# **SMEDG PRESENTATION**

Thursday, September 22cnd, 2011

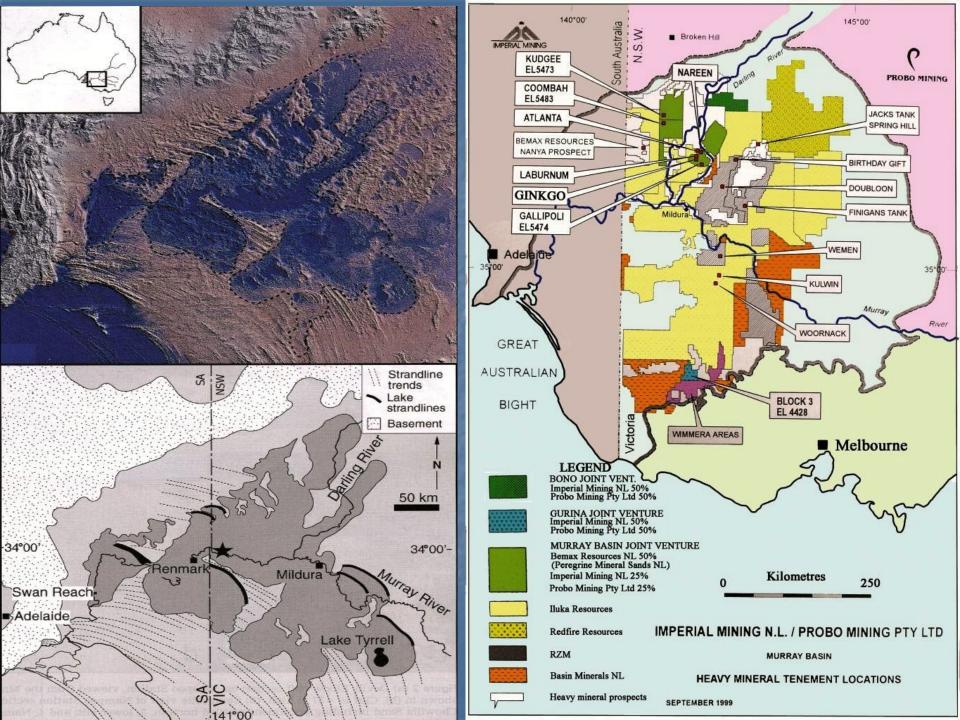
# **Exploration: the People and the Mines**

by

**Tony Hope** 











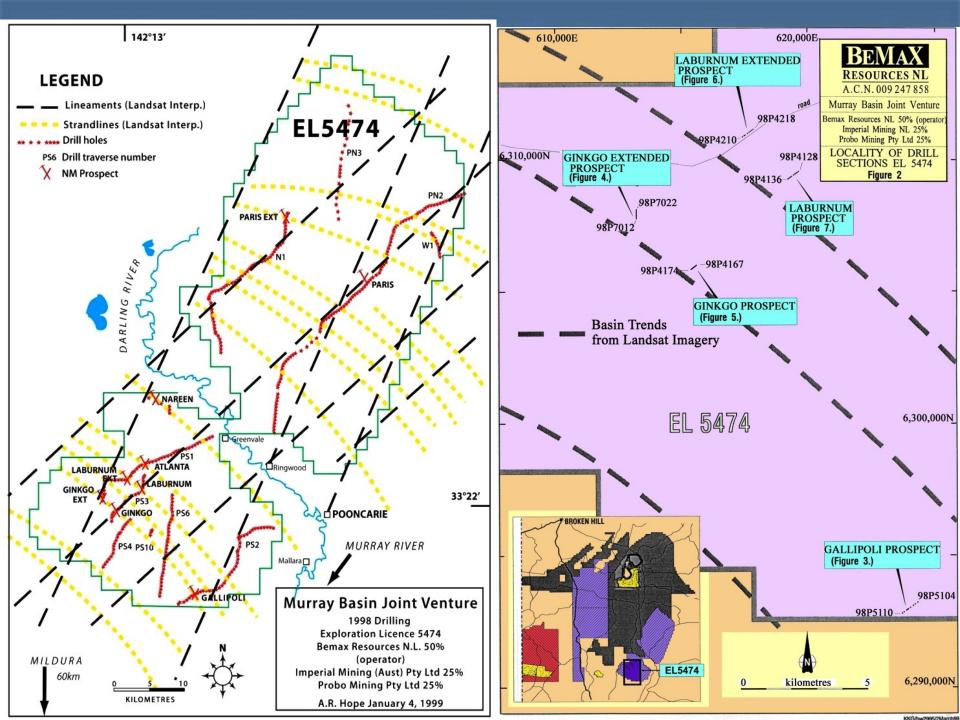


N.S.W. RUTILE MINING COMPANY PTY. LTD.

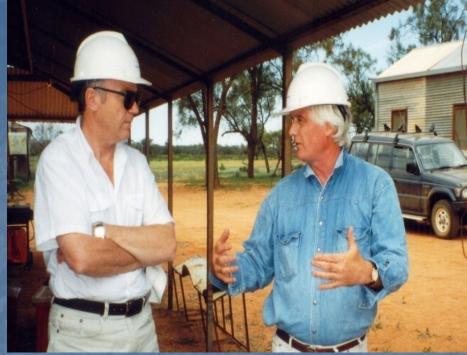


The Quality Brand

ZIRCON















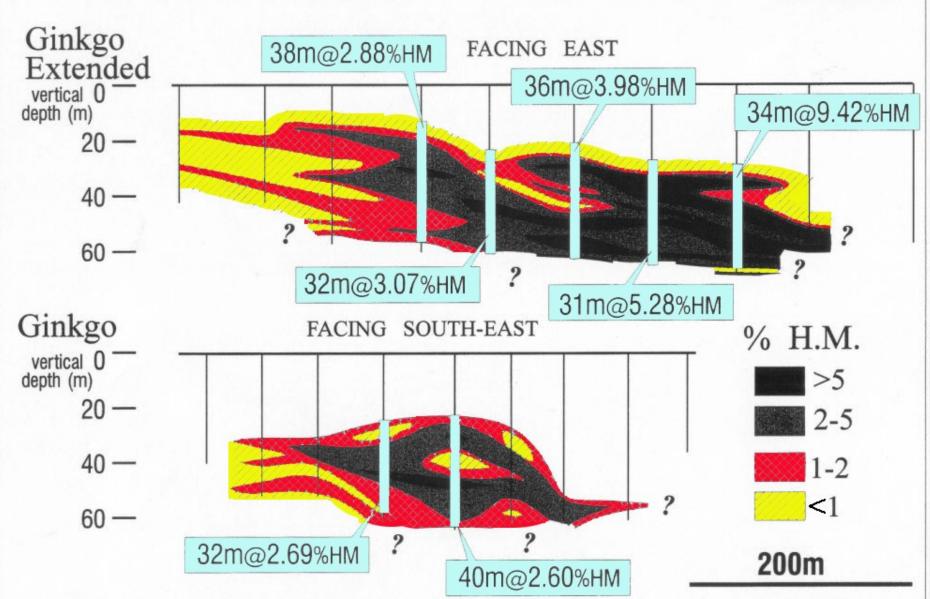






### GINKGO PROSPECT Sections











#### **Ginkgo Mineral Sands Project**

**Bankable Feasibility Study Executive Summary** February 2002



BeMaX Resources NL ABN 60 009 247 858 Level 6, 10 Market Street Brisbane QLD 4000 Australia Tel: +61 7 3229 4951 Fax: +61 7 3211 8765 Web: http://www.BeMaX.com.au



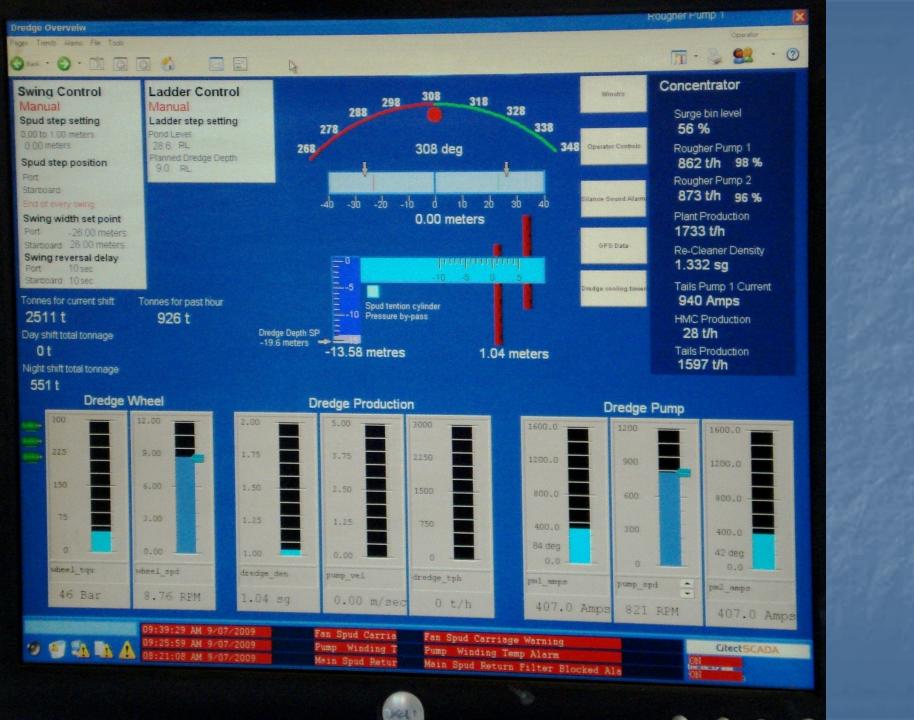


Plate 3.1. The Aboriginal field crew who participated in the Ginkgo archaeological survey. From left to right: Junette Mitchell, Philip Lawson and Lotty Williams.





















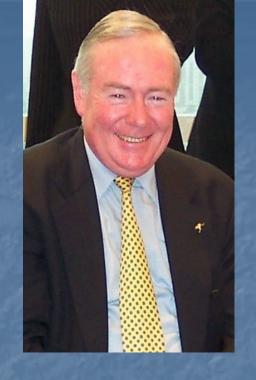














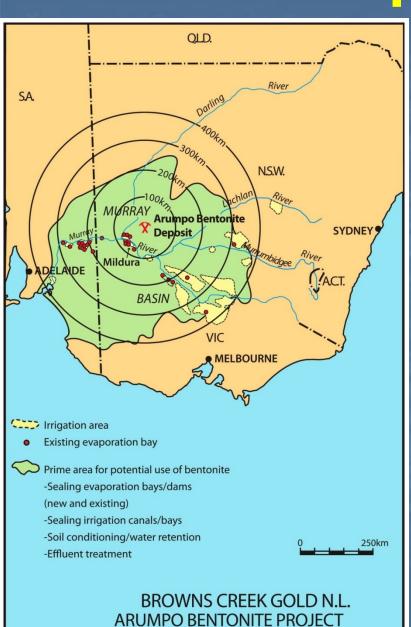




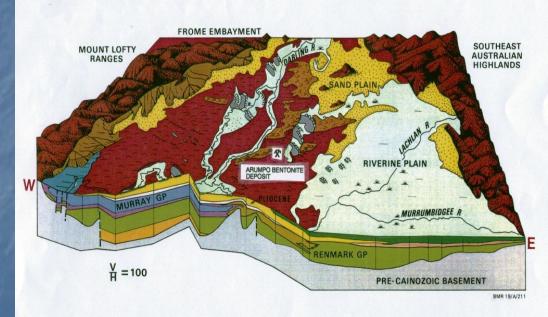




# **Arumpo Bentonite**



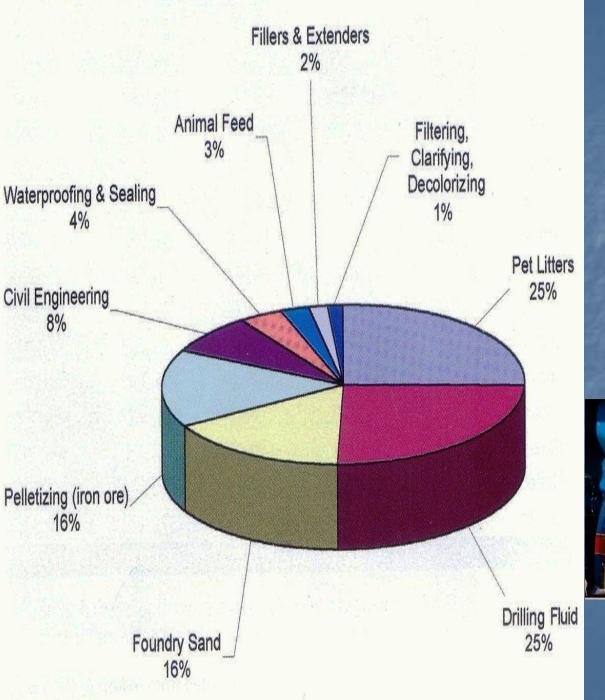
**Location Map** 



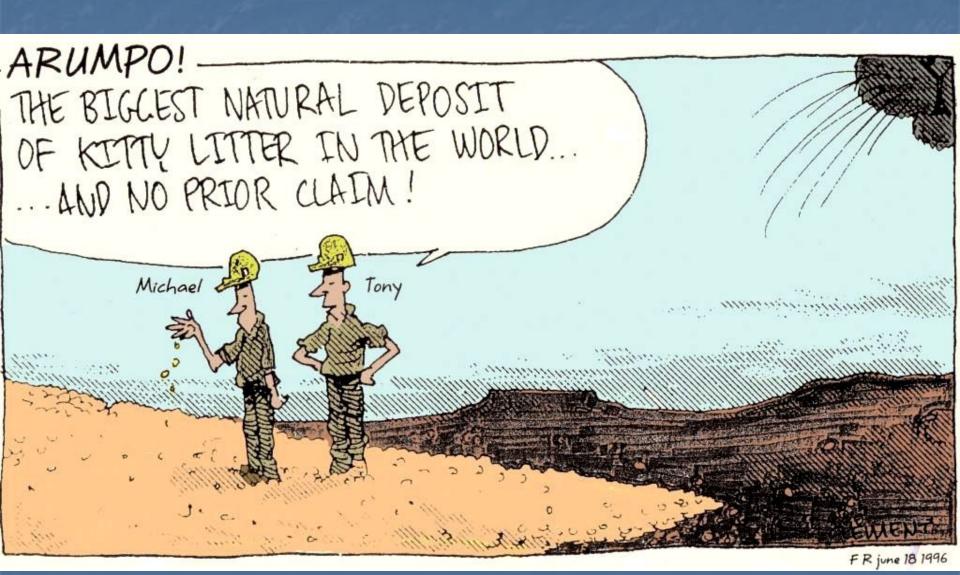
CROSS SECTION THROUGH MURRAY BASIN (after BMR)

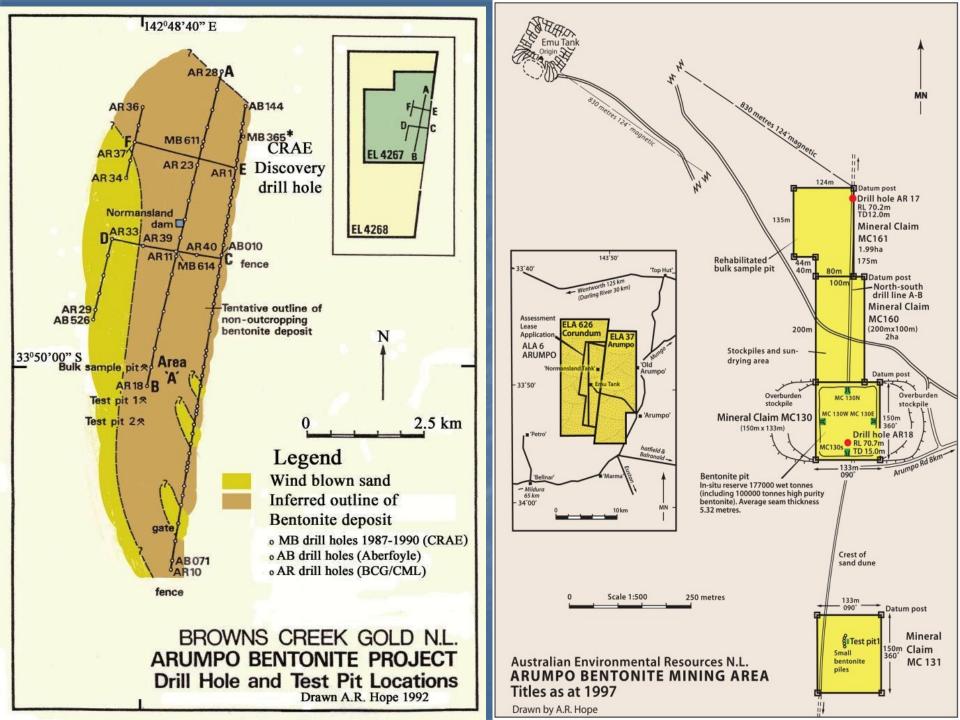


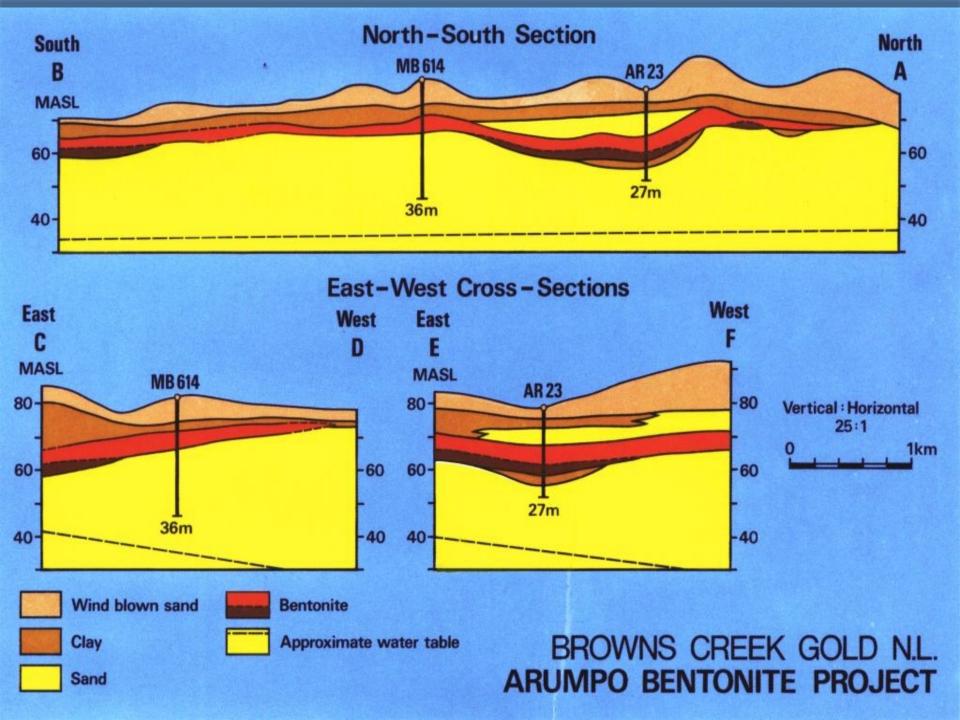




















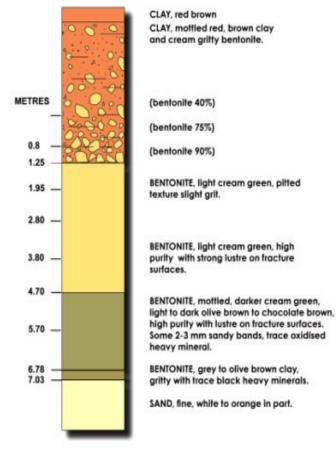






#### MC 130E TEST CUT

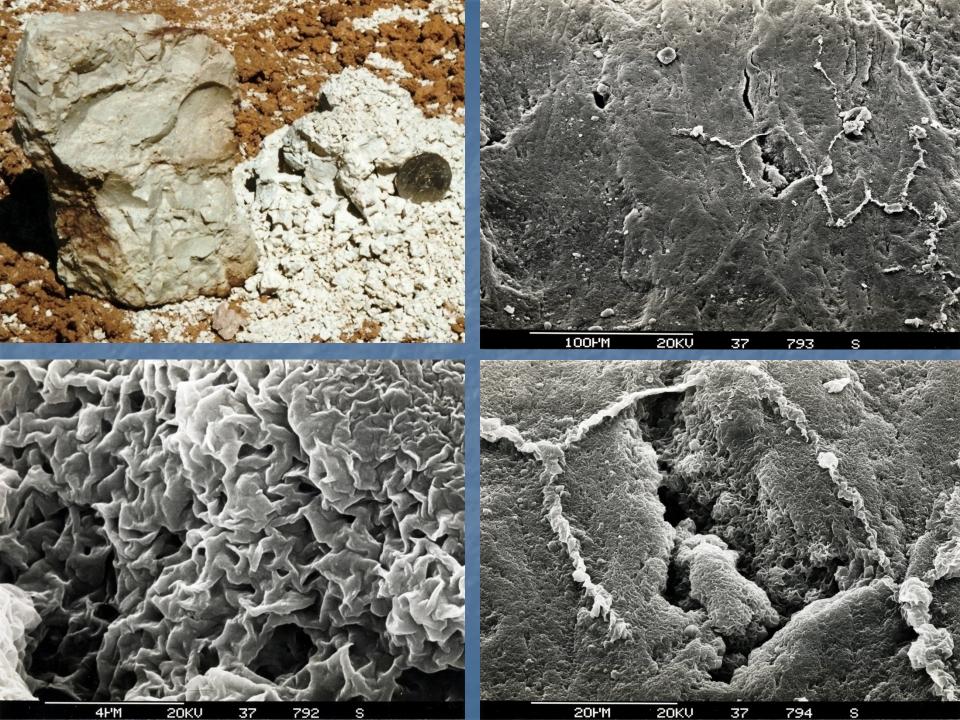
SAMPLE INTERVAL METRES	SAMPLE WIDTH METRES	MONTMOR- ILLONITE %	MOISTURE	Ph	SWELLING VOLUME ml/2g	CEC (NH)	EXCHANGEABLE CATIONS	
							Mg	Na
0 - 0.80	0.80	77	29.1	5.0	7.0	52.8	30.7	18.9
0.8 - 1.25	0.45	85	34.4	4.8	9.5	76.9	40.7	27.1
1.95 - 2.80	0.70	97	32.0	4.8	10.0	74.2	40.5	26.8
2.80 - 3.80	0.85	94	36.3	4.8	8.0	85.3	47.2	31.1
3.80 - 4.70	1.00	>98	37.8	4.9	10.0	91.4	54.0	34.3
4.70 - 5.70	0.90	>99	41.2	4.8	8.0	100.2	55.5	37.0
5.70 - 6.78	1.00	>98	40.9	4.8	7.5	91.1	49.7	34.5
6.78 - 7.03	1.08	95	39.8	4.8	8.0	80.4	43.4	29.2
	0.25	69	22.1	5.0	8.5	51.9	28.9	17.9
BENTONITE	19,5750		WEIGHTED AVERAGE					
	5.53	97	38.3	4.8	8.5	87.5	48.6	32.3



VERTICAL SCALE
METRES

**AUSTRALIAN ENVIRONMENTAL RESOURCES NL** 

ARUMPO BENTONITE SECTION MC 130E



#### ARUMPO BENTONITE PROJECT, NSW

#### **BULK SAMPLE PIT**

### PLANNING FOCUS MEETING ON SEPTEMBER 29, 1993



From left to right	From	left	to	rig	ht
--------------------	------	------	----	-----	----

Harvey Johnston Ken Mansell **Howard Clay** 

National Parks and Wildlife Service

Robin Baird

Stephen Harding

Citrus grower
Shire Engineer, Wentworth Shire Council
Environment Protection Authority
General Manager, Wentworth shire Council
Mayor, Wentworth Shire Council
Arumpo Bentonite Pty Limited
Department of Water Resources Don McKinnon **Tony Hope David Harris** 

Senior Inspector of Mines, Department of Mineral Resources Total Catchment Management Committee Pastoralist, Arumpo Station Keith Chilman

Debbie Tkachenko

Ken Sue National Parks and Wildlife Service Jo Gorman

Department of Conservation and Land Management Ted Lowe (seated)

Regional Inspector of Mines, Department of Mineral Resources Photographer: Stan Goodman











Vol. 73 No. 55

## UNIRAYSIA DA

MILDURA, WEDNESDAY, DECEMBER 16, 1992 Published since 1920

Phone (050) 23 0211



# **Weather conditions**

All the district news — Country Round-up TOMORROW

Sunraysia basketba

Industrial clay lode at Arumpo Station has potential for domestic and export development

# hopes for mining venture

A SUNRAYSIA minting venture with
the potential to earn miltions of domestic and
export dollars could be
up and running by the
end of next year.

Sydney-based mining company—
Browns Creek Gold — yesterdu
an industrial clay known as benoite in remote bush north of
the dollar yesterdu
and to be the clay
was confirmed by a comprehensive survey earlier this year o
extensive survey earlier this year
enteroite. As the project is not expected to
be project is not expected to A ing venture with the potential to earn millions of domestic and export dollars could be up and running by the end of next year.

was confirmed by a comprehen-sive survey earlier this year on remote Arumpo Station, about 80

tal damage.

tonnes per year.

erned by demand.

• From Page 1

of a sought-after high-purity so-

dium bentonite which would be

suitable for a number of the traditional uses listed above as well as

some agricultural and environmentally important applications closer to home including soil condi-

tioning in horticulture and lining waste and saline water ponds to minimise seepage into the water

table and subsequent environmen-

at 70 million tonnes - Australian

consumption for traditional ben-

tonite applications is just 70,000

Mr Hope said how long the de-

posit would last was dependent on

the amount taken annually from

the site and that would be gov-

Mining consultant, Mr Robert

Creelman, who has been a part of

the Arumpo project since its incep-

tion earlier this year, said the site

had the potential to produce high

grade bentonite "for generations".

The Arumpo seam is between

four and 30 metres underground

The Arumpo deposit is composed

Bentonite prospects bright

ooth nere and overseas.
Outlining his company's ambitious plans yesterday at a special
news conference, Browns Creek
Gold exploration director, Mr
Anthony Hope, said the major
potential for world market expansion existed in non-traditional uses
of bentonits

of bentonite.

Bentonite is described as a soft, highly plastic industrial clay with valuable swelling and sealing properties. It is used for many different purposes, depending on type and grade

and red sandy loam.

would be relatively simple.

covered by non-commercial clay

Mining, according to Mr Hope.

"The top soil and non-

bonder in animal feed, as a carrier for dust pesticides, as an absorb-ent for clarifying and purifying various liquids including wine, a thickener for paints, medical and pharmaceutical products, latex rubber, glue and a suspending agent in printing and in enamelling procelain.

and remedial environmental app cations, such as dam sealing and sandy soil conditioning, that soil conditioning, that stic and world market expan-



Mr Anthony Hope, explains the company's hopes and expectations for Arumpo bentonite. More details are on Page 2.

#### Wentworth councillors enthusiastic about Arumpo bentonite plans

# Clay mining supp

WENTWORTH Shire Council has enthusiastically endorsed plans to mine the industrial clay bentonite on Arumpo Station.

Councillors this week expressed strong support for the proposal which could be worth millions of domestic and export dollars.

Mining could begin within 12 months according to Sydney-based Browns Creek Gold, the mining company proposing the

clay was confirmed by a comprehensive survey earlier this year. Bentonite is described as a soft, highly plastic industrial clay with

valuable swelling and sealing properties, used for many different rposes, depending on type and

The major traditional uses are the prevention of seepage in engineering works, as a bonding agent in foundry sand, as a drilling mud, as a binder in iron pelletising, as refractory for lining furnaces, a bonder in animal feed, as a carrier for dust pesticides, as an absorbent for clarifying and purifying

The project is not expected to contribute greatly to Sunraysia's job market — mining is not a labor intensive industry in these days of hi-tech machinery. However, its employment potential is in spin-off industries, proponents claim, and that potential has been seized upon by shire councillors.

Shire president, Cr Don McKinnon, said there was an opportunity for the shire to be the site for bentonite processing facilities value adding exercise that should not be lost to out district".

"We need to keep that technology here so that it creates wealth and we help fund, will also being doing its utmost to ensure the success o the venture.

There was unanimous support for Cr McKinnon's sentiments among his fellow councillors.

"We should be giving them (the mining company) all the help we can . . . and doing everything pos-sible to facilitate this development," Cr Frank Cannizzo said.

"Because bentonite is used by wineries for the clarification of their product, there was no reason a secondary industry processing bentonite for this purpose could not

# y the

## Bentonite a wonder soil

By ANDREW MARSHALL

IT'S only dirt - clay actually but the extraordinary uses for Bentonite include livestock feed additives, soil moisture enhancers and kitty litter.

Mined primarily in Wyoming and Texas in the US, a new big find in South West NSW seems set to launch a whole new industry in Australia, with particular benefits for agriculture.

Salinity control may be one of the biggest advantages offered by this wonder clay.

Bentonite's qualities stem from its ability to swell when in contact with moisture, absorbing water, oil and paint

It is the world's most impervious clay,



ecking out a sample of bentonite from Arumpo Station near Lake ingo in far south western NSW are mining consultant, Dr Robert eelman, and Browns Creek Gold chairman, Michael Hickey,

## Bentonite can hold up to 15 times its weight in water

# An absorbing material

The Arumpo bentonite seam is large by world standards, accord-TT seems Mother Nature ing to Mr Hope. Initial research inknew that the Murray Valdicates the main seam is about six lev was going to have a kilometres long, about one kilomenumber of major watertre wide and has an average depth related problems this century of five metres. and laid down the basis for a The deposit has been estimated cure three million years ago.

That 'cure', according to its proponents, is bentonite, a special kind of clay that can absorb up to 15 times its weight in water.

Sunraysia has a large deposit of high-purity bentonite on its doorstep - on remote Arumpo Station, 80 kilometres north-east of the city in New South Wales' Western Lands grazing leases

Mining of the valuable resource is proposed while overseas studies into its amazing properties and uses are ongoing

The benefits for Sunraysia could be many, according to those backing the mining bid, including applications leading to the control of blue-green algae, saline saline water, water loss through seepage in irrigation and soil conditioning in horticulture.

Bentonite, described as a soft, highly plastic industrial clay with valuable swelling and sealing properties, has been used overseas to line earthen water storages and canals to minimise seepage into the water table, to line toxic waste storage facilities and to condition soil in sandy country.

The company planning to mine the Arumpo site is Sydney-based Browns Creek Gold.

Independent mining consultant, Mr Robert Creelman, party to the Arumpo mining bid since its inception earlier this year, claimed yesterday bentonite had the potential to help Sunraysia and the Murray Valley beat its worsening water problems.

Mr Creelman said bentonite's value lay in its ability to absorb

vast quantities of water, quickly. He said bentonite mixed with the soil at the bottom of an earthen irrigation channel, particularly in

sandy loam, would have a significant impact on the amount of water lost through seepage.

"This has ramifications for the efficient use of water." he said. "It will mean less water will have to be pumped from the river system because less will be lost undeground."

"Bentonite quickly absorbs water and swells. The channel bottom would quickly become waterlogged, resisting the passage of water downwards." he said.

Mr Creelman said it was also feasible, in theory, to 'dam' the sides of earthen channels, thereby limiting seepage again.

He said in the case of blue-green algae, bentonite could form a barrier to irrigation water seepage downwards, holding it above the water table, closer to the crop

roots "This would allow more efficient water use while allowing crops to make better use of the water and fertilisers - preventing leaching into the water table and subse-crseas. quent flows back into water In Japan Bentonite was mixed with courses like the Murray River," Mr Creelman said.

He said this would limit the nutrient flows back into the river, Similar uses would be investigated in identified by recent research as a stralia, including pelletising animal major catalyst for algal break-trition or health doses for slow release

Mr Creelman and Browns Creek rticularly lot fed cattle. Gold exploration director, Mr An-thony Hope, held talks with a lustry in Australia and overseas as a number of district water and horti-rifying agent, and as a pet litter. cultural authority representative In fact, the "kitty litter" market in on Monday to outline the potential pan and Europe consumes several applications of bentonite.

The pair claimed wide interest had been shown and one Sunraysia citrus property had already been earmarked for soil conditioning trials

Mr Creelman said he, and the mining company, were also looking to work closely with other research orgaisations in this area to trial and test bentonite applications in irrigation and water ling qualities were well established. Australia's total use of the mineral clay

tiliser and herbicides and pelletised to ate a slow-release product applied to oded rice crops.

ce they were consumed by livestock,

ies more bentonite every year than exploration rights over the Arumpo site.

in industry and agriculture. Bentonite, (technically known as Sme-

tite or Montmorillanite) is mined from small deposits the Hunter Valley and in Oueensland, but much of Australia's current consumption is imported.

The import replacement and even export opportunities provide added incentive to the investigation work to get underway, organised by the Browns Creek Gold company with research organisations like CSIRO.

Browns Creek Gold - operating in Central West NSW near Blayney, on the NSW South Coast and in WA - has





























# B

## Low permeability and high performance dam linings

## **Water Storage Sealing**

Bentonite & Permeability

Soils of low permeability are needed for water storage construction to reduce seepage loss. Where the local country soil has high or marginal permeability, addition of bentonite can lower the seepage rate and make the material most suitable for dam construction.

Arumpo Bentonite is ideally suited to sealing

water storages due
to its extremely fine
grain size, swell and
liquid limit. It has
a low permeability
which decreases with
increased head pressure



Addition rates of typically 5-15% in

the barrier layer when effectively compacted will reduce permeability many times with substantial reduction in seepage loss. The performance of every soil system differs so therefore it's important to know its characteristics and the best addition level of bentonite to use. Tests are available using specialised laboratories.

For further details on permeability of different soils and the effect of bentonite addition ask for our technical bulletin.

#### A Dam Leak...

There is nothing more frustrating than to find that the water storage you have built has become a muddy puddle when you most need it. But many dams do just that.

The leak can be most effectively repaired using bentonite to reduce soil permeability and provide a permanent solution.

#### Method of Use

The most effective method of using Arumpo Bentonite for dam sealing is during the construction stage or when the existing dam has been completely emptied.



There are 4 techniques by which Arumpo Bentonite can be incorporated into a dam. These are: mixed blanket, pure blanket sprinkle method, and cut- off wall.

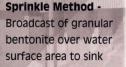
Blanket techniques are the most common with new dams. The particular method used depends also on the local country soil type and its permeability characteristics.

The following are brief descriptions. Ask for our detailed technical bulletin for more information.

**Mixed Blanket** - Incorporation of bentonite with existing soil by rotary hoe, followed by compaction and a protective layer over the barrier. Typically 5-15Kg/m<sup>2</sup> is needed to form an impermeable seal. This is the most reliable method and is recommended to be applied during construction or when the dam is empty.

**Pure Blanket -** Application of continuous blanket of Arumpo Bentonite 6-12mm

thick overlayed by a compacted protective layer.



and be drawn into leaking zone. Typical

usage rate  $10 \text{kg/m}^2$  of dam floor area.

**cut-Off Wall -** Specialised technique for sealing horizontal flows by back-filling a trench with a bentonite.

**Dam Entry/Discharge Points -** Arumpo Bentonite can be used in a 30-50% mix to provide an impervious barrier around pipes and similar structures.

**Delivery** -Arumpo bentonite is packed in convenient easy to handle 25kg bags and can also be shipped in bulka bags and in bulk trucks.











## Arumpo Stockfeed Bentonite is accessible to most major markets.



Arumpo Stockfeed Bentonite is the best product for inclusion in most feeds. Some of the benefits demonstrated through research are:

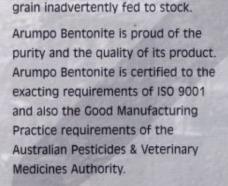
- Rumen buffering properties that provides faster adaptation to dietary changes.
- Provides acidosis protection.
- Can protect stock against the affects of feed toxins such as aflotoxin.
- Improves
   feed pellet quality
   through its binding capability.
- It also has lubricating qualities that can reduce friction to extend die life.

Arumpo Stockfeed Bentonite is available in fine and granular grades to suit various requirements.

Arumpo Stockfeed Bentonite is extremely high purity and top quality. Bentonite is registered by the Australian Pesticides & Veterinary Medicines Authority as a veterinary therapeutic product: allowing improved adaptation to high concentrate diets and assists in the prevention of acidosis in sheep and cattle. It also guards against the affect on aflotoxins

in contaminated

Arumpo Stockfeed





Company



Safe to use, application rates should be 3-4% of finished feed initially and can be reduced after 3-4 weeks to 1-2%.

There is no with-holding period required as Arumpo Stockfeed Bentonite is a completely natural product.

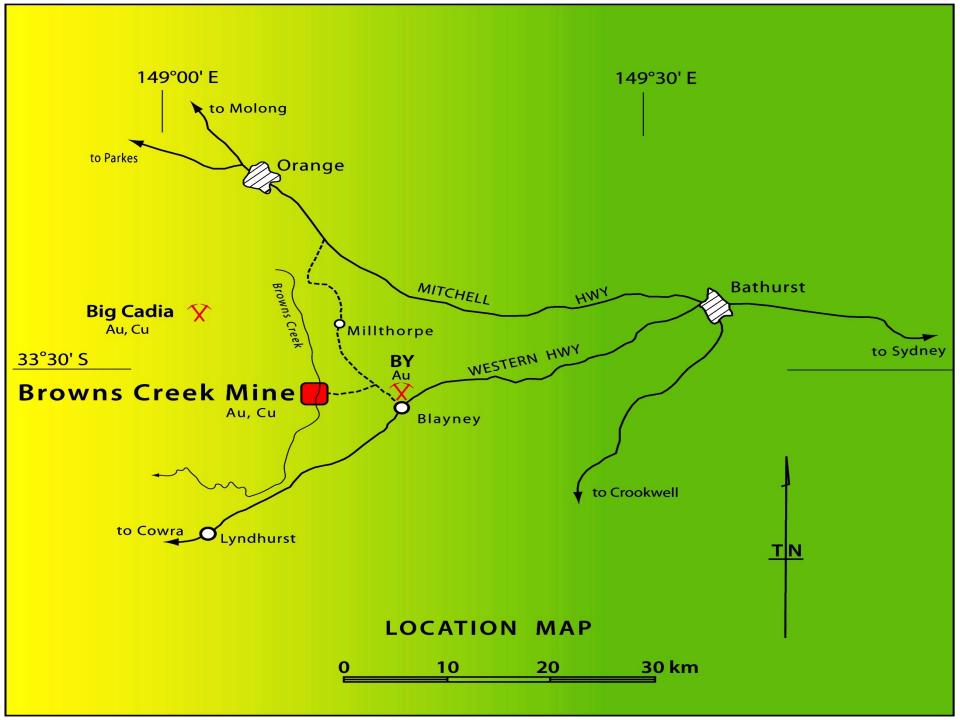
Packed in convenient and easy to handle 25 Kg packs, it can also be shipped in bulka bags and in bulk

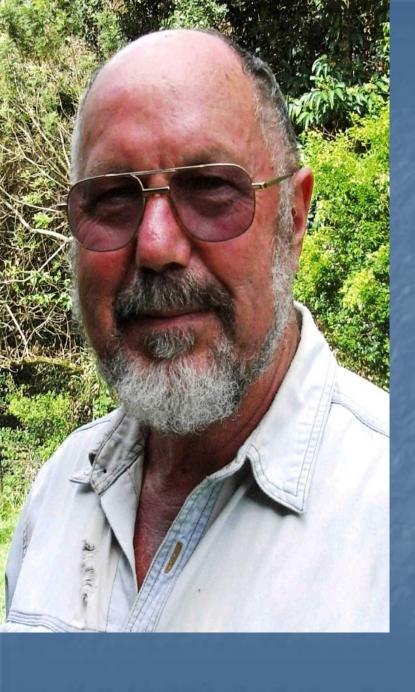


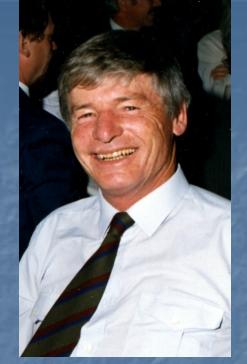
trucks for users equipped to handle bulk ingredients.

Arumpo Bentonite's management team is totally committed to provide courteous and efficient service guaranteeing prompt on-time deliveries with accurate documentation every time.



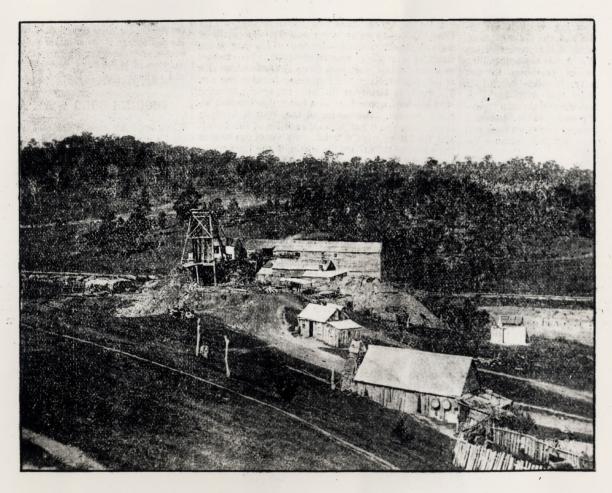




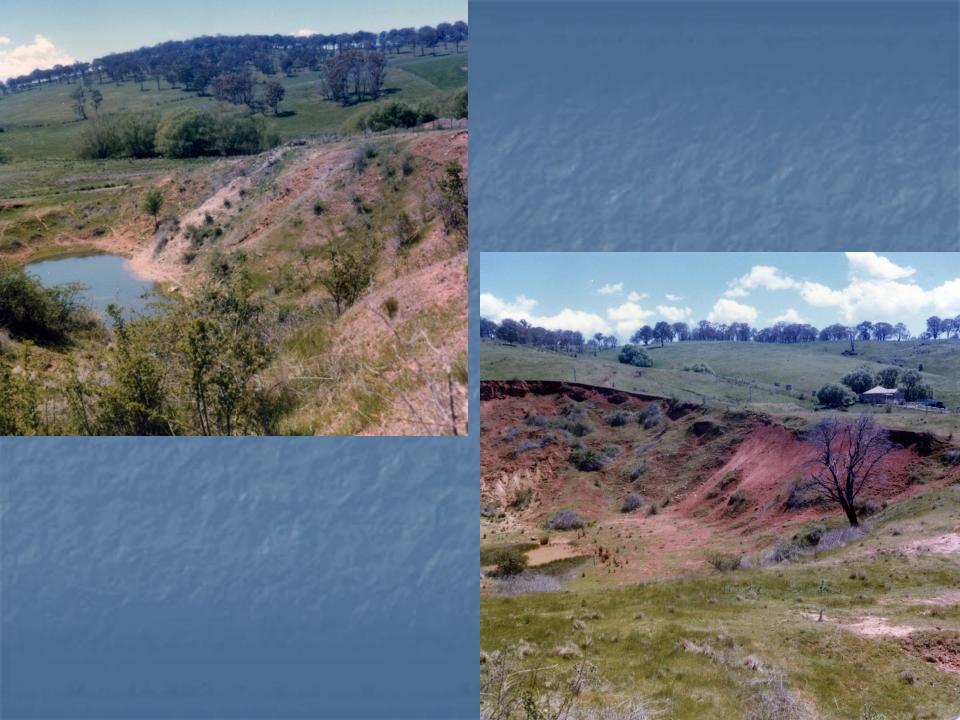




## VIEWS OF THE BROWN'S CREEK MINE, BLAYNEY, N.S.W.



1.-GENERAL VIEW OF THE MINE.











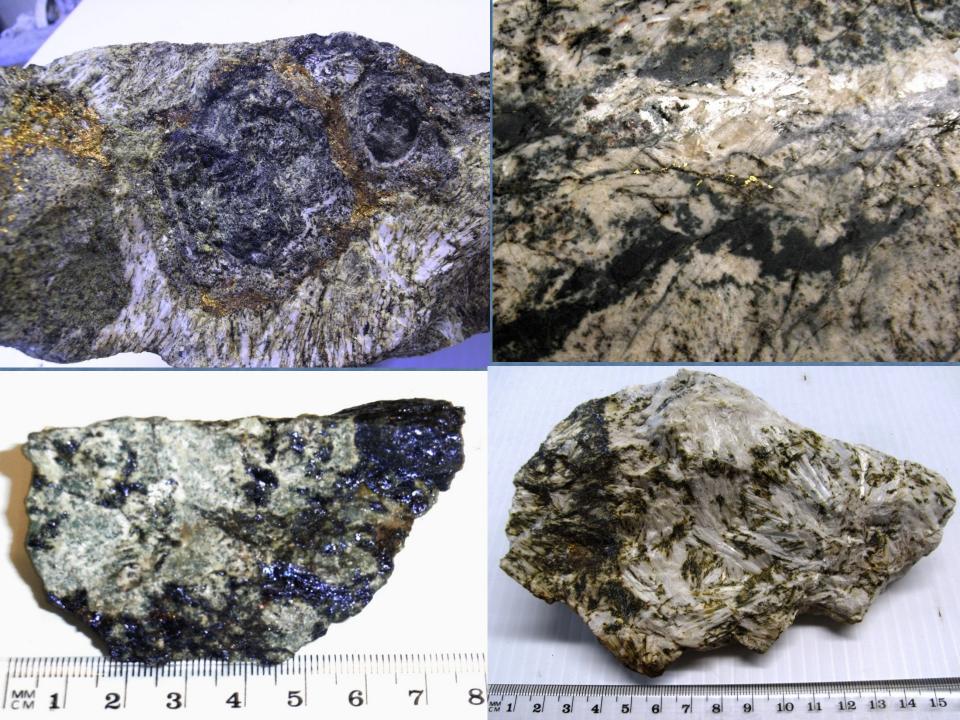


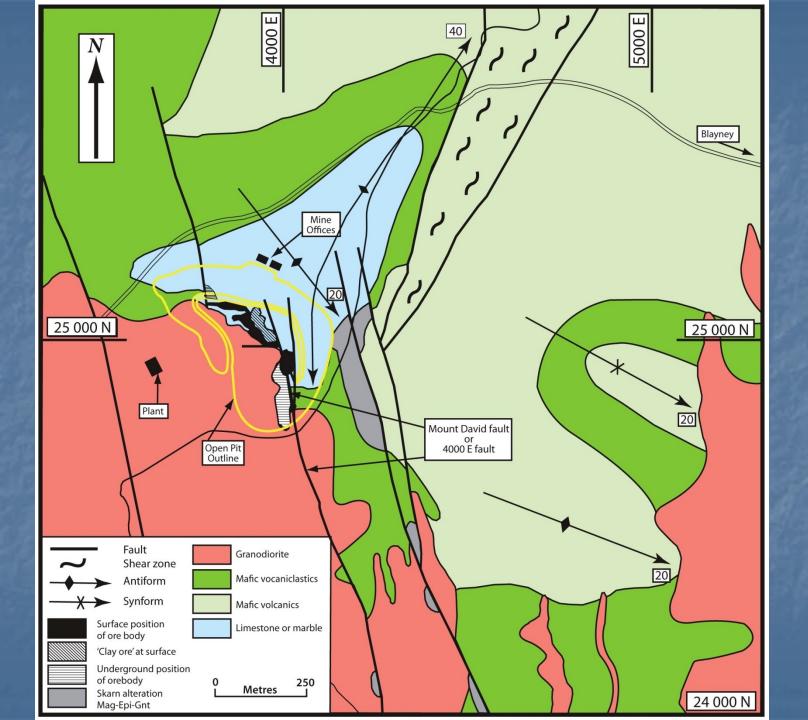


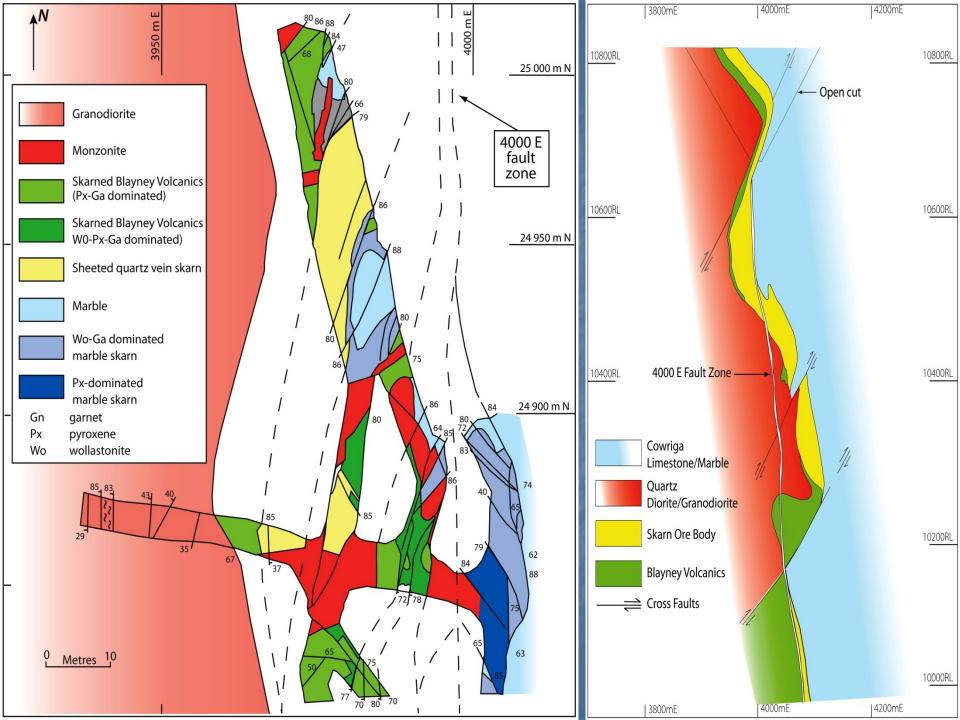






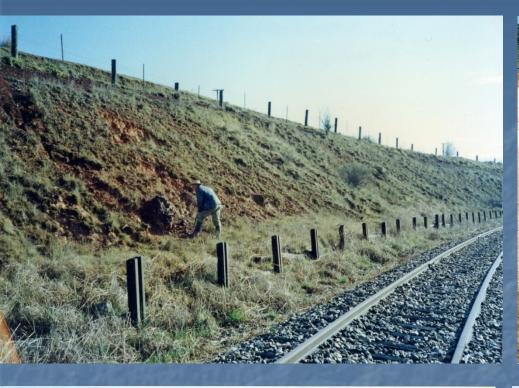


















## BROWNS CREEK EXPLORATION JOINT VENTURE

#### BY DEPOSIT

Geotechnical Drill Hole BYD 1, January, 1990.

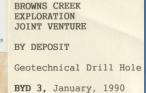




from (m)		to(m)	
3.80	_	10.45	SILTSTONE
10.45	-	15.62	GRAYWACKE
15.62	-	19.00	SILTSTONE, Brecciated
19.00	-	26.00	ALTERED SILTSTONE, Dark clay high in Fe and Mn, vein quartz fragments, sulphides.













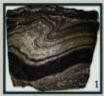










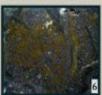
















This book is devoted to people with exploration and mining in their blood, but will also be of great interest for those wanting to learn about the minerals industry and some of its personalities.

Professor Ross R Large Director ARC Centre of Excellence in Ore Deposits University of Tasmania.



This is an important record of activities that contributes to the hertage record of the AusIMM, but will also excite young people looking for a career that offers intellectual challenge, travel and adventure.

Peter McCarthy Chairman, AuslMM Heritage Committee AuslMM Past President 2007-08



The general public as well as explorers and students will be keen to read this book.

David Mason, General Manager Geological Survey of Queenstand.



The book covers a period in Australia's history when the mineral resources industry has achieved unprecedented prominence.

Lindsay Gilligan PSM Former Director, Geological Survey of New South Wales.



This book is for people who want to know where our minerals come from.

Dr Peter Greenwood, HonFlEAust, EngExec, FIET, SMIEEE. Former National President Engineers Australia.

- Layered shale and lead-silver-zinc mineralisation. Mount isa Queenstand.
- 2. Chrysoprase. Marlborough Queensland.
- 3. Malachite (copper). Near Mount Isa Queensland.
- 4. Chalcopyrite (copper) and pyrite. Parkes NSW.
- 5. Azunte (copper). Ok Tedi PNG.
- 6. Copper-lead-silver-zinc mineralisation. Leyte Philippines.
- 7. Gold with magnetite and bizmuthunite. Tennant Creek NT.
- (1, 2, 3, and 7-K. Wright collection, 4 and 6-A. Hope collection, 5 D. Fishburn).



# THE HOPE Factor



MINERAL DISCOVERIES
AUSTRALIA PAPUA NEW GUINEA
& THE PHILIPPINES

Anthony R. Hope

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Gerard A. Farley, Franco Maranzana and Gavin Thomas

**Supporting Organisations** 







# THE END



