The Importance of Brownfields Exploration in Company Building and the Key Attributes of Success

The Northern Star Experience in the Kalgoorlie District
Presentation Contents

- The Global Movement Towards Brownfields Exploration
- The Northern Star Growth Story – The Impact of Near Mine Exploration Success
- The Kalgoorlie District – Success in a Mature Environment: Select Case Studies
  - Kundana (Pegasus, Millennium, Hornet-Rubicon Pegasus Link), Velvet
- Key Attributes of Success
Exploration Expenditure Trends
Why the movement towards Brownfield Exploration?

The trend in exploration expenditure on Greenfield projects does not correlate with gold price, with the overall percentage of spend declining even in a rising gold environment.

The decline in greenfields exploration expenditure correlates strongly with the Global Financial Crisis of 2007-2008, widely described by economists as the worst downturn since the great depression.

Investors are more cautious with their funds, as demonstrated by the metrics used to value mining companies.

THE MARKET STRUGGLES TO EVALUATE EXPLORATION POTENTIAL
The Rise of Northern Star

- At the start of 2010, NST share price was <A$0.03
- The transition from explorer to producer commenced in 2010 with the acquisition of Paulsens. Paulsens had 6 months of mine life at acquisition
- 2014 marked a transformational year for Northern Star; acquiring Plutonic, Kundana, Kanowna Belle and Jundee for A$182.5M. These operations were divested by majors sighting high costs and short life of mines (all <2 years)
The 2014 Northern Star Acquisition Game Plan

COUNTER CYCLICAL INVESTMENT

- Gold Price Low / Falling
- AUD:USD Exchange Rate High
- Poor Sentiment Towards Gold
- Operations with low NPV

OPERATIONAL EFFICIENCY OPPORTUNITY

- High cost operations with opportunity for reduction
- Opportunity for productivity improvements

BROWNFIELD EXPLORATION UPSIDE

- Target operations with high near mine exploration upside
- Rapid growth opportunities
- INVEST HEAVILY IN GROWTH OPPORTUNITIES (BROWNFIELD EXPLORATION)
Kalgoorlie Asset Overview
Land Holding & Operations

KANOWNA CAMP
KUNDANA CAMP
CARBINE CAMP

KANOWNA BELLE PROCESSING HUB
- 1.8Mtpa Capacity
- Versatile Processing Facility
  - Roaster to Treat Refractory Ores
  - Conventional CIP for Freemilling Ores
  - Gravity Recovery
- Arsenic Capture

KUNDANA & East Kundana JV
(Raleigh, Rubicon Hornet, Pegasus, Centenary, Szielecki, Barkers, Millennium)

KANOWNA BELLE
- ~4Moz Historic Production
- Narrow Vein High Grade
- Quartz Hosted at Contacts
- Narrow UG Longhole Open Stoping

KALGOORLIE

NST Managed Tenure

• 1.8Mtpa Capacity
• Versatile Processing Facility
  - Roaster to Treat Refractory Ores
  - Conventional CIP for Freemilling Ores
  - Gravity Recovery
• Arsenic Capture

KANOWNA BELLE PROCESSING HUB

KUNDANA CAMP

KALGOORLIE

KUNDANA CAMP

CARBINE CAMP

50km
5Moz Historic Production
Refractory Sulphide Orebody
Sediment/Porphyry Hosted
Bulk UG Longhole Open Stoping

KALGOORLIE Asset Overview
Land Holding & Operations

KALGOORLIE

KANOWNA BELLE PROCESSING HUB

KUNDANA CAMP

CARBINE CAMP

50km
5Moz Historic Production
Refractory Sulphide Orebody
Sediment/Porphyry Hosted
Bulk UG Longhole Open Stoping

KALGOORLIE

KUNDANA CAMP

CARBINE CAMP

50km
5Moz Historic Production
Refractory Sulphide Orebody
Sediment/Porphyry Hosted
Bulk UG Longhole Open Stoping

KALGOORLIE

KUNDANA CAMP

CARBINE CAMP

50km
5Moz Historic Production
Refractory Sulphide Orebody
Sediment/Porphyry Hosted
Bulk UG Longhole Open Stoping

KALGOORLIE

KUNDANA CAMP

CARBINE CAMP

50km
5Moz Historic Production
Refractory Sulphide Orebody
Sediment/Porphyry Hosted
Bulk UG Longhole Open Stoping

KALGOORLIE

KUNDANA CAMP

CARBINE CAMP

50km
5Moz Historic Production
Refractory Sulphide Orebody
Sediment/Porphyry Hosted
Bulk UG Longhole Open Stoping

KALGOORLIE

KUNDANA CAMP

CARBINE CAMP

50km
5Moz Historic Production
Refractory Sulphide Orebody
Sediment/Porphyry Hosted
Bulk UG Longhole Open Stoping

KALGOORLIE

KUNDANA CAMP

CARBINE CAMP

50km
5Moz Historic Production
Refractory Sulphide Orebody
Sediment/Porphyry Hosted
Bulk UG Longhole Open Stoping

KALGOORLIE

KUNDANA CAMP

CARBINE CAMP

50km
5Moz Historic Production
Refractory Sulphide Orebody
Sediment/Porphyry Hosted
Bulk UG Longhole Open Stoping

KALGOORLIE

KUNDANA CAMP

CARBINE CAMP

50km
5Moz Historic Production
Refractory Sulphide Orebody
Sediment/Porphyry Hosted
Bulk UG Longhole Open Stoping

KALGOORLIE
Results of the Investment in Brownfield Exploration

**KALGOORLIE OPERATIONS AT ACQUISITION**

**LIFE OF MINE PRODUCTION PROFILE AT 2013**
**ABX Share (HIGH-MODERATE CONFIDENCE)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Produced Ounces Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>84F</td>
</tr>
<tr>
<td>2014</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td></td>
</tr>
</tbody>
</table>

**MINING RESERVES AT Dec 31st 2013 (ABX Share)**

- 2.6Mt @ 4.9g/t for 408Koz

**KB UG**: 72k oz left in reserve

**RESOURCES (M,I&Inf) AT Dec 31st 2013 (ABX Share)**

- 8.4Mt @ 5.0g/t for 1.3Moz

**KALGOORLIE OPERATIONS AT JUNE 2016**

- 6 New Discoveries since 2014
  - Millennium, Paradigm North, Pode, Falcon, Ambition, Golden Eye
- Advancement of Numerous Projects
  - Pegasus, Hornet-Rubicon, Velvet, Raleigh, Skinners Vein, Drake, White Feather, Six Mile
- 1 New Mine
  - Millennium

**MINING RESERVES AT Jun 30th 2016 (NST Share)**

- 5.6Mt @ 5.1g/t for 912Koz

**KB UG**: 266Koz left in reserve after mining >180Koz

**RESOURCES (M,I&Inf) AT Jun 30th 2016 (NST Share)**

- 26.4Mt @ 4.2g/t for 3.6Moz

> $50M EXPLORATION INVESTMENT

> >400Koz PRODUCED SINCE ACQUISITION
Strategic Planning - The Framework for Success

With a massive increase in exploration spend, strategic planning was critical in ensuring the funds were spent achieving the outcomes required for the business.

- Analysis of the pipeline of projects showed an imbalance. The mid-level advanced exploration projects, or ‘next generation of mines’, were under-represented.

- A 3 Year strategic plan was developed, with the first year dedicated >50% of spend to advancing the early stage targets.
Case Study - The Rebirth of Kundana

Kundana* Camp
Annual Reserve & Resource Versus Cumulative Production

- South Pit, North Pit
- Strzelecki, Barkers, Centenary Pits & UG
- Raleigh, Rubicon & Hornet Discoveries
- Plunging Shoot Theory
- Pegasus, Millennium, 2.1km Link Drive: INVESTMENT IN EXPLORATION

Ounces


Reserve Ounces  Resource Ounces (Inclusive of Reserves)  Cumulative Production (Oz)

* Excludes Frogs Leg & White Foil
Pegasus - A Major Discovery in a Mature Field

Surface Drilling @ January 2011

KEY TAKEAWAY: ‘Well Drilled’ does not necessarily mean ‘Well Explored’

K2 Trend – Rubicon/Hornet @ January 2011

2012-2014: PEGASUS
1 Million Ounce Deposit
Grading +10g/t Identified in a ‘well drilled’ area
KUNDANA: Applying the Pegasus Exploration Learnings

Strong South plunge of mineralisation observed at the Centenary Underground Mine (Similar orientation to Pegasus & Frogs Leg)

Development may have stopped at south dipping low grade flexures as seen at Pegasus

Unlike Pegasus, the north plunge is absent at Centenary (or is it?)

The Millennium target aims to test the theory that the development stopped on a low grade flexure and there may be a blind north-plunging shoot near surface
In August 2015 NST announced a maiden resource on Millennium of 1.8Mt @ 5.8gpt for 346koz.
Velvet - The Ultimate Revival

- First hit in 2005 (49.0m @ 4g/t)
- Located 600m from development and 700m below surface made it difficult to intersect
- Follow up drilling in 2005-2006 failed to replicate the original hit
- The discovery hole was found underground and gyro surveyed. It was out by ~25m
- Drilling in 2014 managed to replicate the original hit
Northern Star found itself in a similar position to the predecessor companies, with patchy interesting results but not enough confidence to define a resource. There were still questions over the geology.

Northern Star took the ‘geology first’ approach and the ability to see beyond resource numbers. A decision was made to put in a 250 metre exploration drive in order to better drill positioning. Results vindicated that decision, with intersections including:

- KDU3398: 24.5m @ 30.6g/t
- KDU3394: 42.7m @ 13.4g/t
- KDU3381: 36.3m @ 13.7g/t
- KDU3342: 58.6m @ 3.3g/t

Because questions over the geological and structural system remained, the decision was taken to extend the exploration development and access the Velvet system.
**Drilling continued as the access development continued. The most spectacular hit in the history of Kanowna Belle UG was returned, with KDU3397 returning a downhole and uncut intersection of **47.9m @ 83.1g/t (~30.3m TW)**

**Access showed the Velvet alteration system is located adjacent to the Fitzroy Fault. The mineralisation occurs at or near the contact between a sedimentary grit and a rheologically more competent unit described as ‘Andesite’ by site geologists. The high grade zone is structurally complex and contains abundant carbonate breccias.**

**The mineralisation remains open in all directions and provides a new exploration model and mineralisation style for Kanowna Belle more than 20 years after the main deposit was discovered.**
FY2015 Results Include:
197m @ 2.4g/t, including
18m @ 17.7g/t, &
3.0m @ 25.6g/t
3m @ 50.4g/t
16m @ 6.0g/t

• Potential northern repetition of the Paradigm Orebody

PARADIGM NORTH (NST 100%)

FY2015 Results Include:
15m @ 6.2g/t
2.9m @ 37.4g/t
3.2m @ 26.6g/t

• New vein discovered by field mapping and sampling

GOLDEN EYE (NST 100%)

FY2015 Results Include:
2m @ 11.3g/t
2m @ 9.8g/t
3m @ 5.0g/t

• New interpretation of old mapping, targeting K2

AMBITION (EKJV, 51%)

FY2015 Results Include:
5m @ 8.2g/t
3m @ 5.3g/t
1m @ 22.0g/t

• North Plunging Shoot adjacent to the Centenary Orebody

MILLENIUM (NST 100%)

FY2015 Results Include:
3m @ 18.5g/t
5m @ 5.3g/t
1m @ 25.0g/t

• North Plunging Shoot north of Pegasus

DRAKE HIGH GRADE (EKJV, 51%)

Other Exploration Highlights

Discovery
Other Exploration Highlights - Kalgoorlie District

Project Advancement

**CARBINE CAMP**

- **CARBINE** (NST 100%)
  - Veins and disseminated sulphides in volcanics thrust over sediments
  - FY2015 Results Include:
    - 4.0m @ 8.2g/t
    - 3.0m @ 8.6g/t
    - 3.0m @ 7.8g/t

**KUNDANA CAMP**

- **CHRISTMAS** (NST 100%)
  - Conceptual North Plunging Shoot on Strzelecki. Offset of Raleigh
  - FY2015 Results Include:
    - 1.6m @ 24.4g/t
    - 0.9m @ 31.7g/t
    - 1.3m @ 4.3g/t

**SIX MILE** (NST 100%)

- Shear hosted mineralisation, sheeted veins in Porphyry
  - FY2015 Results Include:
    - 4m @ 12.2g/t
    - 11m @ 6.0g/t
    - 3m @ 29.2g/t

**PODE/K2B** (EKJV, 51%)

- Moderately west dipping vein in the HW of K2 Pegasus
  - FY2015 Results Include:
    - 4.0m @ 18.9g/t
    - 3.0m @ 20.7g/t

**WHITE FEATHER** (NST 100%)

- Narrow Vein High Grade
  - FY2015 Results Include:
    - 1m @ 5.328g/t
    - 1m @ 60.3g/t
    - 0.3m @ 303.1g/t
    - 3m @ 8g/t

Results are downhole width and uncut
Key Attributes of Success

**Challenge the Preconceived Geological Ideas**
- Geological Interpretation often becomes ‘FACT’

**Persistence & Potential Recognition**
- ‘Well Drilled’ doesn’t necessarily mean ‘Well Explored’

**Recognising the Differing Skillsets of Brownfields and Regional Explorationists**
- What is important when FINDING a mineral system may not be as important when you are IN IT

**Understanding Acceptable but Educated Risk**
- Seeing beyond the Resource Numbers

**Strategic Planning**
- Spending money to achieve the goals of the business
Key Attributes of Success

- **Maintain a Balanced Pipeline of Projects**
  - Ignore early staged projects at your peril

- **Consolidate and Validate the Data**
  - There are orebodies hiding in the database

- ** Maintain the Human Capital**
  - People are Key

- **You Don’t Have To Drill to Explore**
  - Much of the success in Kalgoorlie had the foundations in the times we didn’t have enough money to drill

- **Integration of Mine Geology, Exploration and Long Term Planning**
  - Strong interaction between the key growth disciplines enhances the prospects of success
Conclusion

Even though around Kalgoorlie we are in a so called ‘Mature Well Explored’ Gold Field, significant discoveries of new deposits are still possible for companies willing to back their geological teams and invest in the future.