

Minerals and Metals Availability in New South Wales Australia

Compiled by
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Minerals Development Branch

Using information current at 1 March 2006



**NSW DEPARTMENT OF
PRIMARY INDUSTRIES**

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PREFACE

The New South Wales Department of Primary Industries has prepared this publication to provide information regarding the supply of mineral commodities produced within New South Wales (NSW). This document provides a reference to the NSW non-coal mineral commodities and products available from the State's mines and processing plants and lists the major or significant producers. It is intended to regularly update this publication.

Company contact details are included to facilitate direct trade enquiries to the major commodity producer(s). When contacting the listed companies it is important to provide detailed information regarding specifications, purchasing method, consignment size, port of entry and delivery dates.

Industry associations are listed to facilitate access to additional information on smaller-scale New South Wales producers not included in this document.

Commodities are arranged under the following classifications:

- Metallic mineral concentrates and metals
- Industrial minerals and products

Information on mine ownership, production, reserves, location, geology and on coal and petroleum and construction materials may be sought from other Departmental publications including:

- New South Wales Minerals Industry Annual
- New South Wales Coal Industry Profile

Detailed geological enquiries relating to industrial and metallic mineral resources should be directed to the Geological Survey of NSW, a Branch of the Department (phone: (02)4931 6666; fax (02) 4931 6790; www.dpi.nsw.gov.au/minerals).

Further information on the availability of mineral commodities in New South Wales may be obtained by contacting:

Minerals Liaison Officer

Minerals Development
Minerals Resources Division
Department of Primary Industries
PO Box 344
Hunter Region Mail Centre, NSW 2310
Australia

Telephone: (02) 4931 6481
Facsimile: (02) 4931 6790
Email: karen.varnum@dpi.nsw.gov.au
Website: www.dpi.nsw.gov.au/minerals

The Australian ISD code prefix is '61'.

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Map of Major Metallic Mines and Deposits

Map of Major Industrial Mineral Mines and Deposits

MINERAL RESOURCES AGENCIES IN AUSTRALIA

New South Wales

Department of Primary Industries, Mineral Resources Division

56 High Street
MAITLAND, NSW 2320
PO Box 344
HUNTER REGION MAIL CENTRE,
NSW 2310
Phone: (02) 4931 6666
Fax: (02) 4931 6790
www.dpi.nsw.gov.au/minerals
webcoord@dpi.nsw.gov.au

Queensland

Department of Natural Resources and Mines

Mineral House
41 George Street
BRISBANE QLD 4000
GPO Box 2454
BRISBANE QLD 4001
Phone: (07) 3896 3111
Tollfree: (outside Brisbane metro)
1800 803 788
Fax: (07) 3224 8236
www.nrm.qld.gov.au
sales@nrm.qld.gov.au

Victoria

Department of Primary Industries Department of Sustainability and Environment

1 Spring Street
MELBOURNE VIC 3000
Phone: 136 186 within Australia
+ (61) 3 533 2500 outside Australia
Fax: (03) 9412 4803
www.dpi.vic.gov.au
customer.service@nre.vic.gov.au

Commonwealth

Geoscience Australia

Cnr Jerrabomberra Ave & Hindmarsh
Drive
SYMONSTON ACT 2609
GPO Box 378
CANBERRA ACT 2601
Phone: (02) 6249 9111
Fax: (02) 6249 9999
www.aqso.gov.au
ref.library@ga.gov.au

Western Australia

Department of Industry and Resources

Mineral House
100 Plain Street
EAST PERTH WA 6004
Phone: (08) 9222 3333
Fax: (08) 9222 3444
www.doir.wa.gov.au

South Australia

Primary Industries and Resources South Australia

Office of Minerals and Energy Resources
7th Floor, 101 Grenfell Street
ADELAIDE SA 5001
GPO Box 1671
ADELAIDE SA 5001
Phone: (08) 8463 4154
Fax: (08) 8463 4155
www.pir.sa.gov.au
Abbot.Peta@saugov.sa.gov.au

Northern Territory

Department of Primary Industries, Fisheries & Mines

Centrepont Building
Smith Street Mall
DARWIN NT 0800
GPO Box 3000
DARWIN NT 0801
Phone: (08) 8999 6443
Fax: (08) 8999 5221
www.minerals.nt.gov.au
geoscience.products@nt.gov.au

Tasmania

Department of Infrastructure, Energy and Resources

Mineral Resources Tasmania
30 Gordons Hill Road
ROSNY PARK TAS 7018
PO Box 56
ROSNY PARK TAS 7018
Phone: (03) 6233 8377
Fax: (03) 6233 8338
www.mrt.tas.gov.au
info@mrt.tas.gov.au

NEW SOUTH WALES MINERALS INDUSTRY OVERVIEW

The New South Wales (NSW) minerals industry, comprising coal, metallic and industrial mineral production and exploration plus established minerals processing operations, makes a major contribution to the State's economy in terms of business activity, investment, regional development, job creation and export revenue.

The minerals industry is the State's largest export industry, accounting for about 32% of merchandise exports valued at \$6.4 billion annually. Coal, iron and steel and aluminium are the State's major mineral and processed metal exports. The industry (including value-added minerals processing) directly employs about 25 000 people, many of these in rural centres, and generates indirect employment many times this figure. NSW is a low cost world-leading producer of coal, gold, base metals and gemstones.

- Total NSW mineral production in 2003-2004 was valued at \$6.7 billion. Preliminary figures for 2004-05 suggest that the estimated value of NSW mineral production could be around \$9.2 billion.
- Saleable coal production was 114.2 million tonnes (a 2.4 per cent increase over 2002-03), valued at \$4.8 billion in 2003-04 and is the State's largest mining sector. Metallic and industrial mineral production is also very significant - valued at around \$1.46 billion.
- The wealth generated by the State's minerals industry is based on 52 coal mines, about 11 major metalliferous mines, a similar number of significant industrial minerals operations plus a large number of smaller metallic and industrial mineral mines and numerous construction materials operations.
- Mining operations are spread throughout the State, though coal mining is concentrated on known resources of high quality black coal within the five coalfields of the Sydney - Gunnedah Basin (Hunter, Newcastle, Gunnedah, Western and Southern Coalfields).
- Metallic mining operations and projects are concentrated in three main areas of the State - Broken Hill, Orange and Cobar - all well served by existing infrastructure and rural communities.
- There are about 30 coal projects and 28 metallic and industrial mineral projects proposed for likely development over the next five years. Potentially, these projects could be worth about \$3.5 billion in investment and generate over 2500 direct jobs. Private new capital expenditure in the NSW Minerals Industry in 2003-04 was \$1.1 billion, exceeding \$1 billion for the second consecutive year.
- Industrial minerals production in New South Wales ranges from very high value commodities such as opals and sapphires to low value, high volume extractive materials (such as sand and coarse aggregate essential for building and construction). There are numerous medium value commodities such as clays, limestone, magnesite, magnetite, diatomite, high purity silica, mineral sands and

dimension stone - all produced in New South Wales - which are essential raw materials for many other industries.

- Value-added minerals processing (including established steel and aluminium smelting and refining operations) is an important component of the State's minerals industry, with much of this production exported. Minerals processing in NSW directly employs about 10 000 people. The strength of NSW as a location for value-added processing is based on well-established infrastructure and internationally competitively priced electricity.

Exploration

The State's mining industry is based on the favourable geology of NSW, which has led to the discovery and development of many world class mineral deposits. The NSW Government has committed \$60 million to supporting investment and exploration in this State. The results of these programs should continue to provide significant stimulus to future exploration for mineral and petroleum resources.

NSW Government funded exploration initiatives have stimulated private mineral and petroleum exploration investment in the State. In 2003-04 NSW private mineral and petroleum exploration expenditure was just over \$71 million. Higher coal and metallic mineral prices since the beginning of 2004 and encouragement from NSW Government funded exploration initiatives, has resulted in a substantial increase in exploration expenditure in NSW for 2004-05, with private mineral and petroleum exploration in NSW exceeding \$100 million.

The major focus for exploration has been on gold and base metal deposits in the Lachlan Fold Belt and the Broken Hill region, and mineral sands deposits in the Murray Basin. Gold exploration expenditure exceeded \$20 million in 2003-04, while coal exploration expenditure was over \$13 million.

In addition, significant petroleum exploration interest has been generated in recent years. Private petroleum exploration expenditure has increased from \$11.3 million in 2001-02 to \$20.9 million in 2003-04. Increased gas exploration activities near Narrabri and coal seam methane exploration in the Sydney Basin has led to petroleum exploration expenditure increasing to over \$30 million in 2004-05.

As a result of NSW Government exploration initiatives around 80% of the State is covered by modern, high-resolution airborne geophysical surveys.

METALLIC MINERAL CONCENTRATES AND METALS

ALUMINA and ALUMINIUM

The Hunter Valley is Australia's major regional producer of aluminium. Two aluminium producers have smelters in the Region. The largest and most modern is the **Tomago Aluminium** smelter built in an industrial area at Tomago and employing around 1000 people. The Tomago smelter is one of the largest in Australia, with a capacity of 474 000 tonnes a year (with an expansion to 530 000 tonnes per year being phased in by 2007, which will make Tomago the largest smelter in Australia).

Tomago produces aluminium ingots, extrusion billet and rolling slabs. These products are exported to markets in Asia (principally Japan), Europe and North America, where they are turned into a variety of products. Tomago is one of the world's lower cost and more efficient aluminium smelters.

The other smelter is operated by **Hydro Aluminium Australia Pty Ltd** near Kurri Kurri west of Newcastle. This plant has a capacity of 153 000 tonnes of aluminium annually and has been operating since 1966. The Hydro smelter produces various types of ingots that are used to produce a vast range of products.

The major raw material used by the smelters is alumina which is processed from bauxite. Australia is one of the world's major producers of bauxite and alumina although NSW does not mine bauxite ore or produce alumina. The State's aluminium smelter requirements are "imported" from interstate alumina refineries.

Contact information for major NSW Aluminium suppliers:

Gove Aluminium Finance Ltd

Locked Bag 6
CHATSWOOD, NSW 2057
Phone: (02) 9235 8144
Fax: (02) 9235 8166
Mr John Davies
Managing Director
govealuminium@csr.com.au
www.csr.com.au

Pechiney Pacific Pty Ltd

GPO Box 4473
SYDNEY, NSW 1044
Phone: (02) 9235 5411
Fax: (02) 9235 2333
Mr Ian Pocock
Sales and Marketing Manager
ian_pocock@pechiney.com
www.alcan.com

Hydro Aluminium Australia Pty Ltd

PO Box 1
KURRI KURRI NSW 2327
Phone: (02) 4937 1555
Fax: (02) 4937 3452
Ms Leanne Pringle
Metal Services Coordinator
leanne.pringle@hydro.com
www.hydro.com

Tomago Aluminium

PO Box 405
RAYMOND TERRACE NSW 2324
Phone: (02) 4966 9669
Fax: (02) 4966 9711
Laurent Musy
Chief Executive Officer
www.tomago.com.au

Contact data for some of the major international alumina suppliers, who may be able to cater for large unscheduled orders, are listed below:

Comalco Alumina

GPO Box 153
BRISBANE, QLD 4001
Phone: (07) 3115 3400
Fax: (07) 3115 3401
Mr Jim Connor
Managing Director
www.comalco.com

Alcoa World Alumina Australia

PO Box 252
APPLECROSS, WA 6953
Phone: (08) 9316 5111
Fax: (08) 9316 5228
Mr Wayne Osborn
Managing Director
www.alcoa.com.au

Capral Aluminium Ltd

71 Ashburn Road
BUNDAMBA, QLD 4304
Phone: 1 300 365 110
Fax: 1 300 133 970
Mr Robin W Freeman
Managing Director
customerservice@capral.com.au
www.capral.com.au

Other information on aluminium is available from:

Australian Aluminium Council

PO Box 63
DICKSON, ACT 2602
Phone: (02) 6267 1800
Fax: (02) 6267 1888
Mr Ron Knapp
Executive Director
aac@aluminium.org.au
www.aluminium.org.au

ANTIMONY

More than 75% of the world's antimony production is used to make antimony trioxide for use in flame-retardants in textiles, plastics and paints. The only antimony produced in NSW has been derived from antimony-gold concentrates mined at the Hillgrove mine near Armidale, which closed in 2002. **Straits Resources Ltd** purchased the mine in February 2004 and has undertaken an exploration program. Mining at the Hillgrove operation may recommence during 2006.

Straits Resources Ltd

First Floor

35 Ventnor Avenue

WEST PERTH, WA 6005

Tel: (08) 9480 0500

Fax: (08) 9480 0520

Mr Milan Jerkovic

Chief Executive Officer

www.straits.com.au

NICKEL and COBALT

NSW could become a major producer of nickel-cobalt in the medium term. Development consent was granted in 2001 for the Syerston lateritic nickel-cobalt project, located in central west NSW. Syerston was purchased by **Ivanplats Syerston Pty Ltd** in August 2004 and an application to vary the development consent was granted in October 2005. Syerston, if it proceeds, will be the first nickel project to be developed in NSW, producing around 53,000 tonnes per annum of mixed sulphide precipitate.

Jervois Mining NL is also evaluating a potentially large lateritic nickel-cobalt project near Young.

Zinc concentrates produced from the Broken Hill mine (see "Lead and Zinc" section) contain small but economically significant amounts of cobalt. It is estimated that about 20 tonnes of cobalt per annum is available as an unprocessed commodity contained in zinc concentrates.

Using hydrometallurgical recovery techniques, **HydroMet Operations (Southern) Pty Ltd** processes refinery residues at Unanderra to produce around 50 tonnes per annum of cobalt sulphate and other chemicals.

**HydroMet Operations
(Southern) Pty Ltd**
PO Box 42
UNANDERRA, NSW 2526
Phone: (02) 4271 1822
Fax: (02) 4271 6151
Mr Greg Wrightson
Managing Director
office@hydromet.com.au
www.hydromet.com.au

Ivanplats Syerston Pty Ltd
Level 5
190 St Georges Terrace
PERTH, WA 6000
Phone: (08) 9322 0970
Fax: (08) 9226 5155
Mr Mick Ryan
Project Manager

Jervois Mining
Level 20, 114 William St
MELBOURNE VIC 3000
Phone: (03) 9670 3766
Fax: (03) 9670 3691
Mr Duncan Pursell
Managing Director
jervois@bigpond.com
www.jervoismining.com.au

COPPER

The most significant growth in the value of NSW mineral production in recent years has occurred in copper, which reached a peak of \$534 million in 2003-04, an increase of 37% over the previous year.

NSW is Australia's third largest copper producing state, with mine output in 2003-04 of 163 000 tonnes. Major copper producers for 2003-04 include the Ridgeway gold mine (47 378 t), CSA mine (37 454 t), Cadia Hill gold mine (37 380 t), Northparkes mine (26 451 t), and smaller amounts from the Mineral Hill mine.

The copper industry in NSW should benefit from the generally positive medium-term outlook for the metal. The infrastructure advantages of NSW and prospective geology should underpin ongoing development and the expansion of existing operations.

Significant expansion opportunities exist at the **Cadia Valley Operations**. In March 2005 the NSW Government granted development consent for a \$114 million extension at depth to the Ridgeway underground gold mine (Ridgeway Deeps). Development work has commenced on extending the decline and an optimal development route will be considered in a definitive feasibility study to be completed in 2006-07.

Newcrest Mining has also committed \$100 million for a feasibility study on its Cadia East project. Work on a 7 km underground decline to the ore body commenced in May 2005. Further exploration work will be undertaken.

Northparkes Mines has announced its commitment to the \$185 million E48 development as the next production phase of its copper (gold, silver) mine 27 km northwest of Parkes. The E48 ore body is located approximately 2 km north of the existing E26 underground mine and will be accessed via the existing decline, with ore transported by an extension to the existing underground ore handling conveyor system.

At the CSA mine, **Cobar Management Pty Ltd** has focused on 'in mine' exploration. Significant extensions to the main copper bearing lenses have been identified, increasing in grade and width at depth.

The Tritton copper mine (**Tritton Resources Limited**) in the State's central west near Nyngan was officially opened in early April 2005. In 2005-06 the mine is expected to produce 26,000 t of copper, ramping up to 33,000 t of copper per annum at full production in 2006-07.

The major NSW copper concentrate and metal suppliers include:

**Glencore International AG
Cobar Management Pty Ltd**
CSA Mine
PO Box 31
COBAR, NSW 2835
Phone: (02) 6836 2001
Fax: (02) 6836 2746
Mr Nigel Slonker
General Manager
administration@cmpl.com.au
www.cmpl.com.au

Newcrest Mining Ltd
Cadia Valley Operations
1460 Cadia Road
SOUTH ORANGE, NSW 2800
Phone: (02) 6392 2300
Fax: (02) 6366 4333
Mr Tony McPaul
General Manager
www.newcrest.com.au

Tritton Resources Ltd
Level 2, 5 Ord St
WEST PERTH WA 6005
Phone: (08) 9486 4422
Fax: (08) 9486 4433
Mr Mick McMullen
Executive Technical Director
admin@trittonresources.com.au
www.trittonresources.com.au

Rio Tinto
Northparkes Mines
PO Box 995
PARKES NSW 2870
Phone: (02) 6861 3000
Fax: (02) 6861 3111
Mr Barry Lavin
Managing Director
www.riotinto.com

Triako Resources Ltd
Level 2
80 Mount Street
NORTH SYDNEY, NSW 2060
Phone: (02) 9925 0110
Fax: (02) 9925 0112
Dr A.R. Collins
Managing Director
triako@triako.com.au
www.triako.com.au

GOLD

Three quarters of the world's annual gold supply is used in production of jewellery. The remainder is used for electrical and electronic purposes, coins and medal production, dentistry and as a store of wealth by central banks and private investors.

NSW is now Australia's second largest gold producing state. In 2003-04 NSW increased its share of Australia's total annual gold production to over 10%, or 28.0 t, a 5.7% increase on 2002-03. Underpinning this strength has been **Newcrest Mining's** Cadia Valley Operations (Cadia Hill and Ridgeway) and increased production at existing operations such as Northparkes and Peak Gold Mines.

Major NSW gold producing mines during 2003-04 are as follows.

	MINE	LOCATION	COMPANY
1)	Ridgeway	3km NW of Cadia Hill	Newcrest Mining Ltd see contact details under "Copper"
2)	Cadia Hill	23 km SW Orange	Newcrest Mining Ltd see contact details under "Copper"
3)	The Peak / New Occidental	Cobar	Peak Gold Mines (100% Goldcorp) see contact details below
4)	Northparkes	27 km NW Parkes	Rio Tinto see contact details under "Copper"
5)	Mineral Hill	65 km NNW Condobolin	Triako Resources Ltd see contact details under "Copper"
6)	Peak Hill	50 km N Parkes	Alkane Exploration NL see contact details below

Gold production in NSW is forecast to exhibit the fastest rate of growth of all minerals in coming years. Improving gold prices and increased production resulted in a 2.3% increase in the value of gold production for 2003-04 to \$493 million. This value is expected to exceed \$500 million by 2004-05, driven in particular by significantly higher production from the Ridgeway mine and new production from the Cowal gold mine.

Development work on **Peak Gold Mines** New Cobar underground mine was completed in September 2005. At full production the mine will produce about 175,000 t of ore per annum.

Weddin Shire Council granted development consent for the Broula King gold mine, 25 km east of Grenfell, in November 2005. The mine is expected to produce 23,000 oz of gold over a period of 2 years.

In March 2005 the NSW Government granted development consent for a \$114 million extension at depth to the Ridgeway underground gold mine (Ridgeway Deeps). Development work has commenced on extending the decline and an optimal development route will be considered in a definitive feasibility study to be completed in 2006-07.

Newcrest Mining has also committed \$100 million for a feasibility study on its Cadia East project. Work on a 7 km underground decline to the ore body commenced in May 2005. Further exploration work will be undertaken.

Barrick Gold's \$340 million Cowal gold project, north of West Wyalong, was granted a mining lease by the NSW Government in June 2003. Initial construction on the mine commenced in February 2004 and is progressing according to schedule. Production at the mine commenced in the first quarter 2006.

A feasibility study for **Triako Resources'** Hera gold project is scheduled for completion in mid 2006. A development decision by the Company on the project is expected during 2006.

Alkane Exploration is continuing its ongoing exploration program at its Wyoming gold project aimed at resource definition and establishing a better geological understanding of the mineralising system. The Company may commence a feasibility study on the project in 2006.

A comprehensive listing of Sydney based gold merchants involved in the refining and trading of gold bullion, gold coins and nuggets and other precious metals can be found in the Sydney 'Yellow Pages' under the section 'Gold Buyers &/or Refiners' and 'Gold and Silver Merchants'.

Peak Gold Mines

PO Box 328
COBAR NSW 2835
Phone: (02) 6830 2213
Fax: (02) 6836 2999
Mr Jamie Coad
General Manager - Operations
www.goldcorp.com

Alkane Exploration NL

129 Edward Street
PERTH, WA 6000
Phone: (08) 9227 5677
Fax: (08) 9227 8178
Mr. Ian Chalmers
Managing Director
www.alkane.com.au

Barrick Gold of Australia Ltd

Level 10, 2 Mill Street
PERTH WA 6000
Phone: (08) 9212 5777
Fax: (08) 9322 5700
Mr Richard Weston
General Manager - Cowal Project
www.barrick.com

Golden Cross Resources Ltd

22 Edgeworth David Avenue
HORNSBY NSW 2077
Phone: (02) 9482 8833
Fax: (02) 9482 8488
Mr Kim Stanton-Cross
Managing Director
info@goldencross.com.au
www.goldencross.com.au

SILVER

Approximately half the world's silver production is consumed in silverware and jewellery and in photographic emulsions. Because of its excellent electrical conductivity, silver is also widely used in the electrical and electronics industries.

Silver production in NSW has fallen significantly in recent years to 78 t in 2003-04, a 45% decline from 2000-01. The value of silver production also fell to \$20 million from \$40 million in 2000-01. The major reason behind this decline in silver production can be attributed to a fall in production from the State's major silver-lead-zinc mine at Broken Hill.

In 2003-04, the **Perilya** owned Broken Hill mine produced 1.7 million ounces of silver contained in lead concentrate. Significant quantities of silver are also produced from the CSA and Endeavor mines near Cobar.

CBH Resources has completed an extensive drilling program at its Rasp project within CML 7 at Broken Hill. As a result of this program, the resource at the Rasp project has been significantly increased. Resource and exploration drilling is ongoing with scoping studies for a new mine development in progress.

In September 2003, CBH purchased the Elura mine at Cobar and renamed it the Endeavor mine. CBH has increased mine output capacity to 1.4 Mtpa. Construction of a paste fill plant was completed in the first half of 2005 and started pasting fill in May 2005. This will allow production at the mine to continue for at least a further eight years.

Currently, a number of silver projects are at advanced stages of exploration or feasibility studies. These projects include Lewis Ponds near Orange and Bowdens near Mudgee. The development of these projects will, however, be contingent on the outlook for silver as well as lead and zinc prices.

A comprehensive listing of Sydney-based silver merchants involved in the refining and trading of silver bullion can be found in the Sydney "Yellow Pages" under the section "Gold and Silver Merchants".

Perilya Ltd

Level 10, 553 Hay Street
PERTH, WA 600
Phone: (08) 6210 2000
Fax: (08) 6210 2099
perilya@wt.com.au
www.perilya.com.au

CBH Resources Ltd

Level 3
Elizabeth Plaza
NORTH SYDNEY, NSW 2060
Phone: (02) 9925 8100
Fax: (02) 9925 8111
Mr Robert Besley
Chief Executive Officer & Managing
Director
office@cbhresources.com.au
www.cbhresources.com.au

IRON and STEEL

NSW does not possess large commercial deposits of high-grade iron ore suitable for steelmaking. The State 'imports' all of its iron ore requirements, primarily from Western Australia. Bluescope Steel purchases its coking coal requirements from BHP Billiton's Illawarra Coal operations and purchases its limestone requirements within NSW for iron and steel manufacture.

Australia's four largest iron ore producers, from deposits located within WA are:

Company	Mines	Contact
BHP Billiton Iron Ore Pty Ltd	Yarrie, Yandi, Jmblebar, Mt Whaleback	Phone: (08) 9320 4444 Fax: (08) 9320 4178
Hamersley Iron	Marandoo, Tom Price, Paraburdoo, Yandicoogina	Phone: (08) 9327 2327 Fax: (08) 9327 2346
Robe River Mining	Pannawonica-Deepdale, West Angelas	Phone: (08) 9327 2800 Fax: (08) 9327 2383
Portman Iron Ore Ltd	Koolyanobbing	Phone: (08) 9426 3333 Fax: (08) 9426 3344

There is iron and steel production capacity of about 5.50 Mtpa within NSW. **Bluescope Steel** located at Port Kembla produces 5.14Mtpa of steel slab, plate, and hot rolled coil. It is the largest steel production facility in Australia and one of the world's lowest-cost producers of steel products. Over 45% of this production is exported. **OneSteel's** Sydney Steel Mill at Rooty Hill has production capacity of about 0.50 Mtpa of steel from recycled steel products.

OneSteel's Market Mills Business at Newcastle now solely mills rod, bar, and wire steel products from steel billet sourced from the Whyalla steelworks (in South Australia). OneSteel also manufactures pipe and tube at its Newcastle and Port Kembla facilities.

Smorgon Steel Manufacturing operates an electric arc furnace at Waratah that has an annual capacity of about 280,000 tpa. The Waratah plant produces finished products, including grinding balls for mineral processing plants, alloy and carbon rod and bar, and train wheels.

BlueScope Steel Direct

Locked Bag 8825
South Coast Mail Centre
NSW 2521
Phone: 1800 800 789
Fax: 1800 800 744
Mr Kirby Adams
Chief Executive Officer & Managing
Director
www.bluescopesteel.com.au

OneSteel Ltd

Level 23, 1 York Street
SYDNEY, NSW 2000
Phone: (02) 9239 6666
Fax: (02) 9251 3042
Mr Geoff Plummer
Chief Executive Officer &
Managing Director
www.onesteel.com

Smorgon Steel Group Ltd

650 Lorimer Street
Port Melbourne VIC 3207
Phone: (03) 9673 0400
Fax: (03) 9673 0450
Mr Bruce Loveday
Executive General Manager
Corporate & Investor Relations
www.smorgonsteel.com.au

LEAD and ZINC

Lead and zinc production has long been the cornerstone of metallic mineral production in NSW, although over recent years output has fallen due to a decline in reserves and grade and increasing mining depth at **Perilya Ltd's** Broken Hill operations.

CBH Resources (CBH) Endeavour mine is the other major NSW base metal producer. CBH purchased the mine (then called Elura) from Pasminco in September 2003.

In 2003-04, NSW lead production fell to 105,000 tonnes from 107,000 tonnes the previous year. Despite the decline in actual lead production, the value of lead production increased between 2002-03 and 2003-04 by about 27% to \$103 million.

NSW zinc production has fallen over the past few years to around 225,000 t in 2003-04, while the value of zinc production in NSW has also fallen from \$533 million in 2000-01 to \$305 million in 2003-04.

The possible decline in NSW silver and base metal production may be slightly compensated by the possible development of two new prospects, Bowdens and Lewis Ponds, both of which are at an advanced stage of exploration.

However **CBH Resources** has completed an extensive drilling program at its Rasp project within CML 7 at Broken Hill. As a result of this program, the resource at the Rasp project has been significantly increased. Resource and exploration drilling is ongoing with scoping studies for a new mine development in progress.

The focus of much of the exploration at Broken Hill continues to be Broken Hill style massive silver-lead-zinc mineralisation in Palaeoproterozoic rocks of the Curnamona Province.

On-going production from Perilya's Broken Hill operation and the possibility of increased production from Endeavour should maintain current levels of lead and zinc production in the short to medium term.

CBH Resources Ltd
Level 3, Elizabeth Plaza
NORTH SYDNEY, NSW 2060
Phone: (02) 9925 8100
Fax: (02) 9925 8111
Mr Robert Besley
Chief Executive Officer &
Managing Director
www.consbh.com.au

Perilya Ltd
Level 10, 553 Hay Street
WEST PERTH WA 6005
Phone: (08) 6210 2000
Fax: (08) 6210 2099
Mr Len Jubbar
Chief Executive Officer & Managing
Director
perilya@perilya.com.au
www.perilya.com.au

HydroMet Operations (Southern) Pty Ltd produces a range of base metal chemicals. The company produces approximately 3500 tonnes of zinc sulphate for the agriculture and fertiliser industries at its Unanderra plant.

HydroMet Operations (Southern) Pty Ltd

PO Box 42

UNANDERRA, NSW 2526

Phone: (02) 4271 1822

Fax: (02) 4271 6151

Mr Iain Woodhill

Consultant Sales and Marketing Manager

woodhill@nelsonbay.com

www.hydromet.com.au

INDUSTRIAL MINERALS AND PRODUCTS

Industrial minerals are a diverse set of mostly non-metallic mineral commodities that have a wide range of uses. NSW is a major producer of industrial minerals and products for domestic and export markets, with numerous deposits throughout the State. Industrial minerals' production in NSW accounts for around \$101 million or around 1.5% of the State's total value of mineral production. The total benefits accruing from the industrial minerals industry include production of many value added downstream materials such as bricks, cement, glass, ceramics and refractories.

Construction materials (gravels, crushed stone, and sand) are not included in this document because of the large number of operations and the close links between production and domestic markets. Information on major sources and producers of these materials in the Central Coast region of New South Wales may be obtained from the Department's Geological Survey Phone: (02) 4931 6666 Fax: (02) 4931 6790 (www.dpi.nsw.gov.au/minerals).

Instead, emphasis is given to the minerals that (either before or after processing) have properties that service diverse technical applications or meet relatively exacting standards. Thus, glass-making sand has been included since it has more critical specifications than construction sand.

The processing of various industrial minerals may give increased product diversity; hence, only an indicative range of mineral properties is given.

Major producers of cement, ceramic products and refractory products in the State are also listed. A more comprehensive listing for these commodities for the Sydney region is given in the Sydney "Yellow Pages" telephone directory.

BARITE

Barite or barytes (BaSO_4) is a soft, inert mineral with a high density. It is used primarily as a weighting agent in oil drilling muds, as a filler and extender in paint and plastics, as a flux in glassmaking and as source material for barium chemicals.

Although barite has been mined in NSW for many years, there was no barite production in 2003-04. The Kempfield barite deposit, about 30 km south of Blayney, which is associated with silver, lead and zinc mineralisation has ceased production pending the development of a silver-barite mine. Intensive exploration work by Golden Cross Resources Ltd at Kempfield has brought the size of the barite resource to 9.36 Mt at 26% barite.

Mr H Henry
"Tralea"
TRUNKEY CREEK, NSW 2741
Phone: (02) 6368 8615

Golden Cross Resources Ltd
22 Edgeworth David Avenue
HORNSBY NSW 2077
Phone: (02) 9482 8833
Fax: (02) 9482 8488
Mr Kim Stanton-Cross
Managing Director
info@goldencross.com.au
www.goldencross.com.au

BERYL

Industrial grade beryl ($\text{Be}_3\text{Al}_2\text{Si}_6\text{O}_{18}$) is used as a feedstock for beryllium metal, alloys and oxide, all of which have many high-tech applications particularly in the nuclear, electronic and ceramic industries. Small quantities of beryl are produced as a by-product of feldspar mining at Broken Hill. See the "Feldspar" section for further information.

CALCIUM CARBONATE POWDERS

Omya Australia Pty Ltd and **Unimin Australia** produce a wide range of high-quality, finely ground calcium carbonate (CaCO_3) products from limestone deposits in NSW. Omya operates two plants in NSW at Bathurst and Moss Vale. Some of the products are characterised by extremely fine particle sizes and a high degree of brightness.

Typical applications include fillers and extenders in paint, rubber and plastics, animal feed supplementation, abrasive blasting, coal mining applications, agriculture, welding, chemical neutralisation, paper filling, propellants and synthetic marble.

Omya Australia Pty Ltd

PO Box 430
LINDFIELD, NSW 2070
Phone: (02) 9416 6077
Fax: (02) 9416 8008
Dr Richard Flook
Chief Executive Officer
www.omya.com.au

Unimin Australia

Level 16, 111 Pacific Highway
NORTH SYDNEY, NSW 2060
Phone: (02) 9458 2929
Fax: (02) 9458 2900
Mr. Tom Cudbush
Managing Director
info@unimin.com.au
www.unimin.com.au

CEMENT

About 50% of NSW limestone production is used in the manufacture of cement. Cement grade limestone should contain more than 95% CaCO₃, less than 3% MgCO₃ and be free of sulphides and phosphates. Approximately 1.5 tonnes of limestone are required to make 1 tonne of cement.

The State's cement industry is facing a number of constraints. These include fluctuations in building and construction levels and competition from low priced cement imports from Asia.

Limestone for cement is mined by **Blue Circle Southern Cement Ltd (BCSC)** at Marulan and by **Cement Australia** at Kandos. Cement Australia quarries limestone at Kandos for the Company's nearby cement works that produce about 35 per cent of the State's needs. The Kandos limestone quarry has reserves for more than 30 years at current production rates of around 600,000 t per year.

Blue Circle Southern Cement Ltd's (BCSC) quarry at South Marulan is the largest limestone quarry in Australia. Reserves at Marulan are estimated to be between 200 and 300 Mt of predominantly high grade limestone containing more than 95% calcium carbonate. Annual production is about 3 Mt. About 50% of the production is railed to the BCSC cement works at Berrima.

Silica sand for use in cement manufacture is produced from a deposit of weathered (friable) sandstone near Penrose, in the Southern Highlands, for the Blue Circle Southern Cement works at Berrima.

Cement Australia Ltd

Level 19, 111 Pacific Highway
NORTH SYDNEY, NSW 2060
Phone: (02) 9956 8811
Fax: (02) 9956 7311
Mr. Chris Leon
Chief Executive Officer &
Managing Director
information@cemaust.com.au
www.cemaust.com.au

Blue Circle Southern Cement Ltd

50 Bridge Street
SYDNEY, NSW 2000
Phone: (02) 9220 6300
Fax: (02) 9231 0643
Mr Rod Pearse
Managing Director
www.bluecirclesouthernccement.com.au

CERAMICS and CLAY PRODUCTS

A ceramic product is defined as an inorganic, non metallic product that has been subjected to a high temperature during manufacture or use (generally at least 470 degrees C). A typical clay for brick manufacture will be fired to full hardness at 900-1200 degrees C.

Ball clay and kaolin based materials are widely used in the production of white ware ceramic products such as sanitary ware, pottery, electrical porcelain and crockery. Common clay and shale materials are used predominantly for brick, pipe, paver and tile manufacture ("structural clay products"). Suppliers of these products are generally located within major population centres. The major manufacturers of structural clay products within the Sydney region are:

Austral Brick Co Pty Ltd

Wallgrove Road
HORSLEY PARK, NSW 2164
Phone: (02) 9830 7777
Fax: (02) 9831 3771
Sales Department
infonsw@australbricks.com.au
www.australbrick.com.au

Norbrik

169 Port Hacking Road
MIRANDA, NSW 2228
Phone: (02) 9522 9281
www.norbrik.com.au

CSR

Locked Bag 6
CHATSWOOD NSW 2057
Phone: (02) 9235 8000
Fax: (02) 9235 8044
Sales Department
www.csr.com.au

Boral Ltd

50 Bridge Street
SYDNEY, NSW 2000
Phone: (02) 9220 6300
Fax: (02) 9233 6605
info@boral.com.au
www.boral.com.au

Advances in knowledge about the chemical, mineralogical and physical properties of other materials such as zircon and ceramic grade alumina are responsible for the development of a range of **advanced ceramic materials**. These materials possess a low specific gravity, low coefficient of thermal expansion, extreme hardness and are highly resistant to corrosion. They are finding increasing use in specialised wear resistant, abrasive and insulation applications. Major NSW suppliers of advanced ceramic materials and products are:

Taylor Ceramic Engineering

65 Anderson Road
MORTDALE NSW 2223
Phone: (02) 9534 1300
Fax: (02) 9534 6504
Ms Julie Taylor
Managing Director
tce@ozemail.com.au
<http://members.ozemail.com.au/~tce/home.htm>

K C Industries

PO Box 77
CROYDON NSW 2132
Phone: (02) 9797 9844
Fax: (02) 9798 8640
Mr John Cooper
Managing Director
admin@kcindustries.com.au
www.kcindustries.com.au

CLAYS (Bentonite, Kaolin, Structural and Cement Clay/Shale)

Bentonite

Total bentonite production in NSW for 2003-04 was about 37,000 t with a value of about \$2.8 million. Several high-quality deposits of bentonite occur in NSW, with varying contents of the smectite (montmorillonite) group of clay minerals.

Specialised grades of bentonite are used in a wide range of industrial applications for domestic and export markets. Bentonite is used mainly as a viscosity and filtration control agent in water based drilling muds, as a bonding agent in foundry sand, and it is widely used in the pelletisation of stockfeeds. Particular types are used to seal dams and for other civil engineering applications and as a moisture absorbent in pet litter. Acid activated bentonite is also used in refining oils, fats and solvents.

Bentonite is being used increasingly for environmental applications. Particular types have a high absorbency for gaseous, liquid and solid industrial wastes, including heavy metal contaminants in solution and for oil spillages both on land and water.

At Cressfield, near Scone in the upper Hunter Valley, calcium-magnesium bentonite is mined by **Unimin Australia Limited**. A large deposit of sodium-magnesium bentonite is being mined by **Arumpo Bentonite Pty Ltd** at Arumpo, 80 km northeast of Mildura. The deposit contains approximately 70 Mt of sodium-magnesium bentonite.

Sodium-magnesium and calcium-magnesium bentonites have differing characteristics and optimum end-use applications. It is advisable to request advice from the Technical/Sales Managers prior to purchase.

Unimin Australia

Level 16, 111 Pacific Highway
NORTH SYDNEY, NSW 2060
Phone: (02) 9458 2929
Fax: (02) 9458 2900
Mr Tom Cudbush
Managing Director
info@unimin.com.au
www.unimin.com.au

Arumpo Bentonite Pty Ltd

PO Box 5045
MILDURA VIC 3502
Phone: (03) 5021 0744
Fax: (03) 5021 0755
Mr Matthew Gardam
Production Manager
arumpo@arumpo.com.au
www.arumpo.com.au

Kaolin

Kaolin is a clay composed primarily of the hydrated aluminosilicate mineral kaolinite ($\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2 \cdot 2\text{H}_2\text{O}$) with minor amounts of quartz, feldspar, mica, chlorite and other clay minerals. It is distinguished from other clays by its softness, whiteness and ease of dispersion in water. Various types of kaolins may be termed ball clays, fireclays or flint clays depending on their properties or use.

Kaolin in its unfired state has applications as a filler and extender in paper, paints and plastics. Fired kaolin is used to make ceramic pottery, tiles, insulators and refractories. Flint clay, a hard dense form of kaolin, is used primarily in refractories. About 14,000 t of kaolin valued at \$0.8 million, was produced in NSW in 2003-04.

The Coorabin/Oaklands area is currently the major source of high quality kaolin in NSW. Other sources of kaolin are Swan Bay, Gulgong, Ulan, and Barraba.

Unimin Australia have kaolin quarries at Gulgong and Puggoon. High quality Gulgong clay is used for a range of filler and ceramic applications. The clay from Puggoon is suitable for both refractory and ceramic applications.

Unimin Australia

Level 16, 111 Pacific Highway
NORTH SYDNEY, NSW 2060
Phone: (02) 9458 2929
Fax: (02) 9458 2900
Mr Tom Cudbush
Managing Director
info@unimin.com.au
www.unimin.com.au

Structural and cement clay\shale

In 2003-04, the total recorded production of structural and cement clays in NSW was around 2.4 Mt, valued at about \$11 million. Significant quantities of structural clay/shale, estimated at up to 0.5 Mtpa, are also won from excavations for major building and construction projects. Most structural clay/shale is used for making bricks and pavers, with less than 5% used to make roofing tiles.

Due to the relatively high cost of transport for these low unit value materials, structural clay quarries are generally located close to major markets in population centres. The Sydney region is the major market for structural clay products and the source of about 80% of the State's total output. For further information on clay deposits in the State, contact the Department's Geological Survey (phone: (02) 4931 6666).

DIATOMITE

Diatomite is a soft, chalk-like, sedimentary rock composed of the fossilised remains of microscopic aquatic plants known as diatoms. Diatomite, also known as diatomaceous earth or kieselguhr, is highly absorbent and chemically inert.

Due to the ability of diatomite to absorb its own weight in liquid, its major use in Australia is for pet litter absorbent. Industrial uses are mainly as a filtering aid, especially for dry-cleaning fluids, beverages, sugar, oils, hydrocarbon fuels, and chemicals and in filters for water supplies and swimming pools. Diatomite is also used as a general absorbent for oil and chemical spills and as a soil conditioner (due to its trace metal content of Mg, Ca and P).

Supersorb Environmental NL is the State's only diatomite producer and also Australia's largest. In 2003-04 the company mined about 20,000 t of diatomite from its Kyooma mine near Barraba in northeastern NSW.

Supersorb Environmental NL has defined proved reserves of approximately 500,000 t and additional resources of 14 Mt within its present site, giving it an expanded resource base for possible future increases in production.

Supersorb Environmental NL

55 Collie Street

ALBANY WA 6330

Phone: (08) 9842 1955

Fax: (08) 9842 1644

Mr Brad Sounness

Managing Director

enquiries@supersorb.com.au

www.supersorb.com.au

DIMENSION STONE (Granite, Marble, Sandstone, Slate)

Dimension stone is natural stone that has been cut or shaped to a specific size for a particular building or decorative application. The term encompasses a large variety of rock types, and is classified by the industry into four broad groups: granite, sandstone, marble and slate. Dimension stones have unique combinations of qualities, specifically colour, texture and durability that make them particularly attractive in building and interior design applications. Commercial uses include cladding of buildings, restoration, exterior paving, landscaping and feature walls, interior benchtops and other decorative applications.

NSW possesses large, high quality resources of dimension stone. In 2003-04, NSW produced about 29,000 t of dimension stone (mainly sandstone and granite) valued at an estimated \$4.4 million.

Most of the State's dimension sandstone comes from Triassic sandstone units in the Mt White, Somersby, Bundanoon and Kurrajong areas. **Gosford Quarries Pty Ltd** is the State's largest producer. **Bundanoon Sandstone** produces several varieties of sandstone from its quarry near Bundanoon in the Southern Highlands, and **Sydney Sandstone Pty Ltd** produces dimension sandstone from a quarry near Kurrajong. Several smaller operators work dimension stone quarries in the Sydney region.

Contact details for the major NSW producers/processors are:

Australian Dimension Stone Pty Ltd

Level 1, 66 King Street
SYDNEY NSW 2000
Phone: (02) 9299 8981
Fax: (02) 9299 8983
Mr Lawrence Hee
Activity: Granite block producer

Central West Granite Supplies

Nanima Street
EUGOWRA NSW 2806
Phone: (02) 6859 2301
(02) 6947 4940
Fax: (02) 6947 2657
Mr Colin Morris
grandeequarry@hn.ozemail.com.au
Activity: Granite producer and processor

Gosford Quarries (NSW) Pty Ltd

300 Johnston Street
PO Box 86
ANNANDALE NSW 2038
Phone: (02) 9810 7555
Fax: (02) 9810 1669
Mr Phil Brown
Activity: Sandstone and Granite
producer and processor
sales@gosfordquarries.com.au
www.gosfordquarries.com.au

Stonetile Australia Pty Ltd

345 Clergate Road
ORANGE, NSW 2800
Phone: (02) 6363 1188
Fax: (02) 6361 3127
Ms Caroline Gardiner
Managing Director
Activity: Granite and sandstone tile processor.
info@stonetile.com.au
www.stonetile.com.au

Sydney Sandstone Pty Ltd

21 Bullridge Road,
EAST KURRAJONG 2758
Phone: (02) 4576 3439
Fax: (02) 4576 3462
Activity: Sandstone products

Bundanoon Sandstone Pty Ltd

Lever Park Rd
BUNDANOON 2578
Phone: (02) 4883 6216
Fax: (02) 4883 6075
Mr John Parkes
bundystone@hn.ozemail.com.au
Activity: **Sandstone** producer and processor

DOLOMITE

Dolomite is very similar to limestone in nature, but is composed of calcium-magnesium carbonate (dolomite, $\text{CaCO}_3.\text{MgCO}_3$), rather than calcium carbonate (calcite, CaCO_3). The minerals calcite and dolomite form a continuous substitution series, resulting in rocks of all compositions between pure limestone and pure dolomite. Generally, dolomite is regarded as rock containing more than 15% MgCO_3 .

Dolomite has many applications. In its raw state, it is used in metallurgical fluxes, fertilisers, water treatment, glass and chemical manufacture, ceramics and as a filler. When calcined, it is used in the manufacture of cements, refractory bricks and as a source for magnesium chemicals.

Dolomite (dolomitic limestone) is produced by **Mudgee Dolomite and Lime** and **B.W. & R.F. Murdoch** near Mudgee, mainly for chemical uses and as metallurgical flux. About 13,000 t were produced in 2003-04.

Large resources of dolomite suitable for most applications occur at Lucknow and Mount Hope, west of Rylstone. Major untested dolomite resources exist north of Broken Hill that may have potential for future mining.

Mudgee Dolomite and Lime Pty Ltd

PO Box 342 (Buckaroo Lane)

MUDGEES NSW 2850

Phone: (02) 6373 3939

Fax: (02) 6373 3766

Mr Robert Murdoch

Managing Director

info@mudgeedolomitelime.com.au

www.mudgeedolomitelime.com.au

FELDSPAR

Feldspars are aluminosilicate minerals with varying amounts of potassium, sodium and calcium. Most economic deposits of feldspar in NSW are pegmatitic in origin and occur in the Broken Hill region. In 2003-04 less than 2,000 t of feldspar was produced.

Feldspars are principally used as a source of alumina and alkalis in glass-making and the ceramic industry. Manufacturers use sodium-rich feldspar for glass making and potassium-rich feldspar for ceramic production. Due to the availability of cheaper alternative materials many Australian consumers have changed to substitutes such as calcined alumina and soda ash for glassmaking.

Demand for feldspar is increasing particularly in Asia, as a result of increased production of ceramic wall and floor tiles. Feldspar demand in Australia is strong due to the continued growth in container glass mainly for wine exports.

At Broken Hill, **Unimin Australia** recently upgraded its processing plant to produce more finely milled feldspar and also garnet. Very large resources of feldspar have also been identified within Unimin Australia's Oberon Alaskite deposit. The company has carried out additional reserve drilling and is investigating the feasibility of large scale production and further processing.

Unimin Australia

Level 16, 111 Pacific Highway
NORTH SYDNEY, NSW 2060

Phone: (02) 9458 2929

Fax: (02) 9458 2900

Mr. Tom Cudbush

Managing Director

info@unimin.com.au

www.unimin.com.au

GARNET

Garnet comprises a group of complex aluminium silicate materials, and some varieties are used as a gemstone. Garnet is used mainly as an abrasive. It is also used as a filtration medium and in non-skid surfaces. The only recent source in NSW is at Triple Chance in the Broken Hill area. This operation is now owned by **Unimin Ltd**. In 2003-04 there was no garnet production recorded.

Interest in the use of garnet as an alternative to silica and slags in the abrasive industry is increasing, and there is considerable potential for expansion of garnet production in the Broken Hill area as well as for the discovery of resources in other parts of the State.

Unimin Australia

Level 16, 111 Pacific Highway
NORTH SYDNEY, NSW 2060

Phone: (02) 9458 2929

Fax: (02) 9458 2900

Mr. Tom Cudbush

Managing Director

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www.unimin.com.au

GEMSTONES (Opal, Sapphire, Ruby, Diamond, Other)

Opal

Australia is the major source of precious opal in the world with NSW accounting for over half of the national output. Opal mining is mainly centred in the Lightning Ridge district with minor production from the White Cliffs district. Lightning Ridge is the principal world source of the highly prized black opal. The estimated value of opal production in NSW in 2003-04 was about \$29 million.

Mining, cutting and polishing of opals is carried out by a large number of individual miners or groups of miners. Trading in opals is largely performed by individual mine operators at Lightning Ridge and White Cliffs.

The opal miners' Associations listed below can assist prospective buyers by providing contact details for its members on the opal fields. Contact details for opal traders and merchants in the metropolitan areas can be obtained via the **Australian Opal and Gem Industry Association** or the Sydney Yellow Pages phone directory.

Lightning Ridge Miners' Association

Lot 60 Morilla St
PO Box 177
LIGHTNING RIDGE NSW 2834
Phone: (02) 6829 0427
Fax: (02) 6829 0830
Ms Jasna Bedenikovic
Secretary / Manager
Irma@lightningridge.net.au
www.wj.com.au/org/Irma.html

Australian Opal and Gem Industry Association

Suite 309, 149 Castlereagh Street
SYDNEY NSW 2000
Phone: (02) 9267 1310
Fax: (02) 9267 1037
info@jaa.com.au

Sapphire

Most of the State's sapphire production is extracted from Tertiary volcanics and associated alluvial gravels in the New England region near Glen Innes and Inverell.

King Island Scheelite Ltd (formerly known as GTN Resources Ltd) announced in June 2002, that due to the poor market conditions, all its sapphire operations in the Kings Plains, near Inverell would be placed on care and maintenance until market conditions improve, with sales continuing from accumulated stocks.

Despite a long history of production from the New England area, the region still has good potential for further major production. Possible new production from deposits in the valleys of the eastern feeder of Kings Plains Creek would help stem the historic decline in output.

There was no significant recorded commercial sapphire production in 2003-04.

Sapphires may be available for purchase from the following significant producers:

King Island Scheelite Ltd

Level 9, 1 York Street
SYDNEY, NSW 2000
Phone: (02) 9250 0111
Fax: (02) 9241 6953
Mr Ray Soper
Chairman
info@kindislandscheelite.com.au
www.kingislandscheelite.com.au

Wilson Gems & Investments

PO Box 4
INVERELL, NSW 2360
Phone: (02) 6722 1134
Fax: (02) 6722 1134
Mr John Wilson
Managing Director
info@austgem.com.au
www.austgem.com.au

Reddestone Sapphire Mining Pty Ltd

PO Box 252
GLEN INNES NSW 2370
Phone: (02) 6732 5173
Fax: (02) 6732 5174
Mr Rod Cook
Managing Director
reddestone@ozemail.com.au
www.reddestone.com

Ruby

Commercial deposits of ruby have been identified by **Cluff Resources Pacific NL** in the Barrington Tops area, north of Newcastle. In October 2004 Gloucester Shire Council granted development consent for a two-stage development commencing with 50,000 t per annum (see contact details in the next section). The Gloucester area is the only major source of facet quality ruby in Australia, and one of a few in the world.

Cluff Resources Pacific NL

Locked Bag 3355
HORNSBY NSW 2077
Phone: (02) 9482 4655
Fax: (02) 9482 4987
Mr Peter Kennewell
Managing Director
cluff@bigpond.com.au
www.cluff.com.au

Diamond

Prior to the development of the Argyle deposits in Western Australia, NSW was the largest producer of diamonds of any Australian state with over half a million carats, mostly from the New England region. In the Copeton area **Cluff Resources Pacific NL** in association with various explorers, most recently **Diamond Ventures NL** (at Bingara), have mined several hundred carats of diamonds, a high proportion of which are of gem quality.

The 'Subduction diamond model' developed by Departmental geologists has led to a reappraisal of past exploration results and NSW remains very prospective for new diamond discoveries. Encouraging exploration results have been achieved, especially near Brewarrina and White Cliffs, and in the Central Highlands.

Cluff Resources Pacific NL

Locked Bag 3355

HORNSBY NSW 2077

Phone: (02) 9482 4655

Fax: (02) 9482 4987

Mr Peter Kennewell

Managing Director

cluff@bigpond.com.au

www.cluff.com.au

Other Gemstones

Small quantities of gem quality beryl, emerald, garnet, nephrite, rhodonite, topaz and turquoise have been/are produced in NSW. For additional information on deposits of these and other gems please contact the Department's Geological Survey, (phone: (02) 4931 6666). The **Australian Opal and Gem Industry Association** (listed under "Opal") may also be of assistance.

GYPSUM

Gypsum, is the major commercial form of calcium sulphate ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$). In its natural state, gypsum is generally associated with various impurities such as sand, clay and limestone. Much of the State's production is used locally by farmers as a soil conditioner.

Gypsum production in NSW has increased significantly in recent years and in 2003-04 was around 230,000 t, valued at about \$2.5 million. The largest producer is the White Plains mine near Balranald, with other mines around Bourke, Moulamein, Manara and Goolgowi. Most of these mines produce gypsum for soil conditioning and other agricultural and horticultural applications. Mining commenced at the Paxtons mine, to the north of Balranald, during 2003. This mine produces high purity crystalline gypsum suitable for a range of applications in the agriculture, construction and food industries.

Although NSW production is expected to continue to supply mainly local agricultural markets, there has recently been an increase in demand for gypsum in soil conditioning. One supplier, **Balranald Gypsum**, is supplying customers as far a field as the State's north coast from operations in the Balranald area. The company was granted a mining lease in June 2004, for the Norm's mine north of Balranald. The Norm's mine will supplement and eventually replace production from the nearby White Plains operation. The Norm's mine will produce about 180,000 t per annum of gypsum over an expected life of 5-6 years.

The two major NSW gypsum producers are:

Far Western Stone Quarries Pty Ltd
'Dalkeith'
CASSILIS NSW 2329
Phone: (02) 6376 4623
Fax: (02) 6376 1149
Mr Anthony Martin

Balranald Gypsum
PO Box 13
BALRANALD NSW 2715
Phone: (03) 5020 1990
Fax: (03) 5020 1984
Mr Peter Morton
Managing Director
balg@iinet.net.au

LIMESTONE

Limestone is a sedimentary rock composed largely of calcium carbonate (CaCO_3). Beside speciality calcium carbonate powders (see separate entry), limestone is mined for use in the manufacture of cement (see Cement), as a flux for local iron and steel manufacture, in the production of calcined (quick) and hydrated limes, for chemical production and for agricultural uses (including acid soil amelioration).

The most important quarries are near Marulan and Wombeyan in the Southern Highlands, in the State's central west, (from Kandos to Mudgee and south of Bathurst) and at Attunga near Tamworth.

Production of limestone in NSW for 2003-04 was recorded at 4.6 Mt valued at about \$33 million with around 50% being used for the manufacture of cement. **Blue Circle Southern Cement's** (BCSC) quarry at South Marulan is the largest limestone quarry in Australia.

The major limestone producers listed below manufacture various grades of limestone for a range of uses (besides cement production).

Omya Australia Pty Ltd

PO Box 430
LINDFIELD, NSW 2070
Phone: 1800 251 306
Fax: (02) 9416 8008
Dr Richard Flook
Chief Executive Officer
www.omya.com.au

Blue Circle Southern Cement Ltd

50 Bridge Street
SYDNEY, NSW 2000
Phone: (02) 9220 6300
Fax: (02) 9231 0643
Mr Rod Pearse
Managing Director
www.bluecirclesouthern cement.com.au

Unimin Australia

Level 16, 111 Pacific Highway
NORTH SYDNEY, NSW 2060
Phone: (02) 9458 2929
Fax: (02) 9458 2900
Mr. Tom Cudbush
Managing Director
info@unimin.com.au
www.unimin.com.au

Hyrock Pty Ltd

"Astrolabe"
Rutherford Lane
LITHGOW NSW 2790
Phone: (02) 6359 0180
Fax: (02) 6359 0100
Mr Brad Brown
Marketing Manager
Brad.brown@hyrock.com.au
www.hyrock.com.au

Mudgee Dolomite and Lime Pty Ltd

PO Box 342 (Buckaroo Lane)

MUDGEES NSW 2850

Phone: (02) 6373 3939

Fax: (02) 6373 3766

Mr Bob Murdoch

Director

mdl@hwy.com.au

Cement Australia Holdings Pty Ltd

Level 19, 111 Pacific Hwy

NORTH SYDNEY NSW 2060

Phone: (02) 9956 8811

Fax: (02) 9956 7311

Mr Chris Leon

CEO & Managing Director

www.cemaust.com.au

MANGANESE DIOXIDE

Delta EMD Australia Pty Ltd produces high purity electrolytic manganese dioxide at its Mayfield plant, near Newcastle. The manganese oxide feedstock is imported from manganese mining operations located on Groote Eylandt in the Northern Territory. The plant produces about 15% of the world's requirements for electrolytic manganese dioxide which is used in the manufacture of alkaline dry-cell batteries.

Delta EMD Australia Pty Ltd

PO Box 249

MAYFIELD NSW 2304

Phone: (02) 4941 1500

Fax: (02) 4960 2075

Mr Michael Renehan

www.deltapl.com

MAGNESITE

Magnesite (magnesium carbonate - $MgCO_3$) occurs as bedded sedimentary deposits, replacement deposits or alteration deposits with minor amounts of limestone, silica and iron. Commercially acceptable magnesite should contain at least 95% $MgCO_3$. The most important magnesite deposits in NSW are located at Thuddungra (northwest of Young). Other deposits are found at Fifield (northwest of Condobolin), Lake Cargelligo and Attunga.

Magnesite is marketed in three major forms: crude, dead-burned and caustic-calcined. **Crude magnesite** is used primarily in the production of dead-burned and caustic-calcined magnesia, with smaller quantities used in the preparation of chemicals and in agriculture. **Dead-burned magnesite** is a durable refractory material, and it can be used directly or as a constituent in refractory bricks and other refractory products. **Caustic-calcined magnesite** is resilient, fireproof, spark-proof, and vermin-proof. It is used in agricultural, environmental and chemical applications and to make magnesium oxychloride and oxysulphate cements. The building industry consumes large quantities of caustic-calcined magnesite for use as a flooring material, in wall boards and in acoustic tiles. Caustic-calcined magnesite of suitable quality can be further processed at very high temperatures in an electric arc furnace to electrofused magnesia, a superior refractory material.

In 2003-04, NSW produced about 43,000 t of magnesite. The most important source of magnesite in NSW is at Thuddungra, north-west of Young, where a deposit of exceptionally high purity is mined by **Causmag International**. In recent years, Causmag International has expanded production and developed new markets both domestically and overseas for different magnesia grades. Smaller amounts of magnesite for local agricultural use are produced from deposits near Lake Cargelligo by **Paton Fertilizers Pty Ltd**.

Exploration in the Thuddungra area has identified two ore bodies to the north and northwest of the currently mined deposit.

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Mr Damian Giuliano
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www.causmag.com.au

Paton Fertilisers Pty Ltd
PO Box 524
PENRITH NSW 2750
Phone: (02) 4729 2888
Fax: (02) 4729 2810
Mr Bruce Cairns
Managing Director
info@paton.com.au
www.paton.com.au

MAGNETITE

Magnetite (magnetic iron oxide - Fe_3O_4) produced in NSW is used exclusively by the coal processing industry. Magnetite is highly magnetic and has a high specific gravity. When finely milled, it remains suspended in water, giving a dense medium suitable for separating impurities from coal. The magnetite is easily recovered in a magnetic field. All current magnetite production in NSW is from the Tallawang mine near Gulgong, owned by **Unimin Australia Ltd**. This operation produced about 42,000 t of magnetite in 2003-04.

Unimin Australia

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Managing Director
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MINERAL SANDS

Rutile is the richest ore of the metal titanium containing at least 95% titanium dioxide (TiO₂). **Ilmenite** contains about 45% titanium dioxide. About half of the world's rutile and virtually all the ilmenite production is used to produce non-toxic titanium dioxide pigments for paint, paper, plastics, textiles and inks. Titanium metal is used in alloys for aerospace and aviation industries, for medical applications, in making ceramics and refractories, in special lightweight alloys for sporting goods and spectacles and as an abrasive.

Zircon is the main ore of the metal zirconium and is a valuable refractory material used as a foundry sand, in aluminium and glass furnaces and as ladle linings in steel making. It is also widely used in ceramics manufacture as a glaze and in chemicals and wear resistant advanced ceramics. NSW zircon has a low iron content which is necessary for use as a glaze for ceramic tile manufacture where whiteness of the finished product is important.

Monazite is the main ore of thorium and contains about 6% thorium oxide with varying amounts of rare earth elements such as cerium, lanthanum, yttrium, neodymium and europium. The most important market for monazite is as a source of cerium dioxide (used for glass polishing powders) and other rare earth materials.

As the world's largest producer of mineral sands, Australia supplies about 37 per cent of world zircon production, about 50 per cent of rutile concentrate, and 23 per cent of ilmenite. In 2003-04, all NSW production was from existing stockpiles. Ilmenite production was 600 t, zircon production was about 500 t and rutile production was about 700 t. No production of monazite has been recorded in recent years. The overall value of the State's production of mineral sands has fallen from a high of \$101 million in 1989-90 to \$1.0 million in 2003-04.

All mineral sand production in NSW to date has come from marine and aeolian deposits on the coastal fringe. Available resources within these deposits are nearing exhaustion and mining has ceased. Major new resources have been identified in the Murray Basin (which extends into South Australia and Victoria) and these deposits are the subject of intense, ongoing exploration by several companies.

Recent exploration has established the Murray Basin to be one of the world's prime mineral sand provinces. The first mineral sands mine in the NSW part of the Murray Basin, the Ginkgo mine, was commissioned in December 2005 and trucking of concentrate to the Mineral Separation Plant in Broken Hill commenced in January 2006.

More than 170 individual strandline occurrences of mineral sands of comparable grainsize to east coast ore bodies have been discovered in the NSW part of the Basin. Many of these are considered to be potentially economic.

The most notable discoveries in NSW are the **BEMAX Resources NL** Ginkgo and Snapper deposits, the Birthday Gift, Karra and Cylinder prospects (the Prungle Project) and the deposits in the Euston project area (**Iluka Resources Ltd**) including the Kerribee, Koolamon, Castaway, Dispersion and Earl deposits.

The total coarse-grained mineral sand resources in the NSW portion of the Murray Basin probably exceeds 100 Mt, comprising about 56% ilmenite, 17% rutile, 12% zircon, and 10% leucoxene and altered ilmenite.

BEMAX Resources NL

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Phone: (07) 3229 4951

Fax: (07) 3211 8765

Mr Tony Shirfan

Managing Director

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www.bemax.com.au

Iluka Resources Ltd

GPO Box U1988

PERTH WA 6845

Phone: (08) 9360 4700

Fax: (08) 9360 4777

Mr. Mike Folwell

Chief Executive Officer &

Managing Director

www.iluka.com

PERLITE

Perlite is a glassy volcanic rock, derived from lava formed in geologically recent times, which has cooled very quickly and then undergone hydration. Perlite generally contains between 2% and 5% water.

Industrial perlite is produced in two stages. Firstly, natural perlite is mined, beneficiated and graded near to the mine site to yield crude perlite. In the second stage, which usually takes place near to centres of consumption, perlite is rapidly heated for a short time to temperatures between 800°C and 1000°C to yield expanded perlite, a sterile, ultra lightweight aggregate.

Major uses of perlite are in hydroponic cultivation, plant propagation and cultivation, fire protection products, refractories, insulation and filtration of wine, beer and vegetable oils. There is no current production of natural perlite in NSW. However, **Orica Chemnet** produces about 4,000 tpa of perlite products from its processing plant at Banksmeadow, NSW.

Orica Chemnet

1 Nicholson Street
MELBOURNE, VIC 3000
Phone: 1300 550 400
Fax: 1300 550 081
companyinfo@orica.com
www.orica-chemnet.com

PYROPHYLLITE and TALC

Pyrophyllite is a hydrated aluminium silicate mineral with industrially important properties similar to those of talc. Deposits of talc, (a hydrated magnesium silicate mineral) in NSW are mostly fairly small and not of high quality. Pyrophyllite is used predominantly as a constituent in refractories and whiteware ceramics, and as a mineral filler.

There was no pyrophyllite production in NSW in 2003-04. The Back Creek mine near Pambula, previously owned by Unimin Australia Ltd, has changed ownership. Its future as a pyrophyllite producer is uncertain. Small quantities of pyrophyllite have also been previously produced from Botobolar by **Mudgee Dolomite & Lime Pty Ltd.**

REFRACTORY PRODUCTS

Refractories are materials that are capable of withstanding high temperatures and corrosive environments without fusing or decomposing. Refractory products are used in steel, aluminium, brick, base metal and mineral production or processing, the cement, glass making and power generation industries and in many other high temperature industrial processes.

There has been a decrease in refractory production. **Shinagawa Thermal Ceramics** has three production centres (one at Port Kembla and two at Unanderra) with a combined capacity of 47,000 tonnes a year. **Thermal Ceramics Australia** also produces a wide range of refractory and ceramic products at its Unanderra plant.

**Shinagawa Refractories
Australasia Pty Ltd**
Glastonbury Avenue
UNANDERRA, NSW 2526
Phone: (02) 4221 1700
Fax: (02) 4221 1794
enquiries@thermal.com.au
www.shinagawa.co.jp/English

Thermal Ceramics Australia
10-14 Toogood Avenue
BEVERLEY, SA 5009
Phone: (08) 8243 5300
Fax: (08) 8243 0571
thermal.australia@morganplc.com
www.thermalceramics.com

SERPENTINITE

Serpentinite is a rock composed largely of serpentine, a magnesium-rich silicate mineral associated with ultrabasic igneous rocks. Its prime use in NSW is as a flux in steel-making although serpentinite can also be used in agricultural applications. The Somerset mine near Coolac, operated by **Somerset Mining Pty Ltd**, is the State's only serpentinite mine. In 2003-04, the mine produced over 80,000 t of serpentinite. Future production will be dependent on a continuation of the contract to supply the Port Kembla steelworks, with some material also used as aggregate.

Somerset Mining Pty Ltd

PO Box 161

YOUNG NSW 2594

Phone: (02) 6382 2420

Fax: (02) 6382 2830

Mr Jeff Bowerman

Mine Manager

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SILICA

Silica is used in the manufacture of glass, cement, ceramics, as a foundry sand, metallurgical flux, filtration medium and in producing silicon metal, ferrosilicon and fused silica. It is also used for a range of applications in the electronics, chemical and construction industries, and as an abrasive (although the latter has declined because of the associated health risks).

Sources of silica are commonly classified as either “fine silica” which comprises silica sand and friable sandstone: or “coarse silica (also referred to as “lump silica”) which includes quartz, quartzite, and quartz gravel.

Fine Silica

The main sources of fine silica in NSW are the sand deposits of the Stockton Bight-Port Stephens area. In 2003-04, a total of about 240,000 t of fine silica valued at about \$6.0 million was produced in NSW. The State’s glass manufacturing industry is the major consumer.

The State’s supply of sand used in the manufacture of colourless glass is obtained from high purity “inner barrier” dune deposits on the Tilligerry Peninsula near Tanilba Bay. These resources are mined by **Unimin Australia**. The main source of sand for the manufacture of amber glass and glass plate is the Salt Ash mine at Williamtown, also operated by Unimin Australia. PB White Minerals Pty Ltd also produces amber grade glass sand from Salt Ash, as well as other types of industrial sand from a deposit at Londonderry, near Penrith.

The other major use for silica sand in NSW is as foundry sand. The “outer barrier” dunes of Stockton Bight are now the State’s principal source of foundry sand. The main producers are **Quality Sand and Ceramics**, **Robinson’s Anna Bay Sand**, and **Metromix Pty Ltd**.

Silica sand for use in cement manufacture is produced from a deposit of weathered (friable) sandstone near Penrose, in the Southern Highlands, for the **Blue Circle Southern Cement** works at Berrima. The Penrose quarry has been acquired from Unimin Australia Ltd by **Boral Ltd**.

Glassmaking Sand

Unimin Australia

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PB White Minerals Pty Ltd

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Foundry Sand

Quality Sand & Ceramics Pty Ltd

Lavis Lane
WILLIAMTOWN NSW 2318
Phone: (02) 4965 1429
Fax: (02) 4965 1740
Ms Julie Towers
Managing Director

Robinson's Anna Bay Sand

41 Gan Gan Rd
ANNA BAY NSW 2316
Phone: (02) 4982 1177
Fax: (02) 4982 2007
Mr Peter Robinson
General Manager
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www.robinsonssand.com.au

Metromix Pty Ltd

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Phone: (02) 9849 7400
Fax: (02) 9635 4816
Mr Chris Wulf
General Manager

Boral Ltd

50 Bridge Street
SYDNEY, NSW 2000
Phone: (02) 9220 6300
Fax: (02) 9233 6605
info@boral.com.au
www.boral.com.au

Coarse Silica

Quartzite, quartz gravel and reef quartz deposits are the major sources of coarse silica in New South Wales. Quartzite is mined at Marrangaroo, near Lithgow, by **Metromix Pty Ltd**, for use as a flux in steelmaking and as coarse aggregate. In 2003-04, a total of about 158,000 t of coarse silica valued at about \$2.0 million was produced in NSW.

Deposits of high purity coarse silica occur at Bolivia, near Tenterfield, and in the Cowra district. These deposits are suitable for processing into a range of value added products, including silicon metal, silicon carbide, and fused silica, but are not currently used for such purposes. At Bolivia, **Darryl McCarthy Contractors Pty Ltd** has mined a pipe-like body of extremely high purity quartz. This material has previously been exported to Japan to produce high grade fused silica used as a filler in semi conductors for the electronics industry, in addition to its use as a refractory medium.

In the vicinity of Cowra, gravel deposits composed predominantly of high purity quartz pebbles have been quarried at two locations - at "Glenella" by **Glenella Aggregates Pty Ltd** and at "Mulyan" by **TJ Bryant Pty Ltd** - principally for use as decorative aggregate and filtration gravels.

Glenella Quarry Pty Ltd

Battery Rd
COWRA NSW 2794
Phone: (02) 6345 4253
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Mr Michael Howe
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www.glenellaquarry.com

T J Bryant Pty Ltd

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Mr Tom Bryant
Managing Director

**Darryl McCarthy Contractors
Pty Ltd**

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Mr Darryl McCarthy
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Metromix Pty Ltd

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Mr Chris Wulf
General Manager

ZEOLITES

Zeolites are a group of hydrated aluminosilicates of the alkali and alkaline earth metals, particularly sodium, potassium and calcium. Zeolites are industrially useful because their atomic structure and cation exchange properties make them suitable for many applications in agriculture, pollution control, soil conditioning, as an additive in stockfeed, for odour control purposes, and in water treatment. Two mines are now operating and production has been steadily increasing as markets are developed. Production in 2003-04 was about 2,400 t.

Natural zeolite minerals occur in various sedimentary, igneous and low grade metamorphic rocks. In NSW, **Zeolite Australia Ltd** operates the Escott mine and processing plant, 5 km southwest of Werris Creek. Zeolites from the Escott deposit are used in many parts of Australia and some are exported. Zeolite Australia has recently completed a major plant upgrade which has increased the processing capacity for zeolites from the Escott mine.

Castle Mountain Enterprises Pty Ltd is producing zeolites at Bindawalla, near Quirindi. A deposit of at least 2.5 million tonnes was discovered by the Company, with a further 2 million tonnes also held under an Assessment Lease Application. The Company has established an open cut mine, and built a modern state of the art processing plant to custom mill and produce a range of particle sizes and specifications.

The zeolite from the Castle Mountain deposit contains virtually no soluble salts, which renders it particularly suitable for aquaculture, and safe for the treatment of drinking water. It also does not put undesirable salts into the soil when used with fertilisers.

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