

# Pampa Norte Spence site tour

Ivan Arriagada President Pampa Norte 2 October 2012



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#### **Exploration Targets and Mineral Resources**

This presentation includes information on Exploration Targets (Potential Mineralisation) and Mineral Resources. Mineral Resources are compiled by: J Céspedes (MAusIMM) – Spence. This is based on Mineral Resource information in the BHP Billiton 2012 Annual Report and can be found at www.bhpbilliton.com.

Exploration Targets (Potential Mineralisation) are compiled by J des Rivieres (IGI).

All information is reported under the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, 2004' (the JORC Code) by the above-mentioned persons who are employed by BHP Billiton and have the required qualifications and experience to qualify as Competent Persons for Mineral Resources or Exploration Results under the JORC Code.

The compilers verify that this report is based on and fairly reflects the Exploration Targets and Mineral Resources information in the supporting documentation and agree with the form and context of the information presented.

Mineral Resource classification (100% basis) for each province, where relevant, are contained in Table 1.

#### Table 1

Province	Measured Resource	Indicated Resource	Inferred Resource	Range of Potential Mineralisation (Bt)		BHP Billiton interest	
	(Mt)	(Mt)	(Mt)	Low	Mid	High	%
Spence	232 @ 0.91% Cu	1,315 @ 0.47% Cu	1,260 @ 0.37% Cu	0.8 @ 0.4-0.5% Cu	1.2 @ 0.4-0.5% Cu	1.9 @ 0.4-0.5% Cu	100

The range of Potential Mineralisation is estimated from geological information including boreholes, outcrops and geophysical information. The potential quantity is conceptual in nature, there has been insufficient exploration to define a Mineral Resource and it is uncertain if further exploration will result in the determination of a Mineral Resource. It should not be expected that the quality of the Potential Mineralisation is equivalent to that of the Mineral Resource.

## Chilean site tour program



#### Day 1: Sunday, 30 September 2012

Welcome and safety induction	Brendan Harris			
Non-ferrous overview	Andrew Mackenzie			
Well positioned to deliver low risk copper growth	Peter Beaven			
Base Metals performance overview	Margaret Beck			
Low risk, high return projects	Peter Beaven			
Our confidence in the long term outlook for copper	Shaun Verner			
Coloso Port site tour	Pedro Damjanic			
Chile update	Maria Olivia Recart			
Santiago project hub	Carlos Mesquita			
Examining the broader portfolio	Peter Beaven			
Day 2: Monday, 1 October 2012				
Escondida presentation	Edgar Basto			
Escondida site tour				
Day 3: Tuesday, 2 October 2012				
Pampa Norte presentation	Ivan Arriagada			
Spence site tour				

# Spence site tour



Time	Description
07.30 - 09.45	Coach transfer from Terrado Suites to Spence
09.45 - 10.00	Welcome and morning tea
10.00 - 11.45	Pampa Norte presentation
11.45 – 12.00	Spence safety induction
12.00 - 14.30	Spence site tour
14.30 - 15.30	Lunch with Spence management
15.30 – 17.45	Coach transfer from Spence to Terrado Suites

# **Visitor safety induction**



- Stay with your escort at all times especially if an emergency occurs
- You will be advised when to wear
  - a reflective vest and safety helmet
  - safety glasses (fit over prescription glasses)
  - steel toe boots
  - gloves
  - hearing protection
- Use handrails when on stairs
- Keep clear of all machinery
- We have a no smoking policy inside buildings and vehicles
- Cameras can be used outside buildings

# Key themes



- Pampa Norte a successful combination of Spence and Cerro Colorado
- HSEC performance amongst the best in the industry
- High return projects recently completed
- Targeting unit cost savings in FY13
- Spence Hypogene project could substantially increase the life of mine

# Pampa Norte combination a major success



- Combined Spence and Cerro Colorado operations into a single asset
  - complementary oxide and secondary sulphide leach operations
  - allows sharing of best practices and critical skills
- 29%<sup>1</sup> of Base Metals copper production in FY12
- Grade adjusted production capacity
  - Spence approximately 180 ktpa<sup>2</sup> of copper
  - Cerro Colorado approximately 95 ktpa<sup>2</sup> of copper
- Plant debottlenecking completed at both operations
  - increased processing capacity at Spence to 61 ktpd (from 56 ktpd)
  - increased processing capacity at Cerro Colorado to 55 ktpd (from 52 ktpd)



2. BHP Billiton interest is 100%.



# Pampa Norte leadership team

#### Well established and experienced

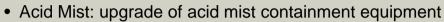




# Committed to health, safety, environment and the community







- Silica: dust emission suppression programs
- Noise: upgrade of mining equipment cabin conditions



- Focus on top 5 risks per operating area
- Critical controls implementation
- · Verification of controls performance standards





- High quality water consumption: use of thermo-film in leach pads
- Energy usage: infrared control in electrowinning plant for energy efficiency
- Greenhouse gas emissions: reduced haul truck diesel consumption





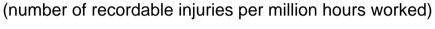
- Education: people for mining
- Supplier capacity building: BHP Billiton Cluster program
- Quality of life: health, basic infrastructure and culture

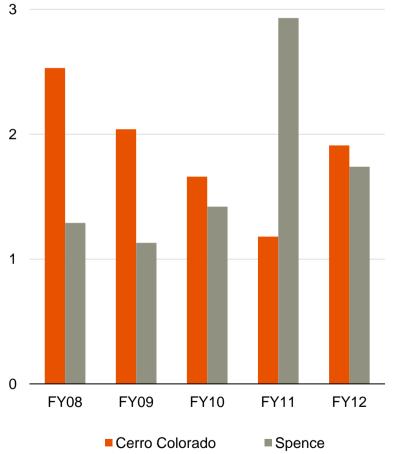
# Safety performance amongst the best in the industry



- Focus on Material Safety Risk and Critical Controls
- Ensure that performance standards for critical controls are designed and operated effectively
- Leading indicators such as Significant Incidents Reporting are used to monitor exposure management and the control of risks in the field
- We promote a culture that encourages the reporting of potential incidents and exposure to hazards

#### Total Recordable Injury Frequency (TRIF)





# **Community engagement is a priority**



- Over 10 different communities are in our area of influence, mostly around Cerro Colorado
- We are focused on
  - community engagement, communication and participation
  - ensuring our projects and operations are understood (workshops and indigenous consultation)
  - implementing community projects that have a high social impact and improve the quality of life and create local capabilities
- Our investment in community development projects is expected to be approximately US\$10 million in FY13











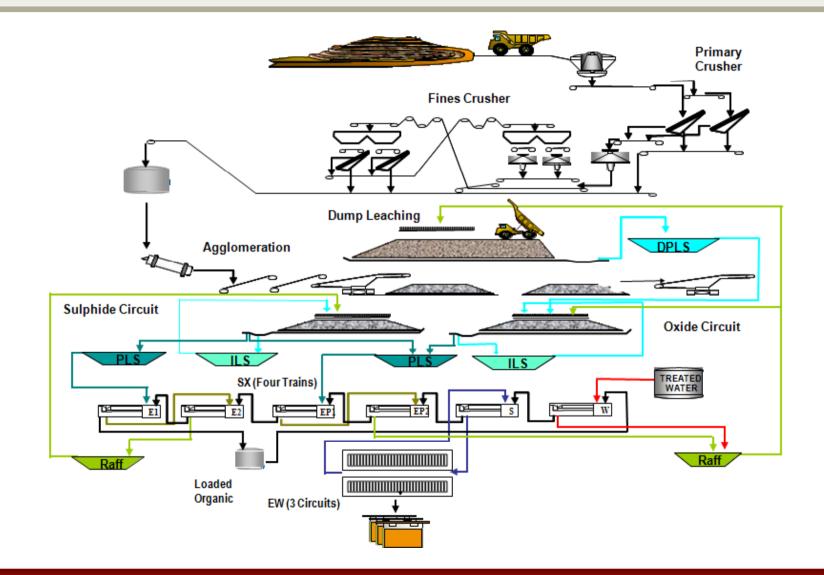






#### **Spence: operations overview**





# **Spence: operations overview**



#### Mine

- Material moved: 302 ktpd
  - 36 trucks, 4 shovels & 4 front end loaders

#### Plant

- Throughput increased from 56 ktpd to 61 ktpd
- Dry area
  - 1 primary crusher
  - 2 secondary crushers
  - 5 tertiary crushers
- Agglomeration
  - 2 agglomeration drums
- Stacking and leached ore reclaim
  - 2 stackers: one each for oxides and sulphides
  - 1 bucket wheel and spreader
- SX/EW: 200 ktpa<sup>1</sup> cathode capacity

#### **Transportation**

• Cathodes are transported by rail to the port of Antofagasta



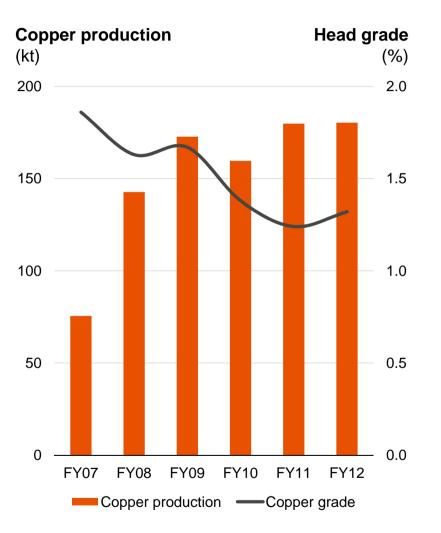


1. Grade affected average production capacity is approximately 180 ktpa.

#### BHP Billiton Base Metals site tour, 2 October 2012

# Improved recoveries, record copper production

- Record production of 180 kt in FY12
- The trend in head grade remains consistent with the mine plan
- New mobile equipment has allowed the north side of the orebody to be mined
  - mitigates the impact of grade decline
- Recoveries have continued to improve since first production was achieved in FY07 and reflects
  - ore quality sequencing
  - optimised hydrometallurgical processes and ore type mix





# High return projects recently completed

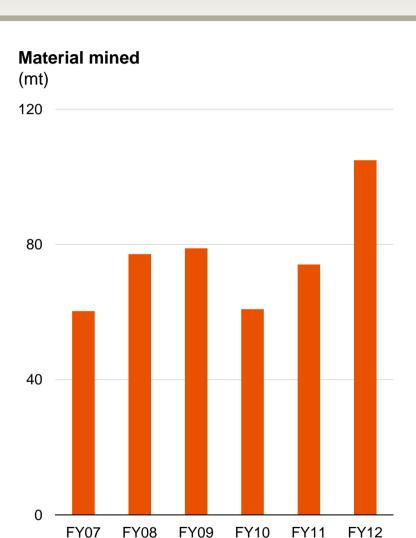


#### **Spence North Phase Access**

- Provides earlier access to higher grade ore
  - total investment of US\$132 million
  - completed in June 2012
- 18 additional pieces of earthmoving equipment (trucks, shovel, drills)
- The camp facilities and truck shop (four new bays) were expanded

#### Spence debottlenecking

- Increased processing capacity
  - from 56 ktpd to 61 ktpd
  - investment of US\$40 million
  - improvement in conveyor belt capacity and new agglomeration line
  - completed in August 2012

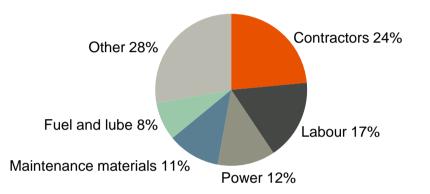


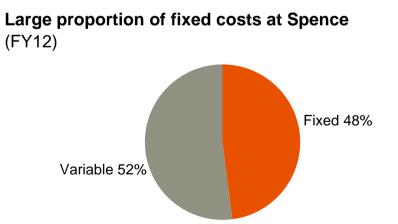
# Cost pressures partially offset by higher grades



- Spence unit cash costs increased by 22% in FY12
  - higher strip ratios following commencement of the North Phase Access project
  - higher prices for power, fuel, acid and explosives
  - higher one off plant maintenance
  - increased labour costs due to tight market in Chile
- Partially offset by higher grade
- Spence cost breakdown
  - US Dollar indexed costs: 68%
  - fixed costs: 48%

Spence cost breakdown (FY12)





#### BHP Billiton Base Metals site tour, 2 October 2012

## **Targeting unit cost savings in FY13**

- Cost saving opportunities have been identified
  - an absence of one-off costs that affected profitability in FY12 (plant maintenance)
  - economies of scale with completion of the North Phase Access project and Spence debottlenecking project
  - substantial reduction in operating and non-essential expenditure
- Longer term challenges remain
  - higher stripping ratio until FY15 at which time it reverts to the life of mine average
  - continued tight labour market in Chile
  - high power costs due to dependence on imported fossil fuels

#### Spence unit cash costs

(index, FY08=100)

250 200 150 100 50 0 **FY08** FY09 FY10 FY11 FY12 FY13e FY14e Cash cost per tonne of material mined Cash cost per tonne of copper

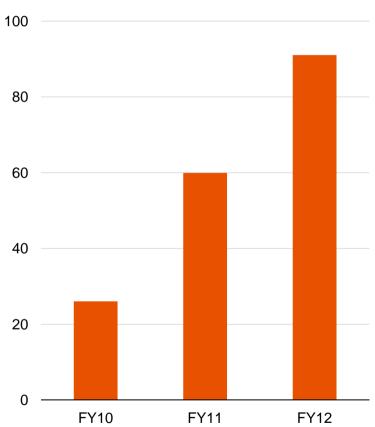


# A successful brownfield exploration program



- A successful exploration program
  - declaration of a significant hypogene (chalcopyrite) resource
    - 2.4 bt @ 0.43% copper and 117 ppm molybdenum<sup>1</sup>
- Brownfield exploration is focused on identifying mineralisation amenable to leaching for use in existing facilities

#### Pampa Norte exploration



(thousand meters drilled)

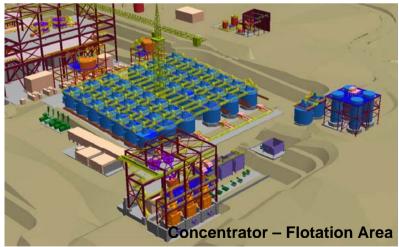
1. BHP Billiton 2012 Annual report. Refer to Mineral Resources disclaimer Table 1 on slide 3 as presented on 2 October 2012.

# Significant new resource underpins another development option



- Spence Hypogene project is currently in prefeasibility
- Potential to exploit the hypogene resource via development of a 95 ktpd concentrator with longer term expansion potential
- Key facilities and infrastructure required
  - concentrator (1x SAG and 2x ball mills)
  - concentrate pipeline
  - desalination plant and water pipeline
  - tailings dam
  - port capacity
- Initial analysis suggests this is a robust project with attractive economics

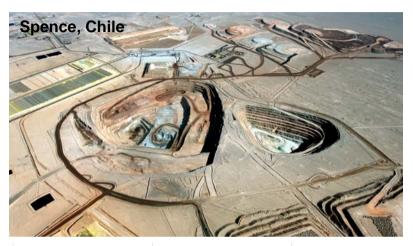


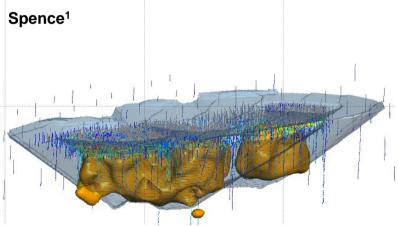


# Spence Hypogene project could substantially increase the life of mine



- Could extend the mine life by over 50 years
- Would result in the conversion of large hypogene resources into reserves
- No pre-stripping would be required to access the hypogene mineralisation
- Low technical risk
  - in house expertise
  - replication of OGP1 design
- Has the potential to benefit from existing infrastructure and equipment
- Could add approximately 150–200 ktpa of copper production for the first ten years post commissioning





1. Perspective view of the Spence Mineral Resources as of 31 December 2011, showing drill data (vertical lines), limit of +0.2% Cu as chalcopyrite and open pit limit of declared resources as stated in Slide 3. Material of TCu > 0.2% outside the pit limit is included in the Potential Mineralisation stated on Slide 3. Pit dimensions are approximately 4km x 1km x 0.5km in depth.

# **Key themes**



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# bhpbilliton resourcing the future