## Lynas' Mt Weld Rare Earth Project

Lynas Corporation is an independent Australian listed company that is based in Sydney.

After a change of control in June 2001, Lynas sold its gold interests in Western Australia to focus its attention on Rare Earths and its world-class deposit at Mt Weld, located 35km south of Laverton in the Northern Goldfields.

Although Rare Earths were known to exist in the region, the commercially valuable Central Lanthanide Deposit at Mt Weld was not discovered until 1988.

Extensive exploration has defined a rich carbonatite system containing various high value specialty metals, and the deposit is believed to be the largest and highest grade of its type on earth with proven reserves of Rare Earth oxides (REOs) of nearly one million tonnes at an average grade of 12 percent.

Lynas has successfully completed extensive process testwork, engineering studies for Rare Earths ore concentration and chemical processing to produce Rare Earth chlorides.

Mt Weld's known reserves are equivalent to more than six years of the world's total REO production, with two of the primary ore types having an average grade almost three times higher than the majority of the world's other REO deposits.

It is the only commercially viable deposit of Rare Earth oxides outside of China.

Mt Weld will be a small, open pit operation with the final dimensions being 600 metres by 300 metres with mining to a depth of 70 metres. Because of the high grade of the ore, production is expected to be less than 200 000 tonnes annually for the 20-year plus life of the mine.

Lynas aims to become a fully integrated supplier of Rare Earths by controlling its product from the mine to the end customer, and will focus on using China's technical expertise and low cost processing technology.

The company proposes to use both Australian and Chinese processes to deliver consistent supplies of high quality products at competitive prices to the world market.

Lynas holds a strategic 19.9 percent stake in AMR technologies Inc. AMR is the world's second largest separation processor of Rare Earths with two established Rare Earths plants operating in China

## Rare Earth Applications

The Rare Earth series of elements have a range of unique metallurgical, chemical, catalytic, electrical, magnetic and optical properties that enable them to play a major role in many different applications.

The history of the use of Rare Earths dates back to the 1880s when Rare Earth salts were first used in gas mantles, including streetlights of many of the world's major cities.

By the 1900s applications included gas lighter flints and glass decolouration and by the 1930s fluorescent lighting tubes contained Rare Earths.

The greatest advancements in the use of Rare Earths came after the 1950s when the higher purity materials were being produced and used for glass polishing and camera optics. The television manufacturing industry has long been a heavy user of Rare Earths.

The improvement of colour TV images in the early 1960s, which lead to rapid commercialisation in the 1970s, was due to the replacement of the existing red phosphor with a brilliant red phosphor consisting of europium and yttrium.

By the 1980s Rare Earths were being used in laptop computers, auto catalysts, fibre optic communication systems and mobile telephones, which typically exploited their magnetic, catalytic or optical properties.

Two of the most important permanent magnet materials include Rare Earth elements. Rare Earth magnets will continue to penetrate traditional ferrite magnet applications especially in the automotive industry where power to weight and size ratios are important.

Pressure by governments worldwide to reduce harmful exhaust emissions from vehicles saw the development of catalytic converters, which Rare Earth elements, lanthanum and cerium, play an important role.

Today, in many industries product development engineers are reaching the technological limits of traditional materials and are turning to new materials to keep pace with the modern hi-tech advancements in society.

New materials and novel applications of Rare Earths enable companies to produce more efficient, higher performance and cleaner products that have the technological edge over their competition.

In the new millennium Rare Earths uses include plasma television screens, digital cameras, MRI imaging, environmentally friendly rechargeable batteries and pharmaceutical applications.

New applications for Rare Earths continue to reach air conditioning based on a DC compressor driven by Rare Earth magnets.

## The Reality of Radiation

Radiation is all around us; it is a part of our daily life.

We are all exposed to natural sources of radiation because of the presence of the radioactive elements potassium, uranium and thorium in all rocks and soils. The black stain often seen on our local beaches, which is occasionally mistaken for an oil spill, is a good example of a natural product that has higher radioactivity than the average rocks or soils.

Around the Esperance Port, the granite rocks of Dempster Head produce higher than average radiation, whereas our white beaches produce some of the lowest levels of radiation. Most fertilisers that are shipped through the Port produce radiation because of the presence of potassium and small concentrations of uranium.

Even the foods we eat and drink expose us to radiation. For instance, bananas and milk have small concentrations of potassium. Coffee also produces radiation.

Our lungs are exposed to radiation present in the air we breathe because of the gas radon that is produced from uranium naturally present in the ground. Cosmic rays from outer space also expose us to radiation.

If you have a chest or dental x-ray you are exposed to man-made radiation.

Rare Earth ores are commonly higher in radioactivity than the average rocks and soils around us. They are typically found associated with low levels of radioactive thorium and uranium. An advantage of the mineral composition of Lynas' Mt Weld deposit is that it has lower levels of natural radioactivity compared to other rare earth deposits.

Should the proposal to export Mt Weld's Rare Earth Ore proceed, the naturally occurring radiation levels at the Port will be measured to obtain a baseline for future monitoring which will be carried out during the handling of the Rare Earths Ore.

A radiation management plan will be prepared that will outline procedures to minimise port workers and contractors' exposure to radiation in the Port. The Plan will also outline strategies to reduce dust associated with stockpiling and loading of the Rare Earth ores, and workers exposure to this dust.

The Port has consulted with its employees on the Lynas' proposal, and the issues they have raised are being addressed.

## Esperance Connection

Lynas Corporation identified Esperance Port as the preferred port from which to ship Rare Earth ores from its Mt Weld open pit operation to China, with the first shipment planned for late 2005.

Esperance Port currently handles more than 7.2 million tonnes of cargo annually with more than five million tonnes of iron ore from Portman's Koolyanobbing operations the main export. More than 1.5 million tonnes of grain and 250 000 tonnes of nickel were shipped through Esperance last year.

Portman intends to increase its iron ore shipments to eight million tonnes annually from the end of 2005.

Lynas Corporation plans to mine about 200 000 tonnes of ore annually at Mt Weld. The company has developed a radiation management plan for the Mt Weld operation that will control dust, contain rainfall runoff from the plant site, and reduce the workers exposure to the rare earth ores.

All environmental and Aboriginal Heritage studies and approvals for the project are complete.

The ore mined at Lynas' Mt Weld pit will be road transported in eight tonne kibbles to Leonora where it will be transferred and railed to Esperance on existing rail services.

As the radiation level in the Mt Weld Rare Earth ores is well below the threshold for regulated transport, the material is designated as being non-hazardous for transport.

At the Esperance Port the material will be stockpiled in closed sheds and shipments of between 10 000 and 50 000 tonnes will be loaded using a fully enclosed and automated loading system to minimize dust and workers exposure to the material.

The Port will develop its own radiation management plan if the proposal goes ahead. Naturally occurring radiation levels will be measured before any Rare Earth ores are stockpiled at the Port to obtain a baseline for future monitoring.

The Port's radiation management plan will reduce the workers exposure to the Rare Earth ores, will use automation to load the ore onto ships, and will eliminate any dust hazard.

Once the Port is satisfied that all requirements can be met to safely handle the Rare Earth ores about 125 000 tonnes will be shipped in up to eight shipments a year.

The Mt Weld material will be processed at Lynas owned and operated plants in China.