



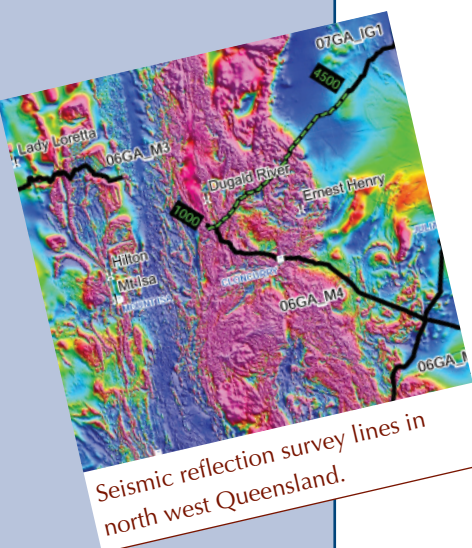
Australian Government  
Geoscience Australia

# Australian *Mineral* EXPLORATION

FEBRUARY 2008

A REVIEW OF EXPLORATION FOR THE YEAR **2007**

An extended version of this review is available at [www.ga.gov.au](http://www.ga.gov.au)



## OVERVIEW

- » Australian mineral exploration spending in 2006–07<sup>1</sup> rose by 38% to a record \$1714.6 million<sup>2</sup> of which 36% was spent on the search for new deposits<sup>3</sup>.
- » Spending rose in all States and the Northern Territory with South Australia up by 78% to \$260.7 million while Western Australia dominated with 49% of Australian mineral exploration spending.
- » The base metal group<sup>4</sup> was the dominant target accounting for 32% of exploration spending overtaking gold (27%) for the first time since 1983.
- » Exploration results were announced for a wide range of commodities with the most significant being the announcement of a 38% increase in contained copper in the Olympic Dam deposit, South Australia, and of an initial 4 Moz gold resource in the Tropicana deposit, Western Australia.

## EXPLORATION REVIEW

Australian mineral exploration expenditure rose by 38% to a record \$1714.6 million in 2006–07<sup>1</sup> according to the Australian Bureau of Statistics (ABS). In 2006–07 constant dollars expenditure was also a record (Figure 1).

Spending increased in all States and the Northern Territory. Western Australia remained dominant attracting \$839.1 million, an increase of 42%. In South Australia spending rose by 78%, the largest increase for any jurisdiction, to \$260.7 million. In Queensland spending was up 24% to \$272.3 million; New South Wales up 26% to \$144.1 million; Victoria up 11% to \$82.5 million; Northern Territory up 23% to \$92.2 million and in Tasmania spending rose by 5% to \$23.7 million.

The base metal group became the major exploration target as spending rose to \$555.0 million: copper \$234.5 million (up 68%), zinc-lead-silver \$139.4 million (up 49%) and nickel \$181.1 million (up 24%). Gold remained the largest individual commodity targeted in 2006–07 but its share of total exploration spending fell to 27% (\$455.8 million) due to growth in spending on base metals, iron ore, uranium, coal, and mineral sands. Following the surge in interest in uranium exploration spending rose by 103% to \$114.1 million.

<sup>1</sup>Australian financial year from 1 July 2006 to 30 June 2007.

<sup>2</sup>All monetary references in this paper are to Australian dollars unless otherwise stated.

<sup>3</sup>Exploration spending on the search for new deposits covers exploration for previously unknown mineralisation or exploration on known mineralisation which is not yet classified as a resource.

<sup>4</sup>Copper, lead, zinc, silver, nickel, cobalt.

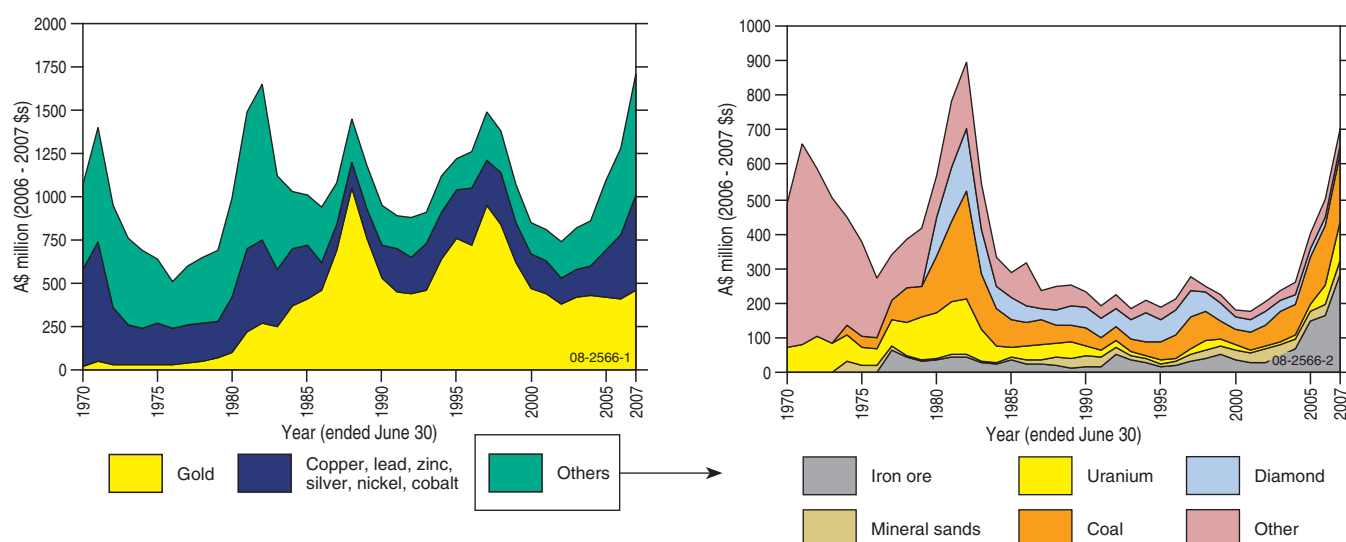


Figure 1: Australian mineral exploration expenditure in constant 2006–07 dollars. Based on ABS data deflated by Consumer Price Index.

ABS survey data showed that, nationally, 36% of spending was on exploration for new deposits, compared to 37% in 2005–06. Victoria (46%) had the highest proportion of its exploration directed to the search for new deposits while South Australia had the lowest at 24%. The national share of exploration for new deposits is slightly lower than the Metals Economics Group (MEG) world survey of non-ferrous minerals exploration budgets for 2007 which found that 39% of exploration budgets in Australia was for grassroots exploration.

In 2006–07, ABS reported that exploration drilling totalled 8.455 million metres, an increase of 1.618 million metres (24%) from 2005–06. Of this increase, exploration drilling in the search for new mineralisation rose by 0.622 million metres to 3.240 million metres. Exploration of existing mineralisation rose by 0.996 million metres to 5.215 million metres.

The MEG survey of world non-ferrous mineral exploration budgets for 2007 reported an increase of 40% to an estimated record total budget of US\$10.5 billion. MEG included uranium in the survey for the first time in 2007 and estimates that, including uranium, world budgets for non-ferrous mineral exploration was US\$11.4 billion. Of this, US\$1183.2 million was for exploration in Australia. Australia's share of global non-ferrous mineral exploration budgets (excluding uranium) rose to 11.9% and Australia had the second highest share of budgets after Canada (19%).

According to the MEG survey, 60% of the 2007 non-ferrous mineral exploration budgets for Australian-based companies was for exploration in Australia. The survey included 512 companies with non-ferrous exploration budgets of more than US\$100 000 that were exploring in Australia. Budgets for Australian non-ferrous mineral exploration included: gold (US\$387.5 million), base metals (US\$585.9 million) and uranium (US\$154.2 million).

Funds raised from over 100 initial public offerings on the Australian Securities Exchange in 2007 were fully or partially for mineral exploration in Australia. These companies aimed to raise over of \$520 million for Australian exploration and many were heavily oversubscribed.

# GOVERNMENT PROGRAMS

The Australian, State and Northern Territory governments continued to support the sector with programs designed to help reduce the inherent risk in exploration.

## GEOSCIENCE AUSTRALIA

Geoscience Australia completed the first major surveys under its \$58 million five-year program to stimulate discovery of hydrocarbon and energy minerals in onshore Australia. A continent-wide 145 000 line km airborne magnetic and gamma-ray tie-line survey was completed and will provide a uniform national gamma-ray spectrometric database and map and an improved magnetic map. In partnership with the Geological Survey of Queensland, a 1175 km deep crustal seismic reflection transect was completed from the eastern margin of the Mount Isa Province to the Georgetown Province and to the northern margin of the Drummond Basin. Magnetotelluric and gravity data was also acquired along this transect. Phase 1 of a major regional AEM survey in the Paterson Province in Western Australia was completed. A continent-wide surficial geochemical survey has commenced.

## NEW SOUTH WALES

EXPLORATION NSW is a \$30 million, seven-year (2000–07) program supporting minerals and petroleum exploration and it has been extended to 2008 with an additional \$8 million, for 'New Frontiers' projects. It aims to provide world class geoscience information to assist explorers with online access to data. The current focus is on frontier terrains and the 3rd dimension, targeting the Thomson Orogen and extensions to the Stawell/Bendigo zones.

## QUEENSLAND

The SMART EXPLORATION and SMART MINING – FUTURE PROSPERITY programs with funding of nearly \$50 million from 2005–06 to 2009–10 are providing new geological and geophysical data for the Mount Isa region, the Bowen, Surat, Cooper and Drummond Basins, and the Charters Towers and Mount Rawdon regions. These data include airborne magnetic and radiometric, gravity, deep seismic, airborne hyperspectral surveys and geological mapping programs. It also includes funds for collaborative drilling with explorers, for mobilisation costs for drilling and geophysical surveys, and funds for junior mineral explorers for research and interpretation for target generation.

## TASMANIA

TasExplore is a four-year \$5.05 million program consisting of \$4.1 million for new geoscientific information and \$0.95 million for promotion of exploration opportunities. Aeromagnetic and radiometric data have been acquired over NE Tasmania and the Furneaux Group and geological mapping has been undertaken in the central North and is taking place in NE Tasmania and on King Island. The aim of the project is an upgraded 3D geological model of Tasmania.

## VICTORIA

The Victorian Government's \$5 million, four-year, Rediscover Victoria initiative started in 2007 and has completed its first of three rounds of support for industry drilling, as well as accelerating the development of a world-class 3D geological map of Victoria to assist explorers. Rediscover Victoria complements the Victorian Government's other geoscience programs including the Victorian Initiative for Minerals and Petroleum (VIMP) and Developing Gold Undercover, a \$9 million initiative over three years from 2006 aimed at delivering new geoscience data and information to aid discovery of concealed gold resources.

## WESTERN AUSTRALIA

The Western Australian Government continued to provide an additional \$3 million per year to the Geological Survey of Western Australia to stimulate exploration. This funding accelerates the acquisition and release of new pre-competitive geoscience information in greenfields areas of the State and focuses particularly on new regional geophysical information. A three year, \$1.2 million program of scanning and release on the web of a further 21 000 open file company mineral exploration reports ended in mid-2007. These reports were released under amended provisions of the Mining Act that allow for a reduced (five year) confidentiality period for statutory mineral exploration information.

## NORTHERN TERRITORY

The Northern Territory Government announced a new four-year, \$12 million exploration initiative named 'Bringing Forward Discovery' commencing in July 2007. This initiative includes extensive regional gravity surveys and major field-based prospectivity assessments, with an emphasis on under-explored 'greenfield' regions. Highlights during 2007 included a detailed airborne magnetic and radiometric survey over the Dunmarra Basin, and release of a major report on the geology and resource potential of the southern Georgina Basin.

## SOUTH AUSTRALIA

The Plan for Accelerating Exploration (PACE), launched in 2004, is a five-year \$22.5 million initiative that aims to increase exploration and mineral production in South Australia, as well as ensuring that the state is showcased as a premier destination for resource exploration and investment. In April 2007, the PACE initiative was extended by \$8.4 million over two years, with the new funding taking its value to \$30.9 million over seven years. During 2007, the state's largest gravity survey was completed under PACE, covering more than 45 000 square kilometres of the remote north of South Australia within the highly prospective Gawler Craton.

# EXPLORATION

High levels of exploration spending in Australia in 2007 generated a large number of drill intersections of economic grade or which are encouraging for others reasons for most commodities. An indicative selection of intersections of these types is reported below. In addition, earlier stage exploration activities including, rock chip sampling, geochemical and geophysical surveying identified a large number of prospects for further, more detailed exploration. These are not reported below. A selection of Australian mineral discoveries in recent years is shown in Table 1.

**Table 1: A selection of Australian mineral discoveries since 2000.**

Year	State	Deposit/Project	Commodities	Status
2000	WA	West Musgraves	Ni, Cu, Co	Exploration; Preliminary resource: 392 Mt @ 0.3% Ni, 0.33% Cu
2000 and later	WA	Golden Grove Orebodies (Incl. Amity, Hougoumont, Ethel)	Cu, Pb, Zn, Ag	Mine; Resources of 1.3Mt Zn, 0.6 Mt Cu, 0.8 Mozs Au, 41 Mozs Ag, 0.14 Mt Pb
2000 and later	WA	Flying Fox (T0-T7 Zones)	Ni	Mine; Total resource 3.7 Mt @ 3.4% Ni for 126 330 t Ni
2000	NSW	Hera	Au, Zn, Pb, Cu, Ag	Exploration; Resources of 2.2 Mt @ 3.4 g/t Au, 4.2% Zn, 3.1 Pb, 0.2% Cu, 18 g/t Ag
2001	NSW	Wyoming	Au	Exploration; Resources of 0.6 Mozs contained Au
2001	SA	Prominent Hill	Cu, Au	Development; Production 2008; Reserves 0.9 Mt contained Cu, 1.3 Mozs contained Au
2002	WA	Jaguar	Cu, Pb, Zn, Ag	Mine; First product shipped October 2007
2002	WA	Copernicus	Ni, Cu, Co	Feasibility; Total resource 0.85 Mt @ 1.2% Ni, 0.81% Cu, 0.05% Co
2004 and later	WA	Alec Mairs (various zones discovered later)	Ni	AM 2: Indicated Resources 38 000 t @ 14.05% Ni, Inferred Resources 17 000 @ 10.38% Ni
2004	WA	Trident	Au	Mine; Total resource 4.36 Mt @ 5.7 g/t Au for 0.8 Mozs Au
2004	SA	Jacinth & Ambrosia	Mineral sands	Exploration; Eucla Basin; Bankable Feasibility Study for completion mid-2008
2004	WA	Prospero	Ni	Development; Probable Reserves 1.19 Mt @ 4.45% Ni
2005	WA	Tropicana	Au	Exploration; Tropicana-Havana Resources: 4.05 Mozs Au
2005	SA	Four Mile	U	Exploration; Four Mile West inferred resource 3.9 Mt @ 0.37% U <sub>3</sub> O <sub>8</sub>
2005	SA	Tripitaka	Mineral sands	Exploration; Drilling for water supply; Prefeasibility study
2005	SA	Carrapateena	Cu, Au	Exploration; 905 m @ 2.1% Cu, 1.0 g/t Au
2006	SA	Gulliver's	Mineral sands	Exploration; Part of Eucla Basin Mineral Sands Project
2006	WA	Cooljarloo North	Mineral sands	Exploration; Thick, +10% HM intersections
2006	QLD	Rocklands	Cu	Exploration; Bankable Feasibility study by June 2008
2007	WA	Spotted Quoll	Ni	Exploration; 8.72 m @ 11.35% Ni
2007	SA	Dromedary	Mineral sands	Exploration; Eucla Basin; 1-14.6% HM
2007	WA	Cyclone & Hurricane	Mineral sands	Exploration; Eucla Basin; 4.5% HM over an average 5 m; zircon content of up to 50%



**BASE METALS (FIGURE 2)****New South Wales**

CBH Resources Ltd reported that infill drilling at the **Hera** deposit near Nymagee was likely to upgrade the resource estimated at 2.2 Mt @ 3.4g/t Au, 4.2% Zn, 3.1% Pb, 0.2% Cu and 18g/t Ag. Intersections reported included 6.0 m @ 5.5g/t Au, 0.3% Cu, 8.9% Pb, 9.3% Zn, 50g/t Ag which included a 1.95 m zone @ 11.7g/t Au, 0.5% Cu, 21.0% Pb, 20.9% Zn and 119g/t Ag.

At the **Browns Reef** project, 5 km W of Lake Cargelligo, drilling by Comet Resources Ltd has confirmed the project's potential with an intersection of 6 m @ 11.4% Zn, 4.8% Pb, 1.2% Cu, 74g/t Ag reported within a 58 m intersection of 2% Zn, 0.9% Pb, 0.45% Cu, 19g/t Ag. Other intersections included 20 m @ 5% Zn, 2.8% Pb, 0.16% Cu and 13.5g/t Ag, and 11 m @ 3.7% Zn, 1.5% Pb, 0.4% Cu and 10.5g/t Ag.

**Northern Territory**

At the **Browns East** prospect, 80 km S of Darwin, Compass Resources NL reported encouraging copper-uranium mineralisation in drill intersections. They included 10 m @ 6.61% Cu, 0.46% Co, 0.33% Ni, 165g/t Ag and 3.8 lb/t U<sub>3</sub>O<sub>8</sub>; 15 m @ 5.79% Cu, 0.17% Co, 0.21% Ni, 203g/t Ag, and 3 m @ 2.25% Cu, 0.10% Co, 0.09% Ni, 10.9 lb/t U<sub>3</sub>O<sub>8</sub>.

At the **Explorer 108** prospect 100 km WSW of Tennant Creek, deep drilling returned wide zones of high-grade mineralisation. Westgold Resources NL reported an intersection in an extension of the main high-grade zone of 42 m @ 4.3% Zn, 1.7% Pb, 13.4g/t Ag, 0.4g/t Au from 345 m. This intersection included two 7 m intersections of 9.1% Zn and 6.5% Zn respectively.

**Queensland**

CuDeco Ltd continued to report high-grade copper intersections from exploration at its **Rocklands** project near Cloncurry. These included 14 m @ 3.91% Cu from 58 m; 58 m @ 1.68% Cu, 0.26g/t Au and 436ppm Co from 92 m, and 19 m @ 2.94% Cu and 0.24g/t Au from 51 m.

Drilling by Copper Strike Ltd in the Einasleigh district returned significant intersections of zinc-lead-silver mineralisation at the **Chloe** and **Jackson** prospects. Indicative of these intersections were, at Chloe, 40 m @ 6.6% Zn, 2.8% Pb, 41g/t Ag, 0.3% Cu from 244 m, and 23.6 m @ 7.9% Zn, 3.2% Pb,

55g/t Ag and 0.4% Cu from 394.2 m. At Jackson an intersection of 15 m @ 6.4% Zn, 5.3% Pb, 194g/t Ag and 0.1% Cu was reported.

**South Australia**

Teck Cominco Ltd reported a spectacular drill intersection from the **Carrapateena** prospect, discovered in 2005, of 905 m @ 2.1% Cu and 1.0g/t Au which included 191 m @ 3% Cu and 0.9g/t Au, and 95 m @ 3.3% Cu and 0.6g/t Au. Teck is continuing exploration at Carrapateena.

At the **Kanmantoo** project, Hillgrove Resources Ltd continued drilling to increase the existing inferred resource of 33.4 Mt @ 0.9% Cu and 0.2g/t Au. Intersections included 14 m @ 2.50% Cu, 0.61g/t Au; 19 m @ 1.88% Cu; 6 m @ 4.19% Cu, 0.25g/t Au, and 13 m @ 1.01% Cu, 1.60g/t Au.

**Tasmania**

At the **Hellyer** mine, Bass Metals Ltd reported results for a drill hole aimed at testing the Southern barite zone which is along strike from the old Hellyer mine. A 57.5 m downhole intercept returned 9.2% Zn, 4.7% Pb, 94g/t Ag and 2.89g/t Au. Included in this was 11.65 m @ 13.8% Zn, 8.3% Pb, 144g/t Ag and 3.2g/t Au.

**Western Australia**

Encouraging zinc intersections were reported by **Prairie Downs** Metals Ltd from the Prairie Downs prospect 60 km SW of Newman. Intersections reported late in the year included 3 m @ 12.1% Zn, 2.75% Pb, 35g/t Ag; 4 m @ 11.8% Zn, 3.0% Pb, 38g/t Ag; and 5 m @ 8.2% Zn, 2.5% Pb and 29g/t Ag.

Northern Star Resources Ltd intersected significant mineralisation at its **Emull** prospect 50 km SW of Halls Creek in the Kimberley region. These intersections included 15 m @ 4.27% Zn, 0.76% Cu, 6.8g/t Ag which included a higher grade zone of 4 m @ 11.29% Zn, 1.05% Cu, 5.6g/t Ag; 18 m @ 4.06% Zn, 0.76% Cu and 5.8g/t Ag including 6 m @ 8.19% Zn, 0.82% Cu and 5.0g/t Ag.

**NICKEL (FIGURE 3)****Northern Territory**

Drilling by GBS Gold International Inc. at its **Chinese Big Pit** zone in the Pine

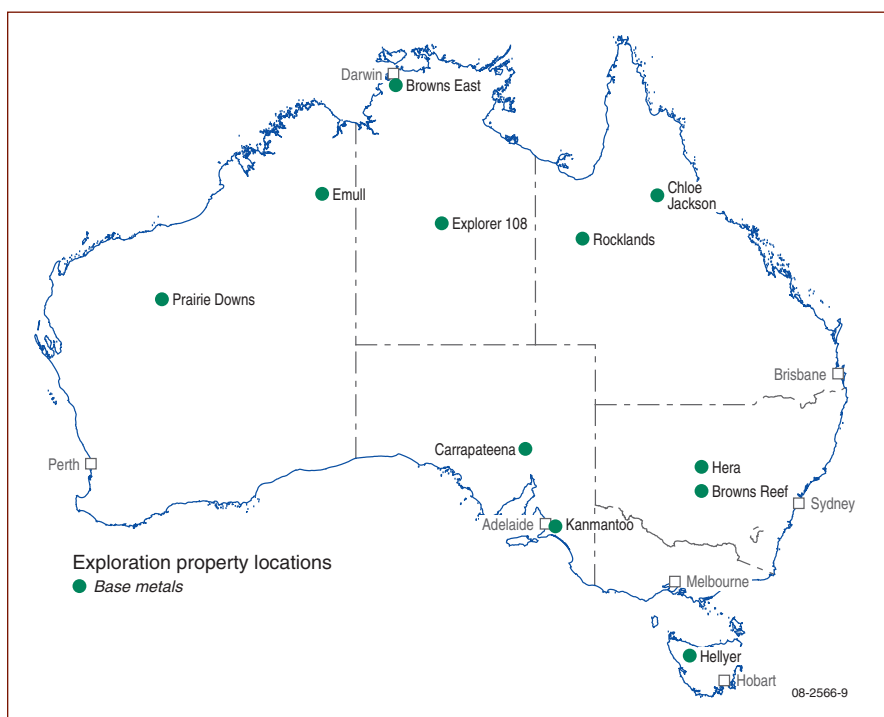


Figure 2: Selected base metal exploration projects, 2007.

Creek area during gold exploration intersected high-grade nickel mineralisation. The intersection was 2 m @ 5.4% Ni, 0.8% Co from 73 m downhole.

## Queensland

Metallica Minerals Ltd reported the results of infill drilling on the inferred resource at the **Minnamoolka** lateritic deposit in its NORNICO project. Intersections reported included 33 m @ 1.27% Ni from surface, 11 m @ 1.01% Ni from 1 m, and 22 m @ 1.07% Ni from 2 m.

## South Australia

Lincoln Minerals Ltd discovered lateritic nickel in the **Cockabidnie** project, 130 km WSW of Whyalla with an initial intersection of 6 m @ 0.42% Ni, 0.06% Co, and 0.02% Cu from 21 m. Subsequent intersections included 4 m @ 0.68% Ni, 0.05% Co and 0.03% Cu above a 12 m mineralised saprolite zone which yielded 0.34% Ni, 0.02% Co and 0.02% Cu.

## Tasmania

Exploration by Allegiance Mining NL in the vicinity of its Avebury nickel mine near Zeehan continued to yield encouraging results. At the **Bison** prospect drill intersections of 7 m @ 1.5% Ni and 24 m @ 0.7% Ni were encountered. At the **Melba Flats** project further encouraging intersections were reported including 1.6 m @ 2.38% Ni, 1.83% Cu, 0.37g/t Au, 0.41g/t Pt, 0.79g/t Pd, and 3.5 m @ 1.29% Ni, 1.29% Cu, 0.24g/t Au, 0.34g/t Pt and 0.49g/t Pd.

## Western Australia

In October, Western Areas NL, reported a high-grade nickel discovery at the **Spotted Quoll** prospect 6 km S of the Flying Fox mine. The first diamond drill hole intersected 6.2 m @ 4.8% Ni which included 3.6 m @ 6.9% Ni from 121.5 m down hole.

Jubilee Mines NL announced an extension to its **Sinclair** nickel deposit near Leonora. Drill intersections included 5.4 m @ 4.7% Ni, 10.4 m @ 3.4% Ni and 34.4 m @ 3.0% Ni. The deposit remains open down plunge.

Exploration at the **Alec Mairs** deposit 500 m S of the Cosmos Deeps mine by Jubilee Mines NL returned high-grade drill intercepts. At AM2, intersections reported included 3.3 m @ 10.6% Ni, 5.3 m @ 7.3% Ni and 3.1 m @ 9.8% Ni. At AM5 results from drilling included 52 m @ 3.2% Ni, 3.1 m @ 19.4%

Ni and 23.7 m @ 3.6% Ni which included 1.5 m @ 20.0% Ni.

## GOLD (FIGURE 4)

### New South Wales

Ongoing exploration by Alkane Exploration Ltd at the Tomingley Gold Project near Peak Hill returned encouraging results. At the **Caloma** prospect, 600 m E of the Wyoming Three deposit, intersections included 4 m @ 14.00g/t Au from 80 m, 3 m @ 5.54g/t Au from 24 m and 7 m @ 9.12g/t Au from 132 m.

Exploration drilling 7 km SE of **West Wyalong** by Golden Cross Resources Ltd intersected a possible new gold reef. Drilling intersected gold mineralisation including 2 m @ 19.1g/t Au from 106 m downhole. In addition, holes drilled under old workings identified the Mallee Vale reef with an intersection of 4 m @ 6.11g/t Au from 28 m and the Pine Ridge reef returned 2 m @ 1.48g/t Au from 36 m.

### Northern Territory

GBS Gold International Inc. reported continuing encouraging drilling intersections from the **Chinese Big Pit** zone located about 55 km NW of its Union Reefs plant near Pine Creek. Intersections reported include 11 m @ 35.7g/t Au, 13 m @ 4.8g/t Au and 4 m @ 4.6g/t Au.

## Queensland

Drilling by Mantle Mining Corporation Ltd extended the known mineralisation at the **Granite Castle** prospect 165 km W of Charters Towers, and returned encouraging results. These included 3 m @ 6.26g/t Au, 313.6g/t Ag from 45 m, 5 m @ 8.64g/t Au, 132.2g/t Ag from 97 m; and 7 m @ 3.48g/t Au, 79.7g/t Ag from 125 m.

Beacon Minerals Ltd reported encouraging intersections from drilling at the **Steam Engine** prospect 150 km SE of Georgetown. This drilling, yielded intersections including 6 m @ 5.5g/t Au from 95 m; 12 m @ 3.5g/t Au from 10 m; and 5 m @ 4.5g/t Au from 19 m. All contained higher grade zones.

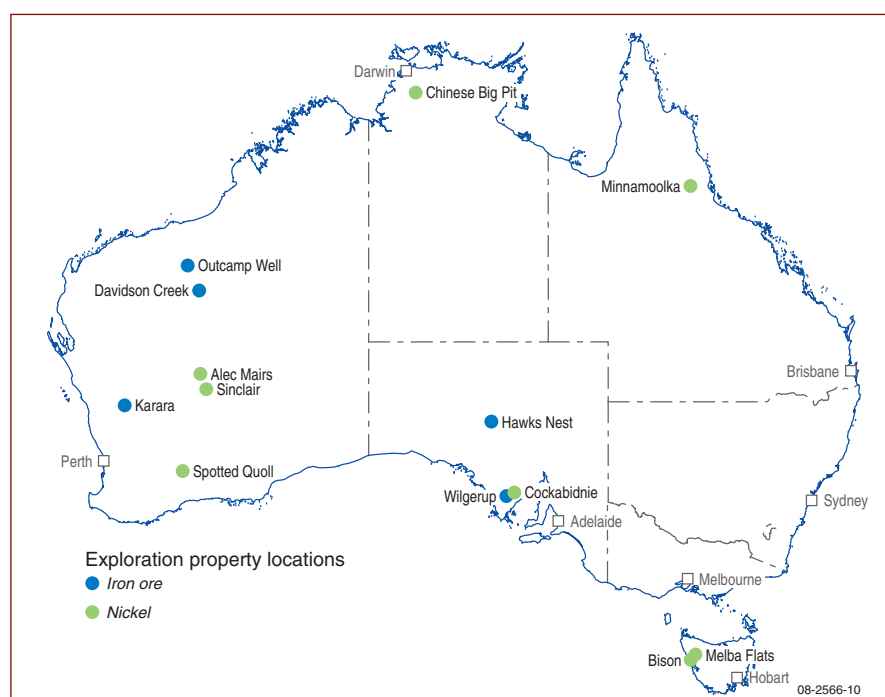


Figure 3: Selected nickel and iron ore exploration projects, 2007.

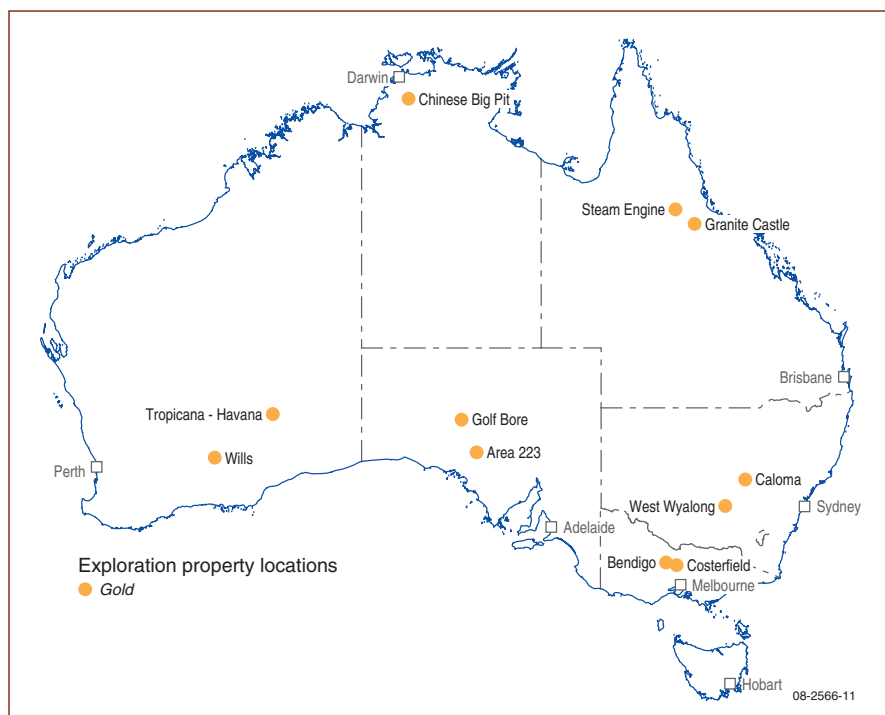


Figure 4: Selected gold exploration projects, 2007.

## South Australia

Southern Gold Ltd reported high-grade gold intersections from its initial drilling at the **Golf Bore** deposit near the Challenger mine. Golf Bore is part of the Challenger Area Joint Venture with Dominion Mining Ltd. Intersections included 12 m @ 7.56g/t Au from 81 m, 9 m @ 5.79g/t Au from 54 m, and 9 m @ 2.69g/t Au from 63 m.

Drilling over parts of the **Area 223** deposit at Tunkillia by Minotaur Exploration Ltd continued to yield good intersections. Among the better results were 10 m @ 8.3g/t Au from 51 m, 3 m @ 16.2g/t Au from 54 m, and 9 m @ 4.1g/t Au from 60 m, all from the oxide zone.

## Victoria

Bendigo Mining Ltd's drilling on the Gill reef at the **Bendigo** project at Bendigo encountered very high-grade intersections over 460 m strike length. Included were 0.9 m @ 4070g/t Au, 6.2 m @ 57g/t Au and 1.3 m @ 55g/t Au.

Drilling at the **Costerfield** gold-antimony project near Costerfield by Cambrian Mining Plc returned shallow, high-grade intersections. Intersections reported included 4.15 m @ 18.8g/t Au, 3.8% Sb; 3.0 m @ 23.1g/t Au, 5.0% Sb; and 2.25 m @ 20.8g/t Au, 10.93% Sb.

## Western Australia

The Joint Venture partners AngloGold Ashanti Ltd (70%) and Independence Group NL (30%) reported an initial resource estimate for the **Tropicana – Havana** deposits 230 km ESE of Laverton of 4.05 Mozs Au. Exploration outside the conceptual pit zone continues to yield significant results. At Tropicana intersections included 19 m @ 4.0g/t Au, 29 m @ 3.2g/t Au, and 22 m @ 3.5g/t Au. At Havana, intersections included 30 m @ 5.3g/t Au, 30 m @ 4.2g/t Au, and 22 m @ 4.4g/t Au.

Avoca Resources Ltd announced the discovery of significant gold mineralisation at shallow depths on the **Wills** Prospect, 25 km N of Trident. Wills occurs in an area of no previous drilling or evidence of historical workings and is under about 20 m of cover. Intersections reported include 2 m @ 10.1g/t Au from 17 m, 5 m @ 5.7g/t Au from 23 m, and 2 m @ 5.8g/t Au from 23 m.

## IRON ORE (FIGURE 3)

### South Australia

Centrex Metals Ltd reported encouraging hematite mineralisation from the **Wilgerup** deposit located 30 km SE of Lock. In the Wilgerup North pod intersections included 23 m @ 65.5% Fe, 2.16% SiO<sub>2</sub>, 1.38% Al<sub>2</sub>O<sub>3</sub>, 0.057% P, and 30 m @ 60.6% Fe, 4.97% SiO<sub>2</sub>, 2.03% Al<sub>2</sub>O<sub>3</sub> and 0.39% P.

Early drill results from the Tui prospect at the **Hawks Nest** project reported by Western Plains Resources Ltd included 64 m @ 61.3% Fe, 12.6% SiO<sub>2</sub>, 0.61% Al<sub>2</sub>O<sub>3</sub>, 0.02% P and 0.08% LOI, and 18 m @ 55.6% Fe, 16.2% SiO<sub>2</sub>, 0.63% Al<sub>2</sub>O<sub>3</sub>, 0.02% P and 2.02% LOI.

### Western Australia

Gindalbie Metals Ltd reported the discovery of magnetite mineralisation beneath the BH2 hematite deposit at the **Karara** deposit, 45 km E of Koolanooka. Typical drill intersections include 64 m @ 49.5% Fe, 26.0% SiO<sub>2</sub>, 0.129% P, 0.041% S; 88 m @ 44.0% Fe, 32.4% SiO<sub>2</sub>, 0.086% P, 0.024% S, and 64 m @ 45.0% Fe, 32.9% SiO<sub>2</sub>, 0.096% P and 0.014% S.

FerrAus Ltd announced the discovery of iron mineralisation at its **Davidson Creek** project 20 km W of Jigalong in the east Pilbara region. The mineralisation is Marra Mamba ore and intersections reported include 32 m @ 59.6% Fe, 0.070% P, 3.3% SiO<sub>2</sub>, 2.3% Al<sub>2</sub>O<sub>3</sub>, 8.6% LOI, and 30 m @ 57.3% Fe, 0.091% P, 4.9% SiO<sub>2</sub>, 2.9% Al<sub>2</sub>O<sub>3</sub> and 9.5% LOI.

Encouraging results were reported by BC Iron Ltd from drilling on the **Outcamp Well** channel iron prospect 40 km SW of Nullagine. Intersections included 14 m @ 57.9% Fe, 3.4% SiO<sub>2</sub>, 1.8% Al<sub>2</sub>O<sub>3</sub>, 0.02% P, 10.8% LOI, and 10 m @ 58.9% Fe, 2.6% SiO<sub>2</sub>, 1.3% Al<sub>2</sub>O<sub>3</sub>, 0.02% P, and 11.5% LOI.

## MINERAL SANDS (FIGURE 5)

### New South Wales

Bemax Resources Ltd discovered the **Atlas** Prospect in the Murray Basin. Assays delineated a zone 4.9 m thick over a width of 135 m averaging 15.4% heavy minerals (HM) at a 3% HM cut-off.



Iluka Resources Ltd discovered the **Nepean** deposit, 70 km N of Balranald. Nepean has a heavy mineral core with grades of greater than 30% HM and combined rutile and zircon assemblages of greater than 20%.

## South Australia

Iluka Resources Ltd announced the discovery of the **Typhoon** prospect 5 km SE of its Jacinth-Ambrosia deposits in the Eucla Basin. Drilling intersected HM sands over a width of approximately 1000 m and up to 21 m thick. A provisional analysis of composited samples returned an average zircon grade of 17%.

Iluka also announced the discovery of the **Dromedary** prospect, 45 km NE from Ceduna. Four drill traverses returned intersections of mineral sands over an apparent width of up to 500 m and up to 1 km along strike. Mineralisation is up to 4.5 m thick from an average depth of 25 m. The HM grade ranges from 1% to 14.6% and mineralogy suggests an average zircon assemblage of 17%.

## Victoria

Bemax Resources Ltd reported drill results from its **Kulwin North** deposit ENE of Ouyen confirmed a strike length of over 5 km for the deposit with potential to extend this to the north. Some of the better intersections reported were 6.0 m @ 19.3% HM, 6.0 m @ 15.6% HM, and 4.5 m @ 24.2% HM. In the southern part of the deposit the HM composition is 15% rutile, 15% zircon and 61% ilmenite.

## Western Australia

Image Resources NL reported further encouraging drill intersections at **Cooljarloo North**, 3 km N of the Cooljarloo mine near Cataby. Included were 6 m @ 15.7% HM from the Hyperion zone and 6 m @ 16.0% HM and 3 m @ 21.1% HM from the Target 2 zone. At Target 7 which is 0.5 km W of Hyperion initial drilling returned intersections including 6 m @ 7.1% HM, 7 m @ 6.8% HM and 7 m @ 6.2% HM.

Diatreme Resources Ltd and Minerals Corporation Ltd announced a mineral sands discovery in the Eucla Basin on the South Australia-Western Australia border. Drilling identified the **Cyclone** and **Hurricane** prospects. At Cyclone the best results had an average grade of 4.5% HM over an average 5 m thickness and a zircon content of up to 50%. At Hurricane drilling returned 2 m @ 10% HM (estimated) and 4.5 m @ 3.8% HM (estimated).

## RARE EARTH ELEMENTS

(FIGURE 5)

### Northern Territory

Arafura Resources Ltd undertook infilling drilling at the **Nolans** deposit to upgrade the existing indicated and inferred resource of 18.6 Mt @ 3.1% REO, 14% P<sub>2</sub>O<sub>5</sub> and 0.47 lb/t U<sub>3</sub>O<sub>8</sub>. Significant intersections were reported including 5.4 m @ 23.8% REO, 4.7 lb/t U<sub>3</sub>O<sub>8</sub>, 8.3 m @ 11.4% REO, 2.2 lb/t U<sub>3</sub>O<sub>8</sub>, 4.7 m @ 7.9% REO, 1.2 lb/t U<sub>3</sub>O<sub>8</sub>, and 17.3 m @ 6.6% REO and 1.2 lb/t U<sub>3</sub>O<sub>8</sub>. Nolans is 135 km NNW of Alice Springs.

### Western Australia

Navigator Resources Ltd reported initial results from drilling at the **Cummins Range** project 130 km SW of Halls Creek. Preliminary assays from 4 m composite intersections were 48 m @ 3.5% REO from 24 m and 64 m @ 3.3% REO from 16 m. In addition, preliminary uranium intersections included 44 m @ 881ppm U<sub>3</sub>O<sub>8</sub> from 28 m and 24 m @ 798ppm U<sub>3</sub>O<sub>8</sub> from 72 m.

## TIN (FIGURE 5)

### New South Wales

High-grade tin intersections with associated copper, zinc and indium were reported by YTC Resources Ltd from the **Doradilla** project, 45 km SE of Bourke. Intersections included 40 m @ 1.5% Sn, 0.52% Cu, 110ppm In, and 0.35% Zn from 6 m, which included 18 m @ 3.04% Sn, 0.85% Cu, 230ppm In, and 0.73% Zn from 18 m.

### Tasmania

At the **St Dizier** deposit on the west coast near Zeehan, Stellar Resources Ltd reported encouraging tin intersections from the first hole of a three hole diamond drilling program. Intersections included 22 m @ 1.12% Sn from 13m, 4.5 m @ 3.82% Sn from 39.2 m, and 57 m @ 0.6% Sn from 44 m.

## URANIUM (FIGURE 5)

### Northern Territory

Energy Metals Ltd, manager of the **Biglryi** joint venture, continued to report significant uranium

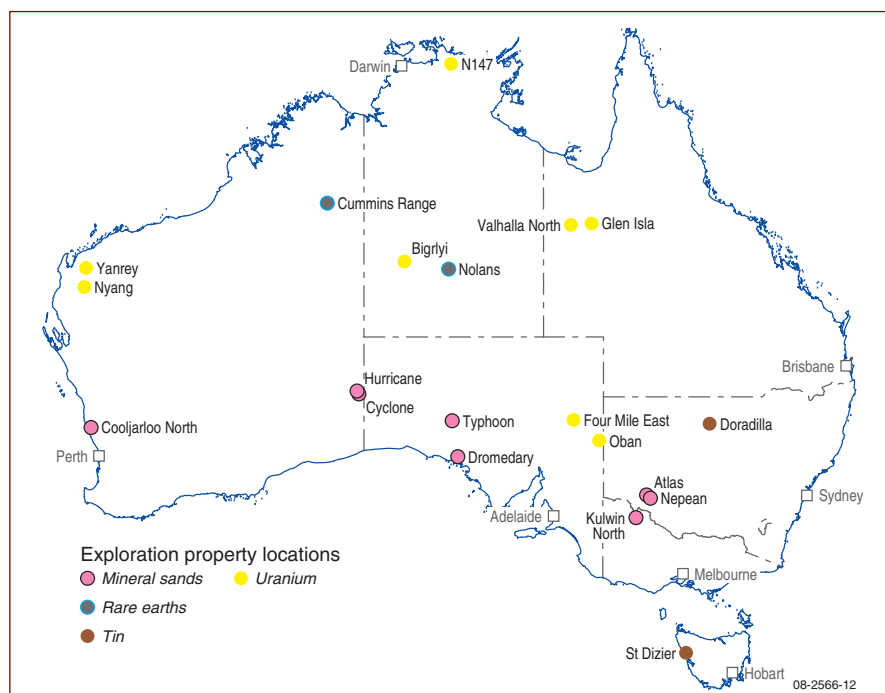


Figure 5: Selected mineral exploration projects, 2007.



mineralisation from the project. Results included 2.34 m @ 0.56%  $eU_3O_8$ , 1.98 m @ 0.45%  $eU_3O_8$ , and 3.60 m @ 0.39%  $eU_3O_8$ . The company reported resources at Biglyi of 14.3 million pounds  $U_3O_8$  and 16.3 million pounds  $V_2O_5$ . Biglyi is 350 km NW of Alice Springs.

Uranium Equities Ltd reported that core from a diamond drill hole at the **N147** prospect 82 km WSW of Maningrida, returned 22.1 m @ 0.36%  $U_3O_8$  from a depth of 114.1 m. Results from a second hole returned 28.1 m @ 0.125%  $eU_3O_8$  from 88.3 m, and 21.7 m @ 0.306%  $eU_3O_8$  from 129.4 m.

## Queensland

At the **Valhalla North** project in northwest Queensland, Fusion Resources Ltd intersected high grade uranium mineralisation. At the Duke Batman prospect downhole intersections included 10 m @ 1289ppm  $U_3O_8$  which included 5 m @ 2278ppm  $U_3O_8$ . Other intersections included 4 m @ 1133ppm  $U_3O_8$ , and 7 m @ 314ppm  $U_3O_8$ .

Bowen Energy Ltd reported that drilling on the **Glen Isla** prospect, 45 km NNW of Cloncurry had returned encouraging uranium grades. Intersection included 1 m @ 1705ppm U, 1 m @ 389ppm U and 1 m @ 159ppm U. Drilling also indicated anomalous uranium levels in another palaeochannel.

## South Australia

Alliance Resources Ltd continued exploration at its **Four Mile East** project located 110 km ENE of Leigh Creek. High-grade uranium intersections reported included 0.7 m @ 2.51%  $pU_3O_8$ , 1.85 m @ 1.94%  $pU_3O_8$ , 4.70 m @ 0.69%  $pU_3O_8$ , and 4.10 m @ 1.69%  $pU_3O_8$ . The Company expects a resource estimate for the northern part of Four Mile East to be available in about April 2008.

Curnamona Energy Limited reported that ongoing drilling at the **Oban** prospect, 100 km NW of Broken Hill, encountered encouraging uranium intersections, including 5.3 m @ 0.085 %  $eU_3O_8$  and 8.20 m @ 0.08%  $eU_3O_8$ .

## WESTERN AUSTRALIA

Metex Resources NL reported that reconnaissance drilling on its **Nyang** prospect, 150 km N of Carnarvon, encountered uranium mineralisation. Intersections included 8 m @ 1320ppm  $U_3O_8$  which included 1 m @ 2323ppm  $U_3O_8$ , and 1 m @ 2983ppm  $U_3O_8$ , 15 m @ 546ppm  $U_3O_8$  including 1 m @ 1640ppm  $U_3O_8$  and 3 m @ 595ppm  $U_3O_8$  including 1 m @ 1202ppm  $U_3O_8$ .

Scimitar Resources Ltd reported encouraging uranium intersections in drilling at its **Yanrey** prospect 85 km S of Onslow. The intersections included 2.4 m @ 1614ppm  $eU_3O_8$ , 3.8 m @ 1309ppm  $eU_3O_8$ , and 1.4 m @ 1284ppm  $eU_3O_8$ .

# RESOURCES

During 2007 approximately 66% of exploration expenditure in Australia was on deposits for which at least an inferred resource had been established with the aim of further defining the resource and understanding the nature of the deposit. The resource information presented below and in Figure 6 is an indicative selection new resources reported during the year and not a comprehensive listing.

## BASE METALS

### Queensland

Copper Strike Ltd announced initial inferred resources for the **Chloe** and **Jackson** prospects in the Einasleigh area. Using a cut-off grade of 3% Zn equivalent over a minimum of 4 m the resource estimates are: Chloe 1.82 Mt

@ 5.12% Zn, 2.23% Pb, 42g/t Ag, and 0.25% Cu and Jackson 0.49 Mt @ 5.26% Zn, 4.06% Pb, 115g/t Ag and 0.11% Cu.

### South Australia

BHP Billiton Pty Ltd reported a 77% increase in resource tonnage and 38% increase in contained copper metal at its **Olympic Dam** deposit in the Gawler Craton, South Australia. Ongoing drilling and geological interpretation has allowed a resource estimate to be prepared which put total resources in the deposit at 7738 Mt @ 0.87% Cu, 0.29 kg/t  $U_3O_8$ , 0.30g/t Au and 1.61g/t Ag and a separate gold only resource of 117 Mt @ 1.19g/t Au. Included in the resource is a combined proved and probable reserve estimated by the company at 399 Mt @ 1.87% Cu, 0.58 kg/t  $U_3O_8$ , 0.68g/t Au and 4.0g/t Ag.

### Tasmania

Ongoing exploration at Bass Metals Ltd's **Que River** deposit near Queenstown resulted in a 34% increase in its resource inventory. Total mineral resources in June 2007 were 0.736 Mt @ 5.7% Zn, 2.9% Pb, 1.1% Cu, 84g/t Ag, 0.93g/t Au of which almost 75 percent is in the measured and indicated resource categories.

### Western Australia

At its **Whundo** and **West Whundo** deposits Fox Resources Ltd reported that copper metal content of resources rose by 10% and 29% respectively to 11 000 t Cu for each. In addition, at Whundoo there is 4410 t of contained zinc in a resource of 0.42 Mt @ 1.05% Zn.

## NICKEL

### Queensland

Metallica Minerals Ltd announced that its **NORNICO** Nickel Project has a total resource of 34.8 Mt @ 0.71% Ni for an in situ 247 800 t of nickel metal. This resource includes the Bell Creek and Minnamoolka deposits.

### Western Australia

A 41% increase in nickel resources was announced for the **Sinclair**

deposit located near Leonora, by Jubilee Mines NL in September. Jubilee reported that the deposit contains 47 300 t Ni in a total resource of 1.89 Mt @ 2.5% Ni. Almost 41% of the contained nickel is in the indicated resource category while the remainder are inferred resources.

In August, Sally Malay Mining Ltd reported a 23% increase in reserves at the **Sally Malay** operation which will add at least one year to the mine life. The probable reserve increased to 2.79 Mt @ 1.32% Ni, 0.61% Cu and 0.07% Co for a contained 36 800t Ni. The measured and indicated resource at the end of June 2007 was 2.83 Mt @ 1.73% Ni, 0.80% Cu and 0.09% Co.

## GOLD

### Queensland

Conquest Mining Ltd announced an indicated and inferred resource of 16 Mt @ 1.85g/t Au, 58g/t Ag and 0.33% Cu for its **Silver Hill** deposit, part of its Mount Carlton project near Collinsville. Total resources at Mount Carlton are 17.8 Mt @ 1.79g/t Au, 58.7g/t Ag and 0.31% Cu.

### Western Australia

The Joint Venture partners AngloGold Ashanti Ltd (70%) and Independence Group NL (30%) reported an initial open cut resource estimate for the **Tropicana – Havana** deposits located on the eastern margin of the Yilgarn Craton 230 km ESE of Laverton. At a 0.6g/t Au cut-off grade a total resource of 62.8 Mt @ 2.01g/t Au for a contained 4.05 Mozs Au was reported. This was made up of 31.1 Mt @ 2.09g/t Au for 2.09 Mozs Au in the indicated resource category and 31.7 Mt @ 1.93g/t Au for 1.96 Mozs Au in the inferred resource category.

## IRON ORE

### South Australia

Western Plains Resources Ltd published resource estimates for the **Hawks Nest** magnetite deposits 100 km NE of Tarcoola. The largest deposit is Kestrel for which the company reported a total resource of 220 Mt @ 36% Fe, 0.06% P, 38% SiO<sub>2</sub>, 0.94% Al<sub>2</sub>O<sub>3</sub> and 0.69% LOI.

## Western Australia

Exploration of channel iron mineralisation in its Solomon project area by Fortescue Metals Group Ltd resulted in an announcement of an inferred resource estimate for the **Serenity** area 60 km NNW of Tom Price. The resource estimate is 1014 Mt @ 56% Fe, 7.3% SiO<sub>2</sub>, 3.8% Al<sub>2</sub>O<sub>3</sub>, 0.81% P and 8.06% LOI.

## URANIUM

### Queensland

Summit Resources Ltd announced an inferred resource of 2 Mt at 0.105% U<sub>3</sub>O<sub>8</sub> (using a 0.023% U<sub>3</sub>O<sub>8</sub> cut-off) for the **Andersons** uranium deposit near Mount Isa. An inferred resource of 4.2 Mt @ 0.041% U<sub>3</sub>O<sub>8</sub> (using a 0.023% U<sub>3</sub>O<sub>8</sub> cut-off) was also announced for the Watta deposit.

### South Australia

Marathon Resources Ltd reported a new resource estimate for its **Mt Gee** deposit in the Flinders Ranges. At a cut off grade of 300ppm U<sub>3</sub>O<sub>8</sub> the company reported resources of: indicated resources 3.1 Mt @ 717ppm U for 2200 t U<sub>3</sub>O<sub>8</sub> and an inferred resource of 39.7 Mt @ 622ppm U for 24 700 t U<sub>3</sub>O<sub>8</sub>.

## Western Australia

The first resource for Maximus Resources Ltd's **Windimurra** prospect, located about 70 km ESE of Mount Magnet was announced in December. The inferred resource is 19 Mt @ 180ppm U<sub>3</sub>O<sub>8</sub> for a contained 3400 t (7.5 million pounds) U<sub>3</sub>O<sub>8</sub> at a cut off grade of 100ppm U<sub>3</sub>O<sub>8</sub>.

# PROJECT DEVELOPMENTS

A large number of mineral projects were at various stages of development during 2007. The following is an illustrative listing to highlight the range of projects under investigation and their distribution across the continent (Figure 7). For a more comprehensive review of major project activity see the Australian Bureau of Agricultural and Resource Economics publication Australian

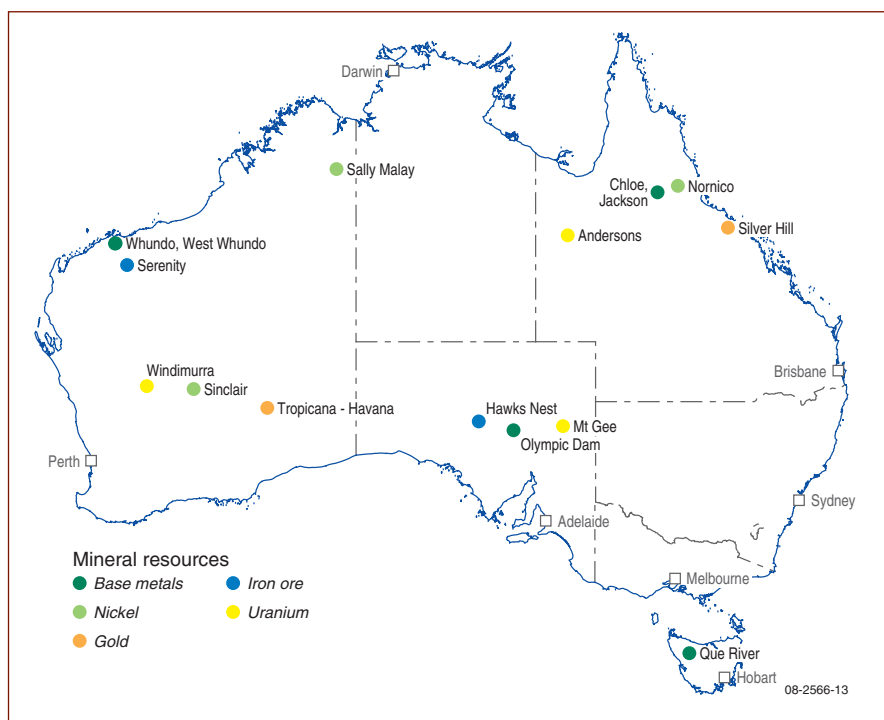


Figure 6: Selected mineral projects where new or revised resource estimates were announced in 2007.

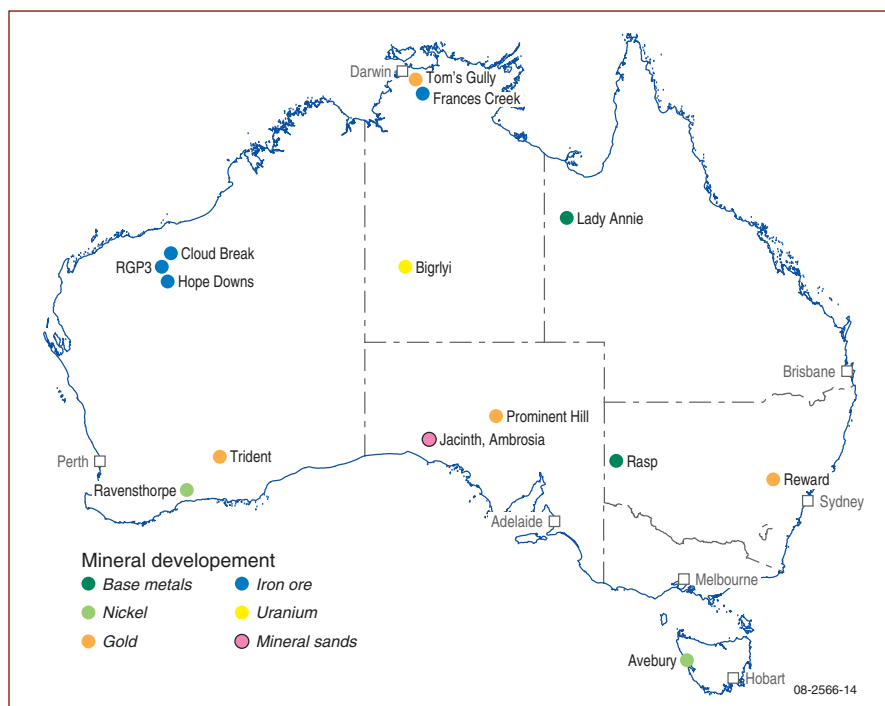


Figure 7: Selected mineral development projects 2007.

Commodities, Vol. 14 No. 4 December Quarter 2007 available at [www.abare.gov.au](http://www.abare.gov.au).

## BASE METALS

### New South Wales

CBH Resources Ltd has opened a decline into the Western Mineralisation from the old Kintore open pit in the centre of the Broken Hill Main Lode. The **Rasp** Mine will initially exploit the Western Mineralisation at a rate of 750 000 tpa. Output will be 65 000 tpa zinc concentrate (50% Zn), 35 000 tpa lead concentrate (70% Pb) and 800 000 oz/pa Ag in the lead concentrate.

### Queensland

CopperCo Ltd announced that copper production had commenced at the **Lady Annie** project, NW of Mount Isa, with commissioning completed in the September quarter and plating of copper cathode commencing at the end of September. Full production at the design capacity of 19 000 tpa was achieved in October 2007 with expansion to 25 000 tpa planned for 2008.

## GOLD

### New South Wales

Hill End Gold Ltd announced that mining commenced at the Hill End project in June. The high-grade **Reward** area has a resource of 124 000 t @ 19g/t Au. Bulk sampling of the deposit will be used to obtain more reliable information on the grade and tonnage estimates for the deposit.

### Northern Territory

GBS Gold International Inc. will bring the **Tom's Gully** project into production. The project will be based on an initial probable reserve of 740 000 t @ 7.1g/t Au and the company is targeting a mid-2008 start to production. Production is expected to be at an average of 35 000–40 000 ozs/year over the initial reserve life of about 3.5 years.

### South Australia

The development of the **Prominent Hill** project continued on schedule for mining the first ore in early 2008 and first commercial concentrate production

in the third quarter of 2008. Oxiana Ltd report that the first full year of production will be 2009 with an expected output of copper concentrates containing 117 000 t Cu, 86 000 oz Au and 390 000 oz Ag.

## Western Australia

Underground development and production commenced at Avoca Resources Ltd's **Trident** deposit at Higginsville. Annual production levels of around of 160 000 to 190 000 ozs are expected over the life of the mine.

## IRON ORE

### Northern Territory

Territory Resources Ltd exported the first shipment of iron ore from its **Frances Creek** mine 190 km S of Darwin. The company expected to ship an additional 200 000 t from Darwin to China by the end of 2007.

## Western Australia

Fortescue Metals Group Ltd reported favourable progress at the **Cloud Break** mine and associated rail and port developments the Pilbara region. At the end of November the Company was on schedule to make its first export shipment in May 2008. A commitment to an expansion from 50 Mtpa to 100 Mtpa has been made.

Late in the year BHP Billiton Ltd's 85% owned **RGP3** program was on schedule for completion by year's end. The project will add 20 Mtpa to the company's annual production capacity in the Pilbara. BHP's estimated share of the cost for RGP3 was US\$1300 million. The company's RGP4 project in the Pilbara was reported to be on schedule and when completed in the first half of 2010 will add 26 Mtpa to the company's production capacity. BHP's share of the estimated cost of the project is US\$1850 million.

Rio Tinto Ltd-Hancock Prospecting Pty Ltd will fast-track the expansion of the **Hope Downs** project at an estimated cost of US\$350 million. The expansion will give the project a capacity of 30 Mtpa on completion in 2009. Work on the initial 22 Mtpa project commenced in 2006 with first production expected by early 2008.



## MINERAL SANDS

### South Australia

Iluka Resources Ltd will undertake a Definitive Feasibility Study for the potential development of its **Jacinto** and **Ambrosia** deposits in the Eucla Basin. It is expected to be completed by mid-2008 to allow a development decision and possible first production by mid-2010. The study will consider a wet concentrator plant with a capacity of 1000 tph of sand. This would allow production of about 300 000 tpa of zircon.

## NICKEL

### Tasmania

At **Avebury**, Allegiance Mining NL reported that construction continued and the project will have a mill throughput of 900 000 tpa of ore producing more than 8500 t of nickel-in-concentrates per annum with production scheduled for the first quarter of 2008.

### Western Australia

At the **Ravensthorpe** project in southern Western Australia, BHP Billiton Ltd anticipates first production in the first quarter of 2008. The project will have a capacity of up to 50 000 tpa of nickel in concentrates. Late in the year the

company noted that construction and pre-commissioning were essentially complete and process commissioning of the plant was on schedule. Capital expenditure on the project was reported as totalling US\$2200 million.

## URANIUM

### Northern Territory

Energy Metals Ltd, manager of the Biglyi Joint Venture announced positive results from an Initial Scoping Study for the **Biglyi** uranium-vanadium project 350 km NW of Alice Springs. Highlights of the study included: Production of 8.43 Mlb of  $U_3O_8$  and 6.97 Mlb of  $V_2O_5$  over eight years from 2.73 Mt of ore using a conventional acid leach and solvent extraction process.

## CONTACTS FOR AUSTRALIAN GOVERNMENTS

### AUSTRALIA

#### Geoscience Australia

GPO Box 378  
Canberra ACT 2601 Australia  
Tel: +61 (0)2 6249 9087  
Fax: +61 (0)2 6249 9983  
Email: mike.huleatt@ga.gov.au  
Web: www.ga.gov.au

#### Department of Resources, Energy and Tourism

GPO Box 9839  
Canberra ACT 2601, Australia  
Tel: +61 (0)2 6213 6000  
Fax: +61 (0)2 6213 7000  
Email: Michael.Sheldrick@ret.gov.au  
Web: www.ret.gov.au

### NEW SOUTH WALES

#### Department of Primary Industries - Mineral Resources

PO Box 344  
Hunter Regional Mail Centre  
NSW 2320 Australia  
Tel: +61 (0)2 49316696  
Fax: +61 (0)2 49316789  
Email: lindsay.gilligan@dpi.nsw.gov.au  
Web: ww.dpi.nsw.gov.au/minerals

### NORTHERN TERRITORY

#### Department of Primary Industry, Fisheries and Mines, Northern Territory Geological Survey

PO Box 3000  
Darwin NT 0801 Australia  
Tel: +61 (0)8 8999 5313  
Fax: +61 (0)8 8999 6824  
Web: www.nt.gov.au/dpifm/Minerals\_  
Energy/Geoscience/

### QUEENSLAND

#### Department of Mines and Energy, Geological Survey of Queensland

Block A 80 Meiers Road  
Indooroopilly QLD 4068 Australia  
Tel: +61 (0)7 3362 9365  
Fax: +61 (0)7 3362 9368  
Email: david.mason@dme.qld.gov.au.  
Web: www.dme.qld.gov.au

### SOUTH AUSTRALIA

#### Primary Industries and Resources South Australia

Mineral and Energy Division  
GPO Box 1671  
Adelaide SA 5001 Australia  
Tel: +61 (0)8 8463 4153  
Fax: +61 (0)8 8463 4155  
Email: heithersay.paul@saugov.sa.gov.au  
Web: www.pir.sa.gov.au

### TASMANIA

#### Mineral Resources Tasmania

PO Box 56  
Rosny Park TAS 7018 Australia  
Tel: +61 (0)3 6233 8377  
Fax: +61 (0)3 6233 8338  
Email: info@mrt.tas.gov.au  
Web: www.mrt.tas.gov.au

### VICTORIA

#### Department of Primary Industries

Minerals and Petroleum Division  
GPO Box 4440  
Melbourne VIC 3001 Australia  
Tel: +61 (0)3 9658 4454  
Fax: +61 (0)3 9658 4460  
Email: customer.service@dpi.vic.gov.au.  
Web: www.dpi.vic.gov.au

### WESTERN AUSTRALIA

#### Department of Industry and Resources, Geological Survey of Western Australia

100 Plain Street  
East Perth WA 6044 Australia  
Tel: +61 (0)8 9222 3160  
Fax: +61 (0)8 9222 3633  
Email: tim.griffin@doir.wa.gov  
Web: www.doir.wa.gov.au

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