is capable of being operated at commercial levels.

During the exploration, evaluation, development and construction stages of a mine, there will be assets (such as drill rigs, excavators and haul trucks) that are being used. These assets are depreciated because they are in use, and the depreciation expense is classified as exploration, evaluation, development or construction expenditure, as appropriate. IAS 16 specifically acknowledges that such depreciation charges may need to be capitalised into the carrying amount of another asset, such as the mineral property itself or related infrastructure.

Many processing plants rely on a series of assets being in place before they can be operated. In these circumstances, some assets may be completed before the processing plant can start operating because there are other assets that have yet to be completed. For example, a completed concentrate pipeline cannot be used if the concentrator assets remain under construction. For the purposes of determining when depreciation should commence, such assets are bundled together so that depreciation starts when the entire processing plant is capable of operating. However, each asset (or component) with a different useful life is recorded separately on the fixed asset register to ensure it is depreciated correctly.

### 6.8 When to stop depreciation

Depreciation only ceases when an asset:
- becomes fully depreciated;
- is classified as held for sale (in accordance with IFRS 5 Non-Current Assets Held for Sale and Discontinued Operations), after which it should be recorded at the lower of its previous carrying amount and ‘fair value less costs to sell; or
- is derecognised, either because it has been sold or because no future economic benefit is expected from its use or disposal and, hence, it needs to be written off.

Any gain or loss that arises from derecognising an asset is included in profit or loss when it is derecognised. Any gains are classified as income but cannot be included in revenue.

Depreciation must continue if an asset is capable of being used but is temporarily idle (for example, because of strike action or because it is currently surplus to requirements). However, if an asset is being depreciated on a units-of-production basis and there is no production, the depreciation charge is zero.

### 6.9 Future development costs

Substantial costs are incurred up-front when a new mine is established but before production commences. In some cases, however, it is known that future development costs will need to be incurred to extract all of the reserve/resource base from the mine. For example, it may be necessary to expand the tailings facilities or remove more overburden or, in the case of an underground mine, it may be necessary to construct many new levels and cross-cuts.

In situations where it is known that future development costs will need to be incurred to extract all of the reserve/resource base, one approach is to split the costs attributed to the mineral property between those that can:
- be attributed to the entire orebody (such as the property acquisition costs and transfers from exploration and evaluation), which should be depreciated over the full reserve/resource base; and
only be attributed to part of the orebody (such as the overburden removal costs or the cost of constructing the first tailings facility), which should be depreciated over the relevant portion of the reserve/resource base. This might result in the use of several different reserve/resource bases for different components of the mine development costs. As and when additional development costs are incurred, they are depreciated over the part of the orebody to which they relate.

Any amounts capitalised in respect of the future dismantlement, removal and restoration of the mine site are depreciated on a basis consistent with the mine development activity to which they relate. This approach is consistent with the requirement that each part of an asset with a cost that is significant to the total cost of the item should be depreciated separately. It also avoids the need to quantify the future development costs in determining the current depreciation charges.

An alternative approach is to take account of the future development costs when determining the pattern of depreciation charges on the existing asset. As a result, the annual depreciable amount of the existing asset is relatively higher in the early years (before the additional development costs have been incurred), and relatively lower in later years (when the additional development costs have been incurred and are also being depreciated). In many situations, this alternative approach would be expected to produce a similar pattern of depreciation to the approach outlined above.

Both of these approaches reduce the extent to which the depreciation charge can be expected to increase over the life of the mine. It is not acceptable to depreciate the existing asset over the entire reserve/resource base if it is known that significant development costs will need to be incurred in order to extract part of those reserves/resources (and hence the depreciation charge will rise significantly at some point in the future). This would conflict with IAS 16, which requires the depreciation charge to reflect the expected pattern of consumption of the asset’s future economic benefits. It would also involve charging depreciation on some components of the existing asset over a period that exceeds their expected useful lives.

6.10 Insurance and capital spares
The specialised nature of the equipment used by mining operations and the remote locations in which they are typically located means that entities often keep additional spare parts for key pieces of equipment to ensure that downtime is minimised in the event of equipment failure. Guidance on the capitalisation and depreciation of insurance and capital spares is set out in Chapter 8.

6.11 Presentation and disclosure
Specific disclosure requirements relating to depreciation and amortisation include the following (for each class of property, plant and equipment and each class of intangible asset):

- the depreciation/amortisation methods adopted and the useful lives or depreciation/amortisation rates used. These should include an explanation of:
  - the reserve/resource base used to determine depreciation/amortisation charges and, where non-reserve material is included, the basis for determining how and when such material is included; and
  - the treatment of future development costs, where they are expected to be significant;
- the total depreciation/amortisation charge for the period (and, for amortisation, the line item(s) in the income statement where it is included);
- the accumulated depreciation/amortisation (aggregated with accumulated impairment losses) at the beginning and end of the period;
- the nature and effect of any change in accounting estimate that has an effect in the current period or is expected to have an effect in future periods. This would include changes to:
  - useful lives, including changes to the reserve/resource base (even if they will only impact future depreciation/amortisation charges);
  - residual values; and
  - depreciation/amortisation methods.

Where relevant, management should also consider explaining why the straight-line method is being used to depreciate/amortise assets for which the consumption of future economic benefits is linked to the volume of production.

There are additional disclosure requirements for intangible assets with an indefinite useful life, but they will rarely affect mining entities.
7 Impairment
7 Impairment

Mining is a capital-intensive industry, so most mining entities carry a significant number of non-current assets on their balance sheets, such as property, plant and equipment and intangible assets. It is therefore possible for significant impairment losses (or reversals) to arise. In addition, goodwill attributed to mining operations is often considered a wasting asset and cannot be amortised; regular impairment charges are therefore possible even for successful mining entities.

This chapter considers the application of IAS 36 Impairment in the mining industry. IFRS 6 Exploration for and Evaluation of Mineral Resources contains special impairment rules for capitalised exploration and evaluation expenditure, which are dealt with in Chapter 2.

7.1 Key definitions

Assets should be tested for impairment whenever indicators of impairment exist. An impairment loss should be recognised for the amount by which the carrying amount exceeds its recoverable amount.

The key terms are defined as follows:

- **carrying amount** is the ‘amount at which an asset is recognised after deducting accumulated depreciation (amortisation) and accumulated impairment losses’;
- **a cash-generating unit (CGU)** is the ‘smallest identifiable group of assets that generates cash flows largely independent of the cash inflows from other assets or groups of assets’;
- **recoverable amount** is the ‘higher of fair value less costs to sell and value in use’;
- **fair value less costs to sell** is the ‘amount obtainable from the sale of an asset or CGU in an arm’s length transaction between knowledgeable, willing parties, less the costs of disposal’;
- **value in use** is the ‘present value of the future cash flows expected to be derived from an asset or CGU’.

7.2 Impairment indicators

7.2.1 Mining-specific indicators

An entity assesses at each balance sheet date whether there is any indication that an asset may be impaired. If any indication exists, the entity must estimate the asset’s recoverable amount.

Common indicators of impairment in the mining industry include:

- a significant decline in the market value of entities producing the same commodity;
- a significant deterioration in expected future commodity prices;
- a significant adverse movement in foreign exchange rates;
- a significant increase in production costs (which are usually reflected in a deterioration in the CGU’s operating results);
- a large cost overrun on a capital project (including an overrun during the development and construction of a new mine);
- a significant increase in the expected cost of dismantling assets and restoring the site, particularly towards the end of a mine’s life (bearing in mind that these costs need to be capitalised into the cost of the related assets);
- a significant reduction in the mineral content of ore reserves/resources (for example, because grades have been lower than expected);
- serious mine accidents, such as a pit wall failure and underground collapse;
- a significant increase in market interest rates; and
- adverse changes in government regulations and environmental law, including a significant increase in the taxes payable by the mine.

7.2.2 Commodity prices

Commodity prices fluctuate regularly. Whether a price reduction during a particular period should be regarded as an impairment trigger will depend on various contributing factors. Mining entities should consider the:

- **expected life of the mine** – for example, if a mine is in the final few years of production, a reduction in the relevant commodity price could significantly impact the cash flows to be generated from the remaining resources;
- **reasons for the price reduction** – for example, a price reduction might be triggered by short-term, temporary factors (such as a transitory reduction in demand) or structural changes to the industry that are expected to impact long-term prices (such as the emergence of cheaper substitutes or technological changes that significantly impact the marginal cost of production); and
Financial reporting in the mining industry

7.2.3 Production costs

Management should also consider the potential impact of changes in production costs. Any significant changes specific to a particular mine are likely to represent an impairment trigger; changes that impact the industry as a whole might only have a limited impact on a long-life mine if management can demonstrate that higher costs are likely to flow through into higher commodity prices.

7.2.4 Taxation

Impairments are calculated on a pre-tax basis, as explained below. It may therefore seem surprising that a significant increase in taxation could be an impairment trigger. This arises because:

- indirect taxes impact directly on the net cash flows generated from a mine; and
- income tax rates impact the pre-tax discount rate applied in the calculation of value in use, even if the post-tax discount rate is unaffected. Income tax rates will also affect the amount a knowledgeable, willing party would be willing to pay to acquire a mine.

7.3 Determination of the cash-generating unit

7.3.1 Individual assets

Assets should be tested for impairment at the lowest level possible – ideally at the individual asset level. This means that individual assets need to be assessed for impairment if they become redundant – ie, they are no longer required to operate the mine. Any surplus assets that are rented to third parties should be considered separately.

Any land that cannot be sold until a mine comes to the end of its useful life is attributed to the same CGU as the mine. Surplus land should be excluded from this CGU and tested for impairment separately. As a consequence, the proceeds that would arise from selling such land cannot be taken into account in assessing whether an impairment provision is required for the mine. Where a sale of land is highly probable and is expected within one year, and the land is available for immediate disposal, the land is accounted for in accordance with IFRS 5 Non-Current Assets Held for Sale and Discontinued Operations.

7.3.2 Grouping assets into CGUs

Most mining assets are grouped into CGUs because the individual assets do not generate cash inflows that are largely independent from the other assets. In such cases, the mining entity must ensure that each individual CGU represents the smallest group of assets that generate largely independent cash flows.

The determination of CGUs will often be straightforward for the mining industry because each individual mine (and its related non-current assets) will be treated as a single CGU. IAS 36 includes an example of a mining entity that owns a railway. The railway is used exclusively to support the mine, does not generate any independent cash flows and could only be sold for scrap value. The railway is grouped with the mine as a whole for impairment purposes. It is not considered a separate CGU.

7.3.3 Vertically integrated operations

The determination of CGUs can be more complex when a mining entity is involved in processing the output from its mines, including downstream activities such as the manufacture of extruded products. A factor that needs to be taken into account is whether an ‘active market’ exists for any of the intermediate products (even if, in practice, all of the intermediate products are used internally). An active market is a market in which all of the following conditions exist:

- the items traded within the market are homogeneous;
- willing buyers and sellers can normally be found at any time; and
- prices are available to the public.

Judgement is often needed when applying these concepts to the intermediate products from a mining operation.

In cases where a mining operation has to be subdivided into separate CGUs, relevant external prices are used to determine the value in use for individual CGUs (which may not be the same as the transfer prices used internally).
7.3.4 Shared assets
Several mines located in the same region may share assets (for example, port and rail facilities or processing equipment). This is common in the coal industry, for example, where an entity might own several mines in the same region. Judgement is involved in determining how such shared assets should be treated for impairment purposes. Factors to consider include:

- the significance of the shared assets to the mining operations. For example, it is likely that each mine will be treated as a separate CGU if the shared assets only play a minor role. However, it may be appropriate to treat the mines and the shared assets as a single CGU if the shared assets form a significant part of the operation;
- whether the shared assets generate substantial cash flows from third parties as well as the entity’s own mines. If this is the case, the shared assets might represent a separate CGU; and
- how the operations are managed.

Any shared assets that do not belong to a single CGU but relate to more than one CGU still need to be taken into account for impairment purposes. The carrying amount of shared assets should be allocated to an individual CGU or group of CGUs on a reasonable and consistent basis. The allocation to individual CGUs should be possible for shared assets used in the processing or transportation of the output from several mines which, for example, could be allocated between the mines according to their respective reserves/resources.

7.3.5 Goodwill
Goodwill cannot be amortised. It must be tested annually for impairment. For the purposes of impairment testing, any goodwill arising from a business combination must be allocated to the individual CGUs or groups of CGUs on a reasonable and consistent basis. Alternatively, goodwill may need to be impaired on an annual basis in its later years of operation, given that the recoverable amount will fall each year to reflect the extraction and sale of the remaining reserves/resources.

In the event that an impairment loss arises, the carrying amount of the goodwill must be reduced first. The other non-current assets held by the CGU or group of CGUs are only impaired once the goodwill has been written down to zero; the remainder of the impairment is then allocated to the relevant non-current assets on a pro rata basis based on their carrying values.

7.4 Determination of value in use
Value in use is determined by estimating the future cash flows that the entity expects to derive from an asset (or group of assets) and then determining the net present value of those cash flows. However, there are a number of complications that can arise in applying the IAS 36 requirements to a mining operation.
7.4.1 Commodity prices

The value-in-use calculation for mining assets with a long life is heavily dependent on the entity’s view of the long-term price for the particular commodity that it sells. There are strong arguments in certain circumstances for concluding that the commodity price assumptions should reflect the long-term outlook rather than current market prices. For example, the market price of many commodities is linked to marginal cost in the longer term. It may not be appropriate to calculate value in use using current commodity prices if it is clear that these prices are not sustainable in the longer term. IAS 36 does not prescribe which commodity price to use for its value-in-use calculations, but whichever method an entity selects must be applied consistently.

The commodity price assumptions exclude the impact of any hedging contracts that have been entered into to protect future revenue streams that are already on the balance sheet. The expected future cash flows arising from such derivatives are already recognised as a separate asset (or liability), so they cannot be included in calculating impairment provisions under IAS 36 as well. This also means that any assets (or liabilities) recognised in respect of the derivatives are excluded from the carrying amount of the assets being tested for impairment.

7.4.2 Exchange rates

IAS 36 requires future cash flows in foreign currencies to be discounted and then translated using the spot exchange rate at the date that the value-in-use calculation is performed. It is possible that value-in-use calculations will reflect long-term commodity price assumptions (for the reasons described above) and current exchange rates. This means that the assumptions will be inconsistent for many of the countries producing commodities, as commodity prices have a significant bearing on the relative strength of the local currency.

7.4.3 Future capital expenditure

IAS 36 restricts the extent to which value-in-use calculations can be adjusted to reflect future capital expenditure. The future cash flows are estimated on the basis of the current condition of the asset (or group of assets), and enhancements resulting from future capital expenditure are not taken into account unless specifically committed to.

This does not prevent mining entities from taking account of future capital expenditure that is necessary to gain access to all of the mine’s reserves/resources, including future development costs. IAS 36 permits the inclusion of cash outflows necessary to make the asset (in this case the mineral reserve/resource) ready for use or sale. It is not possible to take account of capital expenditure that is specifically designed to enhance the net present value of the mine through reducing future operating costs and/or increasing output. This can result in the need to make significant adjustments to the cash flow projections prepared by management for the purposes of mine planning and reserve/resource estimation.

In addition, the capital expenditure required to exploit a mine’s reserves/resources can result in enhancements to the mine’s performance (such as the installation of new equipment). This can be difficult to allow for when preparing value-in-use calculations.

There is evidence that costs for many commodities decline over the long term, partly because of the impact of capital expenditure. Some mining entities take this into account when determining their projected selling prices. However, a value-in-use calculation that allows for a real-terms decline in selling prices, but also assumes flat production costs, is unlikely to provide a reliable benchmark for assessing the recoverable amount of a mining entity’s assets.

7.4.4 Future cost savings

IAS 36 requires cash flow projections to exclude the future cash outflows and inflows expected from a future restructuring to which the entity is not yet committed. The net benefit expected to arise from restructuring an operation can only be taken into account when the related costs have already been incurred or provided for.

There are certain efficiency improvements in a mine that may arise as a matter of course over the life of the operation. For example, ore grades that are expected to increase will result in lower unit costs and may deliver cost savings as well. The costs incurred on overburden removal will drop towards the end of an open pit, which is likely to result in reduced cash outflows. It is appropriate to take account of these future improvements when calculating value in use, as they arise from the existing nature of the orebody, not from a future restructuring.
7.4.5 Period of projections
IAS 36 requires the cash flow projections used to determine value in use to cover a maximum period of five years, unless a longer period can be justified. For mining entities, a period longer than five years can typically be justified because management projects further ahead than five years. Indeed, it is necessary to project the cash flows separately for each year of operation if the grade (and volume of production) is expected to vary significantly over time. It may also be necessary to incur significant capital expenditure at certain points during the life of the mine to gain access to all of the reserves/resources.

7.4.6 Reserves and resources
It may be appropriate to use only proved and probable reserves to estimate the useful lives of mining assets for depreciation purposes, as noted in Chapter 6. In assessing recoverable amount, however, it may be necessary to include resources that have not yet been designated as reserves to the extent that future economic benefits from the non-reserve material are considered probable.

The more uncertainty surrounding the resources, the more risk that should be factored into the value-in-use calculation. This can be achieved by adjusting the expected future cash flows or by applying a different (higher) discount rate to the cash outflows and inflows associated with the non-reserve material.

7.4.7 Environmental and closure/decommissioning provisions
The estimated future cash flows should exclude any cash outflows that relate to obligations that have been recognised as liabilities (such as creditors and pension liabilities) to avoid double-counting. At first sight, it appears that this would also apply to environmental remediation provisions and closure/decommissioning provisions, to the extent that they have already been recognised on the balance sheet. However, IAS 36 states that liabilities must be taken into account in determining a CGU’s recoverable amount where the disposal of the CGU would require the buyer to assume the related liability. The example included in IAS 36 involves an entity operating a mine in a country where the owner will have to restore the site on completion of the mining operation.

To perform a meaningful comparison between the carrying amount of the CGU and its recoverable amount, the book value of the related provisions is deducted from the CGU’s recoverable amount (whether it is determined using value in use or fair value less costs to sell) and from the carrying amount of the CGU’s assets. It should be noted that the carrying amount of the CGU includes any amounts capitalised in respect of closure/decommissioning obligations. This is why a significant increase in the expected closure/decommissioning costs can result in an impairment, particularly towards the end of a mine’s life.

7.4.8 Discount rates
The discount rate used to calculate value in use is the risk-adjusted rate that reflects the current market assessment of specific risks of the asset or CGU. The discount rate is not adjusted for risks that have already been considered in projecting future cash flows.

Each mineral property is unique, so the appropriate discount rate almost always has to be estimated with regard to relevant market rates (including the mining entity’s own weighted average cost of capital). Management should consider asset-specific risks such as political risk (if this is an issue in the country where the mine is located), currency risk and any risks pertaining to the commodity being mined. It may be appropriate in some cases to apply different discount rates to different sets of cash flows.

The discount rate should be a pre-tax rate; the estimated future cash flows should also be pre-tax (i.e., they should exclude income taxes). IAS 36 recognises that in many cases the only observable market rates will be post-tax rates but nonetheless requires the post-tax rate to be converted to a pre-tax rate. This cannot be done by simply grossing up the post-tax discount rate using the standard or effective rate of tax and then discounting the pre-tax cash flows at that grossed up rate. Allowance has to be made for the effect of any special factors that might materially distort the relationship between the post-tax rate and the pre-tax rate, such as tax losses carried forward and accelerated capital allowances.

7.4.9 Relevance of value in use calculations
In light of the specific rules described above, many mining entities may not regard value-in-use calculations as providing an appropriate basis for determining impairment losses (or reversals). The value-in-use calculations may be sufficient
to demonstrate that no impairment write-down is required, but entities may be forced to use the ‘fair value less costs to sell’ model when the value-in-use calculation indicates a possible impairment loss (or reversal), bearing in mind that recoverable amount is the higher of value in use and fair value less costs to sell.

7.5 Fair value less costs to sell

The definition of fair value less costs to sell is ‘the amount obtainable from the sale of an asset or cash generating unit in an arm’s length transaction between knowledgeable, willing parties, less the costs of disposal’. This requires the determination of the hypothetical sale price that would be achieved on the sale of the asset or business unit. It is not necessary for there to be a proposed sale of the asset or business unit in question. However, it must be possible to estimate reliably what the asset or business unit would realise if sold in a freely negotiated transaction at the date of the valuation.

IAS 36 contains little guidance on how the fair value of an asset should be determined where there is no active market. Fair value less costs to sell may be calculated using any reasonable valuation approach. This includes comparison with the price achieved in market transactions involving similar assets, although the value of recent transactions in other mineral properties will seldom provide adequate evidence of an individual property’s value. However, industry rules of thumb will often provide a good benchmark.

Discounted cash flow techniques are permitted provided that the underlying assumptions are based on those that a market participant would make. In contrast to value in use, fair value less costs to sell allows the impact of a planned restructuring or enhancement to be taken into account if this is the course of action that a market participant would pursue. The net benefits would have to be valued from the perspective of what a knowledgeable, willing buyer would be prepared to pay for them.

The cash flows used in a fair value calculation will be post-tax, so there is no need to estimate a pre-tax discount rate.

The main reason that an entity may choose to use fair value less costs to sell is that it is less restrictive than value in use. As a result, the underlying assumptions are usually closer to those that management has employed in its own forecasting process; the value can therefore be estimated more easily. The lack of restrictions also means that, in many cases, fair value less costs to sell will be higher than the value in use ie, there is less risk of having to recognise an impairment loss.

Costs of disposal must be deducted in estimating fair value less costs to sell. This includes legal costs, stamp duty and similar transaction taxes.

7.6 Reversals of previous write-downs

IAS 36 requires an entity to assess at each reporting date any indication that a previously recognised impairment loss no longer exists or has decreased. If there is such an indication, management should estimate the recoverable amount and determine whether an impairment reversal is appropriate.

The indicators that impairment losses may have reversed are mainly the opposite of those set out in Section 7.2.1 above. However, it is important to note that:

- reversals should not be recognised where the recoverable amount exceeds the carrying amount simply from the passage of time (and there needs to be a favourable event or improvement in circumstances since the impairment loss was recognised, which results in an increase in the estimated service potential of the CGU and justifies changing the estimated future cash flows); and

- impairment losses relating to goodwill cannot be reversed.

Where an impairment loss has been calculated using value in use, a reversal might arise because an expected restructuring has been implemented or capital expenditure that is required to enhance the mine’s operating performance has been incurred. A particular issue that arises for mining entities is whether increases in commodity prices should be treated as an indicator that an impairment loss has reversed. If there has been a structural change in the market, and higher commodity prices are now expected in the long-term, this should be treated as indicating a potential reversal.

However, it may be reasonable for a mining entity to argue that short-term price movements (around the expected long-term average price) do
not result in an impairment reversal for a long-life mine. An entity might argue that short-term fluctuations in prices are a normal feature of commodity markets and would have been expected to arise when the impairment loss was initially calculated. Also, if the price increase is expected to be temporary, reversing the impairment loss in the current period simply means that there is likely to be an impairment charge in a few years when the price falls again. The approach for evaluating the impact of price movements should be determined, in advance, and may need to be disclosed as part of the significant judgements and estimates in the financial statements.

7.7 Presentation and disclosure

A number of disclosures are required where an entity has recognised an impairment loss during the period or reversed a previous impairment loss, including:

- the amount of the impairment loss (or reversal), analysed by class of asset and primary reporting segment, with an explanation of the line item(s) affected in the income statement;
- for each material impairment loss (or reversal):
  - the events and circumstances leading to the recognition of the loss (or reversal);
  - an explanation of the nature of the asset or a description of the CGU;
  - the amount of the impairment loss (or reversal) and the primary segment to which the asset (or CGU) belongs;
  - whether the recoverable amount is based on fair value less costs to sell or value in use;
  - the basis used to determine fair value less costs to sell (where this is the recoverable amount); and
  - the discount rate used to calculate value in use (where this is the recoverable amount); and
- the main classes of assets affected and the main events and circumstances giving rise to the impairment losses (or reversals) for the aggregate impairment losses (or reversals) not covered by the detailed disclosures summarised above.

There is no explicit requirement to disclose the discount rate where fair value less costs to sell has been calculated using projected future cash flows. However, best practice reporters provide this disclosure as it is required for value in use.

Entities are also encouraged to disclose the assumptions used to determine the recoverable amount of each asset (or CGU).

A number of additional disclosures are required in cases where a mining entity has significant amounts of goodwill. These are:

- the carrying amount of the goodwill allocated to a CGU (or group of CGUs);
- the basis on which the CGU’s (or group of CGUs’) recoverable amount has been determined;
- where the recoverable amount is based on value in use, the key assumptions (including management’s approach to determining key assumptions), the period for which cash flow projections have been prepared (and an explanation as to why this exceeds five years, where relevant), and the discount rate;
- where the recoverable amount is based on fair value less costs to sell, the methodology used to determine fair value less costs to sell and where it is not based on an observable market price (which will usually be the case), a description of the key assumptions and management’s approach to determining key assumptions; and
- where a reasonably possible change in a key assumption would cause an impairment loss, the amount of headroom between the recoverable amount and the carrying amount, the value assigned to the assumption, and the amount by which the value assigned to the assumption would have to change in order to eliminate the headroom.

These disclosures are required for:

- any individual CGUs (or groups of CGUs) that account for a significant proportion of the entity’s total goodwill; and
- any CGUs (or groups of CGUs) that do not account for a significant proportion of the entity’s goodwill individually but are affected by the same key assumptions and account for a significant proportion of the entity’s goodwill in aggregate.
An entity may need to disclose its commodity price assumption(s) in order to meet the above disclosure requirements, given that the value of each key assumption must be disclosed where a reasonably possible change to the assumption would cause an impairment loss.

Similar disclosures to those required for goodwill also need to be made for intangible assets with indefinite lives, although this rarely applies to mining entities.
8 Inventories
8 Inventories

The issues covered in this chapter include the recognition and measurement of product inventories (such as ores, concentrates and metals) and stores (including consumables, spare parts and insurance spares). Many inventory measurement and valuation problems are caused by the nature and location of the product. Inventories of mine product include:

- run of mine ore;
- work in progress (crushed ore, ore in-circuit); and
- finished goods (concentrate, metal).

This chapter also examines the treatment of joint products and by-products.

8.1 Recognition?

The measurement point is determined according to the asset recognition criteria in the IASB Framework. Ore should be recognised as inventory as soon as it is extracted, the reliable assessment of mineral content is possible and the cost of production can be reliably determined.

8.1.1 Work in progress

Materials in process in the mining industry often have measurement issues. This can arise in concentrators, smelters and refineries — where materials may be enclosed in pipes or vessels, with no uniformity of grade — or in stockpiles, particularly underground, where management has limited access to dimensions.

Processing varies in extent, duration and complexity from mineral to mineral; and different production and processing techniques may be used in the production of a specific mineral. The point at which work-in-process inventory is first recognised and measured — rather than continues to be treated as part of the mineral reserves — is when a reliable assessment of mineral content is possible and the cost of production can reliably be determined.

Generally accepted practice in the mining industry has been diverse in the recognition and costing of inventory because the assessment of mineral content and the reliable determination of production costs vary from mine to mine. Some entities only recognise metal inventory after it has been processed through the concentrate stage; others recognise the cost of broken ore and ore under leach in addition to recognising concentrate and finished product.

It has become accepted practice for entities to recognise inventory as early as the broken ore stage, provided reasonable estimates can be made of quantity, recovery and cost. Materials are usually first measured for financial reporting purposes at the time they are extracted; the measurement point may depend on the nature of the product and the extent of the processing activities to be carried out.

8.1.2 Long-term stock piles

Low grade ore extracted from a mine is often stockpiled to maximise the volume of saleable production by prioritising the processing of high-grade ore. Low-grade ore stockpiles may only be processed many years later when mining operations have ceased.

The inventory of low-grade ore material is recognised when future economic benefits are expected to flow to the entity — ie, it is probable that there will be future cash flows from the sale of the product processed from low-grade ore stock piles.

Low-grade ore material that is being stock piled ‘in case’ it can be processed at some point in the future (because, at the time of extraction, the mineral content is below what is currently economically viable) is not recognised. This is because it is unlikely that future benefits will flow to the entity. The cost of extracting the ore is treated as a waste removal cost.

8.2 Measurement issues

8.2.1 Stockpile measurement

Quantities are normally based on physical measurements from weightometers or truck loads. For example, when large amounts of material are held in stockpiles, aerial surveys are sometimes used to determine the contours of the material.

In other cases, a multiple stockpile technique is often used where storage facilities permit its application. Individual stockpile volumes are separately recorded, and physical volumes of each stockpile are regularly cleared to zero.

Quantities are usually determined on a net dry-weight basis. Bulk density and other conversion
factors are used and are subject to regular review. Grade is generally determined through assay testing, and block reconciliations are done. Surveys are used as a test of the reasonableness of these measures, but the densities and grades make them variable.

Stockpile measurement is an inherently inaccurate science. It is common industry practice to use at least two measurement methods so that the results of the two can be compared and contrasted.

8.2.2 Heap leaching

Heap leaching brings its own measurement problems when assessing product quantities and realisable values. Besides the normal difficulties of stockpile measurement and the sampling of large volumes, the metal recovery factor is always difficult to determine because of the varying physical attributes of material in the heap leach pads. The ultimate recovery is therefore unknown until leaching is completed.

It is normal industry practice to recognise ore loaded on heap leach pads as inventory despite these measurement problems, because it provides a better matching of revenue and costs. The key question is whether pads are measured separately, in groups or in total.

The preferred approach is to consider each pad separately (as far as possible) because this reduces the expected variability in ore type to more manageable levels.

8.3 Cost and net realisable value

IAS 2 Inventories requires inventories to be measured at the lower of cost and net realisable value. It excludes application to minerals and mineral products that are measured at net realisable value in accordance with well-established industry practice. Such industry practice is limited mainly to by-products and not to most mining products.

The following sections deal with the determination of costs, their assignment to individual inventories and the assessment of net realisable value in accordance with IAS 2.

8.3.1 Determination of costs

The absorption method is used to determine the cost of inventories. This means that the cost of inventory consists of:

- all costs of purchase;
- costs of conversion; and
- other costs incurred in bringing the inventories to their present location and condition.

Costs of conversion include costs that directly relate to production and an allocation of fixed and variable production overheads. Variable production overheads are allocated to the cost of inventory on the basis of the actual level of production; fixed overheads are allocated by reference to the ‘normal capacity’ of a facility. Normal capacity does not refer to the facility’s maximum capacity; it relates to the capacity that is expected to be achieved on average over several periods and not in periods of abnormally high production.

Administrative overheads that do not contribute to bringing inventories to their present location and condition are excluded from the cost of inventories. Judgement may be required in establishing whether overheads should be attributed to production and the portion thereof. For example, the finance department in a production plant normally supports the following functions:

- production – by paying direct and indirect production wages and salaries, controlling purchases and related payments, and preparing periodic financial statements for the production units;
- marketing and distribution – by analysing sales and controlling the sales ledger; and
- general administration – by preparing management accounts and annual financial statements and budgets, controlling cash resources and planning investments.

Storage costs that are not a necessary stage of the production process are also excluded from the cost of inventories. However, certain storage costs are necessary for production – for example, costs of storing mineral solutions/suspensions for drying/settling prior to refining the product.

Overhead costs incurred during periods of idle capacity, due to breakdowns or scheduled
maintenance, are excluded from the cost of inventories and expensed as incurred. The following table highlights the treatment of the key costs incurred in the production of inventory:

<table>
<thead>
<tr>
<th>Description of costs</th>
<th>Include in inventory</th>
<th>Do not include in inventory</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Direct</td>
<td>Overheads</td>
</tr>
<tr>
<td>Production materials and services (such as explosives, fuel, power, consumables, catalysts and production drilling costs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct labour costs, including related payroll additives (such as pensions)</td>
<td></td>
<td></td>
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<tr>
<td>Mining contractors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal amounts of materials wastage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Costs of transporting materials to different locations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supervisor salaries and related payroll additives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other indirect labour at the mine site and related processing facilities, including related payroll additives</td>
<td></td>
<td></td>
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<tr>
<td>Indirect materials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance costs associated with running the mine and related processing facilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depreciation of mine property acquisition costs and capitalised development costs (including any amounts transferred from exploration and evaluation expenditure)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depreciation of mining and production equipment, and related facilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste removal costs (except to the extent that they are capitalised to deferred stripping in periods when the stripping ratio is above the expected life-of-mine stripping ratio)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amounts transferred from deferred stripping (in periods when the stripping ratio is below the expected life-of-mine stripping ratio)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage and handling costs for raw materials, components, other supplies and work in progress that are not a necessary stage of the production process</td>
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<td></td>
</tr>
<tr>
<td>Product research to develop new uses for minerals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Around mine exploration (except to the extent that exploration costs are capitalised)</td>
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<td></td>
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<tr>
<td>Royalties (if based on sales not production)</td>
<td></td>
<td></td>
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<tr>
<td>Abnormal amounts of wasted materials or labour or other abnormal inefficiencies (such as strike action)</td>
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<td></td>
</tr>
<tr>
<td>Selling costs</td>
<td></td>
<td></td>
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<tr>
<td>Distribution costs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage costs of finished product, including insurance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General management and administration costs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Financial reporting in the mining industry

8.3.2 Assigning costs to inventories

All inventory is classified as either ‘not ordinarily interchangeable’ or ‘other inventory’. Mining inventories are normally classified as ‘other inventory’. They have costs assigned on the basis of first-in, first-out (FIFO) or weighted average cost formulas.

Entities are required to use the same cost-formula method for all inventories of a similar nature. A difference in geographical location of inventories or in the respective tax rules is not sufficient to justify the use of a different cost methodology.

8.3.3 Net realisable value

Inventory is carried at the lower of cost and net realisable value. Net realisable value is estimated by calculating the net selling price less all costs still to be incurred in converting the relevant inventory to saleable product, and delivering it to the customer. The selling price of mine products is generally determined by reference to mineral content; management must determine the grade of the material as well as the physical quantities.

Net realisable value is determined on the basis of conditions that existed at balance sheet date; subsequent price movements are also considered to determine whether they provide more information about the conditions that were present at balance sheet date. The net realisable value should be determined using the most reliable estimate of the amounts the inventories are expected to realise. This will typically be the spot price at the balance sheet date. However, both the spot price and the forward commodity price at the balance sheet date may provide reliable estimates of the amount the inventories are expected to realise, unless subsequent events indicate that those prices are inappropriate. Only those subsequent events that confirm conditions existing at the balance sheet date should be considered at the balance sheet date. A consistent approach to different commodities will need to be applied, and this approach should be consistent from one year to the next.

If there are forward sales contracts in place to fix the price of a quantity of product, then the forward sales contract price is used to value the net realisable value of that quantity of inventory held unless there is a requirement for the sales contracts to be recognised as a separate asset or liability on the balance sheet, in accordance with IAS 39 Financial Instruments: Recognition and Measurement. If the forward sales contracts are fair valued on the balance sheet, use of the forward contract price would result in double-counting the cash flows in respect of the contracts.

Where commodities are priced in a foreign currency, the year-end spot exchange rate on the balance sheet date is used to translate the selling price into local currency.

If circumstances causing a previous write-down of inventories to net realisable value have reversed or changed (for example, a metal price decline has been reversed), the write-down is reversed, and the effect on the current period profit is disclosed.

8.3.3.1 Long-term stockpiles

Management must consider carefully the determination of net realisable value in situations where long-term stockpiles are recognised as a separate asset.

The estimate of the costs necessary to convert the ore into saleable product must take into account any expected difference between future inflation factors applicable to revenue and costs. The sales proceeds may not be sufficient to recover the costs of the inventory if costs are expected to grow at rates in excess of revenue.

The assumptions about the long-term commodity prices used in the estimate of the sales proceeds must be consistent with those used for impairment purposes.

Application of a discount factor to the future cash flows associated with the sales proceeds and conversion costs may be appropriate. In such cases, the net realisable value of the inventory that is not expected to be sold for a long period of time, determined using discounted future cash flows, will typically be low or close to zero.

8.4 Joint products and by-products

It is common in the mining industry for more than one metal to be produced by the same process. For example, base metals such as lead and zinc are often found together; silver is normally found with gold.

Joint products are ‘two or more products produced simultaneously from a common raw material source, with each product having a significant relative sales value’. One joint product cannot be produced without the other, and the products cannot be identified separately until
a certain production stage, often called the ‘split-off point’, is reached.

By-products are ‘secondary products obtained during the course of production or manufacture, having relatively small importance when compared with the principal product or products’.

8.4.1 Joint products or by-products?

Reasons vary for treating mine production as joint products or by-products. The treatment is usually related to the importance of the products to the viability of the mine. Similar mining entities may therefore use different treatments to suit differing grades and quantities of the same type of product. The difference in treatment should not affect the capacity to compare the entities if each applies its method consistently.

If joint products or by-products are a material element of the production of a mining entity, the accounting policy applied to their measurement should be disclosed in the financial statements. IAS 2 allows any rational and consistent basis of cost allocation when the conversion costs of a product are not separately identifiable. Varying practices are therefore used to value joint and by-products.

8.4.2 Valuing joint products

The split-off basis varies from case to case. The most common method is to allocate joint production costs to joint products at the split-off point, based upon either:

• the ability to contribute to sales revenue, based on the net realisable value at the split off point or relative sales value at the end of production; or

• the volume of production, where the realisable value of each unit of production is similar.

Cost allocation based on the volume of production may be inappropriate if there is a significant difference between the relative sales value of the joint products (as would be the case for a mine producing lead and silver). This is because the costs allocated to the lower-value product may exceed its net realisable value, while the entity would earn ‘super’ profits on the higher value product.

Whichever allocation method is used must be applied consistently, using reliable production and revenue data.

Costs of production after separation are charged directly to the product to which they relate.

8.4.3 Valuing by-products

By-products are often valued at estimated net realisable value due to their generally insignificant nature, with a corresponding credit to the cost of production of the main product. When inventories are measured at net realisable value, any subsequent changes in that value are recognised in the income statement.

Some mining entities attribute to by-products only the costs of processing after the split-off point. They then carry them in their accounting records at the lower of that cost and net realisable value.

Whichever method is chosen must be applied consistently.

8.5 Insurance and capital spares

Spare parts are usually carried as inventory and recognised as an expense when consumed. Entities often keep additional spare parts for key pieces of equipment to ensure that downtime is minimised in the event of equipment failure, due to the specialised nature of the equipment used by mining operations and the remote locations in which they are typically located.

There are two main categories of spare parts:

• insurance spares, which the entity only expects to use if there is an unexpected breakdown or equipment failure; and

• capital spares, which the entity anticipates will eventually be used as replacement parts.

8.5.1 Insurance spares

Insurance spares are major items and parts kept on hand to ensure the uninterrupted operation of production equipment if there is an unexpected breakdown or equipment failure. They do not include items that are generally consumed or replaced during the regular maintenance cycle. Insurance spares are normally used only because of a breakdown, and are not generally expected to be used.

Insurance spares are capitalised within property, plant and equipment and depreciated over the same period as the component they are associated with. This reflects the fact that they are ‘available for use’ immediately. The residual value used to
Financial reporting in the mining industry

53

8.6 Consumable stores and other spare parts

Inventories of consumable stores and spare parts are carried at the lower of cost and net realisable value.

This means that consumable stores and spare parts are carried at cost if the entity expects that they will be used in operations and their cost will be recoverable through the sale of the final product at above cost.

Damaged and obsolete consumable stores and spare parts are written down to net realisable value as soon as they are identified.

Surplus consumable stores and spare parts should be identified on a timely basis. Any losses to be incurred as a result of their subsequent return to suppliers, sale or other means of disposal are provided for as soon as management considers that such losses are likely. The issue of net realisable value of consumables becomes more important towards the end of the life of the mine, in anticipation of any potential loss on disposal of consumable stores that may be unused.

8.7 Presentation and disclosure

IAS 2 sets out the disclosure requirements. Significant disclosures required and recommended are set out below.

8.7.1 Accounting policy note

The accounting policy note should disclose:

- the basis of valuation of production inventories; and
- the type and extent of overheads included within inventory (not specifically required by IAS 2; however, it can be informative because mine products are sometimes valued on a basis different from that generally used in manufacturing industries).

8.7.2 Inventory types

Inventory details that must be disclosed are:

- the composition of inventories under their relevant headings in a separate note on inventories, including the split of production inventory and stores; and
- amounts of inventories in final form and awaiting shipment, materials in the course of processing (for example, concentrate in the mill circuit or concentrates awaiting smelting or refining), raw materials, consumable stores and other inventories.

8.7.3 Other disclosures

Other disclosures include:

- the amount of any write-down to net realisable value or reversal of write-downs, as well as the carrying amount of inventories pledged for liabilities; and
- disclosure of the cost of inventories recognised as an expense during the period – ie, the cost of sales.
9 Closure and environmental liabilities
9 Closure and environmental liabilities

Mines create environmental change and cause environmental disturbance. They also exploit finite mineral resources, and at some point will have to close. Mining entities are usually required to perform some kind of environmental remediation/restoration of disturbed areas, such as the dismantling and demolition of infrastructure and the removal of residual material. Environmental remediation procedures may also occur as a result of disturbances caused during either the development phase or production phase of a mine. The associated costs of remediation/restoration can be significant. The accounting treatment for closure and environmental costs is therefore critical.

9.2 Accounting for closure and environmental costs

IAS 37 Provisions, Contingent Liabilities and Contingent Assets provides guidance on how to account for closure and environmental costs. IFRIC 1 Changes in Existing Decommissioning, Restoration and Similar Liabilities provides guidance on how revisions to these liabilities are accounted for. IFRIC 5 Rights to Interests arising from Decommissioning, Restoration and Environmental Rehabilitation Funds provides guidance on how to account for ‘funds’ set up to finance the costs of decommissioning plant or in undertaking environmental rehabilitation.

The principle of IAS 37 is that closure and environmental costs are provided for in the accounting period when the obligation arising from the related disturbance occurs (whether this occurs during mine development or during the production phase). These costs are based on the net present value of the estimated future costs to rehabilitate/restore the damage caused to date. It is not acceptable to use the incremental method whereby the entity accrues for the total future expected closure and environmental costs by gradually increasing the provision over the life of the mine.

9.1 Environmental issues

Environmental issues are one of the most pressing business concerns facing a mining entity. There is now a greater emphasis on the environmental issues of mining, not only in money spent but also in increased awareness of the need to demonstrate and commit to environmental issues.

9.1.1 Internal control systems

Mining companies use environmental management systems to address environmental risks within the internal controls of the entity, rather than reacting to them at the operational level, and to ensure compliance with national and international environmental regulations.

9.1.2 Environmental reporting

Many mining companies report on environmental issues affecting their operations as part of their operating and financial review in the annual report and/or in separate sustainability or corporate responsibility reports. Environmental reporting can be complex.

The Global Reporting Initiative (GRI) has issued guidelines for sustainability reporting. There is no requirement for companies to provide assurance on sustainability reporting. With the issue by the International Audit and Assurance Standards Board (IAASB), part of the International Federation of Accountants (IFAC), of ISAE 3000 International Standard on Assurance Engagements, an increase is expected in mining companies providing external assurance over their environmental reporting.
an obligation should normally be recognised at the development stage before any production takes place, as significant damage is caused in preparing for mining operations.

Even where the rehabilitation/restoration is not expected to be performed for a long time, say 100 years or more, a provision is still recognised where there is a present obligation to remediate. The effect of the time to expected decommissioning is reflected in the discounting of the provision (see Section 9.2.3 below).

### 9.2.2 Measurement

A provision is recognised when a reasonable estimate of the obligation can be made. In many cases, there is an element of uncertainty about either the timing and/or the amount of the expenditure. However, a provision is recognised as long as a ‘reasonable estimate’ can be made. Only in rare cases will it be impossible to quantify a provision.

Restoration costs are a significant cost of a project and are typically included in the assessment of the feasibility of a project. A mining entity usually makes reasonably accurate estimates as part of the decision to proceed to development.

The amount recognised as a provision is the best estimate of the expenditure needed to settle the present obligation arising. The liability reflects the condition of the assets, including the damage to the mine site at the respective period-end. Provisions for closure and environmental costs therefore exclude any additional obligations that are expected to arise from future disturbances. The costs also exclude the impact of any expected proceeds on sale or disposal of scrap materials.

The estimate is complicated by the fact that closure plans are typically based around the expected footprint of a mining operation when it comes to an end. Judgement is also required in assessing the remediation work that will be required – the detailed discussions about closure plans often do not take place until the closure is imminent, and the minimum standards required by local regulation/legislation may change over time and by location.

If the provision involves a large number of items, the ‘best estimate’ is determined by taking into account all possible outcomes and using probabilities to weight those outcomes.

The costs include not only external expenditure but also internal costs essential to the closure. Factors to consider when determining the ‘best estimate’ are:

- expected inflation;
- advances in technology;
- productivity improvements; and
- the particular circumstances faced by the operation or mine.

Management must only take changes in technology or in regulation/legislation into account if there is demonstrable evidence that those changes will occur.

### 9.2.3 Discount rate

If the settlement of the obligation occurs over a period of time, the estimate of future costs is discounted using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the liability.

The estimated future costs may already have been adjusted to reflect inflation and risk; the pre-tax risk-free borrowing rate is then used.

### 9.2.4 Capitalise versus expense

Where a closure and environmental obligation arises from mine development activities, the costs are capitalised as part of the cost of the associated asset. It is important to ensure that the costs are allocated to the asset to which they relate and then depreciated over the useful life of that asset.

Where a closure and environmental obligation arises from mine production activities, the costs are expensed because there are no associated future economic benefits.

It is often difficult to distinguish between obligations that arise from production and those attributable to mine development. In the case of waste removal activities, for example, restoration obligations that arise from moving material to waste dumps before the mine enters production are capitalised as a mine development cost (provided the obligations are not abnormal). When those same activities occur during the production phase, they may be related to both current-period production and mine development. The treatment of the restoration obligations must be consistent with the treatment of the associated waste removal costs.
9.2.5 Adjustments to provisions

The cost of closure and environmental remediation is uncertain. Cost estimates can vary over time in response to many factors, including changes to the relevant legal requirements, the emergence of new restoration techniques and experience at other mine sites. The expected timing of expenditure can also change — for example, in response to changes in ore reserves or production rates. There could therefore be significant adjustments to the provision for closure and environmental clean-up, which would affect future financial results.

Provisions are therefore reviewed at each balance sheet date and adjusted to reflect the current best estimate. Events that change the measurement are:
- the amortisation or ‘unwinding’ of the discount;
- a change in the estimated cash flows – such as new disturbance, updated cost estimates, changes to the estimated lives of operations; and
- revisions to the discount rate.

Changes to provisions that were capitalised on initial recognition in the cost of the related asset are added to or deducted from the carrying amount of the asset. However, the adjustments to the asset are restricted. The carrying value of the asset cannot decrease below zero and cannot increase above recoverable amount.

The accretion of the discount on a decommissioning liability is recognised as part of finance expense in the income statement.

Where the cost is capitalised, a significant increase in the asset carrying value could result in it exceeding its recoverable amount and must be considered as a potential impairment trigger. This is particularly relevant towards the end of the life of a mine.

A significant decrease to a decommissioning liability may exceed the depreciated carrying value of the associated asset. The carrying value of the associated asset cannot be reduced below zero, and any excess is credited to the income statement. Adjustments to a decommissioning liability that would normally be capitalised but are associated with a fully depreciated asset are recognised in the income statement immediately. Again, this is particularly relevant towards the end of the life of a mine.

9.2.6 Funds

Many mining entities contribute to a separate fund established to help fund closure and environmental obligations. These funds may be required by regulation or law or may be voluntary.

Typically, a fund is separately administered by independent trustees who invest the contributions received by the fund in a range of assets, usually debt and equity securities. The trustees determine how contributions are invested, within the constraints set by the fund’s governing documents, and any applicable legislation or other regulations.

The mining entity then obtains reimbursement of actual decommissioning costs from the fund as they are incurred. However, the mining entity may only have restricted access or no access to any surplus assets in the fund (ie, those not needed to meet eligible decommissioning costs).

IFRIC 5 provides guidance on the accounting treatment for these funds. Management must recognise the entity’s interest in the fund separately from the liability to pay closure and environmental costs. Offsetting is not appropriate.

In addition, management must determine whether the entity has control, joint control or significant influence over the fund and account for the fund accordingly. In the event that the entity does not have control, joint control or significant influence, the fund is accounted for as a reimbursement of the entity’s closure and environmental obligation, at the lower of the amount of the decommissioning obligation recognised and the entity’s share of the fair value of the net assets of the fund.

Any movements in a fund accounted for as a reimbursement are recognised in the income statement as finance income/expense.

9.2.7 Deferred taxation

See Chapter 13.1.7.

9.3 Termination benefits

Payments made to employees in connection with the closure of a mine must be accounted for under IAS 19 Employee Benefits.

It is certain that a mine’s ore reserves will be exhausted at the end of the life of mine, and it often follows from this that redundancy costs will arise. In this respect, redundancy obligations are very similar to decommissioning obligations.
However, IAS 19 restricts when termination benefits can be recognised, with a liability only recognised when the entity is demonstrably committed to the redundancies by having:
- a detailed formal plan for the terminations; and
- no realistic possibility of withdrawal.
Termination benefits can therefore only be recognised when the closure date has been announced and other recognition criteria are met.

9.4 Presentation and disclosure
For each class of provision, IAS 37 requires disclosure of:
- the nature of the obligation;
- the factors relevant in determining the timing of the expenditure where there is significant uncertainty;
- the amount provided and methods used to determine the amount;
- a statement of whether the amount is discounted, where applicable; and
- any actual or potential offsets to the liability.
For recognised provisions, management must also disclose the movements in each material class of provisions, showing separately:
- additional provisions;
- adjustments to existing provisions;
- amounts used during the year;
- amounts released unused; and
- the interest accrued during the year, if provisions were discounted.
For funds, management must disclose:
- a description of the nature of any interest in a fund; and
- any restrictions on access to the assets of the fund.
10 Revenue
10 Revenue

This chapter discusses the recognition and measurement of revenue. Revenue applying to the extraction of mineral ores falls outside the scope of IAS 18 Revenue, but the standard provides the guidelines on how and when to recognise revenue.

10.1 General principles

IAS 18 states that revenue is recognised only when:

- the significant risks and rewards of ownership have been transferred from the seller to the purchaser;
- there is no continuing managerial involvement to the degree usually associated with ownership or effective control over the goods sold;
- the amount of revenue and the costs incurred can be reliably measured; and
- the flow of future economic benefits is probable.

This means that mining entities must generally be satisfied that the following have occurred:

- the product has been despatched to the purchaser and is no longer under the physical control of the producer;
- the product is in a form that can be delivered to a purchaser, requiring no additional processing by or on behalf of the producer;
- the quantity and quality of the product can be determined with reasonable accuracy; and
- the selling price can be determined with reasonable accuracy.

Further discussion of the IAS 18 criteria, as they apply to mining entities, is outlined below.

10.1.1 Transfer of risk and reward of ownership

The transfer of significant risks and rewards of ownership usually occurs when legal title or possession is transferred to the buyer.

The concept of the transfer of risks and rewards of ownership is reflected in the rules regarding the contractual terms of trade established by the International Chamber of Commerce, which have been widely adopted as practice internationally.

Examples of typical contractual terms of trade include:

- Free On Board (FOB) contracts – stipulate that the purchaser assumes the risk of loss, and therefore the insurance risk, upon delivery of the product to an independent carrier; and
- Cartage Insurance Freight (CIF) arrangements – the producer retains risk of loss until the product has been delivered to a specific location and title passes.

Many variations of contracts arise in practice that combine elements of CIF and FOB. The accounting must follow the terms of trade. These will determine the point in time at which risk is transferred; revenue may be recognised only at this point in time.

10.2 Transfer of effective control over goods sold

10.2.1 Physical transfer

IAS 18 states that the seller must not maintain any ongoing managerial or other effective control over the product for revenue to be recognised. The cessation of effective control is often realised at the point that the physical control is transferred.

Physical control may be relinquished when, for example, the product has been delivered to an independent carrier or loaded onto a ship. This does not always involve a transfer of risks and rewards if the purchaser has not accepted physical risk. Generally, physical risk will have passed once the purchaser has control over the physical goods (for example, once loading is complete when the shipping vessel has been selected by the purchaser). The terms of trade will be the ultimate determinant, particularly when an independent carrier is used.

For example, with the sale of poured gold bars, revenue should not be recognised before the gold is collected by the security firm (which normally takes over all risks), even though the gold has been sold under forward contract. Once the security firm takes delivery, revenue can be recognised, as both physical control and risk have been transferred.

10.2.2 Advanced payments

Companies may receive payments in advance of product delivery. Such payments do not in themselves provide evidence that revenue must be recognised, as there has been no transfer of risks and rewards of the product. Money will have to be refunded if the transporting vessel sinks or the product is stolen, and a replacement product supplied or some other form of compensation made.
Revenue is generally not recognised under typical terms of trade, even if advance payment has been received, in the following circumstances:

- orders have been received for product in the form it is usually sold, and product is available for delivery but has not been allocated to a specific customer;
- product is available, and an order has been received specifying quantity and price, but a delivery date has not been determined;
- product is available, but the purchaser has specifically requested a delay in shipment; or
- product is available, but shipment has been delayed due to temporary shipping difficulties (for example a vessel’s movements are restricted by adverse weather) or shipping schedules are infrequent.

However, revenue may be recorded in the last two examples in some circumstances. This would require the product to be fully insured, held in a separate location and clearly identified as being the property of the purchaser. To recognise revenue, the risks and rewards must have been transferred to a specific purchaser or otherwise insured on the buyer’s behalf.

10.2.3 Delayed shipment

A purchaser may pay a significant portion of the final estimated purchase price and request delayed shipment because of limited storage space. A sale may be recognised if the product has been specifically identified for the purchaser, is available for immediate delivery and is held at the purchaser’s risk. The product is usually physically segregated from other product and is clearly marked as belonging to the purchaser; it is not therefore available for sale to other parties. Acknowledgement of the arrangement by both the producer and purchaser must be evidenced in the form of a formal agreement between the parties.

Specific arrangements in all circumstances must satisfy the basic principles of IAS 18 in relation to effective control and risk/reward transfer.

10.2.4 Saleable form

Revenue must not be recognised prior to the completion of all processing and treatment activities that are the producer’s responsibility, as set out in the contract of sale. However, contracts of sale may provide for sales at various stages of the treatment process. For example, main product may be sold as refined metal, ore, pellets, concentrate or other intermediate products. For example, a copper producer might deliver concentrate to a smelter for processing. The refined smelter output is then sold in its final form to an end user of the copper product.

If the producer has a contract of sale with the smelter rather than the end user of the copper product, revenue can recognised on delivery to the smelter, as the producer has no further obligations and the contract is for concentrate.

If the producer has a contract of sale with the end user, revenue must not be recognised on delivery of concentrate to the smelter. The saleable form in the contract is refined copper, and revenue cannot be recognised until delivery to the end user of that refined copper.

10.3 Reliable measurement

Revenue should be recognised if it can be reliably measured.

10.3.1 Measurement of quality and quantity

Contracts for the sale of commodities may specify a certain level of quality and quantity on which the agreed upon price is based. Sales with these types of clauses often allow for acceptance-testing by the purchaser and may result in refusal of a delivery, but more likely an adjustment to the final sales price.

These contracts may be specific with respect to:

- a final weight;
- the results of assay testing of the product;
- the permissible level of ash, moisture grade or composition; or
- the determination of final penalties.

In most cases, producers will have a process in place to test product samples prior to shipment so that compliance with buyer specifications can be reasonably assured. The purchaser conducts tests of its own and any adjustments are applied to the final selling price.

The various assessment processes in place and producer experience contribute to whether a reliable estimate of revenue can be made. If significant adjustments have been made to revenue estimates in the past, it will be difficult to satisfy the reliable estimate criteria until the final price of a shipment is agreed by the purchaser.
10.3.2 Measurement of selling price

The pricing of products is a key factor in determining when revenue may be recognised. Pricing may affect whether all or part of a sale can be reliably measured. IAS 18 does not, however, require final pricing to be fixed before revenue can be recognised.

Pricing in the mining industry may be set by reference to a spot price or another market based price close to the time of sale, eliminating the need for estimation.

The key driver is whether a reliable estimate of sales price can be formed. Past history, forward curves and reference to market data will in many cases provide a producer with a reliable basis to estimate revenue.

10.3.2.1 Provisional pricing

Provisional pricing usually occurs when a mining entity produces a mineral concentrate which is sold to a smelter, producing metal which is then sold in a worldwide commodity market.

Common factors affecting contract sales prices are:

- average market prices between certain dates (quotational period);
- market price on a measurement date subsequent to delivery;
- escalation clauses in contracts;
- reference to selling prices obtained by other sellers; and
- amounts realised by a purchasing smelter, net of smelter charges.

Producers may receive provisional payments from purchasers on delivery with a final payment on settlement. This provisional payment can be as high as 90% of the final consideration.

In most cases, the relevant forward market price should provide a reliable basis for measuring the value of the sale at the date of delivery. If so, the sale should be recognised at this time. At each subsequent period-end, the final adjustment to the sales value should be assessed using the most up-to-date market prices. Any gain or loss arising subsequent to the initial recognition of the sale should be recognised in the income statement.

Some mining entities use derivatives to protect economically against movement in the market price after the sale has been recognised. In such cases, the provisional pricing contract and the matching derivative have to be fair valued at the period end, and the amounts recognised in the income statement should offset.

Other variations of sale price may include revenue sharing arrangements where a base price is specified but both parties will share the excess in some contractual proportion if the purchaser realises a higher price, and the producer bears any shortfall. Sales might be recognised at the basic price at the time of delivery, and any excess recognised when revenue recognition criteria is met. Any shortfall is recognised as a reduction of revenue if it becomes likely that the producer will have to reimburse the purchaser.

10.4 Tolling arrangements

Many companies involved in the industry provide value-added services to companies that mine ore or unprocessed mineral product. These companies may be involved in smelting, washing, refining or transporting product on behalf of another company.

For example, a custom smelter may operate on either a purchase or toll basis. On a purchase basis, the smelter is entitled to a charge based on the final sale price of the metal produced. On a toll basis, the smelter is entitled to a treatment (toll) charge, which is usually fixed by contract or based on a formula relating to the selling price of the metal.

Revenue recognition might then be at the point of:

- when the metal is shipped to the smelter;
- when the metal arrives at the smelter;
- at the end of the period in which the smelter has to make provisional payment; or
- when the smelter advises the producer of the final metal quantities and, in some instances, sales price.

The appropriate point is determined based on the transfer of risks and rewards, taking into account the factors discussed previously. The risk of loss is key in all intermediary arrangements as the risk of loss may transfer directly from the producer to the final purchaser, with the intermediary not assuming any risk of physical loss.

When intermediaries are used, an assessment of whether such an arrangement constitutes a lease under IFRIC 4 must also be considered (see Chapter 17).
10.5 Agency arrangements

Producers may deliver product to an agent who will market and sell the product on behalf of the producer. From the agent’s perspective, IAS 18 stipulates that revenue is only recognised in relation to the agent’s fee or commission upon sale.

Using our custom smelter example, if the smelter receives only the toll charge and the risk of loss remains with the producer until delivery to the final vendor, the smelter does not recognise the gross value of any shipments of refined metal, only its toll charge. The smelter is acting as an agent of the producer.

10.6 Long-term contracts

Long-term sales contracts are common in the mining industry. Producers and buyers enter into sales contracts that are often a year or longer in duration to secure supply and reasonable pricing arrangements. Such contracts are often fundamental to the development and continuation of a mining entity and are the basis on which the decision is made to proceed to the production stage. Sales under long-term contracts are accounted for under the principles previously discussed, but other considerations may also arise.

Contracts will typically stipulate a set volume of product over the period at an agreed price. There are often clauses within the contract relating to price adjustment or escalation over the course of the contract to protect the producer and/or the seller from significant changes to the underlying assumptions in place at the time the contract was signed. Prices may vary based on world market prices, cost escalation or some other form of price index. Such contracts may include embedded derivatives (see Chapter 12).

Contracts may also allow for changes in the quantity or timing of deliveries, and may or may not provide for compensatory arrangements for either party if circumstances change. Producers may also agree to variations notwithstanding any legally enforceable rights.

10.6.1 Onerous contracts

If a long-term contract results in continuing losses because pricing and other contract terms cannot be changed, associated capitalised mine expenditure may not be recoverable; it may therefore require an impairment assessment.

An entity only recognises a provision for a loss in relation to an individual contract if the unavoidable costs of meeting the obligations under the contract exceed the economic benefits expected to be received under it. If an onerous contract exists whereby product is supplied to a third party on terms that cannot yield a profit, associated assets such as the underlying mine is written down prior to recognising any provision for loss. After such write-downs, the remaining loss is the lower of the cost of fulfilment and penalties payable to exit the contract.

Many mining contracts will permit periodic adjustments if circumstances change, particularly as long-term relationships between producers and buyers are becoming more important as global demand for minerals increases. Therefore the terms of the contract need to be reconsidered before the provision for onerous contract is recognised.

10.7 Take-or-pay contracts

Purchasers may commit to purchase a quantity of product at a time when they are unsure as to what their needs will be. This type of arrangement is undertaken by a purchaser who is looking to secure supply and is willing to pay a premium in the event the full quantity is not taken up.

Take-or-pay contracts involve a purchaser committing to take a minimum quantity of product or, in the event that they do not, to pay for the total quantity committed. The contract will usually express a quantity over a longer term period – for example, over the course of a year. The purchaser may be entitled to take a higher quantity of product in the following year if the full amount contracted for is not taken up in the current year. Many take-or-pay contracts include a written option; a written option to buy or sell a non-financial item cannot qualify for own-use accounting (see Chapter 12).

The producer must consider how to account for any payments received for product not taken. The appropriate treatment in most cases is to defer the revenue until the quantity has been taken up (ie, in the following period) or until it is virtually certain that delivery of the product paid for will never be taken. The reversal of the amount deferred is recorded as revenue in the period in which delivery of the product is taken.

The key determinant is whether the terms of the contract allow for flexibility in the acceptance schedule by the purchaser. Revenue recognition
may be appropriate where rollover is not permitted, as the producer has a legally enforceable right to payment. Revenue deferral may be appropriate if historically those rights have been waived without penalty.

The principles above are also applied to some floor-price contracts. A minimum price may be specified in a sales contract, and the purchaser may have the right to recoup any premium between the floor price and the current market price if the market price subsequently rises above the floor price. The premium received is deferred until it is virtually certain no repayment or recoupment will take place.

In take-or pay-arrangements involving an intermediary – for example, a custom smelter that only services a specific producer’s output – the producer must consider whether the smelter is a leased asset under IFRIC 4 (see Chapter 7).

10.8 Lump-sum contributions

There are typically two types of lump-sum contributions that a mining company may receive:

- contributions by customers (i.e., to achieve production capacity upgrade); and
- government assistance.

Lump-sum contributions may take various forms, including interest-free or low-interest loans, contributions of assets, financial guarantees and cash payments.

A producer may receive a contribution from a customer to assist in undertaking capital works, capacity expansions or other improvements. Such a contribution is typically accompanied by an expectation of future product supply or future price concessions over a period of time. A producer will not typically have completed all tasks necessary to be entitled to revenue until the product has been delivered. Recognition of the lump-sum payment as revenue is not appropriate at the time of receipt, and is considered deferred income until the associated product has been delivered.

If a lump-sum contribution is received without any future performance requirement, the contribution is recognised on the date of receipt, in accordance with the requirements outlined in IAS 20 Accounting for Government Grants and Disclosure of Government Assistance. Most contributions are, however, conditional. The contribution is therefore deferred until the condition is fulfilled. Government grants are always recognised as other income, not revenue.

10.9 Asset swaps

Exchanges of inventories may take place. Producers may exchange or swap inventories in various locations to fulfil demand on a timely basis in a particular location.

IAS 18 prohibits recognition of revenue where goods of a similar nature are exchanged. For example, no revenue is recognised if a shipment of brown coal in Australia is exchanged for a shipment of similar quantity and quality in Russia. Revenue is recognised on exchanges of dissimilar goods based on the fair value of consideration received net of any cash consideration paid.

10.10 Presentation and disclosure

Management must make the following disclosures:

- the accounting policy adopted for the recognition of revenue including all aspects – for example, shipment terms and provisional pricing;
- the amount of each significant category of revenue recognised during the period including revenue arising from:
  - the sale of goods;
  - the rendering of services;
  - interest;
  - royalties; and
  - dividends; and
- the amount of revenue arising from exchanges of goods or services included in each significant category of revenue.

IAS 1 Presentation of Financial Statements also requires disclosure of critical accounting judgement where specific judgements are made in relation to the application of the revenue accounting policy – for example, prices used in the assessment of provisional pricing arrangements.
11 Foreign currency
11 Foreign currency

Mining entities commonly undertake transactions in more than one currency, as commodity prices are often denominated in US dollars and costs are typically denominated in the local currency.

11.1 Key concepts
IAS 21 The Effects of Changes in Foreign Currency Exchange Rates defines an entity’s functional currency as the currency of the primary economic environment in which it operates. This is the currency in which the entity measures its results and financial position. An entity’s presentation currency is the currency in which it presents its accounts.

Reporting entities may select any presentation currency (subject to the restrictions imposed by local regulations or shareholder agreements). However, the functional currency must reflect the substance of the entity’s underlying transactions, events and conditions; it is unaffected by the choice of presentation currency.

Exchange differences can arise for two reasons:
• when a transaction is undertaken in a currency other than the entity’s functional currency; or
• when the presentation currency differs from the functional currency.

11.2 Determining the functional currency
Identifying the functional currency for a mining entity can be complex because there are often significant cash flows in both the US dollar and local currency. IAS 21 includes some primary and secondary indicators. The primary indicators are given priority in determining an entity’s functional currency.

11.2.1 Primary indicators
The primary indicators are:
• the currency:
  – that mainly influences sales prices for goods and services; and
  – of the country whose competitive forces and regulations mainly determine the sales prices of its goods and services; and
• the currency that mainly influences labour, material and other costs of providing goods or services.

Management must draw a distinction between ‘influence’ and ‘denomination’ in the first of these indicators. IAS 21 indicates that the currency in which selling prices are denominated and settled is often the currency that mainly influences selling prices, but this is not necessarily the case. Many sales within the mining industry are conducted either in, or with reference to, the US dollar. However, the US dollar may not always be the main influence on these transactions. For many of the commodities sold by mining entities, it is difficult to identify a single country whose competitive forces and regulations mainly determine the selling prices.

11.2.2 Secondary indicators
Management must turn to the secondary indicators if the primary indicators do not provide an obvious answer. These are:
• the currency in which funds from financing activities (ie, from issuing debt and equity instruments) are generated; and
• the currency in which receipts from operating activities are usually retained (taking account of any exchange control restrictions, which may require that all, or a portion, of the US dollar revenues are converted into local currency).

If a company’s operations are financed in US dollars as well as its surplus cash, this might tip the balance towards treating the US dollar as the functional currency. If the operation raises its finance in local currency and elects (or is required) to convert its US dollar revenues into local currency, this tends to point towards using the local currency.

IAS 21 also describes some factors to consider in determining whether the functional currency of a foreign operation is the same as that of the parent company. This would apply, for example, where an overseas sales office is used to market the output from the parent company’s mine and its cash is all remitted back to the parent.

11.2.3 Reaching a conclusion
If the functional currency is not obvious, management must use its judgement. A typical mine might receive all of its revenue in US dollars with most of its costs denominated in the local currency and only some in US dollars. Management may conclude that the US dollar is the functional currency, as the majority of the cash flows are denominated and settled in the
US dollar. Alternatively, management may decide that the local currency is the single most important currency affecting the operation if it determines that the selling prices for the entity’s products are influenced by a basket of currencies and are merely expressed in US dollars.

Mining entities operating in similar situations may reach a different view about their functional currency depending on how their selling prices are determined and the importance attached to them. This does not mean that management has a free choice. Management must reach a decision based on the criteria set out in IAS 21, and the basis for their conclusions must be sufficiently documented.

Care is also needed in determining the functional currency of holding companies and finance companies.

11.3 Transaction undertaken in a currency other than the entity’s functional currency

In this situation:
- the transaction is recorded initially using the spot exchange rate on the date of the transaction;
- at each subsequent balance sheet date, any foreign currency monetary amounts (for example, cash balances or trade receivables) are re-translated at the spot exchange rate as at that date;
- any non-monetary items (for example, inventory or property, plant and equipment) measured at historical cost are not re-translated at subsequent balance sheet dates; and
- any exchange differences arising from the settlement or re-translation of monetary balances are reported in profit or loss in the period in which they arise, with one exception. The exception concerns exchange differences on monetary balances that form part of the reporting entity’s net investment in a foreign operation. These differences are recorded in a separate component of equity in the entity’s consolidated financial statements.

Foreign currency amounts are re-translated at spot exchange rates under IAS 39, even if those balances have been hedged effectively using a derivative. IAS 39 requires all derivatives to be recorded separately on the balance sheet at fair value. However, derivatives can affect the amount recorded on the balance sheet in respect of non-monetary amounts because the gains/losses on effective hedges can be reclassed from equity and included in the cost of the hedged item. For example, a mining entity enters into a forward foreign currency contract in respect of an item of equipment that it has ordered from overseas. If the hedge is effective, the cost of the equipment is translated into the entity’s functional currency at the exchange rate on the date when it is delivered, and the carrying amount is adjusted to reflect the exchange gain/loss on the hedge.

The requirements relating to derivatives are addressed in Chapter 12.

11.4 When the presentation currency differs from the functional currency

The presentation currency may differ from the functional currency for two reasons: firstly, because the entity has decided on a presentation currency that differs from its functional currency; secondly (and more commonly), because there are foreign operations with a functional currency different from the reporting entity’s presentation currency. In this situation:
- each entity’s assets, liabilities and results are measured initially in the functional currency and then translated into the presentation currency;
- assets and liabilities (including non-monetary items) are translated into the presentation currency using the exchange rate on the relevant balance sheet date; and
- income and expenditure are translated into the presentation currency using actual exchange rates (or average rates if this provides a reasonable approximation); and
- exchange differences arising from this translation process are recorded as a separate item of equity within shareholders’ funds.

Cumulative exchange differences recorded through equity are recycled through the income statement if the foreign operation to which they relate is partially disposed of or sold. One complication that can arise in the mining industry is that a foreign operation might cease operations when the resources have been exhausted, rather than being sold. However, the cumulative exchange differences still need to be recycled through the income statement because
a disposal includes the liquidation, repayment of share capital or abandonment of an entity.

11.5 Changes to the functional currency

Once the functional currency has been determined for a particular entity, it can only be changed if there is a change in the underlying transactions, events or conditions relevant to the entity. This is likely to be rare for a mining entity, unless there is a fundamental change to the economic environment of the country in which it is based (such as a new requirement for US dollar revenues to be converted into local currency). If the functional currency does change, all items are translated into the new functional currency using the exchange rate at the date of change.

11.6 Hyperinflationary economies

Certain countries with mining operations suffer from hyperinflation. IAS 29 Financial Reporting in Hyperinflationary Economies describes a number of characteristics that indicate hyperinflation, including a cumulative inflation rate over three years that approaches, or exceeds, 100%.

If the functional currency is determined to be the US dollar the normal translation requirements described above apply.

If the functional currency is determined to be the local currency, IAS 29 requires the entity’s local currency financial statements (including the corresponding figures for earlier periods) to be restated to reflect current price levels in accordance with the IAS 29 requirements.

These restated financial statements can then be translated into a different, non-hyperinflationary presentation currency (as would often be the case for a reporting entity with a subsidiary operating in a hyperinflationary environment). All amounts (ie, income, expenditure and equity items, not just assets and liabilities) are translated at the exchange rate on the most recent balance sheet date. Comparative figures are not restated.

It is not possible for a mining entity to elect to use a hard currency (such as the US dollar) as its functional currency to avoid the need to restate its local currency financial statements at current price levels. The functional currency must be determined on the basis of the primary and secondary indicators described above.

11.7 Presentation and disclosure

There is no explicit requirement to disclose an entity’s accounting policies in respect of foreign currency transactions. However, IAS 1 requires disclosure of significant accounting policies that are relevant to providing a true understanding of the financial statements, which is likely to include the policies relating to foreign currency transactions for most mining entities. In view of the judgement that is usually involved in determining a mining entity’s functional currency, some disclosure of this may also be needed to meet the IAS 1 requirement for the disclosure of significant judgements.

Some of the disclosure requirements that can impact mining entities include:

- the aggregate net exchange difference recognised through the income statement (excluding amounts arising on financial instruments measured at fair value through profit and loss);
- the aggregate net exchange difference classified in a separate component of equity (and a reconciliation of the movements during the year);
- if a reporting entity elects to use a presentation currency that is different from the functional currency; and
- currency risks and how these risks are managed, as required by IAS 32 Financial Instruments: Disclosure and Presentation and IFRS 7 Financial Instruments: Disclosures.

Exchange differences can be classified in the income statement according to the nature of the item to which they relate. Exchange differences arising from trading transactions may therefore be included in the results of operating activities, and exchange differences relating to financing (such as US dollar debt in a mining entity with its local currency as the functional currency) may be included as a component of the finance cost/income.
12 Financial instruments
Commodity prices, input costs and foreign exchange rates are subject to volatility, so many mining entities try to manage their exposure to such volatility through financial and other hedging instruments. Financial instruments take many forms. Mining entities may use a combination of options, forward sales and spot deferred contracts to protect themselves against fluctuations in prices by establishing a fixed future price.

The accounting for financial instruments can have a major impact on a mining entity’s financial statements – not only through the accounting for derivatives (such as forward contracts to purchase or sell commodities and foreign currency, and interest rate and currency swaps), but also through the rules affecting derivatives that reside within a non-derivative ‘host’ contract – so-called embedded derivatives. Even mining entities that are solely engaged in producing, refining and selling commodities, are often party to commercial contracts that contain embedded derivatives due to the nature of their products and operations.

Financial reporting requirements for financial instruments are covered in IAS 39 Financial Instruments: Recognition and Measurement.

### 12.1 Principle of IAS 39

The core principle of IAS 39 is that all derivatives are recorded on the balance sheet at fair value, with gains and losses from changes in fair value recorded in the income statement, unless the strict criteria to qualify for hedge accounting are achieved.

Many in the industry believe that IAS 39 provides a one-sided view of the situation. Changes in the value of derivatives are reflected in the financial statements immediately; the offsetting changes in the value of an item not qualifying or designated as a hedged item (namely the mineral reserves in the ground) are not recognised until some point in the future when the production is realised.

The IASB is considering whether reserves and resources should also be accounted for at fair value (see Chapter 5).

### 12.2 Derivatives

#### 12.2.1 Definition of a derivative

IAS 39 defines a derivative as a financial instrument with the following characteristics:

- its value changes in response to an ‘underlying’, for example, a commodity price or foreign exchange rate;
- it requires no initial net investment, or an initial net investment that is smaller than would be required to purchase the underlying; and
- it is settled at a future date.

Whether or not a contract meets the definition of a derivative can have significant accounting implications. A contract that meets the definition is recorded on the balance sheet at fair value. The requirements for hedge accounting must be achieved in order to minimise volatility within the income statement (to the extent that the contract is used as part of a sound economic risk management strategy).

There are a variety of contracts in the mining industry that can meet the definition of a derivative. The table below highlights three examples:

<table>
<thead>
<tr>
<th>Value changes with an underlying</th>
<th>Little/no initial net investment</th>
<th>Future settlement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gold sales forward contract</td>
<td>Gold price</td>
<td>Yes – typically little/no up-front exchange</td>
</tr>
<tr>
<td>Electricity purchase forward contract</td>
<td>Electricity price in a deregulated market</td>
<td>Yes – typically little/no up-front exchange</td>
</tr>
<tr>
<td>Diesel purchase forward contract</td>
<td>Diesel price</td>
<td>Yes – typically little/no up-front exchange</td>
</tr>
</tbody>
</table>
12.2.2 Own use accounting

Contracts that are held in accordance with an entity’s ‘expected purchase, sale or usage requirements’ are outside the scope of IAS 39; ‘own use’ accounting (often described as ‘normal purchase normal sales’ accounting) is applied. The criteria for applying own use accounting are as follows:

- the contract is used to purchase or sell quantities of a commodity in the ordinary course of business, consistent with the entity’s usual requirements; and
- the contract is always settled by physical delivery.

The first criterion is normally straightforward to apply; for example, commodity forwards are often used either to sell production in the ordinary course of business or to purchase supply inputs to the production process.

The second criterion is more problematic for mining entities. Many contracts used in the industry are financially settled, either as a matter of convenience and economic efficiency, or because the output from the mine is not in a form that could be delivered in settlement of an over-the-counter or market traded hedging contract. A past practice of financial settlement generally precludes the company from qualifying for own-use accounting.

Precious metals producers have the best chance of qualifying for own-use accounting, because they often retain title of the metal up to the point it is in its final saleable form. Own-use accounting may apply, for example, if a gold producer retains title up to the point where the ore is refined into bullion and then transfers title to the counterparty to a gold forward sales contract (in exchange for the gross contract price).

IAS 39 prohibits the application of the own-use accounting to a written option to buy or sell a commodity (or any other non-financial asset) that can be settled net or that is readily convertible to cash. A commodity contract that includes volume flexibility related to the quantity of the commodity delivered under the contract must be considered in the light of this. An assessment must be completed to determine whether the contract volume flexibility has the characteristics of a requirements (forward) contract versus a written option (ie, contains a premium paid at the inception or through the life of the contract).

12.2.3 Embedded derivatives

Mining entities are often party to commercial contractual arrangements that contain embedded derivatives within the host contract. An embedded derivative is ‘a feature within a contract that exhibits characteristics that if in a standalone contract would be considered a derivative in its own right’. Contracts that are not measured at fair value in their entirety, including contracts that qualify for own-use accounting, are still assessed for the existence of embedded derivatives.

For example, a normal business contract whose value changes based on variables such as inflation (such as a consumer price or labour index), commodity prices (such as the price of diesel in purchase contracts or the price of coal in electricity contracts) and foreign currency (as distinct from the reporting entity’s functional currency) contains embedded derivatives that are within the scope of the standard.

The IAS 39 measurement criteria do not apply to embedded derivatives that are ‘closely related’ to the ‘economic characteristics and risks of the host contract’ (ie, the contracts in which they are embedded). The fair value movements for the full remaining life of the derivative in all other cases are accounted for at fair value. The ‘closely related’ concept is applied to all of the commercial contracts within the mining sector that contain embedded derivatives.
The following examples illustrate some of the types of embedded derivatives that arise in the mining industry and provide guidance on how they should be accounted for under IAS 39:

<table>
<thead>
<tr>
<th>Example contract</th>
<th>Embedded derivative</th>
<th>Is it closely related?</th>
<th>Accounting outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>South African mining company (rand functional currency), with gold sale contract denominated in US$.</td>
<td>Yes – rand: US$ forward.</td>
<td>Yes – because certain commodities (for example, gold) are routinely denominated in the US$ in transactions around the world. This does not apply to all commodities that are sold by mining entities.</td>
<td>No need to separate and fair value. Some other commodities, if the sales contract is denominated in a currency that differs from the entity’s (or the relevant counterparty’s) functional currency, will contain an embedded derivative that must be fair valued.</td>
</tr>
<tr>
<td>Australian mining company (Ausz$ functional currency), with a contract to purchase equipment from a Japanese supplier (Japanese yen functional currency) in US$.</td>
<td>Yes – Aus$: US$ forward.</td>
<td>No – because the US$ is not the functional currency of either party to the contract, nor could it be argued that such contracts are routinely denominated in US$.</td>
<td>Separate the Aus$: US$ forward from the host contract, and account for it at fair value.</td>
</tr>
<tr>
<td>Russian mining company (Russian rouble functional currency) has a service contract denominated in US$.</td>
<td>Yes – Russian rouble: US$ forward.</td>
<td>Yes – because the US$ is commonly used in contracts to purchase or sell non-financial items in the economic environment in which the transaction takes place.</td>
<td>No need to separate and fair value.</td>
</tr>
<tr>
<td>Australian mining company has an electricity supply contract for its aluminium smelter indexed to the LME aluminium price.</td>
<td>Yes – aluminium forward.</td>
<td>No – because the index is not closely related to the relevant economic characteristics of the host contract, relating to the supply of electricity. The exemption cannot be applied even though the index is relevant to the smelter.</td>
<td>Separate the aluminium forward from the host contract and account for at fair value.</td>
</tr>
</tbody>
</table>

**12.2.3.1 Routinely denominated**

The US-dollar denominated sales contract in the first example above meets the ‘closely related’ criteria, as the commodity is routinely denominated in the US dollar. Many commodities are routinely denominated in the US dollar due to the global nature of the industry. Examples of commodities routinely denominated in US dollar include:

- gold;
- silver;
- platinum;
- aluminium (and alumina);
- copper (refined and concentrate);
- coal (thermal and coking);
- iron ore (fines, lump and pellet);
- diamonds;
- titanium products/feedstock;
- uranium;
- nickel;
- lead; and
- zinc;

The following commodities are not routinely denominated in a single currency in commercial transactions:

- borates;
- salt; and
- talc.
Mining entities must take care to cover their full population of contracts when assessing contracts for embedded derivatives. Conclusions must be adequately documented.

12.2.4 Impairment

All contracts that are derivatives are recognised on the balance sheet at fair value under IAS 39. The expected future cash flows arising from derivatives are recognised as a separate asset (or liability) and are not included in calculating impairment provisions under IAS 36 Impairment as well. This means that any assets (or liabilities) recognised in respect of the derivatives are excluded from the carrying value of the assets being tested for impairment. The market prices used in an entity’s value-in-use calculation under IAS 36 must be consistent with the market prices used in the valuation of its derivative contracts under IAS 39.

12.3 Hedge accounting

The objective of hedge accounting is to recognise in the income statement, gains and losses on the hedging derivative in the same period or periods in which the underlying exposure being hedged is brought to account. This is achieved under IAS 39 either:

- by deferring gains or losses on the hedged item in equity and reclassifying these to the income statement when the hedged transaction is recognised (cash flow or net investment hedge); or
- by recording the gains and losses on the derivative in income, as well as an offsetting adjustment in the income statement to the carrying amount of the hedged item for the risk being hedged (fair value hedge).

Hedge accounting can only be adopted when the qualifying criteria in Section 12.3.2 are met.

12.3.1 Different types of hedges

12.3.1.1 Fair value hedge

A fair value hedge is a hedge of the exposure to changes in fair value of a recognised asset or liability or an unrecognised firm commitment, or an identified portion of such an asset, liability or firm commitment that is attributable to a particular risk and could affect profit or loss. One of the most common examples of a fair value hedge is where debt finance is via a fixed interest rate loan, and the entity wishes to hedge the fair value of the loan against a declining interest rate environment through a ‘receive fixed, pay floating’ interest rate swap.

The gain or loss from remeasuring the hedging instrument at fair value (derivative) or the foreign currency component of its carrying amount (non-derivative) is recognised immediately in the income statement. The carrying amount of the hedged item is adjusted for the gain or loss attributable to the hedged risk at the same time. The change is also recognised immediately in the income statement to offset the value change on the derivative.

12.3.1.2 Cash flow hedge

A cash flow hedge is a hedge of the exposure to variability in cash flows that:

- is attributable to a particular risk associated with a recognised asset or liability or a highly probable forecast transaction; and
- could affect profit or loss.

Cash flow hedges are commonly used in the mining industry to hedge highly probable forecasted commodity sales from production against declining commodity prices through a forward sales contract or a purchased put option. They are also used where a ‘pay fixed, receive floating’ interest rate swap is used to hedge the cash flow variability of a variable interest rate loan. The portion of the gain or loss on the hedging instrument that is determined to be an effective hedge is recognised directly in equity.

The gain or loss deferred in equity is recycled to the income statement when the hedged cash flows affect income. If the hedged cash flows result in the recognition of a non-financial asset or liability on the balance sheet, the entity can choose to adjust the basis of the asset or liability by the amount deferred in equity.

12.3.1.3 Net investment hedge

A net investment hedge is a hedge of a mining entity’s investment in the net assets of a foreign operation. This might be achieved via a foreign currency borrowing or by entering into a foreign currency forward exchange contract. Gains and losses on the hedging instrument are deferred in equity, similar to a cash flow hedge, in the foreign
currency translation reserve. They are only recognised in the income statement on partial disposal or sale of the foreign operation or a liquidation of the investment.

12.3.2 Qualifying for hedge accounting
A mining entity must meet certain criteria before it is allowed to account for a hedge under one of the approaches discussed above. These criteria can be broken down into three broad categories:

- the hedge is documented at its inception;
- there is specific designation between the hedging instrument and the hedged item; and
- the expected effectiveness of the hedge is formally demonstrated, and the effectiveness is proven retrospectively.

12.3.2.1 Hedge documentation
The documentation requirements require an entity to document:

- the risk management strategy;
- the specific hedged item;
- the derivative being used to hedge that item;
- the nature of the risk being hedged; and
- how hedge effectiveness will be measured.

12.3.2.2 Hedge designation
IAS 39 requires documented evidence of which derivative instrument is hedging which transaction. A mining entity hedging forecast commodity sales from its production most commonly achieves this by matching specific derivatives (and notional amounts) against a chronological schedule of forecast production. The first derivative listed in the schedule hedges the first x units of sales in the month of maturity, where x is the notional amount of the derivative contract. The second contract listed hedges the next y sales, where y is its notional amount, and so on.

12.3.2.3 Hedge effectiveness
To achieve hedge accounting, the entity must demonstrate the expectation that the hedge will be highly effective over its life. It then proves, throughout the life of the hedge, that the hedge was highly effective in order to continue to qualify for hedge accounting. Changes in fair values or cash flows of the derivative are expected to offset those of the hedged item within the range of 80-125%. Ineffectiveness in the hedge relationship is recognised within the income statement.

12.3.3 When is a forecast commodity sale considered highly probable?
Mining entities must consider whether future commodity sales are highly probable in order to qualify for cash flow hedge accounting. Factors that should be considered include:

- proved and probable reserves: does the entity have proved and probable reserves (supported by a feasibility study) supporting the forecast future sales? It would be difficult to assert that the future sale transaction is probable without proved and probable reserves, although in some situations this may be possible;
- mine plan: is the forecast transaction supported by a mine plan demonstrating that the entity will produce at least the hedged quantity on the specified date? Does the entity have a history of meeting the production forecasts included in the mine plan?;
- infrastructure: has the entity completed the necessary mine development and capital investment to support the future production? If not, does it have the financial and operating capability, as well as the intent, to do so?;
- percentage of total forecast production hedged: the probability of a forecast sale of 50% of the company’s expected production is easier to demonstrate under the ‘highly probable’ tests than when the forecast sale is close to 100% of the entity’s expected production;
- time to forecast sale: the further out the forecasted sale, the more evidence is required to demonstrate that it is highly probable; and
- track record of forecast sales: a past pattern of designated hedge transactions not actually occurring as specified will call into question an entity’s ability to predict forecast transactions accurately.

12.3.4 Accounting considerations for specific events
The following section sets out, in simple terms, the accounting implications of some specific events that can impact on the hedging of forecast transactions:
12.3.4.1 Early hedge close-out, but sale still expected to occur
If the hedged forecast transaction is still expected to occur (it no longer needs to be highly probable), any amounts deferred in equity are recognised in profit or loss when the hedged transaction affects profit or loss, or are adjusted against the initial carrying amount of a non-financial asset or liability.

12.3.4.2 Forecast sale no longer expected to occur
Hedge accounting is discontinued and any amounts previously deferred in equity are immediately recognised in profit or loss. The derivative may be redesignated as the hedge of another transaction.

12.3.4.3 Short-term contracts rolled forward at maturity to hedge a longer-term forecast sale
IAS 39 permits the use of rollover hedging strategies provided the use is documented as part of the risk management strategy. The effective portions of the fair value adjustments on consecutive short-term contracts are deferred in equity until the forecast sale impacts profit and loss.

12.3.4.4 Hedge contract rolled forward at maturity to hedge a different forecast sale
If a forecast sale occurs when expect but the related derivative is rolled forward at maturity to hedge a different forecast sale then the gains or losses deferred in equity in respect of the initial transaction must still be recycled through the income statement when that initial transaction affects profit or loss (even if the rollover defers settlement of the derivative). Gains or losses arising subsequent to the roll forward are deferred in equity and recycled when the later transaction impacts profit or loss.

12.4 Presentation and disclosure
The IAS 32 disclosure requirements are extensive. The standard requires certain general disclosures, quantitative disclosures for certain ‘failed’ hedges, and additional disclosures for cash flow hedges and hedges of a net investment in a foreign operation. These include, but are not limited to:

- the entity’s objectives and strategies for holding and issuing derivatives, and a description of the items or transactions for which risks are hedged;
- a description of the forecast transactions being hedged, the maximum period of time before the transactions are expected to occur, and the transactions or other events that will result in the recognition in earnings of gains and losses that have accumulated in equity;
- the net gain or loss recognised in earnings for the period representing aggregate ineffectiveness for all hedges, and the components of the derivatives’ gains or losses excluded from the assessment of hedged effectiveness;
- an estimate of the amount of gains and losses included in equity that will be recognised in earnings within the next 12 months; and
- disclosure of certain ‘failed’ hedges including the amount of gains and losses recognised in earnings as a result of:
  - a previously hedged firm commitment that becomes no longer firm (for example, the commitment is cancelled); or
  - a previously hedged forecast transaction that becomes probable of not occurring.

IFRS 7 requires disclosure of the following:

- financial risks, including how they are managed, based on information used by management. Entities are required to report the metrics they use internally to manage and measure financial risks; and
- measurement and disclosure of the amount by which equity and profit or loss could change from what is reported at the balance sheet date, should markets move by ‘reasonably possible’ amounts (ie, sensitivity analysis).
13 Taxation and royalties
13 Taxation and royalties

Mining companies often operate across a broad range of geographies and tax jurisdictions. Many countries offer generous tax incentives, income tax holidays and other concessions, to attract companies to invest. These incentives can be successful in encouraging mining projects that lack sources of cheap funding or are in remote/developing areas.

Once a mine is established and operating, governments may also require payment of mining taxes, that vary with the level of profit earned or royalties, based on either production or revenue. Royalties may create similar issues to those identified in the accounting for income tax.

13.1 Deferred taxation

The amount of tax payable on the taxable profits for a particular period often bears little relationship to the amount of income and expenditure appearing in the financial statements, as tax laws and financial accounting standards differ in their recognition of income, expenditure, assets and liabilities.

The tax charge in the income statement reflects not only the charge based on taxable profit, but also an amount that recognises the tax effects of transactions appearing in the financial statements in one period which will fall to be taxed in a different period. The recognition of this additional amount gives rise to deferred taxation.

Examples where such differences arise include the following:

- a mining entity may receive tax deductions for 150% of the exploration expenditure it incurs;
- there may be accelerated deductions allowed for calculating taxable income that create temporary differences between the tax written-down value of an asset and its carrying value for accounting purposes; and
- a fair value adjustment to the accounting value of an asset acquired as part of a business combination may have nil impact on the tax value of the asset.

13.1.1 Balance sheet liability method

IAS 12 Income Taxes requires a deferred tax liability or asset to be recognised in respect of temporary differences that exist at the balance sheet date. Temporary differences are defined as ‘differences between the carrying amount of an asset or liability in the balance sheet and its tax base’. The deferred tax expense for the period represents the amount required to adjust the net deferred tax liability or asset to the new balance at each reporting date.

13.1.2 Tax base

Deferred tax is calculated on the difference between the carrying amount of an asset or liability in the balance sheet and its tax base. The tax base of an asset or liability is defined as ‘the amount attributed to that asset or liability for tax purposes’.

13.1.2.1 Tax base of an asset

The tax base of an asset is the amount that will be deductible from any taxable income derived when the carrying amount of the asset is recovered.

Examples include:

- mining equipment – the tax base is usually the written-down value for tax purposes (the amount that can still be claimed as a deduction in future periods); and
- receivables from the sale of concentrate – the tax base will be equal to the carrying value in the accounts if the revenue is taxed on an accruals basis and therefore has already been included in taxable income.

13.1.2.2 Tax base of a liability

The tax base of a liability is its carrying amount minus any amount that will be deductible for that liability in future periods.

Examples include:

- provisions for future restoration costs – the tax base will be nil if the costs are deductible at the time when the restoration work is undertaken (rather than when the costs are accrued);
- trade creditors:
  - if the related expenditure has already been deducted for tax purposes, the tax base is equal to the carrying amount of the liability;
  - if the related expenses will be deducted on a cash basis, the tax base is nil; and
  - if the creditors relate to the acquisition of fixed assets, the payment has no tax consequences and the tax base equals the carrying amount.
13.1.3 Recognition
A deferred tax asset or liability is recognised for a temporary balance sheet difference if it meets the recognition criteria set out in the IASB Framework. For an asset to be recognised, it must be probable that when it is realised it will create future economic benefits. In other words, it must be probable that there will be a taxable profit against which the deductible temporary difference can be used.

A deferred tax liability should always be recognised in full.

There are exceptions to these requirements for deferred tax assets or liabilities that arise from:
• the initial recognition of goodwill; and
• the initial recognition of an asset or a liability (where the recognition does not affect the accounting profit or the taxable income at that time and the transaction is not a business combination).

13.1.4 Measurement
The deferred tax assets and liabilities are measured at tax rates expected to apply when the associated asset is realised or liability settled. The measurement must reflect the manner in which the asset or liability is expected to be recovered or settled. For example, if the tax rate on gains on disposal is different from the tax rate on other income and the entity expects to sell the asset without further use, the tax rate applicable for disposals is used.

Where there is an intention for the asset to be used to generate income for a period of time and then sold, a blended rate should be utilised that reflects management’s intention of both the timing of the disposal and the carrying value that will be recovered through both use and sale. In such a circumstance, it is not appropriate to only use the tax rate applicable for disposals nor that applicable to income, rather a rate that reflects the actual plans of the entity.

Discounting of deferred tax assets and liabilities is not permitted under IAS 12.

13.1.5 Tax losses
A deferred tax asset is recognised for the estimated future tax benefit relating to unused tax losses and unused tax credits if it is probable that taxable profits will be available against which the deferred tax asset can be used.

Mining operations often generate significant tax losses in the exploration, development and pre-production phases; these are subsequently recouped through sale of product over many years. Judgement is required in assessing whether it is appropriate to recognise a deferred tax asset in relation to such tax losses.

In assessing the probability that losses will be recouped and therefore whether the deferred tax asset is recognised, management must consider if any expiry period under relevant tax legislation exists. Any assessment of future taxable profits against which losses are recouped must not be over a longer period than the tax loss expiry period.

Cash flows used to determine future taxable profits should be based on the same assumptions as those used for forecasting cash flows in impairment assessments.

13.1.6 Tax holidays
Governments may offer tax concessions to encourage development of mine sites in the form of temporary tax holidays or concessional tax rates. Where entities receive such benefits, an entity should record deferred tax based on the expected future tax consequences.

For example, suppose an entity receives a 10-year tax holiday, in which period it pays no taxes, and holds infrastructure assets with a useful life of 20 years. As no tax is payable in years one to 10, deferred tax should not be provided in respect of any temporary differences that will reverse in years one to 10 during the tax holiday period. However, the temporary differences should be determined and tracked to make sure that deferred tax is provided on temporary differences that will reverse in years 11 to 20, outside the tax holiday period.

13.1.7 Rehabilitation assets and liabilities
Where a rehabilitation provision is recognised as a consequence of constructing a mine site, the capitalised closure costs should be recognised at their present value as both an asset and a liability.

Rehabilitation costs can often only be claimed as a tax deduction in the period when the rehabilitation activities occur, in which case the tax base of the rehabilitation obligation is nil.

There are usually no tax deductions available for the rehabilitation assets, in which case the tax base of the rehabilitation asset is also nil.
As noted earlier, IAS 12 provides an exemption from recognising deferred tax when an asset or liability is initially recognised outside of a business combination and does not affect accounting profit or taxable income. However, the provision for rehabilitation is subsequently increased to reflect the passage of time; other changes may also be recognised based on revised estimates of the closure costs. These subsequent adjustments do not qualify for the initial recognition exemption, except for increases resulting from the accrual of the discount.

Therefore, whilst mining entities are not required to recognise deferred tax in relation to the initial recognition of rehabilitation assets and liabilities, they are required to recognise deferred tax in relation to subsequent changes in the provision.

Mining entities must make a policy choice as to whether the initial recognition exemption is adopted or not. For ease of record-keeping, mining entities may wish not to exercise the initial recognition exemption in respect of rehabilitation assets and liabilities (so that all movements are treated on a consistent basis).

On the other hand, the present value of closure costs on initial recognition may not be significant in comparison to the future value due to the discounting applied over the long life of mine sites.

### 13.1.8 Joint ventures

IAS 12 requires a deferred tax liability to be recognised for all undistributed profits in a joint venture interest unless:

- the entity can control the timing of the distribution of those profits (timing of the reversal of the tax balance); and
- it is probable that the profits will not be distributed in the foreseeable future.

No liability is recognised if the mining entity can control the sharing of profits or timing of distribution. An entity arguably does have this ability when joint control exists; however, legislative issues may make the timing of distribution a little more difficult to control.

Any tax liability that is required to be recognised must take into account tax credits/benefits arising from tax paid by the joint venture.

For example, a Canadian mining entity (30% effective tax rate) has an interest in a US joint venture (20% effective tax rate). The Canadian entity is entitled to a tax credit to the extent of any tax paid by the US venture due to tax relief agreements in place. If the exemption criteria are not satisfied, the Canadian entity recognises a deferred tax liability on undistributed profits in the joint venture at the 10% differential, to cover the additional tax it would have to pay on any distributions received.

Various jurisdictions have withholding and other specific tax assessments when profits are distributed internationally. Each arrangement must be considered individually, particularly where joint ventures operate internationally.

Where a joint venture is proportionally consolidated, the investor recognises in its balance sheet its share of the joint venture’s assets and liabilities. The related tax bases would also be included in the investor’s tax balance sheet. Therefore, any temporary differences arising between the carrying amounts and tax bases of the assets and liabilities should be recognised, and deferred tax provided in the normal way.

### 13.1.9 Ore body

An entity must recognise deferred tax in relation to any assets and liabilities acquired in a business combination. However, IAS 12 does not permit recognition of a deferred tax liability on goodwill. This is because goodwill is a residual and the recognition of the deferred tax liability would increase the carrying amount of the goodwill.

It is normal in the mining industry for significant fair value to be allocated to the ore body in a business combination. The tax base of the ore body may be significantly lower than the fair value (and in some jurisdictions it is nil). A deferred tax liability is recognised on the ore body in such situations.

Chapter 15 addresses this in further detail.

### 13.2 Royalties and mining taxes

Royalties and special mining taxes paid to a government represent a form of taxation. The provisions of IAS 12 apply to income taxes, including all domestic and foreign taxes that are based on taxable profits. There is a need for judgement in determining whether royalties and special mining taxes are income taxes.
Royalty and mining tax arrangements differ significantly around the world. They can be split into those calculated with reference to:

- net amounts – such as profit before tax or net profit; and
- gross amounts – such as revenue or production.

### 13.2.1 Net amounts

Payments to governments that are based on a measure of income less expense generally fall within the scope of IAS 12. In such cases, they are accounted for and classified as income taxes in the income statement. Hence, a deferred taxation asset or liability is recognised where differences exist on recognition of profit for accounting purposes compared to mining tax calculation purposes (subject to the exemptions described earlier).

### 13.2.2 Gross amounts

Payments to a government that are based on gross amounts, such as production or revenue, generally fall outside the scope of IAS 12; in such cases IAS 37 Provisions, Contingent Liabilities and Contingent Assets applies.

Legislation may specify royalties to be paid at a certain rate, but subject to a minimum aggregate amount which is triggered if the level of production fails to reach a specified volume or value. Minimum royalties are expensed as incurred. However, if the minimum royalty must still be paid after the mine is abandoned or the lease ends, an accounting treatment similar to the accounting for restoration and rehabilitation costs should be applied to the royalty.

Payments to a government that are based on gross amounts, such as production or revenue, are classified in accordance with the substance of the transaction, as follows:

- revenue adjustment – royalties based on revenue;
- production cost – royalties based on production; or
- other operating cost – other royalties based on gross amounts.

### 13.3 Presentation and disclosure

The disclosure requirements set out in IAS 12 are addressed below.

#### 13.3.1 Tax expense

Disclose the major components of tax expense separately with:

- a reconciliation between the tax expense and the profit multiplied by the statutory tax rate; or
- a reconciliation between the average effective tax rate and the applicable tax rate.

Also disclose an explanation of any change in tax rates.

#### 13.3.2 Temporary differences

For each type of temporary difference, disclose:

- the amount of any temporary differences not recognised as a deferred tax asset or liability;
- the amount of the deferred tax assets and liabilities recognised in the balance sheet; and
- the amount of deferred tax income or expense recognised in the income statement.

#### 13.3.3 Recognition of deferred tax asset

Disclose the amount of deferred tax asset and evidence supporting the asset when:

- the use of the asset depends on future taxable profits;
- the entity has suffered a loss in the current or preceding year; and
- tax losses are carried forward.

#### 13.3.4 Other disclosures

Disclose:

- the tax consequences of dividends proposed or declared before the issue of the financial statements but not recognised as a liability in the financial statements; and
- the existence and financial effect of any tax holiday.
14 Joint ventures
Joint ventures are common in the mining industry, with entities sharing the high risks and significant capital requirements with other mining entities and/or local governments. The advantages of combining national interests with the expertise of an international mining group have also made joint ventures attractive. The form of a joint venture can vary and is often influenced by financing and/or tax considerations and local legislation.

14.1 Definition of a joint venture

IAS 31 Interests in Joint Ventures defines joint ventures as all contractual arrangements ‘whereby two or more parties undertake an economic activity which is subject to joint control’.

This type of contractual arrangement distinguishes interests in joint ventures from other investments/interests. The arrangement does not have to be a written contract, but there is usually a degree of formality (for example, a detailed joint venture agreement), particularly for large projects.

14.1.1 Joint control

Joint control means the ‘contractually agreed sharing of control over an economic activity’.

Joint control and control are mutually exclusive. An undertaking does not qualify as joint venture if one party is able to control it. Similarly, an arrangement where strategic decisions can be made by a majority (simple or otherwise) of the venturers is not joint control.

Where joint control exists, strategic financial and operating decisions relating to the joint venture require the unanimous consent of the venturers. The type of strategic decisions that require unanimous consent include characteristics such as:

- approving a business plan;
- changing the strategic direction of the business, such as the volume of exploration activity;
- capital expenditure;
- disposing of large quantities of assets;
- major financing; and
- selecting accounting policies.

Joint control does not mean that every venturer must have an equal financial interest in the venture. Venturers may have different interests in the net assets and profit and loss of a venture but still be equal in terms of exercising joint control.

14.2 Types of joint ventures

Joint ventures can take many forms, but fall into one of three broad groups:

- jointly controlled operations;
- jointly controlled assets; and
- jointly controlled entities.

14.2.1 Jointly controlled operations

Jointly controlled operations are joint undertakings that exhibit the following features:

- there is no corporation, partnership or other entity, or any other financial structure, that is separate from the venturers themselves;
- each venturer uses its own fixed assets and carries its own inventories;
- each venturer incurs its own expenses and liabilities and raises its own finance;
- the joint venture activities may be carried out by the venturer’s employees alongside the venturer’s similar activities; and
- the venturers share any revenue from the sale of joint product and any expenses incurred in common.

The arrangements for distributing revenue may require each venturer to receive a proportion of the net earnings each year, or to bear a proportion of production and related costs and receive a share of the product for sale on its own behalf. Each party may alternatively obtain its portion of the sale proceeds through one of the venturers also acting as selling agent by separate agreement between the parties.

14.2.2 Jointly controlled assets

Jointly controlled assets, in contrast to jointly controlled operations, involve the joint control (often also joint ownership) of one or more assets contributed to, or acquired for the purpose of, the joint venture. Each venturer takes a share of the output from the assets and bears an agreed share of the expenses incurred. An example would be a refinery that is jointly constructed and owned by a group of mining entities.

14.2.3 Jointly controlled entities

A jointly controlled entity is a joint venture that involves the establishment of a corporation, partnership or other entity in which each venturer has an interest. The entity operates in the same way as other entities, except that a contractual
arrangement between the venturers establishes joint control over its activities.

14.3 Joint venture accounting

Jointly controlled assets and jointly controlled operations are joint ventures that do not involve the establishment of a separate entity.

The accounting for an interest in jointly controlled assets is similar to the proportional consolidation model applied for jointly controlled entities. Each party to a jointly controlled asset should recognise:

- its share of the jointly controlled asset, classified according to the nature of the asset;
- any liabilities the venturer has incurred;
- its proportionate share of any liabilities that arise from the jointly controlled assets;
- its share of expenses from the operation of the assets; and
- any income arising from the operation of the assets.

In the case of a jointly controlled operation, each venturer uses its own property, plant and equipment and carries its own inventory. It also incurs its own expenses and liabilities and raises its own finance. The venturer should recognise 100% of the assets it controls and the liabilities it incurs as well as its own expenses and its share of income from the sale of goods or services from the joint venture.

IAS 31 provides a choice between proportional consolidation and the equity method to account for a venturer’s interest in a jointly controlled entity.

14.3.1 Proportional consolidation method

The venturer recognises separately its share of each of the following:

- jointly controlled assets;
- liabilities for which it is jointly responsible;
- income; and
- expenses.

14.3.2 Equity method

As an alternative to proportional consolidation, a venturer may recognise its interest in a jointly controlled entity using the equity method. This involves recognising its share of the joint venture’s net assets (plus any attributable goodwill) as a separate line item on the balance sheet.

14.3.3 Application

The following table summarises the accounting for the various types of joint undertakings:

<table>
<thead>
<tr>
<th>Separated entity</th>
<th>Jointly controlled entity</th>
<th>No joint control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment:</td>
<td>If control, apply IAS 27 consolidation; If significant influence, apply IAS 28 equity accounting; Otherwise, apply IAS 39 and account for at fair value.</td>
<td></td>
</tr>
<tr>
<td>Jointly controlled asset or operation: apply the accounting described in Section 14.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14.3.4 Investments and undivided interests

If there is no joint control (or control), a mining entity’s interest in an investee is accounted for either as an investment (if it involves a separate legal entity) or as an undivided interest in assets.

If the investor has significant influence over the investee, IAS 28 Investments in Associates applies and equity accounting must be used.

In all other cases, the investments are carried at fair value under IAS 39 Financial Instruments: Recognition and Measurement.

Undivided interests are very similar to jointly controlled assets and operations, except that the investor does not have joint control over the assets or operation. Undivided interests typically involve shared infrastructure assets.

Investors in undivided interests should normally recognise their share of any working capital as a single current asset and their share of producing property as a single non-current asset. The latter does not qualify as property, plant and equipment.
but is accounted for in a similar way – ie, at historical cost less accumulated amortisation and impairment. Liabilities are recorded separately to the extent that the investor is liable under the terms of the agreement.

14.4 General considerations

14.4.1 Transactions between joint venture and venturer

A venturer must eliminate any material unrealised profits and losses arising from transactions between it and the joint venture. Any adjustments made to eliminate unrealised profits are based on the proportion attributable to the venturer’s own interest. If a venturer transfers an asset to the joint venture at a loss and this is indicative of its market value, the full amount of the loss is recognised – because this is an indication of an impairment loss or a reduction in the net realisable value of the item.

14.4.2 Contributions of assets to a joint venture

Contributions to a joint venture entity are transfers of assets by venturers in exchange for an interest in the joint venture. Such contributions may take various forms: for example, plant and mineral leases (sometimes with additional cash). They may be made either upon establishing the joint venture or subsequently.

With a jointly controlled asset, the contribution of assets results in a partial disposal of that asset by the contributing venturer; the gain or loss is recognised in the income statement. The other venturers’ interests are recorded at their share of the fair value of the asset on the date of contribution.

With a jointly controlled entity, any equity interest that a venturer receives is based on the fair value of the assets contributed. Any equity interest the other venturers receive is based on the value of what they have contributed. If a venturer receives monetary or non-monetary assets in addition to receiving an equity interest in the jointly controlled entity, an appropriate portion of the gain or loss on the transaction is recognised by the venturer in profit or loss.

Any unrealised gains or losses on non-monetary assets contributed to a jointly controlled entity are eliminated against the underlying assets under the proportionate consolidation method or against the investment under the equity method.

14.4.3 Accounting policies

A venturer reviews the accounting policies used to prepare a joint venture’s financial statements to confirm that they are consistent with its own policies. This is done when the amounts are considered significant to the venturer’s affairs. For a mining entity, such a review typically concentrates on the following items:

- depreciation policy;
- inventory valuations;
- restoration and rehabilitation provisions;
- the treatment of exploration and evaluation expenditure; and
- other significant financial reporting matters covered in this document.

The venturer notionally restates the financial statements of the joint venture, when necessary, to comply with its own accounting policies before applying proportional consolidation or equity accounting.

14.5 Carried interests

A carried interest arises where one venturer (the carrying party) agrees to pay for another venturer’s (the carried party’s) share of development costs. The carrying party is compensated by receiving an additional share of the commodity produced until the carried costs have been recovered, together with the agreed return on those costs.

The appropriate accounting treatment for a carried interest varies depending on the facts and circumstances.

The carrying party should generally capitalise the costs incurred in respect of the carried interest and amortise them on a units-of-production basis over the additional share of the minerals to which it is entitled. Hence, the capitalised cost is reclassified to inventory as the mineral is received from the carried party.

For the carried party, the arrangement is in substance a financing transaction. It retains an interest in the deposit but has arranged for the carrying party to finance part of its share of the development expenditure, which will be repaid in minerals rather than in cash.
Therefore, the carried party should normally recognise a liability in respect of the commodities it expects to deliver in return. A revaluation of this liability is appropriate if the volume of the commodities to be delivered is fixed.

An alternative view is that the carried party has transferred the right to a defined volume of future production and should not recognise any assets, expenses or liabilities in respect of the carried costs. In this case, the carried party should consider whether this is an impairment indicator for its residual interest in the deposit.

### 4.6 IASB developments

The IASB is undertaking a project on joint venture accounting, aiming to reduce differences between IFRS and US GAAP. In December 2005, the IASB tentatively decided to eliminate proportional consolidation for jointly controlled entities and therefore to allow only equity accounting.

The IASB has also expressed a view that the accounting treatment should not depend on the legal form, but on the substance of a joint venture. The scope of its project has been expanded to consider the definition of a joint venture and its main characteristics, because it felt the current standard did not adequately address the difference between a joint venture entity and a direct interest in the underlying individual assets and liabilities of a joint arrangement. Direct interests are arrangements in which the participants continue to hold direct rights in assets contributed and assume direct responsibilities for obligations arising from the joint economic activity. For example, the participants may provide direct financing by advancing funds, might lease assets to the arrangement under operating leases or might render services and technical assistance with resources and employees that remain under the participants’ unilateral control. In contrast, an indirect interest is one in which participants do not have control over the underlying single assets and are not responsible for underlying liabilities; rather they have only a right to share in the net outcome expected to be generated by that business’s operations.

The IASB expects to publish an exposure draft later in 2007 and an amended standard in 2008. The proposals are expected to require entities to account for their direct interests in the individual assets and liabilities of a joint arrangement and to equity account for indirect interests in joint ventures that constitute a business.

### 14.7 Presentation and disclosure

There is a requirement to disclose the accounting policy used to account for interests in joint ventures.

Interests in significant joint ventures and the ownership interest in jointly controlled entities should be listed and described.

Contingent liability disclosures should include:

- any contingencies that the venturer has incurred in relation to the joint venture;
- the venturer’s share of contingencies that have been incurred jointly with other venturers;
- the venturer’s share of contingent liabilities of the joint venture itself; and
- contingencies that arise from being contingently liable for the liabilities of the other venturers.

The following capital commitments should be disclosed:

- commitments of the venturer for the interest in the joint venture;
- the venturer’s share of commitments that have been incurred jointly with other venturers; and
- the venturer’s share of the commitments of the joint venture itself.
15 Business combinations
Increasing globalisation and consolidation of the mining industry has meant that merger and acquisition transactions are commonplace in the industry. The transaction process can be complex. There are a range of issues that need to be considered in accounting for transactions in accordance with IFRS for Business Combinations.

### 15.1 Definition of a business

To be considered a business, and not simply a group of assets and liabilities, IFRS requires the net assets to form an integrated set of activities managed together for providing a return to investors or other economic benefits. The key element of the definition is ‘integration’.

A producing mine is likely to be a business; a licence to explore, on its own, is normally just an asset. Projects that lie in development terms between the two are likely to be more difficult to judge. The variety of different structures used (for example, incorporated vehicles and unincorporated joint ventures) can add complexity to the accounting.

If the assets purchased do not constitute a business, the acquisition is accounted for as the purchase of individual assets. The distinction is important because in an asset purchase:
- no goodwill is recognised; and
- deferred tax is generally not recognised for asset purchases (because of the initial recognition exemption in IAS 12 Income Taxes, which does not apply to business combinations).

### 15.2 Identification of a business combination

Transactions may be structured in a variety of ways, including purchase of shares, purchase of net assets, establishment of a new company that takes over existing businesses and restructuring of existing entities. Where there are a number of transactions linked together or transactions which are contingent on completion of each other, the overall result is considered as a whole. This is because IFRS focuses on the substance of transactions and not the legal form to determine if a business combination has taken place.

Business combinations involving mining projects may include:
- acquisition of a direct interest in a project; or
- acquisition of an equity interest in a mining entity.

The only exemptions to applying business combination accounting under IFRS are:
- when the assets acquired do not constitute a business (as discussed above);
- when businesses are brought together to form a joint venture (see Chapter 14);
- businesses that are under common control (where no change in ownership takes place); and
- combinations resulting from contract alone (with no transfer of ownership).

A business combination is considered to have taken place when control is obtained. Both existing voting rights and capacity to control in the form of currently exercisable options and rights are considered in determining when control or capacity to control exists.

### 15.3 Purchase method

IFRS 3 requires the purchase method of accounting to be applied to all business combinations. The purchase method comprises the following steps:
- identifying the acquirer;
- measuring the cost of the business combination; and
- allocating, at the acquisition date, the cost of the business combination to the assets, liabilities and contingent liabilities acquired.

#### 15.3.1 Identifying the acquirer

IFRS 3 requires an acquirer to be identified as the first step of any business combination. The acquirer in the combination is the entity that obtains control of the other entities or businesses. The distinction is significant, as the cost of the business combination is only allocated to the net assets of the acquiree. The acquirer’s net assets remain at existing carrying values.

IFRS 3 describes a set of principles to determine who the acquirer might be. These are:
- if the fair value of one of the combining entities is significantly greater than the other entities, the larger entity is likely to be the acquirer;
- if the business combination is effected through an exchange of voting shares for cash, the entity giving up cash is likely to be the acquirer; and
- if the management of one of the combining businesses is able to dominate the selection
of the combined management team, that business is likely to be the acquirer.

This may lead to the situation of a reverse acquisition, particularly if the legal form involves creation of a new company or the acquisition of a large company by a smaller company. In such instances, the legal acquirer may not be the accounting acquirer under IFRS 3.

15.3.2 Cost of acquisition

The cost of acquisition is the purchase consideration and consists of:

- cash or cash equivalents paid;
- the fair value of assets given, liabilities incurred or assumed and equity instruments issued by the acquirer in exchange for control; and
- costs directly attributable to the acquisition.

The fair value is determined if shares or other non-cash items are part of the purchase price. Their market price at the date of acquisition is generally considered to approximate fair value if shares are issued and they are listed.

Only direct and incremental costs can be included in the cost of acquisition. These include professional fees, such as legal and accounting fees. Costs of issuing shares or arranging finance are accounted for as part of the equity proceeds or financial liability rather than as a cost of the acquisition.

15.3.2.1 Contingent consideration

The purchase consideration often depends on future events, such as royalties payable to the vendor as a percentage of future mine revenue. If a contingent consideration is payable, an estimate must be made of the probable payout if it can be reliably measured. This is then included in the cost of the combination.

Adjustments are made to the cost of the combination if further payments become probable, or if expected payments are not made.

15.3.3 Allocation of the cost of the combination to assets and liabilities acquired

IFRS 3 requires all identifiable assets and liabilities (including contingent liabilities) acquired to be recorded at their fair value. These include assets and liabilities that may not have been previously recorded by the entity acquired.

The principle used to determine fair values is that they should reflect current market values that would be paid in a commercial transaction. For example, a long-term sales contract to sell ore forward at an above market price may have value; a contract to sell at market rates may not.

Some of the common identifiable assets and liabilities specific to the mining industry that might be recognised in a business combination, in addition to inventory or property, plant and equipment, include the following:

- Mining/exploration leases;
- Mining properties;
- Customer sales contracts (see above);
- Water rights; and
- Environmental/closure provisions.

In some cases it can be challenging to have to value separately the identifiable assets and liabilities.

15.3.3.1 Undeveloped properties/resources and exploration potential

In the mining industry, specific attention must be given to the treatment of undeveloped properties/resources or exploration potential in ascribing fair values to individual assets. A significant portion of the cost of an acquisition may relate to the value of undeveloped properties. In valuing undeveloped properties, management should consider similar recent transactions in the market. The specific characteristics of the properties also need to be taken into account, including the type/volume of exploration and evaluation work previously carried out, the location of the deposits and expected future commodity prices.

15.3.3.2 Inventory

‘Normal’ principles for fair valuing inventory apply to transactions in the mining industry, but complications can arise. For example, the determination of the fair value of long-term stockpiles will require judgement in estimating the future sales proceeds and processing costs.
15.4 Goodwill versus mining properties/exploration costs

When a mining entity is acquired, the fair value of the purchase consideration is often higher than the acquirer’s interest in the fair value of the net assets of the acquiree (including the fair value of the mineral properties and exploration assets). A key question which arises is whether the excess represents goodwill or whether it should increase the value of the mining property and/or exploration assets.

The distinction is significant because of differing accounting treatments after acquisition:
- goodwill is not amortised and is subject to an annual impairment assessment; and
- mining properties and exploration assets are expensed if the exploration later proves to be unsuccessful (see Chapters 2 and 3).

There is a further difference relating to the recognition of deferred tax. A mining entity has to recognise deferred tax on the difference between the fair value and the tax value of the assets acquired in a business combination. Usually, the fair value uplift to mining properties and exploration assets is not tax deductible and therefore results in a deferred tax liability. Goodwill is the exception; no deferred tax is recognised on goodwill.

Historically, it has not been common practice in the mining industry to recognise goodwill on the basis that any premium paid as part of the purchase consideration relates to mining properties or exploration potential. However, it is incorrect to assume that goodwill never arises.

Goodwill can arise from several different sources. For example, goodwill recognition is appropriate if a specific buyer can realise synergies from shared infrastructure assets (for example port and rail facilities, and product preparation plants) or proprietary mining techniques that are not available to other entities. Also, a mining entity may be willing to pay a premium to protect the value of other mining operations that it already owns. This also represents goodwill.

In the gold mining industry, the effect of future expectations on the gold price is often included in the share price, resulting in higher prices paid for gold mining companies. It is not possible to value the ‘gold premium’ included in the share price as a separate intangible; it can therefore result in goodwill being accounted for on combinations. Attention must be given to the carrying amount of any goodwill to ensure impairment losses are provided for if required.

15.5 Deferred tax

As noted above, an entity recognises deferred tax on the fair value adjustments to the net assets of an acquired mining company, including any increase in the value of mining properties and/or exploration assets. No deferred tax liability is recognised on goodwill itself.

It is commonplace for tax jurisdictions not to allow companies to claim tax deductions on acquired mining properties if the asset will be realised through extraction of resources. The tax base should reflect the manner in which the value of the asset will be realised. If this is through extraction of the resource, the tax base will be zero. In such cases it is likely that a large deferred tax liability will need to be recognised.

This deferred tax liability can result in the recognition of goodwill because it reduces the net assets of the acquired entity. The extent of such goodwill will depend on the fair value of the mining properties and the exploration assets.

15.5.1 Tax losses

It is possible for acquired mining entities to have tax losses. This can arise even if the entity is trading profitably, as a result of the carry forward of exploration costs and allowances for significant capital projects. Such tax losses are recognised as an asset at the date of the business combination if it is probable they will be utilised by the combined entity.

If the entity does not initially satisfy the recognition criteria but subsequently determines it can make use of the acquired losses, the losses are recognised as an income tax benefit. However, a corresponding reduction in the carrying amount of the goodwill is also recognised through the income statement.

Recognition of tax losses and any corresponding adjustment to the carrying amount of goodwill are not limited to the 12-month window available to finalise provisional accounting for other assets and liabilities (see Section 15.6).
15.6 Provisional assessments of fair values

IFRS 3 recognises that purchase accounting may only be determined on a provisional basis, particularly where an acquisition is completed close to year-end. This is common in the mining industry, as an acquirer typically needs time to evaluate the acquired mining properties and exploration assets. In such cases, a mining entity has 12 months from the date of acquisition to finalise the determination of fair values, with any adjustments recognised as part of the accounting for the initial business combination. Further adjustments beyond the 12-month window are recognised in the income statement as a change in estimate.

15.7 Restructuring costs

After a business combination there are often large restructuring costs. These costs may only be recognised as part of the business combination if they were previously recognised by the acquiree. Any other costs (such as terminations subsequent to the business combination) must be recorded as an expense. Similarly, any restructuring or other costs incurred by the acquirer itself cannot be included in the business combination.

15.8 Presentation and disclosure

IFRS 3 disclosure requirements are extensive, particularly in the year of combination.

Information that must be disclosed in the year of combination for material business combinations and in aggregate for immaterial business combinations (including any post-balance sheet date acquisitions) is as follows:

- details of the combining entities or businesses;
- the cost of the combination and details of the components of cost;
- the amounts recognised at the acquisition date for each class of the acquiree’s assets, liabilities and contingent liabilities and, where practical, the carrying amounts of each of those classes, determined in accordance with IFRSs, immediately before the combination;
- the amount of any excess of the acquirer’s interest in the net fair value of the identifiable assets, liabilities and contingent liabilities over the cost of the combination recognised in the income statement;
- a description of the factors that contributed to the recognition of goodwill (for example, unrecognised intangibles or buyer synergies);
- the amount of the acquiree’s profit or loss since the acquisition date included in the acquirer’s reported profit or loss for the period (period of ownership);
- the revenue and profit or loss of the combined entity for the period if the acquisition had taken place at the start of the period; and
- details of any adjustments arising from changes to provisional accounting, or other adjustments arising from business combination accounting.
16 Empowerment transactions
16 Empowerment transactions

Mining entities may make share grants where no identifiable goods or services are received in return. These share grants may be made as part of corporate social responsibility programs, or as required by local legislation designed to empower local communities. The economic benefits derived from an enhanced corporate image can take a variety of forms, such as attracting or retaining employees, or improving or maintaining the ability to do business with local suppliers.

Such share grants arise from the black economic empowerment (BEE) provisions in South Africa; legislation requires locally disadvantaged communities to have a minimum share ownership percentage in mining entities.

IFRIC 8 Scope of IFRS 2 addresses the accounting for such grants where no identifiable benefit is received in return for a grant of shares or options.

16.1 When does this apply?

Under a normal employee or supplier share-based compensation arrangement, a mining entity expects to receive goods or services in return for shares and options granted. IFRS 2 Share Based Payments requires an expense to be recognised, based on the fair value of shares and options granted (employees) or the fair value of goods and services received (suppliers). However, in all such instances an identifiable good or service is received.

For contributions made as part of a corporate responsibility program or BEE provisions, for example, IFRIC 8 notes that an unidentifiable benefit is typically considered to have been received. The only instance where no benefit is received is when the reason for the transfer of shares can clearly be identified as having no unidentifiable benefit. An example of this is where a principle shareholder transfers a tranche of shares for no consideration to a related entity for tax planning purposes.

16.2 How is the unidentifiable benefit measured?

IFRIC 8 presumes that the value of the unidentifiable benefit received equates to the difference between the fair value of the shares or options granted and any identifiable benefits received. For example, if disadvantaged community members can purchase shares at a bargain price, the unidentifiable benefit is the difference between the fair value of the shares and the price paid. If there is no consideration or identifiable benefits received, the value of the unidentifiable benefit is the fair value of the shares.

16.3 How is this benefit accounted for?

IFRIC 8 requires the benefit to be accounted for in accordance with IFRS 2; the benefit is treated as a share-based compensation expense. Where shares vest immediately, the benefit is presumed to have been received and is recognised as an expense.

16.4 Practical difficulties in application

Practical difficulties may arise in the application of this requirement. For example, suppose an entity awards $1,500 of shares to a local government in return for a five-year exploration licence. The fair value of the licence is $1,000, resulting in an unidentifiable benefit of $500. The licence should be recognised at its fair value of $1,000 and amortised over the useful life. However, it may be unclear how the unidentifiable benefit of $500 should be accounted for. It might be recognised and amortised over the same five-year period, or expensed in profit and loss.

In practice, it is unlikely (in the absence of any vesting conditions over the shares) that the unidentifiable benefit will meet the criteria for recognition as an asset – in which case it will have to be expensed.

In a BEE example, shares may be granted to BEE partners in order for an entity to obtain a BEE equity credential. The BEE equity credential is an intangible item that does not meet the IFRS definition of an intangible asset. It also is therefore expensed.
17 Leasing
17 Leasing

IAS 17 Leases excludes application to leases to explore for or use minerals. The exemption includes mineral leases, mining licenses, exploration and prospecting licenses. However, IAS 17 is applicable to mining entities that enter into other arrangements that are in substance a lease. Many mining entities enter into various arrangements that convey a right to use specific assets; these may need to be classified as leases. Examples of such arrangements include:

- service agreements;
- throughput arrangements;
- tolling contracts;
- energy-related contracts; and
- transportation service contracts.

17.1 When does a lease exist?

IFRIC 4 Determining whether an Arrangement contains a Lease establishes criteria for determining whether a contract should be designated as a lease.

The following conditions must be met for an arrangement to qualify for designation as a lease:

- fulfilment of the arrangement is dependent on the use of a specific asset; and
- the arrangement conveys the right to use the asset.

17.1.1 Use of a specific asset

A specific asset is identified either explicitly or implicitly. A specific asset is implicitly identified when:

- it is not economically feasible or practical for the supplier to use alternative assets;
- the supplier only owns one suitable asset for the performance of the obligation;
- the asset used needs to be at a particular location or is specialised; or
- the supplier is a special purpose entity formed for a limited purpose.

An arrangement that involves the use of assets located at a mine site, where the geographical isolation precludes any practical form of substitution of the assets, would normally meet this test.

17.1.2 Right to use the specific asset

The payment provision under an arrangement is analysed to determine whether payments are made for the right to use the asset, rather than for the actual use of the asset or its output. This requires a consideration of whether any of the following conditions are met:

- the purchaser has the ability (or right) to operate or direct others to operate the asset in a manner it determines while obtaining (or controlling) more than an insignificant amount of the output of the asset;
- the purchaser has the ability (or right) to control physical access to the asset while obtaining (or controlling) more than an insignificant amount of the output of the asset; and
- the purchase price is not a fixed/market price per unit of output, and it is remote that any third party will take more than an insignificant amount of the output of the asset.

Arrangements in which a mining entity takes substantially all of the output from a dedicated asset (such as an oxygen plant) will often meet one of the above conditions. This occurs regularly in the mining industry because of the remote location in which mines are often found.

For example, suppose a mining entity commits to pay a power station a fixed amount per annum, regardless of the amount of electricity generated. Where it is remote that a third party will take more than an insignificant amount of the electricity generated (for example, where the power station is located at a remote mine site and is not connected to the local electricity grid), the payments are made for the right to use the power station. Hence, the arrangement is classified as a lease.

17.2 What are the consequences of an arrangement that contains a right to use an asset?

When an arrangement is within the scope of IFRIC 4, cash flows under the arrangement must be separated into their respective components. The components frequently include the right to use the asset, service agreements, maintenance agreements, and fuel supply. The payments for the right to use the asset are accounted for as a lease in accordance with the guidance in IAS 17. This includes the classification of the right of use as either an operating lease or a finance lease.
The accounting for the other components is in accordance with the relevant guidance in IFRS.

17.2.1 Operating lease
If an arrangement contains an operating lease, the specific asset leased remains on the balance sheet of the lessor. However, operating lease payments are recognised on a straight-line basis over the life of the lease.

17.2.2 Finance lease
If an arrangement contains a finance lease, the specific asset leased is recorded on the balance sheet of the lessee and not the lessor. The lessor recognises a lease receivable, which falls within the scope of IAS 39.

17.3 Presentation and disclosure
IAS 17 sets out detailed disclosure requirements for leases. The more common disclosures required are set out below:

- a general description of an entity’s significant lease arrangements;
- the total of future minimum lease payments (and the present value of future minimum lease payments and a reconciliation for finance leases) for each of the following periods:
  - no later than one year;
  - later than one year and not later than five years; and
  - later than five years; and
- the carrying amount of assets held under finance leases.
18 Non-GAAP measures
18 Non-GAAP measures

Investors and analysts always desire more information about mining entities. Whilst IFRS sets out the form and content of a mining entity’s financial statements, management may wish to present investors with supplemental information in the form of non-GAAP measures. Most commonly, these comprise earnings before interest and tax (EBIT), earnings before interest, tax, depreciation and amortisation (EBITDA) and various forms of adjusted profit or underlying profit based on management’s view of meaningful information for investors. Another common non-GAAP measure in the mining industry is cash costs; for example, gold mining entities often present the cash cost per ounce of gold produced.

8. What are non-GAAP measures?

IFRS prescribes the form and required minimum disclosures in a mining entity’s income statement and associated notes. IAS 1 Presentation of Financial Statements also allows for further line items, headings and subtotals to be included in the income statement where such presentation is relevant to understanding by the reader.

Any measure not defined in IFRS is regarded as a non-GAAP measure, as it has no basis of calculation outlined in the literature. Many such measures may be common in an industry, but others may be unique to individual entities.

8.2 Can non-GAAP measures be used?

IFRS does not prohibit the use of non-GAAP measures. However, management need to consider local regulatory and listing rules requirements. Some countries entirely prohibit the use of such measures whereas others place restrictions on how non-GAAP measures are presented.

It is recommended that non-GAAP measures that are permitted by local regulatory requirements should be:

• carefully defined so that investors can make an assessment of comparability between companies; and
• presented on a consistent basis from one year to another.

Care should be exercised in selecting a name for each non-GAAP measure, to make sure the name is not misleading. In all cases, non-GAAP measures should be regarded as a supplement to, and not a replacement of, IFRS information.

It is also important that the presentation of such measures does not conflict with the requirement of fair presentation. Hence, they should not be given undue prominence or used to mislead investors.

18.2.1 Cash costs

Mining analysts use cash costs as a key measure of a mining entity’s performance. The idea is that cash costs:

• provide useful information about the efficiency of a mine and its position on the cost curve;
• allow a mine to be benchmarked against others in the industry; and
• enable investors to assess the mine’s ability to generate cash at different commodity prices.

There are no standards for calculating or reporting cash costs across the industry as a whole. However, the Gold Institute has published a voluntary standard for the reporting of cash costs for the gold industry. The key intention is to tabulate the costs of the mine on a per-unit of output basis; the standard is easily applied to other types of mining (not just gold).
## 18.2.1.1 The Gold Institute standard

<table>
<thead>
<tr>
<th>Cost Item</th>
<th>Per Ounce</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct mining expenses</td>
<td>x</td>
</tr>
<tr>
<td>Stripping and mine development</td>
<td>x</td>
</tr>
<tr>
<td>adjustments</td>
<td></td>
</tr>
<tr>
<td>Third party smelting, refining</td>
<td>x</td>
</tr>
<tr>
<td>and transport costs</td>
<td></td>
</tr>
<tr>
<td>By-product credits</td>
<td>x</td>
</tr>
<tr>
<td>Other</td>
<td>x</td>
</tr>
<tr>
<td><strong>Cash operating costs</strong></td>
<td>x</td>
</tr>
<tr>
<td>Royalties</td>
<td>x</td>
</tr>
<tr>
<td>Production taxes</td>
<td>x</td>
</tr>
<tr>
<td><strong>Total cash costs</strong></td>
<td>x</td>
</tr>
</tbody>
</table>
19 First-time adoption
19 First-time adoption

Applying IFRS presents challenges. The previous chapters in this book deal with accounting issues that affect mining entities on an ongoing basis. This chapter looks at specific mining issues relating to first-time adoption of IFRS.

19.1 Background

IFRS 1 First-time Adoption provides guidance to entities adopting IFRS for the first time. The key principle of IFRS is full retrospective application of all IFRS in force at the closing balance sheet date in an entity’s first IFRS financial statements. However, there are a number of exemptions that reduce the burden of retrospective application.

IFRS 1 requires entities to:
- identify clearly their first IFRS financial statements;
- prepare an opening balance sheet at the date of transition to IFRS;
- select accounting policies that comply with IFRS, and apply those accounting policies retrospectively to all of the periods presented in the first IFRS financial statements;
- consider whether to apply any of the optional exemptions from retrospective application and apply the mandatory exceptions; and
- make extensive disclosures to explain the transition to IFRS.

19.2 Common first-time adoption issues in the mining sector

The following table summarises some of the adjustments that are commonly made by entities in the mining sector on first-time adoption (excluding adjustments that apply to entities across all sectors).

<table>
<thead>
<tr>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deferred tax</td>
<td>Requirement to recognise deferred taxation on mining licenses/mineral leases on first-time adoption. The corresponding adjustment is taken to retained earnings.</td>
</tr>
<tr>
<td>Fair value as deemed cost</td>
<td>Entities may elect to revalue mining licenses/mineral leases to fair value on first-time adoption. The corresponding adjustment is taken to retained earnings. A higher depreciation expense is then incurred in future years.</td>
</tr>
<tr>
<td>Restoration and rehabilitation provisions</td>
<td>Requirement to recognise a provision (and a corresponding asset) on first-time adoption.</td>
</tr>
<tr>
<td>Embedded derivatives in contracts</td>
<td>Requirement to recognise embedded derivatives in mining-related contracts on the basis of the conditions that existed at the date it first became a party to the contract.</td>
</tr>
<tr>
<td>Hedging</td>
<td>Companies must comply with the strict hedging criteria before the transition date to apply hedge accounting in respect of derivatives. Derivatives that do not meet the hedging criteria are accounted for at fair value with subsequent adjustments recognised through the income statement.</td>
</tr>
</tbody>
</table>
Appendices
Appendix 1  Example disclosures

This appendix provides ‘accounting policies’ for topics that impact significantly on mining entities, together with some illustrative disclosures on ‘critical accounting estimates and judgements’ for a few key topics.

1 Summary of significant accounting policies

The principal accounting policies adopted in the preparation of the financial statements are set out below. These policies have been consistently applied to all the years presented, unless otherwise stated. The financial report includes separate financial statements for ABCD Holdings Limited as an individual entity and the consolidated entity consisting of ABCD Holdings Limited and its subsidiaries.

1.1 Basis of preparation

The separate and consolidated financial statements of ABCD Holdings Limited have been prepared in accordance with International Financial Reporting Standards (IFRS). These financial statements have been prepared under the historical cost convention, as modified by the valuation of available-for-sale financial assets and financial assets and financial liabilities (including derivative instruments) at fair value through profit or loss.

1.2 Impairment of assets

An impairment assessment is carried out annually for goodwill and indefinite lived intangibles. The group reviews and evaluates all other assets including property, plant and equipment for impairment when events or circumstances provide an indicator of impairment.

For the purpose of assessing impairment, assets are grouped at the lowest levels for which there are separately identifiable cash flows (cash-generating units).

When such events or changes in circumstances impact on a particular asset or cash-generating unit, its carrying value is assessed by reference to its recoverable amount being the higher of fair value less costs to sell and value in use. Value in use is calculated as the net present value of expected future cash flows of the relevant cash-generating unit.

The best evidence of an asset’s fair value is the value obtained from an active market or binding sale agreement. Where neither exists, fair value less costs to sell is based on the best available information to reflect the amount the group could receive for the cash-generating unit in an arm’s length sale. In some cases this is estimated using a discounted cash flow analysis. For the purposes of calculating value in use, cash-flow forecasts are based on detailed mine plans and operating budgets, modified as appropriate to meet the requirements of IAS 36 Impairment of Assets. Future cash flows reflect:

- future production estimates – which include proved and probable reserves, resource estimates and committed expansions;
- expected future commodity prices, based on current market price, forward prices and the group’s assessments of the long term average price; and
- future cash costs of production, capital expenditure and rehabilitation obligations.

If the carrying amount of the asset exceeds its recoverable amount, the asset is impaired and an impairment loss is charged to the income statement so as to reduce the carrying amount in the balance sheet to its recoverable amount.

A previously recognised impairment loss is reversed if the recoverable amount increases as a result of a reversal of the conditions that originally resulted in the impairment. This reversal is recognised in the income statement and is limited to the carrying amount that would have been determined, net of depreciation, had no impairment loss been recognised in prior years.

1.3 Property, plant and equipment

Property, plant and equipment is carried at cost less accumulated depreciation and any impairment charges. Depreciation is recorded over the useful life of the asset, or over the remaining life of the mine if shorter, as follows:

- Mining properties (including exploration, evaluation and development expenditure, and payments to acquire mineral rights and leases) and associated mining equipment – on a units of production basis;
- Buildings – x-y years on a straight line basis; and
- Processing equipment – a-b years on a straight line basis.

Depreciation charges are based on proved and probable reserves.
Estimates of residual values and useful lives are reassessed annually, and any change in estimate is taken into account in the determination of future depreciation charges.

1.4 Exploration and evaluation expenditure

Exploration and evaluation costs related to an area of interest are written off as incurred except they are carried forward as an asset in the balance sheet where the rights of tenure of an area are current and it is considered probable that the costs will be recouped through successful development and exploitation of the area of interest, or alternatively by its sale.

Capitalised costs include costs directly related to exploration and evaluation activities in the relevant area of interest. General and administrative costs are allocated to an exploration or evaluation asset only to the extent that those costs can be related directly to operational activities in the relevant area of interest.

Capitalised exploration and evaluation expenditure is written off where the above conditions are no longer satisfied.

Identifiable exploration assets acquired are recognised as assets at their fair value, as determined by the requirements of IFRS 3 Business Combinations. Exploration and evaluation expenditure incurred subsequent to the acquisition of an exploration asset in a business combination is accounted for in accordance with the policy outlined above.

All capitalised exploration and evaluation expenditure is assessed for impairment if facts and circumstances indicate that an impairment may exist. Exploration and evaluation assets are also tested for impairment once commercial reserves are found, before the assets are transferred to development properties.

1.5 Development expenditure

Development expenditure incurred by or on behalf of the group is accumulated separately for each area of interest in which economically recoverable resources have been identified. Such expenditure comprises cost directly attributable to the construction of a mine and the related infrastructure.

Once a development decision has been taken, the carrying amount of the exploration and evaluation expenditure in respect of the area of interest is aggregated with the development expenditure and classified under non current assets as “development properties”.

A development property is reclassified as a “mining property” at the end of the commissioning phase, when the mine is capable of operating in the manner intended by management.

No depreciation is recognised in respect of development properties until they are reclassified as “mining properties”.

Development properties are tested for impairment in accordance with the policy in note 1.2.

1.6 Mining properties

When further development expenditure is incurred in respect of a mining property after the commencement of production, such expenditure is carried forward as part of the mining property when it is probable that additional future economic benefits associated with the expenditure will flow to the consolidated entity. Otherwise such expenditure is classified as a cost of production.

Depreciation is charged using the units-of-production method, with separate calculations being made for each area of interest. The units-of-production basis results in a depreciation charge proportional to the depletion of proved and probable reserves.

Mine properties are tested for impairment in accordance with the policy in note 1.2.

1.7 Decommissioning and site rehabilitation

An obligation to incur decommissioning and site rehabilitation costs occurs when environmental disturbance is caused by exploration, evaluation, development or ongoing production. Costs are estimated on the basis of a formal closure plan and are subject to regular review.

Decommissioning and site rehabilitation costs arising from the installation of plant and other site preparation work, discounted to their net present value, are provided when the obligation to incur such costs arises and are capitalised into the cost of the related asset. These costs are charged against profits through depreciation of the asset and unwinding of the discount on the provision. Depreciation is included in operating costs while the unwinding of the discount is included as
a financing cost. Changes in the measurement of a liability relating to the decommissioning or site rehabilitation of plant and other site preparation work are added to, or deducted from, the cost of the related asset.

The costs for the restoration of site damage, which arises during production, are provided at their net present values and charged against operating profits as extraction progresses. Changes in the measurement of a liability which arises during production are charged against operating profit.

The discount rate used to measure the net present value of the obligations is the pre tax rate that reflects the current market assessment of the time value of money and the risks specific to the obligation.

1.8 Deferred stripping costs

Stripping costs comprise the removal of overburden and other waste products from a mine. Stripping costs incurred in the development of a mine before production commences are capitalised as part of the cost of constructing the mine and are subsequently depreciated over the life of the operation.

Stripping costs incurred during the production stage of a mine are deferred when this is considered the most appropriate basis for matching the costs against the related economic benefits. The amount deferred is based on the waste-to-ore ratio (‘stripping ratio’), which is calculated by dividing the tonnage of waste mined by the quantity of ore mined. Stripping costs incurred in a period are deferred to the extent that the current period ratio exceeds the expected life-of mine-ratio. Such deferred costs are then charged to the income statement to the extent that, in subsequent periods, the current period ratio falls below the life-of mine-ratio. The life-of-mine stripping ratio is calculated based on proved and probable reserves. Any changes to the life-of-mine ratio are accounted for prospectively.

Deferred stripping costs are included in the cost base of assets when determining a cash-generating unit for impairment assessment purposes.

1.9 Revenue recognition

Group policy requires all production to be sold under contract. Revenue is only recognised on individual shipments when persuasive evidence exists that the following criteria are satisfied:

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

Satisfaction of these conditions depends on the terms of trade with individual customers. Generally the risks and rewards are considered to have transferred to the customer when title and insurable risk of loss transfer.

Certain products are sold on a ‘provisional pricing’ basis where the sale price received by the group is subject to a final adjustment at the end of a period that may be up to 180 days after delivery to the customer. The final sale price is based on the market price on the quotational date in the contract of sale. Sales are initially recognised when the revenue recognition criteria have been satisfied, using market prices at that date. At each reporting date the provisionally priced shipment is marked to market based on the forward selling price for the quotational point specified in the contract until that point is reached. Revenue is only recognised on this basis where the forward selling price can be reliably measured.

Many of the group’s sales are subject to an adjustment based on inspection of the shipment by the customer. In such cases, revenue is recognised based on the group’s best estimate of the grade at the time of shipment, and any subsequent adjustments are recorded against revenue when advised. Historically, the differences between estimated and actual grade have not been significant.
2 Critical accounting estimates and judgements

2.1 Ore reserve estimates

The group’s disclosed reserves are its best estimate of product that can be economically and legally extracted from the relevant mining properties. Estimates are developed after taking into account a range of factors including quantities, ore grades, production techniques and recovery rates, exchange rates, forecast commodity prices and production costs.

The group’s estimates are supported by geological studies and drilling samples to determine the quantity and grade of each ore body. Significant judgement is required to generate an estimate based on the geological data available.

Ore reserve estimates are calculated based on [industry code of practice] which require the use of reasonable assumptions. Accordingly, reserves may be calculated on selling prices that vary from current market prices.

Ore reserve estimates may change from period to period. This may impact the group’s financial results. In particular, such changes in reserves may impact depreciation charges, asset carrying values, deferred stripping costs and rehabilitation provisions.

2.2 Decommissioning and site rehabilitation estimates

Provision is made for the costs of decommissioning and site rehabilitation costs when the related environmental disturbance takes place. Provisions are recognised at the net present value of future expected costs as outlined in Note 1.7.

The provision recognised represents management’s best estimate of the costs that will be incurred, but significant judgement is required as many of these costs will not crystallise until the end of the life of the mine. Estimates are reviewed annually and are based on current regulatory requirements and the estimated useful life of mines. Engineering and feasibility studies are undertaken periodically, however significant changes in the estimates of contamination, restoration standards and techniques will result in changes to provisions from period to period. The final cost of currently recognised rehabilitation provisions may be x% higher or y% lower than currently provided for based on the range of engineering estimates evaluated by management.

The discount rate currently applied in the calculation of the net present value of the provisions is z%. Rehabilitation expenditure is largely expected to take place at the end of the respective mine lives, which vary from x-y years.

2.3 Impairment

Estimates are required to be made in order to assess assets for impairment in accordance with note 1.2. These incorporate the expected future commodity price, estimates of ore reserves and projected future production costs.

The long-term [commodity] price currently used is $X. An x% increase or decrease to the long-term [commodity] price may impact the carrying value of assets should there not be a corresponding decrease in production costs through a reduction in input prices, a change in technology or management corrective action.

The discount rate currently applied is z%. An increase in the discount rate to y% may impact the carrying value of assets.

Ore reserve estimates are dependent on various factors, as set out in note 2.1.
Appendix 2  Glossary

Assay testing
Proportions of metal in ores or concentrates are determined using analytical techniques.

Care and maintenance
Mining operations are suspended because of a change in circumstances such as a lack of short term profitability.

Cash-cost
A measure of the average cost of producing a unit of output, calculated by dividing the total working costs (excluding corporate administration) in a period by total production over the same period. Working costs represent total operating costs less royalties and depreciation.

Closure
The cessation of mining activities and restoration of the site.

Concentrate
Material that has been processed to increase the content of the contained metal or mineral relative to the contained waste.

Crosscut
A mine working which is driven horizontally and at right angles to an adit, drift or level.

Crushing and grinding
The processes by which ore is broken into small pieces to prepare it for further processing.

Cut-off grade
The lowest grade of mineralised material that qualifies as ore in a given deposit.

Doré
A bar of intermixed gold and silver metals containing impurities. Doré is separated at a refinery into pure gold and silver bullion.

Forward sales
The sale of a commodity for delivery at a specified future date and price.

Grade
The relative quality or percentage of metal content.

Head grade
The total mineral content of the ore being fed into the process plant.

Indicated resources (which, where they are financially recoverable, are probable mineral reserves)
A mineral resource sampled by drill holes, underground openings, or other sampling procedures, at locations too widely spaced to ensure continuity, but close enough to give a reasonable indication of continuity and where geoscientific data are known with a reasonable level of reliability.

Inferred resources
An estimate, inferred from geoscientific evidence, drill holes, underground openings, or other sampling procedures, and before testing and sampling information is sufficient to allow a more reliable and systematic estimation. There is no equivalent reserve category for financially recoverable inferred resources.

Measured resources (which, where they are financially recoverable, are proved mineral reserves)
A mineral resource intersected and tested by drill holes, underground openings, or other sampling procedures, at locations which are spaced closely enough to confirm continuity and where geoscientific data are reliably known.

Mill
A machine used to grind ore.

Mine
Mines are the source of mineral-bearing material found near the surface (generally mined as open cuts) or deep in the ground (generally mined as undergrounds).

Mineral resources
Mineral resources are calculated for tonnage or volume from dimensions revealed in outcrops, pits, trenches, drill holes, or mine workings, and supported by other appropriate exploration techniques. The sites used for inspection sampling and measuring must be so spaced that the geological character, continuity, grades, and nature of the material are sufficiently well defined that the physical character, size, shape, quality and mineral content can be established to the degree needed to meet the appropriate resource classification.
Mineralisation
A deposit of rock containing one or more minerals for which the economics of recovery have not been established.

Open pit/open cut
Surface mining in which the ore is extracted from a pit.

Ore
Material that contains one or more minerals, at least one of which has commercial value and which can be recovered at a profit.

Ore body
A continuous well-defined mass of material of sufficient ore content to make extraction economically feasible.

Overburden
Waste sitting above the ore body.

Probable reserves
Those measured and/or indicated mineral resources which are not yet ‘proved’ but of which detailed technical and economic studies have demonstrated that extraction can be justified at the time of determination and under specific conditions.

Proved reserves
Those measured mineral resources of which detailed technical and economic studies have demonstrated that extraction can be justified at the time of determination and under specific conditions.

Recovery rate
Percent of total contained mineral values that are extracted into a saleable product.

Refining
The final stage of metal production in which remaining impurities are removed from the molten material by introducing air and fluxes. The impurities are removed as gases or as slag.

Resources
An identified in-situ mineral occurrence from which minerals may be recovered.

Sampling
Taking small pieces of rock at intervals along exposed mineralisation to determine mineral content.

Shaft
A mine-working (usually vertical) used to transport miners, supplies and equipment.

Slag
The waste substance formed in any one of several ways by chemical action and fusion at furnace operating temperatures.

Smelting
A metallurgical operation in which metal is further separated from impurities. A typical smelting operation involves furnacing and converting concentrates to separate the desirable components from other elements. The desirable components are sent to a refinery for further processing.

Spot price
The current price of a metal for immediate delivery.

Stockpile
A supply stored for future use.

Stope
The underground excavation from which ore is extracted.

Stripping ratio
The ratio of overburden and waste to ore in an open pit operation.

Stripping
The process of removing overburden or waste to expose ore.

Tailings
The waste material from ore after the economically recoverable metals and minerals have been extracted.

Waste
Rock lacking sufficient grade and/or other characteristics of ore probable of being commercially exploited.

Yield/recovered grade
The actual grade of ore realised after the mining and treatment process.
Appendix 3 PwC contacts

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