# Melbourne Mining Club

## **December 4, 2007**

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"Providing Energy for the Future"

#### Slide 0 - Introduction

Thanks for that introduction, and thanks also for the invitation to join you today at this influential forum to talk to you about the growing importance of uranium as fuel for an energy-hungry world and how Energy Resources Australia is working to contribute to that need.

Before commencing my presentation, I would like to respectfully acknowledge the Mirarr Gundjeihmi traditional owners, traditional owners of the Ranger and Jabiluka lease areas, as well as the town of Jabiru where the majority of our employees live.

#### Slide 1 - Outline

ERA is the fourth largest uranium producer in the world, providing almost 10 per cent of the world's uranium production from our open cut mine in the Northern Territory.

ERA is a publicly listed company, and its largest shareholder is Rio Tinto with 68.4 per cent.

I am here today to tell you about how our 26 year old Ranger operation is poised for further expansion - and the exciting developments in the marketplace we are selling into.

# Slide 2 – Factors driving Nuclear Capacity

It will be no secret to anyone here that there has been something of a nuclear power renaissance in the last few years.

We have seen large increases in prices driven by many factors - high demand combined with supply constraints and a change in the attitudes to nuclear power around the world.

As I see it there are four key factors driving the renewed worldwide interest in nuclear power:

- growth in demand for electricity;
- energy security issues;
- increases in fossil fuel prices; and
- Heightened awareness of climate change and the prospect of carbon emission costs being imposed on fossil fuel energy production and use.

These factors explain why Australian uranium is now in such demand.

## Slide 3 – World Energy Demand

World electricity demand is projected to almost double over the period to 2030, from 15 trillion kilowatt hours (kWh) in 2005 to 30 trillion kWh in 2030.

Most of the increase is expected to occur in developing countries, notably China and India. Total demand from developing countries will exceed that of the OECD by 2030.

Over the period to 2030, electricity demand in these countries is projected to grow *three times as fast* as in the OECD, tripling developing country electricity demand by 2030.

The fastest growth in electricity demand, averaging 5.4% per year over the period to 2030, is projected to occur in India, followed by China at 4.9% growth per year.

Energy security has become a major concern in Europe and North America.

The International Energy Agency forecasts that fossil fuels will continue to dominate the fuel mix to meet global energy demand in the decades ahead.

For electricity, this will mean increased reliance on gas from Siberia, the Middle East and North Africa, giving rise to considerable concern in Europe and North America.

Nuclear power offers enhanced energy security and helps to diversify the fuel mix in the electricity sector, particularly in countries which must import energy resources. These countries include France, Japan, South Korea and Taiwan.

Large energy consuming nations, such as the Russian Federation, China, India and the US, are endowed with large fossil fuel resources, but are also looking to nuclear power as a means of diversifying their fuel mix.

### Slide 4 – Fossil Fuel Prices

The increases in oil and natural gas prices and more recently coal, are tending to make the nuclear fuel option more economically competitive.

Environmental considerations are expected to become significant drivers of nuclear power growth in some countries.

In particular, nuclear power is seen as a means of cutting greenhouse gas emissions and localised air pollution.

The greenhouse emissions over the full life cycle from nuclear power are comparable to re-newables, and between **10** and **100** times less than natural gas and coal.

#### Slide 5 – World nuclear Power

The world's 439 nuclear power reactors currently generate 16% of the world's electricity. Another 33 reactors are under construction and a further 94 are planned, or on order.

While nuclear power generates 16% of world electricity, it generates 23% of the OECD's electricity.

The red dots on this slide show the locations of the world's nuclear reactors, which as you can see are currently concentrated in North America, Europe, Japan and South Korea, with significant growth now underway in China and India.

China has a dozen reactors under construction or about to start construction, with about 25 more planned and a further 86 proposed. India has six reactors under construction and a further 10 planned.

The US and Europe have shown renewed interest, but political issues will mean that future planning and development is likely to be slow, although after a long period we have now seen the first application for a new build lodged in the US.

#### Slide 6 - Outline

Turning to the uranium market, it is worth noting that Australia is a major player in world uranium, with three current operational mines, our own Ranger mine, BHP Billiton's Olympic Dam copper/uranium/gold operation in South Australia, and the small in situ leach Beverley operation, owned by Heathgate Resources. The small Honeymoon mine in South Australia is set for go ahead next year.

## Slide 7 – Uranium Fuel Cycle

In Australia, uranium ore is mined and processed on site into uranium oxide for export.

The intensive processing necessary for fuel rod fabrication takes place at several locations in the Northern hemisphere.

Hence, you can see from this slide that we are only associated with the first part of the process, the mining and extraction of the uranium oxide, or U3O8.

It is worth a quick introduction to the nuclear fuel cycle because there is a lot of misunderstanding about what is done in Australia, and where the value is added downstream.

The conversion, enrichment and fuel fabrication of our uranium is done at facilities in the US, Canada, and France, and is then sent on to our customers worldwide.

The good news about the fuel cycle for a company like ERA is that demand is not particularly price sensitive – certainly not from a value in use basis.

There remains plenty of upside with respect to nuclear fuel prices - fuel accounts for 26 percent of the overall production cost (fuel plus operations and maintenance expenses) of nuclear energy, versus 78 percent for coal or 94 percent for natural gas.

Nuclear power is very capital-intensive, but the fuel's contribution to the overall cost of the electricity produced is relatively small.

The cost of uranium (without processing) constitutes only 3 percent to 5 percent of the cost of a kilowatt-hour of nuclear-generated electricity, so even a large fuel price escalation will have relatively little effect.

For instance, typically a doubling of the uranium market price would increase the fuel cost for a reactor by 26% and the electricity cost about 7% (whereas doubling the gas price would typically add 70% to the price of electricity from that source.

The large increases in uranium prices over the past three years increase the overall production cost of electricity generated at nuclear power plants by only a few tenths of a cent per kilowatt-hour.

Even with further increases in the price of uranium, the cost of nucleargenerated electricity will remain low and competitive with other electricity sources, and it will be even more competitive in a carbon constrained world.

## Slide 8 – Sources of Primary Uranium

There are two sources of uranium - primary and secondary.

**Primary fuel supply** comprises uranium sourced directly from mines like our Ranger mine, and in 2006 constituted 65% of the world supply of total uranium.

The remainder of the supply comes from **secondary** sources;

- Russian material in the form of Highly enriched and low enriched uranium, which became available as nuclear weapons were decommissioned
- US Dept of Energy stockpiles
- Utility inventories and
- Reprocessed fuel (Mixed oxide fuel)

Key points about the mined supply is:

- Canada and Australia produce nearly half current world production
- Australia has the largest proven reserves of uranium, the graph on the right reflects that Australia has 36% of reasonably assured

resources, that is resources which can be recovered for less than US 40\$/Kg.

- The rest of world production is split between Kazakhstan and former Russian-bloc and Africa (more specifically Niger and Namibia)
- Utilities generally purchase most of their fuel requirements through long-term contracts, with delivery lead times of several years.

# **Slide 9 – Concentration of Supply**

The current supply of uranium is highly concentrated. As we saw in the earlier slide, most uranium reserves and resources are in Australia and Canada, in hands of relatively few players.

ERA, although it has the world's second largest mine, is the word's 4th largest producer. Rio Tinto Uranium, the marketing arm of ERA and also Rössing in Namibia, is the second largest supplier in the world.

## Slide 10 – Uranium Spot Price

The price of uranium has really kicked in recent years, after a long stagnant period in the late 80s and 90s.

In the past 12 months the spot price rallied significantly, peaking at US\$136. The spot price has not reached these heights since the late 1970s. Although spot price slipped more recently it has since rebounded and now sits at US\$93/lb. Term price has remained strong at \$95/lb.

Key market drivers include the effect of rising/increased demand ahead of production, which is making supply very tight.

This has arisen from:

- Production being relatively flat and secondary supply reducing, as well as a number of production shortfalls at existing and new mines
- Greater utilisation of reactors
- Increased inventory builds

Additional demand has also entered the market through speculation by Investors/Hedge funds.

## Slide 11 – Uranium Demand vs Supply

Turning to the future supply/demand balance you can see that the supply outlook is uncertain. Many new projects need to come on stream to meet forecast demand requirements, and there have been a number of projects that have stumbled as they have attempted to bring production to the market.

Secondary supply sources that have typically accounted for up to 40% of the market, are now diminishing. Utilities have now exhausted their inventory stockpiles that were built up in the late 1970's and early 1980's. The Russian Highly Enriched Uranium agreement ends in 2013.

Therefore the mined supply will need to increase.

2006 production was down 6% on 2005 – even though it was expected to be an increase of 2.5% this does not even include impact of Cameco's Cigar Lake, which was not expected to come on-stream until 2008, now 2011 or later.

Most major producers have had production difficulties including unfortunately Ranger due to severe weather events, and although Kazakhstan the exception they are now struggling with acid supply and have down rated production until the end of 2008.

With growing concern on climate change we could also see a significant shift in demand to the high case or beyond. The imposition of high carbon taxes could radically change the competitiveness of nuclear energy and this form of energy, particularly in China, could meet the burgeoning energy demands without further contributions to greenhouse emissions.

#### Slide 12 - Outline

I will now bring the remainder of this presentation to focus on ERA and its future plans.

# Slide 13 – ERA and other uranium deposits

The graphic on the left hand side depicts the existing uranium operations in Australia along with uranium deposits or prospective uranium mines. The right hand graphic zooms in to give you an idea of the location of ERA's two leases - Ranger and Jabiluka.

As can be seen the Alligator Rivers regions of the Northern Territory has produced a number of outstanding ore bodies including Jabiluka, Ranger 1, Ranger 3 and Koongarra to the south.

Kintyre (Rio Tinto) and Yeelirrie (BHPB) are in Western Australia but presently the WA Government does not allow Uranium mining.

Similarly, Valhalla in Queensland cannot go ahead until the Queensland government changes their position.

### Slide 14 – ERA Lease Areas

ERA's foundations as a business are inextricably linked to two seminal events; Australia's first Aboriginal land rights legislation and the creation of the Kakadu National Park.

ERA operates on areas that are surrounded by, but separate from, the Kakadu National Park, but are owned by Aboriginal Traditional Owners under the Commonwealth's Aboriginal Land Rights Act governing the Northern Territory.

Our background, 250 km east of Darwin in the Alligator Rivers region, is essentially the story of two uranium operations:

- the Ranger mine, which won its licence to operate in the late 1970s and has produced uranium oxide for export since 1980;
- and the Jabiluka lease 22 kilometres to the north, acquired by ERA in 1991, now on long term care and maintenance, and will not be developed without the consent of the traditional owners.

The Ranger lease contains a series of different mineral anomalies, two of which have been developed. Ore body 1 was mined as an open pit and was completed in 1994 and mining of ore body 3, also an open pit, began in 1996 and still continues.

I believe that the ERA lease areas are the most prospectable Uranium ground in Australia if not the world.

# Slide 15 – Safety Performance

Turning firstly to the company's safety performance, I am very pleased to report our safety performance as measured by both Lost Time Injury Rates and All Injury Frequency Rates continues to improve, and we sit well ahead of the average performance of the industry.

This is consistent with the trend established over the last few years, and all staff remain focused on achieving our goal of zero injuries.

Our mine, given its location, surrounded by a World Heritage listed National Park is one of, if not the most, highly regulated mine in Australia.

Our operations are overseen by a Commonwealth Supervising Scientist with more than 40 staff ensuring, among other things, the integrity of the local ecosystems.

The Supervising Scientist has consistently maintained that Ranger mine has had no detrimental impact on the surrounding Kakadu National Park. This is a record of which we are very proud, and committed to maintain.

# Slide 16 – Ranger Operational Area

This slide shows an overview of the Ranger operational area, which I will use to set the scene for our expansion plans including:

- ◆ Pit 3
- ♦ Pit1
- ♦ TSF
- ♦ Exploration area adjacent to the operating pit

### Slide 17 - Outline

Turning now to the current expansion and exploration work underway at ERA.

#### Slide 18 – Pit 3 Extension

Based on positive exploration and drilling results near the edge of the current pit, ERA announced an extension to the mine in September 2007.

This extension, combined with optimisation of the current shell, added 4,857 tonnes (10 Mlbs) of contained U3O8 to our reserves and will extend the life of mining at Ranger from 2008 to 2012.

The processing plant will continue to operate to 2020. In addition to extending the life of mine, the extension will create 45 new permanent jobs on site.

The cost of the extension is estimated to be A\$57 million, comprising predominantly expenditure for additional mining equipment and infrastructure.

The overlay shows the pit extending to the S-E by approximately 240m. The pit depth will extend from 205m to 265m. The extension will increase the overall size of Pit #3 by 14 Ha, and involve the movement of some 55Mt of material.

The majority of uranium production from this extension will occur in 2011.

# Slide 19 – Pit 3 Drilling intersects

This is an east west section through the Ranger 3 mineralisation and shows the drill-hole orientation and the mineralised intersects.

The brown shell represents the current final pit design (Shell 12).

The blue-green shell is the approved pit extension (Shell 50).

It can be seen that the mineralisation extends down dip at an angle of between 30 and 35 degrees, and also sits below the current floor of the pit.

To put the intersects in context we continue to report grades outside of the current pit area consistent with the mineralisation within the existing pit.

(explain chart)

The colours on the chart represent the grades:

- red greater than 0.5% U3O8,
- orange 0.35-0.5,
- yellow 0.25-0.35 and
- green 0.12 to 0.25.

### Slide 20 – Potential Mine Extension

To look at the mineralisation in another view – this slide represents an east west cross-section of the resource model through the pit.

In September ERA also announced a pre-feasibility study to examine options to extend the mine further by open cut mining (to the PFS or pre feasibility study area) and increase production from the processing plant.

The proposed mine extension highlighted the need to understand and define the uranium resource contained within the carbonate dominated lower mine sequence.

To achieve this further drilling targeting the mineralisation commenced during this quarter and will form the basis of ongoing studies into the first quarter of 2008.

This diagram illustrates a typical section across the known mineralisation at Ranger 3 and beyond to what we have deemed the Ranger 3 Deeps area.

The red sequence represents mineralisation at a cut off grade of 0.08% U3O8. Some of the mineralisation shown outside the pre feasibility study ("PFS") Area is not included in Ranger's declared resources but if it were included it would be predominantly in the inferred category.

### Slide 21

The feasibility study is investigating the optimum mining shell as well as the optimum mining rate for the extension. We will also perform a conceptual review of an underground development.

As part of potential expansion options the opportunity to increase the crushing/grinding (communition) circuit capacity of the plant, currently the bottleneck of our existing processing plant, will be examined.

With the substantial amount of low grade ore already stockpiled on the surface, which will increase with any further mine extensions ERA is also investigating the application of world class heap leach to these low grade ores.

The study will analyse a potential increase to the hydromet or downstream section of the processing plant. Within this framework we also need to consider the overlays of organisation and resources, the critical issue of water and tailings management as well as Traditional owner and other stakeholders input and the approvals process.

The implications of any further expansion will also need to carefully consider the closure and rehabilitation implications.

We are progressing this work as I speak and expending \$10m on the Pre-Feasibility study. I anticipate the initial work to be completed in the first half of 2008, before moving on to with a more detailed feasibility study for the final option.

### Slide 22 (flyover)

To assist in visualising the pit extension that has already been approved, we have developed an animated flyover of Ranger. The flyover demonstrates the Shell 50 mine development.

### Slide 23 – Exploration Potential

Now moving to the exploration activity.

This slide shows the anomalies spread over the lease area. Besides our active expansion studies we also are maintaining our exploration program on the lease.

As I stated earlier we believe our lease areas are the most prospective area in Australia if not the world for Uranium.

A channel of uranium exist through this area – starting to the South of our lease area with the Koongarra deposit, and then moving up through the Ranger deposits and anomolies, through the Jabiluka lease.

The purpose of our exploration program, after the near field exploration of Pit 3 and the potential underground extension – Ranger 3 Deeps, is to continue to provide a pipeline of potential resources well into the future.

#### Slide 24- Outline

Turning now to our Sustainable development activity, which is paramount to any mining company, but more so to ERA given our unique location.

## Slide 25- Sustainable Development

This slide shows Yvonne Margarula – senior traditional owner of the Mirarr, and some of her family members, providing cultural awareness training to our employees.

An important element of our operation today, and any potential expansion programs, is our commitment to sustainable development.

Several programs we have implemented recently with the Mirarr include:

Cultural awareness courses with participation by traditional owners

- Working closely with Traditional Owners to develop and implement traditional burning regimes and other environmental management regimes on the lease.
- And working with traditional owners to identify and preserve and areas of cultural heritage on our lease areas.

Any of expansion programs will under-go rigorous environmental assessment and will include planning for rehabilitation and closure following completion of operations.

Any disturbance to our leases must be rehabilitated such that the lease may be reincorporated back into the National Park and the Mirarr estate.

## Slide 26 - Staff

ERA prides itself on having a diverse workforce. We have in excess of 20% female employees, with females present in all sectors of the workforce from mine operators to Board members.

We have been awarded Employer of Choice for Women status by the Australian Government for a number of years

We are increasing our emphasis on Indigenous employment and I will talk more on this shortly, and we have many cultural groups represented in our team.

We are predominantly a residential operation based in the town of Jabiru, but more recently introduced fly in fly out operations from Darwin. This provides additional lifestyle choices for employees, important in this resource constrained environment.

We make a significant contribution to training in the local region and the Territory through a number of training programs and support further education for all employees.

I am please to say that our turnover remains stable and relatively low given the remoteness of our operations, and the external labour market ERA and its employees make a significant contribution to the town and region.

Much of the town's infrastructure was installed by ERA and we provide electricity to the town from the Ranger site and provide the airport infrastructure.

ERA and its employees are active in all aspects of the town, whether it be through sporting and community events or encouraging local business ventures in the region.

### Slide 27 – Indigenous Employment

ERA is also working hard to increase opportunities for Indigenous people, particularly those local to our region.

This year we have set a new record for the number of indigenous employees directly employed in our business. This slide shows the current number of Indigenous employees at 65, or 16% per cent of our total workforce.

While this is new territory for ERA, we have a long way to go. I recognise that our reputation in this area has can be further improved.

Our focus will remain on improving employment and training opportunities for local Aboriginal people – for those who want the opportunity we must provide a pathway through which they can be successful.

Key elements of our employment program includes the true commitment of our senior management team to creating opportunities, and then appropriate and tailored support programs for individuals who decide to join us. We must focus on sustainable outcomes, not just statistics.

We will seize the opportunity presented by our expansion programs to create planned positions for indigenous employees and a structured program to support our current pit extension has already commenced.

# Slide 28 (In Summary)

ERA is a large and enduring uranium producer, with considerable operational experience and a well established market position.

ERA is the fourth largest uranium producer and the Ranger mine is the second largest uranium mine in the world.

As I have outlined today there are significant expansion opportunities at Ranger and we continue to carry out exploration work on the Ranger lease. Jabiluka is a very important asset to ERA and we are working hard to demonstrate that there are benefits to all stakeholders.

ERA is part of the Rio Tinto group, which provides access to technical resources, procurement arrangements and other services.

We have a portfolio of sales contracts in place with long term customers. We have been a major player in the industry for almost three decades and we intend to remain so for many years to come.

Thankyou for your attention - Slide 29 (Image of Ranger)