2016 financial statements

Contents

Group income statement

Years ended 31 December

	Note	2016 US$m	2015 US$m	2014 US$m
Consolidated operations				
Consolidated sales revenue	2,3	**33,781**	34,829	47,664
Net operating costs (excluding items shown separately)	4	**(26,799)**	(27,919)	(33,910)
Impairment charges net of reversals	6	**(249)**	(2,791)	(1,062)
Net gains/(losses) on disposal of interests in businesses	2,37	**515**	64	(563)
Exploration and evaluation costs	13	**(497)**	(576)	(747)
Profit/(loss) relating to interests in undeveloped projects	13	**44**	8	(36)
Operating profit		**6,795**	3,615	11,346
Share of profit after tax of equity accounted units	7	**321**	361	625
Impairment reversals of investments in equity accounted units after tax	6	**–**	–	589
Profit before finance items and taxation		**7,116**	3,976	12,560
Finance items				
Net exchange gains/(losses) on external debt and intragroup balances	24	**611**	(3,538)	(1,995)
Net losses on derivatives not qualifying for hedge accounting		**(24)**	(88)	(46)
Finance income	8	**89**	52	64
Finance costs	8	**(1,111)**	(750)	(649)
Amortisation of discount		**(338)**	(378)	(382)
		(773)	(4,702)	(3,008)
Profit/(loss) before taxation		**6,343**	(726)	9,552
Taxation	9	**(1,567)**	(993)	(3,053)
Profit/(loss) after tax for the year		**4,776**	(1,719)	6,499
– attributable to owners of Rio Tinto (net earnings/(loss))		**4,617**	(866)	6,527
– attributable to non-controlling interests (net earnings/(loss))		**159**	(853)	(28)
Basic earnings/(loss) per share	10	**256.9c**	(47.5)c	353.1c
Diluted earnings/(loss) per share	10	**255.3c**	(47.5)c	351.2c

The notes on pages 116 to 194 are an integral part of these consolidated financial statements.

Group statement of comprehensive income

Years ended 31 December

	Note	2016 US$m	2015 US$m	2014 US$m
Profit/(loss) after tax for the year		**4,776**	(1,719)	6,499
Other comprehensive (loss)/income:				
Items that will not be reclassified to profit or loss:				
Actuarial (losses)/gains on post retirement benefit plans	45	**(90)**	619	(735)
Tax relating to these components of other comprehensive (loss)/income	9	**29**	(175)	215
		(61)	444	(520)
Items that have been/may be subsequently reclassified to profit or loss:				
Currency translation adjustment [(a)]		**(157)**	(2,395)	(2,004)
Currency translation on companies disposed of, transferred to the income statement		**99**	(2)	53
Fair value movements:				
– Cash flow hedge losses		**(88)**	(41)	(48)
– Cash flow hedge losses transferred to the income statement		**116**	32	55
– Gains/(losses) on revaluation of available for sale securities		**13**	(19)	(36)
– Losses on revaluation of available for sale securities transferred to the income statement		**–**	11	6
Tax relating to these components of other comprehensive (loss)/income	9	**4**	(3)	(9)
Share of other comprehensive income/(loss) of equity accounted units, net of tax		**11**	(57)	(44)
Other comprehensive loss for the year, net of tax		**(63)**	(2,030)	(2,547)
Total comprehensive income/(loss) for the year		**4,713**	(3,749)	3,952
– attributable to owners of Rio Tinto		**4,504**	(2,443)	4,322
– attributable to non-controlling interests		**209**	(1,306)	(370)

(a) Excludes a currency translation charge of US$35 million (2015: US$503 million; 2014: US$376 million) arising on Rio Tinto Limited's share capital for the year ended 31 December 2016, which is recognised in the Group statement of changes in equity. Refer to Group statement of changes in equity on page 114.

The notes on pages 116 to 194 are an integral part of these consolidated financial statements.

Group cash flow statement

Years ended 31 December

	Note	**2016 US$m**	2015 US$m	2014 US$m
Cash flows from consolidated operations [(a)]		**11,368**	12,102	18,896
Dividends from equity accounted units		**253**	210	298
Cash flows from operations		**11,621**	12,312	19,194
Net interest paid		**(1,294)**	(827)	(981)
Dividends paid to holders of non-controlling interests in subsidiaries		**(341)**	(310)	(309)
Tax paid		**(1,521)**	(1,792)	(3,618)
Net cash generated from operating activities		**8,465**	9,383	14,286
Cash flows from investing activities				
Purchases of property, plant and equipment and intangible assets	2	**(3,012)**	(4,685)	(8,162)
Disposals of subsidiaries, joint ventures and associates	37	**761**	(38)	887
Purchases of financial assets		**(789)**	(49)	(24)
Sales of financial assets		**582**	65	172
Sales of property, plant and equipment and intangible assets		**354**	97	744
Net funding of equity accounted units		**(12)**	11	(117)
Acquisitions of subsidiaries, joint ventures and associates	37	**–**	(3)	–
Other investing cash flows		**12**	2	(3)
Net cash used in investing activities		**(2,104)**	(4,600)	(6,503)
Cash flows before financing activities		**6,361**	4,783	7,783
Cash flows from financing activities				
Equity dividends paid to owners of Rio Tinto	11	**(2,725)**	(4,076)	(3,710)
Proceeds from additional borrowings		**4,413**	1,837	442
Repayment of borrowings		**(9,361)**	(3,518)	(3,476)
Proceeds from issue of equity to non-controlling interests		**101**	103	1,291
Own shares purchased from owners of Rio Tinto		**–**	(2,028)	–
Purchase of non-controlling interests	37	**(23)**	–	–
Other financing cash flows		**104**	12	17
Net cash flows used in financing activities		**(7,491)**	(7,670)	(5,436)
Effects of exchange rates on cash and cash equivalents		**(35)**	(159)	(156)
Net (decrease)/increase in cash and cash equivalents		**(1,165)**	(3,046)	2,191
Opening cash and cash equivalents less overdrafts		**9,354**	12,400	10,209
Closing cash and cash equivalents less overdrafts	21	**8,189**	9,354	12,400
(a) Cash flows from consolidated operations				
Profit/(loss) after tax for the year		**4,776**	(1,719)	6,499
Adjustments for:				
– Taxation		**1,567**	993	3,053
– Finance items		**773**	4,702	3,008
– Share of profit after tax of equity accounted units		**(321)**	(361)	(625)
– Impairment charges net of reversals of investments in equity accounted units after tax	6	**–**	–	(589)
– Net (gains)/losses on disposal of interests in businesses	37	**(515)**	(64)	563
– Impairment charges net of reversals	6	**249**	2,791	1,062
– Depreciation and amortisation		**4,794**	4,645	4,860
– Provisions (including exchange differences on provisions)	26	**1,417**	726	712
Utilisation of provisions	26	**(627)**	(585)	(973)
Utilisation of provision for post-retirement benefits	26	**(370)**	(230)	(296)
Change in inventories		**292**	526	937
Change in trade and other receivables		**(794)**	1,404	962
Change in trade and other payables		**229**	(431)	(380)
Other items [(b)]		**(102)**	(295)	103
		11,368	12,102	18,896

(b) Includes a cash outflow of US$29 million (2015: outflow of US$227 million; 2014: inflow of US$66 million) mainly relating to derivative contracts transacted for operational purposes and not designated in a hedge relationship.

The notes on pages 116 to 194 are an integral part of these consolidated financial statements.

Group balance sheet

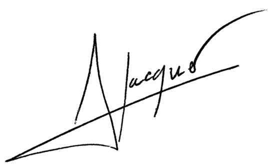
At 31 December

	Note	2016 US$m	2015 US$m
Non-current assets			
Goodwill	12	**951**	892
Intangible assets	13	**3,279**	3,336
Property, plant and equipment	14	**58,855**	61,057
Investments in equity accounted units	15	**5,019**	4,941
Inventories	16	**143**	253
Deferred tax assets	17	**3,728**	3,309
Trade and other receivables	18	**1,342**	1,356
Tax recoverable		**38**	78
Other financial assets (including loans to equity accounted units)	20	**822**	788
		74,177	76,010
Current assets			
Inventories	16	**2,937**	3,168
Trade and other receivables	18	**3,460**	2,386
Tax recoverable		**98**	118
Other financial assets (including loans to equity accounted units)	20	**359**	223
Cash and cash equivalents	21	**8,201**	9,366
		15,055	15,261
Assets of disposal groups held for sale	19	**31**	293
Total assets		**89,263**	91,564
Current liabilities			
Borrowings and other financial liabilities	22	**(922)**	(2,484)
Trade and other payables	25	**(6,361)**	(6,237)
Tax payable		**(764)**	(135)
Provisions including post-retirement benefits	26	**(1,315)**	(1,190)
		(9,362)	(10,046)
Non-current liabilities			
Borrowings and other financial liabilities	22	**(17,470)**	(21,140)
Trade and other payables	25	**(789)**	(682)
Tax payable		**(274)**	(295)
Deferred tax liabilities	17	**(3,121)**	(3,286)
Provisions including post-retirement benefits	26	**(12,479)**	(11,876)
		(34,133)	(37,279)
Liabilities of disposal groups held for sale	19	**(38)**	(111)
Total liabilities		**(43,533)**	(47,436)
Net assets		**45,730**	44,128
Capital and reserves			
Share capital			
– Rio Tinto plc	27	**224**	224
– Rio Tinto Limited	28	**3,915**	3,950
Share premium account		**4,304**	4,300
Other reserves	29	**9,216**	9,139
Retained earnings	29	**21,631**	19,736
Equity attributable to owners of Rio Tinto		**39,290**	37,349
Attributable to non-controlling interests		**6,440**	6,779
Total equity		**45,730**	44,128

The notes on pages 116 to 194 are an integral part of these consolidated financial statements.

The financial statements on pages 109 to 194 were approved by the directors on 1 March 2017 and signed on their behalf by

Jan du Plessis
Chairman



Jean-Sébastien Jacques
Chief executive

Chris Lynch
Chief financial officer

Group statement of changes in equity

Year ended 31 December 2016	Attributable to owners of Rio Tinto						
	Share capital (notes 27 and 28) US$m	Share premium US$m	Other reserves (note 29) US$m	Retained earnings (note 29) US$m	Total US$m	Non-controlling interests US$m	Total equity US$m
Opening balance	**4,174**	**4,300**	**9,139**	**19,736**	**37,349**	**6,779**	**44,128**
Total comprehensive income for the year [a]	**–**	**–**	**(49)**	**4,553**	**4,504**	**209**	**4,713**
Currency translation arising on Rio Tinto Limited's share capital [b]	**(35)**	**–**	**–**	**–**	**(35)**	**–**	**(35)**
Dividends	**–**	**–**	**–**	**(2,725)**	**(2,725)**	**(352)**	**(3,077)**
Companies no longer consolidated	**–**	**–**	**–**	**–**	**–**	**8**	**8**
Own shares purchased from Rio Tinto shareholders to satisfy share options	**–**	**–**	**(43)**	**(37)**	**(80)**	**–**	**(80)**
Change in equity interest held by Rio Tinto [c]	**–**	**–**	**108**	**40**	**148**	**(313)**	**(165)**
Treasury shares reissued and other movements	**–**	**4**	**–**	**–**	**4**	**–**	**4**
Equity issued to holders of non-controlling interests	**–**	**–**	**–**	**–**	**–**	**109**	**109**
Employee share options and other IFRS 2 charges to the income statement	**–**	**–**	**61**	**64**	**125**	**–**	**125**
Closing balance	**4,139**	**4,304**	**9,216**	**21,631**	**39,290**	**6,440**	**45,730**

Year ended 31 December 2015	Attributable to owners of Rio Tinto						
	Share capital (notes 27 and 28) US$m	Share premium US$m	Other reserves (note 29) US$m	Retained earnings (note 29) US$m	Total US$m	Non-controlling interests US$m	Total equity US$m
Opening balance	4,765	4,288	11,122	26,110	46,285	8,309	54,594
Total comprehensive income for the year [a]	–	–	(2,020)	(423)	(2,443)	(1,306)	(3,749)
Currency translation arising on Rio Tinto Limited's share capital [b]	(503)	–	–	–	(503)	–	(503)
Dividends	–	–	–	(4,076)	(4,076)	(315)	(4,391)
Share buy-back	(88)	–	6	(1,946)	(2,028)	–	(2,028)
Companies no longer consolidated	–	–	–	–	–	5	5
Own shares purchased from Rio Tinto shareholders to satisfy share options	–	–	(25)	(28)	(53)	–	(53)
Change in equity interest held by Rio Tinto	–	–	–	20	20	(17)	3
Treasury shares reissued and other movements	–	12	–	1	13	–	13
Equity issued to holders of non-controlling interests	–	–	–	–	–	103	103
Employee share options and other IFRS 2 charges to the income statement	–	–	56	78	134	–	134
Closing balance	4,174	4,300	9,139	19,736	37,349	6,779	44,128

Year ended 31 December 2014	Attributable to owners of Rio Tinto						
	Share capital (notes 27 and 28) US$m	Share premium US$m	Other reserves (note 29) US$m	Retained earnings (note 29) US$m	Total US$m	Non-controlling interests US$m	Total equity US$m
Opening balance	5,141	4,269	12,871	23,605	45,886	7,616	53,502
Total comprehensive income for the year [a]	–	–	(1,689)	6,011	4,322	(370)	3,952
Currency translation arising on Rio Tinto Limited's share capital [b]	(376)	–	–	–	(376)	–	(376)
Dividends	–	–	–	(3,710)	(3,710)	(304)	(4,014)
Own shares purchased from Rio Tinto shareholders to satisfy share options	–	–	(129)	(31)	(160)	–	(160)
Treasury shares reissued and other movements	–	19	–	3	22	–	22
Newly consolidated operations	–	–	–	–	–	6	6
Change in equity interest held by Rio Tinto	–	–	–	36	36	(29)	7
Equity issued to holders of non-controlling interests [d]	–	–	–	–	–	1,291	1,291
Companies no longer consolidated	–	–	–	–	–	(18)	(18)
Employee share options and other IFRS 2 charges to the income statement	–	–	69	196	265	117	382
Closing balance	4,765	4,288	11,122	26,110	46,285	8,309	54,594

(a) Refer to Group statement of comprehensive income.
(b) Refer to note 1(d).
(c) The restructure of Coal & Allied Industries Limited completed on 3 February 2016. The restructure involved the exchange of a 32.4 per cent interest in Hunter Valley Operations mine for an additional 20 per cent shareholding in Coal & Allied Industries Limited, increasing Rio Tinto's shareholding of Coal & Allied Industries Limited from 80 per cent to 100 per cent.
(d) Equity issued to holders of non-controlling interests in 2014 included US$1,158 million of proceeds from a rights issue by Turquoise Hill Resources Ltd in January 2014.

Reconciliation with Australian Accounting Standards

The Group's financial statements have been prepared in accordance with IFRS, as defined in note 1, which differs in certain respects from the version of International Financial Reporting Standards that is applicable in Australia, referred to as Australian Accounting Standards (AAS).

Prior to 1 January 2004, the Group's financial statements were prepared in accordance with UK GAAP. Under IFRS, as defined in note 1, goodwill on acquisitions prior to 1998, which was eliminated directly against equity in the Group's UK GAAP financial statements, has not been reinstated. This was permitted under the rules governing the transition to IFRS set out in IFRS 1. The equivalent Australian Standard, AASB 1, does not provide for the netting of goodwill against equity. As a consequence, shareholders' funds under AAS include the residue of such goodwill, which amounted to US$561 million at 31 December 2016 (2015: US$560 million).

Save for the exception described above, the Group's financial statements drawn up in accordance with IFRS are consistent with the requirements of AAS.

Outline of dual listed companies structure and basis of financial statements

The Rio Tinto Group

These are the financial statements of the Group formed through the merger of economic interests of Rio Tinto plc and Rio Tinto Limited ("Merger"), and presented by both Rio Tinto plc and Rio Tinto Limited as their consolidated accounts in accordance with both UK and Australian legislation and regulations.

Merger terms

On 21 December 1995, Rio Tinto plc and Rio Tinto Limited, entered into a dual listed companies (DLC) merger. Rio Tinto plc is incorporated in the UK and listed on the London and New York Stock Exchanges and Rio Tinto Limited is incorporated in Australia and listed on the Australian Stock Exchange. The merger was effected by contractual arrangements between the companies and amendments to Rio Tinto plc's Memorandum and Articles of Association and Rio Tinto Limited's Constitution.

As a result, Rio Tinto plc and Rio Tinto Limited and their respective groups operate together as a single economic enterprise, with neither assuming a dominant role. In particular, the arrangements:

- confer upon the shareholders of Rio Tinto plc and Rio Tinto Limited a common economic interest in both groups;
- provide for common boards of directors and a unified management structure;
- provide for equalised dividends and capital distributions; and
- provide for the shareholders of Rio Tinto plc and Rio Tinto Limited to take key decisions, including the election of directors, through an electoral procedure in which the public shareholders of the two companies in effect vote on a joint basis.

The merger involved no change in the legal ownership of any assets of Rio Tinto plc or Rio Tinto Limited, nor any change in the ownership of any existing shares or securities of Rio Tinto plc or Rio Tinto Limited, nor the issue of any shares, securities or payment by way of consideration, save for the issue by each company of one special voting share to a trustee company which facilitates the joint electoral procedure for public shareholders. During 2002, each of the parent companies issued a DLC Dividend Share to facilitate the efficient management of funds within the DLC structure.

Accounting standards

The financial statements have been drawn up in accordance with IFRS as defined in note 1. The Merger was accounted for as a merger under UK GAAP. As permitted under the rules governing the transition to IFRS, which are set out in IFRS 1, the Group did not restate business combinations that occurred before the transition date of 1 January 2004. As a result, the DLC Merger of economic interests described above continues to be accounted for as a merger under IFRS as defined in note 1.

The main consequence of adopting merger rather than acquisition accounting is that the balance sheet of the merged Group includes the assets and liabilities of Rio Tinto plc and Rio Tinto Limited at their carrying values prior to the merger, subject to adjustments to achieve uniformity of accounting policies, rather than at their fair values at the date of the merger. For accounting purposes Rio Tinto plc and Rio Tinto Limited are viewed as a single public parent company (with their respective public shareholders being the shareholders in that single company). As a result, the amounts attributable to both Rio Tinto plc and Rio Tinto Limited public shareholders are included in the amounts attributed to owners of Rio Tinto on the balance sheet, income statement and statement of comprehensive income.

Australian Corporations Act

The financial statements are drawn up in accordance with an order, under section 340 of the Australian Corporations Act 2001, issued by the Australian Securities and Investments Commission (ASIC) on 14 December 2015. The main effect of the order is that the financial statements are prepared on the basis that Rio Tinto Limited, Rio Tinto plc and their respective controlled entities are treated as a single economic entity, and in accordance with the principles and requirements of International Financial Reporting Standards as adopted by the European Union (EU IFRS) and include a reconciliation from EU IFRS to the Australian equivalents of IFRS (see above).

For further details of the ASIC Class Order relief see page 204.

Notes to the 2016 financial statements

1 Principal accounting policies

Corporate information

Rio Tinto's business is finding, mining and processing mineral resources. Major products are aluminium, copper, diamonds, gold, industrial minerals (borates, titanium dioxide and salt), iron ore, thermal and metallurgical coal and uranium. Activities span the world and are strongly represented in Australia and North America, with significant businesses in Asia, Europe, Africa and South America.

Rio Tinto plc is incorporated in the UK and listed on the London and New York Stock Exchanges and Rio Tinto Limited is incorporated in Australia and listed on the Australian Stock Exchange. Rio Tinto plc's registered office is at 6 St James's Square, London SW1Y 4AD, UK. Rio Tinto Limited's registered office is at 120 Collins Street, Melbourne, Australia, 3000.

These financial statements consolidate the accounts of Rio Tinto plc and Rio Tinto Limited (together "the Companies") and their respective subsidiaries (together "the Group") and include the Group's share of joint arrangements and associates as explained in note 1(b) below. The Group's financial statements for the year ended 31 December 2016 were authorised for issue in accordance with a directors' resolution on 1 March 2017.

Notes 33 to 36 provide more information on the Group's subsidiaries, joint arrangements and associates and note 40 provides information on the Group's transactions with other related parties.

Basis of preparation of the financial statements

The basis of preparation and the accounting policies used in preparing the Group's 2016 financial statements are set out below.

The financial statements have been prepared on a going concern basis in accordance with the Companies Act 2006 applicable to companies reporting under International Financial Reporting Standards and in accordance with applicable UK law, applicable Australian law as amended by the Australian Securities and Investments Commission Order dated 14 December 2015, Article 4 of the European Union IAS regulation and also with:

- International Financial Reporting Standards as issued by the International Accounting Standards Board (IASB) and interpretations issued from time to time by the IFRS Interpretations Committee (IFRS IC) both as adopted by the European Union (EU) and which are mandatory for EU reporting as at 31 December 2016; and
- International Financial Reporting Standards as issued by the IASB and interpretations issued from time to time by the IFRS IC which are mandatory as at 31 December 2016.

The above accounting standards and interpretations are collectively referred to as "IFRS" in this report. The Group has not early adopted any amendments, standards or interpretations that have been issued but are not yet mandatory.

The Group's financial statements have been prepared on the basis of accounting policies consistent with those applied in the financial statements for the year ended 31 December 2015 except for the implementation of a number of minor amendments issued by the IASB and endorsed by the EU which have been applied for the first time in 2016. These new pronouncements do not have a significant impact on the Group's financial statements and therefore prior-period financial statements have not been restated for these pronouncements.

Mandatory for 2017 – not yet endorsed by the EU

Amendments to IAS 12: Recognition of Deferred Tax Assets for Unrealised Losses. These amendments on the recognition of deferred tax assets for unrealised losses clarify how to account for deferred tax assets related to debt instruments measured at fair value.

IAS 7 – Statement of cash flows, Narrow-scope amendments. The amendments introduce an additional disclosure that will enable users of financial statements to evaluate changes in liabilities arising from financing activities. The Group will be required to provide information on movements in gross liabilities arising from financing activities in addition to the net debt reconciliation currently provided.

The Group does not expect these pronouncements to have a significant impact on the Group's financial statements.

Mandatory beyond 2017

IFRS 9 "Financial Instruments", IFRS 15 "Revenue from Contracts with Customers" and IFRIC 22 "Foreign Currency Transactions and Advance Consideration" are mandatory in 2018 and IFRS 16 "Leases" is mandatory in 2019.

The Group's process of implementation of new pronouncements is in four stages:

- Diagnostic – the high-level identification of accounting issues in the new pronouncement that will impact the Group.
- Confirmation of understanding – the detailed review of contracts or other relevant data and training for finance, commercial, procurement and other teams.
- Solution development – identifying and progressing system and data changes.
- Implementation.

The Group is currently evaluating the impact of these pronouncements. This work is ongoing and additional impacts may be identified later in the implementation process.

IFRS 9 "Financial Instruments" – endorsed by the EU

The standard includes a single approach for the classification and measurement of financial assets, based on cash flow characteristics and the business model used for the management of the financial instruments. It introduces the expected credit loss model for impairment of financial assets which replaces the incurred loss model used in IAS 39. Lastly, the standard amends the rules on hedge accounting to align the accounting treatment with the risk management practices of the business.

Work to date has primarily focused on the Group's Treasury operations, which hold the majority of the Group's financial instruments, with a high level review of the rest of the Group. In 2017, a more detailed review will be completed including analysis at a business unit level. Potential differences identified to date relate to the alternative under IFRS 9 to amortise the cost of hedging over the life of the hedging instrument (this is currently taken directly to the income statement under IAS 39), and changes to the calculation of impairment losses as well as the possibility of increased application of hedge accounting. The Group does not currently expect the impact of these changes to be material.

IFRS 15 "Revenue from Contracts with Customers" – endorsed by the EU

The core principle of IFRS 15 is that an entity recognises revenue related to the transfer of promised goods or services when control of the goods or services passes to customers. The amount of revenue recognised should reflect the consideration to which the entity expects to be entitled in exchange for those goods or services.

Work to date has focused primarily on the Iron Ore and Aluminium product groups, as these together account for over 70 per cent of the Group's sales revenue, with a limited review of contracts at other product groups. In 2017, further review of contracts will be undertaken at all businesses. To date, no material measurement differences have been identified between IAS 18, the current revenue recognition standard, and IFRS 15.

The Group sells a significant proportion of its products on CFR or CIF Incoterms. This means that the Group is responsible for providing shipping services after the date at which control of the goods passes to the customer at the loading port. Under IAS 18, the Group recognises such shipping and other freight revenue and accrues the associated costs in full on loading. The impact of treating freight, where applicable, as a separate performance obligation and therefore recognising revenue over time would not have materially impacted revenue, costs or earnings as at 31 December 2016.

IFRS 15 as well as IFRS 9 requires certain additional disclosures, in particular in relation to the impact of provisional pricing and, where applicable, changes to systems are being made to capture this data.

The Group expects to adopt the modified transitional approach to implementation where any transitional adjustment is recognised in retained earnings at the date of implementation of the standard without adjustment of comparatives. The new standard will only be applied to contracts that remain in force at the transition date.

IFRIC 22 "Foreign Currency Transactions and Advance Consideration" – not yet endorsed by the EU

The Interpretation, which was issued on 8 December 2016, addresses how to determine the date of a transaction for the purpose of determining the exchange rate to use on initial recognition of an asset, expense or income (or part of it) when a related non-monetary asset or non-monetary liability arising from the payment or receipt of advance consideration in a foreign currency is derecognised.

The Group is currently evaluating the impact of this pronouncement.

IFRS 16 "Leases" – not yet endorsed by the EU

Under the new standard, a lessee is in essence required to:

(a) recognise all right of use assets and lease liabilities, with the exception of short term (under 12 months) and low value leases, on the balance sheet. The liability is initially measured at the present value of future lease payments for the lease term. This includes variable lease payments that depend on an index or rate but excludes other variable lease payments. The right of use asset reflects the lease liability, initial direct costs, any lease payments made before the commencement date of the lease, less any lease incentives and, where applicable, provision for dismantling and restoration.

(b) recognise depreciation of right of use assets and interest on lease liabilities in the income statement over the lease term.

(c) separate the total amount of cash paid into a principal portion (presented within financing activities) and interest portion (which the Group presents in operating activities) in the cash flow statement.

This standard will have an impact on the Group's earnings and shareholders' funds at transition and in future years. It must be implemented retrospectively, either with the restatement of comparatives or with the cumulative impact of application recognised as at 1 January 2019 under the modified retrospective approach.

IFRS 16 contains a number of practical expedients, one of which permits the classification of existing contracts as leases under current accounting standards to be carried over to IFRS 16.

Under the modified retrospective approach, on a lease-by-lease basis, the right of use of an asset may be deemed to be equivalent to the liability at transition or calculated retrospectively as at inception of the lease.

Under IFRS 16 the present value of the Group's operating lease commitments as defined under the new standard, excluding low value leases and short term leases, will be shown as right of use assets and as lease liabilities on the balance sheet. Information on the undiscounted amount of the Group's operating lease commitments under IAS 17, the current leasing standard, is disclosed in note 31. The Group is considering the available options for transition.

To date, work has focused on the identification of the provisions of the standard which will most impact the Group. In 2017, work on these issues and their resolution will continue and work on the detailed review of contracts and financial reporting impacts will commence as well as assessment of likely changes to systems.

Judgments in applying accounting policies and key sources of estimation uncertainty

The preparation of the financial statements requires management to make assumptions, judgments and estimates and to use judgment in applying accounting policies and in making critical accounting estimates.

These assumptions, judgments and estimates are based on management's best knowledge of the relevant facts and circumstances, having regard to previous experience, but actual results may differ materially from the amounts included in the financial statements. Key areas of judgment and estimation uncertainty are highlighted below and further information is contained in the accounting policies and/or the notes to the financial statements.

Areas of judgment that have the most significant effect on the amounts recognised in the financial statements are:

– Dual listed companies reporting (see Dual listed companies structure on page 115);
– Determination of Cash Generating Units (CGUs), review of asset carrying values, impairment charges and reversals and the recoverability of goodwill – note 1(e) and (i), note 6, note 12 and note 13;
– Estimation of asset lives – note 1(e) and (i);
– Determination of ore reserve and mineral resource estimates – note 1(j);
– Provision for onerous contracts – note 1(i);
– Close-down, restoration and environmental obligations – note 1(k);
– Deferral of stripping costs – note 1(h);
– Recognition of deferred tax on mining rights recognised in acquisitions – note 1(m);
– Uncertain tax positions – note 1(m), note 9 and note 31;
– Recoverability of potential deferred tax assets – note 17(c), (e) and (f);
– Capitalisation of exploration and evaluation costs and development costs prior to the decision to mine/construct – note 1(f);
– Identification of functional currencies – note 1(d);
– Estimation of obligations for post-employment costs– note 1(n) and note 45;
– Basis of consolidation – note 1(b) and note 42;
– Contingencies – note 31.

Key sources of estimation uncertainty that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year are:

– Review of asset carrying values, impairment charges and reversals and the recoverability of goodwill – note1(e) and (i), note 6, note 12 and note 13;
– Estimation of asset lives – note 1(e) and (i);
– Determination of ore reserve and mineral resource estimates – note 1(j);
– Provision for onerous contracts – note 1(i);
– Estimation of close-down, restoration and environmental costs and the timing of expenditure – note 1(k) and note 26;
– Uncertain tax positions – note 1(m), note 9 and note 31;
– Recoverability of potential deferred tax assets – note 17 (c), (e) and (f);
– Capitalisation of exploration and evaluation costs and development costs prior to the decision to mine/construct – note 1(f);
– Estimation of obligations for post-employment costs – note 1(n) and note 45;
– Contingencies – note 31.

These areas of judgment and estimation are discussed further in critical accounting policies and estimates on pages 125 to 127.

(a) Accounting convention

The financial information included in the financial statements for the year ended 31 December 2016, and for the related comparative periods, has been prepared under the historical cost convention, as modified by the revaluation of certain derivative contracts and financial assets, the impact of fair value hedge accounting on the hedged item and the accounting for post-employment assets and obligations. The Group's policy in respect of these items is set out in the notes below.

Notes to the 2016 financial statements
continued

1 Principal accounting policies continued

The Group's financial statements are presented in US dollars and all values are rounded to the nearest million (US$m) unless otherwise stated.

Where applicable, comparatives have been adjusted to measure or present them on the same basis as current period figures.

(b) Basis of consolidation (notes 33 to 36)

All intragroup transactions and balances have been eliminated on consolidation.

Where necessary, adjustments are made to the locally reported assets, liabilities, and results of subsidiaries, joint arrangements and associates to bring their accounting policies into line with those used by the Group.

Subsidiaries: Subsidiaries are entities controlled by either of the Companies. Control exists where either of the Companies has: power over the entities, that is, existing rights that give it the current ability to direct the relevant activities of the entities (those that significantly affect the Companies' returns); exposure, or rights, to variable returns from its involvement with the entities; and the ability to use its power to affect those returns. Subsidiaries are fully consolidated from the date on which control is transferred to the Group. They are deconsolidated from the date that control ceases.

Unincorporated arrangements: In some cases, the Group participates in unincorporated arrangements and has rights to its share of the assets and obligations for its share of the liabilities of the arrangement rather than a right to a net return, but does not share joint control. In such cases, the Group recognises: its share of assets and liabilities; revenue from the sale of its share of the output and its share of any revenue generated from the sale of the output by the unincorporated arrangement; and its share of expenses. All such amounts are measured in accordance with the terms of the arrangement, which is usually in proportion to the Group's interest in the arrangement. These amounts are recorded in the Group's financial statements on the appropriate lines.

Joint arrangements: A joint arrangement is an arrangement in which two or more parties have joint control. Joint control is the contractually agreed sharing of control such that decisions about the relevant activities of the arrangement (those that significantly affect the Companies' returns) require the unanimous consent of the parties sharing control. The Group has two types of joint arrangements:

Joint operations (JO): A JO is a joint arrangement in which the parties that share joint control have rights to the assets, and obligations for the liabilities, relating to the arrangement. This includes situations where the parties benefit from the joint activity through a share of the output, rather than by receiving a share of the results of trading. In relation to its interest in a JO, the Group recognises: its share of assets and liabilities; revenue from the sale of its share of the output and its share of any revenue generated from the sale of the output by the JO; and its share of expenses. All such amounts are measured in accordance with the terms of the arrangement, which is usually in proportion to the Group's interest in the JO. These amounts are recorded in the Group's financial statements on the appropriate lines.

Joint ventures (JV): A JV is a joint arrangement in which the parties that share joint control have rights to the net assets of the arrangement. JVs are accounted for using the equity accounting method.

Associates: An associate is an entity, that is neither a subsidiary nor a joint arrangement, over which the Group has significant influence. Significant influence is presumed to exist where there is neither control nor joint control and the Group has over 20 per cent of the voting rights, unless it can be clearly demonstrated that this is not the case. Significant influence can arise where the Group holds less than 20 per cent of the voting rights if it has the power to participate in the financial and operating policy decisions affecting the entity. Investments in associates are accounted for using the equity accounting method.

The Group uses the term "equity accounted units" (EAUs) to refer to associates and JVs collectively. Under the equity accounting method the investment is recorded initially at cost to the Group, including any goodwill on acquisition. In subsequent periods the carrying amount of the investment is adjusted to reflect the Group's share of the EAUs' retained post-acquisition profit or loss and other comprehensive income. Long term loans to EAUs that in substance form part of the Group's net investment (quasi equity loans) are financial assets but are included in the line "Investments in equity accounted units" on the face of the balance sheet. When the Group's share of losses in an EAU equals or exceeds its interest in the EAU, including such long term loans and any other unsecured receivables, the Group does not recognise further losses, unless it has incurred legal or constructive obligations to continue to make payments on behalf of the EAU.

Acquisitions (note 37)

Under the "acquisition" method of accounting for business combinations, the purchase consideration is allocated to the identifiable assets acquired and liabilities and contingent liabilities assumed (the identifiable net assets) on the basis of their fair value at the date of acquisition, which is the date on which control is obtained.

The consideration transferred for the acquisition of a subsidiary comprises the fair values of the assets transferred, the liabilities incurred to the former owners of the acquiree, the fair value of any asset or liability resulting from a contingent consideration arrangement and any equity interests issued by the Group. Costs related to the acquisition of a subsidiary are expensed as incurred.

The excess of the consideration transferred, the amount of any non-controlling interest in the acquiree and the acquisition-date fair value of any previous equity interest in the acquiree over the fair value of the identifiable net assets acquired is recorded as goodwill. Any shortfall is immediately recognised in the income statement.

Provisional fair values allocated at a reporting date are finalised within 12 months of the acquisition date.

Non-controlling interests in the acquiree, that are present ownership interests and entitle their holders to a proportionate share of the entity's net assets in the event of liquidation, are recognised by the Group in one of two ways with the choice being available on an acquisition-by-acquisition basis. They can be measured at either the non-controlling interest's proportionate share of the acquiree's identifiable net assets or at fair value. In some cases, non-controlling interests may be treated as equity options and valued on that basis. Goodwill (see note (e)) and amounts attributable to non-controlling interests will differ depending on the basis used.

Where the Group has a previously held non-controlling interest in the acquiree, this is remeasured to fair value at the date control is gained with any gain or loss recognised in the income statement. The cash cost of the share purchase that gives rise to control is included within "Investing activities" in the cash flow statement.

Where the Group increases its ownership interest in a subsidiary, the difference between the purchase price and the carrying value of the share of net assets acquired is recorded in equity. The cash cost of such purchases is included within "Financing activities" in the cash flow statement.

The results of businesses acquired during the year are included in the consolidated financial statements from the date on which control, joint control or significant influence commences.

Disposals (note 37)

Individual non-current assets or "disposal groups" (that is, groups of assets and liabilities) to be disposed of by sale or otherwise in a single transaction are classified as "held for sale" if the following criteria are met at the period end:

- the carrying amount will be recovered principally through a sale transaction rather than through continuing use; and

– the disposal group is available for immediate sale in its present condition subject only to terms that are usual and customary for such sales; and
– the sale is highly probable.

Disposal groups held for sale are carried at the lower of their carrying amount and fair value less costs to sell. The comparative balance sheet is not restated. Disposal groups acquired with a view to resale are held at the fair value determined at the acquisition date. For these assets acquired for resale no profits or losses are recognised between the acquisition date and the disposal date, unless there is a subsequent impairment.

On classification as held for sale, the assets are no longer depreciated and, if applicable, equity accounting ceases.

If control is lost, any interest in the entity retained by the Group is remeasured to its fair value and the change in carrying amount is recognised in the income statement. The retained interest may be subsequently accounted for as a joint venture, joint operation, associate or financial asset depending on the facts. Certain amounts previously recognised in other comprehensive income in respect of the entity disposed of, or for which control, joint control or significant influence has ceased, may be recycled to the income statement. The cash proceeds of disposals are included within "Investing activities" in the cash flow statement.

Changes in the Group's interest in a subsidiary that do not result in a loss of control are accounted for in equity. The cash proceeds of such disposals are included within "Financing activities" in the cash flow statement.

(c) Sales revenue

Sales revenue comprises sales to third parties. All shipping and handling costs incurred by the Group are recognised as operating costs. Amounts billed to customers in respect of shipping and handling are classified as sales revenue where the Group is responsible for freight. If the Group is acting solely as an agent, amounts billed to customers are offset against the relevant costs. Revenue from other services is recognised as those services are rendered to and accepted by the customer.

Sales revenue excludes any applicable sales taxes. Mining royalties payable are presented as an operating cost or, where they are in substance a profit-based tax, within taxation.

Revenues from the sale of significant by-products, such as gold, are included in sales revenue. Sundry revenue, incidental to the main revenue-generating activities of the operations, is treated as a credit to operating costs.

Third-party commodity swap arrangements for delivery and receipt of smelter grade alumina are offset within operating costs.

Sales of copper concentrate are stated at their invoiced amount which is net of treatment and refining charges.

Sales revenue is only recognised on individual sales when all of the following criteria are met:

– 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.

In most instances, sales revenue is recognised when the product is delivered to the destination specified by the customer, which is typically the vessel on which it will be shipped, the destination port or the customer's premises.

The Group's products are sold to customers under contracts which vary in tenure and pricing mechanisms, including some volumes sold in the spot market. Sales revenue is commonly subject to adjustment based on an inspection of the product by the customer.

Pricing for iron ore is on a range of terms, the majority being either monthly or quarterly average pricing mechanisms, with a smaller proportion of iron ore volumes being sold on the spot market.

Certain of the Group's products are provisionally priced at the date revenue is recognised, however, with the exception of copper, prices are generally finalised within the quarter of the month of shipment. The final selling price is based on the price for the quotational period stipulated in the contract. Substantially all iron ore sales are reflected at final prices in the results for the period. Final prices for copper concentrate are normally determined between 30 to 180 days after delivery to the customer. Revenue for provisionally priced copper sales is recognised at the period end based on estimates of the fair value of the consideration receivable based on relevant forward market prices. The change in fair value attributable to prices is included in sales revenue.

Information on provisionally priced sales contracts is included in note 30.

(d) Currency translation

The functional currency for each entity in the Group, and for joint arrangements and associates, is the currency of the primary economic environment in which that entity operates. For many entities, this is the currency of the country in which they are located. Transactions denominated in other currencies are converted to the functional currency at the exchange rate ruling at the date of the transaction. Monetary assets and liabilities denominated in foreign currencies are retranslated at period-end exchange rates.

The Group's financial statements are presented in US dollars, as that presentation currency most reliably reflects the global business performance of the Group as a whole. On consolidation, income statement items for each entity are translated from the functional currency into US dollars at average rates of exchange, except for material one-off transactions, which are translated at the rate prevailing on the transaction date. Balance sheet items are translated into US dollars at period-end exchange rates.

Exchange differences arising on the translation of the net assets of entities with functional currencies other than the US dollar are recognised directly in the currency translation reserve. These translation differences are shown in the statement of comprehensive income, with the exception of translation adjustments relating to Rio Tinto Limited's share capital which are shown in the statement of changes in equity.

Where an intragroup balance is, in substance, part of the Group's net investment in an entity, exchange gains and losses on that balance are taken to the currency translation reserve.

Except as noted above, or in relation to derivative contracts designated as cash flow hedges, all other exchange differences are charged or credited to the income statement in the year in which they arise.

(e) Goodwill and intangible assets (excluding exploration and evaluation expenditure) (notes 12 and 13)

Goodwill is not amortised; it is tested annually for impairment or more frequently if events or changes in circumstances indicate a potential impairment. Investments in EAUs, including any goodwill, are tested for impairment as a single asset when a trigger for impairment has been identified. The Group's impairment policy is explained in note 1(i).

Purchased intangible assets are initially recorded at cost. Finite-life intangible assets are amortised over their useful economic lives on a straight-line or units of production basis, as appropriate. Intangible assets that are deemed to have indefinite lives and intangible assets that are not yet ready for use are not amortised; they are reviewed annually for impairment or more frequently if events or changes in circumstances indicate a potential impairment in accordance with accounting policy note 1(i).

Notes to the 2016 financial statements
continued

1 Principal accounting policies continued

The Group considers that intangible assets have indefinite lives when, based on an analysis of all of the relevant factors, there is no foreseeable limit to the period over which the asset is expected to generate cash flows for the Group. The factors considered in making this judgment include the existence of contractual rights for unlimited terms or evidence that renewal of the contractual rights without significant incremental cost can be expected for indefinite future periods in view of the Group's investment intentions. The life cycles of the products and processes that depend on the asset are also considered.

(f) Exploration and evaluation (note 13)
Exploration and evaluation expenditure comprises costs that are directly attributable to:

– researching and analysing existing exploration data;
– conducting geological studies, exploratory drilling and sampling;
– examining and testing extraction and treatment methods; and/or
– compiling pre-feasibility and feasibility studies.

Exploration expenditure relates to the initial search for deposits with economic potential. Expenditure on exploration activity undertaken by the Group is not capitalised.

Evaluation expenditure relates to a detailed assessment of deposits or other projects that have been identified as having economic potential. Capitalisation of evaluation expenditure commences when there is a high degree of confidence that the Group will determine that a project is commercially viable, that is the project will provide a satisfactory return relative to its perceived risks, and therefore it is considered probable that future economic benefits will flow to the Group.

The carrying values of capitalised evaluation expenditure for undeveloped mining projects (projects for which the decision to mine has not yet been approved at the appropriate authorisation level within the Group) are reviewed at each reporting date for indicators of impairment in accordance with IFRS 6 and when indicators are identified, are tested in accordance with IAS 36. Evaluation expenditure for non-mining projects is reviewed and tested under IAS 36.

In the case of undeveloped mining projects which have arisen through acquisition, the allocation of the purchase price consideration may result in undeveloped properties being recognised at an earlier stage of project evaluation compared with projects arising from the Group's exploration and evaluation programme. The impairment review is based on a status report summarising the Group's intentions to recover value through development, sale or other partnering arrangements. Subsequent expenditure on acquired undeveloped projects is only capitalised if it meets the high degree of confidence threshold discussed above.

In some cases, undeveloped projects are regarded as successors to orebodies, smelters or refineries currently in production. Where this is the case, it is intended that these will be developed and go into production when the current source of ore is exhausted or to replace the output when existing smelters or refineries are closed.

(g) Property, plant and equipment (note 14)
Once an undeveloped mining project has been determined as commercially viable and approval to mine has been given, expenditure other than that on land, buildings, plant, equipment and capital work in progress is capitalised under "Mining properties and leases" together with any amount transferred from "Exploration and evaluation". Ore reserves may be declared for an undeveloped mining project before its commercial viability has been fully determined. Evaluation costs may continue to be capitalised during the period between declaration of ore reserves and approval to mine as further work is undertaken in order to refine the development case to maximise the project's returns.

Costs of evaluation of a smelter or refinery prior to approval to develop are capitalised under "Capital works in progress", provided that there is a high degree of confidence that the project will be deemed to be commercially viable.

Costs which are necessarily incurred whilst 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 are expected to give rise to a future economic benefit. Interest on borrowings related to construction or development projects is capitalised, at the rate payable on project-specific debt if applicable or at the Group or subsidiary's cost of borrowing if not, until the point when substantially all the activities that are necessary to make the asset ready for its intended use are complete. It may be appropriate to use a subsidiary's cost of borrowing when the debt was negotiated based on the financing requirements of that subsidiary.

Property, plant and equipment is stated at cost, as defined in IAS 16, less accumulated depreciation and accumulated impairment losses. The cost of property, plant and equipment includes, where applicable, the estimated close-down and restoration costs associated with the asset.

(h) Deferred stripping (note 14)
In open pit mining operations, overburden and other waste materials must be removed to access ore from which minerals can be extracted economically. The process of removing overburden and waste materials is referred to as stripping. During the development of a mine (or pit), before production commences, stripping costs related to a component of an orebody are capitalised as part of the cost of construction of the mine (or pit) and are subsequently amortised over the life of the mine (or pit) on a units of production basis.

In order for production phase stripping costs to qualify for capitalisation as a stripping activity asset, three criteria must be met:

– it must be probable that there will be an economic benefit in a future accounting period because the stripping activity has improved access to the orebody;
– it must be possible to identify the "component" of the orebody for which access has been improved; and
– it must be possible to reliably measure the costs that relate to the stripping activity.

A "component" is a specific section of the orebody that is made more accessible by the stripping activity. It will typically be a subset of the larger orebody that is distinguished by a separate useful economic life (for example, a pushback).

Production phase stripping can give rise to two benefits: the extraction of ore in the current period and improved access to ore which will be extracted in future periods. When the cost of stripping which has a future benefit is not distinguishable from the cost of producing current inventories, the stripping cost is allocated to each of these activities based on a relevant production measure using a life-of-component strip ratio. The ratio divides the tonnage of waste mined for the component for the period either by the quantity of ore mined for the component or by the quantity of minerals contained in the ore mined for the component. In some operations, the quantity of ore is a more appropriate basis for allocating costs, particularly where there are significant by-products. Stripping costs for the component are deferred to the extent that the current period ratio exceeds the life of component ratio. The stripping activity asset is depreciated on a "units of production" basis based on expected production of either ore or contained minerals over the life of the component unless another method is more appropriate.

The life-of-component ratios are based on the ore reserves of the mine (and for some mines, other mineral resources) and the annual mine plan; they are a function of the mine design and therefore, changes to that design will generally result in changes to the ratios. Changes in other technical or economic parameters that impact the ore reserves (and for some mines, other mineral resources) may also have an impact on the life-of-component ratios even if they do not affect the mine design. Changes to the ratios are accounted for prospectively.

It may be the case that subsequent phases of stripping will access additional ore and that these subsequent phases are only possible after the first phase has taken place. Where applicable, the Group considers this on a mine-by-mine basis. Generally, the only ore attributed to the stripping activity asset for the purposes of calculating a life-of-component ratio, and for the purposes of amortisation, is the ore to be extracted from the originally identified component.

Where a mine operates several open pits that are regarded as separate operations for the purpose of mine planning, initial stripping costs are accounted for separately by reference to the ore from each separate pit. If, however, the pits are highly integrated for the purpose of mine planning, the second and subsequent pits are regarded as extensions of the first pit in accounting for stripping costs. In such cases, the initial stripping (i.e. overburden and other waste removal) of the second and subsequent pits is considered to be production phase stripping.

The Group's judgment as to whether multiple pit mines are considered separate or integrated operations depends on each mine's specific circumstances.

The following factors would point towards the initial stripping costs for the individual pits being accounted for separately:

- If mining of the second and subsequent pits is conducted consecutively with that of the first pit, rather than concurrently.
- If separate investment decisions are made to develop each pit, rather than a single investment decision being made at the outset.
- If the pits are operated as separate units in terms of mine planning and the sequencing of overburden removal and ore mining, rather than as an integrated unit.
- If expenditures for additional infrastructure to support the second and subsequent pits are relatively large.
- If the pits extract ore from separate and distinct orebodies, rather than from a single orebody.

If the designs of the second and subsequent pits are significantly influenced by opportunities to optimise output from the several pits combined, including the co-treatment or blending of the output from the pits, then this would point to treatment as an integrated operation for the purposes of accounting for initial stripping costs.

The relative importance of each of the above factors is considered in each case.

Deferred stripping costs are included in "Mining properties and leases" within "Property, plant and equipment" or within "Investments in equity accounted units", as appropriate. Amortisation of deferred stripping costs is included in "Depreciation of property, plant and equipment" within "Net operating costs" or in "Share of profit after tax of equity accounted units", as appropriate.

(i) Depreciation and impairment (notes 13 and 14)

Depreciation of non-current assets

Property, plant and equipment is depreciated over its useful life, or over the remaining life of the mine or smelter or refinery if that is shorter and there is no reasonable alternative use for the asset by the Group.

The useful lives of the major assets of a cash-generating unit are often dependent on the life of the orebody to which they relate. Where this is the case, the lives of mining properties, and their associated refineries, concentrators and other long-lived processing equipment are generally based on the expected life of the orebody. The life of the orebody, in turn, is estimated on the basis of the life-of-mine plan. Where the major assets of a cash-generating unit are not dependent on the life of a related orebody, management applies judgment in estimating the remaining service potential of long-lived assets. Factors affecting the remaining service potential of smelters include, for example, smelter technology and electricity purchase contracts when power is not sourced from the company's, or in some cases a local government's, renewably sourced electricity generating capacity.

The useful lives and residual values for material assets and categories of assets are reviewed annually and changes are reflected prospectively.

Depreciation commences when an asset is available for use. The major categories of property, plant and equipment are depreciated on a units of production and/or straight-line basis as follows:

Units of production basis

For mining properties and leases and certain mining equipment, consumption of the economic benefits of the asset is linked to production. Except as noted below, these assets are depreciated on a units of production basis.

In applying the units of production method, depreciation is normally calculated based on production in the period as a percentage of total expected production in current and future periods based on ore reserves and, for some mines, other mineral resources. Other mineral resources may be included in depreciation calculations in limited circumstances and where there is a high degree of confidence that they can be extracted economically. This would be the case when the other mineral resources do not yet have the status of ore reserves merely because the necessary detailed evaluation work has not yet been performed and the responsible technical personnel agree that inclusion of a proportion of measured and indicated resources is appropriate based on historical reserve conversion rates.

Other mineral resources would usually only be included in unit of production calculations where there are very large areas of contiguous mineralisation, for which the economic viability is not sensitive to likely variations in grade, as may be the case for certain iron ore, bauxite and industrial minerals deposits. The required level of confidence is unlikely to exist for minerals that are typically found in low-grade ore (as compared with the above), such as copper or gold. In these cases, specific areas of mineralisation have to be evaluated in considerable detail before their economic status can be predicted with confidence.

Where measured and indicated resources are used in the calculation of depreciation for infrastructure, primarily rail and port, which will benefit current and future mines, then the measured and indicated resources may relate to mines which are currently in production or to mines where there is a high degree of confidence that they will be brought into production in the future. The quantum of mineral resources is determined taking into account future capital costs as required by the Joint Ore Reserves Committee (JORC) code. The depreciation calculation, however, does not take into account future development costs for mines which are not yet in production. Measured and indicated resources are currently incorporated into depreciation calculations in the Group's Australian iron ore business.

Straight-line basis

Assets within operations for which production is not expected to fluctuate significantly from one year to another or which have a physical life shorter than the related mine are depreciated on a straight-line basis.

Impairment charges/reversals of non-current assets

Impairment charges and reversals are assessed at the level of cash-generating units which, in accordance with IAS 36 "Impairment of Assets", are identified as the smallest identifiable asset or group of assets that generate cash inflows, which are largely independent of the cash inflows from other assets. Separate cash-generating units are identified where an active market exists for intermediate products, even if the majority of those products are further processed internally. Impairment of financial assets is evaluated in accordance with IAS 39.

In some cases, individual business units consist of several operations with independent cash-generating streams which constitute separate cash-generating units.

Goodwill acquired through business combinations is allocated to the cash-generating unit or groups of cash-generating units if that is the lowest level within the Group at which goodwill is monitored for internal management purposes, that are expected to benefit from the related business combination. All goodwill, intangible assets that have an indefinite life and intangible assets that are not ready for use are tested annually for impairment as at 30 September, regardless of whether there has been an impairment trigger or more frequently if events or changes in circumstances indicate a potential impairment.

Notes to the 2016 financial statements
continued

1 Principal accounting policies continued

Property, plant and equipment and intangible assets with finite lives are reviewed for impairment if there is an indication that the carrying amount may not be recoverable. The Group conducts an internal review of the asset values annually as at 30 September which is used as a source of information to assess for indications of impairment or reversal of previously recognised impairment losses. External factors, such as changes in forecasted commodity prices, costs and other market factors as well as internal factors such as cancellation of a project or reduced project scope, are also monitored to assess for indications of impairment or reversal of previously recognised impairment losses. If any such indication exists then an impairment review is undertaken; the recoverable amount is assessed by reference to the higher of value in use (being the net present value of expected future cash flows of the relevant cash-generating unit in its current condition) and fair value less costs of disposal (FVLCD).

When the recoverable amount of the cash-generating unit is measured by reference to FVLCD, this amount is further classified in accordance with the fair value hierarchy for observable market data that is consistent with the unit of account for the cash-generating unit being tested. The Group considers that the best evidence of FVLCD is the value obtained from an active market or binding sale agreement and, in this case, the recoverable amount is classified in the fair value hierarchy as level 1. When FVLCD is based on quoted prices for equity instruments but adjusted to reflect factors such as a lack of liquidity in the market, the recoverable amount is classified as level 2 in the fair value hierarchy. No cash-generating units are currently assessed for impairment by reference to a recoverable amount based on FVLCD classified as level 1 or level 2.

Where unobservable inputs are material to the measurement of the recoverable amount, FVLCD is based on the best information available to reflect the amount the Group could receive for the cash-generating unit in an orderly transaction between market participants at the measurement date. This is often estimated using discounted cash flow techniques and is classified as level 3 in the fair value hierarchy.

Where the recoverable amount is assessed using FVLCD based on discounted cash flow techniques, the resulting estimates are based on detailed life-of-mine and/or long-term production plans. The latter may include brownfield expansions which have not yet been approved at the appropriate authorisation level in the Group.

The cash flow forecasts for FVLCD purposes are based on management's best estimates of expected future revenues and costs, including the future cash costs of production, capital expenditure, closure, restoration and environmental costs. For the purposes of determining FVLCD from a market participant's perspective, the cash flows incorporate management's price and cost assumptions in the short and medium term. In the longer term, operating margins are assumed to remain constant where appropriate, as it is considered unlikely that a market participant would prepare detailed forecasts over a longer term. The cash flow forecasts may include net cash flows expected to be realised from the extraction, processing and sale of material that does not currently qualify for inclusion in ore reserves. Such non-reserve material is only included when there is a high degree of confidence in its economic extraction. This expectation is usually based on preliminary drilling and sampling of areas of mineralisation that are contiguous with existing ore reserves. Typically, the additional evaluation required to achieve reserves status for such material has not yet been done because this would involve incurring evaluation costs earlier than is required for the efficient planning and operation of the mine.

As noted above, cost levels incorporated in the cash flow forecasts for FVLCD purposes are based on the current life-of-mine plan or long-term production plan for the cash-generating unit. This differs from value in use which requires future cash flows to be estimated for the asset in its current condition and therefore does not include future cash flows associated with improving or enhancing an asset's performance.

Anticipated enhancements to assets may be included in FVLCD calculations and therefore, generally result in a higher value.

Where the recoverable amount of a cash-generating unit is dependent on the life of its associated orebody, expected future cash flows reflect the current life of mine and/or long-term production plans, which are based on detailed research, analysis and iterative modelling to optimise the level of return from investment, output and sequence of extraction. The mine plan takes account of all relevant characteristics of the orebody, including waste-to-ore ratios, ore grades, haul distances, chemical and metallurgical properties of the ore impacting process recoveries and capacities of processing equipment that can be used. The life-of-mine plan and/or long term production plans are, therefore, the basis for forecasting production output and production costs in each future year.

Forecast cash flows for ore reserve estimation for JORC purposes are generally based on Rio Tinto's commodity price forecasts, which assume short-term market prices will revert to the Group's assessment of the long-term price, generally over a period of three to five years. For most commodities, these forecast commodity prices are derived from a combination of analyses of the marginal costs of the producers and of the incentive price of these commodities. These assessments often differ from current price levels and are updated periodically. The Group does not believe that published medium and long-term forward prices necessarily provide a good indication of future levels because they tend to be strongly influenced by spot prices. The price forecasts used for ore reserve estimation are generally consistent with those used for impairment testing unless management deems that in certain economic environments, a market participant would not assign Rio Tinto's view on prices, in which case management estimates the assumptions that a market participant would be expected to use.

Forecast future cash flows of a cash-generating unit take into account the sales prices under existing sales contracts.

The discount rates applied to the future cash flow forecasts represent an estimate of the rate the market would apply having regard to the time value of money and the risks specific to the asset for which the future cash flow estimates have not been adjusted. The Group's weighted average cost of capital is generally used as a starting point for determining the discount rates, with appropriate adjustments for the risk profile of the countries in which the individual cash-generating units operate. For final feasibility studies and ore reserve estimation, internal hurdle rates, which are generally higher than the Group's weighted average cost of capital, are used. For developments funded with project finance, the debt component of the weighted average cost of capital may be calculated by reference to the specific interest rate of the project finance and anticipated leverage of the project.

For operations with a functional currency other than the US dollar, the impairment review is undertaken in the relevant functional currency. In estimating FVLCD, internal forecasts of exchange rates take into account spot exchange rates, historical data and external forecasts, and are kept constant in real terms after five years. The great majority of the Group's sales are based on prices denominated in US dollars. To the extent that the currencies of countries in which the Group produces commodities strengthen against the US dollar without commodity price offset, cash flows and, therefore, net present values are reduced. Management considers that over the long term, there is a tendency for movements in commodity prices to compensate to some extent for movements in the value of the US dollar, particularly against the Australian dollar and Canadian dollar, and vice versa. However, such compensating changes are not synchronised and do not fully offset each other. In estimating value in use, the present value of future cash flows in foreign currencies is translated at the spot exchange rate on the testing date.

Non-current assets (excluding goodwill) that have suffered impairment are reviewed using the same basis for valuation of such assets as explained above whenever events or changes in circumstances indicate that the impairment loss may no longer exist, or may have decreased. If appropriate an impairment reversal will be recognised. The carrying amount of the cash-generating unit after reversal must be the lower of (a) the recoverable amount, as calculated above, and (b) the carrying amount that would have been determined (net of amortisation or depreciation) had no impairment loss been recognised for the cash-generating unit in prior periods.

An onerous contract is defined under IAS 37 "Provisions, Contingent Liabilities and Contingent Assets" as a contract under which the unavoidable costs of meeting the obligations under the contract exceed the economic benefits expected to be received under it. However, no provision is required unless the related assets, which may be the wider cash-generating unit of which the business unit forms part, are fully impaired or the contract becomes stranded as a result of a business decision.

(j) Determination of ore reserve and mineral resource estimates

The Group estimates its ore reserves and mineral resources based on information compiled by Competent Persons as defined in accordance with the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves of December 2012 (the "JORC code", which is produced by the Australasian Joint Ore Reserves Committee).

Ore reserves and, for certain mines, other mineral resources, determined in this way are used in the calculation of depreciation, amortisation and impairment charges and for forecasting the timing of the payment of close-down and restoration costs and the recovery of deferred tax assets. The depreciation and impairment policy above notes instances in which mineral resources are taken into account for accounting purposes. In addition, value may be attributed to mineral resources in purchase price allocations undertaken for the purposes of business combination accounting.

(k) Close-down, restoration and environmental obligations (note 26)

The Group has provisions for close-down and restoration costs which include the dismantling and demolition of infrastructure, the removal of residual materials and the remediation of disturbed areas for mines and certain refineries and smelters. These provisions are based on all regulatory requirements and any other commitments made to stakeholders. Closure provisions are not made for those operations that have no known restrictions on their lives as the closure dates cannot be reliably estimated. This applies primarily to certain North American smelters which have indefinite-lived water rights or power agreements for renewably sourced power with local governments.

Close-down and restoration costs are a normal consequence of mining or production, and the majority of close-down and restoration expenditure is incurred in the years following closure of the mine, refinery or smelter. Although the ultimate cost to be incurred is uncertain, the Group's businesses estimate their costs using current restoration standards and techniques.

Close-down and restoration costs are provided for in the accounting period when the obligation arising from the related disturbance occurs, based on the net present value of the estimated future costs of restoration to be incurred during the life of the operation and post closure. Where appropriate, the provision is estimated using probability weighting of the different remediation and closure scenarios. The obligation may occur during development or during the production phase of a facility.

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, and are reviewed at each reporting period during the life of the operation to reflect known developments. The estimates are also subject to formal review, with appropriate external support, at regular intervals.

The initial close-down and restoration provision is capitalised within "Property, plant and equipment". Subsequent movements in the close-down and restoration provisions for ongoing operations, including those resulting from new disturbance related to expansions or other activities qualifying for capitalisation, updated cost estimates, changes to the estimated lives of operations, changes to the timing of closure activities and revisions to discount rates are also capitalised within "Property, plant and equipment". These costs are then depreciated over the lives of the assets to which they relate. Changes in closure provisions relating to closed operations are charged/credited to "Net operating costs" in the income statement.

Where rehabilitation is conducted systematically over the life of the operation, rather than at the time of closure, provision is made for the estimated outstanding continuous rehabilitation work at each balance sheet date and the cost is charged to the income statement.

The amortisation or "unwinding" of the discount applied in establishing the provisions is charged to the income statement in each accounting period. The amortisation of the discount is shown within "Finance items" in the income statement.

Environmental costs result from environmental damage that was not a necessary consequence of operations, and may include remediation, compensation and penalties. Provision is made for the estimated present value of such costs at the balance sheet date. These costs are charged to "Net operating costs", except for the unwinding of the discount which is shown within "Finance items".

Remediation procedures may commence soon after the time the disturbance, remediation process and estimated remediation costs become known, but can continue for many years depending on the nature of the disturbance and the remediation techniques used.

(l) Inventories (note 16)

Inventories are valued at the lower of cost and net realisable value, primarily on a weighted average cost basis. Average costs are calculated by reference to the cost levels experienced in the relevant month together with those in opening inventory. The cost of raw materials and consumable stores is the purchase price. The cost of partly-processed and saleable products is generally the cost of production, including:

– labour costs, materials and contractor expenses which are directly attributable to the extraction and processing of ore or the production of alumina and aluminium;
– the depreciation of mining properties and leases and of property, plant and equipment used in the extraction and processing of ore or the production of alumina and aluminium; and
– production overheads.

Work in progress includes ore stockpiles and other partly processed material. Stockpiles represent ore that has been extracted and is available for further processing. If there is significant uncertainty as to if and when the stockpiled ore will be processed, the ore is expensed as mined. If the ore will not be processed within 12 months after the balance sheet date, it is included within non-current assets and net realisable value is calculated on a discounted cash flow basis. Quantities of stockpiled ore are assessed primarily through surveys and assays. Certain estimates, including expected metal recoveries, are calculated using available industry, engineering and scientific data, and are periodically reassessed taking into account technical analysis and historical performance.

(m) Taxation (note 9 and note 17)

Current tax is the tax expected to be payable on the taxable income for the year calculated using rates that have been enacted or substantively enacted at the balance sheet date. It includes adjustments for tax expected to be payable or recoverable in respect of previous periods. Where the amount of tax payable or recoverable is uncertain, Rio Tinto establishes provisions based on the Group's judgment of the most likely amount of the liability, or recovery.

Deferred tax is calculated in accordance with IAS 12. The Group provides for deferred tax in respect of fair value adjustments on acquisitions. These adjustments may relate to assets such as mining rights that, in general, are not eligible for income tax allowances. Provision for deferred tax is based on the difference between the carrying value of the asset and its income tax base (which may be nil). Even when there is no income tax base, the existence of a tax base for capital gains tax

1 Principal accounting policies continued

purposes is not usually taken into account in determining the deferred tax provision for the assets, unless they are classified as held for sale, because it is expected that the carrying amount will be recovered primarily through use of the assets and not from disposal.

(n) Post-employment benefits (note 45)

The Group operates a number of defined benefit plans which provide lump sums, pensions, medical benefits and life insurance to retirees. In accordance with IAS 19, for post-employment defined benefit plans, the difference between the fair value of any plan assets and the present value of the plan obligations is recognised as an asset or liability in the balance sheet.

Where appropriate, the recognition of assets may be restricted to the present value of any amounts the Group expects to recover by way of refunds from the plan or reductions in future contributions. In determining the extent to which a refund will be available the Group has considered whether any third party, such as a trustee or pension committee, has the power to enhance benefits or to wind up a pension plan without the Group's consent.

The most significant assumptions used in accounting for pension plans are the discount rate, the inflation rate and the mortality rate. The discount rate is used to determine the net present value of the obligations, the interest cost on the obligations and the interest income on plan assets. The discount rate used is the yield on high-quality corporate bonds with maturities and terms that match those of the post-employment obligations as closely as possible. Where there is no developed corporate bond market in a currency, the rate on government bonds is used. The inflation rate is used to project increases in future benefit payments for those plans that have benefits linked to inflation. The mortality rates are used to project the period over which benefits will be paid, which is then discounted to arrive at the net present value of the obligations.

The current service cost, any past service cost and the effect of any curtailment or settlements are recognised in the income statement. The interest cost less interest income on assets held in the plans is also charged to the income statement. All amounts charged to the income statement in respect of these plans are included within "Net operating costs" or in "Share of profit after tax of equity accounted units", as appropriate.

The Group's contributions to defined contribution plans are charged to the income statement in the period to which the contributions relate.

(o) Cash and cash equivalents (note 21)

For the purpose of the balance sheet, cash and cash equivalents comprise: cash on hand, deposits held on call with banks, and short-term, highly liquid investments that are readily convertible into known amounts of cash and which are subject to insignificant risk of changes in value. Bank overdrafts are shown as current liabilities in the balance sheet.

For the purposes of the cash flow statement, cash and cash equivalents are net of bank overdrafts that are repayable on demand.

(p) Financial instruments (note 30)

(i) Financial assets

Classification

The Group classifies its financial assets in the following categories: at fair value through profit or loss; loans and receivables; held-to-maturity; and available-for-sale investments. The classification depends on the purpose for which the financial assets were acquired. The Group's policy with regard to financial risk management is set out in note 30. Generally, the Group does not acquire financial assets for the purpose of selling in the short term. When the Group enters into derivative contracts, these transactions are designed to reduce exposures related to assets and liabilities, firm commitments or anticipated transactions.

Management determines the classification of financial assets at initial recognition.

(a) Financial assets at fair value through profit or loss
Assets in this category are classified as current assets if expected to be settled within 12 months, otherwise they are classified as non-current. Derivatives, including embedded derivatives separated from the host contracts, are included within financial assets/financial liabilities at fair value through profit or loss unless they are designated as hedging instruments.

(b) Loans and receivables
Loans and receivables comprise non-derivative financial assets with fixed or determinable payments that are not quoted in an active market. Trade receivables are included within this category; however, trade receivables subject to provisional pricing are valued as explained in note 1(c) Sales revenue.

(c) Held-to-maturity
Held-to-maturity investments are non-derivative financial assets with fixed or determinable payments and fixed maturity that the Group has the intention and ability to hold to maturity and which do not qualify as loans and receivables. Assets in this category are classified as "Other investments" and are classified as current assets or non-current assets based on their maturity.

(d) Available-for-sale
Available-for-sale financial assets are non-derivative financial assets that are either designated as available-for-sale or not classified in any of the other categories. Assets in this category are included in non-current assets unless the Group intends to dispose of the assets within 12 months of the balance sheet date or the asset matures within 12 months.

Recognition and measurement

All derivatives, available-for-sale financial assets and financial assets at fair value through profit or loss are initially recognised at fair value, with transaction costs expensed in the income statement, and are subsequently carried at fair value. Loans and receivables and held-to-maturity financial assets are initially recognised at fair value plus transactions costs and are subsequently carried at amortised cost using the effective interest method.

The fair values of the various derivative instruments used for hedging purposes are disclosed in note 30. Movements on the hedging reserve are disclosed in note 29.

(ii) Financial liabilities

Borrowings and other financial liabilities (including trade payables but excluding derivative liabilities) are recognised initially at fair value, net of transaction costs incurred, and are subsequently stated at amortised cost.

The Group participates in supply chain finance arrangements whereby vendors may elect to receive early payment of their invoice from a bank by factoring their receivable from Rio Tinto. These arrangements do not modify the terms of the original liability and therefore, financial liabilities subject to supply chain finance continue to be classified as trade payables.

(q) Share-based payments (note 44)

The fair value of the Group's share plans is recognised as an expense over the expected vesting period with a corresponding entry to retained earnings for Rio Tinto plc plans and to other reserves for Rio Tinto Limited plans.

The Group uses fair values provided by independent actuaries calculated using either a lattice-based option valuation model or a Monte Carlo simulation model.

The terms of each plan are considered at the balance sheet date to determine whether the plan should be accounted for as equity or cash-settled. The Group does not operate any plans as cash-settled. However, the Performance Share Plan can, at the discretion of the directors, offer employees an equivalent amount in cash. This is not standard practice. In some jurisdictions, employees are granted cash-settled awards where equity-settled awards are prohibited by local laws and regulations. The value of these awards is immaterial.

The Group's equity-settled share plans are settled either by: the issuance of shares by the relevant parent company, the purchase of shares on market, or the use of shares held in treasury which were previously acquired as part of a share buy-back. If the cost of shares acquired to satisfy the plans differs from the expense charged, the difference is taken to retained earnings or other reserves, as appropriate.

(r) Share capital (notes 27 and 28)

Ordinary shares are classified as equity. Incremental costs directly attributable to the issuance of new shares are shown in equity as a deduction, net of tax, from the proceeds.

Where any Group company purchases the Group's equity share capital (treasury shares), the consideration paid, including any directly attributable incremental costs (net of income taxes) is deducted from equity attributable to owners of Rio Tinto. Where such shares are subsequently reissued, any consideration received, net of any directly-attributable incremental costs and the related income tax effects, is included in equity attributable to owners of Rio Tinto.

(s) Segment reporting (notes 2 and 3)

Operating segments are reported in a manner consistent with the internal reporting provided to the chief operating decision maker (CODM). The Group considers that Rio Tinto's chief executive is the CODM, who is responsible for allocating resources and assessing performance of the operating segments.

Critical accounting policies and estimates

(i) Dual listed companies reporting

As described in the "Outline of dual listed companies structure and basis of financial statements" on page 115, for the purposes of preparing the IFRS compliant consolidated financial statements of the Rio Tinto Group, both the DLC companies, Rio Tinto plc and Rio Tinto Limited, are viewed as a single company, and the interests of shareholders of both companies are presented as the equity interests of shareholders in the reporting entity.

The 2016 Annual report satisfies the obligations of Rio Tinto Limited to prepare consolidated accounts under Australian company law, as amended by an order issued by the Australian Securities and Investments Commission on 14 December 2015. The 2016 financial statements disclose the effect of the adjustments to the Group's consolidated profit/(loss), consolidated total comprehensive income/(loss) and consolidated shareholders' funds as prepared under IFRS as defined on page 116 that would be required under the version of International Financial Reporting Standards that is applicable in Australia, referred to as Australian Accounting Standards (AAS).

The US dollar is the presentation currency used in these financial statements, as it most reliably reflects the Group's global business performance.

(ii) Determination of CGUs, review of asset carrying values, impairment charges and reversals and the recoverability of goodwill (notes 6, 12 and 13)

Events or changes in circumstances can give rise to significant impairment charges or reversals of impairment. Identification of the appropriate composition of cash-generating units requires judgment and, together with estimates in respect of the timing of project expansions and the cost to complete asset construction, is critical to determining the recoverable amounts for cash-generating units.

Where the recoverable amounts of the Group's cash-generating units are assessed using analyses of discounted cash flows, the resulting valuations are also sensitive to changes in estimates of long-term commodity prices, production timing and recovery rates, exchange rates, operating costs, reserve estimates, closure costs and discount rates and, in some instances, the renewal of mining licences. Some of these factors are unique to each individual cash-generating unit.

Note 6 outlines the significant judgments, sensitivities and assumptions made in measuring the impairments recorded and notes 12 and 13 outline judgments in relation to the testing of cash-generating units containing goodwill and indefinite-life intangible assets respectively.

(iii) Estimation of asset lives and determination of ore reserve and mineral resource estimates

Intangible assets are considered to have indefinite lives when, based on an analysis of all of the relevant factors, there is no foreseeable limit to the period over which the asset is expected to generate cash flows for the Group. The factors considered in making this judgment include the existence of contractual rights for unlimited terms; or evidence that renewal of the contractual rights without significant incremental cost can be expected for indefinite periods into the future in view of the Group's investment intentions.

Rio Tinto estimates its ore reserves and mineral resources based on information compiled by Competent Persons as defined in accordance with the JORC code (see note 1(j)). The amounts presented under IFRS and AAS are based on the ore reserves, and in some cases mineral resources, determined under the JORC code.

The estimation of ore reserves and mineral resources requires judgment to interpret available geological data and then to select an appropriate mining method and establish an extraction schedule. It also requires assumptions about future commodity prices and demand, exchange rates, production costs, transport costs, recovery rates and discount rates and, in some instances, the renewal of mining licences. There are many uncertainties in the estimation process and assumptions that are valid at the time of estimation may change significantly when new information becomes available.

New geological data, as well as changes in assumptions and unforeseen operational issues, may change ore reserve and mineral resource estimates and may ultimately result in their restatement. Changes in ore reserves and, in some cases, mineral resources, could have an impact on: depreciation and amortisation rates; the carrying values of intangible assets and property, plant and equipment; deferred stripping calculations; provisions for close-down and restoration costs; and the recovery of deferred tax assets.

(iv) Provision for onerous contracts

Provision for an onerous contract is made only when the related assets, which may be part of the wider cash-generating unit of which the business unit forms part, are fully impaired or the contract becomes stranded as a result of a business decision. Judgment is required as to when it is appropriate to look to the wider cash-generating unit.

In some cases, product to be supplied under a sales contract can become onerous when the cost of production exceeds the revenues or it is purchased externally and sold at a loss. The decision on sourcing will be dependent on the Group's future marketing plans and changes in those plans may impact the amount of any provision.

(v) Close-down, restoration and environmental obligations (note 26)

Provision is made for close-down, restoration and environmental costs when the obligation occurs, based on the net present value of estimated future costs with, where appropriate, probability weighting of the different remediation and closure scenarios. The ultimate cost of close-down and restoration is uncertain, and management uses its judgment and experience to determine the potential scope of rehabilitation work required and to provide for the costs associated with that work. Adjustments are made to provisions when the range of possible outcomes becomes sufficiently narrow to permit reliable estimation.

Cost estimates can vary in response to many factors including: changes to the relevant legal or local/national government ownership requirements and any other commitments made to stakeholders; review of remediation and relinquishment options; the emergence of new restoration techniques and the effects of inflation. Experience gained at other mine or production sites is also a significant consideration, although elements of the restoration and rehabilitation of each site are relatively unique to the site and, in some cases, there may be relatively limited restoration and rehabilitation activity and historical precedent against which to benchmark cost estimates. External experts support the cost estimation process where appropriate.

Notes to the 2016 financial statements
continued

1 Principal accounting policies continued

Cost estimates are updated throughout the life of the operation and generally must comply with the Group's Capital Project Framework once the operation is ten years from expected closure. The expected timing of expenditure included in cost estimates can also change, for example in response to changes to expectations relating to ore reserves and mineral resources, production rates, operating licences or economic conditions. Expenditure may occur before and after closure and can continue for an extended period of time depending on the specific site requirements. Some expenditure can continue into perpetuity. In such cases, the provision for these ongoing costs may be restricted to a period for which the costs can be reliably estimated.

As noted in note (k) above, changes in closure and restoration provisions for ongoing operations are capitalised and therefore have no impact on equity at the time the change is made. Subsequently, such changes will impact depreciation and the unwind of discount.

The main risk of changes to equity within the next year therefore relate to changes to closure estimates for closed operations and any changes to environmental estimates including any arising from new incidents.

Cash flows must be discounted if this has a material effect. The selection of appropriate sources on which to base the calculation of the risk-free discount rate used for such close-down, restoration and environmental obligations requires judgment.

As a result of all of the above factors, there could be significant adjustments to the provision for close-down, restoration and environmental costs which would affect future financial results.

(vi) Deferral of stripping costs (note 14)

Stripping of waste materials takes place throughout the production phase of a surface mine or pit. The identification of components within a mine and of life of component strip ratios requires judgment and is dependent on an individual mine's design and the estimates inherent within that. Changes to that design may introduce new components and/or change the life of component strip ratios. Changes in other technical or economic parameters that impact ore reserves may also have an impact on the life of component strip ratios, even if they do not affect the mine's design. Changes to the life of component strip ratios are accounted for prospectively.

The Group's judgment as to whether multiple pit mines are considered separate or integrated operations determines whether initial stripping of a pit is deemed to be pre-production or production phase stripping and, therefore, the amortisation base for those costs. The analysis depends on each mine's specific circumstances and requires judgment: another mining company could make a different judgment even where the fact pattern appears to be similar.

(vii) Recognition of deferred tax liabilities on mining rights recognised in acquisitions

Deferred tax is provided in respect of fair value adjustments on acquisitions. These adjustments may relate to assets such as mining rights that, in general, are not eligible for income tax allowances. Provision for deferred tax is based on the difference between the carrying value of the asset and its income tax base (which may be nil). Even where there is no income tax base, the existence of a tax base for capital gains tax purposes is not usually taken into account in determining the deferred tax liability for the assets, unless they are classified as held for sale, because it is expected that the carrying amount will be recovered primarily through use of the assets and not from disposal. For acquisitions after 1 January 2004, such a deferred tax liability on acquisition results in a consequential increase in the amounts attributed to goodwill. For acquisitions prior to 1 January 2004, such deferred tax was recognised in equity on transition to IFRS.

(viii) Uncertain tax positions

The Group operates across a large number of jurisdictions and is subject to periodic challenges by local tax authorities on a range of tax matters during the normal course of business, including transfer pricing, indirect taxes and transaction related issues. Where the amount of tax payable or recoverable is uncertain, the Group establishes provisions based on the Group's judgment of the most likely amount of the liability, or recovery. Further information is given in note 9.

(ix) Recoverability of potential deferred tax assets (note 17)

The Group has tax losses, and other deductible temporary differences, mainly in Australian, Canadian, French, US and Mongolian taxable entities, that have the potential to reduce tax payments in future years. Deferred tax assets have been recognised to the extent that their recovery is probable, having regard to the availability of sufficient taxable temporary differences relating to the same taxation authority and the same taxable entity, the estimates of projected future taxable income of these taxable entities and after taking account of specific risk factors that are expected to affect the recovery of these assets including risk of expiry of losses.

(x) Capitalisation of exploration and evaluation costs and development costs prior to the decision to mine/construct (note 13)

Under the Group's accounting policy, exploration expenditure on exploration activity undertaken by the Group is not capitalised. Evaluation expenditure is capitalised when there is a high degree of confidence that the Group will determine that a project is commercially viable and it is therefore considered probable that future economic benefits will flow to the Group.

A project's commercial viability is determined based on whether it will provide a satisfactory return relative to its perceived risks. Once commercial viability has been established, the Group will decide, at the appropriate authorisation level (that is, the Rio Tinto Investment Committee, and the board where appropriate) whether the project should proceed. In determining whether to approve a mining project, the Investment Committee reviews the ore reserves estimate together with analyses of the net present value of the project and sensitivity analyses for the key assumptions.

There are occasions when the Group concludes that the asset recognition criteria are met at an earlier stage than the granting of approval to proceed. In these cases, evaluation expenditure is capitalised if there is a high degree of confidence that the Group will determine the project is commercially viable. The Group's view is that a high degree of confidence is greater than "more likely than not" (that is, greater than 50 per cent certainty) and less than "virtually certain" (that is, less than 90 per cent certainty). Determining whether there is a high degree of confidence that the Group will ultimately determine that an evaluation project is commercially viable requires a significant degree of judgment and assessment of all relevant factors such as the nature and objective of the project; the project's current stage; project timeline; current estimates of the project's net present value, including sensitivity analyses for the key assumptions; and the main risks of the project. Development expenditure incurred prior to the decision to proceed is subject to the same criteria for capitalisation, being a high degree of confidence that the Group will ultimately determine that a project is commercially viable.

In accordance with IFRS 6 "Exploration for and Evaluation of Mineral Resources", the criteria for the capitalisation of evaluation costs are applied consistently from period to period.

Subsequent recovery of the carrying value for evaluation costs depends on successful development, sale or other partnering arrangements of the undeveloped project. If a project does not prove viable, all irrecoverable costs associated with the project net of any related impairment provisions are charged to the income statement.

(xi) Identification of functional currencies

The functional currency for each subsidiary, unincorporated arrangement, joint operation and equity accounted unit, is the currency of the primary economic environment in which it operates. Determination of functional currency involves significant judgment and other companies may make different judgments based on similar facts. For many of Rio Tinto's businesses, their functional currency is the currency of the country in which they operate. The Group reconsiders the functional currency of its businesses if there is a change in the underlying transactions, events or conditions which determine their primary economic environment.

The determination of functional currency affects the carrying value of non-current assets included in the balance sheet and, as a consequence, the amortisation of those assets included in the income statement. It also impacts exchange gains and losses included in the income statement and in equity.

(xii) Estimation of obligations for post-employment costs (note 45)

The value of the Group's obligations for post-employment benefits is dependent on the amount of benefits to be paid out and is discounted to the balance sheet date. This amount will vary depending on the assumptions made about the future pay increases received by members of final pay plans, the level of inflation (for those benefits that are subject to some form of inflation protection), the number of individuals and how long individuals live in retirement. Most of the Group's defined benefit pension plans are closed to new entrants and the majority of the obligations relate to former employees. As a consequence, the carrying value of the Group's post-employment obligations is less sensitive to assumptions about future salary increases than it is to assumptions regarding future inflation. The assumption regarding future inflation is based on market yields on inflation-linked instruments where possible, combined with consensus views on future inflation, and is derived using the same process at each reporting date. Changes to the assumption, therefore, reflect changes to the market and consensus views of future inflation.

The Group reviews the actual mortality rates of retirees in its major pension plans on a regular basis and uses these rates to set its current mortality assumptions. It also uses its judgment with respect to allowances for future improvements in mortality having regard to standard improvement scales in each relevant country and after taking external actuarial advice.

The discount rate used to value post-employment obligations is based upon the yields on high quality corporate bonds in the relevant currency which have durations consistent with the nature of the obligations. The discount rate will vary from one period to another in line with movements in corporate bond yields, but at any given measurement date there is relatively little estimation uncertainty. This rate is also used to calculate the interest cost on obligations and interest income on plan assets.

Details of the key assumptions, how they have moved since the previous balance sheet date and the sensitivity of the carrying value to changes in the assumptions are set out in note 45.

(xiii) Basis of consolidation (notes 33 to 36)

Judgment is sometimes required to determine whether after considering all relevant factors, the Group has control, joint control or significant influence over an entity. Significant influence includes situations of collective control (see note 36a).

(xiv) Contingencies (note 31)

Disclosure is made of material contingent liabilities unless the possibility of any loss arising is considered remote based on the Group's views and legal advice.

Notes to the 2016 financial statements

continued

2 Operating segments

Rio Tinto's management structure is based on the principal product groups in the tables below together with the global functions that support the business, which include Growth & Innovation. The chief executive of each product group reports to the chief executive of Rio Tinto. The chief executive of Rio Tinto monitors the performance of each product group based on a number of measures, including EBITDA, capital expenditure and operating cash flows, with underlying earnings and free cash flow being the key financial performance indicators. Finance costs and net debt are managed on a Group basis.

The operating segment data has been adjusted in accordance with the organisational restructure announced on 21 June 2016. The main impacts are as follows: Iron Ore Company of Canada has moved from the Iron Ore product group to the Energy & Minerals product group; Coal businesses have moved from the previous Copper & Coal product group to the Energy & Minerals product group; and, Diamonds businesses have moved from the previous Diamonds & Minerals product group to the Copper & Diamonds product group.

Generally, business units are allocated to product groups based on their primary product. The Energy & Minerals product group includes businesses with products such as uranium, borates, salt and titanium dioxide feedstock together with coal operations and the Simandou iron ore project, which is the responsibility of the Energy & Minerals product group chief executive. The Copper & Diamonds product group includes certain gold operations in addition to copper and diamonds.

The financial information by business unit provided on pages 199 to 203 of these financial statements provides additional voluntary disclosure which the Group considers useful to the users of the financial statements.

Gross sales revenue	2016 US$m	2015 US$m	2014 US$m
Iron Ore	**14,605**	13,952	21,585
Aluminium	**9,458**	10,117	12,123
Copper & Diamonds	**4,524**	5,592	7,183
Energy & Minerals	**6,734**	7,140	9,253
Other Operations	**–**	13	241
Reportable segments total	**35,321**	36,814	50,385
Inter-segment transactions	**(3)**	(29)	(344)
Product group total	**35,318**	36,785	50,041
Items excluded from underlying earnings	**18**	(1)	–
Gross sales revenue	**35,336**	36,784	50,041
Share of equity accounted units and adjustments for inter-subsidiary/equity accounted units sales	**(1,555)**	(1,955)	(2,377)
Consolidated sales revenue per income statement	**33,781**	34,829	47,664

Gross sales revenue includes the Group's proportionate share of sales revenue of equity accounted units (after adjusting for sales to subsidiaries) of US$1,585 million (2015: US$1,987 million; 2014: US$2,533 million) which are not included in consolidated sales revenue. Consolidated sales revenue includes subsidiary sales of US$30 million (2015: US$32 million; 2014: US$156 million) to equity accounted units which are not included in gross sales revenue.

Capital expenditure	2016 US$m	2015 US$m	2014 US$m
Iron Ore	**868**	1,608	4,038
Aluminium	**916**	1,682	2,021
Copper & Diamonds	**1,441**	1,576	2,097
Energy & Minerals	**141**	552	757
Other Operations	**(11)**	(36)	(56)
Reportable segments total	**3,355**	5,382	8,857
Other items	**(46)**	65	(407)
Less: capital expenditure of equity accounted units	**(651)**	(859)	(1,032)
Capital expenditure per financial information by business units	**2,658**	4,588	7,418
Add: Proceeds from disposal of property, plant and equipment	**354**	97	744
Capital expenditure per cash flow statement	**3,012**	4,685	8,162

Capital expenditure for reportable segments comprises the net cash outflow on purchases less disposals of property, plant and equipment, capitalised evaluation costs and purchases less disposals of other intangible assets. The details provided include 100 per cent of subsidiaries' capital expenditure and Rio Tinto's share of the capital expenditure of joint operations and equity accounted units.

Depreciation and amortisation	2016 US$m	2015 US$m	2014 US$m
Iron Ore	1,645	1,744	1,789
Aluminium	1,250	1,172	1,180
Copper & Diamonds	1,601	1,261	1,219
Energy & Minerals	739	830	1,028
Other Operations	34	32	34
Reportable segments total	**5,269**	5,039	5,250
Other items	51	68	82
Less: depreciation and amortisation of equity accounted units	(526)	(462)	(472)
Depreciation and amortisation per note 4	**4,794**	4,645	4,860

Product group depreciation and amortisation for reportable segments totals include 100 per cent of subsidiaries' depreciation and amortisation and Rio Tinto's share of the depreciation and amortisation of equity accounted units. Rio Tinto's share of the depreciation and amortisation charge of equity accounted units is deducted to arrive at depreciation and amortisation, excluding equity accounted units, as shown in note 4. These figures exclude impairment charges and reversals, which are excluded from underlying earnings.

Tax charge	2016 US$m	2015 US$m	2014 US$m
Iron Ore	2,005	1,747	3,595
Aluminium	171	303	303
Copper & Diamonds	(320)	(77)	196
Energy & Minerals	331	122	140
Other Operations	(73)	(73)	(135)
Reportable segments total	**2,114**	2,022	4,099
Other items	(191)	(192)	(193)
Exploration and evaluation not attributed to product groups	(27)	(25)	(34)
Net finance costs	(484)	(245)	(396)
	1,412	1,560	3,476
Tax charge/(credit) excluded from underlying earnings	155	(567)	(423)
Tax charge per income statement	**1,567**	993	3,053

Further information on the tax charge/(credit) excluded from underlying earnings is provided below in the section "Underlying earnings".

Underlying earnings [(a)]	2016 US$m	2015 US$m	2014 US$m
Iron Ore	4,611	3,940	7,963
Aluminium	947	1,118	1,248
Copper & Diamonds	(18)	370	1,118
Energy & Minerals	610	175	232
Other Operations	(86)	(88)	(240)
Reportable segments total	**6,064**	5,515	10,321
Other items	(241)	(375)	(593)
Exploration and evaluation not attributed to product groups	(147)	(211)	(262)
Net finance costs	(576)	(389)	(161)
Underlying earnings	**5,100**	4,540	9,305
Items excluded from underlying earnings [(a)]	(483)	(5,406)	(2,778)
Net earnings/(loss) attributable to owners of Rio Tinto per income statement	**4,617**	(866)	6,527

Underlying earnings is reported by Rio Tinto to provide greater understanding of the underlying business performance of its operations and to enhance comparability of reporting periods.

The measure of underlying earnings, in conjunction with net cash generated from operating activities and capital expenditure (net of proceeds on disposals), together with free cash flow, is used by the chief executive of Rio Tinto to assess the performance of the product groups. Underlying earnings and net earnings/(loss) both represent amounts net of tax attributable to owners of Rio Tinto. The following items are excluded from net earnings/(loss) in arriving at underlying earnings in each period irrespective of materiality:

– Net gains/(losses) on disposal of interests in businesses.
– Impairment charges and reversals.
– Profit/(loss) after tax from discontinued operations.
– Exchange and derivative gains and losses. This exclusion includes exchange gains/(losses) on US dollar net debt and intragroup balances, gains/(losses) on currency and interest rate derivatives not qualifying for hedge accounting and gains/(losses) on commodity derivatives not qualifying for hedge accounting.

2 Operating segments continued

In addition, there is a final judgmental category which includes, where applicable, other credits and charges that, individually or in aggregate if of a similar type, are of a nature or size to require exclusion in order to provide additional insight into underlying business performance.

Product group earnings include earnings of subsidiaries and equity accounted units stated before finance items but after the amortisation of discount on provisions.

Rio Tinto's share of the underlying profits of equity accounted units amounted to US$309 million in 2016 (2015: US$390 million; 2014: US$626 million). This amount is attributable as follows: US$272 million profit to the Copper & Diamonds product group and US$37 million profit to other product groups (2015: US$307 million profit to the Copper & Diamonds product group and US$83 million profit to other product groups; 2014: US$551 million profit attributable to the Copper & Diamonds product group and US$75 million profit to other product groups). These amounts are included in underlying earnings of the relevant product groups and include the underlying earnings of the Group's tolling entities which process alumina. Tolling entities recharge the majority of their costs and generally have minimal earnings.

(a) Reconciliation of net earnings/(losses) to underlying earnings

Exclusions from underlying earnings	Pre-tax [k] 2016 US$m	Taxation 2016 US$m	Non-controlling interests 2016 US$m	Net amount 2016 US$m	Net amount 2015 US$m	Net amount 2014 US$m
Impairment charges net of reversals (note 6)	(249)	66	–	(183)	(1,802)	(138)
Net gains/(losses) on disposal of interests in businesses [b]	515	(133)	–	382	48	(349)
Exchange and derivative gains/(losses):						
– Exchange gains/(losses) on US dollar net debt and intragroup balances [c]	603	(88)	1	516	(3,282)	(1,858)
– Losses on currency and interest rate derivatives not qualifying for hedge accounting [d]	(22)	6	4	(12)	(88)	(22)
– Gains on commodity derivatives not qualifying for hedge accounting [e]	41	(9)	–	32	88	30
Onerous port and rail contracts [f]	(469)	140	–	(329)	–	–
Restructuring costs and global headcount reductions [g]	(265)	71	17	(177)	(258)	(82)
Increased closure provision for non-operating and legacy operations [h]	(402)	120	–	(282)	(233)	–
Tax provision [i]	–	(380)	–	(380)	–	–
Recognition of deferred tax assets relating to planned divestments	–	–	–	–	234	–
Write off of deferred tax asset following the MRRT repeal	–	–	–	–	–	(362)
Gain on disposal of the Group's St James's Square properties	–	–	–	–	–	356
Other exclusions [j]	(102)	52	–	(50)	(113)	(353)
Total excluded from underlying earnings	(350)	(155)	22	(483)	(5,406)	(2,778)
Net earnings/(loss)	6,343	(1,567)	(159)	4,617	(866)	6,527
Underlying earnings	6,693	(1,412)	(181)	5,100	4,540	9,305

(b) Net gains on disposal of interests in businesses in 2016 related mainly to the sale of Rio Tinto's 40 per cent interest in the Bengalla Joint Venture on 1 March 2016 and the sale of the Lochaber assets in Scotland on 23 November 2016. This was partially offset by a loss on disposal of the 100 per cent interest in Carbone Savoie on 31 March 2016.

In 2015, the balance related mainly to the reduction in shareholding of SouthGobi Resources Ltd, the sale of the Group's interest in Murowa Diamonds and Sengwa Colliery on 17 June 2015 and the Aluminium product group divestments of ECL on 9 July 2015 and Alesa on 24 November 2015.

(c) Net exchange gains in 2016 comprise post-tax foreign exchange gains of US$123 million principally on external US dollar denominated net debt in non-US dollar functional currency companies (on borrowings of approximately US$17.6 billion), and US$393 million gains on intragroup balances mainly as the Canadian dollar strengthened against the US dollar. The Group took further steps during 2016 to reduce the income statement exposure on retranslation of intragroup balances.

Net exchange losses in 2015 comprise post-tax foreign exchange losses of US$1,197 million on external US dollar denominated net debt in non-US dollar functional currency companies (on borrowings of approximately US$23.1 billion), and US$2,085 million losses on intragroup balances, as the Australian dollar, Canadian dollar and the Euro all weakened against the US dollar.

(d) Valuation changes on currency and interest rate derivatives, which are ineligible for hedge accounting, other than those embedded in commercial contracts, and the currency revaluation of embedded US dollar derivatives contained in contracts held by entities whose functional currency is not the US dollar.

(e) Valuation changes on commodity derivatives, including those embedded in commercial contracts, that are ineligible for hedge accounting, but for which there will be an offsetting change in future Group earnings.

(f) A review of the infrastructure capacity requirements in Queensland, Australia, has confirmed that it is no longer likely that Rio Tinto will utilise the Abbot Point Coal Terminal and associated rail infrastructure capacity contracted under take or pay arrangements. On 31 October 2016, agreement was reached with Adani, the owner of the port, to relinquish that capacity. Accordingly, an onerous contract provision has been recognised based on the net present value of expected future cash flows for the port and rail capacity discounted at a post-tax real rate of 2 per cent, resulting in a post-tax onerous contract charge of US$329 million. During the second half of the year, as a result of the agreement to relinquish port capacity, there was a decrease of US$240 million before tax in the estimated onerous contract provision.

(g) The Group has specific criteria in place to determine whether restructuring costs should be excluded from underlying earnings. Only restructuring costs which are material to a business unit are excluded.

(h) The increase in closure provision (non-operating sites) relates to the Gove alumina refinery in Northern Territory, Australia where operations have been curtailed since May 2014. The provision has been updated based on the current cost estimates from the studies which are expected to be finalised mid-2017.

Future revisions to the closure cost estimate during the study periods (including the next stage of feasibility study) are expected to be excluded from underlying earnings as the site operating assets have been fully impaired.

(i) Tax provision includes amounts provided for specific tax matters for which the timing of resolution and potential economic outflow are uncertain.

In particular, the Group is currently in discussions with the Australian Taxation Office (ATO) in relation to the transfer pricing of certain transactions between Rio Tinto entities based in Australia and the Group's commercial centre in Singapore for the period since 2009. These matters were raised by Rio Tinto with the ATO through advance ruling requests or are under discussions pursuant to our co-operative compliance agreement.

(j) Other credits and charges that, individually, or in aggregate, if of similar type, are of a nature or size to require exclusion in order to provide additional insight into underlying business performance. In 2016, other exclusions included costs related to multiple transformation projects and recuperation of capital losses against capital gains on divestment. In 2015, other exclusions included a provision relating to the incomplete divestment of Carbone Savoie within the Rio Tinto Aluminium product group, divestment costs and an increase in provision relating to the Gove refinery. In 2014, other exclusions included US$116 million (after non-controlling interests and tax) IFRS 2 "Share-based Payment" charge. This reflected the discount to an estimated fair value at which shares were transferred to the Government of Guinea under the Simandou project Investment Framework ratified on 26 May 2014.

(k) Exclusions from underlying earnings relating to equity accounted units are stated after tax and are included in the column "Pre-tax".

3 Operating segments – additional information

Consolidated sales revenue by destination [(a)]	2016 %	Adjusted [(b)] 2015 %	Adjusted [(b)] 2014 %	2016 US$m	Adjusted [(b)] 2015 US$m	Adjusted [(b)] 2014 US$m
China	**42.6**	41.8	38.3	**14,405**	14,566	18,257
Asia (excluding China and Japan)	**14.8**	13.7	13.2	**5,011**	4,762	6,313
United States of America	**14.4**	15.5	14.8	**4,862**	5,400	7,032
Japan	**10.9**	11.2	15.6	**3,681**	3,907	7,449
Europe (excluding UK)	**7.8**	8.5	9.0	**2,621**	2,970	4,308
Canada	**3.3**	3.4	2.9	**1,099**	1,167	1,397
Australia	**2.1**	2.5	2.1	**715**	866	978
UK	**1.0**	1.0	1.0	**352**	339	475
Other countries	**3.1**	2.4	3.1	**1,035**	852	1,455
Consolidated sales revenue	**100.0**	100.0	100.0	**33,781**	34,829	47,664

(a) Consolidated sales revenue by geographical destination is based on the ultimate country of destination of the product, if known. If the eventual destination of the product sold through traders is not known then revenue is allocated to the location of the product at the time when the risks and rewards of ownership are transferred. Rio Tinto is domiciled in both the UK and Australia.

(b) The 2015 and 2014 comparatives above have been amended to correct the allocation of revenues by region. The impact is to decrease the amount allocated to Canada by US$321 million and US$318 million for 2015 and 2014 respectively and to increase other regions in aggregate by the same amount.

Consolidated sales revenue by product

Consolidated sales revenues of the Group are derived from the following products sold to external customers:

	2016 US$m	2015 [(a)] US$m	2014 [(a)] US$m
Iron ore	**15,855**	15,239	23,178
Aluminium	**9,342**	9,904	11,667
Copper	**1,609**	1,577	2,590
Coal	**2,567**	2,703	3,590
Industrial minerals	**1,954**	2,155	3,238
Gold	**608**	1,063	976
Diamonds	**613**	698	901
Other	**1,233**	1,490	1,524
Consolidated sales revenue	**33,781**	34,829	47,664

(a) 2015 and 2014 comparative figures have been adjusted to conform with the 2016 presentation of consolidated sales revenue, where previously gross sales revenue was presented.

Non-current assets other than excluded items

The total of non-current assets other than items excluded is shown by location below. This is allocated based on the location of the business units holding the assets.

Non-current assets other than excluded items [(a)]	2016 US$m	2015 [(a)] US$m
Australia	**30,602**	32,615
Canada	**14,362**	14,396
Mongolia	**7,743**	7,712
United States of America	**4,958**	5,372
Africa	**3,882**	3,682
South America	**3,785**	3,639
Indonesia	**1,482**	1,385
Europe (excluding France and the UK)	**429**	451
UK	**66**	274
France	**251**	267
Other countries	**891**	895
	68,451	70,688
Non-current assets excluded from analysis above:		
Deferred tax assets	**3,728**	3,309
Other financial assets (including loans to equity accounted units)	**822**	788
Quasi equity loans to equity accounted units [(b)]	**163**	183
Tax recoverable	**38**	78
Accounts receivable	**975**	964
Total non-current assets per balance sheet	**74,177**	76,010

(a) Allocation of non-current assets by country is based on the location of the business units holding the assets. It includes investments in equity accounted units totalling US$4,856 million (2015: US$4,758 million) which represents the Group's share of net assets excluding quasi equity loans shown separately within "Loans to equity accounted units" above.

(b) Loans to equity accounted units comprise quasi equity loans of US$163 million (2015: US$183 million) included in "Investments in equity accounted units" on the face of the balance sheet and non-current non-quasi equity loans of US$39 million (2015: US$nil) shown within "Other financial assets".

Notes to the 2016 financial statements

continued

4 Net operating costs (excluding items shown separately)

	Note	2016 US$m	Adjusted [a] 2015 US$m	2014 US$m
Raw materials, consumables, repairs and maintenance [a]		**8,456**	8,823	11,044
Amortisation of intangible assets	13	**227**	207	237
Depreciation of property, plant and equipment	14	**4,567**	4,438	4,623
Employment costs	5	**4,881**	5,446	6,659
Shipping and other freight costs		**1,454**	2,165	3,370
Decrease in finished goods and work in progress		**391**	701	1,284
Royalties		**1,889**	1,863	2,516
Amounts charged by equity accounted units [a] [b]		**1,184**	1,246	1,554
Net foreign exchange gains/(losses)		**38**	(263)	(34)
Other external costs		**3,472**	4,181	3,074
Provisions (including exchange differences on provisions)	26	**1,404**	731	1,138
Research and development		**60**	104	112
Costs included above qualifying for capitalisation		**(521)**	(661)	(738)
Other operating income		**(703)**	(1,062)	(929)
Net operating costs (excluding items shown separately) [c]		**26,799**	27,919	33,910

(a) The 2015 comparative has been amended to correctly present the purchases from non-tolling equity accounted units as "Amounts charged by equity accounted units". The impact is to decrease the amount allocated to "Raw materials, consumables, repairs and maintenance" by US$787 million and to increase "Amounts charged by equity accounted units" by the same amount.

(b) Amounts charged by equity accounted units relate to toll processing and also include purchases from equity accounted units of bauxite and aluminium which are then processed by the product group or sold to third parties. Generally, purchases are in proportion to the Group's share of the equity accounted unit but in 2016, US$383 million (2015: US$378 million; 2014: US$463 million) related to purchases of the other investors' share of production.

(c) Net operating costs includes operating lease expense of US$573 million (2015: US$644 million). Costs for leases of dry bulk vessels (which include costs for crewing services) are included within "Shipping and other freight costs" and other lease costs are included within "Other external costs".

5 Employment costs

	Note	2016 US$m	2015 US$m	2014 US$m
Total employment costs				
– Wages and salaries		**4,235**	4,670	5,878
– Social security costs		**429**	430	467
– Net post-retirement charge	45	**522**	439	590
– Share option charge	44	**116**	128	152
		5,302	5,667	7,087
Less: charged within provisions		**(421)**	(221)	(428)
Employment costs	4	**4,881**	5,446	6,659

6 Impairment charges and reversals

	Note	Pre-tax 2016 US$m	Taxation 2016 US$m	Non-controlling interests 2016 US$m	Net amount 2016 US$m	Pre-tax amount 2015 US$m	Pre-tax amount 2014 US$m
Copper & Diamonds – Argyle		**(241)**	**64**	**–**	**(177)**	–	–
Copper & Diamonds – Molybdenum Autoclave Process		**–**	**–**	**–**	**–**	(17)	(559)
Energy & Minerals – Simandou		**–**	**–**	**–**	**–**	(2,039)	–
Energy & Minerals – Energy Resources of Australia		**–**	**–**	**–**	**–**	(260)	–
Energy & Minerals – Roughrider		**–**	**–**	**–**	**–**	(229)	–
Aluminium – Other		**–**	**–**	**–**	**–**	(179)	(46)
Aluminium – Kitimat		**–**	**–**	**–**	**–**	–	(1,092)
Aluminium – Pacific Aluminium smelters		**–**	**–**	**–**	**–**	–	1,224
Other		**(8)**	**2**	**–**	**(6)**	(67)	–
Total impairment charge net of reversals		**(249)**	**66**	**–**	**(183)**	(2,791)	(473)
Allocated as:							
Goodwill	12	**–**				(116)	–
Intangible assets	13	**(1)**				(1,833)	–
Property, plant and equipment	14	**(248)**				(652)	(1,034)
Investment in equity accounted units		**–**				–	589
Other assets and liabilities		**–**				(190)	(28)
Total impairment charge net of reversals		**(249)**				(2,791)	(473)
Comprising:							
Impairment charges net of reversals of consolidated balances					**(249)**	(2,791)	(1,062)
Impairment reversals of investments in equity accounted units (pre-tax)					**–**	–	841
Total impairment charge net of reversals in the financial information by business unit (page 200)					**(249)**	(2,791)	(221)
Taxation (including related to EAUs)					**66**	(57)	83
Non-controlling interests					**–**	1,046	–
Total impairment in the income statement					**(183)**	(1,802)	(138)

Copper & Diamonds

Argyle Diamond Mine, Australia

An impairment trigger assessment at the Argyle cash-generating unit resulted in the identification of impairment indicators as a result of lower production volumes compared with forecast and lower prices achieved for bulk diamonds. The recoverable amount for Argyle has been determined to be US$191 million assessed by reference to a value in use (VIU) model in line with the accounting policy set out in note 1(i). The reduction in the recoverable amount resulted in a pre-tax impairment charge of US$240 million to property, plant and equipment and US$1 million to intangible assets. In arriving at VIU, post-tax cash flows expressed in real terms have been estimated and discounted using a post-tax discount rate of 7.0 per cent, giving consideration to the specific amount and timing of future tax cash flows.

Oyu Tolgoi, Mongolia

The restart of the Oyu Tolgoi Underground Mine Development was approved in May 2016 by all shareholders of the project. Subsequently, all necessary permits were granted, the project finance was drawn down and the main contractor for engineering, procurement and construction management was appointed. Underground work is underway and progressing as planned.

As part of the annual impairment review at 30 September 2016, the project was reviewed for indicators that would require reassessment of its carrying value. The review concluded that there were no indicators of impairment or impairment reversal. Management continues to optimise production planning and sequencing of development and to implement cost reductions that are intended to improve the overall value of the project and the headroom from further impairment. The scale and complexity of the underground development means that reversal of previous impairments is not appropriate at this stage of the construction.

Molybdenum Autoclave Process, US

In 2015, previously estimated net disposal proceeds for the Molybdenum Autoclave Process project were reduced resulting in a pre-tax impairment of US$17 million recorded against property, plant and equipment. In 2014, following a review of the investment case and subsequent decision to terminate the project, a pre-tax impairment charge of US$559 million was recorded against property, plant and equipment.

Energy & Minerals

Simandou, Guinea

In 2015, a pre-tax impairment charge of US$1,655 million to exploration and evaluation intangible assets and a pre-tax impairment charge of US$194 million to property, plant and equipment were recognised to fully write-down the long-term assets of the Simandou project. In addition a pre-tax charge of US$7 million was recognised in relation to inventories and a pre-tax charge of US$183 million was also recognised as a financial liability for contractual arrangements.

Energy Resources of Australia (ERA), Australia

In 2015, a pre-tax write down to property, plant and equipment and intangible assets of US$260 million to fully write off these long-term assets was recognised. Deferred tax assets of US$123 million were also fully written off.

Roughrider, Canada

In 2015, a pre-tax impairment charge of US$116 million to fully write off goodwill and a pre-tax impairment charge of US$113 million to exploration and evaluation intangible assets were recognised. The recoverable amount for Roughrider has been determined by reference to a fair value less cost of disposal (FVLCD) model in line with the accounting policy set out in note 1(i).

Notes to the 2016 financial statements
continued

6 Impairment charges and reversals continued

Aluminium

Other

In 2015, a pre-tax impairment loss of US$147 million was recorded in relation to the Carbone Savoie cash-generating unit and US$32 million was recorded in relation to other aluminium businesses which were subsequently disposed of in the second half of 2015.

In 2014, a pre-tax impairment loss of US$46 million was recorded in relation to other aluminium businesses.

Kitimat, Canada

In 2014, revisions to forecast capital required to complete the modernisation project resulted in a pre-tax impairment charge of US$1,092 million to the property, plant and equipment of the cash-generating unit. The recoverable amount was determined by reference to a FVLCD model, in line with the accounting policy set out in note 1(i).

Pacific Aluminium, Australia and New Zealand

Impairment reversal was recorded in 2014 in relation to the Tomago, Bell Bay and Boyne smelters, and the Gladstone Power Station, within the Pacific Aluminium cash-generating unit as evidence emerged that previously recognised impairment losses from 2011 and 2012 had reversed.

7 Share of profit after tax of equity accounted units

	2016 US$m	2015 US$m	2014 US$m
Sales revenue: Rio Tinto share [a]	1,727	2,149	2,852
Operating costs	(1,237)	(1,609)	(1,804)
Profit before finance items and taxation	490	540	1,048
Finance items	(33)	(37)	(49)
Share of profit after tax of equity accounted units	20	35	30
Profit before taxation	477	538	1,029
Taxation	(156)	(177)	(404)
Profit for the year (Rio Tinto share)	321	361	625

(a) Sales revenue of equity accounted units excludes sales by equity accounted units to Group subsidiaries.

Further information relating to the Group's interests in joint ventures and associates is given in notes 35 and 36.

8 Finance income and finance costs

	Note	2016 US$m	2015 US$m	2014 US$m
Finance income from equity accounted units (Rio Tinto share)		6	8	10
Other finance income (including bank deposits and other financial assets)		83	44	54
Total finance income		89	52	64
Interest payable and similar charges [a]		(898)	(1,004)	(1,119)
Loss on early redemption of bonds [b]		(324)	–	–
Amounts capitalised	14	111	254	470
Total finance costs		(1,111)	(750)	(649)

(a) Interest payable and similar charges relate to interest on bank loans and other borrowings. This includes a fair value loss on interest rate swaps designated as fair value hedges of US$89 million (2015: US$11 million loss; 2014: US$199 million gain) and a fair value gain on bonds and notes attributable to interest rate risk of US$89 million (2015: US$17 million loss; 2014: US$200 million loss).

(b) Loss on early redemption of bonds includes a premium charge of US$441 million; unamortised debt issuance costs and fees of US$42 million partially offset by the write off of the fair value hedge adjustment of US$159 million (refer to note 30).

9 Taxation

	Note	2016 US$m	2015 US$m	2014 US$m
Taxation charge				
– Current		**2,115**	1,132	3,402
– Deferred	17	**(548)**	(139)	(349)
		1,567	993	3,053

Prima facie tax reconciliation	2016 US$m	2015 US$m	2014 US$m
Profit/(loss) before taxation	**6,343**	(726)	9,552
Deduct: share of profit after tax of equity accounted units	**(321)**	(361)	(625)
Deduct: impairment reversal after tax of investments in equity accounted units (a)	**–**	–	(589)
Parent companies' and subsidiaries' profit/(loss) before tax	**6,022**	(1,087)	8,338
Prima facie tax payable/(receivable) at UK rate of 20 per cent (2015: 20 per cent; 2014: 21 per cent)	**1,204**	(217)	1,751
Higher rate of taxation on Australian underlying earnings	**604**	506	1,038
Impact of items excluded in arriving at underlying earnings (b):			
Impairment charges net of reversals	**(16)**	615	(112)
Gains and losses on disposal of businesses	**30**	(11)	(85)
Foreign exchange on excluded finance items	**(33)**	481	231
Onerous port and rail contracts	**(46)**	–	–
Closure provision for legacy operations	**(40)**	–	–
Tax provision (c)	**380**	–	–
Recognition of deferred tax assets relating to planned divestments	**–**	(250)	–
Impact of tax law changes on recognition of deferred tax assets (d)	**–**	–	401
Other exclusions	**(48)**	(17)	(35)
Impact of changes in tax rates and laws	**(9)**	(3)	(11)
Other tax rates applicable outside the UK and Australia on underlying earnings	**(283)**	(68)	5
Resource depletion and other depreciation allowances	**(15)**	(15)	(121)
Research, development and other investment allowances	**(15)**	(21)	(34)
Recognition of previously unrecognised deferred tax assets	**(154)**	(40)	(106)
Unrecognised current year operating losses	**25**	45	73
Other items	**(17)**	(12)	58
Total taxation charge (e)	**1,567**	993	3,053

(a) For the year ended 31 December 2014, the impairment reversal in investments in equity accounted units is net of a tax charge of US$252 million.

(b) The impact for each item includes the effect of tax rates applicable outside the UK.

(c) The tax provision includes amounts provided for tax matters for which the timing of resolution and potential economic outflow are uncertain.

Specifically, the Group has recognised a charge of US$380m in the year to 31 December 2016 for matters currently under discussion with the Australian Taxation Office (ATO) in relation to the pricing of certain transactions between Rio Tinto entities based in Australia and the Group's commercial centre in Singapore for the period since 2009. These matters were raised by Rio Tinto with the ATO through advance ruling requests or are under discussions pursuant to our co-operative compliance agreement.

The pricing adopted by the Group in determining the amounts paid to the Singapore commercial centre is based on supporting analysis and applies established principles. All transactions with the Singapore commercial centre are undertaken on an arm's length basis and priced in accordance with OECD guidelines and local tax requirements and where applicable, the Group has used previous settlements reached with the ATO for prior periods as the basis to determine the commission rates. While the Group is satisfied that these transactions align with tax requirements, differences of interpretation with tax authorities can occur. This includes whether an arm's length transfer price should be based on revised commission rates or some other basis, for example based on the direct costs of the relevant function.

The ATO is reviewing the transactions and its position in relation to arm's length transfer pricing. In the light of ongoing discussions with the ATO about the transfer prices charged between Singapore and Australia, management has reassessed the tax provision in accordance with its accounting policy as described in note 1(m).

The Group has not received amended tax assessments from the ATO in respect of these matters, but it is possible that assessments may be issued in the near future. It is possible that the final amount of any payment to the ATO may vary from the amount currently provided. The Group does however consider that any difference between the maximum amount of the possible economic outflow in the next financial year and the amount of the tax provision is not material.

(d) For the year ended 31 December 2014, the remaining Minerals Resource Rent Tax (MRRT) starting base deferred tax asset was derecognised on repeal of the tax in Australia.

(e) This tax reconciliation relates to the Group's parent companies, subsidiaries and joint operations. The Group's share of profit of equity accounted units is net of tax charges of US$156 million (31 December 2015: US$177 million; 31 December 2014: US$404 million).

Notes to the 2016 financial statements

continued

9 Taxation continued

	2016 Total US$m	2015 Total US$m	2014 Total US$m
Tax on exchange adjustments	–	–	(3)
Tax on fair value movements:			
– Cash flow hedge fair value (gains)/losses	–	(3)	2
– Cash flow hedge gains transferred to the income statement	4	–	–
– Losses on revaluation of available for sale securities	–	–	1
– (Losses)/gains on revaluation of available for sale securities transferred to the income statement	–	–	(1)
Tax credit/(charge) on actuarial losses/(gains) on post-retirement benefit plans	29	(175)	215
Other	–	–	(8)
Tax relating to components of other comprehensive income/(loss) for the year (a)	**33**	(178)	206

(a) This comprises deferred tax credit of US$33 million (2015: charge of US$174 million; 2014: credit of US$205 million) and current tax charge of US$nil (2015: charge of US$4 million; 2014: credit of US$1 million), plus share of tax on other comprehensive income of equity accounted units shown separately (see note 17).

10 Earnings/(loss) per ordinary share

	2016 Earnings US$m	2016 Weighted average number of shares (millions)	2016 Per share amount (cents)	2015 Loss US$m	2015 Weighted average number of shares (millions)	2015 Per share amount (cents)
Basic earnings/(loss) per share attributable to ordinary shareholders of Rio Tinto (a)	**4,617**	**1,797.3**	**256.9**	(866)	1,824.7	(47.5)
Diluted earnings/(loss) per share attributable to ordinary shareholders of Rio Tinto (b)	**4,617**	**1,808.6**	**255.3**	(866)	1,824.7	(47.5)

	2014 Earnings US$m	2014 Weighted average number of shares (millions)	2014 Per share amount (cents)
Basic earnings per share attributable to ordinary shareholders of Rio Tinto (a)	6,527	1,848.4	353.1
Diluted earnings per share attributable to ordinary shareholders of Rio Tinto (b)	6,527	1,858.7	351.2

(a) The weighted average number of shares is calculated as the average number of Rio Tinto plc shares outstanding not held as treasury shares of 1,373.7 million (2015: 1,398.1 million; 2014: 1,413.0 million) plus the average number of Rio Tinto Limited shares outstanding of 423.6 million (2015: 426.6 million; 2014: 435.4 million) over the relevant period. No Rio Tinto Limited ordinary shares were held by Rio Tinto plc in any of the periods presented.

(b) For the purposes of calculating diluted earnings per share, the effect of dilutive securities of 11.3 million shares in 2016 and 10.3 million shares in 2014 is added to the weighted average number of shares described in (a) above. This effect is calculated under the treasury stock method. In accordance with IAS 33 "Earnings per share", for the purposes of calculating diluted loss per share, the effect of potentially dilutive securities has not been taken into account for the year ended 31 December 2015. The Group's only potential dilutive ordinary shares are share options for which terms and conditions are described in note 44.

11 Dividends

	2016 US$m	2015 US$m	2014 US$m
Rio Tinto plc previous year final dividend paid	**1,443**	1,642	1,533
Rio Tinto plc interim dividend paid	**604**	1,476	1,299
Rio Tinto Limited previous year final dividend paid	**473**	520	473
Rio Tinto Limited interim dividend paid	**205**	438	405
Dividends paid during the year	**2,725**	4,076	3,710
Dividends per share: paid during the year	**152.5c**	226.5c	204.5c
Dividends per share: proposed in the announcement of the results for the year	**125.0c**	107.5c	119.0c

	Dividends per share 2016	Dividends per share 2015	Dividends per share 2014
Rio Tinto plc previous year final (pence)	**74.21p**	77.98p	65.82p
Rio Tinto plc interim (pence)	**33.80p**	68.92p	56.90p
Rio Tinto Limited previous year final – fully franked at 30% (Australian cents)	**151.89c**	152.98c	120.14c
Rio Tinto Limited interim – fully franked at 30% (Australian cents)	**59.13c**	144.91c	103.09c

	Number of shares 2016 (millions)	Number of shares 2015 (millions)	Number of shares 2014 (millions)
Rio Tinto plc previous year final	**1,373.9**	1,412.7	1,413.2
Rio Tinto plc interim	**1,374.4**	1,395.2	1,413.8
Rio Tinto Limited previous year final	**423.5**	435.0	435.6
Rio Tinto Limited interim	**424.0**	423.7	435.7

The dividends paid in 2016 are based on the following US cents per share amounts: 2015 final – 107.5 cents, 2016 interim – 45.0 cents (2015 dividends paid: 2014 final – 119.0 cents, 2015 interim – 107.5 cents; 2014 dividends paid: 2013 final – 108.5 cents, 2014 interim – 96.0 cents).

The number of shares on which Rio Tinto plc dividends are based excludes those held as treasury shares and those held by employee share trusts which waived the right to dividends. Employee share trusts waived dividends on 428,529 Rio Tinto plc ordinary shares and 13,881 American Depository Receipts (ADRs) for the 2015 final dividend and on 217,661 Rio Tinto plc ordinary shares and 31,604 ADRs for the 2016 interim dividend (2015: 342,902 Rio Tinto plc ordinary shares and 24,582 ADRs for the 2014 final dividend and on 237,266 Rio Tinto plc ordinary shares and 27,050 ADRs for the 2015 interim dividend; 2014: 207,766 Rio Tinto plc ordinary shares and 3,353 ADRs for the 2013 final dividend and on 90,304 Rio Tinto plc ordinary shares and 1,912 ADRs for the 2014 interim dividend). In 2016, 2015 and 2014, no Rio Tinto Limited shares were held by Rio Tinto plc.

The number of shares on which Rio Tinto Limited dividends are based excludes those held by shareholders who have waived the rights to dividends. Employee share trusts waived dividends on Rio Tinto Limited shares of 681,818 for the 2015 final dividend and on 152,834 shares for the 2016 interim dividend (2015: 727,676 for the 2014 final dividend and on 474,665 for the 2015 interim dividend; 2014: 183,981 shares for the 2013 final dividend and 24,046 for the 2014 interim dividend).

In addition, the directors of Rio Tinto announced a final dividend of 125.0 cents per share on 8 February 2017. This is expected to result in payments of US$2,249 million (Rio Tinto plc: US$1,719 million, Rio Tinto Limited US$530 million). The dividends will be paid on 6 April 2017 to Rio Tinto plc and Rio Tinto Limited shareholders on the register at the close of business on 24 February 2017.

The proposed Rio Tinto Limited dividends will be franked out of existing franking credits or out of franking credits arising from the payment of income tax during 2017.

The approximate amount of the Rio Tinto Limited consolidated tax group's retained profits and reserves that could be distributed as dividends and franked out of available credits that arose from net payments of income tax in respect of periods up to 31 December 2016 (after deducting franking credits expected to be utilised on the 2016 final dividend declared) is US$11,577 million.

12 Goodwill

	2016 US$m	2015 US$m
Net book value		
At 1 January	**892**	1,228
Adjustment on currency translation	**59**	(220)
Impairment charges [(a)]	**–**	(116)
At 31 December	**951**	892
– cost	**17,144**	17,120
– accumulated impairment	**(16,193)**	(16,228)
At 1 January		
– cost	**17,120**	20,122
– accumulated impairment	**(16,228)**	(18,894)

At 31 December, goodwill has been allocated as follows:

	2016 US$m	2015 US$m
Net book value		
Richards Bay Minerals	**502**	439
Pilbara	**360**	363
Dampier Salt	**89**	90
	951	892

(a) The 2015 impairment charge of US$116 million represents the full impairment of goodwill arising from the Hathor Exploration Limited acquisition, which includes the Roughrider project. Refer to note 6 for further details.

Notes to the 2016 financial statements
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12 Goodwill continued

Impairment tests for goodwill

Richards Bay Minerals

Richards Bay Minerals' annual impairment review resulted in no impairment charge for 2016 (2015: no impairment charge). The recoverable amount has been assessed by reference to FVLCD, in line with the policy set out in note 1(i) and classified as level 3 under the fair value hierarchy. FVLCD was determined by estimating cash flows until the end of the life-of-mine plan including anticipated expansions. In arriving at FVLCD, a post-tax discount rate of 9.0 per cent (2015: 9.3 per cent) has been applied to the post-tax cash flows expressed in real terms.

The key assumptions to which the calculation of FVLCD for Richards Bay Minerals is most sensitive and the corresponding decrease in FVLCD are set out below:

	US$ million
5% decrease in the titanium slag price	198
1% increase in the discount rate applied to post-tax cash flows	326
10% strengthening of the South African rand	658

Other assumptions include the long-term pig iron and zircon prices and operating costs. Future selling prices and operating costs have been estimated in line with the policy set out in note 1(i). The recoverable amount of the cash-generating unit exceeds the carrying value for each of these sensitivities applied in isolation.

Pilbara

The recoverability of goodwill arising at Robe River is monitored at the Pilbara cash-generating unit level and has been assessed by reference to FVLCD using discounted cash flows, which is in line with the policy set out in note 1(i) and is classified as level 3 under the fair value hierarchy. In arriving at FVLCD, a post-tax discount rate of 7.0 per cent (2015: 7.3 per cent) has been applied to the post-tax cash flows expressed in real terms. The recoverable amounts were determined to be significantly in excess of carrying value, and there are not considered to be any reasonably possible changes in key assumptions that would cause the remaining goodwill to be impaired.

13 Intangible assets

Year ended 31 December 2016	Exploration and evaluation (a) US$m	Trademarks, patented and non-patented technology US$m	Contract based intangible assets (b) US$m	Other intangible assets US$m	Total US$m
Net book value					
At 1 January 2016	706	94	2,138	398	3,336
Adjustment on currency translation	14	(3)	47	–	58
Expenditure during the year	8	–	–	23	31
Amortisation for the year (c)	–	(13)	(87)	(127)	(227)
Impairment charges (d)	–	–	–	(1)	(1)
Disposals, transfers and other movements (e)	(17)	–	5	94	82
At 31 December 2016	711	78	2,103	387	3,279
– cost	2,588	199	3,897	1,329	8,013
– accumulated amortisation and impairment	(1,877)	(121)	(1,794)	(942)	(4,734)

Year ended 31 December 2015	Exploration and evaluation (a) US$m	Trademarks, patented and non patented technology US$m	Contract based intangible assets (b) US$m	Other intangible assets US$m	Total US$m
Net book value					
At 1 January 2015	2,596	156	2,454	674	5,880
Adjustment on currency translation	(134)	(15)	(393)	(58)	(600)
Expenditure during the year	152	–	–	64	216
Amortisation for the year (c)	–	(15)	(90)	(102)	(207)
Impairment charges (d)	(1,773)	(28)	(30)	(2)	(1,833)
Disposals, transfers and other movements (e)	(135)	(4)	197	(178)	(120)
At 31 December 2015	706	94	2,138	398	3,336
– cost	2,585	208	3,829	1,252	7,874
– accumulated amortisation and impairment	(1,879)	(114)	(1,691)	(854)	(4,538)

(a) Exploration and evaluation assets' useful lives are not determined until transferred to property, plant and equipment. This balance includes the Roughrider project in Canada which had an exploration and evaluation asset at 31 December 2016 of US$353 million (31 December 2015: US$343 million). The impairment charge in the year ended 31 December 2015 of US$1,773 million primarily relates to exploration and evaluation assets within the Simandou and Roughrider projects in the Energy & Minerals product group (see note 6).

(b) The Group benefits from certain intangible assets acquired with Alcan, including power supply contracts and water rights. The water rights are expected to contribute to the efficiency and cost effectiveness of operations for the foreseeable future: accordingly, these rights are considered to have indefinite lives and are not subject to amortisation but are tested annually for impairment. These water rights constitute the majority of the amounts in "Contract based intangible assets".

The remaining carrying value of the water rights (US$1,702 million) as at 31 December 2016 relates wholly to the Quebec smelters cash-generating unit. The Quebec smelters cash-generating unit was tested for impairment by reference to FVLCD using discounted cash flows, which is in line with the policy set out in note 1(i). The recoverable amount of the Quebec smelters is classified as level 3 under the fair value hierarchy. In arriving at FVLCD, post-tax cash flows expressed in real terms have been estimated over the expected useful economic lives of the underlying smelting assets and discounted using a real post-tax discount rate of 7.0 per cent (2015: 7.3 per cent).

The recoverable amounts were determined to be significantly in excess of carrying value, and there are no reasonably possible changes in key assumptions that would cause the remaining water rights to be impaired.

(c) Finite life intangible assets are amortised over their useful economic lives on a straight-line or units of production basis, as appropriate. Where amortisation is calculated on a straight-line basis, the following useful lives have been determined:

Trademarks, patented and non-patented technology
Trademarks: 14 to 20 years
Patented and non-patented technology: ten to 20 years

Contract based intangible assets
Power contracts/water rights: two to 45 years
Other purchase and customer contracts: five to 15 years

Other intangible assets
Internally generated intangible assets and computer software: two to five years
Other intangible assets: two to 20 years

(d) Impairment charges in 2016 relate to the full write off of the intangible assets of the Argyle cash-generating unit (see note 6). Impairment charges in 2015, excluding charges against exploration and evaluation, primarily related to the full write off of the intangible assets of the Carbone Savoie cash-generating unit.

(e) Disposals, transfers and other movements for exploration and evaluation in 2016 includes the disposal of the Mount Pleasant thermal coal project in New South Wales, Australia. The sale to MACH Energy Australia Pty Ltd completed on 5 August 2016. Disposals, transfers and other movements for exploration and evaluation in 2015 included US$164 million transferred to Mining property in relation to the Amrun project in Australia.

Exploration and evaluation expenditure

The charge for the year and the net amount of intangible assets capitalised during the year are as follows:

	2016 US$m	2015 US$m	2014 US$m
Net expenditure in the year (net of proceeds of US$208 million (2015: US$nil; 2014: US$11 million) on disposal of undeveloped projects)	(284)	(705)	(872)
Non-cash movements and non-cash proceeds on disposal of undeveloped projects	(177)	(15)	(53)
Amount capitalised during the year	8	152	142
Net charge for the year	(453)	(568)	(783)
Reconciliation to income statement			
Exploration and evaluation costs	(497)	(576)	(747)
Profit/(loss) relating to interests in undeveloped projects	44	8	(36)
Net charge for the year	(453)	(568)	(783)

At 31 December 2016, a total of US$726 million had been capitalised related to projects which had not yet been approved to proceed. This comprised evaluation costs of US$711 million included above and US$15 million of early works expenditure within property, plant and equipment (31 December 2015: a total of US$766 million had been capitalised comprising: evaluation costs of US$706 million included above and US$60 million of early works expenditure within property, plant and equipment).

14 Property, plant and equipment

Year ended 31 December 2016	Note	Mining properties and leases (a) US$m	Land and buildings (b) US$m	Plant and equipment US$m	Capital works in progress US$m	Total US$m
Net book value						
At 1 January 2016		11,146	7,571	37,900	4,440	61,057
Adjustment on currency translation		137	62	138	16	353
Adjustments to capitalised closure costs	26	(123)	–	–	–	(123)
Interest capitalised (c)	8	–	–	–	111	111
Additions		237	47	537	2,307	3,128
Depreciation for the year (a) (d)		(760)	(429)	(3,378)	–	(4,567)
Impairment charges, net of reversals (e)		(130)	–	(112)	(6)	(248)
Disposals		(3)	(169)	(86)	–	(258)
Subsidiaries no longer consolidated		(40)	(88)	(217)	(14)	(359)
Transfers and other movements (f)		384	322	924	(1,869)	(239)
At 31 December 2016		10,848	7,316	35,706	4,985	58,855
– cost		22,989	11,444	68,030	5,374	107,837
– accumulated depreciation and impairment		(12,141)	(4,128)	(32,324)	(389)	(48,982)
Non-current assets held under finance leases (g)		–	–	38	–	38
Non-current assets pledged as security (h)		3,310	423	5,332	2,104	11,169

Notes to the 2016 financial statements
continued

14 Property, plant and equipment continued

Year ended 31 December 2015	Mining properties and leases [a] US$m	Land and buildings [b] US$m	Plant and equipment US$m	Capital works in progress US$m	Total US$m
Net book value					
At 1 January 2015	11,913	7,085	39,810	9,885	68,693
Adjustment on currency translation	(1,049)	(890)	(4,268)	(754)	(6,961)
Adjustments to capitalised closure costs (note 26)	147	–	–	–	147
Interest capitalised [c] (note 8)	–	–	–	254	254
Additions	400	374	715	2,767	4,256
Depreciation for the year [a] [d]	(725)	(419)	(3,294)	–	(4,438)
Impairment charges, net of reversals [e]	(69)	(51)	(308)	(224)	(652)
Disposals	(4)	(15)	(77)	–	(96)
Subsidiaries no longer consolidated	–	(7)	(17)	–	(24)
Transfers and other movements [f]	533	1,494	5,339	(7,488)	(122)
At 31 December 2015	11,146	7,571	37,900	4,440	61,057
– cost	22,474	11,405	67,690	5,000	106,569
– accumulated depreciation and impairment	(11,328)	(3,834)	(29,790)	(560)	(45,512)
Non-current assets held under finance leases [g]	–	37	6	–	43
Non-current assets pledged as security [h]	911	294	6,293	2,402	9,900

(a) At 31 December 2016, the net book value of capitalised production phase stripping costs totalled US$1,967 million, with US$1,511 million within Property, plant and equipment and a further US$456 million within Investments in equity accounted units (2015 total of US$1,923 million with US$1,464 million in Property, plant and equipment and a further US$459 million within Investments in equity accounted units). During the year capitalisation of US$319 million was partly offset by depreciation of US$298 million. Depreciation of deferred stripping costs of US$203 million (2015: US$173 million; 2014: US$84 million) is included within "Depreciation for the year".

(b) At 31 December 2016, the net book value amount for land and buildings includes freehold US$7,276 million (2015: US$7,435 million) and long leasehold US$40 million (2015: US$136 million).

(c) Interest is capitalised at a rate based on the Group or relevant subsidiary's cost of borrowing or at the rate on project specific debt, where applicable. The Group's average borrowing rate used for capitalisation of interest is 4.2 per cent (2015: 3.7 per cent).

(d) Assets within operations for which production is not expected to fluctuate significantly from one year to another or which have a physical life shorter than the related mine are depreciated on a straight-line basis as follows:

Land and buildings
Land: not depreciated
Buildings: five to 50 years

Plant and equipment
Other plant and equipment: three to 50 years
Power assets: 25 to 50 years
Capital work in progress: not depreciated

(e) During 2016 impairment charges primarily related to the Copper & Diamonds businesses (see note 6). During 2015 impairment charges primarily related to the Energy & Minerals and Aluminium businesses.

(f) "Transfers and other movements" includes reclassifications and adjustments between categories, including the transfer to assets of disposal groups held for sale.

(g) The finance leases under which these assets are held are disclosed in note 23.

(h) Excludes assets held under finance leases. Non-current assets pledged as security represent amounts pledged as collateral against US$4,783 million (2015: US$701 million) of loans, which are included in note 22.

15 Investments in equity accounted units

Summary balance sheet (Rio Tinto share)	2016 US$m	2015 US$m
Rio Tinto's share of assets		
– Non-current assets	**6,686**	6,780
– Current assets	**832**	429
	7,518	7,209
Rio Tinto's share of liabilities		
– Current liabilities	**(612)**	(941)
– Non-current liabilities	**(1,887)**	(1,327)
	(2,499)	(2,268)
Rio Tinto's share of net assets	**5,019**	4,941

Further details of investments in equity accounted units are set out in notes 35 and 36.

At 31 December 2016 and 2015 the Group had no investments in equity accounted units with shares listed on recognised stock exchanges.

At 31 December 2016, net debt of equity accounted units, excluding amounts due to Rio Tinto, was US$1,338 million (2015: US$1,224 million).

16 Inventories

	2016 US$m	2015 US$m
Raw materials and purchased components	**470**	528
Consumable stores	**840**	1,030
Work in progress	**970**	1,142
Finished goods and goods for resale	**800**	721
	3,080	3,421
Comprising:		
Expected to be used within one year	**2,937**	3,168
Expected to be used after more than one year	**143**	253
	3,080	3,421

Inventory write-downs, net of reversals, amounting to US$51 million (2015: US$192 million; 2014: US$94 million) were recognised during the year.

At 31 December 2016, US$564 million (2015: US$587 million) of inventories were pledged as security for liabilities.

17 Deferred taxation

	2016 US$m	2015 US$m
At 1 January	**(23)**	34
Adjustment on currency translation	**58**	(149)
Credited to the income statement	**(548)**	(139)
(Credited)/charged to statement of comprehensive income [a]	**(33)**	174
Disposals	**(8)**	(1)
Other movements [b]	**(53)**	58
At 31 December	**(607)**	(23)
Comprising:		
– deferred tax liabilities [c] [d]	**3,121**	3,286
– deferred tax assets [c] [e] [f]	**(3,728)**	(3,309)

Deferred tax balances for which there is a right of offset within the same tax jurisdiction are presented net on the face of the balance sheet as permitted by IAS 12. The closing deferred tax liabilities and assets, prior to this offsetting of balances, are shown below.

	Total 2016 US$m	Total 2015 US$m
Deferred tax liabilities arising from:		
Capital allowances	**4,937**	5,311
Unremitted earnings [d]	**659**	664
Capitalised interest	**403**	432
Unrealised exchange gains	**40**	68
Other temporary differences	**301**	451
	6,340	6,926
Deferred tax assets arising from:		
Tax losses [e]	**(2,246)**	(2,170)
Provisions	**(2,040)**	(1,745)
Capital allowances	**(883)**	(794)
Post-retirement benefits	**(888)**	(829)
Unrealised exchange losses	**(342)**	(522)
Other temporary differences	**(548)**	(889)
	(6,947)	(6,949)
Charged/(credited) to the income statement		
Unrealised exchange losses	**156**	(108)
Tax losses	**(122)**	(335)
Provisions	**(279)**	40
Capital allowances	**(441)**	251
Tax on unremitted earnings	**(6)**	(16)
Post-retirement benefits	**(6)**	47
Other temporary differences	**150**	(18)
	(548)	(139)

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17 Deferred taxation continued

(a) The amounts credited directly to the Statement of comprehensive income include provisions for tax on exchange differences on intragroup loans qualifying for reporting as part of the net investment in subsidiaries, on cash flow hedges and on actuarial gains and losses on pension schemes and on post-retirement healthcare plans.

(b) "Other movements" include deferred tax relating to tax payable recognised by subsidiary holding companies on the profits of the equity accounted units to which it relates and amounts credited directly to the statement of changes in equity relating to the restructure of Coal & Allied Industries Limited.

(c) The deferred tax liability of US$3,121 million (2015: US$3,286 million) includes US$3,109 million (2015: US$3,275 million) due in more than one year. The deferred tax asset of US$3,728 million (2015: US$3,309 million) includes US$3,721 million (2015: US$3,091 million) receivable in more than one year. All amounts are shown as non-current on the face of the balance sheet as required by IAS 12.

(d) Deferred tax is not recognised on the unremitted earnings of subsidiaries and joint ventures totalling US$2,523 million (2015: US$2,763 million) where the Group is able to control the timing of the remittance and it is probable that there will be no remittance in the foreseeable future. If these earnings were remitted, tax of US$125 million (2015: US$136 million) would be payable.

(e) There is a limited time period, the shortest of which is four years, for the recovery of US$1,309 million (2015: US$1,482 million) of tax losses and other tax assets which have been recognised as deferred tax assets in the financial statements.

(f) Recognised and unrecognised deferred tax assets are shown in the table below and totalled US$7,170 million at 31 December 2016 (2015: US$6,966 million). Of this total, US$3,728 million has been recognised as deferred tax assets (2015: US$3,309 million), leaving US$3,442 million (2015: US$3,657 million) unrecognised, as recovery is not considered probable.

The recognised amounts do not include deferred tax assets that have been netted off against deferred tax liabilities.

At 31 December	Recognised 2016 US$m	Recognised 2015 US$m	Unrecognised 2016 US$m	Unrecognised 2015 US$m
France [a]	**330**	331	**1,077**	1,112
Canada	**470**	420	**707**	645
US	**1,239**	928	**6**	5
Australia	**1,072**	1,242	**446**	323
Mongolia	**441**	214	**–**	317
Other	**176**	174	**1,206**	1,255
Total [b]	**3,728**	3,309	**3,442**	3,657

(a) US$1,077 million (2015: US$1,112 million) of the unrecognised assets relate to trading losses in France, which were acquired as part of the Alcan acquisition. The amount recognised takes account of legislation which restricts the recovery of losses.

(b) US$964 million (2015: US$784 million) of the unrecognised assets relate to realised or unrealised capital losses, the recovery of which depends on the existence of capital gains in future years. There is a time limit, the shortest of which is one year, for the recovery of US$105 million of the unrecognised assets (2015: US$433 million).

18 Trade and other receivables

	Non-current 2016 US$m	Current 2016 US$m	Total 2016 US$m	Non-current 2015 US$m	Current 2015 US$m	Total 2015 US$m
Trade receivables [a]	**–**	**2,283**	**2,283**	5	1,365	1,370
Other receivables	**347**	**880**	**1,227**	370	752	1,122
Prepayment of tolling charges to jointly controlled entities [b]	**267**	**–**	**267**	288	–	288
Pension surpluses (note 45)	**625**	**–**	**625**	592	–	592
Amounts due from equity accounted units	**–**	**31**	**31**	–	27	27
Other prepayments	**103**	**266**	**369**	101	242	343
	1,342	**3,460**	**4,802**	1,356	2,386	3,742

(a) At 31 December 2016, trade and other receivables are stated net of provisions for doubtful debts of US$66 million (2015: US$77 million). Amounts of US$89 million (2015: US$37 million) were impaired; the majority of these receivables were more than 90 days overdue.

(b) Rio Tinto Aluminium has made certain prepayments to equity accounted units for toll processing of alumina. These prepayments will be charged to Group operating costs as processing takes place.

There is no material element of trade and other receivables that is interest bearing.

The fair value of current trade and other receivables and the majority of amounts classified as non-current assets approximates their carrying value.

As of 31 December 2016, trade receivables of US$230 million (2015: US$123 million) were past due but not impaired. The ageing of these receivables is as follows:

	2016 US$m	2015 US$m
less than 30 days overdue	**196**	71
between 30 and 60 days overdue	**4**	7
between 60 and 90 days overdue	**7**	23
more than 90 days overdue	**23**	22
	230	123

These relate to a number of customers for whom there is no recent history of default.

With respect to trade and other receivables that are neither impaired nor past due, there are no indications as of the reporting date that the debtors will not meet their payment obligations.

19 Assets and liabilities held for sale

Following the termination of the previous sales agreement for Blair Athol, a binding agreement was signed in September 2016 to divest Rio Tinto's 71.2 per cent interest to Terracom subject to certain conditions precedent. At 31 December 2016, assets held for sale also included certain cancelled projects at Rio Tinto Kennecott.

At 31 December 2015, assets and liabilities held for sale primarily related to the Group's 40 per cent interest in the Bengalla coal Joint venture and its interest in Blair Athol.

20 Other financial assets (including non-quasi equity loans to equity accounted units)

	Non-current 2016 US$m	**Current 2016 US$m**	**Total 2016 US$m**	Non-current 2015 US$m	Current 2015 US$m	Total 2015 US$m
Derivative financial instruments	**508**	**24**	**532**	529	77	606
Equity shares and quoted funds	**73**	**83**	**156**	76	81	157
Other investments, including loans [a]	**202**	**252**	**454**	183	23	206
Loans to equity accounted units	**39**	**–**	**39**	–	42	42
	822	**359**	**1,181**	788	223	1,011

(a) Current "other investments, including loans" includes US$250 million (2015: US$nil) of highly liquid financial assets held in managed investment funds classified as held for trading.

Detailed information relating to other financial assets is given in note 30.

21 Cash and cash equivalents

	Note	**2016 US$m**	2015 US$m
Cash at bank and in hand		**956**	843
Money market funds and other cash equivalents		**7,245**	8,523
Balance per Group balance sheet		**8,201**	9,366
Bank overdrafts repayable on demand (unsecured)	22	**(12)**	(12)
Balance per Group cash flow statement		**8,189**	9,354

Cash and cash equivalents of US$358 million (2015: US$426 million) are held in countries where there are restrictions on remittances. Of this balance US$252 million (2015: US$311 million) could be used to repay subsidiaries' third-party borrowings.

There are also restrictions on a further US$1,051 million (2015: US$802 million) of cash and cash equivalents, the majority of which is held by partially owned subsidiaries and is not available for use in the wider Group due to the legal and contractual restrictions currently in place. Of this balance US$766 million (2015: US$53 million) could be used to repay subsidiaries' third-party borrowings.

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22 Borrowings and other financial liabilities

Borrowings at 31 December	Note	Non-current 2016 US$m	Current 2016 US$m	Total 2016 US$m	Non-current 2015 US$m	Current 2015 US$m	Total 2015 US$m
Rio Tinto Finance (USA) plc Bonds 1.375% 2016		–	–	–	–	998	998
Rio Tinto Finance (USA) plc Bonds LIBOR plus 0.84% 2016		–	–	–	–	500	500
Rio Tinto Finance (USA) plc Bonds 2.0% 2017		–	–	–	500	–	500
Rio Tinto Finance (USA) plc Bonds 1.625% 2017		–	–	–	1,247	–	1,247
Rio Tinto Finance (USA) Limited Bonds 6.5% 2018 (a)		–	–	–	1,894	–	1,894
Rio Tinto Finance (USA) plc Bonds 2.250% 2018		–	–	–	1,242	–	1,242
Rio Tinto Finance (USA) Limited Bonds 9.0% 2019 (a)		1,235	–	1,235	1,481	–	1,481
Rio Tinto Finance (USA) Limited Bonds 3.5% 2020		464	–	464	997	–	997
Rio Tinto Finance plc Euro Bonds 2.0% due 2020 (a) (b)		817	–	817	848	–	848
Rio Tinto Finance (USA) Limited Bonds 4.125% 2021 (a)		573	–	573	989	–	989
Rio Tinto Finance (USA) Limited Bonds 3.750% 2021 (a)		621	–	621	1,142	–	1,142
Rio Tinto Finance (USA) plc Bonds 3.5% 2022 (a)		459	–	459	1,004	–	1,004
Rio Tinto Finance (USA) plc Bonds 2.875% 2022 (a)		509	–	509	994	–	994
Rio Tinto Finance plc Euro Bonds 2.875% due 2024 (a) (b)		577	–	577	584	–	584
Rio Tinto Finance (USA) Limited Bonds 3.75% 2025 (a)		1,195	–	1,195	1,202	–	1,202
Rio Tinto Finance (USA) Limited Bonds 7.125% 2028 (a)		980	–	980	1,000	–	1,000
Alcan Inc. Debentures 7.25% due 2028		105	–	105	106	–	106
Rio Tinto Finance plc Sterling Bonds 4.0% due 2029 (a) (b)		609	–	609	738	–	738
Alcan Inc. Debentures 7.25% due 2031		425	–	425	427	–	427
Alcan Inc. Global Notes 6.125% due 2033		741	–	741	741	–	741
Alcan Inc. Global Notes 5.75% due 2035		287	–	287	286	–	286
Rio Tinto Finance (USA) Limited Bonds 5.2% 2040 (a)		1,103	–	1,103	1,147	–	1,147
Rio Tinto Finance (USA) plc Bonds 4.75% 2042 (a)		466	–	466	490	–	490
Rio Tinto Finance (USA) plc Bonds 4.125% 2042 (a)		690	–	690	727	–	727
Oyu Tolgoi LLC Secured Loan due 2027 (c)		2,259	–	2,259	–	–	–
Oyu Tolgoi LLC Secured Loan due 2028 (c)		247	–	247	–	–	–
Oyu Tolgoi LLC Secured Loan due 2029 (c)		866	–	866	–	–	–
Oyu Tolgoi LLC Secured Loan due 2030 (c)		754	–	754	–	–	–
Loans from equity accounting units		–	49	49	–	37	37
Other secured loans		530	127	657	597	104	701
Other unsecured loans		377	508	885	382	595	977
Finance leases	23	24	21	45	45	7	52
Bank overdrafts	21	–	12	12	–	12	12
Total borrowings including overdrafts (d)		**16,913**	**717**	**17,630**	20,810	2,253	23,063

(a) These borrowings are subject to the hedging arrangements summarised below. Fair value hedge accounting has been applied except for the Rio Tinto Finance plc Sterling Bonds 4.0% due 2029 which has cash flow hedge accounting applied.

(b) Rio Tinto has a US$10 billion (2015: US$10 billion) European Debt Issuance Programme against which the cumulative amount utilised was US$1.9 billion equivalent at 31 December 2016 (2015: US$2.1 billion). The carrying value of these bonds after hedge accounting adjustments amounted to US$2.0 billion (2015: US$ 2.2 billion) in aggregate.

(c) These borrowings relate to Oyu Tolgoi LLC project finance facility. The project finance facility provides for interest-only payments for the first five years followed by minimum repayments according to a stepped amortisation schedule for the remaining life of the facility. The due dates stated represent the final repayment date. Further details are provided in note 30.

(d) The Group's borrowings of US$17.6 billion (2015: US$23.1 billion) include US$2.8 billion (2015: US$2.9 billion) which relate to subsidiary entity borrowings that are without recourse to the Group and US$4.8 billion (2015: US$0.7 billion) which is subject to various financial and general covenants with which the respective borrowers were in compliance as at 31 December 2016.

Other financial liabilities	Non-current 2016 US$m	Current 2016 US$m	Total 2016 US$m	Non-current 2015 US$m	Current 2015 US$m	Total 2015 US$m
Derivative financial instruments	517	6	523	283	41	324
Other financial liabilities	40	199	239	47	190	237
Total other financial liabilities	**557**	**205**	**762**	330	231	561
Total borrowings including overdrafts (as above)	16,913	717	17,630	20,810	2,253	23,063
Total borrowings and other financial liabilities	**17,470**	**922**	**18,392**	21,140	2,484	23,624

Swap arrangements

At 31 December 2016, US$7.7 billion (2015: US$7.0 billion) US dollar notional of the fixed rate US dollar borrowings were swapped to floating US dollar rates and US$1.3 billion (2015: US$1.4 billion) US dollar notional equivalent of euro borrowings were fully swapped to floating US dollar rates.

Hedge accounting has been applied to the full notional of items marked (a) in the above table except for: US$75 million (2015: US$75 million) of the Rio Tinto Finance (USA) Limited Bonds 7.125% due 2028 and US$nil million (2015: US$750 million) of the Rio Tinto Finance (USA) Limited Bonds 6.5% due 2018. These portions are held at amortised cost.

The Rio Tinto Finance plc Sterling Bond 4.0% due 2029 at US$0.6 billion (2015: US$0.7 billion) US dollar notional equivalent of sterling was fully swapped to US dollar notional and fixed US dollar rates. Cash flow hedging was applied to the annual interest coupons and principal of this bond. The hedge was fully effective in 2016 and 2015 financial years.

The fair value of interest rate and cross currency interest rate swaps at 31 December 2016 was US$108 million (2015: US$189 million) asset and US$516 million (2015: US$275 million) liability, respectively. These are included within "Other financial assets" and "Other financial liabilities" in the balance sheet.

Details of the major interest rate and cross currency interest rate swaps are shown in note 30.

23 Capitalised finance leases

	Note	2016 US$m	2015 US$m
Present value of minimum lease payments			
Total minimum lease payments		**45**	53
Effect of discounting		**–**	(1)
	14	**45**	52
Payments under capitalised finance leases			
Due within 1 year		**21**	7
Between 1 and 3 years		**8**	28
Between 3 and 5 years		**6**	5
More than 5 years		**10**	12
	14	**45**	52

24 Consolidated net debt

	Note	2016 US$m	2015 US$m
Analysis of changes in consolidated net debt			
Opening balance		**(13,783)**	(12,495)
Adjustment on currency translation		**(103)**	1,586
Exchange gains/(losses) charged/(credit) to the income statement [(a)]		**193**	(1,630)
Cash movements excluding exchange movements		**3,915**	(1,109)
Other movements		**191**	(135)
Closing balance		**(9,587)**	(13,783)
Total borrowings in balance sheet	22	**(17,630)**	(23,063)
Derivatives related to net debt (included in "Other financial assets/liabilities")	30	**(408)**	(86)
Adjusted total borrowings		**(18,038)**	(23,149)
Cash and cash equivalents	21	**8,201**	9,366
Other investments [(b)]	20	**250**	–
Consolidated net debt		**(9,587)**	(13,783)

	2016 US$m	2015 US$m	2014 US$m
Exchange gains/(losses) on US dollar net debt and intragroup balances excluded from underlying earnings			
Exchange gains/(losses) on US dollar net debt	**160**	(1,578)	(1,056)
Exchange gains/(losses) on intragroup balances	**449**	(1,961)	(940)
Exchange gains on loans from equity accounted units	**–**	–	1
Exchange gains on settlement of dividends	**2**	1	–
Credited/(charged) to income statement	**611**	(3,538)	(1,995)

(a) Exchange gains and losses taken to the income statement include amounts excluded from underlying earnings.
(b) Other investments include US$250 million of highly liquid financial assets held in managed investment funds classified as held for trading.

Further information relating to the currency and interest rate exposures arising from net debt and related derivatives is given in note 30.

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25 Trade and other payables

	Non-current 2016 US$m	Current 2016 US$m	Total 2016 US$m	Non-current 2015 US$m	Current 2015 US$m	Total 2015 US$m
Trade payables	–	2,787	2,787	9	2,567	2,576
Deferred income	234	197	431	176	175	351
Accruals	1	973	974	3	1,225	1,228
Other payables	309	1,072	1,381	263	1,075	1,338
Employee entitlements	–	720	720	–	747	747
Royalties and mining taxes	3	516	519	2	345	347
Amounts owed to equity accounted units	151	92	243	131	100	231
Government grants deferred	91	4	95	98	3	101
	789	6,361	7,150	682	6,237	6,919

Due to their short term maturities, the fair value of trade and other payables approximates their carrying value.

26 Provisions (including post-retirement benefits)

	Note	Pensions and post retirement healthcare (a) US$m	Other employee entitlements (b) US$m	Close down and restoration/ environmental (c) US$m	Other US$m	Total 2016 US$m	Total 2015 US$m
At 1 January		3,122	458	8,426	1,060	13,066	14,602
Adjustment on currency translation		3	(3)	(29)	(27)	(56)	(1,344)
Adjustments to mining properties	14						
– changes in estimate		–	–	(123)	–	(123)	147
Charged/(credited) to profit:							
– increases to existing and new provisions		260	255	537	578	1,630	898
– unused amounts reversed		–	(95)	(111)	(33)	(239)	(258)
– exchange losses on provisions		–	–	10	3	13	91
– amortisation of discount		–	1	296	41	338	378
Utilised in year		(370)	(178)	(257)	(192)	(997)	(824)
Actuarial losses/(gains) recognised in equity		152	–	–	–	152	(442)
Subsidiaries no longer consolidated		–	–	(38)	(25)	(63)	(19)
Transfers to assets held for sale		–	–	(4)	–	(4)	(57)
Transfers and other movements		–	12	15	50	77	(106)
At 31 December		3,167	450	8,722	1,455	13,794	13,066
Balance sheet analysis:							
Current		104	305	439	467	1,315	1,190
Non-current		3,063	145	8,283	988	12,479	11,876
Total		3,167	450	8,722	1,455	13,794	13,066

(a) The main assumptions used to determine the provision for pensions and post-retirement healthcare, and other information, including the expected level of future funding payments in respect of those arrangements, are given in note 45.

(b) The provision for other employee entitlements includes a provision for long service leave of US$317 million (2015: US$322 million), based on the relevant entitlements in certain Group operations and includes US$59 million (2015: US$52 million) of provision for redundancy and severance payments.

(c) The Group's policy on close-down and restoration costs is described in note 1(k) and in paragraph (v) under "Critical accounting policies and estimates" on pages 123 and 125. Close-down and restoration costs are a normal consequence of mining, and the majority of close-down and restoration expenditure is incurred in the years following closure of the mine, refinery or smelter. Remaining lives of operations and infrastructure range from one to over 50 years with an average for all sites, weighted by present closure obligation, of around 16 years (2015: 17 years). Although the ultimate cost to be incurred is uncertain, the Group's businesses estimate their respective costs based on current restoration standards and techniques. Provisions of US$8,722 million (2015: US$8,426 million) for close-down and restoration costs and environmental clean-up obligations are based on risk adjusted cash flows. These estimates have been discounted to their present value at a real risk free rate of 2 per cent per annum, based on an estimate of the long-term, risk free, pre-tax cost of borrowing.

Non-current provisions for close down and restoration/environmental expenditure include amounts relating to environmental clean-up of US$366 million (2015: US$286 million) expected to take place between one and five years from the balance sheet date, and US$727 million (2015: US$867 million) expected to take place later than five years after the balance sheet date.

Close-down and restoration/environmental liabilities at 31 December 2016 have not been adjusted for amounts of US$110 million (2015: US$97 million) relating to insurance recoveries and other financial assets held for the purposes of meeting these obligations.

27 Share capital – Rio Tinto plc

	2016 Number (million)	2015 Number (million)	2014 Number (million)	2016 US$m	2015 US$m	2014 US$m
Issued and fully paid up share capital of 10p each						
At 1 January	**1,384.487**	1,425.378	1,425.377	**224**	230	230
Ordinary shares issued (a) (c)	**0.033**	0.022	0.001	**–**	–	–
Shares purchased and cancelled (b)	**–**	(40.913)	–	**–**	(6)	–
At 31 December	**1,384.520**	1,384.487	1,425.378	**224**	224	230
Shares held by public						
At 1 January	**1,374.046**	1,414.147	1,412.695			
Shares reissued from treasury (a)	**0.743**	0.790	1.451			
Shares purchased and cancelled (b)	**–**	(40.913)	–			
Ordinary shares issued (a) (c)	**0.033**	0.022	0.001			
At 31 December	**1,374.822**	1,374.046	1,414.147			
Shares held in treasury	**9.698**	10.441	11.231			
Shares held by public	**1,374.822**	1,374.046	1,414.147			
Total share capital	**1,384.520**	1,384.487	1,425.378			
Other share classes						
Special Voting Share of 10p each (d)	**1 only**	1 only	1 only			
DLC Dividend Share of 10p each (d)	**1 only**	1 only	1 only			
Equalisation Share of 10p each (d)	**1 only**	1 only	1 only			

(a) 33,210 ordinary shares were issued in 2016 under the Global Employee Share Plan (GESP). 743,380 ordinary shares were reissued from treasury during the year resulting from the vesting of awards and the exercise of options under Rio Tinto plc employee share-based payment plans, with exercise prices and market values between £16.53 and £32.235 per share (2015: 21,709 ordinary shares were issued under the GESP, and 789,887 ordinary shares reissued from treasury with exercise prices and market values between £15.086 and £32.375 per share; 2014: 971 ordinary shares were issued under the GESP, and 1,450,659 ordinary shares reissued from treasury with exercise prices and market values between £10.979 and £36.275 per share).

(b) The authority for the Company to buy back its ordinary shares was renewed at the 2016 annual general meeting. No shares were bought back in 2016. 40,912,881 shares were bought back and cancelled in 2015 under the on-market buy-back programme. No shares were bought back in 2014.

(c) The aggregate consideration for new shares issued under the GESP was US$0.9 million (2015: US$0.9 million; 2014: US$0.05 million). The difference between the nominal value and the issue price of the shares issued was credited to the share premium account. The aggregate consideration received for treasury shares reissued was US$4 million (2015: US$13 million; 2014: US$22 million). No new shares were issued as a result of the exercise of options under Rio Tinto plc employee share-based payment plans in 2016, 2015 and 2014.

(d) The "Special Voting Share" was issued to facilitate the joint voting by shareholders of Rio Tinto plc and Rio Tinto Limited on Joint Decisions, following the DLC Merger. The "DLC Dividend Share" was issued to facilitate the efficient management of funds within the DLC structure. Directors have the ability to issue an Equalisation Share if that is required under the terms of the DLC Merger Sharing Agreement.

During 2016, US$40.1 million of shares and ADRs (2015: US$34.1 million; 2014: US$49.5 million) were purchased by employee share ownership trusts on behalf of Rio Tinto plc to satisfy future share options and awards as they vest. At 31 December 2016, 892,938 shares and 33,417 ADRs were held in the employee share ownership trusts on behalf of Rio Tinto plc.

Information relating to share options and other share-based incentive schemes is given in note 44.

28 Share capital – Rio Tinto Limited

	2016 Number (million)	2015 Number (million)	2014 Number (million)	2016 US$m	2015 US$m	2014 US$m
Issued and fully paid up share capital						
At 1 January	**424.19**	435.76	435.76	**3,950**	4,535	4,911
Adjustment on currency translation	**–**	–	–	**(35)**	(503)	(376)
Ordinary shares purchased and cancelled (a)	**–**	(11.57)	–	**–**	(82)	–
At 31 December	**424.19**	424.19	435.76	**3,915**	3,950	4,535
– Special Voting Share (b)	**1 only**	1 only	1 only			
– DLC Dividend Share (b)	**1 only**	1 only	1 only			
Total share capital	**424.19**	424.19	435.76			

(a) In April 2015, 11,566,308 Rio Tinto Limited ordinary shares were purchased at A$48.44 per share and cancelled under an off-market share buy-back programme carried out pursuant to the shareholder approval granted at Rio Tinto Limited's 2015 annual general meeting for off-market and on-market buy-backs of up to 43.5 million Rio Tinto Limited ordinary shares.

(b) The "Special Voting Share" was issued to facilitate the joint voting by shareholders of Rio Tinto Limited and Rio Tinto plc on Joint Decisions following the DLC Merger. The "DLC Dividend Share" was issued to facilitate the efficient management of funds within the DLC structure. Directors have the ability to issue an Equalisation Share if that is required under the terms of the DLC Merger Sharing Agreement.

Share options exercised during the year to 31 December 2016 under various Rio Tinto Limited employee share option schemes were satisfied by the on-market purchase of Rio Tinto Limited shares by a third party on the Group's behalf.

Information relating to share options and other share-based incentive schemes is given in note 44.

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29 Other reserves and retained earnings

	2016 US$m	2015 US$m	2014 US$m
Capital redemption reserve [(a)]			
At 1 January	**34**	28	28
Own shares purchased and cancelled	**–**	6	–
At 31 December	**34**	34	28
Hedging reserves			
At 1 January	**–**	12	3
Parent and subsidiaries' net cash flow hedge fair value losses	**(88)**	(41)	(48)
Parent and subsidiaries' net cash flow hedge losses transferred to the income statement	**116**	32	55
Tax on the above	**4**	(3)	2
At 31 December	**32**	–	12
Available for sale revaluation reserves			
At 1 January	**(139)**	(130)	(117)
Gains/(losses) on available for sale securities	**13**	(16)	(19)
Losses on available for sale securities transferred to the income statement	**–**	7	6
At 31 December	**(126)**	(139)	(130)
Other reserves [(b)]			
At 1 January	**11,735**	11,704	11,766
Change in equity interest held by Rio Tinto	**108**	–	–
Own shares purchased from Rio Tinto Limited shareholders to satisfy share options	**(43)**	(25)	(129)
Employee share options: value of services	**58**	58	69
Deferred tax on share options	**3**	(2)	(2)
At 31 December	**11,861**	11,735	11,704
Foreign currency translation reserve [(c)]			
At 1 January	**(2,491)**	(492)	1,191
Parent and subsidiaries currency translation and exchange adjustments	**(204)**	(1,940)	(1,690)
Equity accounted units currency translation adjustments	**11**	(57)	(43)
Currency translation reclassified on disposal	**99**	(2)	53
Tax on the above	**–**	–	(3)
At 31 December	**(2,585)**	(2,491)	(492)
Total other reserves per balance sheet	**9,216**	9,139	11,122

	2016 US$m	2015 US$m	2014 US$m
Retained earnings [(d)]			
At 1 January	**19,736**	26,110	23,605
Parent and subsidiaries' profit/(loss) for the year	**4,298**	(1,218)	5,243
Equity accounted units' profit after tax for the year	**319**	352	1,284
Actuarial (losses)/gains [(e)]	**(94)**	616	(720)
Tax relating to components of other comprehensive income	**30**	(173)	204
Total comprehensive income/(loss) for the year	**4,553**	(423)	6,011
Share buy-back scheme	**–**	(1,946)	–
Dividends paid	**(2,725)**	(4,076)	(3,710)
Change in equity interest held by Rio Tinto	**40**	20	36
Own shares purchased/treasury shares reissued for share options and other movements	**(37)**	(27)	(28)
Employee share options and other IFRS 2 charges taken to the income statement	**64**	78	196
At 31 December	**21,631**	19,736	26,110

(a) The capital redemption reserve was set up to comply with section 733 of the UK Companies Act 2006 (previously section 170 of the UK Companies Act 1985) when shares of a company are redeemed or purchased wholly out of the company's profits. Balances reflect the amount by which the Company's issued share capital is diminished in accordance with this section.

(b) Other reserves includes US$11,936 million which represents the difference between the nominal value and issue price of the shares issued arising from Rio Tinto plc's rights issue completed in July 2009. No share premium was recorded in the Rio Tinto plc financial statements through the operation of the merger relief provisions of the UK Companies Act 1985.

Other reserves also include the cumulative amount recognised under IFRS 2 in respect of options granted but not exercised to acquire shares in Rio Tinto Limited, less, where applicable, the cost of shares purchased to satisfy share options exercised. The cumulative amount recognised under IFRS 2 in respect of options granted but not exercised to acquire shares in Rio Tinto plc is recorded in retained earnings.

(c) Exchange differences arising on the translation of the Group's net investment in foreign controlled companies are taken to the foreign currency translation reserve, as described in note 1(d). The cumulative differences relating to an investment are transferred to the income statement when the investment is disposed of.

(d) Retained earnings and movements in reserves of subsidiaries include those arising from the Group's share of joint operations.

(e) There were no actuarial losses relating to equity accounted units in 2016, 2015 or 2014.

30 Financial instruments and risk management

Except where stated, the information given below relates to the financial instruments of the parent companies and their subsidiaries and joint operations, and excludes those of equity accounted units. The information is grouped in the following sections:

A – Financial assets and liabilities by categories

B – Derivative financial instruments

C – Fair values

A (a) Financial assets and liabilities by categories

At 31 December 2016	Note	**Total US$m**	Loans and receivables US$m	Available for sale securities US$m	Held at fair value US$m	Held to maturity assets/other financial liabilities US$m
Financial assets						
Cash and cash equivalents	21	**8,201**	8,201	–	–	–
Trade and other receivables [(a)]		**3,432**	3,289	–	143	–
Equity shares and quoted funds	20	**156**	–	156	–	–
Other investments, including loans [(b)]	20	**454**	14	–	431	9
Currency and commodity derivatives: designated as hedges [(c)]	20	**1**	–	–	1	–
Derivatives and embedded derivatives not related to net debt: not designated as hedges [(c)]	20	**423**	–	–	423	–
Derivatives related to net debt [(c)]	20,22,24	**108**	–	–	108	–
Loans to equity accounted units including quasi equity loans		**202**	202	–	–	–
Total financial assets		**12,977**	**11,706**	**156**	**1,106**	**9**
Financial liabilities						
Trade and other payables [(d)]		**(5,386)**			(5)	(5,381)
Short term borrowings and bank overdrafts	22	**(717)**			–	(717)
Medium and long term borrowings	22	**(16,913)**			–	(16,913)
Derivatives related to net debt [(c)]	22,24	**(516)**			(516)	–
Other derivatives and embedded derivatives: not designated as hedges [(c)]	22	**(7)**			(7)	–
Other financial liabilities	22	**(239)**			–	(239)
Total financial liabilities		**(23,778)**			**(528)**	**(23,250)**

At 31 December 2015	Note	Total US$m	Loans and receivables US$m	Available for sale securities US$m	Held at fair value US$m	Held to maturity assets/other financial liabilities US$m
Financial assets						
Cash and cash equivalents	21	9,366	9,366	–	–	–
Trade and other receivables [(a)]		2,468	2,456	–	12	–
Equity shares and quoted funds	20	157	–	157	–	–
Other investments, including loans	20	206	32	–	170	4
Currency and commodity derivatives: designated as hedges [(c)]	20	5	–	–	5	–
Derivatives and embedded derivatives not related to net debt: not designated as hedges [(c)]	20	412	–	–	412	–
Derivatives related to net debt [(c)]	20,22,24	189	–	–	189	–
Loans to equity accounted units including quasi equity loans		225	225	–	–	–
Total financial assets		13,028	12,079	157	788	4
Financial liabilities						
Trade and other payables [(d)]		(5,373)			(24)	(5,349)
Short term borrowings and bank overdrafts	22	(2,253)			–	(2,253)
Medium and long term borrowings	22	(20,810)			–	(20,810)
Derivatives related to net debt [(c)]	22,24	(275)			(275)	–
Other derivatives and embedded derivatives not designated as hedges [(c)]	22	(49)			(49)	–
Other financial liabilities	22	(237)			–	(237)
Total financial liabilities		(28,997)			(348)	(28,649)

(a) This excludes pension surpluses, prepayment of tolling charges to joint operations and other prepayments and other non-financial instrument items within other receivables and will therefore differ from note 18.

(b) "Other investments, including loans" includes US$250 million of highly liquid financial assets held in managed investment funds classified as held for trading.

(c) These financial assets and liabilities in aggregate agree to total derivative financial instruments disclosed in notes 20 and 22.

(d) Trade and other payables excludes deferred income, Government grants, royalties, mining taxes and employee entitlements and will therefore differ from note 25.

Notes to the 2016 financial statements

continued

30 Financial instruments and risk management continued

A (b) Financial risk management

Funding and exposure management

The Group is exposed to a number of financial risks which are considered within the overall Group Risk management framework described on pages 14 to 15. The key financial risks are foreign exchange risk, interest rate risk, commodity price risk, credit risk, liquidity risk and capital management risk which are discussed in detail below.

The Group's policies on financial risk management are clearly defined and consistently applied. The policies look to ensure that the Group has an appropriate capital structure which enables it to manage the risks faced by the organisation through the commodities cycle. The general approach to financial risks is to ensure that the business is robust enough to enable exposures to float with the market. However the Group may choose to fix some financial exposures when it is deemed appropriate to do so.

The Group has a diverse portfolio of commodities and operates in a number of markets, which have varying responses to the economic cycle. This diversity also provides some naturally offsetting long-term positions, for example Australian and Canadian currencies tend to strengthen when commodity prices are high and vice versa.

Treasury operations

Treasury is a centralised support and service function that acts as the custodian of the Group's cash and balance sheet and its key financial risks. It performs its activities in a strong control environment, within board approved limits. It is not a profit centre. It is responsible for managing liquidity through funding and investments as well as financial risks such as foreign exchange, interest, financial counterparty credit, commodity, insurance and pension risk. It is also responsible for managing banking relationships across the Group.

Treasury policy

Rio Tinto does not acquire or issue derivative financial instruments for trading or speculative purposes; nor does it believe that it has material exposure to such trading or speculative holdings through its investments in joint arrangements and associates. However, derivatives are used as and when required in order to manage the Group's exposure in accordance with its underlying financial risk management principles. Cash management and investment activities are managed and co-ordinated centrally by Treasury using only approved counterparties and within allocated credit limits which are reviewed and approved by the board at least annually.

(i) Foreign exchange risk

Management policy

The Group's shareholders' equity, earnings and cash flows are influenced by a wide variety of currencies due to the geographic diversity of the Group's sales and the countries in which it operates. The US dollar, however, is the currency in which the majority of the Group's sales are denominated. Operating costs are influenced by the currencies of those countries where the Group's mines and processing plants are located and also by those currencies in which the costs of imported equipment and services are determined. The Australian and Canadian dollars are the most important currencies (apart from the US dollar) influencing costs. In any particular year, currency fluctuations may have a significant impact on Rio Tinto's financial results. A strengthening of the US dollar against the currencies in which the Group's costs are partly determined has a positive effect on Rio Tinto's Underlying earnings. However, a strengthening of the US dollar does reduce the value of non US dollar denominated net assets and therefore total equity.

Given the dominant role of the US currency in the Group's affairs, the US dollar is the currency in which financial results are presented both internally and externally. It is also the most appropriate currency for financing the Group's operations. Borrowings and cash are predominantly denominated in US dollars, either directly or through the use of derivatives.

Certain financial assets and liabilities, including intragroup balances, are held in currencies other than the functional currency of the relevant subsidiary. This results in an accounting exposure to exchange gains and losses as the financial assets and liabilities are translated into the functional currency of the subsidiary that holds those assets and liabilities. These exchange gains and losses are recorded in the Group's income statement except to the extent that they can be taken to equity under the Group's accounting policy which is explained in note 1(d). Exchange gains and losses on US dollar net debt held in subsidiaries with a non-US dollar functional currency and on all intragroup balances are excluded from underlying earnings. Other exchange gains and losses are included in underlying earnings.

See section B for the details of cross currency interest rate swaps relating to borrowings.

After taking into account relevant swap instruments, almost all of the Group's net debt is denominated in US dollars. The table below summarises, by currency, the Group's net debt, after taking into account relevant cross currency interest rate swaps and foreign exchange contracts:

Net funds/(debt) by currency	Cash and cash equivalents US$m	Other investments US$m	Total borrowings in note 22 US$m	Derivatives related to net debt US$m	**Net funds/ (debt) 2016 US$m**	Net funds/ (debt) 2015 US$m
US dollar	7,631	250	(16,791)	(408)	**(9,294)**	(13,517)
Australian dollar	253	–	(566)	–	**(313)**	(277)
Euro	40	–	(102)	–	**(62)**	(88)
South African rand	104	–	(1)	–	**103**	29
Canadian dollar	15	–	(170)	–	**(155)**	(121)
Other	158	–	–	–	**134**	191
Total	**8,201**	**250**	**(17,630)**	**(408)**	**(9,587)**	(13,783)

Hedging strategy

Under normal market conditions, the Group does not generally believe that active currency hedging of transactions would provide long-term benefits to shareholders. The Group reviews its exposure on a regular basis and reserves the right to enter into hedges to maintain financial stability. Currency protection measures may be deemed appropriate in specific commercial circumstances, typically hedging of capital expenditures and other significant financial items such as acquisitions, disposals, tax and dividends, and are subject to strict limits laid down by the board. Refer to section B for the details of cross currency interest rate, currency forward and option contracts used to manage the currency risk exposures of the Group at 31 December 2016.

Sensitivities

The table below gives the estimated retranslation effect on financial assets and financial liabilities of a ten per cent strengthening in the closing exchange rate of the US dollar against significant currencies. The sensitivity associated with a ten per cent weakening of a particular currency would be broadly equal and opposite to the figures presented. The impact is expressed in terms of the effect on net earnings and underlying earnings, assuming that each exchange rate moves in isolation. The sensitivities are based on financial assets and financial liabilities held at 31 December 2016, where balances are not denominated in the functional currency of the subsidiary or joint operation, and exclude financial assets and liabilities held by equity accounted units. These balances will not remain constant throughout 2017, and therefore the following information should be used with care.

At 31 December 2016
Gains/(losses) associated with ten per cent strengthening of the US dollar

Currency exposure	Closing exchange rate US cents	Effect on net earnings US$m	Of which amount impacting underlying earnings US$m
Australian dollar	72	369	37
Canadian dollar	74	(159)	15
Euro	105	172	–

At 31 December 2015
Gains/(losses) associated with ten per cent strengthening of the US dollar

Currency exposure	Closing exchange rate US cents	Effect on net earnings US$m	Of which amount impacting underlying earnings US$m
Australian dollar	73	(182)	58
Canadian dollar	72	(771)	2
Euro	109	60	(25)

Ten per cent is the annual exchange rate movement that management deems to be reasonably probable (on an annual basis over the long run) for one of the Group's significant currencies and as such provides an appropriate representation.

(ii) Interest rate risk

Management policy

Interest rate risk refers to the risk that the value of a financial instrument or cash flows associated with the instrument will fluctuate due to changes in market interest rates. The Group's interest rate management policy is generally to borrow and invest at floating interest rates. This approach is based on a historical correlation between interest rates and commodity prices. However, in certain circumstances the Group may elect to maintain a higher proportion of fixed rate funding.

Hedging strategy

As noted above, the Group hedges its interest rate risk by entering into interest rate derivatives to achieve its policies. The Group reviews the positions on a regular basis and may act to monetise in-the-money instruments either to take advantage of favourable market conditions, manage counterparty credit risk or as part of its debt management programme. During 2016 in conjunction with its liability management programme, the Group closed out interest rate swaps with a notional principal amount of US$3 billion, giving rise to a net cash inflow of US$113 million, including accrued interest of US$25 million. The interest rate swaps were in fair value hedge relationships prior to close out. See section B for details of currency and interest rate swaps relating to borrowings.

At the end of 2016, US$14.7 billion (2015: US$10.8 billion) of the Group's adjusted total borrowings was at floating rates after taking into account interest and currency interest rate swaps, resulting in a floating to fixed debt ratio of 81 per cent floating to 19 per cent fixed (2015: 47 per cent floating to 53 per cent fixed). On a net debt basis, the floating to fixed debt ratio was 65 per cent floating to 35 per cent fixed (2015: 11 per cent floating to 89 per cent fixed). These ratios were principally impacted by the repayment of fixed rate bonds during the year and the draw down of predominantly floating rate debt in relation to Oyu Tolgoi project financing (See Note 30A(v)). The weighted average interest rate on total adjusted borrowings as at 31 December 2016 was approximately 4.0 per cent (2015: approximately 3.5 per cent) and the weighted average maturity was approximately ten years (2015: eight years). The weighted average maturity and weighted average interest rate are based on current interest rates and the carrying value of total adjusted borrowings at the year end.

See note 22 for the details of debt outstanding at 31 December 2016.

Sensitivities

Based on the Group's net debt (refer to note 24) and other floating rate financial instruments outstanding as at 31 December 2016, the effect on net earnings of a 100 basis point increase in US dollar LIBOR interest rates, with all other variables held constant, would be a charge of US$44 million (2015: US$8 million). The Group has an exposure to interest rate volatility within shareholders' equity arising from fair value movements on derivatives in the cash flow reserve. These derivatives have an underlying exposure to sterling and US dollar rates. With all factors remaining constant and based on the composition of derivatives impacting the cash flow reserve at 31 December 2016, the sensitivity of a 100 basis point increase in interest rates in each of the currencies in isolation would impact equity, before tax, by US$84 million charge (2015: US$100 million charge) for sterling and US$95 million credit (2015: US$103 million credit) for US dollar. A 100 basis point decrease would have broadly the same impact in the opposite direction. These balances will not remain constant throughout 2017, and therefore this information should be used with care.

(iii) Commodity price risk

Management policy

The Group's normal policy is to sell its products at prevailing market prices. Exceptions to this rule are subject to strict limits laid down by the board and to rigid internal controls.

Metals such as copper and aluminium are generally sold under contracts which vary in tenure and pricing mechanisms, with some volumes sold in the spot market. The prices are determined by reference to prevailing market prices on terminal markets, such as the London Metal Exchange (LME) and the Commodities Exchange (COMEX) in New York. Prices fluctuate widely in response to changing levels of supply and demand but, in the long run, prices are related to the marginal cost of supply. Gold is also priced in an active market in which prices respond to daily

30 Financial instruments and risk management continued

changes in quantities offered and sought. Newly mined gold is only one source of supply; investment and disinvestment can be important elements of supply and demand. Contract prices for many other natural resource products including coal are generally agreed quarterly or for longer periods with customers, although volume commitments vary by product.

Certain products, predominantly copper concentrate, are provisionally priced, that is the selling price is determined normally 30 to 180 days after delivery to the customer, based on the market price at the relevant quotation point stipulated in the contract. Revenue is recognised on provisionally priced sales based on estimates of fair value of the consideration receivable which is based on forward market prices. At each reporting date provisionally priced metal sales are marked to market based on the forward selling price for the period stipulated in the contract. For this purpose the expected selling price can be measured reliably at each period end date for those products such as copper concentrate for which the price is directly related to the price of copper for which an active and freely traded commodity market exists, such as the LME, and the value of product sold by the Group is directly linked to the form in which it is traded on that market.

The marking to market of provisionally priced sales contracts is recorded as an adjustment to sales revenue.

During 2016, the Group had 235 million pounds of unsettled copper sales (2015: 252 million pounds) that were provisionally priced at US 250 cents per pound (2015: US 217 cents per pound). The final price of these sales will be determined during the first half of 2017. A ten per cent change in the price of copper realised on the provisionally priced sales, all other factors held constant, would increase or reduce net earnings by US$36 million (2015: US$36 million).

Hedging strategy

Rio Tinto's exposure to commodity prices is diversified by virtue of its broad commodity base and the Group does not generally believe commodity price hedging would provide a long-term benefit to shareholders. The Group may hedge certain commitments with some of its customers or suppliers. Details of commodity derivatives held at 31 December 2016 are set out in section B.

Sensitivities

The Group's commodity derivatives are impacted by changes in market prices and include those aluminium forward and option contracts embedded in electricity purchase contracts outstanding at 31 December 2016. A ten per cent increase in aluminium market prices would reduce net earnings by US$144 million (2015: US$70 million), and a ten per cent decrease in prices would increase net earnings by US$139 million (2015: US$58 million). A ten per cent change in prices would have nil impact on equity, before tax (2015: nil).

The Group's "own use contracts" are excluded from the sensitivity analysis as they are outside the scope of IAS 39. Such contracts to buy or sell non-financial items can be net settled but were entered into and continue to be held for the purpose of the receipt or delivery of the non-financial item in accordance with the business unit's expected purchase, sale or usage requirements.

(iv) Credit risk

Treasury management policy

Credit risk is the risk that a counterparty will not meet its obligations under a financial instrument or customer contract, leading to a financial loss. The Group is exposed to credit risk from its operating activities (primarily from customer receivables) and from its financing activities, including investments in government securities, deposits with banks and financial institutions, other short-term investments, interest rate and currency derivative contracts and other financial instruments.

Credit risks related to receivables

Customer credit risk is managed by each business unit subject to the Group's established policy, procedures and controls relating to customer credit risk management. Credit limits are established for all customers based on internal or external rating criteria. Where customers are rated by an independent credit rating agency, these ratings are used to set credit limits. In circumstances where no independent credit rating exists, the credit quality of the customer is assessed based on an extensive credit rating scorecard. Outstanding customer receivables are regularly monitored and any credit concerns highlighted to senior management. High-risk shipments to major customers are generally covered by letters of credit or other forms of credit insurance.

At 31 December 2016, the Group had approximately 92 customers (2015: 74 customers) that owed the Group more than US$5 million each and these balances accounted for approximately 74 per cent (2015: 75 per cent) of all receivables owing. There were 24 customers (2015: 13 customers) with balances greater than US$20 million accounting for just over 42 per cent (2015: 37 per cent) of total amounts receivable. Details of trade and other receivables past due but not impaired are provided in note 18.

The maximum exposure to credit risk at the reporting date is the carrying value of each class of financial assets (refer to table of financial assets and liabilities reported on page 149.).

Credit risk related to financial instruments and cash deposits

Credit risk from investments in government securities (primarily US Government), corporate and asset backed or money market funds and balances with banks and financial institutions is managed by Group Treasury in accordance with a board approved policy. Investments of surplus funds are made only with approved counterparties who have been assigned specific credit limits beforehand based on specific assessment criteria. The counterparty credit framework and limits are reviewed by the board at least annually. The limits are set to minimise the concentration of credit risk and therefore mitigate the potential for financial loss through counterparty failure.

The maximum credit risk exposure of the Group's financial assets at the balance sheet date is as follows:

	Note	2016 US$m	2015 US$m
Cash and cash equivalents	21	**8,201**	9,366
Trade and other receivables		**3,432**	2,468
Investments	20	**454**	206
Derivative assets	20	**532**	606
Total		**12,619**	12,646

(v) Liquidity and capital risk management

Management policy

The Group's overriding objective when managing capital is to safeguard the business as a going concern whilst maximising returns for shareholders. In a cyclical and capital intensive industry such as the mining industry, maintaining a strong balance sheet and a sound financial risk management framework are desirable to preserve financial flexibility and generate shareholder value through the cycle. In practice, this involves regular reviews by the board and senior management. These reviews take into account the Group's strategic priorities, economic and business conditions and opportunities that are identified to invest across all points of the commodities cycle and focus on the dividend policy and other forms of shareholder return whilst also striving to maintain a strong balance sheet. In February 2016, the Group announced a change in its dividend policy, moving from a progressive dividend policy to a dividend determined by, taking into account the results for the financial year, the outlook for the Group's major commodities, the board's view of the long-term growth prospects of the business and the Group's objective of maintaining a strong balance sheet. The board expects total cash returns to shareholders over the longer term to be in a range of 40 – 60 per cent of underlying earnings in aggregate throughout the cycle. Acknowledging the cyclical nature of the industry in periods of strong earnings and cash generation it is the board's intention to supplement the ordinary dividends with additional returns to shareholders. The resulting capital structure provides the Group with a high degree of financial flexibility at a low cost of capital.

To maintain a strong balance sheet, the Group considers various financial metrics including a net gearing ratio of 20 to 30 per cent, the overall level of borrowings and their maturity profile, liquidity levels, total capital, cash flow, EBITDA and interest cover ratios either on a statutory reported basis or as expected to be adjusted by the credit rating agencies.

Total capital	Note	**2016 US$m**	2015 US$m
Equity attributable to owners of Rio Tinto (see Group balance sheet)		**39,290**	37,349
Equity attributable to non-controlling interests (see Group balance sheet)		**6,440**	6,779
Net debt	24	**9,587**	13,783
Total capital		**55,317**	57,911

Net debt is a measure used by management and the board to manage the Group's capital structure and liquidity risks. Net debt is disclosed in note 24. Net debt decreased from US$13.8 billion at 31 December 2015 to US$9.6 billion at 31 December 2016 as operating cash inflows and divestment proceeds were partly offset by capital expenditure and cash returns to shareholders. At 31 December 2016 net debt to total capital was 17 per cent (2015: 24 per cent) and interest cover (which includes the loss on early redemption of bonds) was seven times (2015: seven times).

The unified credit status of the Group is maintained through cross guarantees whereby contractual obligations of Rio Tinto plc and Rio Tinto Limited are automatically guaranteed by the other. The table below summarises the credit ratings attributed to the Group by Standard and Poor's and Moody's investor services as at 31 December.

	2016	2015
Long term rating	**A-/Baa1**(a)	A-/A3
Short term rating	**A-1/P-2**	A-2/P-2
Outlook	**Stable/ Stable**(a)	Negative/ Stable

(a) On 27 February 2017, the Group was upgraded to A3 with a stable outlook.

The Group has access to various forms of financing including its US Shelf Programme, European Debt Issuance Programme, Commercial Paper and credit facilities. The Group did not issue any listed debt in 2016 under these programmes.

During 2016, the Group redeemed US$7,500 million, in aggregate, principal value of the bonds issued by Rio Tinto Finance (USA) plc and Rio Tinto Finance (USA) Limited as part of a liability management programme. As a result, US$500 million of the 2% 2017 bond, US$1,250 million of the 1.625% 2017 bond, US$1,750 million of the 6.5% 2018 bond, US$1,250 million of the 2.25% 2018 bond, US$246 million of the 9% 2019 bond, US$535 million of the 3.5% 2020 bond, US$420 million of the 4.125% 2021 bond, US$523 million of the 3.75% 2021 bond, US$540 million of the 3.5% 2022 bond and US$486 million of the 2.875% 2022 bond were redeemed early resulting in an aggregate cash outflow of US$7,941 million before fees.

In June 2015, under its US Shelf Programme, the Group issued a Rio Tinto Finance (USA) Limited US$1,200 million 3.75% bond due 2025. The proceeds were used to repurchase the Rio Tinto Finance (USA) Limited US$700 million 2.5% bond due 2016 and the Rio Tinto Finance (USA) Limited US$500 million 2.25% bond due 2016.

During 2016, Oyu Tolgoi LLC drew down US$4,323 million under the project finance facility signed in December 2015. The project finance facility provides for interest-only payments for the first five years followed by minimum repayments according to a stepped amortisation schedule for the remaining life of the facility. The due dates stated below represent the final repayment date.

The facility is provided and funded by international financial institutions and export credit agencies representing the governments of the United States, Canada and Australia, along with 15 commercial banks.

Drawdown comprised, in aggregate, US$699 million MIGA Insured Loan due 2027 (LIBOR plus 2.65% pre-completion, LIBOR plus 3.65% post completion); US$1,591 million commercial banks "B Loan" due 2027 (LIBOR plus 3.4% pre-completion, LIBOR plus 4.4% post completion); US$283 million Export Credit Agencies Loan due 2028 (fixed at 2.3%); US$900 million Export Credit Agencies Loan due 2029 (LIBOR plus 3.65% pre-completion, LIBOR plus 4.65% post completion); and US$850 million International Financial Institutions "A Loan" due 2030 (LIBOR plus 3.78% pre-completion, LIBOR plus 4.78% post completion).

The project finance lenders have agreed a debt cap of US$6,000 million. In addition to the funding drawn down to date (US$4,323 million) there is an additional US$84 million available under the facilities to draw down, subject to certain conditions and the potential for an additional US$1,593 million of Supplemental Debt in future.

In November 2015, Rio Tinto Finance plc and Rio Tinto Finance Limited amended and extended its, in aggregate, US$7.5 billion multi-currency revolving credit facilities, originally signed in 2013, with a syndicate of banks. The facilities had two one-year extension options, the first of which was utilised in November 2016. A US$1,875 million facility currently matures in November 2019 and a US$5,625 million facility (including a US$ denominated same day access swing-line facility) matures in November 2021. The remaining extension option could be utilised in 2017, subject to the agreement by the banks, extending the maturities to November 2020 and November 2022 respectively. The funds made available under the facility agreements may be used for the general corporate purposes of the Group.

Advances under the revolving facilities bear an interest rate per annum based on LIBOR (or EURIBOR, CDOR or BBSW in relation to any euro, Canadian dollar or Australian dollar loans respectively) plus a margin (which is dependent on the Group's long-term credit rating as determined by Moody's and Standard & Poor's and the level of drawdown). The facility agreements contain no financial covenants. At 31 December 2016 the facilities were undrawn.

Notes to the 2016 financial statements
continued

30 Financial instruments and risk management continued

A (c) Financial liability analysis

The table below analyses the Group's financial liabilities by relevant maturity groupings based on the remaining period from the balance sheet date to the contractual maturity date. As the amounts disclosed in the table are the contractual undiscounted cash flows, these balances will not necessarily agree with the amounts disclosed in the balance sheet.

At 31 December 2016

(Outflows)/inflows	Within 1 year or on demand US$m	Between 1 and 2 years US$m	Between 2 and 3 years US$m	Between 3 and 4 years US$m	Between 4 and 5 years US$m	After 5 years US$m	**Total US$m**
Non-derivative financial liabilities							
Trade and other payables	(4,925)	(461)	–	–	–	–	**(5,386)**
Borrowings before swaps	(704)	(191)	(1,330)	(1,347)	(1,317)	(12,806)	**(17,695)**
Expected future interest payments [(a)]	(783)	(779)	(722)	(667)	(620)	(5,056)	**(8,627)**
Other financial liabilities	(199)	(41)	–	–	–	–	**(240)**
Derivative financial liabilities [(b)]							
Derivatives related to net debt – net settled	29	29	27	25	23	25	**158**
Derivatives related to net debt – gross settled [(a)]:							
– gross inflows	55	55	55	842	40	1,377	**2,424**
– gross outflows	(73)	(73)	(73)	(1,045)	(51)	(1,785)	**(3,100)**
Derivatives not related to net debt – net settled	(2)	–	–	–	–	–	**(2)**
Derivatives not related to net debt – gross settled:							
– gross inflows	29	–	–	–	–	–	**29**
– gross outflows	(29)	–	–	–	–	–	**(29)**
Total	(6,602)	(1,461)	(2,043)	(2,192)	(1,925)	(18,245)	**(32,468)**

At 31 December 2015

(Outflows) / inflows	Within 1 year or on demand US$m	Between 1 and 2 years US$m	Between 2 and 3 years US$m	Between 3 and 4 years US$m	Between 4 and 5 years US$m	After 5 years US$m	**Total US$m**
Non-derivative financial liabilities							
Trade and other payables	(4,967)	(406)	–	–	–	–	**(5,373)**
Borrowings before swaps	(2,266)	(1,889)	(3,462)	(1,538)	(1,945)	(12,318)	**(23,418)**
Expected future interest payments [(a)]	(884)	(867)	(837)	(628)	(561)	(4,789)	**(8,566)**
Other financial liabilities	(190)	(5)	–	–	–	–	**(195)**
Derivative financial liabilities [(b)]							
Derivatives related to net debt – net settled	30	30	30	30	29	28	**177**
Derivatives related to net debt – gross settled [(a)]:							
– gross inflows	62	62	62	62	872	1,617	**2,737**
– gross outflows	(65)	(65)	(65)	(65)	(1,039)	(1,824)	**(3,123)**
Derivatives not related to net debt – net settled	(29)	(6)	–	–	–	(2)	**(37)**
Derivatives not related to net debt – gross settled:							
– gross inflows	22	–	–	–	–	–	**22**
– gross outflows	(22)	–	–	–	–	–	**(22)**
Total	(8,309)	(3,146)	(4,272)	(2,139)	(2,644)	(17,288)	**(37,798)**

(a) Interest payments have been projected using interest rates applicable at the end of the applicable financial year. Where debt is subject to variable interest rates, future interest payments are subject to change in line with market rates.

(b) The maturity grouping is based on the earliest payment date.

The maximum carrying value of borrowings repayable, after the impact of swaps, maturing in any financial year is US$1.7 billion (2015: US$3.3 billion).

Offsetting and enforceable master netting agreements

Financial assets and liabilities are offset and the net amount reported in the consolidated balance sheet when there is a legally enforceable right to offset the recognised amounts and there is an intention to settle on a net basis or realise the asset and settle the liability simultaneously. There were no material amounts offset in the balance sheet and no material balances associated with enforceable master netting agreements were identified.

B (a) Derivative financial instruments

The Group's derivatives, including embedded derivatives, as at 31 December 2016, are summarised below:

	Total fair value			
	2016		2015	
Derivatives designated as hedges	Asset US$m	Liability US$m	Asset US$m	Liability US$m
Aluminium forward contracts embedded in electricity purchase contracts [(a)]	–	–	5	–
Interest rate swaps [(b)]	108	(134)	189	(16)
Cross currency interest rate swaps [(c)]	–	(382)	–	(259)
Currency forward contracts, options and swaps	1	–	–	–
Total derivatives designated as hedges	109	(516)	194	(275)
Derivatives not designated as hedges				
Currency forward contracts, options and swaps	1	–	13	–
Aluminium forward contracts [(d)]	6	(2)	5	(22)
Aluminium forward contracts/options embedded in electricity purchase contracts [(a)]	411	(3)	373	(3)
Other embedded derivatives	5	–	21	–
Other commodity contracts	–	(2)	–	(24)
Total derivatives not designated as hedges	423	(7)	412	(49)
Total derivative instruments	532	(523)	606	(324)
Analysed by maturity:				
Less than 1 year	24	(6)	78	(41)
Between 1 and 5 years	110	(194)	121	(144)
More than 5 years	398	(323)	407	(139)
Total	532	(523)	606	(324)
Total net derivative instruments	9		282	

Reconciliation to balance sheet	Note	2016 US$m	2015 US$m
– non-current assets	20	508	529
– current assets	20	24	77
– current liabilities	22	(6)	(41)
– non-current liabilities	22	(517)	(283)
Total net derivatives instruments, detailed above		9	282

(a) Aluminium embedded derivatives (forward contracts and options) are contained within certain aluminium smelter electricity purchase contracts. These contracts reduce the Group's margin exposure to movements in the aluminium price.

(b) The interest rate swaps are used to convert certain fixed rate borrowings to a floating rate. For further details, see note 22.

(c) The cross currency interest rate swaps are used to convert non US dollar denominated borrowings to either fixed or floating US dollar borrowings. For further details see note 22.

(d) The aluminium forward contracts are entered into to convert aluminium sales made at a fixed price to LME cash. In 2016 the aluminium forward contracts which were taken out to convert aluminium sales made at a fixed price to LME cash were not designated as hedges as they are largely offset. In 2015, the US$(6) million ineffective portion arising from cash flow hedges was recognised in the income statement.

C (a) Fair values

The carrying amounts and fair values of all of the Group's financial instruments which are not carried at an amount which approximates their fair value at 31 December 2016 and 31 December 2015 are shown in the following table. The fair values of the Group's cash equivalents and loans to equity accounted units approximate their carrying values as a result of their short maturity or because they carry floating rates of interest.

		31 December 2016		31 December 2015	
	Note	Carrying value US$m	Fair value US$m	Carrying value US$m	Fair value US$m
Short term borrowings	22	(717)	(706)	(2,253)	(2,255)
Medium and long term borrowings	22	(16,913)	(18,437)	(20,810)	(20,302)

Borrowings with a carrying value of US$11.9 billion (2015: US$21.3 billion) relate to listed bonds with a fair value of US$12.9 billion (2015: US$20.8 billion) and are categorised as level 1 in the fair value hierarchy. Borrowings with a carrying value of US$4.1 billion (2015: nil) relates to project finance draw down with a fair value of US$4.6 billion (2015: nil) and are categorised as level 3 in the fair value hierarchy. The remaining borrowings have a fair value measured by discounting estimated cash flows with an applicable market quoted yield and are categorised as level 2 in the fair value hierarchy.

Notes to the 2016 financial statements
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30 Financial instruments and risk management continued

C (b) Valuation hierarchy

The table below shows the financial instruments carried at fair value by valuation method at 31 December 2016:

	Note	Total US$m	Level 1 (a) US$m	Level 2 (b) US$m	Level 3 (c) US$m	Not held at fair value US$m
Assets						
Equity shares and quoted funds	20	156	94	–	3	59
Other investments, including loans (d)	20	454	363	–	68	23
Trade receivables (e)		2,283	–	143	–	2,140
		2,893	457	143	71	2,222
Derivatives						
Forward contracts: designated as hedges (Section B)		1	–	1	–	–
Forward contracts and option contracts, not designated as hedges (Section B) (f)		416	–	8	408	–
Derivatives related to net debt (Section B) (g)		(408)	–	(408)	–	–
		2,902	457	(256)	479	2,222

The table below shows the financial instruments carried at fair value by valuation method at 31 December 2015:

	Note	Total US$m	Level 1 (a) US$m	Level 2 (b) US$m	Level 3 (c) US$m	Not held at fair value US$m
Assets						
Equity shares and quoted funds	20	157	87	7	10	53
Other investments, including loans (d)	20	206	99	–	71	36
Trade receivables (e)		1,370	–	12	–	1,358
		1,733	186	19	81	1,447
Derivatives						
Forward contracts: designated as hedges (Section B) (f)		5	–	–	5	–
Forward contracts and option contracts, not designated as hedges (Section B) (f)		363	–	(7)	370	–
Derivatives related to net debt (Section B) (g)		(86)	–	(86)	–	–
		2,015	186	(74)	456	1,447

(a) Valuation is based on unadjusted quoted prices in active markets for identical financial instruments. This category includes listed equity shares and other quoted funds.

(b) Valuation is based on inputs that are observable for the financial instruments which include quoted prices for similar instruments or identical instruments in markets which are not considered to be active, or inputs, either directly or indirectly based on observable market data.

(c) Valuation is based on inputs for the asset or liability that are not based on observable market data (unobservable inputs).

(d) Other investments, including loans, mainly comprise of: cash deposits in rehabilitation funds, government bonds, managed investment funds and royalty amounts receivable. The royalty receivables are valued based on an estimate of forward sales subject to the royalty agreement.

(e) Trade receivables includes provisionally priced receivables relating to sales contracts where selling price is determined after delivery to the customer, based on the market price at the relevant quotation point stipulated in the contract. Revenue is recognised on provisionally priced sales based on the forward selling price for the period stipulated in the contract. At the end of December 2016, US$143 million (2015 US$12 million) of provisionally priced receivables were recognised.

(f) Level 3 derivatives consist of derivatives embedded in electricity purchase contracts linked to the LME with terms expiring between 2017 and 2030 (2015: 2016 and 2030). The embedded derivatives are measured using discounted cash flows and option model valuation techniques. Long-term embedded derivatives with a fair value of US$408 million at 31 December 2016 (2015: US$370 million) are valued using significant unobservable inputs as the term of the derivative extends beyond the forward curve for aluminium.

Aluminium prices are flatlined beyond the market forward curve and increased by projected inflation up to the date of expiry of the contract. The range of market prices are US$2,136 per metric tonne in 2027 to US$2,300 in 2030 (2015: US$2,044 per metric tonne in 2026 to US$2,242 in 2030).

At 31 December 2015 US$5 million were categorised as level 3 as the market premium assumptions used represent unobservable inputs.

(g) Interest rate and currency interest rate swaps are valued using applicable market quoted swap yield curves adjusted for relevant basis and credit default spreads. Currency interest rate swap valuations also use market quoted foreign exchange rates. A discounted cash flow approach is applied to the cash flows derived from the inputs to determine fair value.

There were no transfers between Level 1 and Level 2, or between Level 2 and Level 3 in the year ended 31 December 2016 or the year ended 31 December 2015.

C (c) Level 3 financial assets and financial liabilities

The table below shows the summary of changes in the fair value of the Group's Level 3 financial assets and financial liabilities.

	31 December 2016 Level 3 financial assets and financial liabilities US$m	31 December 2015 Level 3 financial assets and financial liabilities US$m
Opening balance	**456**	282
Currency translation adjustments	**(2)**	(43)
Total realised gains/(losses) included in:		
– Consolidated sales revenue	**1**	–
– Net operating costs	**(28)**	6
Total unrealised gains included in:		
– Net operating costs	**11**	196
Total unrealised gains transferred into other comprehensive income	**–**	15
Additions	**43**	–
Impairment	**(2)**	–
Closing balance	**479**	456
Total gains/(losses) for the year included in the income statement for assets and liabilities held at year end	**11**	(15)

Sensitivity analysis in respect of Level 3 derivatives

Forward contracts and options whose carrying value are valued using unobservable inputs are calculated using appropriate discounted cashflow and option model valuation techniques. The most significant of these assumptions relate to long-term pricing wherein internal pricing assumptions are used after the ten year LME curve. A ten per cent increase in long-term metal pricing assumptions would result in a US$38 million (31 December 2015: US$38 million) decrease in carrying value. A ten per cent decrease in long-term metal pricing assumptions would result in a US$64 million (31 December 2015: US$39 million) increase in carrying value.

31 Contingencies and commitments

	2016 US$m	2015 US$m
Capital commitments excluding the Group's share of Joint Venture Capital Commitments		
Within 1 year	**1,588**	710
Between 1 and 3 years	**433**	98
Between 3 and 5 years	**194**	2
After 5 years	**15**	24
Total	**2,230**	834
Group's share of Joint Venture Capital Commitments		
Within 1 year	**113**	300
Between 1 and 3 years	**–**	57
Total	**113**	357

Capital commitments include open purchase orders for managed operations and expenditure on major projects authorised to date by the Rio Tinto Investment Committee for non-managed operations. On a legally enforceable basis capital commitments would be some US$1.6bn less as many of the contracts relating to the Group's projects have various cancellation clauses.

Unrecognised commitments to contribute funding or resources to joint ventures

The Group has a commitment to purchase and market a portion (in excess of the Group's ownership interest) of the output of Sohar Aluminium Company L.L.C., an aluminium smelter in which the Group is a joint venturer. The Group immediately sells the purchased products to third parties.

The Group, along with the other joint venturers, has made various commitments to provide shareholder funding as required for Sohar Aluminium Company L.L.C., subject to approved thresholds.

At 31 December 2016, Minera Escondida Limitada held an undrawn shareholder line of credit for US$225 million (Rio Tinto share). This has a three year duration. The previous line of credit matured during 2015.

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31 Contingencies and commitments continued

Operating leases

The aggregate amount of minimum lease payments under non-cancellable operating leases are as follows:

	2016 US$m	2015 US$m
Within 1 year	353	400
Between 1 and 3 years	495	590
Between 3 and 5 years	385	443
After 5 years	612	745
	1,845	2,178

Operating leases include leases of dry bulk vessels and offices as well as other property, plant and equipment. The terms of lease payments vary with a significant proportion being fixed rate and including renewal options. Leases for dry bulk vessels include costs for crewing services.

Purchase obligations

The aggregate amount of future payment commitments under purchase obligations outstanding at 31 December was:

	2016 US$m	Adjusted (a) 2015 US$m
Within 1 year	2,631	2,677
Between 1 and 2 years	1,624	2,269
Between 2 and 3 years	1,327	1,856
Between 3 and 4 years	1,125	1,519
Between 4 and 5 years	1,040	1,346
After 5 years (a)	11,334	13,595
	19,081	23,262

(a) The 2015 comparative has been amended to correctly present purchase obligations which are due later than five years. The impact is to increase total 2015 purchase obligations by US$650 million, all of which is due after five years.

Purchase obligations as disclosed above are agreements to purchase goods or services that are enforceable and legally binding and specify all significant terms, including: fixed or minimum quantities to be purchased or consumed; fixed, minimum or variable price provisions; and the approximate timing of the transactions.

Purchase obligations for goods primarily relate to purchases of raw materials and consumables and purchase obligations for services primarily relate to charges for use of infrastructure, commitments to purchase power and freight contracts. These goods and services are expected to be used in the business. To the extent that this changes a provision for onerous obligations may be made as described in note 1(i).

Purchases from joint arrangements or associates are included to the extent that the quantity purchased is in excess of Rio Tinto's ownership interest in the entity. However, purchase obligations exclude contracted purchases of bauxite, alumina and aluminium from joint arrangements and associates and contracted purchases of alumina from third parties as the purchases are made for commercial reasons and the Group is, overall, a net seller of these commodities.

In addition, as explained above, the Group has a commitment to purchase and market a portion (in excess of the Group's ownership interest) of the output of Sohar Aluminium Company L.L.C.

	2016 US$m	2015 US$m
Contingent liabilities (subsidiaries and joint operations)		
Indemnities and other performance guarantees (a) (b)	473	226

(a) Indemnities and other performance guarantees represent the potential outflow of funds from the Group for the satisfaction of obligations including those under contractual arrangements (for example undertakings related to supplier agreements) not provided for in the balance sheet, where the likelihood of the guarantees or indemnities being called is assessed as possible rather than probable or remote.

(b) There were no material contingent liabilities arising in relation to the Group's joint ventures and associates.

Contingent liabilities

On 9 November 2016, Rio Tinto announced that, following an investigation led by external counsel, it had notified or was in the course of notifying the relevant authorities in the United States, United Kingdom and Australia of information concerning contractual payments totalling US$10.5 million made to a consultant who had provided advisory services on the Simandou project in Guinea. Rio Tinto is cooperating fully with each of the relevant authorities. On 12 December 2016, a class action was also filed in the United States District Court for the Southern District of New York against Rio Tinto plc and certain of its current and former directors in connection with the Simandou payments.

On 1 December 2016, Rio Tinto confirmed that it was cooperating with relevant authorities (including the U.S. Securities and Exchange Commission) in connection with an investigation into the impairment included in the Company's 2012 accounts in respect of Rio Tinto Coal Mozambique.

The likely outcome on the Group of these regulatory investigations, and any associated litigation, is subject to a number of significant uncertainties at the present time. They could ultimately expose the Group to material financial cost. The Board has established a dedicated Committee chaired by the chairman of the board to keep these matters under review as they progress.

Guarantees by parent companies

Rio Tinto plc and Rio Tinto Limited have, jointly and severally, fully and unconditionally guaranteed the following securities issued by the following 100 per cent owned finance subsidiaries: US$8.3 billion (31 December 2015: US$17.3 billion) Rio Tinto Finance (USA) Limited and Rio Tinto Finance (USA) plc bonds with maturity dates up to 2042; and US$1.9 billion (31 December 2015: US$2.1 billion) on the European Debt Issuance Programme. In addition, Rio Tinto Finance plc and Rio

Tinto Finance Limited have entered into facility arrangements for an aggregate amount of US$7.5 billion (31 December 2015: US$7.5 billion). The facilities are guaranteed by Rio Tinto plc and Rio Tinto Limited.

Rio Tinto plc has provided a guarantee, known as the completion support undertaking (CSU), in favour of the Oyu Tolgoi LLC project finance lenders. At 31 December 2016 US$4,323 million of project finance debt was outstanding under this facility (31 December 2015: US$ nil). Oyu Tolgoi LLC is jointly owned by Erdenes Oyu Tolgoi LLC (34 per cent), which is controlled by the Government of Mongolia, and Turquoise Hill Resources Ltd (66 per cent, of which Rio Tinto owns 51 per cent). The project finance has been raised for development of the underground mine and the CSU will terminate on the completion of the underground mine according to a set of completion tests set out in the project finance facility.

The Rio Tinto guarantee applies to the extent that Turquoise Hill Resources Ltd cannot satisfy Oyu Tolgoi LLC's project finance debt servicing obligations under its own guarantee to the lenders, called the sponsor debt service undertaking (DSU). Both the CSU and DSU contain a carve-out for certain political risk events.

Contingent assets

The Group has, from time to time, various insurance claims outstanding with reinsurers. At 31 December 2016 and 2015 this included a claim relating to the Manefay slide at Rio Tinto Kennecott in April 2013. Interim progress payments were received on this claim in 2013 and 2015; the final payment was received in January 2017.

32 Average number of employees

	Subsidiaries and joint operations			Equity accounted units (Rio Tinto share)			Group total		
	2016	2015	2014	**2016**	2015	2014	**2016**	2015	2014
The principal locations of employment were:									
Australia and New Zealand	**20,489**	22,125	23,447	**849**	863	711	**21,338**	22,988	24,158
Canada	**10,239**	11,113	12,187	**–**	–	–	**10,239**	11,113	12,187
UK	**487**	542	649	**–**	–	–	**487**	542	649
Europe	**1,722**	2,312	2,850	**–**	–	88	**1,722**	2,312	2,938
Africa	**4,875**	5,651	5,699	**1,270**	1,271	1,560	**6,145**	6,922	7,259
US	**3,196**	3,439	3,503	**–**	–	–	**3,196**	3,439	3,503
Mongolia	**2,737**	2,647	3,212	**–**	–	–	**2,737**	2,647	3,212
Indonesia	**2,862**	2,871	2,959	**–**	–	–	**2,862**	2,871	2,959
South America	**166**	192	356	**1,388**	1,317	1,509	**1,554**	1,509	1,865
Other countries (a)	**749**	595	1,045	**–**	–	–	**749**	595	1,045
	47,522	51,487	55,907	**3,507**	3,451	3,868	**51,029**	54,938	59,775

(a) "Other countries" primarily includes employees in the Middle East (excluding Oman which is included in Africa), India, Singapore and other countries in Asia which are not shown separately in the table above. For the year ended 31 December 2016, the average number of employees in Singapore was 262 (2015: 212) and the average number of employees in India was 280 (2015: 232).

Employee numbers, which represent the average for the year, include 100 per cent of employees of subsidiary companies. Employee numbers for joint operations and equity accounted units are proportional to the Group's interest under contractual agreements. Average employee numbers include a part-year effect for companies acquired or disposed of during the year.

Part-time employees are included on a full-time-equivalent basis. Temporary employees are included in employee numbers.

People employed by contractors are not included.

Notes to the 2016 financial statements
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33 Principal subsidiaries

At 31 December 2016

Company and country of incorporation/ operation	Principal activities	Class of shares held	Proportion of class held (%)	Group interest (%)	Non-controlling interest (%)
Australia					
Argyle Diamonds Limited	Mining and processing of diamonds	Ordinary	100	100	–
Coal & Allied Industries Limited [(a)]	Coal mining	Ordinary	100	100	–
Dampier Salt Limited	Salt production	Ordinary	68.36	68.36	31.64
Energy Resources of Australia Limited	Uranium mining	Ordinary	68.39	68.39	31.61
Hamersley Iron Pty Limited	Iron ore mining	Ordinary	100	100	–
North Mining Limited [(c)]	Iron ore mining	Ordinary	100	100	–
Queensland Coal Pty Limited [(b)]	Coal mining	Ordinary	100	100	–
Rio Tinto Aluminium (Holdings) Limited	Bauxite mining; alumina production; primary aluminium smelting	Ordinary	100	100	–
Robe River Mining Co Pty Ltd [(c)]	Iron ore mining	Class A	40	60	40
		Class B	73.61		
Brazil					
Alcan Alumina Ltda. [(d)]	Alumina production and bauxite mining	Quota	100	100	–
Canada					
Rio Tinto Canada Uranium Corporation	Uranium projects	Common	100	100	–
Iron Ore Company of Canada [(e)]	Iron ore mining; iron ore pellets	Common	58.72	58.72	41.28
Rio Tinto Fer et Titane Inc.	Titanium dioxide feedstock; high purity iron and steel	Common	100	100	–
		Class B preference	100	100	–
		CAD 0.01 preferred	100	100	–
Rio Tinto Alcan Inc.	Bauxite mining; alumina refining; aluminium smelting	Common	100	100	–
Diavik Diamond Mines (2012) Inc. [(f)]	Diamond mining and processing	Common	100	100	–
Guinea					
Simfer Jersey Limited [(g)]	Iron ore project	Ordinary	53	53	47
Madagascar					
QIT Madagascar Minerals SA [(h)]	Ilmenite mining	Common	80	80	15
		Investment certificates	100	100	
		Voting certificates	80	80	20
Mongolia					
Turquoise Hill Resources Ltd (including Oyu Tolgoi LLC) [(i)]	Copper and gold mining	Common	50.79	50.79	49.21
Namibia					
Rössing Uranium Limited [(j)]	Uranium mining	B N$1	71.22	68.62	31.38
		C N10c	70.59		
South Africa					
Richards Bay Titanium (Proprietary) Limited [(k)]	Titanium dioxide/high purity iron production	B Ordinary	100	74	26
		B preference	100		
		Parent Preference	100		
Richards Bay Mining (Proprietary) Limited [(k)]	Ilmenite, rutile and zircon mining	B Ordinary	100	74	26
		B preference	100		
		Parent Preference	100		
United States of America					
Kennecott Holdings Corporation (including Kennecott Utah Copper, Kennecott Land and Kennecott Exploration)	Copper and gold mining, smelting and refining, land development and exploration activities	Common US$0.01	100	100	–
U.S. Borax Inc.	Mining, refining and marketing of borates	Common US$0.10	100	100	–

This list includes only those companies that have a more significant impact on the profit or assets of the Group. Refer to note 47 for a list of related undertakings.

The Group's principal subsidiaries are mostly held by intermediate holding companies and not directly by Rio Tinto plc or Rio Tinto Limited.

(a) In February 2016, after a restructuring of the Coal and Allied group, Rio Tinto obtained a 100 per cent shareholding in Coal & Allied Industries Limited and its wholly-owned subsidiaries. Mitsubishi became a joint venture participant in the Hunter Valley Operations Joint Venture.

(b) Queensland Coal Pty Limited is the main legal entity that holds the Group's interests in Hail Creek (82 per cent), Blair Athol (71.2 per cent) and Kestrel (80 per cent). These are unincorporated arrangements that are not entities; the Group recognises its share of assets, liabilities, revenues and expenses relating to these arrangements. Queensland Coal forms part of the Rio Tinto Coal Australia business unit. In September 2016 the Blair Athol Coal Joint Venture signed a conditional sale and purchase agreement to transfer its interests in the Blair Athol mine to TerraCom Limited. The transaction has not completed and is subject to certain conditions precedent being met, including approval from the Queensland Government.

(c) Robe River Mining Co Pty Ltd (which is 60 per cent owned by the Group) holds a 30 per cent interest in Robe River Iron Associates (Robe River). North Mining Limited (which is wholly owned by the Group) holds a 35 per cent interest in Robe River. Through these companies the Group recognises a 65 per cent share of the assets, liabilities, revenues and expenses of Robe River, with a 12 per cent non-controlling interest. The Group therefore has a 53 per cent beneficial interest in Robe River.

(d) Alcan Alumina Ltda holds the Group's 10 per cent interest in Consórcio De Alumínio Do Maranhão, a joint operation in which the Group participates but is not a joint operator. The Group recognises its share of assets, liabilities, revenues and expenses relating to this arrangement.

(e) Iron Ore Company of Canada is incorporated in the United States of America, but operates in Canada.

(f) Diavik Diamond Mines (2012) Inc. is the legal entity that owns the Group's 60 per cent interest in the Diavik Joint Venture, an unincorporated arrangement that is not an entity. The Group recognises its share of assets, liabilities, revenue and expenses relating to this arrangement.

(g) Simfer Jersey Limited, a company incorporated in Jersey in which the Group has a 53 per cent interest, has an 80.75 per cent interest in Simfer S.A. the company that operates the Simandou mining project in Guinea. The Group therefore has a 42.80 per cent indirect interest in Simfer S.A. These entities are consolidated as subsidiaries and together referred to as the Simandou iron ore project.

(h) The Group's shareholding in QIT Madagascar Minerals SA carries an 80 per cent economic interest and 80 per cent of the total voting rights; a further 5 per cent economic interest is held through non-voting investment certificates to give an economic interest of 85 per cent. The non-controlling interests have a 15 per cent economic interest and 20 per cent of the total voting rights.

(i) The Group has a 50.79 per cent interest in Turquoise Hill, which holds a 66 per cent interest in Oyu Tolgoi LLC (OT) which is subsidiary of Turquoise Hill. The Group therefore has a 33.5 per cent indirect interest in OT. Turquoise Hill is incorporated in Canada but operates principally in Mongolia.

(j) The Group's shareholding in Rössing Uranium Limited (Rössing) holds 35.57 per cent of the total voting rights; the non-controlling interests hold 64.43 per cent of the total voting rights. Rössing is consolidated by virtue of the Group's board control. The Government of Namibia has the ability to veto matters that are considered not to be in the interest of Namibia; this is considered to be a protective right. Rio Tinto therefore has control of Rössing and consolidates it as a subsidiary.

(k) Additional classes of shares issued by Richards Bay Titanium (Proprietary) Limited and Richards Bay Mining (Proprietary) Limited representing non-controlling interests are not shown. The Group's total legal and beneficial interest in Richards Bay Titanium (Proprietary) Limited and Richards Bay Mining (Proprietary) Limited is 74 per cent.

Summary financial information for subsidiaries that have non-controlling interests that are material to the Group

This summarised financial information is shown on a 100 per cent basis. It represents the amounts shown in the subsidiaries' financial statements prepared in accordance with IFRS under Group accounting policies, including fair value adjustments, and before intercompany eliminations.

	Iron Ore Company of Canada 2016 US$m	Iron Ore Company of Canada 2015 US$m	**Energy Resources of Australia 2016 US$m**	Energy Resources of Australia 2015 US$m	**Simandou (a) 2016 US$m**	Simandou (a) (c) 2015 US$m	**Turquoise Hill (b) 2016 US$m**	Turquoise Hill (b) 2015 US$m
Revenue	**1,324**	1,353	**193**	245	**–**	–	**1,203**	1,636
Profit/(loss) after tax	**108**	(12)	**7**	(412)	**(323)**	(1,955)	**140**	215
– attributable to non-controlling interests	**44**	(4)	**2**	(132)	**(160)**	(974)	**37**	76
– attributable to Rio Tinto	**64**	(8)	**5**	(280)	**(163)**	(981)	**103**	139
Other comprehensive income/(loss)	**56**	(341)	**–**	(21)	**–**	–	**2**	7
Total comprehensive income/(loss)	**164**	(353)	**7**	(433)	**(323)**	(1,955)	**142**	222
Non-current assets	**2,315**	2,325	**58**	89	**–**	–	**7,969**	7,712
Current assets	**627**	412	**383**	363	**18**	18	**5,702**	1,728
Current liabilities	**(348)**	(261)	**(96)**	(94)	**(243)**	(78)	**(316)**	(322)
Non-current liabilities	**(755)**	(724)	**(336)**	(355)	**(19)**	(19)	**(4,257)**	(167)
Net assets/(liabilities)	**1,839**	1,752	**9**	3	**(244)**	(79)	**9,098**	8,951
– attributable to non-controlling interests	**759**	724	**2**	1	**(125)**	(44)	**4,073**	4,075
– attributable to Rio Tinto	**1,080**	1,028	**7**	2	**(119)**	(35)	**5,025**	4,876
Cash flow from operations	**302**	206	**18**	56	**(157)**	(59)	**387**	658
Dividends paid to non-controlling interests	**(31)**	–	**–**	–	**–**	–	**–**	–

(a) These figures represent the consolidated position of both Simfer Jersey Limited and Simfer S.A. which together form the Simandou Iron Ore project. In 2016, a post-tax charge of US$194 million (Rio Tinto share US$103 million) has been recognised in Simfer Jersey Limited as a financial liability following the decision by International Finance Corporation (IFC) to exercise a put option in respect of its 4.25% investment in Simfer SA.

(b) Turquoise Hill Resources Ltd holds controlling interests in Oyu Tolgoi. The main driver of the increase in non-current liabilities and current assets, compared with 2015, was the draw-down of Oyu Tolgoi Project financing and the subsequent placing of net proceeds with 9539549 Canada Inc., a wholly owned subsidiary of Rio Tinto. Net proceeds placed with 9539549 Canada Inc. are returned to Turquoise Hill as required for the purposes of Oyu Tolgoi underground mine development and financing.

(c) These amounts include impairment adjustments recognised by Rio Tinto. Refer to note 6 on page 133 for further information.

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33 Principal subsidiaries continued

	Robe River Mining Co Pty Ltd 2016 US$m	Robe River Mining Co Pty Ltd 2015 US$m	Other companies and eliminations (a) 2016 US$m	Other companies and eliminations (a) 2015 US$m	Robe River 2016 US$m	Robe River 2015 US$m
Revenue	**982**	976	**1,139**	1,133	**2,121**	2,109
Profit/(loss) after tax	**482**	615	**517**	203	**999**	818
– attributable to non-controlling interests	**193**	176	**–**	–	**193**	176
– attributable to Rio Tinto	**289**	439	**517**	203	**806**	642
Other comprehensive loss	**(23)**	(107)	**(20)**	(578)	**(43)**	(685)
Total comprehensive income/(loss)	**459**	508	**497**	(375)	**956**	133
Non-current assets	**2,797**	2,935	**3,976**	4,154	**6,773**	7,089
Current assets	**1,122**	602	**(401)**	(10)	**721**	592
Current liabilities	**(92)**	(105)	**(148)**	(247)	**(240)**	(352)
Non-current liabilities	**(666)**	(60)	**(1,546)**	(2,120)	**(2,212)**	(2,180)
Net assets	**3,161**	3,372	**1,881**	1,777	**5,042**	5,149
– attributable to no- controlling interests	**1,263**	1,347	**–**	–	**1,263**	1,347
– attributable to Rio Tinto	**1,898**	2,025	**1,881**	1,777	**3,779**	3,802
Cashflow from operations	**145**	798	**1,496**	733	**1,641**	1,531
Dividends paid to non-controlling interests	**(268)**	(271)	**–**	–	**(268)**	(271)

(a) "Other companies and eliminations" includes North Mining Limited, a wholly owned subsidiary of the Group which accounts for its interest in Robe River and goodwill of US$360 million (2015: US$363 million) that arose on acquisition of the Group's interest in Robe River.

34 Principal joint operations

Company and country of incorporation/operation	Principal activities	Group interest (%)
Australia		
Tomago Aluminium Joint Venture	Aluminium smelting	51.6
Kestrel (a)	Coal mining	80
Gladstone Power Station	Power generation	42.1
Hope Downs Joint Venture	Iron ore mining	50
Queensland Alumina Limited (b) (c)	Alumina production	80
New Zealand		
New Zealand Aluminium Smelters Limited (b) (c)	Aluminium smelting	79.4
Canada		
Aluminerie Alouette Inc.	Aluminium production	40
Indonesia		
Grasberg expansion (d)	Copper and gold mining	40
United States of America		
Pechiney Reynolds Quebec Inc (c) (e)	Aluminium smelting	50.3

This list includes only those joint operations that have a more significant impact on the profit or operating assets of the Group. Refer to note 47 for a list of related undertakings.

The Group's joint operations are held by intermediate holding companies and not directly by Rio Tinto plc or Rio Tinto Limited.

(a) Although the Group has an 80 per cent interest share in the Kestrel Joint Venture, decisions about activities that significantly affect the returns that are generated require agreement of both parties to the Joint Venture Agreement, giving rise to joint control.

(b) Although the Group has a 79.4 per cent interest in New Zealand Aluminium Smelters Limited and an 80 per cent interest in Queensland Alumina Limited, decisions about activities that significantly affect the returns that are generated require agreement of both parties to the arrangements, giving rise to joint control.

(c) Queensland Alumina Limited, New Zealand Aluminium Smelters Limited and Pechiney Reynolds Quebec Inc. are joint arrangements that are primarily designed for the provision of output to the parties sharing joint control; this indicates that the parties have rights to substantially all the economic benefits of the assets. The liabilities of the arrangements are in substance satisfied by cash flows received from the parties; this dependence indicates that the parties in effect have obligations for the liabilities. It is these facts and circumstances that give rise to the classification of these entities as joint operations.

(d) Under the terms of a contractual agreement, Rio Tinto is entitled to 40 per cent of production above specified levels until the end of 2021 and 40 per cent of all production thereafter under the Participation Agreement. This date is subject to extension under certain conditions.

(e) Pechiney Reynolds Quebec Inc. has a 50.1 per cent interest in the Aluminerie de Bécancour, Inc. aluminium smelter, which is located in Canada.

35 Principal joint ventures

At 31 December 2016

Company and country of incorporation/operation	Principal activities	Number of shares held	Class of shares held	Proportion of class held (%)	Group interest (%)
Chile					
Minera Escondida Limitada [(a)]	Copper mining and refining	–	–	30	30
Oman					
Sohar Aluminium Co. L.L.C. [(b)]	Aluminium smelting/power generation	37,500	Ordinary	20	20

This list includes only those joint ventures that have a more significant impact on the profit or operating assets of the Group. Refer to note 47 for a list of related undertakings.

The Group's principal joint ventures are held by intermediate holding companies and not directly by Rio Tinto plc or Rio Tinto Limited.

(a) Although the Group has a 30 per cent interest in Minera Escondida Limitada, participant and management agreements provide for an Owners' Council whereby significant commercial and operational decisions about the relevant activities that significantly affect the returns that are generated in effect require the joint approval of both Rio Tinto and BHP Billiton (holders of a 57.5 per cent interest). It is therefore determined that Rio Tinto has joint control.
The year-end of Minera Escondida Limitada is 30 June. The amounts included in the consolidated financial statements of Rio Tinto are, however, based on accounts of Minera Escondida Limitada that are coterminous with those of the Group.

(b) Although the Group holds a 20 per cent interest in Sohar Aluminium Co. L.L.C., decisions about relevant activities that significantly affect the returns that are generated require agreement of all parties to the arrangement. It is therefore determined that Rio Tinto has joint control.

Summary information for joint ventures that are material to the Group

This summarised financial information is shown on a 100 per cent basis. It represents the amounts shown in the joint ventures' financial statements prepared in accordance with IFRS under Group accounting policies, including fair value adjustments and amounts due to and from Rio Tinto.

	Minera Escondida Limitada [(a)] 2016 US$m	Minera Escondida Limitada [(a)] 2015 US$m	**Sohar Aluminium Company LLC [(a)] 2016 US$m**	Sohar Aluminium Company LLC [(a)] 2015 US$m
Revenue	**4,883**	6,184	**610**	665
Depreciation and amortisation	**(1,213)**	(977)	**(130)**	(135)
Other operating costs	**(2,199)**	(3,777)	**(425)**	(445)
Operating profit	**1,471**	1,430	**55**	85
Finance expense	**(47)**	(20)	**(25)**	(20)
Income tax	**(517)**	(533)	**–**	5
Profit after tax	**907**	877	**30**	70
Total comprehensive income	**907**	877	**30**	70
Non-current assets	**14,947**	13,761	**3,275**	3,400
Current assets	**2,257**	2,177	**255**	255
Current liabilities	**(1,403)**	(2,303)	**(45)**	(240)
Non-current liabilities	**(4,112)**	(2,223)	**(1,505)**	(1,480)
Net assets	**11,689**	11,412	**1,980**	1,935
Assets and liabilities above include:				
Cash and cash equivalents	**443**	197	**20**	10
Current financial liabilities	**(467)**	(1,223)	**20**	(170)
Non-current financial liabilities	**(2,643)**	(1,200)	**(1,350)**	(1,320)
Dividends received from joint venture (Rio Tinto share)	**401**	401	**–**	–

Reconciliation of the above amounts to the carrying value of the Group's interest

Group interest	**30%**	30%	**20%**	20%
Net assets	**11,689**	11,412	**1,980**	1,935
Group's ownership interest	**3,507**	3,424	**396**	387
Other adjustments	**(3)**	(11)	**(2)**	–
Carrying value of Group's interest	**3,504**	3,413	**394**	387

(a) In addition to its "Investment in equity accounted units", the Group recognises deferred tax liabilities of US$579 million (2015: US$582 million) relating to tax on unremitted earnings of equity accounted units.

Notes to the 2016 financial statements
continued

36 Principal associates

At 31 December 2016

Company and country of incorporation/operation	Principal activities	Number of shares held	Class of shares held	Proportion of class held (%)	Group interest (%)
Australia					
Boyne Smelters Limited (a)	Aluminium smelting	153,679,560	Ordinary	59.4	59.4
Brasil					
Mineração Rio do Norte S.A. (b)	Bauxite mining	25,000,000	Ordinary	12.5	12
		47,000,000	Preferred	11.8	
United States of America					
Halco (Mining) Inc	(c)	4,500	Common	45	45

This list includes only those associates that have a more significant impact on the profit or operating assets of the Group. Refer to note 47 for a list of related undertakings.

The Group's principal associates are held by intermediate holding companies and not directly by Rio Tinto plc or Rio Tinto Limited.

(a) The parties that collectively control Boyne Smelters Limited do so through decisions that are determined on an aggregate voting interest that can be achieved by several combinations of the parties. Although each combination requires Rio Tinto's approval, this is not joint control as defined under IFRS 11. Rio Tinto is therefore determined to have significant influence over this company.

(b) Although the Group holds only 12 per cent of Mineração Rio do Norte S.A., it has representation on its board of directors and a consequent ability to participate in the financial and operating policy decisions. It is therefore determined that Rio Tinto has significant influence.

(c) Halco (Mining) Inc has a 51 per cent indirect interest in Compagnie des Bauxites de Guinée, a bauxite mine, the core assets of which are located in Guinea.

Summary information for associates that are material to the Group

This summarised financial information is shown on a 100 per cent basis. It represents the amounts shown in the associate's financial statements prepared in accordance with IFRS under Group accounting policies, including amounts due to and from Rio Tinto.

	Boyne Smelters Limited (a) 2016 US$m	Boyne Smelters Limited (a) 2015 US$m
Revenue	**–**	–
Profit after tax	**12**	40
Other comprehensive loss (b)	**(4)**	(91)
Total comprehensive income/(loss)	**8**	(51)
Non-current assets	**1,465**	1,525
Current assets	**66**	64
Current liabilities	**(121)**	(106)
Non-current liabilities	**(987)**	(1,069)
Net assets	**423**	414

(a) Boyne Smelters Limited is a tolling operation which under Group accounting policies requires the net presentation of income and expenses for product processed on behalf of the participating shareholders. Rio Tinto Aluminium has made certain prepayments to Boyne for toll processing of alumina. These are charged to Group operating costs as processing takes place.

(b) "Other comprehensive loss" is net of amounts recognised by subsidiaries in relation to quasi equity loans.

Group interest	**59.4%**	59.4%
Net assets	**423**	414
Group's ownership interest	**251**	246
Loans to equity accounted units	**163**	183
Carrying value of Group's interest	**414**	429

Summary information for joint ventures and associates that are not individually material to the Group

	Joint ventures 2016 US$m	Joint ventures 2015 US$m	**Associates 2016 US$m**	Associates 2015 US$m
Carrying value of Group's interest	**–**	10	**707**	702
Profit after tax	**–**	–	**36**	60
Other comprehensive income/(loss)	**–**	15	**13**	(43)
Total comprehensive income	**–**	15	**49**	17

37 Purchases and sales of subsidiaries, joint ventures, associates and other interests in businesses

Acquisitions

There were no material acquisitions during the years ended 31 December 2016, 2015 and 2014.

2016 disposals

On 1 March 2016, Rio Tinto disposed of its 40 per cent interest in the Bengalla Joint Venture to New Hope Corporation Limited for US$599 million (net of working capital adjustments, transaction costs and cash disposed of in the Joint Venture).

On 31 March 2016, Rio Tinto disposed of its 100 per cent interest in Carbone Savoie to Alandia Industries.

On 20 July 2016, a tranche of 7.5 per cent non-contributory shares in Simfer S.A.was transferred free of charge to the Government of Guinea as per the terms of the Simandou project agreement signed in 2014, further diluting the ownership percentage of Rio Tinto and its partners in the project. Under the agreement, a second tranche comprising 10 per cent Ordinary Contributory Shares may be acquired at any time for a pro rata share of historical mining cost. The remaining two tranches of 5 per cent ordinary contributing shares may be acquired by the Government of Guinea at market value at any time after 22 April 2026 and 22 April 2031 respectively.

On 2 September 2016, Rio Tinto disposed of its interest in Zululand Anthracite Colliery.

On 23 November 2016, Rio Tinto disposed of its 100 per cent interest in Lochaber to SIMEC for US$410 million (before finalisation of closing adjustments and transaction costs) of which US$224 million was received in December 2016 and US$186 million is due to be received by 31 March 2017.

2015 disposals

On 23 April 2015, Turquoise Hill Resources Ltd completed the block sale of 48.7 million common shares in SouthGobi Resources Ltd and with further divestments has reduced its interest to below 20 per cent. As at 31 December 2015 Turquoise Hill Resources Ltd's interest in SouthGobi Resources Ltd was no longer consolidated as a subsidiary and had been classified as an available for sale investment.

On 17 June 2015, Rio Tinto disposed of its 77.8 per cent interest in Murowa Diamonds and 50 per cent interest in Sengwa Colliery Ltd (Sengwa) to RZ Murowa Holdings Limited.

Rio Tinto completed the sale of ECL to Fives on 9 July 2015 and the sale of Alesa to Groupe Reel on 24 November 2015.

2014 disposals

On 29 May 2014, Rio Tinto completed the sale of its 50.1 per cent interest in the Clermont Joint Venture to GS Coal for US$1,015 million (before finalisation of net debt and working capital adjustments).

On 7 October 2014, Rio Tinto completed the sale of Rio Tinto Coal Mozambique, which comprises the Benga coal mine and other projects in the Tete province of Mozambique, to International Coal Ventures Private Limited for US$50 million (before net debt and working capital adjustments).

Rio Tinto completed the sale of its 50 per cent share in SØRAL to Norsk Hydro Aluminium ASA on 31 October 2014 and the sale of its 46.67 per cent share in Alucam to the Government of Cameroon on 31 December 2014.

On 26 May 2014, Rio Tinto and its Simandou project partners signed an Investment Framework with the Government of Guinea and agreed to transfer an equity interest in Simfer S.A., to the state. The arrangement allows the Government of Guinea to acquire equity interests of up to 25 per cent of Simfer S.A. at a discount to fair value, and a further 10 per cent at full fair value. Arrangements to transfer an interest in a subsidiary undertaking at a discount to fair value are considered to be a share-based payment. The discount provided or value given on the 25 per cent interest in Simfer S.A. was calculated in accordance with IFRS 2 "Share based payment" as US$230 million.

The first tranche of shares comprising 7.5 per cent non-contributory shares was transferred free of charge to the Government of Guinea on 26 May 2014.

38 Directors' and key management remuneration

Aggregate remuneration, calculated in accordance with the UK Companies Act 2006, of the directors of the parent companies was as follows:

	2016 US$'000	2015 US$'000	2014 US$'000
Emoluments[a]	**9,186**	10,590	11,090
Long-term incentive plans	**3,071**	2,118	3,444
	12,257	12,708	14,534
Pension contributions: defined contribution plans	**69**	52	55
Gains made on exercise of share options	**–**	1	–

(a) The aggregate figures in the table above include the full year remuneration for Jean-Sébastien Jacques. Jean-Sébastien was appointed to an executive director position on 17 March 2016.

The Group defines key management personnel as the directors and members of the Executive Committee. The Executive Committee comprises the executive directors, product group chief executive officers and Group executives.

The aggregate remuneration incurred by Rio Tinto plc in respect of its directors was US$10,648,000 (2015: US$6,385,000; 2014: US$6,653,000). The aggregate pension contribution to defined contribution plans was US$69,000 (2015: US$52,000; 2014: US$55,000). The aggregate remuneration, including pension contributions and other retirement benefits, incurred by Rio Tinto Limited in respect of its directors was US$1,696,000 (2015: US$6,375,000; 2014: US$9,796,000). The aggregate pension contribution to defined contribution plans was US$nil (2015: US$nil; 2014: US$nil).

During 2016, one director (2015: one; 2014: one) accrued retirement benefits under defined benefit arrangements, and two directors (2015: one; 2014: one) accrued retirement benefits under defined contribution arrangements.

Emoluments included in the table above have been translated from local currency at the average exchange rate for the year with the exception of bonus payments which, together with amounts payable under long-term incentive plans, have been translated at the year-end rate.

Detailed information concerning directors' remuneration, shareholdings and options is shown in the Remuneration Report, including tables 1 to 3, on pages 70 to 107.

38 Directors' and key management remuneration continued

Aggregate compensation, representing the expense recognised under IFRS, as defined in note 1, of the Group's key management, including directors, was as follows:

	2016 US$'000	2015 US$'000	2014 US$'000
Short-term employee benefits and costs	**22,269**	25,616	30,137
Post-employment benefits	**3,461**	1,049	1,449
Employment termination benefits	**2,682**	–	–
Share-based payments	**15,806**	17,566	19,676
	44,218	44,231	51,262

The figures shown above include employment costs which comprise social security and accident premiums in Canada, the UK and US and payroll taxes in Australia paid by the employer as a direct additional cost of hire. In total, they amount to US$2,295,000 (2015: US$2,320,000; 2014: US$2,870,000) and although disclosed here, are not included in table 1 of the Remuneration Report.

More detailed information concerning the remuneration of key management is shown in the Remuneration report, including tables 1 to 3 on pages 70 to 107.

39 Auditors' remuneration

	2016 US$m	2015 US$m	2014 US$m
Group Auditors' remuneration (a)			
Audit of the company	**4.5**	4.3	4.0
Audit of subsidiaries	**9.0**	10.1	10.7
Total audit	**13.5**	14.4	14.7
Audit related assurance service	**0.9**	0.9	1.1
Other assurance services (b)	**0.6**	0.9	1.0
Total assurance services	**1.5**	1.8	2.1
Tax compliance (c)	**0.5**	0.5	0.4
Tax advisory services (c)	**0.1**	0.4	0.5
Services related to corporate finance transactions not covered above			
– services in connection with bond issues/capital raising	**–**	0.2	0.1
Other non-audit services not covered above	**1.8**	1.1	0.3
Total non-audit services	**3.9**	2.2	1.3
	17.4	18.4	18.1
Audit fees payable to other accounting firms			
Audit of the financial statements of the Group's subsidiaries	**2.1**	1.9	2.7
Fees in respect of pension scheme audits	**0.1**	0.2	0.4
	2.2	2.1	3.1

(a) The remuneration payable to PwC, the Group Auditors, is approved by the Audit Committee. The Committee sets the policy for the award of non-audit work to the auditors and approves the nature and extent of such work, and the amount of the related fees, to ensure that independence is maintained. The fees disclosed above consolidate all payments made to member firms of PwC by the Companies and their subsidiaries, together with the Group's share of the payments made by joint operations. Non-audit services arise largely from assurance and/or regulation related work.

(b) Other assurance services are mainly related to carve-out financial statements and sustainability assurance.

(c) "Taxation services" includes tax compliance and advisory services. Tax compliance involves the review of returns for corporation, income, sales and excise taxes. Tax advisory services include advice on non-recurring acquisitions and disposals, advice on transfer pricing and advice on employee global mobility.

40 Related-party transactions

Information about material related-party transactions of the Rio Tinto Group is set out below:

Subsidiary companies and joint operations

Details of investments in principal subsidiary companies are disclosed in note 33. Information relating to joint operations can be found in note 34.

Equity accounted units

Transactions and balances with equity accounted units are summarised below. Purchases, trade and other receivables, and trade and other payables relate largely to amounts charged by equity accounted units for toll processing of alumina and purchasing of bauxite and aluminium. Sales relate largely to sales of alumina to equity accounted units for smelting into aluminium.

Income statement items	2016 US$m	2015 US$m	2014 US$m
Purchases from equity accounted units	(1,216)	(1,249)	(1,835)
Sales to equity accounted units	248	307	625
Cash flow statement items	US$m	US$m	US$m
Dividends from equity accounted units	253	210	298
Net funding of equity accounted units	(12)	11	(117)
Balance sheet items	US$m	US$m	US$m
Investments in equity accounted units (note 15) (a)	5,019	4,941	4,868
Loans to equity accounted units (note 20)	39	42	71
Loans from equity accounted units (note 22)	(49)	(37)	(52)
Trade and other receivables: amounts due from equity accounted units (b) (note 18)	298	315	423
Trade and other payables: amounts due to equity accounted units (note 25)	(243)	(231)	(225)

(a) Investments in equity accounted units include quasi equity loans. Further information about investments in equity accounted units is set out in notes 35 and 36.
(b) This includes prepayments of tolling charges.

Pension funds

Information relating to pension fund arrangements is set out in note 45.

Directors and key management

Details of directors' and key management remuneration are set out in note 38 and in the Remuneration report on pages 70 to 107.

41 Exchange rates in US$

The principal exchange rates used in the preparation of the 2016 financial statements were:

	Full-year average			Year-end		
	2016	2015	2014	2016	2015	2014
Sterling	1.36	1.53	1.65	1.22	1.48	1.56
Australian dollar	0.74	0.75	0.90	0.72	0.73	0.82
Canadian dollar	0.76	0.78	0.91	0.74	0.72	0.86
Euro	1.11	1.11	1.33	1.05	1.09	1.22
South African rand	0.068	0.079	0.092	0.073	0.064	0.086

42 Bougainville Copper Limited (BCL)

Rio Tinto transferred its 53.83 per cent shareholding in BCL to Equity Trustees Limited (independent trustee) on 30 June 2016 for nil consideration. Equity Trustees Limited subsequently distributed the shares in accordance with the trust deed to nominees of each of the Autonomous Bougainville Government (36.4 per cent) and the Independent State of Papua New Guinea (17.4 per cent) such that each party controlled an equal share of BCL (36.4 per cent). The Group did not previously consolidate BCL as it was determined that in accordance with IFRS, as defined in note 1, the Group did not control the relevant activities, being the mining of copper at the Panguna mine, which was brought to a halt by unrest in 1989. The carrying value has previously been fully impaired and therefore the transfer resulted in no financial impact for the year ended 31 December 2016.

43 Events after the balance sheet date

On 24 January 2017, the Group announced it had reached a binding agreement for the sale of its wholly-owned Australian subsidiary Coal & Allied Industries Limited to Yancoal Australia Limited for up to US$2.45 billion comprising an initial US$1.95 billion cash payment, payable at completion; and US$500 million in aggregate deferred cash payments, payable as annual instalments of US$100 million over five years following completion.

Yancoal Australia is entitled to elect for an alternative purchase price structure of a single cash payment at completion of US$2.35 billion. Rio Tinto will use the consideration received for general corporate purposes.

On 8 February 2017, the Group announced an on-market share buy-back of US$0.5 billion Rio Tinto plc shares.

Except as disclosed above, no significant events were identified after the balance sheet date.

Notes to the 2016 financial statements

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44 Share-based payments

Rio Tinto plc and Rio Tinto Limited have a number of share-based incentive plans, which are described in detail in the Remuneration Report. These plans have been accounted for in accordance with the fair value recognition provisions of IFRS 2 "Share-based Payment".

The charge that has been recognised in the income statement for Rio Tinto's share-based incentive plans, and the related liability (for cash-settled plans), is set out in the table below.

	Charge recognised for the year			Liability at the end of the year	
	2016 US$m	2015 US$m	2014 US$m	**2016 US$m**	2015 US$m
Equity-settled plans	**116**	**128**	152	**–**	–
Cash-settled plans	**–**	**–**	–	**1**	1
Total	**116**	**128**	152	**1**	1

The main Rio Tinto plc and Rio Tinto Limited plans are as follows:

Share Savings Plans

Awards under these plans are settled in equity and accounted for accordingly. The fair value of each award on the day of grant was estimated using a lattice-based option valuation model, including allowance for the exercise price being at a discount to market price.

Awards are no longer granted under the Share Savings Plans as these plans were replaced by the Global Employee Share Plans in 2012. Charges will continue to be incurred until prior period awards have vested.

Share Option Plans

Awards are no longer granted under the Share Option Plans as the long term incentive plan arrangements have been simplified and awards are now only made under the Performance Share Plans. All charges have been incurred as the remaining unvested awards vested during 2015. There remain vested options outstanding under this plan.

UK Share Plan (formerly the Share Ownership Plan)

The fair values of Matching and Free Shares made by Rio Tinto plc are taken to be the market value of the shares on the date of purchase. These awards are settled in equity.

Performance Share Plans

Participants are generally assigned shares in settlement of their awards on vesting and therefore the awards are accounted for in accordance with the requirements applying to equity-settled share-based payment transactions.

For the awards or parts of awards with Total Shareholder Return (TSR) performance conditions, the fair value of the awards was calculated using a Monte Carlo simulation model taking into account the TSR performance conditions. One-third of the awards granted since 2013 are subject to an earnings performance target relative to ten global mining comparators. As this is a non-market related performance condition, under IFRS 2, the fair value recognised is reviewed at each accounting date based on the directors' expectations for the proportion vesting. As at 31 December 2016 it was assumed 100 per cent of awards subject to the earnings condition would vest. Forfeitures prior to vesting are assumed at five per cent per annum of outstanding awards (2015: three per cent per annum).

Management Share Plans

The Management Share Plans were introduced in 2007 to provide conditional share-based awards to management. The vesting of these awards is dependent on service conditions being met. In general, the awards will be settled in equity, including the dividends accumulated from date of award to vesting. The awards are accounted for in accordance with the requirements applying to equity-settled share-based payment transactions.

The fair value of each award on the day of grant is equal to the share price on the day of grant less a small adjustment for the timing of dividends. Forfeitures prior to vesting are assumed at seven per cent per annum of outstanding awards (2015: seven per cent per annum).

Bonus Deferral Plans

The Bonus Deferral Plans were originally introduced in 2009 for the mandatory deferral of the 2008 bonuses for executive directors, product group executives and for other executives. Additional Bonus Deferral Awards have been made each year since 2011 (made in respect of the 2010 bonus) for the mandatory deferral of 50 per cent of the bonuses for executive directors and product group executives and 25 per cent of the bonuses for other executives.

The vesting of these awards is dependent only on service conditions being met. In general, the awards will be settled in equity including the dividends accumulated from date of award to vesting. The awards are accounted for in accordance with the requirements applying to equity-settled share-based payment transactions. The fair value of each award on the day of grant is equal to the share price on the day of grant less a small adjustment for the timing of dividends. Forfeitures prior to vesting are assumed at three per cent per annum of outstanding awards (2015: three per cent per annum).

Global Employee Share Plans

The Global Employee Share Plans were introduced in 2012. The Companies provide matching shares for each share purchased. The vesting of these matching awards is dependent on service conditions being met. These awards are settled in equity. The fair value of each matching share on the day of grant is equal to the share price on the date of purchase. Forfeitures prior to vesting are assumed at five per cent per annum of outstanding awards (2015: five per cent per annum).

Summary of options outstanding

A summary of the status of the Companies' equity-settled share option plans (Share Savings Plans and Share Option Plans) at 31 December 2016 is presented below.

Options outstanding at 31 December 2016	Number	Weighted average exercise price per option £/A$	Weighted average remaining contractual life Years	Aggregate intrinsic value 2016 US$m
Rio Tinto plc Share Savings Plan (exercise price £29)	23,979	£ 28.63	0.5	–
Rio Tinto Limited Share Savings Plan (exercise price A$56)	64,344	A$55.62	0.5	–
Rio Tinto plc Share Option Plan (exercise price £16 – £43)	277,498	£ 30.98	3.0	2
Rio Tinto Limited Share Option Plan (exercise price A$33 – A$77)	201,777	A$61.04	3.0	1
	567,598			3

As at 31 December 2015 there were 1,322,786 options outstanding with an aggregate intrinsic value of US$2 million.

Options exercisable at 31 December 2016	Number	Weighted average exercise price per option £/A$	Weighted average remaining contractual life Years	Aggregate intrinsic value 2016 US$m
Rio Tinto plc Share Option Plan (exercise price £16 – £43)	277,498	£ 30.98	3.0	2
Rio Tinto Limited Share Option Plan (exercise price A$33 – A$77)	201,777	A$61.04	3.0	1
	479,275			3

As at 31 December 2016 there were no options exercisable under either the Rio Tinto plc or the Rio Tinto Limited Share Savings Plans.

The Management Share Plans, Performance Share Plans, Bonus Deferral Plans, Global Employee Share Plans and UK Share Plan together represent 100 per cent (2015: 99 per cent) of the total IFRS 2 charge for Rio Tinto plc and Rio Tinto Limited plans in 2016.

Performance Share Plans

	Rio Tinto plc awards				Rio Tinto Limited awards			
	2016 Number	**Weighted average fair value at grant date 2016 £**	2015 Number	Weighted average fair value at grant date 2015 £	**2016 Number**	**Weighted average fair value at grant date 2016 A$**	2015 Number	Weighted average fair value at grant date 2015 A$
Non-vested shares at 1 January	**2,988,454**	**21.29**	2,928,001	24.05	**2,048,823**	**41.13**	2,024,876	45.87
Awarded	**1,085,974**	**12.81**	912,883	19.59	**535,418**	**28.66**	523,259	39.28
Forfeited	**(603,871)**	**17.22**	(171,310)	20.04	**(526,212)**	**36.18**	(80,207)	39.44
Failed performance conditions	**(203,491)**	**24.61**	(175,554)	31.17	**(161,937)**	**44.71**	(109,808)	62.04
Vested	**(384,013)**	**24.61**	(505,566)	31.19	**(305,135)**	**44.71**	(309,297)	62.03
Non-vested shares at 31 December	**2,883,053**	**18.27**	2,988,454	21.29	**1,590,957**	**37.52**	2,048,823	41.13

	2016 Number	**Weighted average share price 2016 £**	2015 Number	Weighted average share price 2015 £	**2016 Number**	**Weighted average share price 2016 A$**	2015 Number	Weighted average share price 2015 A$
Vested awards settled in shares during the year	**368,623**	**19.08**	481,360	29.44	**284,507**	**42.99**	288,803	58.59
Vested awards settled in cash during the year	**486**	**19.00**	24,206	29.44	**847**	**43.47**	20,494	58.59

In addition to the equity-settled awards shown above, there were 22,010 Rio Tinto plc cash-settled awards outstanding at 31 December 2016 (2015: 4,053 Rio Tinto plc cash-settled awards outstanding). The total liability for these awards at 31 December 2016 was less than US$1 million (2015: less than US$1 million).

44 Share-based payments continued

Management Share Plans, Bonus Deferral Plans, Global Employee Share Plans and UK Share Plan (combined)

	Rio Tinto plc awards[a]				Rio Tinto Limited awards			
	2016 Number	**Weighted average fair value at grant date 2016 £**	2015 Number	Weighted average fair value at grant date 2015 £	**2016 Number**	**Weighted average fair value at grant date 2016 A$**	2015 Number	Weighted average fair value at grant date 2015 A$
Non-vested awards at 1 January	**3,211,727**	**29.70**	2,747,346	31.31	**2,993,396**	**58.09**	2,579,081	59.83
Awarded	**1,673,017**	**20.62**	1,452,429	28.15	**1,405,348**	**45.27**	1,352,526	56.37
Forfeited	**(246,806)**	**23.02**	(239,018)	29.41	**(164,020)**	**54.48**	(200,278)	57.48
Vested	**(1,331,972)**	**28.72**	(749,030)	32.51	**(1,248,644)**	**55.54**	(737,933)	61.19
Non-vested shares at 31 December	**3,305,966**	**26.00**	3,211,727	29.70	**2,986,080**	**53.32**	2,993,396	58.09
Comprising of:								
– Management Share Plan	**1,668,590**	**25.79**	1,778,043	29.62	**1,530,814**	**53.88**	1,629,390	58.09
– Bonus Deferral Plan	**312,767**	**23.24**	274,965	29.99	**148,158**	**50.25**	211,341	59.78
– Global Employee Share Plan	**1,223,144**	**26.90**	1,078,327	29.72	**1,307,108**	**53.03**	1,152,665	57.79
– UK Share Plan	**101,465**	**27.00**	80,392	30.17				

	2016 Number	**Weighted average fair value at grant date 2016 £**	2015 Number	Weighted average fair value at grant date 2015 £	**2016 Number**	**Weighted average fair value at grant date 2016 A$**	2015 Number	Weighted average fair value at grant date 2015 A$
Vested awards settled in shares during the year (including dividend shares applied on vesting)								
– Management Share Plan	**758,776**	**20.07**	633,690	27.14	701,965	43.93	564,679	53.44
– Bonus Deferral Plan	**112,623**	**30.36**	126,997	22.57	113,407	56.78	121,205	45.21
– Global Employee Share Plan	**344,072**	**24.33**	68,422	24.91	332,010	48.69	76,446	52.93
– UK Share Plan	**21,082**	**21.92**	4,687	25.25				

(a) Awards of Rio Tinto American Depository Receipts (ADRs) under the Global Employee Share Plan are included within the totals for Rio Tinto plc awards for the purpose of these tables.

In addition to the equity-settled awards shown above, there were 34,517 Rio Tinto plc and 15,239 Rio Tinto Limited cash-settled awards outstanding at 31 December 2016 (2015: 26,576 Rio Tinto plc and 7,684 Rio Tinto Limited cash-settled awards outstanding). The total liability for these awards at 31 December 2016 was less than US$1 million (2015: less than US$1 million).

45 Post-retirement benefits

Description of plans

The Group operates a number of pension and post-retirement healthcare plans around the world. Some of these plans are defined contribution and some are defined benefit, with assets held in separate trusts, foundations and similar entities.

Defined benefit pension and post-retirement healthcare plans expose the Group to a number of risks:

Uncertainty in benefit payments	The value of the Group's liabilities for post-retirement benefits will ultimately depend on the amount of benefits paid out. This in turn will depend on the level of future pay increases, the level of inflation (for those benefits that are subject to some form of inflation protection) and how long individuals live.
Volatility in asset values	The Group is exposed to future movements in the values of assets held in pension plans to meet future benefit payments.
Uncertainty in cash funding	Movements in the values of the obligations or assets may result in the Group being required to provide higher levels of cash funding, although changes in the level of cash required can often be spread over a number of years. In some countries control over the rate of cash funding or over the investment policy for pension assets might rest to some extent with a trustee body or other body that is not under the Group's direct control. In addition the Group is also exposed to adverse changes in pension regulation.

For these reasons the Group has a policy of moving away from defined benefit pension provision and towards defined contribution arrangements instead. The defined benefit pension plans for salaried employees are closed to new entrants in almost all countries. For unionised employees, some plans remain open.

The Group does not usually participate in multi-employer plans in which the risks are shared with other companies using those plans. The Group's participation in such plans is immaterial and consequently no detailed disclosures are provided in this note.

Pension plans

The majority of the Group's defined benefit pension obligations are in Canada, the UK, the US, Switzerland and the Eurozone.

In Canada the benefits for salaried staff are generally linked to final average pay and are closed to new entrants. Benefits for bargaining employees are reviewed in negotiation with unions and are typically either linked to final average pay or to a flat monetary amount per year of service. Some of these plans have been closed to new entrants but some remain open at present. During 2015 agreement was reached with the unions to close the largest plan to new entrants. New employees now join an arrangement which is defined contribution from the Group's perspective, with any required additional funding being provided by employees. The plans are subject to the regulatory requirements that apply to Canadian pension plans in the relevant provinces and territories (predominantly Quebec). Pension Committees are responsible for ensuring that the plans operate in a manner that is compliant with the relevant regulations. The Pension Committees generally have a number of members appointed by the sponsor and a number appointed by the plan participants. In some cases there is also an independent Committee member.

The defined benefit sections of the UK arrangements are linked to final pay and are closed to new members. New employees are admitted to defined contribution sections. The plans are subject to the regulatory requirements that apply to UK pension plans. Trustees are responsible for ensuring that the plans operate in a manner that is compliant with UK regulations. The Trustee board governing the main UK plans has a number of directors appointed by the sponsor, a number appointed by the plan participants and an independent trustee director.

A number of defined benefit pension plans are sponsored by the US entities. Benefits for salaried staff are generally linked to final average pay and closed to new entrants, while benefits for bargaining employees are reviewed in negotiation with unions and are typically a flat monetary amount per year of service. A Benefits Governance Committee is responsible for ensuring that the plans are compliant with US regulations. Members of that Committee are appointed by the sponsor.

In Europe, there are defined benefit plans in Switzerland, the Netherlands, Germany and France. The largest single plan is in Switzerland and provides benefits linked to final average pay. The Swiss plan is overseen by a Foundation Board which is responsible for ensuring that the plan complies with Swiss regulations. Foundation Board members are appointed by the plan sponsor, by employees and by retirees.

In Australia, the main arrangements are principally defined contribution in nature but there are sections providing defined benefits linked to final pay, typically paid in lump sum form. The defined benefit sections are closed to new entrants.

The Group also operates a number of unfunded defined benefit plans, which are included in the figures below.

Post-retirement healthcare plans

Certain subsidiaries of the Group, mainly in the US and Canada, provide health and life insurance benefits to retired employees and in some cases to their beneficiaries and covered dependants. Eligibility for cover is dependent upon certain age and service criteria. These arrangements are generally unfunded, and are included in the figures below.

Plan assets

The assets of the pension plans are invested predominantly in a diversified range of equities, bonds and property. Consequently, the funding level of the pension plans is affected by movements in the level of equity markets and also by movements in interest rates. The Group monitors its exposure to changes in interest rates and equity markets and also measures its balance sheet pension risk using a value at risk approach. These measures are considered when deciding whether significant changes in investment strategy are required. Asset-liability studies are conducted on a periodic basis for the main pension plans to determine the optimal investment mix bearing in mind the Group's tolerance for risk, the risk tolerance of the local sponsor companies and the views of the pension committees and trustee boards who are legally responsible for the investments of the plans. In Canada, the UK and Switzerland the Group works with the trustees to ensure that the investment policy adopted is consistent with the Group's tolerance for risk. In the US the Group has direct control over the investment policy, subject to local investment regulations.

The proportions of the total fair value of assets in the pension plans for each asset class at the balance sheet date were:

	2016		2015	
Equities	***36.8%***		*37.7%*	
– Quoted		**32.5%**		33.3%
– Private		**4.3%**		4.4%
Bonds	***47.9%***		*48.0%*	
– Government fixed income		**11.3%**		13.5%
– Government inflation-linked		**12.0%**		12.8%
– Corporate and other publicly quoted		**22.3%**		20.8%
– Private		**2.3%**		0.9%
Property	***11.0%***		*10.8%*	
– Quoted property funds		**5.8%**		6.5%
– Unquoted property funds		**5.2%**		4.3%
Qualifying insurance policies	***0.6%***		*0.6%*	
Cash & other	***3.7%***		*2.9%*	
	100.0%		*100.0%*	

The assets of the plans are managed on a day-to-day basis by external specialist fund managers. These managers may invest in the Group's securities subject to limits imposed by the relevant fiduciary committees and local legislation. The approximate total holding of Group securities within the plans is US$16 million (2015: US$23 million).

The holdings of quoted equities are invested either in pooled funds or segregated accounts held in the name of the relevant pension funds. These equity portfolios are well diversified in terms of the geographic distribution and market sectors.

The holdings of government bonds are generally invested in the debt of the country in which a pension plan is situated. Corporate and other quoted bonds are usually of investment grade. Private debt is mainly in North America.

45 Post-retirement benefits continued

The quoted property funds are invested in a diversified range of properties.

The holdings of cash & other are predominantly cash and short-term money market instruments.

Investments in private equity, private debt, and property are less liquid than the other investment classes listed above and therefore the Group's investment in those asset classes is restricted to a level that does not endanger the liquidity of the pension plans.

The Group does not currently utilise derivatives to manage risk in its pension plans. However, fund managers may use derivatives to hedge currency movements within their portfolios and, in the case of bond managers, to take positions that could be taken using direct holdings of bonds but more efficiently.

Maturity of defined benefit obligations

An approximate analysis of the maturity of the obligations is given in the table below:

	Pension benefits	Other benefits	**2016 Total %**	2015 Total %	2014 Total %
Proportion relating to current employees	22%	18%	**21%**	22%	25%
Proportion relating to former employees not yet retired	12%	2%	**12%**	11%	11%
Proportion relating to retirees	66%	80%	**67%**	67%	64%
Total	100%	100%	**100%**	100%	100%
Average duration of obligations (years)	14.4	13.2	**14.3**	13.4	13.9

Geographical distribution of defined benefit obligations

An approximate analysis of the geographic distribution of the obligations is given in the table below:

	Pension benefits	Other benefits	**2016 Total %**	2015 Total %	2014 Total %
Canada	47%	42%	**46%**	44%	46%
UK	28%	2%	**27%**	29%	27%
US	13%	54%	**16%**	15%	15%
Switzerland	6%	0%	**5%**	6%	5%
Eurozone	4%	0%	**4%**	4%	4%
Other	2%	2%	**2%**	2%	3%
Total	100%	100%	**100%**	100%	100%

Total expense recognised in the income statement

	Pension benefits	Other benefits	**2016 Total US$m**	2015 Total US$m	2014 Total US$m
Current employer service cost for defined benefit plans	(148)	(10)	**(158)**	(184)	(196)
Past service income	–	–	**–**	144	66
Curtailment gains/(losses)	1	4	**5**	13	(1)
Settlement gains	–	–	**–**	11	22
Net interest on net defined benefit liability	(55)	(35)	**(90)**	(113)	(133)
Non-investment expenses paid from the plans	(22)	–	**(22)**	(21)	(19)
Total defined benefit expense	(224)	(41)	**(265)**	(150)	(261)
Current employer service cost for defined contribution and industry-wide plans	(255)	(2)	**(257)**	(289)	(329)
Total expense recognised in the income statement	(479)	(43)	**(522)**	(439)	(590)

The above expense amounts are included as an employee cost within net operating costs. In 2016, US$nil (pre-tax) of curtailment and settlement gains have been excluded from underlying earnings (2015: US$nil; 2014: US$2 million relating to divestments).

The curtailments shown in the table above relate primarily to headcount reductions at various operations. The settlement gains in 2015 and 2014 relate mainly to an exercise in the US in which deferred vested participants were offered a one-time lump sum payment in place of their future pension payments. The past service income in 2015 relates to design changes in Canada and to changes to post-retirement medical plans in the US. The past service income during 2014 relates to design changes to post-retirement medical plans in the US.

Total amount recognised in other comprehensive income before tax

	2016 US$m	2015 US$m	2014 US$m
Actuarial (losses)/gains	**(1,120)**	548	(1,853)
Return on assets (net of interest on assets)	**1,031**	79	1,127
Loss on application of asset ceiling	**(1)**	(8)	(9)
Total (loss)/gain recognised in other comprehensive income	**(90)**	619	(735)

Amounts recognised in the balance sheet

The following amounts were measured in accordance with IAS 19 at 31 December:

	Pension benefits	Other benefits	**2016 Total US$m**	2015 Total US$m
Total fair value of plan assets	13,749	–	**13,749**	13,642
Present value of obligations – funded	(14,504)	–	**(14,504)**	(14,443)
Present value of obligations – unfunded	(798)	(926)	**(1,724)**	(1,680)
Present value of obligations – total	(15,302)	(926)	**(16,228)**	(16,123)
Effect of asset ceiling	(63)	–	**(63)**	(49)
Net deficit to be shown in the balance sheet	(1,616)	(926)	**(2,542)**	(2,530)
Comprising:				
– Deficits	(2,241)	(926)	**(3,167)**	(3,122)
– Surpluses	625	–	**625**	592
Net deficits on pension plans	(1,616)	–	(1,616)	(1,668)
Unfunded post-retirement healthcare obligation	–	(926)	**(926)**	(862)

The surplus amounts shown above are included in the balance sheet as Trade and other receivables. See note 18.

Deficits are shown in the balance sheet within Provisions (including post-retirement benefits). See note 26.

Funding policy and contributions to plans

The Group reviews the funding position of its major pension plans on a regular basis and considers whether to provide funding above the minimum level required in each country. In Canada and the US the minimum level is prescribed by legislation. In the UK and Switzerland the minimum is negotiated with the local trustee or foundation in accordance with the funding guidance issued by the local regulators. In deciding whether to provide funding above the minimum level the Group takes into account other possible uses of cash within the Group, the tax situation of the local sponsoring entity and any strategic advantage that the Group might obtain by accelerating contributions. The Group does not generally pre-fund post-retirement healthcare arrangements.

	Pension benefits	Other benefits	**2016 Total US$m**	**2015 Total US$m**	2014 Total US$m
Contributions to defined benefit plans	408	56	**464**	**328**	353
Contributions to defined contribution plans	238	2	**240**	**272**	310
Contributions to industry-wide plans	17	–	**17**	**17**	19
Total	663	58	**721**	**617**	682

Contributions to defined benefit pension plans are kept under regular review and actual contributions will be determined in line with the Group's wider financing strategy, taking into account relevant minimum funding requirements. As contributions to many plans are reviewed on at least an annual basis, the contributions for 2017 and subsequent years cannot be determined precisely in advance. Most of the Group's largest pension funds are fully funded on their local funding basis and do not require long term funding commitments at present. Contributions to defined benefit plans for 2017 are estimated to be around US$480 million but may be higher or lower than this depending on the evolution of financial markets and voluntary funding decisions taken by the Group. Contributions for subsequent years are expected to be at similar levels. Healthcare plans are generally unfunded and contributions for future years will be equal to benefit payments net of participant contributions. The Group's contributions are expected to be similar to the amounts paid in 2016.

Movements in the net defined benefit liability

A summary of the movement in the net defined benefit liability is shown in the first table below. The subsequent tables provide a more detailed analysis of the movements in the present value of the obligations, the fair value of assets and the effect of the asset ceiling.

The amounts shown below include, where appropriate, 100 per cent of the costs, contributions, gains and losses in respect of employees who participate in the plans and who are employed in associates and joint arrangements. Consequently, the costs, contributions, gains and losses may not correspond directly to the amounts disclosed above in respect of the Group. Defined contribution plans and industry-wide plans are excluded from the movements below.

	Pension benefits	Other benefits	**2016 Total US$m**	2015 Total US$m
Change in the net defined benefit liability				
Net defined benefit liability at the start of the year	(1,668)	(862)	**(2,530)**	(3,733)
Amounts recognised in Income	(224)	(41)	**(265)**	(150)
Amounts recognised in Other comprehensive income	(21)	(69)	**(90)**	619
Employer contributions	408	56	**464**	328
Arrangements divested	(8)	–	**(8)**	25
Currency exchange rate (loss)/gain	(103)	(10)	**(113)**	381
Net defined benefit liability at the end of the year	(1,616)	(926)	**(2,542)**	(2,530)

Notes to the 2016 financial statements
continued

45 Post-retirement benefits continued

	Pension benefits	Other benefits	2016 Total US$m	2015 Total US$m
Change in present value of obligation				
Present value of obligation at the start of the year	(15,261)	(862)	**(16,123)**	(18,899)
Current employer service costs	(148)	(10)	**(158)**	(184)
Past service income	–	–	**–**	144
Curtailments	1	4	**5**	13
Settlements	–	–	**–**	52
Interest on obligation	(542)	(35)	**(577)**	(615)
Contributions by plan participants	(23)	–	**(23)**	(28)
Benefits paid	911	56	**967**	995
Experience gain/(loss)	165	(26)	**139**	107
Changes in financial assumptions (loss)/gain	(1,153)	(34)	**(1,187)**	446
Changes in demographic assumptions loss	(63)	(9)	**(72)**	(5)
Arrangements divested	86	–	**86**	46
Currency exchange rate gain/(loss)	725	(10)	**715**	1,805
Present value of obligation at the end of the year	(15,302)	(926)	**(16,228)**	(16,123)

	Pension benefits	Other benefits	2016 Total US$m	2015 Total US$m
Change in plan assets				
Fair value of plan assets at the start of the year	13,642	–	**13,642**	15,219
Settlements	–	–	**–**	(41)
Interest on assets	492	–	**492**	506
Contributions by plan participants	23	–	**23**	28
Contributions by employer	408	56	**464**	328
Benefits paid	(911)	(56)	**(967)**	(995)
Non-investment expenses	(22)	–	**(22)**	(21)
Return on plan assets (net of interest on assets)	1,031	–	**1,031**	79
Arrangements divested	(94)	–	**(94)**	(21)
Currency exchange rate loss	(820)	–	**(820)**	(1,440)
Fair value of plan assets at the end of the year	13,749	–	**13,749**	13,642

	Pension benefits	Other benefits	2016 Total US$m	2015 Total US$m
Change in the effect of the asset ceiling				
Effect of the asset ceiling at the start of the year	(49)	–	**(49)**	(53)
Interest on the effect of the asset ceiling	(5)	–	**(5)**	(4)
Movement in the effect of the asset ceiling	(1)	–	**(1)**	(8)
Currency exchange rate (loss)/gain	(8)	–	**(8)**	16
Effect of the asset ceiling at the end of the year	(63)	–	**(63)**	(49)

In determining the extent to which the asset ceiling has an effect, the Group considers the funding legislation in each country and the rules specific to each pension plan. The calculation takes into account any minimum funding requirements that may be applicable to the plan, whether any reduction in future Group contributions is available, and whether a refund of surplus may be available. In considering whether any refund of surplus is available the Group considers the powers of trustee boards and similar bodies to augment benefits or wind up a plan. Where such powers are unilateral, the Group does not consider a refund to be available at the end of the life of a plan. Where the plan rules and legislation both permit the employer to take a refund of surplus, the asset ceiling may have no effect, although it may be the case that a refund will only be available many years in the future.

Main assumptions (rates per annum)

The main assumptions for the valuations of the plans under IAS 19 are set out below.

	Canada	UK	US	Switzerland	Eurozone
At 31 December 2016					
Discount rate	3.8%	2.6%	3.9%	0.6%	1.4%
Inflation [(a)]	1.9%	3.3%	2.1%	1.0%	1.6%
Rate of increase in pensions	0.4%	2.9%	0.0%	0.0%	1.4%
Rate of increase in salaries	3.2%	3.7%	3.6%	2.0%	2.4%
At 31 December 2015					
Discount rate	3.9%	3.7%	4.2%	0.8%	2.1%
Inflation [(a)]	1.7%	3.0%	2.1%	1.1%	1.7%
Rate of increase in pensions	0.4%	2.6%	0.0%	0.0%	1.6%
Rate of increase in salaries	3.0%	3.7%	3.6%	2.1%	2.3%

(a) The inflation assumption shown for the UK is for the Retail Price Index. The assumption for the Consumer Price Index at 31 December 2016 was 2.2 per cent (2015: 2.0 per cent).

The main financial assumptions used for the healthcare plans, which are predominantly in the US and Canada, were: discount rate: 3.9 per cent (2015: 4.1 per cent); medical trend rate: 9.1 per cent reducing to 5.1 per cent by the year 2025 broadly on a straight-line basis (2015: 8.4 per cent, reducing to 5.1 per cent by the year 2023); claims costs based on individual company experience.

For both the pension and healthcare arrangements the post-retirement mortality assumptions allow for future improvements in longevity. The mortality tables used imply that a man aged 60 at the balance sheet date has a weighted average expected future lifetime of 26 years (2015: 26 years) and that a man aged 60 in 2036 would have a weighted average expected future lifetime of 28 years (2015: 28 years).

Sensitivity

The values reported for the defined benefit obligations are sensitive to the actuarial assumptions used for projecting future benefit payments and discounting those payments. In order to estimate the sensitivity of the obligations to changes in assumptions, we calculate what the obligations would be if we were to make small changes to each of the key assumptions in isolation. The difference between this figure and the figure calculated using our stated assumptions is an indication of the sensitivity to changes in each assumption. The results of this sensitivity analysis are summarised in the table below. Note that this approach is valid for small changes in the assumptions but will be less accurate for larger changes in the assumptions. The sensitivity to inflation includes the impact on pension increases, which are generally linked to inflation where they are granted.

		2016		2015	
		Approximate (increase)/decrease in obligations		Approximate (increase)/decrease in obligations	
Assumption	**Change in assumption**	**Pensions US$m**	**Other US$m**	Pensions US$m	Other US$m
Discount rate	Increase of 0.5 percentage points	**1,031**	**57**	960	50
	Decrease of 0.5 percentage points	**(1,107)**	**(61)**	(1,025)	(54)
Inflation	Increase of 0.5 percentage points	**(536)**	**(19)**	(505)	(17)
	Decrease of 0.5 percentage points	**507**	**17**	481	14
Salary increases	Increase of 0.5 percentage points	**(77)**	**(3)**	(77)	(2)
	Decrease of 0.5 percentage points	**75**	**2**	75	2
Demographic – allowance for future improvements in longevity	Participants assumed to have the mortality rates of individuals who are one year older	**481**	**20**	435	15
	Participants assumed to have the mortality rates of individuals who are one year younger	**(481)**	**(20)**	(435)	(15)
Medical costs trend rates	Increase of 1.0 percentage points	**–**	**(37)**	–	(31)
	Decrease of 1.0 percentage points	**–**	**31**	–	26

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46 Rio Tinto Limited parent company disclosures

As at 31 December	2016 A$m	2015 A$m
Assets		
Current assets	**8,041**	6,034
Non-current assets	**10,758**	11,525
Total assets	**18,799**	17,559
Liabilities		
Current liabilities	**(1,268)**	(616)
Non-current liabilities	**(4,814)**	(4,833)
Total liabilities	**(6,082)**	(5,449)
Net assets	**12,717**	12,110
Shareholders' equity		
Share capital	**4,004**	4,004
Other reserves	**413**	373
Retained earnings	**8,300**	7,733
Total equity	**12,717**	12,110
Profit of the parent company	**4,452**	6,532
Total comprehensive income of the parent company	**4,452**	6,532

Prepared under Australian Accounting Standards (AAS). In relation to Rio Tinto Limited there are no significant measurement differences between AAS and IFRS as defined in note 1.

Rio Tinto Limited guarantees

Rio Tinto Limited provides a number of guarantees in respect of Group companies.

Rio Tinto plc and Rio Tinto Limited have jointly guaranteed the Group's external listed debt under the US Shelf Programme, European Debt Issuance Programme and Commercial Paper Programme which totalled A$14.1 billion at 31 December 2016 (31 December 2015: A$26.6 billion); in addition these entities also jointly guarantee the Group's undrawn credit facility which was A$10.4 billion at 31 December 2016 (31 December 2015: A$10.3 billion).

Rio Tinto Limited has guaranteed other external debt held by Rio Tinto Group entities which totalled A$0.1 billion at 31 December 2016 (31 December 2015: A$0.1 billion) and provided guarantees in respect of certain derivative contracts which were in a liability position of A$1 million at 31 December 2016 (31 December 2015: A$18 million).

In addition, Rio Tinto Limited has provided a guarantee of certain obligations, including contingent obligations, of Rio Tinto Finance Limited, a wholly owned subsidiary.

Pursuant to the DLC Merger, both Rio Tinto plc and Rio Tinto Limited issued deed poll guarantees by which each company guaranteed contractual obligations incurred by the other or guaranteed by the other.

47 Related undertakings

The following tables outline the Group's subsidaries, associated undertakings and joint ventures as defined in Regulation 7 of the UK Companies Act 2006. All subsidaries are included in the Group Consolidation.

Name of undertaking and country of incorporation	Share class	% of share class held by Group companies	Registered office address
10029734 Canada Inc.; Canada	CAD$1.00 Common shares	100	400-1190 Avenue des Canadiens-de-Montréal, Montreal Québec H3B 0E3, Canada
1043802 Ontario Ltd; Canada	CAD Ordinary shares	100	66 Wellington Street West, Suite 4700, Toronto Dominion Bank Tower, Toronto ON M5K 1E6, Canada
46106 YUKON INC.; Canada	CAD Ordinary shares	100	200-204 Lambert Street, Whitehorse YT Y1A 3T2, Canada
46117 YUKON INC.; Canada	CAD Ordinary shares	100	200-204 Lambert Street, Whitehorse YT Y1A 3T2, Canada
	CAD Preferred shares	100	
535630 YUKON INC.; Canada	CAD Common shares	100	c/o Macdonald & Company, 200-204 Lambert Street, Whitehorse YT Y1A 3T2, Canada
	CAD Preferred shares	100	
7999674 CANADA INC.; Canada	CAD Common shares	100	400-1190 Avenue des Canadiens-de-Montréal, Montreal Québec H3B 0E3, Canada
9230556 CANADA INC.; Canada	CAD Common shares	100	400-1190 Avenue des Canadiens-de-Montréal, Montreal Québec H3B 0E3, Canada
	CAD Preferred shares	100	
9539549 CANADA INC.; Canada	USD Common shares	100	400-1190 Avenue des Canadiens-de-Montréal, Montreal Québec H3B 0E3, Canada
AGM Holding Company Pte Ltd; Singapore	USD Ordinary shares	100	77 Robinson Road, #13-00, Robinson 77, 068896, Singapore
Alcan Alumina Ltda.; Brazil	BRL1.00 Quota shares	100	Avenida Engenheiro Emiliano Macieira, 1—km 18, Pedrinhas, Sao Luis, MA, 65095-603, Brazil
Alcan Asia Limited; Hong Kong	HKD Ordinary shares	100	Suite 2802, 28/F, Lippo Centre Tower 2, 89 Queensway, Admiralty, Hong Kong
Alcan Betriebs- und Verwaltungsgesellschaft GmbH; Germany	€51.13 Ordinary shares	100	Alusingenplatz 1, D-78221, Singen, Germany
Alcan Chemicals Limited; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Alcan Composites Brasil Ltda; Brazil	BRL0.01 Ordinary shares	100	Avenida das Nações Unidas, 10.989, 14th floor, Suite 141, São Paulo, 04578-000, Brazil
Alcan Corporation; United States	US$0.01 Ordinary shares	100	Corporation Service Company, 211 East 7th Street, Suite 620, Austin TX 78701-3218, United States
Alcan Farms Limited; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Alcan Finances USA LLC; United States	US$1,000.00 Ordinary shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Alcan Gove Development Pty Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Alcan Gove Pty Limited; Australia	AUD Class A shares	100	123 Albert Street, Brisbane QLD 4000, Australia
	AUD Class B shares	100	
Alcan Gove Superannuation Pty Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Alcan Holdings Australia Pty Limited; Australia	AUD Class A shares	100	123 Albert Street, Brisbane QLD 4000, Australia
	AUD Ordinary shares	100	
Alcan Holdings Europe B.V.; Netherlands	€455.00 Ordinary shares	100	Aluminiumstraat 1, 4823 AL Breda P.O. Box 3408, 4800 DK Breda, The Netherlands
Alcan Holdings Nederland B.V.; Netherlands	€4,555.00 Ordinary shares	100	Aluminiumstraat 1, 4823 AL Breda P.O. Box 3408, 4800 DK Breda, The Netherlands
Alcan Holdings Switzerland AG (SA/Ltd.); Switzerland	CHF0.01 Registered shares	100	Max Hoegger-Strasse 6, P.O. Box 1954, CH-8048 Zürich, Switzerland
Alcan International Network U.S.A. Inc.; United States	USD Ordinary shares	100	CSC, 80 State Street, Albany NY 12207-2543, United States
Alcan Lebensmittelverpackungen GmbH; Germany	€51.13 Ordinary shares	100	Alusingenplatz 1, D-78221, Singen, Germany
Alcan Management Services (Shanghai) Co., Ltd.; China	US$1.00 Ordinary shares	100	Unit E, 40F Wheelock Square, No. 1717 West Nanjing Road, Jing'an District, Shanghai, 200040, China
Alcan Management Services Canada Limited/Societe de Services de Gestion Alcan Canada Limitee; Canada	CAD Ordinary shares	100	400-1190 Avenue des Canadiens-de-Montréal, Montreal Québec H3B 0E3, Canada
Alcan Northern Territory Alumina Pty Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Alcan Packaging Canada Limited; Canada	CAD Ordinary shares	100	McCarthy Tetrault LLP, c/o Joanne Pierucci, Suite 5300 Toronto Dominion Bank Tower, Toronto ON M5K 1E6, Canada

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47 Related undertakings continued

Name of undertaking and country of incorporation	Share class	% of share class held by Group companies	Registered office address
Alcan Packaging Mühltal Gmbh & Co. KG; Germany	€51.13 Ordinary shares	100	Alusingenplatz 1, D-78221, Singen, Germany
Alcan Primary Metal Australia Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Alcan Primary Products Company LLC; United States	USD Units shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Alcan Primary Products Corporation; United States	US$0.01 Ordinary shares	100	CSC, 211 East 7th Street, Suite 620, Austin TX 78701-3218, United States
Alcan Realty Limited/Societe Immobiliere Alcan Limitee; Canada	CAD Ordinary shares	100	400-1190 Avenue des Canadiens-de-Montréal, Montreal Québec H3B 0E3, Canada
Alcan South Pacific Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Alcan Trading AG (SA/Ltd.); Switzerland	CHF1000 Registered shares	100	Max Hoegger-Strasse 6, P.O. Box 1852, CH-8048 Zürich, Switzerland
Aluminium Dunkerque; France	€16.00 Ordinary shares	100	17 Place des Reflets, La Defense 2, 92400, Courbevoie, France
Aluminium Pechiney; France	€16.00 Ordinary shares	100	725 rue Aristide Bergès, 38341 Voreppe Cedex, France
Aluminum Company of Canada Limited/Aluminium du Canada Limitee; Canada	CAD Ordinary shares	100	400-1190 Avenue des Canadiens-de-Montréal, Montreal Québec H3B 0E3, Canada
AML Exploration Pty Limited; Australia[g]	AUD Ordinary shares	100	37 Belmont Avenue, Belmont WA 6104, Australia
AML Properties Pty Ltd; Australia	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Anglesey Aluminium Limited; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Anglesey Aluminium Metal Limited; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
AP Service; France	€15.00 Ordinary shares	100	725 rue Aristide Bergès, 38341 Voreppe Cedex, France
Argyle Diamond Mines Pty Limited; Australia	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Argyle Diamonds (2013) Ltd; Australia	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Argyle Diamonds Limited; Australia	AUD Class A shares AUD Class B shares	100 100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Ashton Canada Pty Limited; Australia	AUD Ordinary shares	100	37 Belmont Avenue, Belmont WA 6104, Australia
Ashton Mining Pty Ltd; Australia	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Ashton Nominees Pty Limited; Australia	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Asia Gold Mongolia LLC; Mongolia	MNT1,250.00 Common shares	100	Suite 201, Seoul Business ctr, Zaluuchuud Av.26, 1s khoroo, Bayanzurkh district, Ulaanbaatar, 13380, Mongolia
Asia Naran Bulag LLC; Mongolia	MNT1,000.00 Common shares	100	suite 201, Seoul Business ctr. Zaluuchuud Av.26, 1s khoroo, Bayanzurkh district, Ulaanbaatar, 13380, Mongolia
Australian Coal Holdings Pty. Limited; Australia[a]	AUD A shares AUD Ordinary shares	100 100	123 Albert Street, Brisbane QLD 4000, Australia
Australian Coal Resources Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Australian Mining & Smelting Pty Ltd; Australia[a]	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
Balkhash Saryshagan LLP; Kazakhstan[c]	–	100	Dostyk 310/G, Almaty, 050020, Kazakhstan
Baume Pty. Limited; Australia[a][g]	AUD Ordinary shares	100	Level 27, Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Beasley River Management Pty Limited; Australia	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Beasley River Mining Pty Limited; Australia	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Bektau B.V.; Netherlands	€200.00 Ordinary shares	75	Aluminiumstraat 1, 4823 AL Breda P.O. Box 3408, 4800 DK Breda, The Netherlands, the Netherlands
Black Hill Land Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Borax España, S.A.; Spain	€150.00 Ordinary shares	100	CN 340, Km 954, 12520 NULES, Castellon, Spain
Borax Europe Limited; United Kingdom	£0.25 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom

Name of undertaking and country of incorporation	Share class	% of share class held by Group companies	Registered office address
Borax Francais; France	€2.75 Ordinary shares	100	89 Route de Bourbourg, 59210, Coudekerque-Branche, France
Borax Malaysia Sdn Bhd; Malaysia	MYR1.00 Ordinary shares	100	Level 7, Menara Milenium, Jalan Damanlela, Pusat Bandar Damansara, Damansara Heights 50490 Kuala Lumpur, Malaysia
Borax Rotterdam N.V.; Netherlands	€453.78 Ordinary shares	100	Welplaatweg 104, 3197KS, ROTTERDAM – BOTLEK, Netherlands
British Alcan Aluminium Plc; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Canning Resources Pty Limited; Australia[a]	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
Capricorn Diamonds Investments Pty Limited; Australia	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Carol Lake Company Ltd.; Canada	CAD$100.00 Ordinary shares	100	400-1190 Avenue des Canadiens-de-Montréal, Montreal Québec H3B 0E3, Canada
Catherine Hill Bay Land Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Cathjoh Holdings Pty Limited; Australia	AUD Ordinary shares	100	Pacific Aluminium, Level 3, 500 Queen Street, Brisbane QLD 4000, Australia
Champlain Reinsurance Company Ltd.; Switzerland	CHF1.23 Registered shares	100	Max Hoegger-Strasse 6, P.O. Box 1852, CH-8048 Zürich, Switzerland
Channar Finance Limited; Australia[g]	AUD Class B shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Channar Financial Services Pty Ltd; Australia[g]	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Channar Investment Nominee Pty Limited; Australia[g]	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Channar Management Services Pty Limited; Australia	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Channar Mining Pty Ltd; Australia	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Channar Security Pty Limited; Australia[g]	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Chlor Alkali Unit Pte Ltd; Singapore	SGD$1.00 Ordinary (SGD) shares	100	12 Marina Boulevard, #20-01 Marina Bay Financial Centre Tower 3, Singapore, 018982, Singapore
	US$1.00 Ordinary (USD) shares	68.4	
CIA. Inmobiliaria e Inversiones Cosmos S.A.C.; Peru	PEN1,000.00 Ordinary shares	100	Av. Santa Maria No. 110 Urb. Miraflores – MIRAFLORES – LIMA, Peru
CNA Bengalla Investments Pty Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
CNA Investments (UK) Pty Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
CNA Resources Holdings Pty Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
CNA Resources Limited; Australia	AUD "A" Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
	AUD "B" Ordinary shares	100	
CNA Sub Holdings Pty Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
CNA UK Limited; United Kingdom[g]	US$0.01 Ordinary bearer shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
CNA Warkworth Australasia Pty Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
CNA Warkworth Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Coal & Allied Industries Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Coal & Allied Mining Services Pty Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Coal & Allied Operations Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Compagnie Générale D'électrolyse Du Palais; France	€0.94 Ordinary shares	100	17 Place des Reflets, La Defense 2, 92400, Courbevoie, France
Compania de Transmision Sierraoriente S.A.C.; Peru	PEN1,000.00 Ordinary shares	100	Av. Santa Maria No. 110 Urb. Miraflores – MIRAFLORES – LIMA, Peru
Corporation De Pêche Ste-Marguerite Inc.; Canada	CAD$10.00 Ordinary shares	96.8	400-1190 Avenue des Canadiens-de-Montréal, Montreal Québec H3B 0E3, Canada
CRA Exploration (India) Private Limited; India	INR10.00 Ordinary shares	99.9	Apartment No.100 A/5, Ground Floor, The Capital Court, Olof Palme Marg, Munirka, NEW DELHI 110067, India
CRA Investments Pty. Limited; Australia	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
CRA Pty Ltd; Australia[a]	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia

Notes to the 2016 financial statements
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47 Related undertakings continued

Name of undertaking and country of incorporation	Share class	% of share class held by Group companies	Registered office address
Dampier Salt Limited; Australia	AUD Ordinary ($1.00257) shares	68.4	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
	AUD Ordinary ($1.88 on 31/01/2013) shares	68.4	
Darex Capital, Inc.; Panama[g]	US$0.01 Par value one cent shares	100	Plaza Bancomer Building, 50th Street Apartedo 6307, Panama 5, Panama
Daybreak Development LLC; United States	US$0.01 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Daybreak Property Holdings LLC; United States[c]	–	–	CSC, 15 West South Temple, Suite 1701, Salt Lake City UT 84101, United States
Daybreak Secondary Water Distribution Company; United States	US$0.01 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Daybreak Water Holding LLC; United States	US$0.01 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
DB Medical I LLC; United States	USD Units shares	100	CSC, 15 West South Temple, Suite 1701, Salt Lake City UT 84101, United States
DBVC1 LLC; United States[c]	–	–	CSC, 15 West South Temple, Suite 1701, Salt Lake City UT 84101, United States
Diavik Diamond Mines (2012) Inc.; Canada	CAD Common shares	100	300-5201 50th Avenue, PO Box 2498, Yellowknife NT X1A 2P8, Canada
Dolphin Properties Pty. Ltd.; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
East Kalimantan Coal Pte. Ltd; Singapore[a]	SGD1.00 Ordinary shares	100	12 Marina Boulevard, #20-01 Marina Bay Financial Centre Tower 3, Singapore, 018982, Singapore
	US$1.00 Ordinary shares	100	
Eastland Management Inc.; United States	US$1.00 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Electric Power Generation Limited; New Zealand[a]	NZD1 Ordinary shares	100	Level 6, 109 Featherston Street, Wellington, 6011, New Zealand
Emirates Energy Limited; United Kingdom[g]	US$1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Energy Resources of Australia Ltd; Australia	AUD A Class ordinary shares	68.4	C/- Mallesons Stephen Jacques, 60 Marcus Clarke Street, Canberra ACT, Australia
Falcon Insurance Ltd; Malta[a]	US$1.00 Class "A" ordinary shares	100	No 7, 4th Floor, Block C, Skyway Offices, 179 Marina Street, Pieta , PTA 9042, Malta
	US$1.00 Class "B" shares	100	
Flambeau Mining Company; United States	US$0.01 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Fundsprops Pty. Limited; Australia[a]	AUD A Class ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
Gladstone Infrastructure Pty Ltd; Australia	AUD Class G Redeemable Preference shares	100	123 Albert Street, Brisbane QLD 4000, Australia
	AUD A Class ordinary shares	100	
Gove Aluminium Ltd; Australia	AUD A Non redeemable preference shares	100	123 Albert Street, Brisbane QLD 4000, Australia
	AUD A Redeemable preference shares	100	123 Albert Street, Brisbane QLD 4000, Australia
	AUD A Class ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
GPS Energy Pty Limited; Australia	AUD A Class ordinary shares	100	Pacific Aluminium, Level 3, 500 Queen Street, Brisbane QLD 4000, Australia
GPS Nominee Pty Limited; Australia	AUD A Class ordinary shares	100	Pacific Aluminium, Level 3, 500 Queen Street, Brisbane QLD 4000, Australia
GPS Power Pty. Limited; Australia	AUD A Class ordinary shares	100	Pacific Aluminium, Level 3, 500 Queen Street, Brisbane QLD 4000, Australia
Gulf Power Company/La Compagnie Gulf Power; Canada	CAD$100.00 Ordinary shares	100	400-1190 Avenue des Canadiens-de-Montréal, Montreal Québec H3B 0E3, Canada
Gumala Advisory Company Pty Ltd; Australia[g]	AUD A Class ordinary shares	51	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Gwandalan Land Pty Ltd; Australia	AUD A Class ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Hail Creek Coal Pty Ltd; Australia	AUD A Class ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Hail Creek Marketing Pty Ltd; Australia	AUD A Class ordinary shares	82	123 Albert Street, Brisbane QLD 4000, Australia
Hamersley Associated Investments Pty Limited; Australia[g]	AUD A Class ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Hamersley Exploration Pty Limited; Australia	AUD A Class ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia

Name of undertaking and country of incorporation	Share class	% of share class held by Group companies	Registered office address
Hamersley HMS Pty Ltd; Australia	AUD A Class ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Hamersley Holdings Limited; Australia[(a)]	AUD A Class ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Hamersley Iron – Yandi Pty Limited; Australia[(a)]	AUD Class B shares AUD Class C shares AUD Ordinary shares	100 100 100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Hamersley Iron Pty Limited; Australia	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Hamersley Resources Limited; Australia	AUD Ordinary shares AUD Z Class ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Hamersley WA Pty Ltd; Australia	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Henlopen Manufacturing Co., Inc.; United States	US$100.00 Ordinary shares	100	CSC, 80 State Street, Albany NY 12207-2543, United States
Heruga Exploration LLC; Mongolia	MNT12,500.00 Common shares	100	suite 201, Seoul Business ctr, Zaluuchuud av.26,1st khoroo, Ulaanbaatar, Bayanzurkh district, 13380, Mongolia
High Purity Iron Inc.; United States	US$1.00 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
HImet Corporation Pty Limited; Australia[(a)(g)]	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
HIsmelt (Operations) Pty Ltd; Australia[(g)]	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
HIsmelt Corporation Pty Limited; Australia	AUD A Class shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Hope Downs Marketing Company Pty Ltd; Australia	AUD A Class shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Howmet Insurance Company, Inc.; United States	US$1.00 Ordinary shares	100	CSC, 159 State Street, Montpelier VT 05602
Hunter Valley Resources Pty Ltd; Australia	AUD A Class shares AUD B Class shares	100 100	123 Albert Street, Brisbane QLD 4000, Australia
HV Operations Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
HVO Coal Sales Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
IAL Holdings Singapore Pte Ltd; Singapore	USD Ordinary shares	100	77 Robinson Road, #13-00, Robinson 77, 068896, Singapore
IEA Coal Research Limited; United Kingdom	£1.00 Ordinary shares	100	Park House, 14 Northfields, London, SW18 1DD, United Kingdom
IEA Environmental Projects Limited; United Kingdom	£1.00 Ordinary shares	100	Park House, 14 Northfields, London, SW18 1DD, United Kingdom
IGP Holding Company Ltd; Virgin Islands, British	USD Ordinary shares	100	Midocean Chambers, Road Town, Tortola, Virgin Islands, British
Industrias Metalicas Castello S.A.; Spain	€6.01 Ordinary shares	100	Calle Tuset 10, 08006, Barcelona, Catalogna, Spain
Integrity Land and Cattle LLC; United States	USD Units shares	100	CSC, 2338 W. Royal Palm Road, Suite J, Phoenix AZ 85021
Iron Ore Company of Canada; United States	US$1,000.00 Series A shares US$1,000.00 Series E shares US$1,000.00 Series F shares	91.4 100 100	2711 Centerville Road, Suite 400, Wilmington Delaware 19808
Itallumina Srl; Italy[(g)]	€1.00 Quotas shares	100	Viale Castro Pretorio 122, 00185, Roma, Italy
Johcath Holdings Pty Limited; Australia	AUD Ordinary shares	100	Pacific Aluminium, Level 3, 500 Queen Street, Brisbane QLD 4000, Australia
Juna Station Pty Ltd; Australia	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Kalamah Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Kalimantan Gold Pty Limited; Australia	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia

47 Related undertakings continued

Name of undertaking and country of incorporation	Share class	% of share class held by Group companies	Registered office address
Kalteng Pty. Ltd; Australia[a]	AUD A Class ordinary shares	100	37 Belmont Avenue, Belmont WA 6104, Australia
	AUD1.00 Class B (Fully paid $1.00 13/01/2003)	100	
	AUD1.00 Class B (Paid to $0.12 02/09/2005)	100	
	AUD Ordinary shares	100	
Kelian Investment Limited; Virgin Islands, British[c]	–	–	Woodbourne Hall, Road Town, Tortola, British Virgin Islands
Kelian Pty. Limited; Australia	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
Kembla Coal & Coke Pty. Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Kennecott Barneys Canyon Mining Company; United States	US$0.01 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Kennecott Exploration Company; United States	US$0.01 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Kennecott Exploration Mexico, S.A. de C.V.; Mexico	MXN1,000.00 Ordinary shares	100	Felix Berenguer 125 – 4, Col. Lomas Virreyes, Distrito Federal, 11000, Mexico
Kennecott Holdings Corporation; United States	US$0.01 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Kennecott Land Company; United States	US$0.01 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Kennecott Land Investment Company LLC; United States[c]	–	–	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Kennecott Molybdenum Company; United States	US$0.01 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Kennecott Nevada Copper Company; United States	US$0.01 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Kennecott Ridgeway Mining Company; United States	US$0.01 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Kennecott Royalty Company; United States	US$100.00 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Kennecott Services Company; United States	US$0.01 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Kennecott Uranium Company; United States	US$0.01 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Kennecott Utah Copper LLC; United States	USD Units shares	100	CSC, 15 West South Temple, Suite 1701, Salt Lake City UT 84101, United States
Kennecott Water Distribution LLC; United States	USD Ordinary shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Kestrel Coal Pty Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Kestrel Coal Sales Pty Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Kirganik LLC; Russian Federation[c]	–	–	2, 23 Liniya, Vasilievsky Ostrov, 199106, St. Petersburg, Russian Federation
Korgantas LLP; Kazakhstan[c]	–	–	Dostyk 310/G, Almaty, 050020, Kazakhstan
Kutaibar Holdings Pty Ltd; Australia[a]	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
Lao Sanxai Minerals Company Limited; Lao People's Democratic Republic	US$1.00 Ordinary shares	70	5th Floor, ANZ Bank Building, 33 Lane Xang Avenue, Hatsady Village, Chanthaboury District, Vientiane Capital, Lao People's Democratic Republic
Lawson Mardon Flexible Limited; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Lawson Mardon Smith Brothers Ltd.; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Lazurnoe LLC; Russian Federation[c]	–	–	2, 23 Liniya, Vasilievsky Ostrov, 199106, St. Petersburg, Russian Federation
Lower Hunter Land Holdings Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Magma Arizona Railroad Company; United States	US$100.00 Common shares	99.9	CSC, 2338 W. Royal Palm Road, Suite J, Phoenix AZ 85021
Malmikaivos Oy; Finland[g]	€168.19 Ordinary shares	100	Raivantie 31 , Perttula, 01860 , Finland
Metallwerke Refonda AG; Switzerland	CHF125 Bearer shares	100	Am Bahnhof, CH-8172, Niederglatt, Switzerland
Metals & Minerals Insurance Pte. Limited; Singapore	SGD Redeemable preference shares	100	2 Shenton Way, #2601, SGX Centre 1, Singapore 068804, Singapore
	SGD Ordinary shares	100	
Miller Pohang Coal Co Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia

Name of undertaking and country of incorporation	Share class	% of share class held by Group companies	Registered office address
Minera Kennecott, S.A. de C.V.; Mexico	MXN1 Series "B" shares	100	Florencia 57, Piso 3, Col. Juarez, Delegacion Cuauhtemoc, Mexico, D.F., 06600, Mexico
Minmi Land Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Mitchell Plateau Bauxite Co. Pty. Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Mount Bruce Mining Pty Limited; Australia	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Mount Pleasant Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Mount Thorley Coal Loading Ltd; Australia	AUD Ordinary shares	58.3	123 Albert Street, Brisbane QLD 4000, Australia
Mount Thorley Operations Pty Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Movele; Luxembourg	USD Ordinary shares USD Preference shares	100 100	22 rue Jean-Pierre Brasseur, L-1258, Luxembourg
Mutamba Mineral Sands S.A.; Mozambique	MZN100.00 Ordinary shares	100	Avenida 24 de Julho, no. 3412, Bairro da Polana Cimento, Maputo City, Mozambique
Namoi Valley Coal Pty. Limited; Australia	AUD Class B shares AUD Ordinary shares	100 100	123 Albert Street, Brisbane QLD 4000, Australia
NBH Pty Ltd; Australia	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Nhulunbuy Corporation Limited; Australia[(c)]	–	–	Endeavour Square, Nhulunbuy, Northern Territory 0880, Australia
Nords Wharf Land Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Norgold Pty Limited; Australia	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
North Gold (W.A.) Pty Ltd; Australia	AUD Ordinary shares AUD Redeemable preference shares	100 100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
North Insurances Pty. Ltd.; Australia	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
North IOC (Bermuda) Holdings Limited; Bermuda	US$1.00 Ordinary shares	100	Clarendon House, 2 Church Street, Hamilton, HM 11, Bermuda
North IOC (Bermuda) Limited; Bermuda	US$143.64 Class A ordinary shares (US$143.64126903) US$1.00 Ordinary shares US$100,000.00 Preferred shares	100 100 100	Clarendon House, 2 Church Street, Hamilton, HM 11, Bermuda
North IOC Holdings Pty Ltd; Australia	AUD Ordinary shares	100	Level 27, Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
North Limited; Australia	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
North Mining Limited; Australia	AUD Ordinary shares AUD Redeemable preference shares	100 100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Northern (Rhondda) Collieries Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Novacoal Australia Pty. Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Nozalela Mineral Sands (Pty) Ltd; South Africa	ZAR 1.00 Ordinary shares	100	The Farm RBM, Number 16317, KwaZulu-Natal, South Africa
Oaklands Coal Pty. Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Olkhovoe LLC; Russian Federation[(c)]	–	–	2, 23 Liniya, Vasilievsky Ostrov, 199106, St. Petersburg, Russian Federation
Orian Holding Corp; Virgin Islands, British	USD Common shares	100	Midocean Cambers-Management and Trust Services (BVI) Limited, PO Box 805, Pelican Drive, Road Town, Tortola, VG 110, Virgin Islands, British
Oyu Tolgoi LLC; Mongolia	MNT10,000.00 Common shares	66	Level 12 Monnis Tower, Chinggis Avenue-15, 1st khoroo, Sukhbaatar District, Ulaanbaatar, 14240, Mongolia
Oyu Tolgoi Netherlands BV; Netherlands	€100.00 Ordinary shares	100	Prins Bernhardplein 200 , Amsterdam, 1097 JB, The Netherlands
Pacific Aluminium (New Zealand) Limited; New Zealand	NZD1 Ordinary shares	100	Level 6, 109 Featherston Street, Wellington, 6011, New Zealand
Pacific Aluminium Bell Bay Sales Pty Limited; Australia	AUD Ordinary shares	100	Pacific Aluminium, Level 3, 500 Queen Street, Brisbane QLD 4000, Australia
Pacific Aluminium Pty. Limited; Australia[(a)]	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
Pacific Aluminium Services Pty Limited; Australia	AUD Ordinary shares	100	Pacific Aluminium, Level 3, 500 Queen Street, Brisbane QLD 4000, Australia

Notes to the 2016 financial statements
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47 Related undertakings continued

Name of undertaking and country of incorporation	Share class	% of share class held by Group companies	Registered office address
Pacific Coast Mines, Inc.; United States	US$1.00 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Pechiney Aviatube Limited; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Pechiney Bâtiment; France	€15.00 Ordinary shares	100	725 rue Aristide Bergès, 38341 Voreppe Cedex, France
Pechiney Bécancour, Inc.; United States	US$1.00 Ordinary shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Pechiney Cast Plate, Inc.; United States	US$1.00 Ordinary shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Pechiney Consolidated Australia Pty Limited; Australia	US$1.00 Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Pechiney Dis Ticaret Limited Sirketi; Turkey[(g)]	TRY25.00 Ordinary shares	100	Karakoy Haci Mimi Mah. Vekil Harc Sok. 10 Kat 4, Beyoglu, Istanbul, Turkey
Pechiney Holdings, Inc.; United States	US$1.00 Ordinary shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Pechiney Metals LLC ; United States[(c)]	–	–	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Pechiney Philippines Inc.; Philippines	PHP10.00 Ordinary shares	99.9	Room 306, ITC Building, 337 Sen Gil Puyat Avenue, Markati, Metro Manila, Philippines
Pechiney Plastic Packaging, Inc.; United States	USD Ordinary shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Pechiney Sales Corporation; United States	US$1.00 Ordinary shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Pechiney Vénézuela, S.A.; Venezuela, Bolivarian Republic of[(g)]	VEB1,000.00 A shares VEB10,000.00 B shares	100 100	Avenida Libertador , Multicentro Empresarial del Estede, Edificio Miranda, Nucleo A, Piso 14, Oficina 146A, Caracas, Venezuela
Peko Exploration Pty Ltd.; Australia	AUD Ordinary shares	100	37 Belmont Avenue, Belmont WA 6104, Australia
Peko-Wallsend Pty Ltd; Australia	AUD Ordinary shares	100	Level 22, Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Pilbara Iron Company (Services) Pty Ltd ; Australia	AUD Ordinary shares	100	Level 22, Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Pilbara Iron Pty Ltd; Australia	AUD Ordinary shares	100	Level 22, Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Port d'Ehoala S.A.; Madagascar	US$100.00 Ordinary shares	100	Immeuble ASSIST, Ivandry , Lot N°35, 5ème étage, 101 Antananarivo , Antananarivo, Madagascar
Project Generation Group Pty Ltd; Australia[(a)]	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
PSZ Pty Limited; Australia	AUD Ordinary shares	100	Level 27, Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
PT Alcan Packaging Flexipack; Indonesia	IDR1,000,000.00 Ordinary shares	100	31st Floor, Menara BTPN, Jl. Dr. Ide Anak Agung Gde Agung Lot 5.5-5.6, Mega Kuningan, Jakarta, 12950, Indonesia
PT Hutan Lindung Kelian Lestari; Indonesia	IDR9,803.00 Ordinary shares	99	Kelian Mine Site, West Kutai, East Kalimantan, Indonesia
PT Kelian Equatorial Mining; Indonesia	IDR1,080.00 Ordinary shares	90	31st Floor, Menara BTPN, Jl. Dr. Ide Anak Agung Gde Agung Lot 5.5-5.6, Mega Kuningan, Jakarta, 12950, Indonesia
PT Mitra Sumbawa Minerals; Indonesia	US$1.00 Ordinary shares	90	15th Floor, Menara Anugrah, Kantor Taman E3.3, Jalan DR. Ide Anak Agung Gde Agung Lot 8.6-8.7, Jakarta, 12950, Indonesia
PT Rikit Alas Minerals; Indonesia	US$1.00 Ordinary shares	90	15th Floor, Menara Anugrah, Kantor Taman E3.3, Jalan DR. Ide Anak Agung Gde Agung Lot 8.6-8.7, Jakarta, 12950, Indonesia
PT Rio Tinto Consultants; Indonesia[(g)]	US$1.00 Ordinary shares	100	31st Floor, Menara BTPN, Jl. Dr. Ide Anak Agung Gde Agung Lot 5.5-5.6, Mega Kuningan, Jakarta, 12950, Indonesia
PT Rio Tinto Exploration; Indonesia[(g)]	US$1.00 Ordinary shares	100	15th Floor, Menara Anugrah, Kantor Taman E3.3, Jalan DR. Ide Anak Agung Gde Agung Lot 8.6-8.7, Jakarta, 12950, Indonesia
PT Rio Tinto Indonesia; Indonesia	US$1.00 Ordinary shares	100	31st Floor, Menara BTPN, Jl. Dr. Ide Anak Agung Gde Agung Lot 5.5-5.6, Mega Kuningan, Jakarta, 12950, Indonesia

Name of undertaking and country of incorporation	Share class	% of share class held by Group companies	Registered office address
PT Rio Tinto Irja; Indonesia[(g)]	US$1.00 Ordinay shares	100	31st Floor, Menara BTPN, Jl. Dr. Ide Anak Agung Gde Agung Lot 5.5-5.6, Mega Kuningan, Jakarta, 12950, Indonesia
QIT Madagascar Minerals Ltd; Bermuda	US$1.00 Ordinay shares	100	Canon's Court, 22 Victoria Street, Hamilton, HM 12, Bermuda
QIT Madagascar Minerals SA; Madagascar	US$10.00 Certicats d'investissemant	100	Immeuble ASSIST, Ivandry , Lot N°35, 5ème étage, 101 Antananarivo , Antananarivo, Madagascar
	US$10.00 Common shares	80	
Quebec North Shore and Labrador Railway Company/ Compagnie de Chemin de Fer du Littoral Nord de Quebec et du Labrador Inc.	CAD$27.59 Ordinary shares	100	400-1190 Avenue des Canadiesn-de-Montréal, Montreal Québec H3B 0E3, Canada Canada
Queensland Coal Pty. Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Química e Metalúrgica Mequital Ltda.; Brazil[(g)]	BRL Ordinary shares	100	Av. das Nacoes Unida, 12551 19o, andar, CJ 1911, 04578-000, Sao Paulo, SP, Brazil
R.W. Miller (Holdings) Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Ranges Management Company Pty Ltd; Australia	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Ranges Mining Pty Ltd; Australia	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Resolution Copper Company; United States	US$0.01 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Resolution Copper Mining LLC; United States[(c)]	–	–	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Richards Bay Mining (Proprietary) Limited; South Africa	ZAR0.01 B Ordinary shares	99.9	The Farm RBM, Number 16317, KwaZulu-Natal, South Africa
	ZAR1 A Ordinary shares	100	
Richards Bay Mining Holdings (Proprietary) Limited; South Africa	ZAR1.00 A Ordinary shares	100	The Farm RBM, Number 16317, KwaZulu-Natal, South Africa
	ZAR1.00 B Ordinary shares	100	
Richards Bay Prefco (Pty) Ltd; South Africa	ZAR0.01 Preference shares	100	The Farm RBM, Number 16317, KwaZulu-Natal, South Africa
Richards Bay Mining (Proprietary) Limited; South Africa	ZAR0.01 Prefence shares shares	100	The Farm RBM, Number 16317, KwaZulu-Natal, South Africa
Richards Bay Titanium (Proprietary) Limited; South Africa	ZAR0.01 B Preference shares	100	The Farm RBM, Number 16317, KwaZulu-Natal, South Africa
	ZAR0.01 BHP Billiton Preference shares	100	
	ZAR0.01 B Ordinary shares	100	
Richards Bay Titanium Holdings (Proprietary) Limited; South Africa	ZAR1.00 A Ordinary shares	100	The Farm RBM, Number 16317, KwaZulu-Natal, South Africa
	ZAR1.00 B Ordinary shares	100	
Rio de Contas Desenvolvimentos Minerais Ltda; Brazil	BRL Quota shares	100	Rua Coronel Durval Matos, S/N. Centro, Municipio de Jaguaquara, Estado da Bahia, CEP45345-000, Brazil
Rio Sava Exploration DOO; Serbia[(c)]	–	–	Takovska 45, Belgrade, 11000, Serbia, Republic of
Rio Tinto (Commercial Paper) Limited; Australia[(a)]	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
Rio Tinto (Hong Kong) Ltd; Hong Kong	HKD Ordinary shares	100	Suite 2802, 28/F, Lippo Centre Tower 2, 89 Queensway, Admiralty, Hong Kong
Rio Tinto (Mauritius) Pty Limited; Mauritius[(g)]	US$1.00 Ordinary shares	100	6th Floor, Tower A, 1 Cybercity, Ebene, Mauritius
Rio Tinto Advisory Services Pty Limited; Australia	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
Rio Tinto Alcan Fund Inc.; Canada	CAD Ordinary shares	100	400-1190 Avenue des Canadiens-de-Montréal, Montreal Québec H3B 0E3, Canada
Rio Tinto Alcan Inc.; Canada	CAD Common shares	100	400-1190 Avenue des Canadiens-de-Montréal, Montreal Québec H3B 0E3, Canada
Rio Tinto Alcan International Ltd. / Rio Tinto Alcan International Ltee; Canada	CAD Common shares	100	400-1190 Avenue des Canadiens-de-Montréal, Montreal Québec H3B 0E3, Canada
Rio Tinto Alcan Middle East DMCC; United Arab Emirates	AED1,000 Ordinary shares	100	Gold Tower, Jlt Cluster I, 8th Floor, Unit E, Dubai, PO BOX 340801, United Arab Emirates
Rio Tinto Alcan Technology Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Rio Tinto Almazpoisk LLC; Russian Federation[(c)]	–	–	3, Aleksandra Lukyanova, 105066, Moscow, Russian Federation
Rio Tinto Aluminium (Bell Bay) Limited; Australia	AUD 7.5% Cumulative preference shares	100	Pacific Aluminium, Level 3, 500 Queen Street, Brisbane QLD 4000, Australia
	AUD Ordinary shares	100	
Rio Tinto Aluminium (Holdings) Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia

Notes to the 2016 financial statements
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47 Related undertakings continued

Name of undertaking and country of incorporation	Share class	% of share class held by Group companies	Registered office address
Rio Tinto Aluminium Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Rio Tinto America Holdings Inc.; United States	US$0.01 Class A common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
	US$100.00 Series A preferred stock	100	
Rio Tinto America Inc.; United States	US$100.00 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Rio Tinto Asia Ltd; Hong Kong	HKD Ordinary shares	100	Suite 2802, 28/F, Lippo Centre Tower 2, 89 Queensway, Admiralty, Hong Kong
Rio Tinto Asia Pty. Limited.; Australia[(a)]	AUD Class A shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
	AUD Ordinary shares	100	
Rio Tinto AuM Company; United States	US$0.01 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Rio Tinto Australian Holdings Limited; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
	US$1.00 Ordinary shares	100	
Rio Tinto Bahia Holdings Limited; United Kingdom	US$1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Base Metals Pty. Limited; Australia[(a)]	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
Rio Tinto Brazilian Holdings Limited; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
	US$1.00 Ordinary shares	100	
Rio Tinto Brazilian Investments Limited; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
	£1.00 Ordinary shares	100	
Rio Tinto Canada Diamond Operation Management Inc.; Canada	CAD Common shares	100	300-5201 50th Avenue, PO Box 2498, Yellowknife NT X1A 2P8, Canada
Rio Tinto Canada Inc; Canada	CAD Class B shares	100	400-1190 Avenue des Canadiens-de-Montréal, Montreal Québec H3B 0E3, Canada
	CAD Class C shares	100	
	CAD Class D shares	100	
	CAD Class J Shares	100	
	Class K Shares	100	
Rio Tinto Canada Management Inc./ Rio Tinto Gestion Canada Inc. ; Canada	CAD Common shares	100	400-1190 Avenue des Canadiens-de-Montréal, Montreal Québec H3B 0E3, Canada
	CAD Preferred shares	100	
Rio Tinto Canada Uranium Corporation; Canada	CAD Common shares	100	400-1190 Avenue des Canadiens-de-Montréal, Montreal Québec H3B 0E3, Canada
Rio Tinto Coal (Clermont) Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Rio Tinto Coal (NSW) Pty Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Rio Tinto Coal Australia Pty Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Rio Tinto Coal Investments Pty Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Rio Tinto Coal NSW Holdings Limited; Australia[(a)]	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Rio Tinto Desenvolvimentos Minerais LTDA.; Brazil	BRL Quotas shares	100	SIG Quadra 04, Lote 175, Torre A, Salas 106 a 109, Edificio Capital Financial Center, Brasilia, CEP 70610-440, Brazil
Rio Tinto Diamonds and Minerals Canada Holding Inc.; Canada	CAD Class A (dividend rights)	100	300-5201 50th Avenue, PO Box 2498, Yellowknife NT X1A 2P8, Canada
	CAD Class B shares	100	
	CAD Class C (voting rights) shares	100	
	CAD Class P1 preferred shares	100	
Rio Tinto Diamonds Limited; United Kingdom	US$1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Diamonds Netherlands B.V.; Netherlands	€500.00 Ordinary shares	100	Aluminiumstraat 1, 4823AL Breda, Postbus 3408, 4800DK, Breda, Netherlands
Rio Tinto Diamonds NV; Belgium	EUR Ordinary shares	100	Hoveniersstraat 53, 2018 Antwerp, Belgium
Rio Tinto Eastern Investments B.V.; Netherlands	€453.78 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Energy America Inc.; United States	US$0.01 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Rio Tinto Energy Limited; United Kingdom	US$1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Escondida Limited; Bermuda	US$1.00 Ordinary shares	100	22 Canon's Court, Victoria Street, Hamilton, HM 12, Bermuda
Rio Tinto European Holdings Limited; United Kingdom[(b)]	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom

Name of undertaking and country of incorporation	Share class	% of share class held by Group companies	Registered office address
Rio Tinto Exploration (Asia) Holdings Pte. Ltd.; Singapore	US$1.00 Ordinary shares	100	12 Marina Boulevard, #20-01 Marina Bay Financial Centre Tower 3, Singapore, 018982, Singapore
Rio Tinto Exploration (PNG) Limited; Papua New Guinea[(a)]	PGK1.00 Ordinary shares	100	c/o BDO Accountants, Section 15, Lot 15, Bernal Street, National Capital District, Papua New Guinea
Rio Tinto Exploration and Mining (India) Private Limited; India	INR10.00 Ordinary shares	100	21st Floor, DLF Building No.5, Tower A, DLF Cyber City, Phase –III, Gurgaon, Haryana, 122002, India
Rio Tinto Exploration Canada Inc.; Canada	CAD Class A shares	100	400-1190 Avenue des Canadiens-de-Montréal, Montreal Québec H3B 0E3, Canada
	CAD Class B shares	100	
	CAD Class C shares	100	
	CAD Class D shares	100	
	CAD Class E preferred shares	100	
Rio Tinto Exploration Gabon SA; Gabon[(g)]	XAF10,000 Ordinary shares	100	C/O NEW ACE Baker Tilly, Quartier Louis – Quaben, Libreville, B.P : 3981 , Gabon
Rio Tinto Exploration India Private Limited; India	INR10.00 Ordinary shares	100	Apartment No.100 A/5, Ground Floor, The Capital Court, Olof Palme Marg, Munirka, NEW DELHI 110067, India
Rio Tinto Exploration Kazakhstan LLP; Kazakhstan[(c)]	–	–	Dostyk 310/G, Almaty, Kazakhstan, 050020, Kazakhstan
Rio Tinto Exploration Pty Limited; Australia[(a)]	AUD Class B shares	100	37 Belmont Avenue, Belmont WA 6104, Australia
	AUD Class C shares	100	
	AUD Ordinary shares	100	
Rio Tinto Exploration Zambia Limited; Zambia	ZMW1.00 Ordinary shares	100	Plot 3827, Parliament Road, Olympia, Lusaka, Zambia
Rio Tinto Fer et Titane inc.; Canada	CAD Class B preference shares	100	1625 Route Marie-Victorin, Sorel-Tracy QC J3R 1M6, Canada
	CAD Common shares	100	
	CAD$0.01 Preferred shares	100	
Rio Tinto FH Limited; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Finance (USA) Limited; Australia[(a)]	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
Rio Tinto Finance (USA) plc; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Finance Canada Inc./Finances Rio Tinto Canada Inc.; Canada	CAD Ordinary shares	100	400-1190 Avenue des Canadiens-de-Montréal, Montreal Québec H3B 0E3, Canada
Rio Tinto Finance Limited; Australia[(a)]	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
Rio Tinto Finance plc; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
	US$1.00 Ordinary shares	100	
Rio Tinto France S.A.S.; France	€15.25 Ordinary shares	100	17 Place des Reflets, La Defense 2, 92400, Courbevoie, France
Rio Tinto Global Employment Company Pte. Ltd.; Singapore	US$1.00 Ordinary shares	100	12 Marina Boulevard, #20-01 Marina Bay Financial Centre Tower 3, Singapore, 018982, Singapore
Rio Tinto Guinée S.A.; Guinea	GNF100,000.00 Ordinary shares	100	Route de la Corniche Nord, Cité Ministérielle—Rue DI 256 Quartier Landréah, Commune de Dixinn—BP 99, Conakry, Guinea
Rio Tinto Holdings LLC; Mongolia	MNT20,000.00 Ordinary shares	100	Suite No 201, Seoul Business Centre, Zaluuchuud Avenue 26, BZD-1, Ulaanbaatar, 13380, Mongolia
Rio Tinto Hydrogen Energy Australia Pty Limited; Australia[(a)]	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
Rio Tinto Hydrogen Energy LLC; United States[(c)]	–	–	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Rio Tinto Iceland Ltd.; Iceland	ISK1.00 Registered shares	100	P.O. Box 244, IS-222, Hafnarfjördur, Iceland
Rio Tinto India Private Limited; India	INR10.00 Ordinary shares	100	Apartment No.100 A/5, Ground Floor, The Capital Court, Olof Palme Marg, Munirka, NEW DELHI 110067, India
Rio Tinto Indonesian Holdings Limited; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
	US$1.00 Ordinary shares	100	
Rio Tinto International Holdings Limited; United Kingdom[(b)]	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto International Trading (Shanghai) Co Ltd; China[(g)]	US$1.00 Ordinary shares	100	Room 1615-3, No. 1 Jilong Road, China (Shanghai) Pilot Free Trade Zone, Shanghai, 200031, China

Notes to the 2016 financial statements
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47 Related undertakings continued

Name of undertaking and country of incorporation	Share class	% of share class held by Group companies	Registered office address
Rio Tinto Investments One Pty Limited; Australia	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Rio Tinto Investments Two Pty Limited; Australia	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Rio Tinto Iron & Titanium (Suzhou) Co., Ltd; China	US$1.00 Ordinary shares	100	418 Nanshi Street, Suzhou Industrial Park, Suzhou, 215021, China
Rio Tinto Iron & Titanium GmbH; Germany[c]	–	–	Mergenthaleralee 77, D-65760, Eschborn, (Frankfurt am Main), Germany
Rio Tinto Iron & Titanium Holdings GmbH; Germany[c]	–	–	Mergenthaleralee 77, D-65760, Eschborn, (Frankfurt am Main), Germany
Rio Tinto Iron & Titanium Limited; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Iron and Titanium Canada Inc./Rio Tinto Fer et Titane Canada Inc.; Canada	CAD Common shares	100	1625 Route Marie-Victorin, Sorel-Tracy QC J3R 1M6, Canada
Rio Tinto Iron Ore Asia Pte Ltd; Singapore	US$1.00 Ordinary shares	100	12 Marina Boulevard, #20-01 Marina Bay Financial Centre Tower 3, Singapore, 018982, Singapore
Rio Tinto Iron Ore Atlantic Limited; United Kingdom	US$1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Iron Ore Europe S.A.S.; France	€100.00 Ordinary shares	100	17 Place des Reflets, La Defense 2, 92400, Courbevoie, France
Rio Tinto Iron Ore Trading China Limited; United Kingdom	US$1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Japan Ltd; Japan	JPY500 Ordinary shares	100	8th Floor, Kojimachi Diamond Building, 1 Kojimachi 4-chome, Chiyoda-ku, Tokyo 102-0083, Japan
Rio Tinto Jersey Holdings 2010 Limited; Jersey	USD Ordinary shares	100	22 Grenville Street, St Helier, JE4 8PX, Jersey
Rio Tinto Korea Ltd; Korea, Republic of	KRW10,000.00 Ordinary shares	100	2nd Floor, JS Tower, 6 Teheran-ro 79-gil, Gangnam-Gu, Seoul, 135-877, Korea, Republic of
Rio Tinto Logistic Services Pty Ltd; Australia[a]	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
Rio Tinto London Limited; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Management Services South Africa (Proprietary) Ltd; South Africa	ZAR2.00 Ordinary shares		1 Harries Road, Illovo, Sandton, 2196, Sandton, South Africa, 2196, South Africa
Rio Tinto Marketing Pte. Ltd.; Singapore	SGD$1.00 Ordinary shares US$1.00 Ordinary shares	100 100	12 Marina Boulevard, #20-01 Marina Bay Financial Centre Tower 3, Singapore, 018982, Singapore
Rio Tinto Marketing Services Limited; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Medical Plan Trustees Limited; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Metals Limited; United Kingdom	£1.00 Ordinary shares US$1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Minera Peru Limitada SAC; Peru	PEN100.00 Ordinary shares	100	Av. La Paz 1049, Oficina 501, Lima 18, Peru
Rio Tinto Mineracao do Brasil Ltda; Brazil	BRL1 Quotas shares	100	SIG Quadra 04, Lote 175, Torre A, Salas 106 a 109, Edificio Capital Financial Center, , Brasilia, Brasilia, CEP 70610-440, Brazil
Rio Tinto Minerals Asia Pte Ltd; Singapore	SGD$1.00 Ordinary shares US$1.00 Ordinary shares	100 100	12 Marina Boulevard, #20-01 Marina Bay Financial Centre Tower 3, Singapore, 018982, Singapore
Rio Tinto Minerals Development Limited; United Kingdom	£0.25 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Minerals Inc.; United States	US$0.01 Common shares	100	CSC, 15 West South Temple, Suite 1701, Salt Lake City UT 84101, United States
Rio Tinto Mining and Exploration Inc.; United States	US$1.00 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Rio Tinto Mining and Exploration Limited; United Kingdom	£1.00 Ordinary shares US$1.00 Ordinary shares	100 100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Mining and Exploration S.A.C.; Peru	PEN0.5 Ordinary shares	100	Calle General Borgono N 1034, Miraflores, Lima 18, Peru
Rio Tinto Namibian Holdings Limited; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Nickel Company; United States	US$0.01 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Rio Tinto Nominees Limited; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Orissa Mining Private Ltd; India	INR100.00 Ordinary shares	51	N-3 / 356, IRC Village, Nayapalli, Bhubaneswar , Orissa, 751015, India

Name of undertaking and country of incorporation	Share class	% of share class held by Group companies	Registered office address
Rio Tinto OT Management Limited; United Kingdom	US$1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Overseas Holdings Limited; United Kingdom	£1.00 Ordinary shares US$1.00 Ordinary shares	100 100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Pension Investments Limited; United Kingdom[b]	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Peru Limited; United Kingdom	US$1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Potash Management Inc./Rio Tinto Potasse Management Inc.; Canada	CAD Common shares	100	400-1190 Avenue des Canadiens-de-Montréal, Montreal Québec H3B 0E3, Canada
Rio Tinto Procurement (Singapore) Pte Ltd; Singapore	US$1.00 Ordinary shares	100	12 Marina Boulevard, #20-01 Marina Bay Financial Centre Tower 3, Singapore, 018982, Singapore
Rio Tinto Pte Ltd; Singapore	SGD$1.00 Ordinary shares SGD$1.00 Preference shares	100 100	12 Marina Boulevard, #20-01 Marina Bay Financial Centre Tower 3, Singapore, 018982, Singapore
Rio Tinto Saskatchewan Management Inc.; Canada	CAD Common shares	100	400-1190 Avenue des Canadiens-de-Montréal, Montreal Québec H3B 0E3, Canada
Rio Tinto Saskatchewan Potash Holdings General Partner Inc.; Canada	CAD Common shares	100	McCarthy Tetrault LLP, Suite 5300, TD Bank Tower 66 Wellington Street West, Toronto ON M5K 1E6, Canada
Rio Tinto Saskatchewan Potash Holdings Limited Partnership; Canada[c]	–	–	McCarthy Tetrault LLP, Suite 5300, TD Bank Tower 66 Wellington Street West, Toronto ON M5K 1E6, Canada
Rio Tinto Services Inc.; United States	US$0.01 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Rio Tinto Services Limited; Australia[a]	AUD Class Z shares AUD Ordinary shares	100 100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
Rio Tinto Shared Services Pty Limited; Australia	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
Rio Tinto Shipping (Asia) Pte. Ltd.; Singapore	US$1.00 Ordinary shares	100	12 Marina Boulevard, #20-01 Marina Bay Financial Centre Tower 3, Singapore, 018982, Singapore
Rio Tinto Shipping Pty. Limited.; Australia[a]	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
Rio Tinto Simfer UK Limited; United Kingdom	US$1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Singapore Holdings Pte Ltd; Singapore	SGD$1.00 Ordinary shares USD Ordinary shares	100 100	12 Marina Boulevard, #20-01 Marina Bay Financial Centre Tower 3, Singapore, 018982, Singapore
Rio Tinto Sohar Logistics LLC; Oman	OMR1.00 Ordinary shares	70	P.O. Box 686, Ruwi, 112, Oman
Rio Tinto South East Asia Limited; United Kingdom	£1.00 Ordinary shares US$1.00 Ordinary shares	100 100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Staff Fund Pty Limited; Australia[a]	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
Rio Tinto Sulawesi Holdings Limited; United Kingdom	US$1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Technological Resources Inc.; United States	US$0.01 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Rio Tinto Technological Resources UK Limited; United Kingdom	US$1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Trading (Shanghai) Co., Ltd.; China	US$1.00 Ordinary shares	100	41/F Wheelock Square, No. 1717 West Nanjing Road, Jing' an District, Shanghai, 200040, China
Rio Tinto Uranium Limited; United Kingdom	US$1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Uranium Services Limited; United Kingdom	US$1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Vostok Limited; United Kingdom	US$1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Rio Tinto Western Holdings Limited; United Kingdom	£1.00 Ordinary shares US$1.00 Ordinary shares	100 100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Riversdale Anthracite Colliery (Proprietary) Ltd; South Africa	ZAR2.00 Ordinary shares	74	Ground Floor – Cypress Place North, Woodmead Business Park, 140-142 Western Service Road, Woodmead, 2151, South Africa
Riversdale Connections (Proprietary) Ltd; South Africa	ZAR1.00 Ordinary shares	100	Ground Floor – Cypress Place North, Woodmead Business Park140/142 Western Service Road, Woodmead, 2191, South Africa

Notes to the 2016 financial statements
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47 Related undertakings continued

Name of undertaking and country of incorporation	Share class	% of share class held by Group companies	Registered office address
Robe River Limited; Australia	AUD Ordinary shares	100	Level 27, Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Robe River Mining Co. Pty. Ltd.; Australia	AUD Class A shares AUD Class B shares	40 76.4	Level 27, Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Rocklea Station Pty Ltd; Australia	AUD Ordinary shares	100	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Rössing Uranium Limited; Namibia	NAD1 "B" Shares shares NAD0.1 "C" Shares	71.2 70.6	360 Sam Nujoma Drive, Klein Windhoek, Windhoek, Namibia
RTA AAL Australia Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
RTA Boyne Limited; Australia	AUD Ordinary shares	100	Pacific Aluminium, Level 3, 500 Queen Street, Brisbane QLD 4000, Australia
RTA Holdco 1 Limited; United Kingdom	USD Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
RTA Holdco 4 Limited; United Kingdom	US$1.00 Ordinary shares US$0.73 Ordinary shares	100 100	6 St James's Square, London, SW1Y 4AD, United Kingdom
RTA Holdco 7 Limited; United Kingdom	US$1.00 Ordinary shares USD Class A preference shares	100 100	6 St James's Square, London, SW1Y 4AD, United Kingdom
RTA Holdco 8 Limited; United Kingdom	US$1.00 Ordinary shares USD Class A preference shares	100 100	6 St James's Square, London, SW1Y 4AD, United Kingdom
RTA Holdco Australia 1 Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
RTA Holdco Australia 3 Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
RTA Holdco Australia 5 Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
RTA Holdco Australia 6 Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
RTA Pacific Pty Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
RTA Sales Pty Ltd; Australia	AUD Class A shares AUD Class B shares	100 100	123 Albert Street, Brisbane QLD 4000, Australia
RTA Smelter Development Pty Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
RTA Weipa Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
RTA Yarwun Pty Ltd; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
RTAlcan 1 LLC; United States	USD Common shares USD Class A preferred shares	100 100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
RTAlcan 2 LLC; United States	USD Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
RTAlcan 3 LLC; United States	USD Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
RTLDS Aus Pty. Ltd; Australia[a]	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
RTLDS UK Limited; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
RTMDC LLC; Mongolia	MNT1,240.00 Common shares	100	7 floor, Seoul Business Centre, Zaluuchuud avenue – 26, 1st khoroo, Bayanzurkh district, Ulaanbaatar, 13381, Mongolia
RTPDS Aus Pty Ltd; Australia	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
Saryarka B.V.; Netherlands	€200.00 Ordinary shares	75	Aluminiumstraat 1, 4823AL Breda, Postbus 3408, 4800DK, Breda, Netherlands
Savoie Services Y.K.; Japan	JPY50,000 Ordinary shares	100	Harumi, 3 Nagahama-cho, Ozu-city, Ehime-ken, 799-3412, Japan
Scheuch Unterstuetzungskasse GmbH; Germany	€51.13 Ordinary shares	100	Alusingenplatz 1, D-78221, Singen, Germany
SGLS LLC; Mongolia	MNT10,000 Common shares	100	Suite 201, Seoul Business ctr.,Zaluuchuud ave.-26,1st khoroo, Bayanzurch District, Ulaanbaatar, 13380, Mongolia
Simfer Jersey Finance 1 Ltd; Jersey	USD Ordinary shares	100	22 Grenville Street, St Helier, JE4 8PX, Jersey
Simfer Jersey Finance 2 Ltd; Jersey	USD Ordinary shares	53	22 Grenville Street, St Helier, JE4 8PX, Jersey
Simfer Jersey Limited; Jersey	USD Ordinary shares	53	22 Grenville Street, St Helier, JE4 8PX, Jersey
Simfer Jersey Nominee Limited; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
SIMFER S.A.; Guinea	GNF100,000 Ordinary shares	80.7	Résidence Dolphine 1 – Coleah Corniche Sud, Commune de Matam, BP 848, Conakry, BP 848, Guinea

Name of undertaking and country of incorporation	Share class	% of share class held by Group companies	Registered office address
Singapore Metals Pte. Ltd.; Singapore	USD Ordinary shares	100	77 Robinson Road, #13-00, Robinson 77, 068896, Singapore
Skeleton Coast Diamonds Limited; Namibia	NAD2.00 Ordinary shares	100	360 Sam Nujoma Drive, Klein Windhoek, Windhoek, Namibia
Skymont Corporation; United States	USD Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Société De Financement Des Risques Industriels; Luxembourg	EUR Ordinary shares	100	534, rue de Neudorf, B.P. 593, Luxembourg, L-2015, Luxembourg
Société D'entreprises, Carrières Et Mines De L'Esterel; France	€9.33 Ordinary shares	100	17 Place des Reflets, La Defense 2, 92400, Courbevoie, France
Société Générale de Recherches et d'exploitations Minières; France	€0.22 Ordinary shares	100	17 Place des Reflets, La Defense 2, 92400, Courbevoie, France
Société Immobilière Alpes Provence; France	€15.00 Ordinary shares	100	17 Place des Reflets, La Defense 2, 92400, Courbevoie, France
Société Minière Et De Participations Guinée-Alusuisse; Guinea[c]	–	–	Tougue, Guinea
Sohio Western Mining Company; United States	US$100.00 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Southern Copper Pty. Limited; Australia	AUD A shares AUD B shares AUD$0.01 Non cumulative redeemable preference shares AUD Ordinary shares	100 100 100 100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
Straitmaile Holdings Limited; Cyprus	US$10.00 Class 'A' ordinary shares	100	Lampousas, 1, 1095 Nicosia, Cyprus
Swift Current Land & Cattle LLC; United States[c]	-	–	CSC, 2338 W. Royal Palm Road, Suite J, Phoenix AZ 85021
Swiss Aluminium Australia Limited; Australia	AUD Ordinary shares AUD$1,000.00 Stock unit shares A AUD$999.00 Stock unit shares B AUD$997.00 Stock unit shares C	100 100 100 100	123 Albert Street, Brisbane QLD 4000, Australia
TBAC Limited; United Kingdom	£1.00 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
Technological Resources Pty. Limited; Australia[a]	AUD A Ordinary shares AUD B Ordinary shares	100 100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
The Barrier Corporation (Vic.) Pty. Limited; Australia[a]	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
The Kelian Community and Forest Protection Trust; Singapore[c]	–	–	10 Collyer Quay, #10-01 Ocean Financial Centre, 049315, Singapore
The Pyrites Company, Inc.; United States	US$1.00 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
The Roberval and Saguenay Railway Company/La Compagnie du Chemin de Fer Roberval Saguenay; Canada	CAD$100.00 Ordinary shares CAD$100.00 Preference shares 6% non-cumulative	100 100	400-1190 Avenue des Canadiens-de-Montréal, Montreal Québec H3B 0E3, Canada
The Zinc Corporation Pty Ltd; Australia	AUD Ordinary shares AUD Z Class ordinary shares	100 100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
Thos. W. Ward Limited; United Kingdom	£0.25 Ordinary shares	100	6 St James's Square, London, SW1Y 4AD, United Kingdom
THR Aruba Holdings LLC A.V.V.; Aruba	US$1.00 Common shares	100	IMC International Management Trust Company N.V., L.G. Smith Blvd. 62, Miramar Building, Oranjestad, Aruba
THR Delaware Holdings, LLC; United States[c]	–	–	National Corporate Research, Ltd., 850 New Burton Road, Suite 201, Dover DE 19904, United States
THR Kharmagtai Pte Ltd.; Singapore	USD Ordinary shares	100	77 Robinson Road, #13-00, Robinson 77, 068896, Singapore

Notes to the 2016 financial statements
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47 Related undertakings continued

Name of undertaking and country of incorporation	Share class	% of share class held by Group companies	Registered office address
THR MINES (BC) LTD.; Canada	CAD Common shares USD Common shares	100 100	354-200 Granville Street, Vancouver BC V6C 1S4, Canada
THR Mines Services Co. Ltd.; Canada	CAD Common shares	100	Lackowicz Shier & Hoffman Barristers & Solicitors, 300-204 Black Street, Whitehorse YT Y1A 2M9, Canada
THR Mongolia Development Inc.; Virgin Islands, British(g)	US$1.00 Common shares	100	Midocean Chambers, Road Town, Tortola, Virgin Islands, British
THR OYU TOLGOI LTD.; Virgin Islands, British	US$1.00 Common shares	100	Midocean Chambers, Road Town, Tortola, Virgin Islands, British
THR Ulaan Pte. Ltd.; Singapore	USD Ordinary shares	100	77 Robinson Road, #13-00, Robinson 77, 068896, Singapore
Three Crowns Insurance Company Limited; Bermuda	£1.00 Ordinary shares	100	Canon's Court, 22 Victoria Street, Hamilton, HM 12, Bermuda
Tinto Holdings Australia Pty. Limited; Australia	AUD A Ordinary shares AUD Ordinary shares	100 100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
Tisand (Proprietary) Limited; South Africa	ZAR1.00 A Ordinary shares ZAR1.00 B Ordinary shares ZAR1,000.00 Cumulative preference shares shares	100 100 100	Administration Block, The Farm, RBM No. 16317, ADMIN DISTR. OF KWAZULU-NATAL, POB 401 Richards Bay, 3900, South Africa
Trans Territory Pipeline Pty Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Turquoise Hill Netherlands Cooperatief U.A.; Netherlands	USD COOP shares	100	Prins Bernhardplein 200, 1097 JB Amsterdam, The Netherlands
Turquoise Hill Resources Limited Luxembourg Branch; Luxembourg(c)	–	–	11-13, boulevard Grand-Duchesse, Charlotte, L-1331, Luxembourg
Turquoise Hill Resources Ltd.; Canada	CAD Common shares	50.8	300-204 Black Street, Whitehorse Yukon Territories Y1A 2M9, Canada
Turquoise Hill Resources Philippines Inc.; Philippines(g)	PHP100.00 Common shares	99.9	Romulo Mabanta Buenaventura Sayoc & De Los Angeles, 21st Floor, Philamlife Tower, 8767 Paswo de Roxas, Makati City, 1226, Philippines
Turquoise Hill Resources Singapore Pte Ltd.; Singapore	SGD1.00 Common shares	100	1A International Business Park, 609933, Singapore
U.S. Borax Inc.; United States	US$0.10 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Union Générale Industrielle Africaine; Morocco	MAD100.00 Ordinary shares	100	52 bld Zerktouni – 1er étage – Appartement N° 3 – , Espace Erreda—Casablanca – Maroc, Maroc, Morocco
Victoria Technology Inc.; United States(a)	US$1.00 Ordinary shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Vostin Pty. Limited; Australia(a)(g)	AUD Ordinary shares	100	Level 27, Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia
Warkworth Coal Sales Ltd; Australia	AUD Ordinary shares	55.5	123 Albert Street, Brisbane QLD 4000, Australia
Warkworth Mining Limited; Australia	AUD Ordinary shares	55.5	123 Albert Street, Brisbane QLD 4000, Australia
Warkworth Pastoral Co Pty Ltd; Australia	AUD Ordinary shares	55.5	123 Albert Street, Brisbane QLD 4000, Australia
Warkworth Tailings Treatment Pty Ltd; Australia	AUD Ordinary shares	55.5	123 Albert Street, Brisbane QLD 4000, Australia
Waste Solutions and Recycling LLC; United States	USD Units shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
West Kutai Foundation Limited; Singapore(c)	–	–	10 Collyer Quay, #10-01 Ocean Financial Centre, 049315, Singapore
Wimmera Industrial Minerals Pty. Limited; Australia(a)	AUD Ordinary shares	100	Level 33, 120 Collins Street, Melbourne VIC 3000, Australia
Winchester South Development Company Proprietary Limited; Australia	AUD Ordinary shares	100	123 Albert Street, Brisbane QLD 4000, Australia
Wyoming Coal Resources Company; United States	US$0.01 Common shares	100	CSC, 2711 Centerville Road, Suite 400, Wilmington DE 19808
Zululand Titanium (Pty) Ltd; South Africa	ZAR1.00 Ordinary shares	100	The Farm RBM, Number 16317, KwaZulu-Natal, South Africa

Associated undertakings (equity accounted) Name of undertaking and country of incorporation	Share class	% of share class held by Group companies	Registered office address
Alufluor AB; Sweden	SEK1,000.00 Ordinary shares	50	Industrigatan 70, Box 902, S-25109, Helsingborg, Sweden
Blair Athol Coal Pty. Ltd.; Australia	AUD Ordinary shares	71.2	123 Albert Street, Brisbane, QLD 4000, Australia
Boyne Smelters Limited; Australia	AUD A1 Class shares AUD A2 Class shares AUD B1 Class shares	100 100 100	500 Queen Street, Brisbane QLD 4000, Australia
CanPacific Potash Inc.; Canada(e)	–	–	c/o McKercher LLP, 374 Third Avenue South, Saskatoon SK S7K1M5, Canada
Chinalco Rio Tinto Exploration Co. Ltd; China(g)	CNY1.00 Capital Contribution (Ordinary shares)	49	Unit 402, China Resources Building, No.8 Jianguomenbei Avenue, Dong Cheng District, Beijing, 100005 P.R., China
Empresa de Mineracao Finesa Ltda.; Brazil	BRL Quotas shares	49	SIA, Trecho 2, Lotes 710/720, Brasilia DF, Brazil
Enarotali Gold Project Limited; Jersey	£0.001 Ordinary shares	25	13 Castle Street, St Helier, Jersey JE4 5UT, JERSEY, Jersey
Fabrica De Plasticos Mycsa, S.A. ; Venezuela, Bolivarian Republic of(g)	VEF1.00 Common shares	49	Urbanización Industrial San Ignacio, parcela 2-A, vía San Pedro, Los Teques, Estado Miranda", Venezuela
Global Hubco BV ; Netherlands	€1.00 Ordinary shares	33.3	c/o TMF Netherlands B.V., Luna Arena, Herikerbergweg 238, 1101, CM Amsterdam Zuidoost, Netherlands
Halco (Mining) Inc.; United States	US$100.00 Ordinary shares	45	The Prentice-Hall Corporation System, Inc., 2711 Centerville Road, Suite 400, Willmington DE 19808, United States
Hydrogen Energy International LLC; United States(e)	–	–	1209 Orange Street, Wilmington, New Castle, Delaware, U.S.A.
Leichhardt Coal Pty Limited; Australia	AUD Ordinary shares	44.7	123 Albert Street, Brisbane QLD 4000, Australia
Minera Escondida Ltda; Chile(e)	–	–	Av. Cerro Plomo, Piso 18, Las Condes, Santiago, 7580154, Chile
Mineracao Tabuleiro Ltda; Brazil	BRL Quotas shares	48	SIA, Trecho 2, Lotes 690/720, Brasilia DF, Brazil
Northern Land Company Ltd; Canada	CAD1.00 Ordinary shares	50	235 Water Street, Ste 1000 Scotia Ctr, St-John's Newfoundland A1C 1B6
Port Waratah Coal Services Ltd; Australia	AUD Ordinary shares	30	Curlew Street, KOORAGANG NSW 2304, Australia
Procivis Savoie; France	€19.00 Ordinary shares	22.1	116 Quai Charles Roissard, 73000, Chambéry, France
Rightship Pty Ltd; Australia	AUD Ordinary shares	33.3	Level 20, 500 Collins Street, Melbourne VIC 3000, Australia
Sohar Aluminium Co. L.L.C.; Oman	OMR1.00 Ordinary shares	20	Sohar Industrial Estate, P.O. Box 80, PC 327, Sohar, Sultanate of Oman
Twin Falls Power Corporation Ltd; Canada	CAD Class B shares	74.4	Hydro Place, P.O. Box 12500, St-John's Newfoundand, Labrador A1B 3T5
Yalleen Pastoral Co Pty Ltd; Australia	AUD Ordinary shares	53	Level 27, Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia

Notes to the 2016 financial statements
continued

Joint ventures (proportionately consolidated) Name of undertaking and country of incorporation	Address of principal place of business	Capital % owned by Group
Aluminerie Alouette Inc.; Canada	400, Chemin de la Pointe-Noire, C.P. 1650, Sept-Îles Québec G4R 5M9, Canada	40
Aluminerie De Bécancour, Inc.; Canada	5555 Pierre Thibault Street, PO 30, Becancour, Quebec G0X 1B, Canada	25.2
Aluminium & Chemie Rotterdam B.V.; Netherlands	Oude Maasweg 80, NL-3197 KJ, Botlek, Rotterdam, The Netherlands	65.8
Bao-HI Ranges Joint Venture; Australia	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia	54
Beasley River Marketing Pty Ltd; Australia	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia	53
Blair Athol Joint Venture	123 Albert Street, Brisbane QLD 4000, Australia	71.2
Cape Bougainville Joint Venture; Australia	123 Albert Street, Brisbane QLD 4000, Australia	67.5
Channar Mining Joint Venture; Australia	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia	60
Consórcio de Alumínio do Maranhão; Brazil	Av. Engenheiro Emiliano Macieira 01, KM18, Pedrinhas, 65095-604, Sao Luis, Maranhao, Brazil	10
Diavik Joint Venture; Canada	300-5201 50th Avenue, Yellowknife NT X1A 2P9, Canada	60
Gladstone Power Station Joint Venture; Australia	NRG Gladstone Operating Service, Gladstone Power Station, Gladstone QLD 4680, Australia	42.1
Grasberg joint operation; Indonesia	Jl Mandala Raya Selatan, No.1 Kuala Kencana, Timika, Irian Jaya, 98663, Indonesia	40
Hail Creek Joint Venture; Australia	123 Albert Street, Brisbane QLD 4000, Australia	82
Hope Downs Joint Venture; Australia	Level 22 Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia	50
Hunter Valley Operations Joint Venture; Australia	123 Albert Street, Brisbane QLD 4000, Australia	67.6
Kestrel Joint Venture; Australia	123 Albert Street, Brisbane QLD 4000, Australia	80
Mitchell Plateau Joint Venture; Australia	123 Albert Street, Brisbane QLD 4000, Australia	65.6
Mount Thorley Co Venture; Australia	123 Albert Street, Brisbane QLD 4000, Australia	80
New Zealand Aluminium Smelters Ltd; New Zealand	Level 6, 109 Featherston Street, Wellington, 6011, New Zealand	79.4
Pechiney Reynolds Quebec, Inc.; United States	CSC, 233 South 13th Street, Suite 1900, Lincoln NE 68508, United States	50.2
Queensland Alumina Limited; Australia	Plant Operations Building, Parsons Point, Gladstone QLD 4680, Australia	80
Robe River Iron Associates Joint Venture; Australia	Level 27, Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia	53
Robe River Ore Sales Pty. Ltd.; Australia	Level 27, Central Park, 152-158 St. Georges Terrace, Perth WA 6000, Australia	53
Tomago Aluminium Company Pty Limited; Australia	638 Tomago Road, NSW 2322, Tomago, Australia	51.6
Tomago Aluminium Joint Venture; Australia	638 Tomago Road, NSW 2322, Tomago, Australia	51.6
Warkworth Joint Venture; Australia	123 Albert Street, Brisbane QLD 4000, Australia	55.6
Winchester South Joint Venture; Australia	123 Albert Street, Brisbane QLD 4000, Australia	75
Winter Road Joint Venture; Canada	300-5201 50th Avenue, Yellowknife NT X1A 2P9, Canada	33.3

(a) Directly held by Rio Tinto Limited.
(b) Directly held by Rio Tinto plc.
(c) Group ownership is held through an interest in capital. The entity has no classes of shares.
(d) Company limited by guarantee.
(e) Group ownership in the associate is held through an interest in capital. The entity has no classes of shares.
(f) All joint ventures are governed by a joint venture agreement.
(g) In liquidation or application for dissolution filed. The filing for Darex Capital Inc. was submitted in January 2017.

Rio Tinto plc

Company balance sheet

As at 31 December	Note	2016 US$m	2015 US$m
Non-current assets			
Investments	B	**36,050**	36,180
Trade and other receivables		**392**	–
		36,442	36,180
Current assets			
Trade and other receivables	C	**6,070**	883
Cash at bank and in hand		**4**	4
		6,074	887
Total assets		**42,516**	37,067
Current liabilities			
Trade and other payables	D	**(12,223)**	(12,079)
Dividends payable		**(16)**	(18)
Other financial liabilities	G	**(23)**	–
		(12,262)	(12,097)
Non-current liabilities			
Other financial liabilities	G	**(392)**	–
Total liabilities		**(12,654)**	(12,097)
Net assets		**29,862**	24,970
Capital and reserves			
Share capital	E	**224**	224
Share premium account		**4,304**	4,300
Other reserves	F	**11,988**	11,988
Retained earnings		**13,346**	8,458
Total equity		**29,862**	24,970

The Rio Tinto plc company balance sheet has been prepared in accordance with Financial Reporting Standard 101 “Reduced Disclosure Framework” (FRS 101). Note A explains the principal accounting policies.

Profit after tax and total comprehensive income for the year amounted to US$6,875 million (2015: US$2,863 million). As permitted by section 408 of the UK Companies Act 2006, no statement of comprehensive income for the Rio Tinto plc parent company is shown.

The Rio Tinto plc company balance sheet, statement of comprehensive income and the related notes on pages 195 to 198 were approved by the directors on 1 March 2017 and the balance sheet is signed on their behalf by

Jan du Plessis	Jean-Sébastien Jacques	Chris Lynch
Chairman	**Chief executive**	**Chief financial officer**

Rio Tinto plc

Registered number: 719885

Rio Tinto plc (the “Company”) is incorporated in the United Kingdom, registered in England and Wales, and domiciled in the United Kingdom

Rio Tinto plc
continued

Company statement of changes in equity

Year ended 31 December 2016	Share capital US$m	Share premium account US$m	Other reserves US$m	Retained earnings US$m	Total equity US$m
Opening balance	**224**	**4,300**	**11,988**	**8,458**	**24,970**
Profit for the financial year (comprehensive income)	**–**	**–**	**–**	**6,875**	**6,875**
Dividends	**–**	**–**	**–**	**(2,046)**	**(2,046)**
Proceeds from issue of shares	**–**	**4**	**–**	**1**	**5**
Share based payments	**–**	**–**	**–**	**58**	**58**
Total	**224**	**4,304**	**11,988**	**13,346**	**29,862**

Year ended 31 December 2015	Share capital US$m	Share premium account US$m	Other reserves US$m	Retained earnings US$m	Total equity US$m
Opening balance	230	4,288	11,982	8,643	25,143
Profit for the financial year (comprehensive income)	–	–	–	2,863	2,863
Dividends	–	–	–	(3,119)	(3,119)
Proceeds from issue of shares	–	12	–	1	13
Share buy-back	(6)	–	6	–	–
Share based payments	–	–	–	70	70
Total	224	4,300	11,988	8,458	24,970

A Principal accounting policies

a. Basis of preparation

The Rio Tinto plc company financial statements have been prepared using the historical cost convention, as modified by the revaluation of certain financial liabilities and in accordance with the UK Companies Act 2006 and FRS 101. The financial statements have been prepared on a going concern basis.

As a result of the amendments to FRS 101 issued in July 2015 and effective for reporting periods beginning 1 January 2016, the balance sheet is now presented in accordance with IAS 1 "Presentation of financial statements".

The accounting policies set out below have been applied consistently to all periods presented in these financial statements. The following exemptions available under FRS 101 have been applied:

- Paragraphs 45(b) and 46 to 52 of IFRS 2, "Share-based payment" (details of the number and weighted average exercise prices of share options and how the fair value of goods and services received was determined).
- Paragraphs 91-99 of IFRS 13 "Fair value measurement" (disclosure of valuation techniques and inputs used for fair value measurement of assets and liabilities).
- IFRS 7 "Financial Instruments: Disclosures".
- Paragraph 38 of IAS 1 "Presentation of financial statements", comparative information requirements in respect of Paragraph 79(a)(iv) of IAS 1.
- The following paragraphs of IAS 1 "Presentation of financial statements":
  - 10 (d) (statement of cash flows);
  - 16 (statement of compliance with all IFRS);
  - 38A (requirement for minimum of two primary statements, including cash flow statements);
  - 38B-D (additional comparative information);
  - 111 (cash flow statement information); and
  - 134-136 (capital management disclosures).
- IAS 7 "Statement of cash flows".
- Paragraph 30 and 31 of IAS 8 "Accounting policies, changes in accounting estimates and errors" (requirement for the disclosure of information when an entity has not applied a new IFRS that has been issued and is not yet effective).
- Paragraph 17 of IAS 24 "Related party disclosures" (key management compensation).
- The requirements of IAS 24, "Related party disclosures" to disclose related-party transactions entered into between two or more members of a group.

b. Judgments in applying accounting policies and key sources of estimation uncertainty

The preparation of the financial statements requires management to make assumptions, judgments and estimates and to use judgment in applying accounting policies and making critical accounting estimates. These judgments, estimates and assumptions are based on management's best knowledge of the relevant facts and circumstances, having regard to previous experience, but actual results may differ materially from the amounts included in the financial statements.

The key area of judgment that has the most significant effect on the amounts recognised in the financial statements is the review for impairment of investment carrying values.

c. Currency translation

Items included in the financial statements are measured using the currency of the primary economic environment in which the Company operates (the functional currency). The financial statements are presented in US dollars, which is the Company's functional and presentation currency. Transactions denominated in other currencies, including the issue of shares, are translated into the functional currency using the exchange rates prevailing at the date of the transaction.

Foreign exchange gains and losses resulting from the settlement of such transactions, and from the translation at year-end exchange rates of monetary assets and liabilities denominated in foreign currencies, are recognised in the profit and loss account.

Exchange rates used are consistent with the rates used by the Group as disclosed in the consolidated financial statements (note 41).

d. Investments

Investments in Group companies are valued at cost less accumulated impairment losses. Investments are reviewed for impairment if events or changes in circumstances indicate that the carrying amount may not be recoverable.

e. Financial guarantees

Financial guarantees are recognised initially at fair value. Subsequently, the liability is measured at the higher of the best estimate of the expenditure required to settle the present obligation and the amount initially recognised less cumulative amortisation.

f. Share-based payments

The Company operates a number of share-based payment plans for Group employees, the details of which are included in the consolidated financial statements (note 44). The fair value of the Company's share plans is recognised as an addition to the cost of the investment in the subsidiary in which the relevant employees work over the expected vesting period, with a corresponding entry to the profit and loss account reserve. Payments received from the Company's subsidiaries in respect of these share-based payments are recognised as a reduction in the cost of the investment. The Company uses fair values provided by independent actuaries calculated using either a lattice-based option valuation model or a Monte Carlo simulation model. The fair value of the share plans is determined at the date of grant, taking into account any market-based vesting conditions attached to the award.

Non-market based vesting conditions (eg earnings per share targets) are taken into account in estimating the number of awards likely to vest. The estimate of the number of awards likely to vest is reviewed at each balance sheet date up to the vesting date, at which point the estimate is adjusted to reflect the actual awards issued. No adjustment is made after the vesting date even if the awards are forfeited or not exercised.

g. Dividend income

Dividend income is recognised when the right to receive payment is established.

h. Treasury shares

The consideration paid for shares repurchased by the Company and held as treasury shares is recognised as a reduction in shareholders' funds through the profit and loss account.

B Investments

	2016 US$m	2015 US$m
Investments in Group companies:		
At 1 January	**36,180**	36,139
Additions	**58**	70
Disposals	**(160)**	–
Other adjustments	**(28)**	(29)
At 31 December	**36,050**	36,180

Rio Tinto plc
continued

At 31 December 2016 the Company had the following principal subsidiaries:

Company	Principal activity	Country of incorporation	Percentage shareholding
Rio Tinto International Holdings Limited	Holding company	UK	100
Rio Tinto European Holdings Limited	Holding company	UK	100

In accordance with Section 409 of the UK Companies Act 2006, a full list of related undertakings is disclosed in the consolidated financial statements (note 47).

C Trade and other receivables

Trade and other receivables includes US$6,007 million (31 December 2015: US$833 million), which is subject to interest based on LIBOR, is unsecured and repayable on demand.

D Trade and other payables

Trade and other payables include US$12,079 million (31 December 2015: US$11,970 million) which is subject to interest rates based on LIBOR, is unsecured and repayable on demand.

E Share capital

	2016 US$m	2015 US$m
Issued and fully paid up share capital of 10p each (a)		
At 1 January	**224**	230
Ordinary shares purchased and cancelled (b)	**–**	(6)
At 31 December	**224**	224

(a) 33,210 new shares (2015: 21,709 new shares) were issued during the year and 743,380 shares (2015: 789,887 shares) were reissued from treasury pursuant to share plans.
(b) During the year nil shares (2015: 40,912,881 shares) were purchased from Rio Tinto Limited and immediately cancelled.

F Other reserves

Other reserves include US$11,936 million which represents the difference between the nominal value and issue price of the shares issued arising from Rio Tinto plc's rights issue completed in July 2009.

G Rio Tinto plc guarantees

Rio Tinto plc provides a number of guarantees in respect of Group companies.

Rio Tinto plc and Rio Tinto Limited have jointly guaranteed the Group's external listed debt under the US Shelf Programme, European Debt Issuance Programme and Commercial Paper Programme which totalled US$10.2 billion at 31 December 2016 (31 December 2015: US$19.4 billion). In addition, these entities also jointly guarantee the Group's undrawn credit facility which was US$7.5 billion at 31 December 2016 (31 December 2015: US$7.5 billion). Rio Tinto plc has provided guarantees in respect of certain derivative contracts that are in a liability position of US$458 million at 31 December 2016 (31 December 2015: US$275 million).

Rio Tinto plc has provided a guarantee, known as the completion support undertaking (CSU), in favour of the Oyu Tolgoi LLC project finance lenders. At 31 December 2016 US$4,323 million of project finance debt was outstanding under this facility (31 December 2015: US$ nil). Oyu Tolgoi LLC is owned by Erdenes Oyu Tolgoi LLC (34 per cent), which is controlled by the Government of Mongolia, and Turquoise Hill Resources Ltd (66 per cent, of which Rio Tinto owns 51 per cent). The project finance has been raised for development of the underground mine and the CSU will terminate on the completion of the underground mine according to a set of completion tests set out in the project finance facility.

The Rio Tinto guarantee applies to the extent that Turquoise Hill Resources Ltd cannot satisfy Oyu Tolgoi LLC's project finance debt servicing obligations under its own guarantee to the lenders, called the sponsor debt service undertaking (DSU). Both the CSU and DSU contain a carve-out for certain political risk events.

During 2016, fees of US$13 million (2015: US$nil) were received from Oyu Tolgoi LLC and Turquoise Hill Resources Ltd as consideration for provision of the CSU with an additional balance of US$13 million (31 December 2015: US$nil) due and included within Current Assets – Trade and other receivables.

Rio Tinto plc has provided a number of guarantees in relation to various pension funds. Subject to certain conditions, Rio Tinto plc would pay any contributions due from Group companies participating in these funds in the event that the companies fail to meet their contribution requirements. The guarantees were not called upon in 2016. The aggregate of company contributions to these plans in 2016 was US$94 million (2015: US$107 million).

Other guarantees issued by Rio Tinto plc in relation to Rio Tinto Group entities as at 31 December 2016 amount to US$337 million (31 December 2015: US$328 million). Included within this balance is US$60 million (31 December 2015: US$59 million) in relation to non-wholly owned subsidiaries.

Pursuant to the DLC Merger, both Rio Tinto plc and Rio Tinto Limited issued deed poll guarantees by which each company guaranteed contractual obligations incurred by the other or guaranteed by the other.

The liability recognised for financial guarantees is US$415 million (31 December 2015: US$nil).

H Events after the balance sheet date

On 8 February 2017, the Group announced an on-market share buy-back of US$0.5 billion Rio Tinto plc shares.

Rio Tinto financial information by business unit

	Rio Tinto interest %	Gross revenue (a) for the year ended 31 December 2016 US$m	2015 US$m	2014 US$m	EBITDA (b) for the year ended 31 December 2016 US$m	2015 US$m	2014 US$m	Net earnings (c) for the year ended 31 December 2016 US$m	2015 US$m	2014 US$m
Iron Ore										
Pilbara	(d)	**14,530**	13,886	21,482	**8,558**	7,730	13,701	**4,662**	4,013	7,956
Evaluation projects/other		**75**	66	103	**(32)**	(55)	27	**(51)**	(73)	7
Total Iron Ore		**14,605**	13,952	21,585	**8,526**	7,675	13,728	**4,611**	3,940	7,963
Aluminium	(e)									
Bauxite		**1,913**	2,057	1,956	**848**	937	752	**493**	542	429
Alumina		**2,118**	2,145	2,158	**27**	(47)	(54)	**(121)**	(187)	(209)
Intrasegment		**(786)**	(849)	(834)	**–**	–	–	**–**	–	–
Bauxite & Alumina		**3,245**	3,353	3,280	**875**	890	698	**372**	355	220
Primary Metal		**4,913**	4,931	5,867	**1,258**	1,245	1,604	**402**	446	629
Pacific Aluminium		**1,971**	2,254	2,483	**264**	408	524	**62**	147	291
Intersegment & Other		**(1,822)**	(1,876)	(2,087)	**(50)**	132	(43)	**(13)**	92	(6)
Integrated Operations		**8,307**	8,662	9,543	**2,347**	2,675	2,783	**823**	1,040	1,134
Other Product Group Items		**1,075**	1,374	2,373	**(42)**	(76)	36	**(30)**	(50)	26
Product group operations		**9,382**	10,036	11,916	**2,305**	2,599	2,819	**793**	990	1,160
Evaluation projects/other		**76**	81	207	**167**	143	111	**154**	128	88
Total Aluminium		**9,458**	10,117	12,123	**2,472**	2,742	2,930	**947**	1,118	1,248
Copper & Diamonds										
Rio Tinto Kennecott	100.0	**1,243**	1,403	2,186	**126**	437	958	**(228)**	44	523
Escondida	30.0	**1,465**	1,855	2,282	**793**	760	1,292	**270**	281	612
Grasberg	(f)	**–**	–	49	**(17)**	(17)	6	**(64)**	(34)	(17)
Oyu Tolgoi & Turquoise Hill	(g)	**1,203**	1,636	1,765	**436**	501	366	**52**	57	(20)
Diamonds	(h)	**613**	698	901	**239**	293	315	**47**	79	104
Product group operations		**4,524**	5,592	7,183	**1,577**	1,974	2,937	**77**	427	1,202
Evaluation projects/other		**–**	–	–	**(190)**	(141)	(184)	**(95)**	(57)	(84)
Total Copper & Diamonds		**4,524**	5,592	7,183	**1,387**	1,833	2,753	**(18)**	370	1,118
Energy & Minerals										
Rio Tinto Coal Australia	(i)	**2,634**	2,757	3,560	**893**	497	450	**382**	48	21
Rio Tinto Coal Mozambique	(j)	**–**	–	59	**–**	–	(96)	**–**	–	(93)
Iron Ore Company of Canada	58.7	**1,324**	1,353	1,696	**335**	197	516	**64**	12	144
Rio Tinto Iron & Titanium	(k)	**1,419**	1,571	2,168	**370**	435	689	**86**	116	248
Rio Tinto Borates	100.0	**620**	624	675	**213**	178	212	**117**	103	121
Dampier Salt	68.4	**259**	306	398	**74**	71	67	**25**	24	18
Uranium	(l)	**456**	474	633	**54**	1	(77)	**10**	(42)	(117)
Product group operations		**6,712**	7,085	9,189	**1,939**	1,379	1,761	**684**	261	342
Simandou iron ore project	(m)	**–**	–	–	**(102)**	(87)	(97)	**(47)**	(41)	(55)
Evaluation projects/other	(n)	**22**	55	64	**(34)**	(57)	(68)	**(27)**	(45)	(55)
Total Energy & Minerals		**6,734**	7,140	9,253	**1,803**	1,235	1,596	**610**	175	232
Other Operations	(o)	**–**	13	241	**(92)**	(81)	(287)	**(86)**	(88)	(240)
Intersegment transactions		**(3)**	(29)	(344)	**–**	–	–	**–**	–	–
Product Group Total		**35,318**	36,785	50,041	**14,096**	13,404	20,720	**6,064**	5,515	10,321

Rio Tinto financial information by business unit

continued

	Rio Tinto interest %	Gross revenue (a) for the year ended 31 December 2016 US$m	2015 US$m	2014 US$m	EBITDA (b) for the year ended 31 December 2016 US$m	2015 US$m	2014 US$m	Net earnings (c) for the year ended 31 December 2016 US$m	2015 US$m	2014 US$m
Product Group Total		**35,318**	36,785	50,041	**14,096**	13,404	20,720	**6,064**	5,517	10,321
Other items					**(411)**	(546)	(755)	**(241)**	(375)	(593)
Exploration and evaluation					**(175)**	(237)	(300)	**(147)**	(211)	(262)
Net interest								**(576)**	(389)	(161)
Underlying EBITDA/earnings					**13,510**	12,621	19,665	**5,100**	4,540	9,305
Items excluded from underlying EBITDA/ earnings		**18**	(1)	–	**(687)**	(563)	(825)	**(483)**	(5,406)	(2,778)
EBITDA/net earnings					**12,823**	12,058	18,840	**4,617**	(866)	6,527
Reconciliation to Group income statement										
Share of equity accounted unit sales and intra-subsidiary/equity accounted units sales		**(1,555)**	(1,955)	(2,377)						
Depreciation & amortisation in subsidiaries excluding capitalised depreciation					**(4,691)**	(4,553)	(4,828)			
Impairment charges, net of reversals					**(249)**	(2,791)	(221)			
Depreciation & amortisation in equity accounted units					**(526)**	(462)	(472)			
Taxation and finance items in equity accounted units					**(241)**	(276)	(759)			
Consolidated sales revenue/profit on ordinary activities before finance items and tax		**33,781**	34,829	47,664	**7,116**	3,976	12,560			

	Rio Tinto interest %	Capital expenditure (p) for the year ended 31 December 2016 US$m	2015 US$m	2014 US$m	Depreciation & amortisation for the year ended 31 December 2016 US$m	2015 US$m	2014 US$m	Operating assets (q) as at 2016 US$m	2015 US$m	2014 US$m	Employees for the year ended 31 December 2016 Number	2015 Number	2014 Number
Iron Ore													
Pilbara	(d)	**868**	1,608	4,038	**1,645**	1,744	1,789	**16,337**	16,848	19,524	**10,424**	11,097	12,032
Evaluation projects/other		**–**	–	–	**–**	–	–	**2**	2	3	**–**	–	–
Total Iron Ore		**868**	1,608	4,038	**1,645**	1,744	1,789	**16,339**	16,850	19,527	**10,424**	11,097	12,032
Aluminium	(e)												
Bauxite		**343**	159	122	**110**	112	126	**1,278**	1,050	1,366	**2,592**	2,603	2,613
Alumina		**87**	158	166	**206**	207	212	**2,588**	2,698	3,166	**2,139**	2,287	2,228
Bauxite & Alumina		**430**	317	288	**316**	319	338	**3,866**	3,748	4,532	**4,731**	4,890	4,841
Primary Metal		**394**	1,249	1,781	**716**	629	692	**10,701**	10,326	11,455	**6,799**	7,980	9,270
Pacific Aluminium		**91**	126	129	**193**	212	135	**1,044**	1,198	1,421	**2,276**	2,339	2,395
Intersegment and Other		**1**	(10)	(177)	**25**	12	15	**171**	677	889	**231**	210	311
Total Aluminium		**916**	1,682	2,021	**1,250**	1,172	1,180	**15,782**	15,949	18,297	**14,037**	15,419	16,817
Copper & Diamonds													
Rio Tinto Kennecott	100.0	**333**	408	642	**530**	344	324	**2,190**	2,442	2,603	**1,638**	1,793	1,976
Escondida	30.0	**517**	770	947	**364**	293	308	**3,565**	3,485	2,999	**1,230**	1,159	1,344
Grasberg	(f)	**174**	179	193	**89**	43	36	**1,151**	1,016	878	**2,859**	2,868	2,955
Oyu Tolgoi & Turquoise Hill	(g)	**322**	92	166	**450**	416	379	**3,804**	3,597	3,933	**2,728**	2,798	3,255
Diamonds	(h)	**97**	124	148	**164**	159	168	**655**	857	1,124	**907**	1,118	1,268
Product group operations		**1,443**	1,573	2,096	**1,597**	1,255	1,215	**11,365**	11,397	11,537	**9,362**	9,736	10,798
Evaluation projects/other		**(2)**	3	1	**4**	6	4	**166**	155	152	**127**	160	153
Total Copper & Diamonds		**1,441**	1,576	2,097	**1,601**	1,261	1,219	**11,531**	11,552	11,689	**9,489**	9,896	10,951
Energy & Minerals													
Rio Tinto Coal Australia	(i)/(r)	**(107)**	108	165	**297**	336	406	**1,807**	2,137	3,099	**3,049**	3,157	3,187
Rio Tinto Coal Mozambique	(j)	**–**	–	2	**–**	–	–	**–**	–	7	**–**	–	183
Iron Ore Company of Canada	58.7	**75**	118	173	**151**	162	164	**1,018**	1,155	1,460	**2,308**	2,316	2,580
Rio Tinto Iron & Titanium	(k)	**97**	150	185	**189**	194	233	**3,662**	3,554	4,424	**4,094**	4,507	4,787
Rio Tinto Borates	100.0	**31**	28	69	**53**	45	41	**508**	585	650	**984**	987	1,024
Dampier Salt	68.4	**11**	14	21	**23**	22	28	**146**	140	193	**317**	394	479
Uranium	(l)	**30**	39	54	**25**	65	135	**(143)**	(216)	151	**1,303**	1,329	1,243
Product group operations		**137**	457	669	**738**	824	1,007	**6,998**	7,355	9,984	**12,055**	12,690	13,483
Simandou iron ore project	(m)	**–**	91	85	**–**	1	14	**13**	(10)	864	**635**	912	958
Evaluation projects/other	(n)	**4**	4	3	**1**	5	7	**272**	276	583	**769**	865	749
Total Energy & Minerals		**141**	552	757	**739**	830	1,028	**7,283**	7,621	11,431	**13,459**	14,467	15,190
Other Operations	(o)	**(11)**	(36)	(56)	**34**	32	34	**227**	(14)	418	**246**	296	845
Product Group Total		**3,355**	5,382	8,857	**5,269**	5,039	5,250	**51,162**	51,958	61,362	**47,655**	51,175	55,835
Intersegment transactions								**142**	242	238			
Net assets/(liabilities) of disposal groups held for sale	(s)							**(7)**	182	(48)			
Other items		**(46)**	65	(407)	**51**	68	82	**(2,420)**	(1,250)	(2,761)	**3,363**	3,763	3,940
Less: equity accounted units		**(651)**	(859)	(1,032)	**(526)**	(462)	(472)						
Total		**2,658**	4,588	7,418	**4,794**	4,645	4,860	**48,877**	51,132	58,791	**51,018**	54,938	59,775
Add back: Proceeds from disposal of property, plant and equipment		**354**	97	744									
Total capital expenditure per cash flow statement		**3,012**	4,685	8,162									
Less: Net debt								**(9,587)**	(13,783)	(12,495)			
Less: EAU funded balances excluded from net debt								**–**	–	(11)			
Equity attributable to owners of Rio Tinto								**39,290**	37,349	46,285			

Notes to financial information by business unit

Business units are classified according to the Group's management structure. The financial information by business unit has been recast in accordance with the organisational restructure announced on 21 June 2016. The main impacts are as follows: Iron Ore Company of Canada has moved from the Iron Ore product group to the Energy & Minerals product group; Coal businesses have moved from the previous Copper & Coal product group to the Energy & Minerals product group; and, Diamonds businesses have moved from the previous Diamonds & Minerals product group to the Copper & Diamonds product group.

a) Gross sales revenue includes the sales revenue of equity accounted units on a proportionately consolidated basis (after adjusting for sales to subsidiaries) in addition to consolidated sales. Consolidated sales revenue includes subsidiary sales to equity accounted units which are not included in gross sales revenue.

b) EBITDA of subsidiaries and the Group's share of EBITDA relating to equity accounted units represents profit before: tax, net finance items, depreciation and amortisation charged to the income statement in the period. Underlying EBITDA excludes the same items that are excluded from underlying earnings.

c) Represents profit after tax for the period attributable to the owners of the Rio Tinto Group. Business unit earnings are stated before finance items but after the amortisation of discount related to provisions. Earnings attributed to business units do not include amounts that are excluded in arriving at underlying earnings.

d) Pilbara represents the Group's 100 per cent holding in Hamersley, 50 per cent holding of Hope Downs Joint Venture and 65 per cent holding of Robe River Iron Associates. The Group's net beneficial interest in Robe River Iron Associates is 53 per cent as 30 per cent is held through a 60 per cent owned subsidiary and 35 per cent is held through a 100 per cent owned subsidiary.

e) Presented on an integrated operations basis splitting activities between Bauxite & Alumina, Primary Metal, Pacific Aluminium and Other integrated operations (which in total reflect the results of the integrated production of aluminium) and Other product group items which relate to other commercial activities.

f) Through a joint venture agreement with Freeport-McMoRan Inc. (Freeport), Rio Tinto is entitled to 40 per cent of material mined above an agreed threshold as a consequence of expansions and developments of the Grasberg facilities since 1998.

g) Rio Tinto's interest in Oyu Tolgoi is held indirectly through its 50.8 per cent investment in Turquoise Hill Resources Ltd (TRQ), where TRQ's principal asset is its 66 per cent investment in Oyu Tolgoi LLC, which owns the Oyu Tolgoi copper-gold mine.

h) Includes Rio Tinto's interests in Argyle (100 per cent) and Diavik (60 per cent). Murowa (77.8 per cent) was included until its disposal to RZ Murowa Holdings Limited on 17 June 2015.

i) As at 31 December 2016, includes Rio Tinto's 100 per cent shareholding in Coal & Allied Industries Limited and its wholly-owned subsidiaries. Rio Tinto as a 100 per cent owner of Coal & Allied holds a 67.6 per cent, 80 per cent and 55.6 per cent respectively, with management rights, in Hunter Valley Operations, Mount Thorley and Warkworth.

   As at 31 December 2015, this represented Rio Tinto's 80 per cent interest in Coal & Allied, through which Rio Tinto held its beneficial interests in Bengalla Joint Venture, Mount Thorley and Warkworth of 32 per cent, 64 per cent and 44.5 per cent respectively.

   Mitsubishi has moved from holding a 20 per cent stake in Coal & Allied (as at 31 December 2015) to holding a direct 32.4 per cent stake in the Hunter Valley Operations.

   On 1 March 2016, Coal & Allied disposed of its 40 per cent interest in Bengalla Joint Venture and on 5 August 2016, Coal & Allied disposed of its 100 per cent interest in the Mount Pleasant project. Both were included up until their respective disposal dates.

   On 24 January 2017, Rio Tinto announced it had reached a binding agreement for the sale of its 100 per cent shareholding in Coal & Allied Industries Limited to Yancoal Australia Limited.

   The transaction is subject to certain conditions precedent being satisfied, including approvals from the Australian Government, Chinese regulatory agencies and the New South Wales Government.

   As a result of the shareholding levels of various Chinese state-owned entities in each of Yankuang, Yanzhou and Chinalco (Aluminium Corporation of China), and Chinalco being a 10.1 per cent shareholder in the Rio Tinto Group, Yancoal Australia is considered to be a related party of Rio Tinto for the purposes of the UK Listing Rules and the ASX Listing Rules. Accordingly, approval is also required from a majority of independent Rio Tinto shareholders (that is, not including Chinalco and any other entities considered to be associates of Chinalco under the UK Listing Rules).

   Subject to all approvals and other conditions precedent being satisfied, it is expected that the transaction will complete in the second half of 2017.

j) On 7 October 2014, Rio Tinto disposed of its interest in Rio Tinto Coal Mozambique (RTCM), including its interests in the Benga project, a 65:35 joint venture with Tata Steel Limited. Zululand Anthracite Colliery (ZAC), which was retained, is reported within Coal Evaluation projects/other. On 2 September 2016, Rio Tinto disposed of its interest in ZAC.

k) Includes Rio Tinto's interests in Rio Tinto Fer et Titane Inc (100 per cent), QIT Madagascar Minerals SA (QMM, 80 per cent) and Richards Bay Minerals (attributable interest of 74 per cent).

l) Includes Rio Tinto's interests in Energy Resources of Australia (68.4 per cent) and Rössing Uranium Limited (68.6 per cent).

m) Simfer Jersey Limited, a company incorporated in Jersey in which the Group has a 53 per cent interest, has an 80.75 per cent interest in Simfer S.A. the company that operates the Simandou mining project in Guinea. The Group therefore has a 42.8 per cent indirect interest in Simfer S.A. These entities are consolidated as subsidiaries and together referred to as the Simandou iron ore project.

n) On 2 September 2016, Rio Tinto disposed of its interest in Zululand Anthracite Colliery (ZAC), which was previously reported within Coal Evaluation projects/other.

o) Other Operations include Rio Tinto's 100 per cent interest in the Gove alumina refinery and Rio Tinto Marine.

p) Capital expenditure comprises the net cash outflow on purchases less disposals of property, plant and equipment, capitalised evaluation costs and purchases less disposals of other intangible assets. The details provided include 100 per cent of subsidiaries' capital expenditure and Rio Tinto's share of the capital expenditure of joint operations and equity accounted units.

q) Operating assets of subsidiaries comprise net assets excluding post-retirement assets and liabilities, net of tax, and are before deducting net debt. Operating assets are stated after deduction of non-controlling interests, which are calculated by reference to the net assets of the relevant companies (ie inclusive of such companies' debt and amounts due to or from Rio Tinto Group companies).

r) Capital expenditure in 2016 for RTCA includes net proceeds of US$192 million for the disposal of 100 per cent interest in the Mount Pleasant thermal coal project to MACH Energy Australia Pty Ltd on 5 August 2016.

s) Following the termination of the previous sales agreement for Blair Athol, a binding agreement was signed in September 2016 to divest Rio Tinto's 71.2 per cent interest to Terracom subject to certain conditions precedent. At 31 December 2016, assets held for sale also included certain cancelled projects at Rio Tinto Kennecott.

At 31 December 2015, assets and liabilities held for sale primarily related to the Group's 40 per cent interest in the Bengalla coal Joint venture and its interest in Blair Athol.

Assets and liabilities held for sale as at 31 December 2014 comprised Rio Tinto's interests in the Blair Athol coal project and SouthGobi Resources Ltd.

Australian Corporations Act – summary of ASIC relief

Pursuant to section 340 of the Corporations Act 2001 (Corporations Act), the Australian Securities and Investments Commission issued an order dated 14 December 2015 that granted relief to Rio Tinto Limited from certain requirements of the Corporations Act in relation to the Company's financial statements and associated reports. The order essentially continues the relief that has applied to Rio Tinto Limited since the formation of the Group's dual listed companies (DLC) structure in 1995. The order applies to Rio Tinto Limited's financial reporting obligations for the financial years and half-years ending between 31 December 2015 and 30 June 2020 inclusive.

In essence, instead of being required under the Corporations Act to prepare consolidated financial statements covering only itself and its controlled entities, the order allows Rio Tinto Limited to prepare consolidated financial statements in which it, Rio Tinto plc and their respective controlled entities are treated as a single economic entity. In addition, those consolidated financial statements are to be prepared:

– in accordance with the principles and requirements of International Financial Reporting Standards as adopted by the European Union (EU IFRS) rather than the Australian Accounting Standards (AAS) (except for one limited instance in the case of any concise report), and in accordance with UK financial reporting obligations generally;
– on the basis that the transitional provisions of International Financial Reporting Standard 1, First-time Adoption of International Financial Reporting Standards, should be applied using the combined financial statements previously prepared for Rio Tinto Limited, Rio Tinto plc and their respective controlled entities under Generally Accepted Accounting Principles in the United Kingdom, under which the DLC Merger between Rio Tinto Limited and Rio Tinto plc was accounted for using "merger", rather than "acquisition", accounting (reflecting that neither Rio Tinto Limited nor Rio Tinto plc was acquired by, or is controlled by, the other; and meaning that the existing carrying amounts, rather than fair values, of assets and liabilities at the time of the DLC Merger were used to measure those assets and liabilities at formation);
– on the basis that Rio Tinto Limited and Rio Tinto plc are a single company (with their respective shareholders being the shareholders in that single company); and
– with a reconciliation, from EU IFRS to AAS, of the following amounts: consolidated loss/profit for the financial year, total consolidated comprehensive loss/income for the financial year and total consolidated equity at the end of the financial year (see page 115).

Those consolidated financial statements must also be audited in relation to their compliance with relevant Australian and UK requirements. Rio Tinto Limited must also prepare a Directors' report which satisfies the content requirements of the Corporations Act (applied on the basis that for these purposes the consolidated entity is the Group, and the consolidated financial statements cover the Group). This includes a Remuneration Report (see pages 70 to 107) prepared in accordance with the requirements of the Corporations Act.

Rio Tinto Limited is also required to comply generally with the lodgement and distribution requirements of the Corporations Act (including timing requirements) in relation to those consolidated financial statements (including any concise financial statements), the Auditor's report and the Directors' report. The Corporations Act also requires that a non-binding resolution to adopt the Remuneration Report be voted on by shareholders at the Company's annual general meeting.

Rio Tinto Limited is not required to prepare separate consolidated financial statements solely for it and its controlled entities. Rio Tinto Limited is also not required to prepare and lodge parent entity financial statements for itself in respect of each relevant financial year.

Rio Tinto Limited must, however, in accordance with the Corporations Act include in the consolidated financial statements for the Group, as a note, various parent entity information regarding Rio Tinto Limited (including in relation to assets, liabilities, shareholders' equity, profit and loss, income, guarantees, contingent liabilities, and contractual commitments) prepared in accordance with AAS (see page 176).

Directors' declaration

Directors' statement of responsibilities in relation to the Group financial statements, Rio Tinto plc financial statements and Rio Tinto Limited financial statements

The directors are responsible for preparing the Annual report, the Remuneration Report and the financial statements in accordance with applicable law and regulations.

UK and Australian company law requires the directors to prepare financial statements for each financial year. Under UK law the directors have elected to prepare the Group financial statements in accordance with International Financial Reporting Standards (IFRSs) as adopted by the European Union and the Rio Tinto plc financial statements in accordance with United Kingdom Generally Accepted Accounting Practice (United Kingdom Accounting Standards and applicable law), including FRS 101 "Reduced disclosure framework".

Under Australian law, the directors are also required to prepare certain Rio Tinto Limited parent company financial statements in accordance with Australian Accounting Standards (AAS). In preparing the Group financial statements, the directors have also elected to comply with IFRSs, issued by the International Accounting Standards Board (IASB).

Under UK and Australian company law the directors must not approve the financial statements unless they are satisfied that they give a true and fair view of the state of affairs of the Group and the companies as at the end of the financial year, and of the profit or loss of the companies and Group for the period (as applicable).

In preparing these financial statements, the directors are required to:

- select suitable accounting policies and apply them consistently;
- make judgments and estimates that are reasonable and prudent;
- state whether IFRSs as adopted by the European Union, applicable UK Accounting Standards and AAS have been followed, subject to any material departures disclosed and explained in the Group and parent company financial statements respectively; and
- prepare the financial statements on the going concern basis unless it is inappropriate to presume that the Group and the companies will continue in business.

The directors are responsible for keeping adequate accounting records that are sufficient to show and explain the transactions of the companies and the Group and disclose with reasonable accuracy at any time the financial position of the companies and the Group and enable them to ensure that:

- the Group financial statements comply with the UK Companies Act 2006, the Australian Corporations Act 2001 as amended by the Australian Securities and Investments Commission Order dated 14 December 2015 and Article 4 of the IAS Regulation;
- the Rio Tinto plc financial statements comply with the UK Companies Act 2006;
- the Rio Tinto Limited parent company disclosures comply with the Corporations Act as amended by the Australian Securities and Investments Commission Order dated 14 December 2015; and
- the Remuneration Report complies with the UK Companies Act 2006 and the Corporations Act 2001 as amended by the Australian Securities and Investments Commission Order dated 14 December 2015.

The directors are also responsible for safeguarding the assets of the Companies and the Group and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

The directors are responsible for the maintenance and integrity of the Group's website. Legislation governing the preparation and dissemination of financial statements may differ between jurisdictions in which the Group reports.

Each of the current directors, whose names and function are listed on pages 50 to 52 in the Governance section, confirm that, to the best of their knowledge:

- the Rio Tinto Group financial statements and notes, which have been prepared in accordance with IFRS as adopted by the EU, the Corporations Act 2001 as amended by the Australian Securities and Investments Commission Order dated 14 December 2015, the UK Companies Act 2006 and Article 4 of the IAS Regulation, give a true and fair view of the assets, liabilities, financial position and profit of the Group;
- the Rio Tinto plc financial statements and notes, which have been prepared in accordance with United Kingdom Generally Accepted Accounting Practice give a true and fair view of the assets, liabilities, financial position and profit of the company;
- the Rio Tinto Limited parent company disclosures, which have been prepared in accordance with Australian Accounting Standards (AAS) and Corporations Act 2001 as amended by the Australian Securities and Investments Commission Order dated 14 December 2015 give a true and fair view of the assets, liabilities, financial position and profit of the company;
- the Strategic report section of the Annual report includes a fair review of the development and performance of the business and the position of the Group, together with a description of the principal risks and uncertainties that it faces; and
- there are reasonable grounds to believe that each of the Rio Tinto Group, Rio Tinto plc and Rio Tinto Limited will be able to pay its debts as and when they become due and payable.

The directors have been given the declarations by the chief executive and chief financial officer required by section 295A of the Corporations Act 2001 as amended by the Australian Securities and Investments Commission Order dated 14 December 2015.

Disclosure of information to auditors

The directors in office at the date of this report have each confirmed that:

- so far as he or she is aware, there is no relevant audit information of which the Group's auditors are unaware; and
- he or she has taken all the steps that he or she ought to have taken as a director to make himself or herself aware of any relevant audit information and to establish that the Group's auditors are aware of that information.

This declaration is made in accordance with a resolution of the board.

Jan du Plessis	Jean-Sébastien Jacques	Chris Lynch
Chairman	**Chief executive**	**Chief financial officer**
1 March 2017	1 March 2017	1 March 2017

Auditor's independence declaration

As lead auditor for the audit of Rio Tinto Limited for the year ended 31 December 2016, I declare that to the best of my knowledge and belief, there have been:

(a) no contraventions of the auditor independence requirements of the *Corporations Act 2001* in relation to the audit; and

(b) no contraventions of any applicable code of professional conduct in relation to the audit.

This declaration is in respect of Rio Tinto Limited and the entities it controlled during the period.

Paul Bendall

Partner

PricewaterhouseCoopers

Melbourne

1 March 2017

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Independent auditors' report of PricewaterhouseCoopers LLP to the members of Rio Tinto plc and PricewaterhouseCoopers to the members of Rio Tinto Limited

For the purpose of this report, the terms "we" and "our" denote PricewaterhouseCoopers LLP in relation to UK legal, professional and regulatory responsibilities and reporting obligations to the members of Rio Tinto plc and PricewaterhouseCoopers in relation to Australian legal, professional and regulatory responsibilities and reporting obligations to the members of Rio Tinto Limited. For the purposes of the table on pages 208 to 210 that sets out the areas of focus / key audit matters and how our audit addressed the area of focus / key audit matter, the terms "we" and "our" refer to PricewaterhouseCoopers LLP and/or PricewaterhouseCoopers and/or our component teams. The Group financial statements, as defined below, consolidate the accounts of Rio Tinto plc and Rio Tinto Limited and their respective subsidiaries ("the Group") and include the Group's share of joint arrangements and associates.

The relevant legislation governing the companies is the United Kingdom Companies Act 2006 ("Companies Act 2006") for Rio Tinto plc and the Australian Corporations Act 2001 ("Corporations Act 2001") as amended by the ASIC order dated 14 December 2015 (the "ASIC Order") for Rio Tinto Limited.

Report on the financial statements and the financial report

Opinion of PricewaterhouseCoopers LLP on the financial statements to the members of Rio Tinto plc

In our opinion:

- the financial statements, defined below, give a true and fair view of the state of the Group's and of Rio Tinto plc's affairs as at 31 December 2016 and of the Group's profit and cash flows for the year then ended;
- the Group financial statements have been properly prepared in accordance with International Financial Reporting Standards ("IFRSs") as adopted by the European Union;
- the Rio Tinto plc company financial statements have been properly prepared in accordance with United Kingdom Generally Accepted Accounting Practice; and
- the financial statements have been prepared in accordance with the requirements of the Companies Act 2006 and, as regards the Group financial statements, Article 4 of the IAS Regulation.

Separate opinion of PricewaterhouseCoopers LLP in relation to financial statements prepared in accordance with IFRSs as issued by the International Accounting Standards Board ("IASB")

As explained in note 1 to the financial statements, the Group, in addition to applying IFRSs as adopted by the European Union, has also applied IFRSs as issued by the IASB.

In our opinion, the Group financial statements comply with IFRSs as issued by the IASB.

Opinion of PricewaterhouseCoopers on the financial report to the members of Rio Tinto Limited

In our opinion:

The accompanying financial report, defined below, is in accordance with the Corporations Act 2001 as amended by the ASIC Order, including:

- giving a true and fair view of the Group's financial position as at 31 December 2016 and of its performance for the year then ended; and
- complying with Australian Accounting Standards and the Corporations Regulations 2001.

Basis for opinion:

We conducted our audit in accordance with Australian Auditing Standards. Our responsibilities under those standards are further described in the *Responsibilities for the financial statements, the financial report and the audit* section of our report.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Independence:

We are independent of the Group in accordance with the auditor independence requirements of the Corporations Act 2001 and the ethical requirements of the Accounting Professional and Ethical Standards Board's APES 110 Code of Ethics for Professional Accountants ("APES 110") that are relevant to our audit of the financial report in Australia. We have also fulfilled our other ethical responsibilities in accordance with APES 110.

What we have audited

The Group financial statements, included within the Annual report and Accounts (the "Annual report"), comprise:

- the Group balance sheet as at 31 December 2016;
- the Group income statement and Group statement of comprehensive income for the year then ended;
- the Group cash flow statement for the year then ended;
- the Group statement of changes in equity for the year then ended;
- notes 1 – 45 and 47 to the Group financial statements, which include a summary of significant accounting policies and other explanatory information;
- the outline of dual listed companies structure and basis of financial statements; and
- the Rio Tinto financial information by business unit.

The Rio Tinto plc company financial statements, included within the Annual report, comprise:

- the Rio Tinto plc company balance sheet as at 31 December 2016;
- the Rio Tinto plc company statement of changes in equity for the year then ended; and
- notes A-H to the Rio Tinto plc company financial statements, which include a summary of significant accounting policies and other explanatory information.

The Group financial statements and the Rio Tinto plc company financial statements are referred to in this report as the "financial statements". The Group financial statements, note 46 "Rio Tinto Limited parent company disclosures" and the Directors' declaration on page 205 are referred to in this report as the "financial report".

PricewaterhouseCoopers LLP has audited the financial statements for the year ended 31 December 2016.

PricewaterhouseCoopers has audited the Reconciliation with Australian Accounting Standards, the Directors' Remuneration Report included in the Directors' report and the financial report for the year ended 31 December 2016.

Certain required disclosures have been presented elsewhere in the Annual report rather than in the notes to the financial statements and the financial report. These are cross-referenced from the financial statements and the financial report and are identified as audited.

The financial reporting framework that has been applied in the preparation of the Group financial statements is applicable law in the United Kingdom, applicable law in Australia as amended by the ASIC Order (described in the Annual report under the heading "Australian Corporations Act – Summary of ASIC relief") and IFRSs as adopted by the European Union and as issued by the IASB.

Independent auditors' report of PricewaterhouseCoopers LLP to the members of Rio Tinto plc and PricewaterhouseCoopers to the members of Rio Tinto Limited

continued

The financial reporting framework that has been applied in the preparation of the Rio Tinto plc company financial statements is United Kingdom Accounting Standards, comprising FRS 101, "Reduced Disclosure Framework" and applicable law (United Kingdom Generally Accepted Accounting Practice).

All currency references are to the United States Dollar, unless otherwise stated.

Our audit approach

The Group's principal activities are minerals and metals exploration, development, production and processing. The Group operates through four product groups which are supported by the Growth & Innovation group and other centralised functions. Together these comprise 49 business units containing multiple reporting units.

Overview

Materiality	Overall Group materiality: $275 million (2015: $300 million).
Scope	We identified the Pilbara business unit as a significant component which required an audit of its complete financial information due to its financial significance to the Group. Aside from the Pilbara, we obtained full scope reporting from a further 21 reporting units (2015: one). Specific audit procedures on certain balances and transactions were performed at a further 12 reporting units (2015: 17), which comprised seven (2015: 12) operating reporting units and five (2015: five) central reporting units, such as treasury entities.
Areas of focus / key audit matters	We assessed the risks of material misstatement in the financial statements and the financial report and determined the following areas of focus / key audit matters for 2016: – impairment assessments (including indicators of impairment and impairment reversal), with a particular focus on property, plant and equipment (at Oyu Tolgoi and Argyle) and indefinite-lived intangible assets in Rio Tinto Aluminium; – provisions for uncertain tax positions, with a particular focus on transfer pricing of certain transactions with the Group's commercial centre in Singapore; – provisions for close-down, restoration and environmental obligations; and – defined benefit pension plan surpluses and deficits.

The scope of our audit and our areas of focus / key audit matters

We conducted our audit in accordance with International Standards on Auditing (UK and Ireland) ("ISAs (UK & Ireland)") and Australian Auditing Standards ("ASAs").

We designed our audit by determining materiality and assessing the risks of material misstatement in the financial statements and the financial report. In particular, we looked at where the directors made subjective judgements, for example in respect of significant accounting estimates that involved making assumptions and considering future events that are inherently uncertain. As in all of our audits, we also addressed the risk of management override of internal controls, including evaluating whether there was evidence of bias by the directors that represented a risk of material misstatement due to fraud.

The risks of material misstatement that were of most significance and had the greatest effect on our audit, including the allocation of our resources and effort in the current year, are identified as "areas of focus / key audit matters" in the table below. We have also set out how we tailored our audit to address these specific areas in order to provide an opinion on the financial statements and financial report as a whole, and any comments we make on the results of our procedures should be read in this context. This is not a complete list of all risks identified by our audit.

Area of focus / key audit matter	How our audit addressed the area of focus / key audit matter
Impairment/reversal of impairment assessment The Group has goodwill of $951 million, indefinite-lived intangible assets of $1,702 million, finite-lived intangible assets of $1,577 million, (including exploration and evaluation assets of $711 million) and property, plant and equipment of $58,855 million as at 31 December 2016. Impairment charges to each of these asset categories have been recognised in previous years. All cash generating units (CGUs) containing goodwill and indefinite-lived intangible assets must be tested for impairment annually. Management must also determine the recoverable amount for other assets including finite-lived intangible assets, property, plant and equipment and evaluation and exploration assets when impairment indicators are identified. The determination of recoverable amount, being the higher of value-in-use and fair value less costs of disposal, requires judgement on the part of management in identifying and then estimating the recoverable amount for the relevant CGUs. Recoverable amounts are based on management's view of key internal value driver inputs and external market conditions such as future commodity prices, the timing and approval of future capital and operating expenditure, and the most appropriate discount rate. As well as considering indicators of impairment, management must determine whether any indicators of reversal of previous impairments are apparent for assets other than goodwill. Due to continued uncertainty over long-term commodity prices, impairment reversals were only considered in a limited number of cases. No impairment reversals were recognised.	For material goodwill balances, other intangible assets, including indefinite-lived water rights in Rio Tinto Aluminium, property, plant and equipment, and exploration and evaluation assets we undertook the following: – satisfied ourselves as to the appropriateness of management's identification of the Group's CGUs and the continued satisfactory operation of the Group's controls over the impairment assessment process; – evaluated management's assessment of impairment indicators, as well as indicators of impairment reversal, including the conclusions reached; – with the support of our valuation experts, benchmarked key market related assumptions in management's valuation models used to determine recoverable amount against external data, including assumptions of future commodity prices, foreign exchange rates and discount rates; and – checked the mathematical accuracy of management's valuation models and agreed relevant data, including assumptions on timing and future capital and operating expenditure, to the latest Life of Mine/production plans and budgets.

Area of focus / key audit matter	How our audit addressed the area of focus / key audit matter
In relation to specific reporting units we noted the following: Argyle – as a result of the lower production volumes compared with forecast and lower prices achieved for bulk diamonds, an impairment trigger was identified for the Argyle CGU. Management determined the recoverable amount for Argyle was $191 million assessed by reference to a value in use ("VIU") model in line with the accounting policy set out in note 1(i). The reduction in the recoverable amount resulted in a pre-tax impairment charge of $240 million related to property, plant & equipment and $1 million to intangible assets. Oyu Tolgoi – this project has progressed during 2016, including formal notice to proceed with the underground mine development and approval of the 2016 Oyu Tolgoi feasibility study by both the Government of Mongolia and Turquoise Hill Resources. The operating assets of the Oyu Tolgoi CGU as at 31 December 2016 were $7.9 billion. Refer to note 6 for management's conclusions and the Audit Committee's views set out on page 59.	In addition to our overall response to impairment risk described above, we performed additional procedures on certain projects or reporting units as follows: – Argyle – assessed the reliability of management's diamond price forecasts based on recent sales prices achieved as well as performing sensitivity analysis over the key assumptions in the VIU model such as changes in diamond prices, operating expenses, the discount rate and exchange rates; and – Oyu Tolgoi – read the formal notice to proceed issued by the Group and the Government of Mongolia and the 2016 Oyu Tolgoi feasibility study. We understood key changes in the 2016 Oyu Tolgoi feasibility study compared with the 2015 feasibility study and the impact of the latest study on Life of Mine assumptions and assessed management's competence and objectivity in preparing the study. Given the positive developments in 2016, we satisfied ourselves that no impairment trigger arose in the year. However, due to the length of time remaining to complete the underground mine, and the associated complexity of doing so, we also satisfied ourselves that developments in 2016 did not give rise to an impairment reversal trigger for the Oyu Tolgoi CGU. We considered the appropriateness of the related disclosures in note 6 to the financial statements.
Close-down, restoration and environmental obligations The Group has provisions for close-down, restoration and environmental obligations of $8,722 million as at 31 December 2016. The calculation of these provisions requires management judgement in estimating the quantum and timing of future costs, particularly given the unique nature of each site, the long timescales involved and the potential associated obligations. These calculations also require management to determine an appropriate rate to discount future costs to their net present value. The judgement required to estimate such costs is compounded by the fact that there has been limited restoration and rehabilitation activity and historical precedent against which to benchmark estimates of future costs. Management reviews the close-down, restoration and environmental obligations on a semi-annual basis, using experts to provide support in its assessment where appropriate. This review incorporates the effects of any changes in local regulations and management's anticipated approach to restoration and rehabilitation. In relation to specific assets, we focussed on the change in provision at the Gove alumina refinery. An updated closure study in 2016 at the Gove refinery resulted in a change in the estimate and an increase in the closure provision by $402 million. Refer to notes 2 and 26, and the Audit Committee's views set out on page 59.	We assessed management's process for the review of closure provisions, and performed detailed testing for 10 reporting units that had a material movement in their closure provision in the year or a material closure provision as at 31 December 2016 (2015: 5 reporting units). As part of our detailed testing of the cost estimates prepared by management for the 10 reporting units selected, we established the existence of legal and/or constructive obligations with respect to the closure provision and considered the intended method of restoration and rehabilitation and associated cost estimate. We also considered the competence and objectivity of management's experts, whether internal or external to the Group, who produced the cost estimates. We checked the mathematical accuracy of management's calculations and assessed the appropriateness of the discount rate using our valuations experts. In addition to our overall response to the risk described above, we performed additional procedures in respect of the Gove alumina refinery provision as follows: – read the latest available technical studies and assessed the appropriateness of the scope of work performed by management and the various third party experts; and – engaged our expert in the field of restoration and rehabilitation to evaluate technical data related to the project. For the remaining reporting units which did not have a material closure provision or material movement in the year, including legacy operations, we considered whether the provision relating to close-down, restoration and environmental obligations was consistent with our understanding of the obligations associated with the operation and the remediation plans. We considered the appropriateness of the related disclosures in notes 2 and 26 to the financial statements.

Independent auditors' report of PricewaterhouseCoopers LLP to the members of Rio Tinto plc and PricewaterhouseCoopers to the members of Rio Tinto Limited

continued

Area of focus / key audit matter	How our audit addressed the area of focus / key audit matter
Provisions for uncertain tax positions The Group operates across a large number of jurisdictions and is subject to periodic challenges by local tax authorities on a range of tax matters during the normal course of business, including transfer pricing, indirect taxes and transaction related tax matters. As at 31 December 2016, the Group has current and non-current taxes payable of $1,038 million. Where the amount of tax payable is uncertain, the Group establishes provisions based on management's best estimate of the most likely outcome. In relation to specific uncertain tax positions, we focussed on matters relating to the transfer pricing of certain transactions between the Group's entities based in Australia and the Group's commercial centre in Singapore. The Group has been in discussion with the Australian Taxation Office ("ATO") on these matters through advance ruling requests or pursuant to the Group's co-operative compliance agreement. The Group has recognised an increase in the tax provision of $380 million in the year. The Group has not yet received amended tax assessments from the ATO in respect of these matters, but it is possible that assessments may be issued in the near future. Refer to notes 2 and 9, and the Audit Committee's views set out on page 59.	We assessed management's process for identifying uncertain tax positions and the related accounting policy of providing for tax exposures. We used our tax specialists to gain an understanding of the current status of tax assessments and investigations and to monitor developments in ongoing disputes. We read recent rulings and correspondence with local tax authorities, as well as external advice received by the Group where relevant, to satisfy ourselves that the tax provisions had been appropriately recorded or adjusted to reflect the latest external developments. In addition to our overall response to the risk described above, we performed additional procedures in respect of the Group's Singapore commercial centre as follows: – read the latest available position paper and expert reports to assess the appropriateness of the provision recognised by management; – checked the mathematical accuracy of management's models and agreed relevant input data to supporting records; and – engaged our experts in the field of transfer pricing to evaluate the basis on which the provision has been recognised. We considered the appropriateness of the related disclosures in notes 2 and 9 to the financial statements.
Defined benefit pension plan surpluses and deficits The Group has approximately 55 defined benefit pension plans. The total fair value of plan assets is $13,749 million, and the total present value of pension obligations is $15,302 million, which are both significant in the context of the overall balance sheet of the Group. The valuation of the pension liabilities requires judgement in determining appropriate assumptions such as salary increases, mortality rates, discount rates, inflation levels and the impact of any changes in individual pension plans. Movements in these assumptions can have a material impact on the determination of the liability. Management uses external actuaries to assist in assessing these assumptions. Judgement is also involved in the measurement of the fair value of certain pension assets. Refer to note 45 and the Audit Committee's views set out on page 59.	We used our actuarial experts to satisfy ourselves that the assumptions used in calculating the pension plan liabilities, including salary increases and mortality rate assumptions, were consistent with the specifics of each in-scope plan and, where applicable, with relevant national and industry benchmarks. We also checked that the discount and inflation rates used in the valuation of the pension liabilities were consistent with our internally developed benchmarks and in line with other companies' recent external reporting. For pension plan assets, we obtained third party confirmations of ownership and third party valuations of individual pension assets. We re-performed a sample of the valuations independently, for example testing the valuation of marketable securities to index prices as at 31 December 2016, recalculating valuations based on observable inputs and using our experts to help us assess other individual asset values whose value is not determined based on observable market inputs, such as property. We considered the appropriateness of the related disclosures in note 45 to the financial statements.

How we tailored the audit scope

As the Group engagement team, we tailored the scope of our audit to ensure that we performed enough work to be able to give an opinion on the financial statements and the financial report as a whole, taking into account the geographical structure of the Group, the accounting processes and controls, and the industry in which the Group operates.

Following the reorganisation of the Group's product group structure in June 2016, the Group is organised into four product groups – Aluminium, Copper & Diamonds, Energy & Minerals and Iron Ore, all of which are supported by the Growth & Innovation group and other centralised functions. Each product group is made up of a number of operating businesses which represent separate business units. Each business unit is comprised of individual reporting units which align to discrete operations. The Group financial statements are a consolidation of reporting units, comprising the Group's operating businesses and centralised functions. We determined the appropriate reporting units to perform work on based on factors such as the size of the balances, the areas of focus / key audit matters as noted above and known accounting matters, and to include unpredictability in our audit procedures.

In establishing the overall approach to the Group audit, we determined the type of work that needed to be performed at reporting units by us, as the Group engagement team, or component auditors from either other PwC network firms or non-PwC firms operating under our instruction. In 2016, we re-evaluated our audit approach in respect of the Aluminium product group, and received reporting directly from Aluminium reporting units that previously reported to, and were aggregated at, the product group level, before being reported to the Group team at that aggregated product group level. With this change in our audit scoping we also extended certain procedures at in-scope reporting units when compared with those undertaken last year to simplify our Group audit approach.

We identified the Pilbara reporting unit as a significant component (as defined within ISAs (UK & Ireland) and ASAs) which, in our view, required an audit of its complete financial information, due to its financial significance to the Group. Outside of the Pilbara reporting unit, we obtained full scope reporting from a further 21 reporting units (2015: one), the increase largely reflecting our revised approach to the Aluminium product group, as well as at other key reporting units in which we previously performed specific audit procedures. Specific audit procedures on certain balances and transactions were performed at a further 12 reporting units (2015: 17), which comprised seven (2015: 12) operating reporting units and five (2015: five) central reporting units, such as treasury entities, primarily to ensure appropriate audit coverage.

As we seek to vary our audit procedures each year to ensure an element of unpredictability, two smaller reporting units (2015: two) were included in our Group audit scope for 2016. We also performed work centrally on IT general controls, journals, taxation and pensions.

Where work was performed by component auditors, we determined the level of involvement we needed to have in the audit work at those reporting units to be able to conclude whether sufficient appropriate audit evidence had been obtained as a basis for our opinion on the Group financial statements as a whole.

We issued formal written instructions to all component auditors setting out the audit work to be performed by each of them and maintained regular communication with the component auditors throughout the audit cycle. These interactions included attending certain component clearance meetings and holding regular conference calls, as well as reviewing and assessing any matters reported. The Group engagement team also reviewed selected audit working papers for certain in-scope component teams.

In addition, senior members of the Group engagement team visited component teams across all four product groups in Canada, Australia, Chile, Mongolia and Singapore. These visits included meetings with local management and with the component auditors, and typically operating site tours.

Materiality

The scope of our audit was influenced by our application of materiality. We set certain quantitative thresholds for materiality. These, together with qualitative considerations, helped us to determine the scope of our audit and the nature, timing and extent of our audit procedures on the individual financial statement line items and disclosures and to evaluate the effect of misstatements, both individually and on the financial statements and the financial report as a whole.

Based on our professional judgement, we determined materiality for the financial statements and the financial report as a whole as follows:

Overall Group materiality	$275 million (2015: $300 million).
How we determined it	We used an average of underlying earnings before tax (as defined in note 2 to the financial statements) of the current and previous three years (2015: 5% of single year underlying earnings before tax).
Rationale for benchmark applied	We chose to use an adjusted underlying earnings measure as the benchmark because an adjusted measure removes the impact of material items which do not recur from year to year or otherwise significantly affect the underlying trend of performance from continuing operations. This is the metric against which the performance of the Group is most commonly assessed by management and reported to shareholders. For 2016 we amended our approach to calculate materiality based on a four year average of profit before tax adjusted for items excluded from underlying earnings. Adoption of a multi-year average benchmark for materiality will respond to longer-term trends in commodity markets and reduce volatility in the measure year-on-year. Using our professional judgement, we determined materiality for this year at $275 million, which equates to approximately 4.1% of the current year's underlying earnings before tax.
Component materiality	For each reporting unit ("component") in our audit scope, we allocated a materiality that was less than our overall Group materiality. The materiality allocated to each component was between $19 million and $250 million.

We agreed with the Audit Committee that we would report to them misstatements identified during our audit above $25 million (2015: $30 million) as well as misstatements below that amount that, in our view, warranted reporting for qualitative reasons.

Going concern

Under the Listing Rules we are required to review the Directors' statement, set out on page 108, in relation to going concern. We have nothing to report having performed our review.

Under ISAs (UK & Ireland) we are also required to report to you if we have anything material to add or to draw attention to in relation to the Directors' statement about whether they considered it appropriate to adopt the going concern basis in preparing the financial statements. We have nothing material to add or to draw attention to.

Under ASAs we are required to conclude on the appropriateness of the directors' use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial report or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report.

As noted in the Directors' statement, the directors have concluded that it is appropriate to adopt the going concern basis in preparing the financial statements. The going concern basis presumes that the Group and the parent companies, defined as Rio Tinto plc and Rio Tinto Limited (the "Parent Companies"), have adequate resources to remain in operation, and that the directors intend them to do so, for at least one year from the date the financial statements were signed.

As part of our audit we have concluded that the directors' use of the going concern basis is appropriate. However, because not all future events or conditions can be predicted, these statements are not a guarantee as to the Group's and Parent Companies' ability to continue as a going concern.

Other required reporting – PricewaterhouseCoopers LLP

Consistency of other information

Companies Act 2006 opinion

In our opinion, based on the work undertaken in the course of the audit:

– the information given in the Strategic report and the Directors' report for the financial year for which the financial statements are prepared is consistent with the financial statements; and
– the Strategic report and the Directors' report have been prepared in accordance with applicable legal requirements.

Independent auditors' report of PricewaterhouseCoopers LLP to the members of Rio Tinto plc and PricewaterhouseCoopers to the members of Rio Tinto Limited

continued

In addition, in light of the knowledge and understanding of the Group and Parent Companies and their environment obtained in the course of the audit, we are required to report if we have identified any material misstatements in the Strategic report and the Directors' report. We have nothing to report in this respect.

ISAs (UK & Ireland) reporting

Under ISAs (UK & Ireland) we are required to report to you if, in our opinion:

Information in the Annual report is: – materially inconsistent with the information in the audited financial statements; – apparently materially incorrect based on, or materially inconsistent with, our knowledge of the Group and Rio Tinto plc acquired in the course of performing our audit; or – otherwise misleading.	We have no exceptions to report arising from this responsibility.
The statement given by the directors on page 66, in accordance with provision C.1.1 of the UK Corporate Governance Code ("the Code"), that they consider the Annual report taken as a whole to be fair, balanced and understandable and provides the information necessary for members to assess the Group's and Rio Tinto plc's position and performance, business model and strategy is materially inconsistent with our knowledge of the Group and Rio Tinto plc acquired in the course of performing our audit.	We have no exceptions to report arising from this responsibility.
The section of the Annual report on page 59, as required by provision C.3.8 of the Code, describing the work of the Audit Committee does not appropriately address matters communicated by us to the Audit Committee.	We have no exceptions to report arising from this responsibility.

The directors' assessment of the prospects of the Group and of the principal risks that would threaten the solvency or liquidity of the Group

Under ISAs (UK & Ireland) we are required to report to you if we have anything material to add or to draw attention to in relation to:

– the directors' confirmation on page 15 of the Annual report, in accordance with provision C.2.1 of the Code, that they have carried out a robust assessment of the principal risks facing the Group, including those that would threaten its business model, future performance, solvency or liquidity.	We have nothing material to add or to draw attention to.
– the disclosures in the Annual report that describe those risks and explain how they are being managed or mitigated.	We have nothing material to add or to draw attention to.
– the directors' explanation on page 15 of the Annual report, in accordance with provision C.2.2 of the Code, as to how they have assessed the prospects of the Group, over what period they have done so and why they consider that period to be appropriate, and their statement as to whether they have a reasonable expectation that the Group will be able to continue in operation and meet its liabilities as they fall due over the period of their assessment, including any related disclosures drawing attention to any necessary qualifications or assumptions.	We have nothing material to add or to draw attention to.

Under the Listing Rules we are required to review the Directors' statement that they have carried out a robust assessment of the principal risks facing the Group and the Directors' statement in relation to the longer-term viability of the Group, set out on page 15. Our review was substantially less in scope than an audit and only consisted of making enquiries and considering the directors' process supporting their statements; checking that the statements are in alignment with the relevant provisions of the Code; and considering whether the statements are consistent with the knowledge acquired by us in the course of performing our audit. We have nothing to report having performed our review.

Adequacy of accounting records and information and explanations received

Under the Companies Act 2006 we are required to report to you if, in our opinion:

– we have not received all the information and explanations we require for our audit;
– adequate accounting records have not been kept by Rio Tinto plc, or returns adequate for our audit have not been received from branches not visited by us; or
– the Rio Tinto plc financial statements and the part of the Directors' Remuneration Report to be audited are not in agreement with the accounting records and returns.

We have no exceptions to report arising from this responsibility.

Directors' remuneration

Directors' Remuneration Report – Companies Act 2006 opinion

In our opinion, the part of the Directors' Remuneration Report to be audited has been properly prepared in accordance with the Companies Act 2006.

Other Companies Act 2006 reporting

Under the Companies Act 2006 we are required to report to you if, in our opinion, certain disclosures of directors' remuneration specified by law are not made. We have no exceptions to report arising from this responsibility.

Corporate governance statement

Under the Listing Rules we are required to review the part of the Corporate Governance Statement relating to ten further provisions of the Code. We have nothing to report having performed our review.

Other required reporting – PricewaterhouseCoopers

Other information

The directors are responsible for the other information. The other information comprises the information included in the Annual report other than the financial report and our auditor's report thereon.

Our opinion on the financial report does not cover the other information and accordingly we do not express any form of assurance conclusion thereon.

In connection with our audit of the financial report, our responsibility is to read the other information identified above and, in doing so, consider whether the other information is materially inconsistent with the financial report or our knowledge obtained in the audit, or otherwise appears to be materially misstated.

If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report in this regard.

Directors' remuneration

Directors' Remuneration Report – Corporations Act 2001 opinion
Under the Corporations Act 2001 (in respect of Rio Tinto Limited) we are required to express an opinion on the Directors' Remuneration Report based on our audit conducted in accordance with ASAs.

Opinion on the Remuneration Report
We have audited the Remuneration Report included on pages 67 to 107 of the Directors' report for the year ended 31 December 2016.

In our opinion, the Remuneration Report of Rio Tinto Limited complies with the requirements of section 300A of the Corporations Act 2001 as amended by the ASIC Order.

Responsibilities
The directors of Rio Tinto Limited are responsible for the preparation and presentation of the Remuneration Report in accordance with section 300A of the Corporations Act 2001 as amended by the ASIC Order.

Our responsibility is to express an opinion on the Remuneration Report, based on our audit conducted in accordance with ASAs.

Responsibilities for the financial statements, the financial report and the audit

Responsibilities of the directors
As explained more fully in the Directors' statement of responsibilities set out on page 205, the directors are responsible for the preparation of the financial statements and the financial report and for being satisfied that they give a true and fair view in accordance with the applicable financial reporting frameworks. The directors are also responsible for such internal control as the directors determine is necessary to enable the preparation of the financial report that is free from material misstatement, whether due to fraud or error.

Auditor's responsibilities for the audit of the financial statements and financial report
Our responsibility is to audit and express an opinion on the financial statements and financial report in accordance with applicable law and ISAs (UK & Ireland) and ASAs respectively. Those standards require us to comply with the Auditing Practices Board's Ethical Standards for Auditors and relevant ethical requirements relating to audit engagements in Australia.

This report, including the opinions, has been prepared for and only for the members of Rio Tinto plc and Rio Tinto Limited as a body in accordance with Chapter 3 of Part 16 of the Companies Act 2006 (in respect of Rio Tinto plc) and the Corporations Act 2001 as amended by the ASIC Order (in respect of Rio Tinto Limited) and for no other purpose. We do not, in giving these opinions, accept or assume responsibility for any other purpose or to any other person to whom this report is shown or into whose hands it may come save where expressly agreed by our prior consent in writing.

An audit involves obtaining evidence about the amounts and disclosures in the financial statements and the financial report to obtain reasonable assurance about whether the financial statements and financial report as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with the ISAs (UK & Ireland) and ASAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements or financial report.

As part of an audit in accordance with the ISAs (UK & Ireland) and ASAs, we exercise professional judgement and maintain professional scepticism throughout the audit. We also:

- identify and assess the risks of material misstatement of the financial statements and financial report, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control;
- obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Group's and the Parent Companies' internal control;
- assess whether the accounting policies are appropriate to the Group's and the Parent Companies' circumstances and have been consistently applied and adequately disclosed;
- evaluate the reasonableness of significant accounting estimates and related disclosures made by the directors;
- assess the overall presentation of the financial statements and the financial report, including the disclosures, and whether the financial statements and the financial report represents the underlying transactions and events in a manner that achieves fair presentation; and
- obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group to express an opinion on the financial statements and the financial report. We are responsible for the direction, supervision and performance of the group audit. We remain solely responsible for our audit opinion.

We primarily focus our work in the areas outlined above by assessing the directors' judgements against available evidence, forming our own judgements, and evaluating the disclosures in the financial statements and the financial report.

We test and examine information, using sampling and other auditing techniques, to the extent we consider necessary to provide a reasonable basis for us to draw conclusions. We obtain audit evidence through testing the effectiveness of controls, substantive procedures or a combination of both.

We communicate with the directors regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

We also provide the directors with a statement that we have complied with relevant ethical requirements regarding independence, and communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

From the matters communicated with the directors, we determine those matters that were of most significance in the audit of the financial statements and the financial report for the current period and had the greatest effect on our audit and are therefore the areas of focus / key audit matters. We describe these matters in our auditors' report unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, we determine that a matter should not be communicated in our report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest benefits of such communication.

Independent auditors' report of PricewaterhouseCoopers LLP to the members of Rio Tinto plc and PricewaterhouseCoopers to the members of Rio Tinto Limited

continued

In addition, we read all the financial and non-financial information in the Annual report to identify material inconsistencies with the audited financial statements and the audited financial report and to identify any information that is apparently materially incorrect based on, or materially inconsistent with, the knowledge acquired by us in the course of performing the audit. If we become aware of any apparent material misstatements or inconsistencies we consider the implications for our report. With respect to the Strategic report and Directors' report, we consider whether those reports include the disclosures required by applicable legal requirements.

Paul Barkus

(Senior Statutory Auditor)

for and on behalf of PricewaterhouseCoopers LLP
Chartered Accountants and Statutory Auditors

London, United Kingdom

1 March 2017

Paul Bendall

Partner

for and on behalf of PricewaterhouseCoopers

Melbourne, Australia

1 March 2017

(a) The maintenance and integrity of the Rio Tinto Group website is the responsibility of the directors; the work carried out by the auditors does not involve consideration of these matters and, accordingly, the auditors accept no responsibility for any changes that may have occurred to the financial statements since they were initially presented on the website.

(b) Legislation in the United Kingdom and Australia governing the preparation and dissemination of financial statements may differ from legislation in other jurisdictions.

Financial summary 2007-2016

US$m	2007	2008	2009	2010	2011	2012	2013	2014	2015	**2016**
Gross sales revenue [a]	33,518	56,905	42,734	59,008	65,298	55,597	54,575	50,041	36,784	**35,318**
Share of equity accounted units' sales revenue and items excluded from underlying earnings	(3,818)	(4,044)	(2,472)	(3,837)	(4,769)	(4,655)	(3,404)	(2,377)	(1,955)	**(1,537)**
Consolidated sales revenue	29,700	52,861	40,262	55,171	60,529	50,942	51,171	47,664	34,829	**33,781**
Underlying profit before interest and tax (PBIT)	10,517	17,683	9,843	21,128	23,662	13,467	16,039	13,851	7,310	**8,053**
Finance costs [b]	(570)	(1,706)	(1,058)	(909)	(759)	(616)	(794)	(967)	(1,076)	**(1,360)**
Exchange differences and derivatives [c]	253	(322)	528	529	2	695	(3,362)	(2,021)	(3,458)	**622**
Other exclusions from underlying earnings	(364)	(6,477)	(1,453)	(257)	(9,633)	(15,977)	(8,378)	(1,311)	(3,502)	**(972)**
Profit/(loss) before tax (PBT)	9,836	9,178	7,860	20,491	13,272	(2,431)	3,505	9,552	(726)	**6,343**
Tax on exclusions	60	988	(91)	42	135	2,896	2,642	423	567	**(155)**
Tax on underlying PBT	(2,150)	(4,730)	(1,985)	(5,338)	(6,607)	(3,485)	(5,068)	(3,476)	(1,560)	**(1,412)**
Loss after tax from discontinued operations	–	(827)	(449)	(97)	(10)	(7)	–	–	–	**–**
Attributable to non-controlling interests	(434)	(933)	(463)	(860)	(955)	(1)	2,586	28	853	**(159)**
Net earnings/(loss) [d]	7,312	3,676	4,872	14,238	5,835	(3,028)	3,665	6,527	(866)	**4,617**
Underlying earnings	7,443	10,303	6,298	13,987	15,572	9,269	10,217	9,305	4,540	**5,100**
Earnings/(loss) per share (basic) – continuing operations [e]	464.9c	286.8c	301.7c	731.0c	303.9c	(163.4)c	198.4c	353.1c	(47.5)c	**256.9c**
Underlying earnings per share (basic) – continuing operations [e]	473.2c	656.2c	357.1c	713.3c	809.7c	501.3c	553.1c	503.4c	248.8c	**283.8c**
Dividends per share: declared for year [f]										
Rio Tinto shareholders (US cents)	111.23c	111.22c	45.00c	108.00c	145.00c	167.00c	192.00c	215.00c	215.00c	**170.00c**
Rio Tinto plc (pence)	56.20p	67.49p	28.84p	67.35p	90.47p	106.77p	120.10p	134.88p	143.13p	**134.36p**
Rio Tinto Limited (Aus. cents)	125.72c	146.22c	51.56c	111.21c	134.01c	160.18c	213.14c	256.07c	296.80c	**222.75c**
Net assets										
Fixed assets [g]	75,888	67,651	72,706	83,895	91,529	90,580	81,554	80,669	70,226	**68,104**
Other assets less liabilities	11,609	8,469	10,078	4,394	1,632	8,478	8,224	4,596	4,037	**4,128**
Provisions (including deferred tax)	(16,013)	(14,987)	(17,998)	(19,706)	(25,935)	(22,126)	(18,221)	(18,176)	(16,352)	**(16,915)**
Net debt	(45,191)	(38,672)	(18,861)	(4,071)	(8,342)	(19,192)	(18,055)	(12,495)	(13,783)	**(9,587)**
Non-controlling interests	(1,521)	(1,823)	(2,094)	(6,265)	(6,685)	(11,187)	(7,616)	(8,309)	(6,779)	**(6,440)**
Equity attributable to owners of Rio Tinto	24,772	20,638	43,831	58,247	52,199	46,553	45,886	46,285	37,349	**39,290**
Capital expenditure [h]	(5,000)	(8,574)	(5,388)	(4,591)	(12,573)	(17,615)	(13,001)	(8,162)	(4,685)	**(3,012)**
Acquisitions	(37,539)	(9)	(396)	(907)	(4,156)	(1,335)	4	–	(3)	**–**
Disposals	13	2,572	2,424	3,800	386	251	1,896	887	(38)	**761**
Net cash generated from operating activities [i]	8,491	14,883	9,212	18,277	20,235	9,430	15,078	14,286	9,383	**8,465**
Cash flows before financing activities [j]	(34,251)	8,702	5,855	16,566	3,245	(8,813)	4,132	7,783	4,783	**6,361**
Ratios										
Operating margin [k]	34%	32%	24%	37%	37%	25%	30%	28%	20%	**23%**
Net debt to total capital [l]	63%	63%	29%	6%	12%	25%	25%	19%	24%	**17%**
Underlying earnings: owners' equity [m]	35%	45%	20%	27%	28%	19%	22%	20%	11%	**13%**
Interest cover [n]	20	10	9	27	27	13	13	13	7	**7**

(a) Gross sales revenue includes 100 per cent of subsidiaries' sales revenue and the Group's share of the sales revenue of equity accounted units (after adjusting for sales to subsidiaries).

Financial summary 2007-2016

continued

(b) Finance costs include net interest and amortisation of discount.

(c) Under IFRS, as defined in note 1, certain gains and losses on currency exchange and on revaluation of derivatives are included in the Group's net earnings/(loss). These items are excluded from underlying earnings.

(d) Underlying earnings is an additional measure of earnings, which is reported by Rio Tinto with its IFRS (as defined in note 1) results to provide greater understanding of the underlying business performance of its operations. It is defined in note 2 to the financial statements. Underlying profit before interest and tax (PBIT) is similar to underlying earnings except that it is stated before tax and interest.

(e) 2009 earnings per share from continuing operations and underlying earnings per share have been calculated using a number of shares which reflects the discounted price of the July 2009 rights issues (the bonus factor). 2007 and 2008 comparatives have been restated accordingly.

(f) Dividends per share are the amounts declared in respect of each financial year. These usually include an interim dividend paid in the year, and a final dividend paid after the end of the year. 2007 and 2008 ordinary dividends per share have been restated using a number of shares which reflects the discounted price of the July 2009 rights issues (the bonus factor).

(g) Fixed assets include property, plant and equipment, intangible assets, goodwill, and investments in, and long-term loans to, equity accounted units.

(h) Capital expenditure is presented gross, before taking into account any disposals of property, plant and equipment or intangible assets.

(i) Net cash generated from operating activities represents the cash generated by the Group's consolidated operations, after payment of interest, taxes, and dividends to non-controlling interests in subsidiaries.

(j) Cash flow before financing activities is stated before deducting dividends payable to owners of Rio Tinto.

(k) Operating margin is the percentage of underlying PBIT, after excluding tax on equity accounted units, to gross sales revenue.

(l) Total capital comprises equity attributable to owners of Rio Tinto plus net debt and non-controlling interests.

(m) Underlying earnings: owners' equity represents underlying earnings expressed as a percentage of the mean of opening and closing equity attributable to owners of Rio Tinto.

(n) Interest cover represents the number of times interest payable less receivable (excluding the amortisation of discount but including capitalised interest) is covered by underlying operating profit, less amortisation of discount, plus dividends from equity accounted units. Underlying operating profit is similar to underlying earnings but is stated before tax, interest and share of profit after tax of equity accounted units.

Summary financial data in Australian dollars, sterling and US dollars

2016 A$m	2015 A$m	2016 £m	2015 £m		2016 US$m	2015 US$m
47,467	48,878	**26,043**	24,063	Gross sales revenue	**35,318**	36,784
45,401	46,281	**24,909**	22,784	Consolidated sales revenue	**33,781**	34,829
8,525	(965)	**4,677**	(475)	Profit/(loss) before tax from continuing operations	**6,343**	(726)
6,419	(2,284)	**3,522**	(1,124)	Profit/(loss) for the year from continuing operations	**4,776**	(1,719)
6,205	(1,151)	**3,404**	(567)	Net earnings/(loss) attributable to Rio Tinto shareholders	**4,617**	(866)
6,854	6,033	**3,761**	2,970	Underlying earnings (a)	**5,100**	4,540
345.2c	(63.1)c	**189.4p**	(31.0)p	Basic earnings/(loss) per ordinary share (b)	**256.9c**	(47.5)c
381.4c	330.6c	**209.2p**	162.8p	Basic underlying earnings per ordinary share (a)(b)	**283.8c**	248.8c
				Dividends per share to Rio Tinto shareholders (c)		
211.02c	297.89c	**108.01p**	146.90p	– paid	**152.5c**	226.5c
163.62c	151.89c	**100.56p**	74.21p	– proposed	**125.0c**	107.5c
8,549	6,356	**4,690**	3,129	Cash flow before financing activities	**6,361**	4,783
(13,281)	(18,924)	**(7,836)**	(9,294)	Net debt	**(9,587)**	(13,783)
54,428	51,280	**32,116**	25,184	Equity attributable to Rio Tinto shareholders	**39,290**	37,349

(a) Underlying earnings exclude net impairment and other charges of US$483 million (2015: charges of US$5,406 million), which are analysed on page 130.
(b) Basic earnings/(loss) per ordinary share and basic underlying earnings per ordinary share do not recognise the dilution resulting from share options on issue.
(c) The Australian dollar and sterling amounts are based on the US dollar amounts, retranslated at average or closing rates as appropriate, except for the dividends which are the actual amounts.

The financial data above has been extracted from the financial information set out on pages 110 to 179.