

# Real Time\*

International Financial Reporting Standards  
in the mining sector

\*connectedthinking

PRICEWATERHOUSECOOPERS 



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# Introduction

International Financial Reporting Standards (“IFRS”) have undoubtedly advanced the international transparency and comparability of financial statements. Many companies have now completed their transition projects, and have produced their first annual reports under IFRS. Drawing on their experiences, it is a good time to reflect on some of the challenges that entities face in applying IFRS to the mining industry.

It is now widely accepted that the task of interpreting and applying IFRS will be a continual challenge, rather than a one-off issue arising on first-time adoption. For the mining industry, there are some unique interpretation and application problems. The industry is characterised by a need for large up-front investment, with low success rates on exploration spending and long lead times on new projects. It also faces significant back-end costs, when mines are eventually closed, in terms of decommissioning the processing facilities, rehabilitating the sites, dealing with residual environmental issues and managing obligations to the workforce and local communities. There are many activities in mining which result in saleable production but also contribute towards the development of the mine, and hence deliver longer term benefits as well. These are just some of the factors that complicate the application of IFRS to the mining industry.

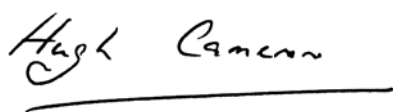
IAS 39 Financial Instruments: Recognition and Measurement can have a major impact on a mining company’s financial statements – not only through the accounting for derivatives (such as forward contracts to purchase or sell commodities and foreign currency, or interest rate and currency swaps), but also through the rules affecting derivatives which reside within a non-derivative “host” contract (so-called “embedded derivatives”).

The interaction with US GAAP, and the move towards convergence, brings further challenges in interpreting IFRS – at a time when the Securities and Exchange Commission (“SEC”) is also taking an active interest in how US GAAP should be applied to the mining industry.

An Extractive Activities working group has been formed by the International Accounting Standards Board (“IASB”), and therefore formal guidance may be provided in respect of many of the issues we highlight in this report. However, this guidance is not expected for several years, and in the meantime decisions need to be taken by the mining entities reporting under IFRS. Without specific guidance, there are many areas in which practice could vary across the industry. In such cases, the disclosure of an entity’s accounting policies, and also the consistent application of those policies, is critical.

Against this background, Real Time highlights some of the key areas of difficulty that impact specifically on the mining industry under IFRS. It also provides some insight into how companies are dealing with these issues, through examples of the accounting policies included in published IFRS financial statements.

We hope you enjoy reading this publication, and we hope it will help the mining industry in setting an agenda of topics for future discussion with the standard setters.



**Hugh Cameron**  
Global Mining Leader  
PricewaterhouseCoopers



**Brian Taylor**  
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# 2. Financial instruments in the mining sector

## 2.1 An outline of IAS 39

In the past, there have been some notable corporate failures which arose because long term contracts were entered into which then resulted in significant losses. Under the accounting practices adopted by these companies, such contracts were not always fully valued and recognised in the financial statements. The IASB decided that a change was needed to address this.

A core principle of IAS 39 is that all “derivatives” must be recorded on the balance sheet at fair value, with gains and losses from re-measurement recorded in the income statement (unless the complex qualifying criteria for hedge accounting can be met). This raises a number of challenges for the mining industry, as follows:

- Although this rule does not apply to “own use” contracts, within the mining sector a wide variety of contracts can potentially meet the definition of a derivative.
- If the entity qualifies for hedge accounting, the hedging instrument gains and losses are either matched against the losses/gains to which they relate or they are recognised through equity until the hedged item affects the income statement. However, this is only permitted where strict documentation standards and other requirements are complied with, and this can involve a lot of work for mining entities with extensive hedging programmes.
- Many in the industry believe that IAS 39 provides a one-sided view of the situation – because changes in the value of derivatives are reflected in the financial statements immediately, while the offsetting changes in the value of the hedged item (namely the ore 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 and whilst the industry recognises this logic, it remains concerned that measurement issues are too significant to lead to meaningfully consistent or useful results.
- Due to the nature of their products and operations, mining entities are often party to commercial contracts which potentially contain embedded derivatives.

In summary, it might be tempting for a mining entity which is solely engaged in producing, refining and selling commodities to assume that it will be outside the scope of IAS 39. However, this is often not the case.

## 2.2 Definition of a derivative

A derivative is defined in IAS 39 as a financial instrument or other contract that possesses each of the following three characteristics:

- The value of the contract changes in response to changes in an “underlying”;
- Little/no initial net investment is required; and
- Future settlement.

Many contracts in the mining industry potentially meet the definition of a derivative. Common industry examples include long-term commodity sales contracts and long-term contracts to purchase electricity or diesel.

Only contracts that are “net” settled (in cash or another financial instrument) are within the scope of IAS 39, but the guidance in the standard means that this includes some of the commodities that are purchased and sold by mining entities. Contracts that are held in accordance with an entity’s “expected purchase, sale or usage requirements” are usually outside the scope of IAS 39 and qualify for “own-use” accounting. The main criteria that must be met to qualify for “own use” accounting are as follows:

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

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

However, the second criterion can be problematic for mining entities because many contracts used in the industry are capable of being financially settled. A past practice of financial settlement of similar contracts precludes a class of contracts from qualifying for “own use” accounting.

## 2.3 Embedded derivatives

Where contracts qualify for “own use” accounting, they must still be assessed for the existence of embedded derivatives. 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”.

Mining entities are often party to commercial contractual arrangements which contain “embedded derivatives” within the host contracts.

For example, any contract indexed to market-based variables - such as inflation (e.g. a consumer price or labour index), commodity prices (e.g. the price of coal in an electricity supply contract) or foreign exchange rates (e.g. where the contract is denominated in a currency other than the entity’s functional currency) - would potentially contain an embedded derivative which must be recognised and measured at fair value.

The measurement criteria of the standard does not apply to embedded derivatives which are “closely related” to the “economic characteristics and risks of the host contract”. In all other cases, however, the embedded derivative must be separated from

the host contract and accounted for at fair value – even though the host contract will not be recognised in the financial statements until a future accounting period, when the relevant good/service is received/delivered.

The “closely related” concept must be applied to all of the commercial contracts within the mining sector that contain embedded derivatives. However, most of the examples in the standard on how the “closely related” concept should be applied relate to the financial services sector and judgement must be applied.

The following examples illustrate some of the types of embedded derivatives that arise in the mining industry, and provides guidance on how they should be accounted for under IAS 39:

Example contract	Embedded derivative	Is it closely related?	Accounting outcome
South African mining company (Rand functional currency), with gold sale contract denominated in US\$.	Yes - Rand: US\$ forward.	Yes - because certain commodities (e.g. gold) are routinely denominated in the US\$ in transactions around the world.  However, this does not apply to all commodities that are sold by mining entities.	No need to separate and fair value.  For some other commodities, however, if the sales contract is denominated in a currency which differs from the entity’s (or the relevant counterparty’s) functional currency then it will contain an embedded derivative that has to be fair valued.
Australian mining company (Aus\$ functional currency), with a contract to purchase equipment from a Japanese supplier (Japanese Yen functional currency) in US\$.	Yes – Aus\$: US\$ forward.	No - because the US\$ is not the functional currency of either party to the contract, nor could it be readily argued that such contracts are routinely denominated in US\$.	Separate the Aus\$: US\$ forward from the host contract, and account for at fair value.
Russian mining company (Russian Rouble functional currency) has a service contract denominated in US\$.	Yes - Russian Rouble: US\$ forward.	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.	No need to separate and fair value.
Australian mining company has an electricity supply contract for its aluminium smelter indexed to the LME aluminium price.	Yes - aluminium forward.	No - because the index is not closely related to the relevant economic characteristics of the host contract, relating to the supply of electricity. Hence the exemption cannot be applied even though the index is relevant to the smelter.	Separate the aluminium forward from the host contract and account for at fair value.



## 2.4 Impairment and IAS 39

IAS 39 can also complicate how asset impairment calculations are performed in the mining industry. Mining entities often enter into contracts to protect the future revenue streams from their production. If those contracts were held off balance sheet, the future cash flows from the contracts would be included in the cash flow forecasts in determining Value in Use under IAS 36 Impairment.

Under IAS 39, however, all contracts which are derivatives are recognised on the balance sheet at fair value. As the expected future cash flows arising from derivatives are recognised as a separate asset (or liability), they cannot be included in calculating impairment provisions under IAS 36 as well. Otherwise they would be double-counted. This also 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 price curves used in an entity's Value in Use calculation, under IAS 36, must be the same market price curves used in the valuation of its derivative contracts under IAS 39.



# 3. Exploring the mining sector

For understandable reasons, IAS 39 has received a lot of focus when companies adopt IFRS for the first time. However, there are a number of other areas in which challenges can arise in applying IFRS. With the exception of IFRS 6 Exploration for and Evaluation of Mineral Resource, there is no specific guidance for mining activities, and some of the literature is difficult to apply in the specific situations that arise in the mining sector.

## 3.1 Exploration and evaluation

### 3.1.1. Capitalisation Policy

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 on the site and commercial mining production can commence. The phases before production begins can take many years and involve significant costs, and most exploration and evaluation projects do not result in a mining operation. The appropriate accounting treatment of these costs is therefore critical.

A variety of practices have historically been adopted in the accounting for exploration and evaluation expenditure. Some mining entities have capitalised all exploration and evaluation expenditure as a matter of policy - whilst others have written off the costs as incurred until a decision was made that commercial exploitation is probable, from which point the costs have been capitalised. Another approach has been to provide in full against exploration costs; if a project was later abandoned, the associated costs have been written off against this provision, whereas if the project was developed into a mine, the provision has been reversed.

IFRS 6, which specifically deals with such expenditure, allows mining entities to retain their existing accounting policies for the capitalisation of exploration and evaluation costs. The costs capitalised under these policies might not meet the IFRS Framework definition of an asset because, for example, the capitalisation criteria followed previously might not require the demonstration of probable future economic benefits. As a result, IFRS 6 may allow mining entities to capitalise expenditure



earlier than would otherwise be the case under the IFRS Framework. In this respect, it is important to note that IFRS 6 only applies to exploration and evaluation costs and not development costs.

IFRS 6 is applicable for annual periods beginning on or after 1 January 2006, but most entities adopting IFRS for the first time have early adopted IFRS 6 in order to preserve the policies followed under their previous GAAP. Unless a first-time adopter applies IFRS 6 straight away, it has to align its policies for the capitalisation of exploration and evaluation expenditure with the IFRS Framework – meaning that costs should only be carried forward on the balance sheet if it can be demonstrated that it is probable (under the Framework) that a future economic benefit will flow to the entity.

IFRS 6 is only a temporary solution until the IASB has time to consider the issue in more detail as part of its Extractive Activities project. In the meantime, it seems likely that IFRS 6 will protect the divergent accounting practices which previously existed across the industry. That said, IFRS 6 does not allow mining entities which already apply IFRS to depart from the IFRS Framework and capitalise costs before a future economic benefit is probable. This is because entities can only change their policy on the capitalisation of exploration and evaluation costs if the new policy is more relevant and no less reliable, or more reliable and no less relevant. This test cannot be met if the new policy is less consistent with the Framework.

### 3.1.2 Impairment of exploration and evaluation assets

There are inherent difficulties in obtaining the information necessary to estimate future cash flows from exploration and evaluation assets. Accordingly, IFRS 6 introduces an impairment testing regime for such assets which differs from the rules set out in IAS 36.

The standard requires mining entities to assess exploration and evaluation assets for impairment

#### Example

Entity X is involved in gold exploration and production. It has two producing mines (A and B) and three exploration sites (C, D and E). Management expect that exploration site C and producing mine A will be operationally dependent if commercial viability is established at exploration site C, due to the use of common infrastructure. In addition, they expect that exploration sites D and E and producing mine B will be operationally dependent if commercial viability is established at the exploration sites, again due to the use of common infrastructure.

Sites A, B, C, D and E are all within the same segment for IAS 14 purposes.

On 30 June 2006, there is a significant downward revisions to the resource estimates for exploration sites C and D. Under IFRS 6, this is a “fact and circumstance” for which an impairment assessment is required. How can Entity X’s management group the sites for the purposes of the impairment test?

#### Solution

Management could decide to group exploration site C with producing mine A, and to combine exploration sites D and E with producing mine B. This would reflect the expected future interdependency of these sites. Alternatively, they could decide to group exploration sites C, D and E with mines A and B on the basis that this is the largest grouping available within the same segment. Another option would be to consider each exploration site separately without any grouping. Clearly this decision could have a significant impact on whether an impairment charge is recognised.

Whichever level of grouping Entity X’s management chooses, it must then apply the same approach to grouping for IFRS 6 impairment testing from period to period.

## Real Time Spotlight

### Anglo American

#### Research and exploration expenditure

Research and exploration expenditure is written off in the year in which it is incurred. When a decision is taken that a mining property is economically feasible and should be developed for commercial production, all further directly attributable, pre-production expenditure is capitalised within tangible assets. Capitalisation of pre-production expenditure ceases when the mining property is capable of commercial production. Capitalised pre-production expenditure prior to commercial production is assessed for impairment in accordance with the Group accounting policy stated above.

when facts and circumstances suggest that the carrying amount of the assets may exceed their recoverable amount. The impairment assessment is performed in accordance with IAS 36, however the level at which the assessment is performed can differ from IAS 36. Specifically, IFRS 6 allows mining entities to group exploration assets with producing assets for the purposes of impairment testing, as long as they establish a policy for this. The only limit specified is that each cash generating unit, or group of cash generating units, to which an exploration and evaluation asset is allocated for impairment testing should not be larger than a segment as defined under IAS 14 Segment Reporting.

This offers mining entities a lot more flexibility than might otherwise have been the case, as illustrated by the example alongside.

## 3.2 Development

### 3.2.1 Start up costs

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. In these situations, a key question which arises under IFRS is how the revenues and costs incurred during the commissioning period should be accounted for.

IAS 16 Property, Plant and Equipment requires that costs can only be capitalised if they are “directly attributable” to the asset, and it also states that revenue from saleable material produced during the testing phase should be deducted from the cost of constructing the asset. So what does this mean for a mine with an extended commissioning period? In commissioning a new block caving mine, for example, in which the production rate increases as the cave goes higher, how should the entity determine which costs are directly attributable to enhancing the operating capability of the asset and those which represent costs of producing saleable material? This can be a difficult judgement.

One option might be to regard all costs and revenues as operating items, and report a large trading loss. This ignores the reality that a substantial proportion of the costs will deliver future economic benefit.

It is also questionable whether all revenues earned during the commissioning period, particularly if they are substantial, should be deducted from the cost of developing the mine. This would only be appropriate if it can clearly be shown that 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. The example in IAS 16 of what might fall into this category is revenues earned from sales of samples produced when testing equipment. This would suggest that the standard setters did not envisage a situation where more than an insignificant amount of revenue would be treated in this way.

This is a good example of a topic for which the IFRS accounting rules do not cater for the specific complexities of the mining industry. IFRS has been drafted on the assumption that expenditure can be attributed to a specific purpose. In this situation, however, expenditure is being incurred which generates saleable production and also forms an essential part of the development of the mine.

### 3.2.2 Decommissioning and restoration costs

IAS 37 Provisions, Contingent Liabilities and Contingent Assets provides guidance on how to account for decommissioning, restoration and similar liabilities, which can be significant for mining entities. In addition, IFRIC 1 Changes in Existing Decommissioning, Restoration and Similar Liabilities contains specific rules on how revisions to these liabilities should be accounted for. In applying the requirements of IAS 37 and IFRIC 1, there are a number of areas where careful consideration is required.

The timing of when to recognise a liability is not

## Real Time Spotlight

### Xstrata

#### Capital work in progress

Assets in the course of construction are capitalised in the capital work in progress account. On completion, the cost of construction is transferred to the appropriate category of property, plant and equipment. The cost of a property, plant and equipment comprises its purchase price and any costs directly attributable to bringing it into working condition for its intended use. Costs associated with a start up period are capitalised where the asset is available for use but incapable of operating at normal levels without a commissioning period. Capital work in progress is not depreciated.

### Rio Tinto

#### Property plant and equipment

Costs associated with commissioning new assets, in the period before they are capable of operating in the manner intended by management, are capitalised. Development costs incurred after the commencement of production are capitalised to the extent they give rise to a future economic benefit. Interest on borrowings related to construction or development projects is capitalised until the point when substantially all the activities that are necessary to make the asset ready for its intended use are complete.

always straightforward. Mining entities may be tempted to recognise decommissioning liabilities when a new mine enters commercial production. In practice, however, a liability should normally be recognised at the development stage. Much of the work undertaken to prepare for mining operations will trigger a decommissioning obligation – even without any production taking place. A liability may also arise from evaluation work, however, the damage is often considered immaterial.

Measurement of the liability can also be difficult. Closure plans are typically based around the expected footprint of a mining operation when it comes to an end. IAS 37 requires that the liability at each period end should reflect the condition of the assets (including the mine site) on that date – and so the amount recognised should not reflect expected future disturbance. Judgement is also required in assessing the remediation work that will be required, since the detailed discussions about closure plans often do not take place until the closure is imminent. In this respect, the minimum standards imposed by the regulators vary over time, and from location to location.

Adjustments to the decommissioning liability (other than the unwind of the discount) should be allocated to the related items of property, plant & equipment and then depreciated over the useful lives of those assets. This can result in a lot of work for mining entities, to ensure that the initial obligations (and then also the adjustments) are allocated correctly.

Another potential area of difficulty concerns the treatment of any significant adjustments to a decommissioning liability towards the end of a

mine's life. A significant increase in the liability arising from a reassessment of the estimated cost, or perhaps an increase in the requirements imposed by the regulators, may result in the recognition of a corresponding asset. It is possible that the recognition of an additional asset towards the end of the life of a mine could push the carrying value of the mine above its Recoverable Amount (as defined in IAS 36). If so, an impairment charge would have to be recognised. As a result, any significant increase to the decommissioning liability in the latter years of an operation should be considered as a potential impairment trigger.

Conversely, a significant decrease to a decommissioning liability might mean that the corresponding reduction in the asset actually exceeds the depreciated value of the amounts previously capitalised. Under IFRIC 1, the carrying value of the asset cannot be reduced below zero, and so the excess amount has to be recognised as a credit to the income statement.

Another issue that arises is whether deferred tax can be recognised in respect of decommissioning assets and liabilities. Deferred tax must be recognised in full on decommissioning assets and liabilities in a business combination. However, the position is less clear cut for decommissioning assets and liabilities arising from an entity's own capital projects.

Some entities have taken the view that the amounts recognised initially, or on subsequent revisions to the cost estimates, fall within the scope of the "initial recognition exemption" in IAS 12 Income Taxes. As the asset and liability do not affect accounting profit or taxable profit when first recognised, the

## Real Time Spotlight

### Rio Tinto

#### Provisions for close down and restoration and for environmental clean up costs

Close down and restoration costs include the dismantling and demolition of infrastructure and the removal of residual materials and remediation of disturbed areas. Estimated close down and restoration costs are provided for in the accounting period when the obligation arising from the related disturbance occurs, whether this occurs during the mine development or during the production phase, based on the net present value of estimated future costs. Provisions for close down and restoration costs do not include any additional obligations which are expected to arise from future disturbance. The costs are estimated on the basis of a closure plan. The cost estimates are calculated annually during the life of the operation to reflect known developments, eg updated cost estimates and revisions to the estimated lives of operations, and are subject to formal review at regular intervals.

Close down and restoration costs are a normal consequence of mining, and the majority of close down and restoration expenditure is incurred at the end of the life of the mine. Although the ultimate cost to be incurred is uncertain, the Group's businesses estimate their respective costs based on feasibility and engineering studies using current restoration standards and techniques.

conclusion they have reached is that deferred tax should not be recognised - although the accretion in the provision from unwinding the discount does impact on accounting profit and so results in a deferred tax asset.

The International Financial Reporting Interpretations Committee (“IFRIC”) considered a similar question in 2005, namely whether the IAS 12 initial recognition exemption applies to the recognition of finance leases. IFRIC acknowledged that there is diversity in practice in whether the initial recognition exemption is applied to finance leases, but decided not to issue an interpretation because of the IASB’s short-term convergence project with the US Financial Accounting Standards Board (“FASB”). Accordingly, some mining entities have taken the alternative view that the IAS 12 initial recognition exemption should not be applied to decommissioning liabilities (and assets) or finance leases. This is also acceptable. However, mining entities need to adopt a consistent policy on deferred tax accounting for decommissioning liabilities (and assets) and finance leases.

### 3.3 Extraction

#### 3.3.1 Reserve base for accounting

Reserves and resources are the source of the value generated by mining entities. They need reserves and resources to deliver future production and future cash inflows.

The amount recognised on the balance sheet in respect of an entity’s reserves and resources asset is normally based on historical cost, and is normally

a lot lower than market value. Some people argue that mining entities should be required to fair value their reserves and resources each year, with the “profit” for the year reflecting the movement in the value of the reserves and resources (such as the discovery of new reserves) rather than the current year’s production activities. Indeed, the IASB is considering this concept as part of its Extractive Activities project. The industry recognises this logic but remains concerned about measurement issues - the inherent difficulty in preparing reliable estimates for the fair value of reserves and resources, concerns about the lack of comparability between entities, and the scope for manipulation of the annual fair value estimates.

Even under the historical cost concept, however, reserves and resources still have a pervasive impact on a mining entity’s financial statements. In particular, they need to be taken into account in assessing:

- The annual charge for depreciation and amortisation.
- The calculation of deferred stripping adjustments.
- The determination of impairment charges (and reversals) under IAS 36.
- The expected timing of future decommissioning and restoration cash flows (which impacts on the discounted value of those obligations).
- The allocation of the purchase price in business combinations.
- The capitalisation of exploration and evaluation costs.

## Real Time Spotlight

### Gold Fields

#### Mineral resource and ore reserve statement

##### Assessment and reporting criteria

The assessment and reporting criteria as outlined in the SAMREC Code and the group’s internal code of practice have been used in the preparation of an internal Competent Persons Report for Resources and Reserves, from which the numbers recorded in this report are drawn.

The following key assumptions and parameters were

used as a basis for estimation in this declaration unless otherwise stated. Assumed Reserve gold prices are in accordance with the guidelines outlined by the SEC and approximate to historical three year average commodity prices and exchange rates.

	F2005		F2004	
	Resource price assumption	Reserve price assumption	Resource price assumption	Reserve price assumption
South Africa	R105,000/kg	R92,000/kg	R115,000/kg	R90,000/kg
Ghana	US\$450/oz	US\$375/oz	US\$400/oz	US\$350/oz
Australia	A\$650/oz	A\$560/oz	A\$650/oz	A\$580/oz

# Real Time Spotlight

## Gold Fields

### Reconciliation of Mineral Resources and Ore Reserve

SA summary year-on-year reconciliation of significant variations in the Resource and Reserve Statement for operating mines is shown in the two accompanying tables. The figures have been corrected to take cognisance of plant recovery, leach pad and mine call factors.

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### Mineral Resources

Attributable Resource reconciliation ('000 oz)	F2004	Mine depletion from Resource*	Growth**	F2005
Driefontein	45,413	1,281	333	44,465
Kloof	84,646	1,236	(13,417)	69,993
Beatrix	21,983,783	(4,225)	16,975	
<b>South Africa</b>	<b>152,043</b>	<b>3,300</b>	<b>(17,309)</b>	<b>131,433</b>
Tarkwa	14,334	648	208	13,894
Damang	1,300	193	377	1,484
St Ives	7,680	629	(1,911)	5,140
Agnew	2,676	226	667	3,117
International	25,990	1,696	(659)	23,635
<b>Grand total</b>	<b>178,033</b>	<b>4,996</b>	<b>(17,968)</b>	<b>155,068</b>

\*Adjusted for Mine Call Factor and Plant Recovery

\*\*Growth includes discovery, improved resource modelling, reduced paylimits, revised parameters and changes in the average long-term gold price.

### Ore Reserves

Attributable Reserve reconciliation ('000 oz)	F2004	Mine depletion from Reserve*	Growth**	F2005
Driefontein	23,617	1,157	916	23,376
Kloof	27,265	1,039	(11,272)	14,954
Beatrix	9,804	639	(959)	8,206
<b>South Africa</b>	<b>60,686</b>	<b>2,835</b>	<b>(11,316)</b>	<b>46,536</b>
Tarkwa	10,473	648	(293)	9,532
Damang	613	193	536	956
St Ives	3,068	629	77	2,516
Agnew	712	226	375	861
International	14,866	1,696	694	13,864
<b>Grand total</b>	<b>75,552</b>	<b>4,531</b>	<b>(10,621)</b>	<b>60,400</b>

\*Adjusted for Plant and Leach Pad Recovery

\*\*Growth includes discovery, improved resource modelling, reduced paylimits, revised parameters and changes in the average gold price



## Real Time Spotlight

### Rio Tinto

#### Depreciation and impairment

In applying the units of production method, depreciation is normally calculated using the quantity of material extracted from the mine in the period as a percentage of the total quantity of material to be extracted in current and future periods based on proved and probable reserves and, for some mines, other mineral resources.

Such non reserve material may be included in depreciation calculations in limited circumstances and where there is a high degree of confidence in its economic extraction. Development costs that relate to a discrete section of an ore body and which only provide benefit over the life of those reserves are depreciated over the estimated life of that discrete section. Development costs incurred which benefit the entire ore body are depreciated over the estimated life of the ore body.

### Anglo American

#### Useful economic lives of assets and ore reserves estimates

The Group's mining properties, classified within tangible assets, are depreciated over the respective life of mine using the unit of production (UOP) method based on proven and probable reserves. When determining ore reserves, assumptions that were valid at the time of estimation may change when new information becomes available. Any changes could affect prospective depreciation rates and asset carrying values.

A key judgement that needs to be made is whether the accounting measures should reflect resources that have not yet been classified as reserves. This is considered further below in relation to the calculation of depreciation. However, there will certainly be some situations where it is appropriate to include resources. For example, an entity's resources are likely to have a disposal value and, if so, will impact on the determination of a mine's Recoverable Amount under IAS 36. It is also commonplace for entities to attribute value to resources in a business combination, as this is usually more appropriate than recognising "goodwill".

In addition, one of the challenges facing the industry is that there is no global standard for the determination of reserves and resources. Without consistency in this critical area, there is clearly a limit on the extent to which IFRS can achieve comparability in the financial reporting by mining entities. Most mining entities provide some disclosure of their reserves and resources in line with local listing requirements. This disclosure is contained in the annual report, not the financial statements, but the disclosure provided is not consistent across the industry.

#### 3.3.2 Depreciation basis

There are various methods that can be used for depreciating property, plant and equipment in the mining industry. Under IAS 16, the method used should reflect the pattern in which the asset's future economic benefits are expected to be consumed by the entity.

The future economic benefits for some mining assets are closely matched to the production throughput or output – for example, the benefits associated with a crusher are linked to ore throughput. For other assets (such as administration office buildings), the benefits do not directly relate to production.

The most common depreciation methods are:

- The straight-line method, which results in an equal annual depreciation expense over the asset's useful life.
- The units-of-production method, in which the depreciation expense reflects the pattern of reserve/resource depletion or throughput.
- The diminishing balance method, which results in a decreasing depreciation expense over the useful life of the asset.

Conceptually, one would expect a lot of mining assets to be depreciated on a units-of-production basis. Certainly this is the most appropriate method for depreciating mining properties, with the annual charge reflecting the amount produced each year. However, some entities depreciate all or most of their mining equipment on a straight-line basis

which is much simpler to apply. This needs to be considered on a case-by-case basis, but where equipment is operated at full capacity throughout its economic life, for example, the straight-line method is unlikely to give a materially different result from a units-of-production basis.

An essential decision in determining the appropriate depreciation charge for a mining entity is the reserve/resource base. This applies even where depreciation is charged on a straight-line basis, because the reserve/resource base has a major impact on the expected life of the mine.

Many mining entities only take account of proved and probable reserves in calculating depreciation charges. This is easily supported by prudence. However, some entities determine the most appropriate reserve base for each mine based on the type of mineral and the characteristics of the deposit.

Of course, care needs to be taken when including non-reserve material in the depreciation base. The key consideration for including such non-reserve material is the degree of certainty of converting resource to reserve. Some specific factors to consider include:

- The entity's history of proving-up resources into reserves.
- The type of deposit – for example, it is easier to justify taking account of non-reserve material for bulk commodities such as coal and iron ore.
- The relevant timeframe – including how quickly it is intended that the additional resource will be proved-up and mined.

- The extent to which the resource is currently accessible or will require additional development expenditure.

Consideration also needs to be given to whether the method for calculating depreciation should take account of future capital expenditure that will be required to access all the reserves and resources that are reflected in the depreciation base. In the absence of specific guidance, practice across the mining industry varies. The more prudent approach is to allow for such future expenditure, as otherwise the depreciation charges will increase over time as more costs are capitalised. Interestingly, however, the SEC does not allow mining entities to take account of future capital expenditure when they report under US GAAP.

### 3.3.3 Deferred stripping

Mining entities often need to remove overburden and other waste materials to access ore reserves. The costs they incur are referred to as “stripping costs”. During the development of a mine (before production begins), the stripping costs are capitalised as part of the depreciable cost of constructing the mine. Those capitalised costs are then depreciated over the productive life of the mine.

For many “open pit” mines, stripping costs continue during the production phase of the mine as it is not necessary or economic for them all to be incurred up-front.

The accounting practice for stripping costs varies, mainly because in some situations the stripping

## Real Time Spotlight

### BHP Billiton

#### Deferred overburden removal costs

Stripping ratios are a function of the quantity of ore mined compared with the quantity of overburden, or waste, required to be removed to mine the ore. Deferral of costs to the Balance Sheet is made, where appropriate, when actual stripping ratios vary from average stripping ratios. Deferral of costs to the Balance Sheet is not made when the waste to ore ratio is expected to be consistent throughout the life of the mine.

Costs which have previously been deferred to the Balance Sheet (deferred overburden removal costs) are included in the Income Statement on a unit of production basis utilising average stripping ratios. Changes in estimates of average stripping ratios are accounted for prospectively from the date of the change.

As it is not possible to separately identify cash inflows relating to deferred overburden removal costs, such assets are grouped with other assets of a cash generating unit for the purposes of undertaking impairment assessments, where necessary, based on future cash flows for the operation as a whole.

### Anglo American

#### Tangible assets

Stripping costs incurred during the production phase to remove additional overburden or waste ore are deferred when they give access to future economic benefits and charged to operating costs using the expected average stripping ratio over the average life of the area being mined. The average stripping ratio is calculated as the number of tonnes of waste material expected to be removed during the life of mine, per tonne of ore mined. The average life of mine cost per tonne is calculated as the total expected costs to be incurred to mine the orebody divided by the number of tonnes expected to be mined. The average life of mine stripping ratio and the average life of mine cost per tonne is recalculated annually in light of additional knowledge and changes in estimates. The cost of stripping in any period will therefore be reflective of the average stripping rates for the orebody as a whole. Changes in the life of mine stripping ratio are accounted for prospectively as a change in estimate.

costs are evenly spread over the mine life whereas in others they fluctuate significantly from year-to-year. Where the costs are spread evenly, entities tend to treat them as a production cost for the year in which they are incurred. In other cases, mining entities often defer any “excess” stripping costs incurred in the earlier years of a mine’s life and then amortise those costs in later years when less is spent on waste removal. Various different methods have evolved within the industry to calculate the amounts to defer (and then amortise), but they all are based around a comparison of the current year ratio of “waste to ore extracted” (or “waste to saleable production”) against the expected average ratio over the life of mine or relevant phase.

Under IFRS, there is no clear guidance on what approach should be adopted – indeed, IAS 16 does not apply to mineral rights and reserves. There is support for deferring production-stage stripping costs in situations where they are a necessary part of gaining access to sections of the orebody that will not be mined until future periods. The difficulty with the industry approach is that it uses the waste ratio to determine how much stripping activity should be attributed to future production. This builds in an assumption that stripping costs will be equalised over time. Some would question whether this is an appropriate benchmark.

Until recently, deferral of stripping costs has been permitted under US GAAP. However, in March 2005 the US FASB’s Emerging Issues Task Force published EITF 04-06: Accounting for Stripping Costs Incurred during Production in the Mining Industry. Going forward, this will prohibit the deferral

of production-stage stripping costs as a non-current asset and instead require that they are treated as a variable production cost for US GAAP.

When stripping costs fluctuate significantly, mining entities argue strongly that it is appropriate for the excess costs to be attributed to future production. The current methodology may be imperfect, but the industry still considers that it better reflects the reality of how mines are developed than the alternative of treating all waste removal as a current year production cost. A concern within the industry is that the IASB might adopt the requirements of EITF 04-06, in the interests of international harmonisation.

### 3.3.4 Long term stockpiles

Mining entities often stockpile low grade ore extracted from the mine until after the higher grade ore has been extracted and processed. This maximises the volume of saleable material, and hence the cash inflows, in the short term. In some cases, these low grade ore stockpiles are not processed for many years – indeed, processing may not commence until mining operations have ceased and hence no new ore is being extracted.

An issue arises as to how the costs associated with extracting such low grade ore (including the related depreciation) should be treated. If the mineral content of the ore is below what is economically viable, and the material is being stockpiled “in case” it can be processed economically at some point in the future, then the costs of extracting the ore should be accounted for as a waste removal cost – with the costs either being attributed to current period production or included in the calculation of deferred stripping.

In those situations where processing is economically viable, however, and management intend to process the ore stockpile at some point in the future, the lower grade stockpile should be recognised as a separate component of inventory and valued in accordance with the requirements of IAS 2 Inventories. Where appropriate, all or part of the stockpile should be classified as “non-current” inventory.

In situations where low grade stockpiles are recognised as a separate asset, mining entities need to consider carefully whether the carrying value exceeds Net Realisable Value (“NRV”). However, the guidance in IAS 2 does not deal with inventory which may not be processed and sold for many years into the future.

Paragraph 30 of IAS 2 states that “estimates of net realisable value are based on the most reliable evidence available at the time the estimates are made, of the amount the inventories are expected to realise. These estimates take into consideration fluctuations of price or cost directly relating to events occurring after the end of the period to the extent that such events confirm conditions existing

## Lihir Gold

### Inventories

In accordance with IAS 2 – “Inventories”, non-current ore stockpiles is defined as ore which is not scheduled to be processed in the twelve months after the Balance Sheet date. The Company believes the processing of these stockpiles will have a future economic benefit to the Company and accordingly values these stockpiles at the lower of cost and net realisable value. Net realisable value is assessed annually based on the product expected to be obtained from the ore at the estimated selling price less costs as calculated for other inventories of ore and metal, less all further costs to completion and all anticipated costs to be incurred prior to its sale.

at the end of the period.” This would appear to mean that NRV can be assessed using the year-end spot price for the relevant commodity, and the residual costs that would be incurred in processing the ore and selling the finished product in the short term.

However, several complications arise when considering inventory that is not expected to be processed and sold for many years. For example:

- If the commodity price is unusually high at the balance sheet date, but is expected to fall significantly before the material is processed and sold, it is possible that an NRV provision would arise if the carrying value was evaluated using the projected long term price (at which the material is expected to be sold), but that no provision would arise using the year-end spot price. The opposite situation can also arise where the year-end price is unusually low, with the result that an NRV provision would seem necessary using the year-end spot price, but not with the longer term price at which the material is expected to be sold.
- In estimating the costs that will need to be incurred in processing the material prior to sale, management may believe that inflationary increases to the costs are likely to exceed the inflationary increases to the commodity price. If so, this may affect whether the revenues from selling the material will be sufficient to recover the carrying value and the residual processing costs.

IAS 2 does not deal with these issues and, in the absence of any specific guidance, it seems likely that practice across the industry will vary.

Similarly, IAS 2 does not preclude the application of discounting to the future cash inflows and outflows used to calculate NRV. There is certainly no requirement to use discounting, but a strong case can be made to justify it - given that the time value of money is normally applied in establishing values for non-current assets.

### 3.3.5 Impairment of mining assets

Mining assets are uniquely exposed to changes in commodity prices. The application of Value in Use under IAS 36 can lead to some unusual questions and counter-intuitive answers. This section looks at some of the problems that arise.

A fundamental challenge is what commodity prices to assume over the life of the mine. Many entities have used a long term price assumption for the commodity price. These price assumptions need to be consistent with price assumptions used by the entity, for example, in valuing long tailed derivatives and for internal use such as budgeting and evaluation.

That said, if there are significant price movements then mining entities need to assess carefully

whether there has been a significant shift in market conditions which will impact on the long term average price used to forecast future cash flows.

There are a number of other complications that can arise when applying IAS 36 to operating mines. Examples are given below:

- Paragraph 54 states that, when calculating Value in Use, future cash flows in foreign currencies should be discounted and then translated using the spot exchange rate at the date when the value in use calculation is performed. This means that Value in Use calculations may reflect long term commodity price assumptions and current exchange rates. For many of the countries producing commodities, this means the assumptions will be inconsistent - because commodity price movements have a significant bearing on the relative strength of the local currency.
- IAS 36 also restricts the extent to which Value in Use calculations can reflect future capital expenditure and cost savings. Essentially, the future cash flows should be calculated for the asset in its current condition, and future improvements in asset performance should not be taken into account, except where they are necessary to make the asset ready for use. These restrictions are often difficult to apply to the mining industry. For example:
  - For many commodities, there is evidence that costs decline in real terms over the long term. Indeed, some mining entities take this into account in estimating their projected future selling prices. A Value in Use calculation that allows for a real terms decline in selling prices, but has to assume flat production costs, may not provide a reliable benchmark for valuing a mining entity’s assets.
  - A mining entity will often have to move its mining operations around different parts of the orebody, and this will require additional capital expenditure. Some assert that such expenditure can be taken into account in calculating Value in Use, on the basis that the mine can be considered an incomplete asset.
  - There are certain cost savings that will be expected to arise over the life of a mine. For example, in years when ore grades are low there might be savings in the cost of smelting and refining and also the costs incurred on overburden removal will drop towards the end of an open pit. In practice, however, it is not always easy to distinguish such savings from future operational improvements.

These difficulties may mean that mining entities will not regard Value in Use calculations prepared under IAS 36 as providing an appropriate basis for determining impairment provisions (or reversals).

## Real Time Spotlight

### Antofagasta

#### Impairment of property, plant and equipment and intangible assets (excluding goodwill)

Property, plant and equipment and finite life intangible assets are reviewed for impairment if there is any indication that the carrying amount may not be recoverable. If any such indication exists, the recoverable amount of the asset is estimated in order to determine the extent of the impairment (if any). Where the asset does not generate cash flows that are independent from other assets, the Group estimates the recoverable amount of the cash-generating unit to which the asset belongs. Any intangible asset with an indefinite useful life is tested for impairment annually and whenever there is an indication that the asset may be impaired.

Recoverable amount is the higher of fair value less costs to sell and value in use. In assessing value in use, the estimated future cash flows are discounted to their present value, using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset for which estimates of future cash flows have not been adjusted.

For mining properties, estimates of future cash flows are based on estimates of the quantities of proven, probable and possible reserves, and assumptions as to future

production levels, future commodity prices, future cash costs of production and capital expenditure. IAS 36 "Impairment of assets" includes a number of restrictions on the future cash flows that can be recognised in respect of future restructurings and improvement related expenditure. When calculating value in use, it also requires that calculations should be based on exchange rates current at the time of assessment. For operations with a functional currency other than the

US dollar, the impairment review is conducted in the relevant functional currency.

If the recoverable amount of an asset or cash generating unit is estimated to be less than its carrying amount, the carrying amount is reduced to the recoverable amount. An impairment is recognised immediately as additional depreciation. Where an impairment subsequently reverses, the carrying amount is increased to the revised estimate of recoverable amount but so that this does not exceed the carrying value that would have been determined if no impairment had previously been recognised. A reversal is recognised as a reduction in the depreciation charge immediately.

### Xstrata

#### Impairment of assets

The carrying amounts of non-current assets are reviewed for impairment whenever events or changes in circumstances indicate the carrying value may not be recoverable. If there are indicators of impairment, a review is undertaken to determine whether the carrying values are in excess of their recoverable amount. The recoverable amount is determined as the higher of an asset's fair value less costs to sell and its value in use. Such review is undertaken on an asset by asset basis, except where such assets do not generate cash flows independent of other assets, when the review is undertaken at the cash generating unit level.

Where a cash generating unit, or group of cash generating units, has goodwill allocated to it, or includes intangible assets which are either not available for use or which have an indefinite useful life (and which can only be tested as part of a cash generating unit), an impairment test is performed at least annually or whenever there is an indication that the carrying amount of such assets may be impaired.

If the carrying amount of an asset exceeds its recoverable amount, an impairment loss is recorded in the income

statement to reflect the asset at the lower amount. In assessing recoverable amount for assets, the relevant future cash flows expected to arise from the continuing use of such assets and from their disposal have been discounted to their present value using a market-determined pre-tax discount rate which reflects current market assessments of the time value of money and asset-specific risks for which the cash flow estimates have not been adjusted.

An impairment loss is reversed in the income statement if there is a change in estimates used to determine recoverable amount since the prior impairment loss was recognised. The carrying amount is increased to recoverable amount but not beyond the carrying amount net of depreciation or amortisation which would have arisen if the prior impairment loss had not been recognised. After such a reversal the depreciation charge is adjusted in future periods to allocate the asset's revised carrying amount, less any residual value, on a systematic basis over its remaining useful life. Goodwill impairments are not reversed.

Although these calculations may be sufficient to demonstrate that no impairment is required, many entities may be forced to adopt the “fair value less costs to sell” model when the Value in Use calculation suggests an impairment charge (or reversal) is required. The problem is that IAS 36 contains little guidance on how this alternative model should be applied.

The use of “fair value less cost to sell” when calculating Recoverable Amount provides more flexibility than the Value in Use approach – and would allow the inclusion of expansion cash flows, for example. However, the assumptions used for fair value calculations must reflect observable market-based data arising from recent relevant transactions. Mining entities that rely on “fair value less costs to sell” therefore need to make robust disclosures about how they have applied IAS 36.

### 3.3.6 Decommissioning and restoration costs

As noted previously, where a decommissioning obligation arises from mine development activities then a corresponding asset should also be recognised. Provisions should also be set up in respect of decommissioning and restoration obligations that arise from production activities, but in this case the cost should be expensed and not capitalised - because it does not give rise to any future economic benefits.

However, it can be 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 should be capitalised as a mine development cost – provided the obligations are not “abnormal”. When those same activities occur during the production phase, however, they may be related to both current period production and also mine development. In such cases, the treatment of the restoration obligations should be consistent with the treatment of the waste removal costs.

Mining entities may be tempted to assume that all decommissioning liabilities can be capitalised as part of the cost of an asset, but this will not always be the case.

### 3.3.7 Joint ventures

Joint ventures to develop ore bodies are common in the mining industry, with entities sharing the risks with other mining entities and/or local governments. For a joint venture to exist under IAS 31 Interests in Joint Ventures, strategic financial and operating decisions need to have the unanimous consent of all the venturers.

An interest that does not qualify as a joint venture may fall under IAS 39. This would be the case

if the arrangement does not convey significant influence either, and takes the form of an interest in a separate entity. Under these circumstances, the investment cannot be carried at cost (less impairment) if a reliable fair value can be determined.

If there is no separate entity, the arrangement does not fall under IAS 39 - this applies to “joint assets” that are not owned by a legal entity, for example. In such cases, where the entity holds an undivided interest in an asset, there is no guidance on how the interest should be treated. One approach is to report the interest as a non-current investment, carried at cost less accumulated depreciation and accumulated impairment.

Under IAS 31, proportional consolidation is required for joint ventures that are not constituted as an entity - jointly controlled assets. An example would

## Real Time Spotlight

### Antofagasta

#### Provisions for decommissioning and site restoration costs

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

Such costs arising from the installation of plant and other site preparation work, discounted to their net present value, are provided and capitalised at the start of each project, as soon as the obligation to incur such costs arises. These decommissioning costs are charged against profits over the life of the mine, through depreciation of the asset and unwinding or amortisation of the discount on the provision. Depreciation is included in operating costs while the unwinding of the discount is included as financing costs. Changes in the measurement of a liability relating to the decommissioning of plant or other site preparation work are added to, or deducted from, the cost of the related asset in the current period.

The costs for restoration of site damage, which is created on an ongoing basis during production, are provided for at their net present values and charged against operating profits as extraction progresses. Changes in the measurement of a liability relating to site damage created during production is charged against operating profit.

be a refinery that is jointly constructed and owned by a group of mining companies. The contribution of assets to a jointly controlled asset arrangement results in a partial disposal of that asset by the contributing venturer, with the gain or loss being recognised in the income statement. The other venturers' interest in the asset is recorded at their share of the fair value of the asset on the date of contribution.

Proportional consolidation is also permitted for joint ventures that are set up as an entity. In this case, however, the standard also permits an alternative approach to be used (the so-called equity method), under which the joint venture results (and net assets) are separately identified on the income statement (and balance sheet) in one line. Many jointly controlled asset arrangements are set up as entities, and this allows mining entities to adopt

#### Example

Entities A, B, C and D (the venturers) each hold a 25% interest in entity J. Financial and operating decisions affecting J need to be approved by a majority of the venturers. A would like to account for its interest in J using proportional consolidation. Is this allowed?

#### Solution

No. Entity A cannot account for J using proportional consolidation because J is not jointly controlled. The voting arrangements would have to require unanimous agreement between the venturers for J to qualify as a joint venture – whereas they actually allow any combination of three of the four venturers to make decisions.

## Rio Tinto

### Basis of consolidation

#### Joint ventures:

A joint venture is a contractual arrangement whereby two or more parties undertake an economic activity that is subject to joint control. Joint control is the contractually agreed sharing of control such that significant operating and financial decisions require the consent of more than one venturer. The Group has two types of joint ventures:

#### Jointly controlled entities ('JCEs'):

A JCE is a joint venture that involves the establishment of a corporation, partnership or other entity in which each venturer has a long term interest. JCEs are accounted for using the equity accounting method.

#### Jointly controlled assets ('JCAs'):

A JCA is a joint venture in which the venturers have joint control over the assets contributed to or acquired for the purposes of the joint venture. JCAs do not involve the establishment of a corporation, partnership or other entity. This includes situations where the participants derive benefit from the joint activity through a share of the production, rather than by receiving a share of the results of trading. The Group's proportionate interest in the assets, liabilities, revenues, expenses and cash flows of JCAs are incorporated into the Group's financial statements under the appropriate headings. In some situations, joint control exists even though the Group has an ownership interest of more than 50 per cent because of the veto rights held by joint venture partners.

## BHP Billiton

### Joint ventures

The BHP Billiton Group undertakes a number of business activities through joint ventures. Joint ventures are established through contractual arrangements that require the unanimous consent of each of the venturers regarding the strategic financial and operating policies of the venture (joint control). The BHP Billiton Group's joint ventures are of two types:

#### Jointly controlled entities

A jointly controlled entity is a corporation, partnership or other entity, in which each venturer holds an interest. A jointly controlled entity operates in the same way as other entities, controlling the assets of the joint venture, earning its own income and incurring its own liabilities and expenses. Interests in jointly controlled entities are accounted for using the equity method.

#### Jointly controlled assets and operations

The BHP Billiton Group has certain contractual arrangements with other participants to engage in joint activities that do not give rise to a jointly controlled entity. These arrangements involve the joint ownership of assets dedicated to the purposes of each venture. These contractual arrangements do not create a jointly controlled entity due to the fact that the joint venture operates under the policies of the venturers who directly derive the benefits of operation of their jointly owned assets, rather than deriving returns from an interest in a separate entity carrying on its own trade or business. The financial report of the BHP Billiton Group includes its share of the assets in such joint ventures, together with the liabilities, revenues and expenses arising jointly or otherwise from those operations. All such amounts are measured in accordance with the terms of each arrangement, which is usually in proportion to the BHP Billiton Group's interest in the jointly owned assets.

a different accounting treatment simply because of the legal form they take – even though, in substance, the jointly controlled entity might operate on an almost identical basis to an unincorporated jointly controlled asset.

The IASB is currently undertaking a project on joint venture accounting. In an effort to harmonise accounting standards internationally, in December 2005 the Board decided to eliminate proportional consolidation for jointly controlled entities and allow only equity accounting. Other standard setters, such as in Australia, have already eliminated this option. However, the Board also decided to expand the scope of its project to consider the definition of joint ventures because they believe the current standard does not adequately address the difference between a joint venture entity and an undivided interest in the assets and liabilities of a joint arrangement.

It is also interesting to note that some entities which have decided to apply equity accounting to their joint ventures have been keen to disclose supplementary information about those joint ventures – such as their share of turnover in a prominent position in the financial statements. This presumably reflects a belief that users of the accounts expect to be provided with such information in cases where a substantial proportion of the Group's profit is derived from equity-accounted joint ventures.

## 3.4 Treatment

### 3.4.1 Joint and by-products

It is common in the mining industry for more than one product to be extracted from a particular ore. Base metals such as lead and zinc are often found together, and gold is commonly found with copper. Reasons vary for treating mine production as joint products or by-products, but the treatment is usually related to the importance of the products to the viability of the mine.

- Joint products are defined in IAS 2 as “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”.

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 used to value joint and by-products.

In relation to joint products, one possible approach

is to allocate the “common costs” based on the relative sales value of the joint products. This method can be justified where the profitability of the joint products is roughly equal, but not where the products have significantly different profit margins. An acceptable alternative may be to allocate costs based on the relative volume of production in some circumstances.

If the amounts involved are immaterial, it is common for by-products to be recorded at net realisable value (i.e. market value less any selling and residual processing costs). This approach is acceptable under IAS 2, so long as it is a well-established practice for the relevant commodity. Some entities, however, account for by-products on a cost basis by applying those costs incurred after the split off point, and carry the inventory at the lower of cost and net realisable value. This method is also acceptable. Whichever method is chosen it should be applied consistently.

### 3.4.2 Tolling arrangements

It is not unusual in the mining sector for entities to sub-contract the production of the metals contained in the ore they have extracted. In those cases where the raw material is sold to the sub-contractor, and is not then purchased back, the accounting is straightforward, with revenue being recognised to reflect the sales value of the material delivered to the sub-contractor. For some commodities, the selling price is calculated by reference to the quoted market price of the finished product with an adjustment being made to cover the residual processing – so that the mining entity is exposed to changes in the market price. In such cases, the revenue should not be grossed up to reflect the theoretical price that would have been received by selling the finished product (and the related deduction for processing costs).

In other cases, the raw materials are delivered to a toll manufacturer without transferring ownership of the material, or alternatively the mining entity is obliged to re-purchase the finished product after the material has been processed. These are referred to as tolling arrangements. In general, such tolling arrangements are accounted for simply as service contracts – with the mining entity continuing to recognise the inventory and treating the charges payable to the toll processor as a production cost.

However, in some situations the mining entity needs to consider carefully whether it should actually consolidate the toll processor. For example, this might be necessary where the mining entity has been involved in establishing the toll processing facility, and has a contractual arrangement which significantly restricts the decision-making powers of the toll processor.

In addition, it is possible that a tolling arrangement will contain a lease that needs to be accounted for in accordance with IAS 17 Leases. IFRIC 4



Determining whether an Arrangement contains a Lease, which comes into effect for periods beginning on or after 1 January 2006, requires an assessment of whether the:

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

IFRIC 4 could also impact on many other arrangements within the mining industry, for example where supplies are manufactured and/or stored by a third party at the mine site.

## 3.5 Other issues

### 3.5.1 Functional currency

Many mining entities have found that identifying the functional currency for different parts of a global group can be complex. Under IAS 21 The Effects of Changes in Foreign Exchange Rates, there are some primary indicators which must be given priority in determining an entity's functional currency, as follows:

- (a) The currency that mainly influences sales prices for goods and services.
- (b) The currency of the country whose competitive forces and regulations mainly determine the sales prices of the goods and services.
- (c) The currency that mainly influences labour, material and other costs of providing goods or services.

Many commodities are sold in US dollars, but this does not necessarily mean that the US dollar is the main influence over the selling prices of those commodities. The selling prices are determined in global markets, and for many commodities the price quoted in US dollars will rise and fall in response to changes in the US dollar exchange rate. Also, it is not practicable to identify a single country whose competitive forces and regulation impact upon selling prices because global supply and demand are the main factors in the short term and the marginal cost of production drives price in the longer term.

The main currency that influences labour, material and other costs will vary by country, often depending upon the stage of development of the country and the size of the local mining industry. In many developing countries, mining operations are forced to import a high proportion of the goods and services they need and even local purchases may be linked to the US dollar where the local currency is not stable. If so, the local currency may have a smaller influence on the operation's cost structure than the US dollar. In many countries, however, the majority of the costs will be fixed in local currency.

Consequently, a lot of judgement is required when determining functional currency and there is a

## Real Time Spotlight

### BHP Billiton

#### Foreign currencies

The BHP Billiton Group's reporting currency and the functional currency of the majority of its operations is US dollars, as this is the principal currency of the economic environments in which they operate.

Transactions denominated in foreign currencies (currencies other than the functional currency of an operation) are recorded using the exchange rate ruling at the date of the underlying transaction. Monetary assets and liabilities denominated in foreign currencies are translated using the rate of exchange ruling at year end and the gains or losses on retranslation are included in the Income Statement, with the exception of foreign exchange gains or losses on foreign currency provisions for site restoration and rehabilitation which are capitalised in property, plant and equipment, and foreign exchange gains and losses on foreign currency borrowings designated as a hedge of the net assets of foreign operations.

The Income Statement of subsidiaries and joint ventures which have functional currencies other than US dollars are translated to US dollars at the date of the transaction. Assets and liabilities are translated at exchange rates prevailing at year end. Exchange variations resulting from the retranslation at closing rate of the net investment in such subsidiaries and joint ventures, together with differences between their Income Statement translated at actual and closing rates, are recorded as a movement in the exchange fluctuation account. Exchange differences arising on long-term foreign currency borrowings used to finance such investments, together with any related income tax effects, are also recorded as a movement in the exchange fluctuation account. The balance of the exchange fluctuation account relating to a foreign operation that is disposed of, or partially disposed of, is recognised in the Income Statement in the year of disposal.

## Real Time Spotlight

### Antofagasta

#### Currency translation

The functional currency for each entity in the Group is determined as the currency of the primary economic environment in which it operates. Transactions other than those in the functional currency of the entity are translated at the exchange rate ruling at the date of the transaction. Monetary assets and liabilities denominated in currencies other than the functional currency are retranslated at year end exchange rates. Gains and losses on retranslation are included in net profit or loss for the period within other finance items.

The presentational currency of the Group and the functional currency of the Company is the US dollar. On consolidation, income statement items for entities with a functional currency other than the US dollar are translated into US dollars at average rates of exchange. Balance sheet items are translated at period end exchange rates. Exchange differences on translation of the net assets of such entities are taken to equity and recorded in a separate currency translation reserve. The Group elected to set the currency translation reserve to zero at 1 January 2004 as permitted by IFRS 1. Cumulative translation differences arising after the transition date to IFRS are recognised as income or as expenses in the income statement in the period in which the disposal occurs.

On consolidation, exchange gains and losses which arise on balances between Group entities are taken to reserves where that balance is, in substance, part of a parent's net investment in its subsidiary, i.e. where settlement is neither planned nor likely to occur in the foreseeable future. All other exchange gains and losses on Group balances are dealt with in the income statement.

Fair value adjustments and any goodwill arising on the acquisition of a foreign entity are treated as assets of the foreign entity and translated at the period end rate.

risk that different entities could reach different conclusions. It would be helpful if additional guidance could be produced on how the IAS 21 principles should be applied to entities selling products that are priced in global markets.

#### 3.5.2 Business combinations

Under IFRS, the distinction between an asset purchase and a business combination is an important one because:

- Any goodwill recognised on acquisition is not amortised.
- Deferred tax is generally not recognised for an asset acquisition (because of the "initial recognition" exemption contained in IAS 12) but is for a business combination.

In most cases, a producing field or mine is likely to be a business whilst a licence to explore, on its own, is just an asset. However, projects that lie in development terms between the two are likely to be more difficult to judge and the variety of different structures used (e.g. incorporation, unincorporated joint venture etc) can add complexity to the accounting.

Some assert that goodwill should not arise in the mining sector because the acquisition cost should be allocated to mineral properties and/or exploration projects instead. However, there will be situations where goodwill might well arise – for example, where an acquisition is expected to produce synergies with an existing mine. Therefore, mining companies cannot simply assume that goodwill never arises. Where goodwill does arise, companies are not allowed to amortise it – even where the goodwill is linked to a mine, which is clearly a wasting asset. Rather, the goodwill has to be tested for impairment on a regular basis – in the expectation that impairment charges will be needed over the life of the mine to which the goodwill is allocated. Some in the industry believe it would make more sense for the goodwill to be amortised on the same basis as the mine to which it relates.

Calculating the fair value of a licence or mineral property, in situations where the uplift is not attributed to goodwill, is not straightforward – bearing in mind that deferred tax has to be recognised on the fair value adjustment. Many mining entities use simultaneous equations to determine the value of the licence/mineral property, and associated deferred tax liability, to arrive at the appropriate net balance.

#### 3.5.3 Provisional pricing

The pricing of products is a key factor in determining when to recognise a sale. Pricing may affect whether all or part of a sale can be reliably measured.

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. Apart from the use of spot or market derived prices at or near the point of sale date, sales contracts often call for pricing to be decided:

- at the average of market prices prevailing during a subsequent defined period (also called the 'quotational period'); or
- after a fixed period following delivery; or
- according to fixed prices but subject to escalation; or
- at the amount realised subsequently by a purchasing smelter, net of smelter charges.

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 up-to-date market prices. Any gain or loss arising subsequent to the initial recognition of the sale should be accounted for as a gain or loss from derivatives in the income statement (because the final price adjustment is linked to movements in the relevant market price, and is effectively a derivative).

Some mining entities use derivatives to protect economically against movements 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.

### 3.5.4 Termination benefits payable to employees

The treatment of termination benefits payable to employees is another situation where IFRS does not cater for the specific circumstances of the mining industry. In contrast to most industries, with a mine it is certain that the ore reserves will be exhausted at some point in the future and redundancy costs will arise. In this respect, redundancy obligations are very similar to the decommissioning obligations discussed earlier.

However, IAS 19 Employee Benefits does not allow for situations where an operation is certain to close many years into the future. It contains some detailed restrictions on when termination benefits can be recognised, and one of the specific requirements is that the time at which the redundancies will take place must be known. As a result, normal practice in the mining industry is for redundancy costs relating to mine closures to be recognised only when the closure date has been announced – which tends to be very close to when the operations actually cease. It is debatable whether this is a common-sense outcome for the mining sector.

## Real Time Spotlight

### Rio Tinto

#### Turnover

Certain products are 'provisionally priced', ie the selling price is subject to final adjustment at the end of a period normally ranging from 30 to 180 days after delivery to the customer, based on the market price at the relevant quotation point stipulated in the contract. Turnover is initially recognised when the conditions set out above have been met, using market prices at that date. At each reporting date the provisionally priced metal is marked to market based on the forward selling price for the quotational period stipulated in the contract until the quotational period expires. For this purpose, the selling price can be measured reliably for those products, such as copper, for which there exists an active and freely traded commodity market such as the London Metals Exchange and the value of product sold by the Group is directly linked to the form in which it is traded on that market.

From 1 January 2005, under IAS 39, the marking to market of provisionally priced contracts is recorded as an adjustment to net operating costs. Prior to 1 January 2005, the marking to market was recorded as an adjustment to turnover.



# 4. Looking ahead

Although many companies have now implemented IFRS for the first time, it is clear that the interpretation and application of the standards will continue to evolve. This means that companies will need to monitor developments closely, to ensure that their accounting policies remain in line with accepted practice.

As the standard setting process moves on, part of the challenge for mining companies will be to highlight the particular issues they face. The IASB's Extractive Activities working group will be an important focal point. To date, the group has focused its attention on the treatment of ore reserves but this publication demonstrates that there are many other issues facing the sector. Companies have an important role to play in encouraging the group to broaden the scope of its work.

Much of the onus is placed on the standard setters. However, if standards are to develop in an effective way that brings us closer to the goals of transparency, comparability and bringing useful information to the market, preparers and users need to engage in a proactive dialogue with the standard setters. Mining entities need to play their part in this process individually and through industry groupings.



# 5. Contacts

PricewaterhouseCoopers ([www.pwc.com](http://www.pwc.com)) provides industry-focused assurance, tax and advisory services to build public trust and enhance value for its clients and their stakeholders. More than 130,000 people in 148 countries work collaboratively using connected thinking to develop fresh perspectives and practical advice.

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