



ASX ANNOUNCEMENT –8 OCTOBER 2003

ZIRCONIUM MINING JOINT VENTURE – DUBBO, NEW SOUTH WALES, AUSTRALIA

- Your Directors are very pleased to announce the execution of a Joint Venture Agreement with Alkane Exploration Ltd and its 100% subsidiary Australian Zirconia Ltd, to develop its Dubbo Zirconium Project (1.4 million tons zirconia ZrO_2 proven and probable reserves).
- The deposit ore body also containing significant quantities of Niobium, Yttrium, Tantalum and rare earths.
- The agreement provides for Astron to earn a 50% share in the project by constructing a 60 kg/hr demonstration pilot plant within a year and within 3 years revising the project economics and feasibility study plus completing applications for project approvals
- Previous work by Alkane included a full resource drilling program and extensive laboratory and mini pilot plant process testwork. A complete feasibility study was prepared by consultants SNC Lavalin in October 2002
- Astron plans, after fully reviewing the previous work, to provide its strong technical input to the project with the objective of establishing and demonstrating viable product recovery processes and capital requirements. Basic zirconium chemicals, and a tantalum and niobium concentrate and an yttrium rare earth concentrate have already been demonstrated to be readily extractable.
- The relatively large resource size means the deposit could be capable of providing a long term stable supply base for manufacture of zirconium chemicals and high purity advanced chemical zirconias and ultimately support a range of very advanced high technology industrial products
- Alkane already has substantial expertise and proven mining project experience in the local New South Wales area and no serious problems are anticipated in developing the project.
- If the project can be successfully developed Australia's position as a leading supplier of zirconium materials, will be clearly established.

DETAILS OF THE DUBBO ZIRCONIA PROJECT (DZP)

The Dubbo Zirconia Project (DZP) is located 20km south of the large regional centre of Dubbo, approximately 400km north west of Sydney in the central west region of New South Wales.

The DZP is centred on the Toongi trachyte intrusive which is a near vertical pipe-like body with dimensions 900 metres by 500 metres. Drilling of the Toongi body has tested the trachyte on a 50 metre square grid to an average vertical depth of 55 metres. A total of 107 holes have been completed with a few holes drilled to near 100 metres vertical to test for depth continuity.

The drilling demonstrated the remarkably uniform grade of the trachyte with only the silicified contact of the body showing major grade variations. Most of the deposit crops out as a small hill with only a thin skin of weathered rock which does not impact on the metal grades.



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A 20 year mining pit has been designed which covers approximately 40% of the surface area of the Toongi body, reaching depths of 20 metres below the top of the hill. The ore recoverable from this pit has been classified as an In pit Measured Resource based upon a 1.5% ZrO₂ cut off. Waste totals 0.23Mt, with equivalent waste to ore ratio of 1:18.

Identified Mineral Resources were assessed as:

IN PIT RESOURCES	MEASURED	4.14 million tonnes	1.91% ZrO₂, 0.041% HfO₂, 0.46% Nb₂O₅, 0.029% Ta₂O₅, 0.138% Y₂O₃, 0.765% Total REO
MEASURED RESOURCES (0-55m, 340mRL)		35.7 million tonnes	1.96% ZrO₂, 0.04% HfO₂, 0.46% Nb₂O₅, 0.03% Ta₂O₅, 0.14% Y₂O₃, 0.745% Total REO
INFERRED RESOURCES (55-100m, 295mRL)		37.5 million tonnes	Similar grade
TOTAL		73.2 million tonnes	Similar grade

During the last four years a programme of metallurgical test work was carried out at the Lakefield Oretest Pty Limited (Lakefield) laboratory in Perth, under the management of Perth based industrial mineral consultants TZ Minerals International Pty Ltd. This programme was successful in demonstrating a process of sulphuric acid leach with solvent extraction recovery and refining of the value metals in the deposit to produce a suite of relatively pure intermediate products which were suitable for further processing to high value materials for use in the expanding electronics, catalyst, engineering ceramic and specialty alloy industries.

The process development work included operation of a mini-pilot plant over 19 days in five separate campaigns. These operations generated several kilogrammes of zirconium and niobium products, some of which were distributed to potential end users in Europe and Japan for assessment. The products distributed consisted of zirconium basic sulphate (ZBS), zirconium hydroxide (ZOH) and a niobium-tantalum concentrate (Nb Conc).

A Definitive Feasibility Study (DFS) was commenced early in 2001 and SNC-Lavalin Australia Pty Ltd (SLA), the Australian office of the large international engineering group, was appointed as the study manager later that year. SLA was responsible for compiling all the data necessary for an assessment of the technical, ancillary and financial aspects of the Project. Although process development work was continuing (specifically reagent optimisation, product quality improvement and the development of the yttrium-rare earth flow sheet), the DFS was completed in late September 2002 based upon a flow sheet frozen at the end of June 2002.

The basic concept of the DZP is a 200,000 tonne per year ore 1st stage throughput to produce:

- **8,000 tonnes (40% ZrO₂ approx) as zirconium sulphate, zirconium hydroxide and zirconium carbonate**
- **600 tonnes niobium (+tantalum) pentoxide as 80% concentrate**
- **1,200 tonnes* yttrium – rare earth oxide as 70% concentrate (*not included in base case model)**

The results of the DFS have shown that, given the complex and innovative nature of the DZP (with no existing Australian or international operating comparison), and the very conservative approach to



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capital/operating costs, the base case model did not give acceptable financial returns on the capital cost, even though producing a positive cash flow. However, with the development of the yttrium-rare earth recovery circuit, other process optimisations and more likely product revenue scenarios, the Project will generate improved returns.

The DFS acknowledged that the Toongi deposit is a major zirconium resource of long term strategic significance. The process developed enables the value metals to be recovered and refined into a number of products that have market appeal. Of particular importance is the fact that the generation of zirconium products from the DZP is not dependent upon zircon sand, and hence the production of ilmenite/rutile from mineral sands deposits. That industry is directly driven by demand for titanium minerals, with zircon being a co-product of projected lower abundance. Zircon currently provides over 90% of feedstock for the zirconia and zirconium chemicals business.

The zirconia and zirconium chemicals industry continued to grow with annual rates around 5% over the last ten years. This rate of growth of consumption is anticipated to be maintained but the potential impact of the commercialisation of solid oxide fuel cells (SOFC) within five years could see a substantial increase in the demand for zirconia. The consumption of niobium and rare earth products also continues to grow and new applications are being developed.

Information relating to reserves or resources has been compiled by Mr D I Chalmers, FAusIMM, FAIG, a director Alkane Exploration Ltd, who is a competent person as defined in the Australasian Code for Reporting of Identified Mineral Resources and Ore Reserves, September 1999, and accurately reflects the information compiled by the competent person..

Additional information and pictures are available on Astron website www.astronchem.com and from Alkane's announcement to the ASX, and the Alkane Website www.alkane.com.au