

Submission to the House of Representatives

Standing Committee on Industry, Science and Resources

**Inquiry into increasing value-adding to
Australian raw materials**

Iluka Resources Limited - a case study

September, 1999

Iluka Resources Limited - Adding Value to Australian Raw Materials Summary

The Iluka Example

Iluka Resources Limited has built a major international titanium minerals business on the success of the company's value-adding initiatives. The company has grown to become a global titanium minerals industry leader, generating earnings of more than \$750 million a year - most as Australian export income.

The Iluka experience shows that increased value adding in the Australia business sector is feasible if new projects are developed in response to genuine commercial opportunities. The Government can help by increasing support for research and development; reintroducing a number of investment incentives and ensuring a practical framework for project assessment and management.

Iluka has excellent prospects of increasing the company's earnings through additional value-adding; but the options have been restricted or delayed by current government policies - particularly limited support for research and development.

The requirements for value adding

Based on Iluka's experience, the ingredients for successful downstream processing include

- Commercial opportunity
- The best technology
- Supportive Government policies
- Resource security

Dividends to the company and community

Some of the commercial and community benefits of Iluka's value adding are

- Improved returns for the company
- Access to new markets
- Increased export performance
- More employment
- Regional business opportunities

Major barriers to value-adding

The problems facing companies planning new value-adding projects include

- Reduced support for research and development
- Limited investment incentives
- Taxation changes
- Waste disposal issues
- Greenhouse gas restrictions
- Potential conflict with customers

Submission to the Inquiry into increasing value-adding to Australian raw materials

Introduction

Iluka Resources is one of the world's major titanium minerals production and processing companies. Employing more than 2500 people in three countries, the Iluka group was established from the merger of Westralian Sands Limited and RGC in 1998. The combined company has a major stake in mineral processing - operating four synthetic rutile plants in Western Australia. These plants were established with substantial Commonwealth and State Government support - particularly scientific research and investment incentives. As a result, the company has developed a significant value-adding business which makes an important contribution to the company's earnings. In addition, downstream processing operations generate major community economic and employment benefits. After more than 20 years in downstream processing, Iluka operations provide a useful insight into the prospects for further value-adding in Australia.

Background

The largest of Australia's titanium minerals producers, Iluka Resources produces feedstock for titanium dioxide paint manufacture - and zircon, used for ceramic glazing. The company began production in 1959, after the discovery of rich ilmenite deposits in the Capel area of Western Australia. Like many of Australia's early mines, the operation was able to compete in international markets because the miners had access to the world's best mineral deposits. Since then, the high grade deposits have been exhausted and the company has relied on its productivity and technological advantages to remain competitive.

In addition, the nature of the industry has changed. In the 1960s and 1970s most titanium dioxide producers used ilmenite for sulphate pigment production. In the past two decades, an increasing number of producers have switched to chloride route titanium dioxide production - a technology which produces much less waste and fewer environmental problems. Most chloride plants use rutile - or an equivalent high titanium-dioxide feedstock - in preference to raw ilmenite.

The changes encouraged Western Australian producers to develop a technology to convert the State's abundant reserves of ilmenite to synthetic rutile. Ilmenite has up to 60 per cent titanium dioxide. Rutile has a titanium dioxide content of approximately 93 per cent; making rutile a much more valuable product (selling for about \$700 a tonne, compared to the ilmenite sale price of approximately \$130 a tonne). By removing most of the impurities - mainly iron - from ilmenite, processing companies can produce a feedstock containing about 92 per cent titanium dioxide (selling for up to \$550-a-tonne).

The process - based on roasting, aeration and acid treatment - was developed with the support of the Federal and State Governments. In particular, the CSIRO and WA Government Chemical Laboratories invested substantial resources and expertise in programs to prove the synthetic rutile process. Without the Government backing, the concept would never have become a commercial proposition.

Synthetic Rutile production gave the Australian industry greater access to the growing chloride route titanium dioxide market. At the same time, the process increased the value of ilmenite and more than doubled the number of employees working in the companies which invested in the new technology.

One of the most important benefits for Australia was the development of a viable titanium dioxide industry. Using locally-produced synthetic rutile, pigment manufacturers established two Western Australian operations which have grown to employ approximately 700 people and generate more than \$400 million a year. The titanium dioxide pigment manufacturers have set their own impressive benchmarks for quality and productivity. Millennium Inorganic Chemicals, based in the Bunbury area of Western Australia, and the Tiwest Joint Venture, which operates a pigment plant at Kwinana near Perth, are amongst the most efficient titanium dioxide producers in the world. Both have foreshadowed plans to expand, as the Asian markets improve.

Iluka is now examining the possibility of processing the iron oxide residue from synthetic rutile production to high quality iron feedstock for steel manufacture. The additional value adding industry has major implications for the economy - and the environmental management of a wide range of mineral processing industries. The process has shown great promise in trials, but the company faces significant financial risks in establishing commercial operations. The Federal Government no longer provides the level of research and development support which was available when the synthetic rutile process was being developed. As a result, the "next step" for the industry has been scaled down while the company-funded research and development program is completed. The introduction of the technology on a commercial scale will be delayed - possibly for several years.

The ingredients for value-adding

Based on the Iluka experience, the ingredients for successful value-adding are -

1. An acceptance of business imperatives

The synthetic rutile business - and consequent titanium dioxide industry - were based on market opportunities. They succeeded because there were sound commercial reasons for their existence. Significantly, the industries did not develop in response to conditional access to reserves. Government intervention, putting pressure on companies to move into value-adding is rarely effective in the long term. Experience at Iluka, and most other Australian mineral processors, shows that good business and production efficiencies are the key factors in value-adding.

2. The right technology

Value-adding is unlikely to succeed without the best available technology. Iluka's downstream processing operations were established when the company applied new technology to meet changing market requirements. The operations have thrived because of a company commitment to continuous technology upgrading and improvement - a program which involved a substantial investment in research and development. In fact, it is unlikely that the synthetic rutile sector of the industry would have survived without ongoing research and development programs. The company has faced intense international competition for its market share - competition which demanded continuous improvements to productivity and efficiency.

Plans for expansion of the company's processing operations will depend, in part, on the development or acquisition of additional leading edge technology.

3. Supportive government policies

The establishment of a major synthetic rutile industry and an expanded titanium dioxide pigment manufacturing business would have been impossible without strong Federal and State Government support. The synthetic rutile technology was developed with the assistance of the CSIRO and WA Government Chemical Laboratories. The technology was implemented, on a large scale commercial basis, in the 1980s - encouraged by attractive Federal Government investment allowances. Government support for research and development - and new industry investment - has declined in the past decade. The changes will make it more difficult for Australian companies to invest in downstream processing in the future.

4. Resource security

Most processing in Australia depends on access to resources. For most products, the local consumer market is too small to stimulate commercial processing of imported materials. As a rule of thumb, a synthetic rutile plant needs 20-25 years of operating life to justify the necessary capital investment. The mining operations which supply the plants last 3-10 years. Unless producers can be sure of access to minerals in the future, they have no way of guaranteeing supplies to the processing operations. This means that mining companies need to have some confidence in the project assessment and approvals process. Governments can help by maintaining a commitment to consistent, objective and transparent project assessment policies.

Dividends to the company and the community

1. Improved returns for the company

From a business perspective, value-adding is a process of maximising the return on investment. With this in mind, titanium mineral producers have been careful to weigh up the benefits of investing in downstream processing, rather than acquiring or developing new mining operations. Downstream processing delivers no real benefit to the company's shareholders, if the profit margin is less than the return on new mining investment. Iluka believes that the company's investment in synthetic rutile production has been worthwhile because the operations have been able to generate good profits on a consistent basis. In addition, the company has been able to secure a significant share of the expanding chloride route titanium dioxide market.

2. Access to new markets

The key incentive for the company's decision to invest in large scale value adding was a change in the global titanium dioxide market. A switch to chloride route pigment production increased the demand for rutile, when reserves of natural rutile were declining. This created a market opportunity for the company's operations. The company developed synthetic rutile - to take the place of natural rutile in pigment manufacture. The synthetic rutile plants gave Australia a greater stake in the major growth sector of the global titanium dioxide industry - helping to secure a more promising long term future for titanium mineral producers like Iluka.

3. A better balance of trade for Australia.

One of the attractions of downstream processing is the potential to increase national earnings from mineral exports. Minerals - or mineral products - account for more than 50 per cent of Australia's merchandise export revenue. By increasing the price of the mineral products, Australian exporters can improve the national trade position - and strengthen the national economy - without increasing the volume of resource exports. The current price of titanium minerals underlines the potential for processing operations to boost Australian trade figures. Ilmenite sells for approximately \$130 a tonne. Synthetic rutile is worth about \$550 a tonne - and locally manufactured titanium dioxide has a market value of approximately \$3000 per tonne. It takes roughly two tonnes of ilmenite to make one tonne of titanium dioxide, ostensibly improving the return 11-12 times by manufacturing pigment in Australia.

However, the formula works to benefit the economy - only if processing is profitable. Processing is not adding value to the national economy if it means diverting investment capital from viable mining operations to marginal manufacturing business.

4. Increased employment

From a community perspective the most important benefit of value-adding is an increase in employment. A breakdown of employment figures for the Western Australian operations of Iluka Resources highlights the impact of secondary processing. The company employs 1250 full time and contract workers in WA. Approximately 575 work in mining, 275 in mineral separation and 400 in synthetic rutile production (These figures include administration and service personnel allocated to each sector on a pro-rata basis). Approximately one quarter of the company's synthetic rutile goes to Millennium Inorganic Chemicals' Western Australian operations which employ another 400 people in titanium dioxide manufacture.

Apart from the increase in job numbers, the introduction of processing facilities creates a wider diversity of jobs - many requiring sophisticated technical and professional skills.

5. Substantial regional business opportunities

The multiplier effect of employment in the mining sector has been estimated at between 3 and 4 consequent jobs for every full time mining employee. Experience at Iluka Resources suggests the use of regional business to support the company's operations is increasing.

A recent survey showed that more than 1000 Western Australian businesses drew a regular income from Iluka - in addition to the significant number of commercial and

service sector activities boosted by the demands of industry employees. Although the survey did not differentiate between mining and processing, anecdotal evidence suggests that a major share of regional business activity has been generated by value-adding.

One of the most important features of the flow-on effect of titanium minerals production is the emphasis on local expenditure. More than 90 per cent of the company's turnover is spent in Australia - approximately two thirds in regional production areas.

The major barriers to value adding

1. Reduced research and development support

By its nature, mineral processing is a technology-based business. New technology has been critical to the establishment of Iluka's synthetic rutile operations. Since the operations first began production, the company has been able to remain competitive because of continuous improvements to way the technology has been applied and refined. As the introductory section of this submission explains, the development of Australia's synthetic rutile industry would have been impossible without government support - particularly the research work of the CSIRO.

This level of support has declined recent years, beginning with cut-backs to CSIRO funding for industry research and culminating in the 1996 budget decision to reduce taxation allowances for private research and development from 150 per cent to 125 per cent. The impact of the decision is shown in the table below.

Investment	Cost to the company based on the following R and D taxation incentives		
	100%	125%	150%
\$1,000,000	640,000	550,000	460,000
plus compliance costs **	-	50,000	50,000
Total	640,000	600,000	510,000

* The table assumes a 36 per cent company tax rate. As the tax rate is lowered in future, the comparative benefit will decrease

** Government estimates put compliance costs (collection and presentation of research and economic data) at 2-5 %. Industry figures range from 5-7 %. Compliance costs would apply to 125 % or 150% allowances only - assuming that the costs can otherwise be treated as operating expenditure qualifying for a 100 per cent deduction.

Iluka's programs show that Government cut-backs in R and D funding could represent false economy, because effective research and development programs have the potential

to increase Government revenue. As the following example from Iluka Resources shows, the Government can expect its foregone taxation revenue to be repaid with substantial dividends once the research is applied to commercial projects.

Synthetic rutile - Process Improvement R and D Program

	\$m
Total Budget	15.1
Return to the company (increased earnings)	19.3
Taxation concessions (cost to Govt)	2.3
Increased tax revenue	6.9

The Government decision to reduce taxation incentives has been accompanied by a shift in policy covering R and D grants to favour more fashionable areas of research, such as medical and information technology. The concept may have some superficial appeal - but the result has been a reduction in research to improve Australian industries which have a proven success record.

The changes will have a significant impact on Australia's prospects of further downstream processing - a fact demonstrated by the progress of an Iluka project to process iron oxide. The iron oxide project is an exciting breakthrough in the evolution of the synthetic rutile industry - with major implications for other mineral processing sectors. An Iluka research team has developed a technology to convert iron-oxide waste - which is currently returned to former mine sites for disposal - into a valuable feedstock for steel manufacture. The technology may be applied to other industries - such as titanium dioxide manufacture, alumina production and nickel processing - resolving a number of significant environmental issues.

Iluka was encouraged to invest in the initial research by the attractive taxation allowances in place before 1996. However, the changes to R and D incentives have meant substantial increases in the cost of moving to the next stage of technology development. As result, the company has decided to put back its development program to reduce financial risks to the company's shareholders. The introduction of the new technology on a commercial basis may be delayed by 3-5 years. Given the comparative high-risk nature of all new technology development, it is likely that other mineral processing companies have taken the same approach

One of the long term implications of the reduced R and D expenditure will be an impact on Australia's ability to develop innovative technologies and practices. There is anecdotal evidence that some of Australia's best scientific talent is being attracted away from research to other areas of industry and commerce.

2. Limited investment incentives

Intense global competition for resource development and processing has encouraged many countries to offer attractive incentives for new or expanded industries. The incentives on offer in Australia are very modest, compared to the support available to producers in rival locations. These issues have been examined by other Government inquiries in recent years, but most of the comparative disadvantages of investing in Australia remain. In general terms, the Australian Government has taken a conservative approach to policies dealing with -

- research and development allowances,
- establishment grants,
- accelerated depreciation,
- taxation holidays, and
- infrastructure support.

Iluka has continued to invest in Australia - despite the Government policies - because of the group's local infrastructure and resource base. The company has a skilled workforce and extensive plant and support facilities in Australia. Because of these factors and the inherent cost advantages of extending brownfields operations - rather than developing greenfields plants - Iluka expects to expand its Australian operations in the future. However, the company believes that the level of investment by Australian industry would be increased by a more proactive set of Government policies. At present, the company's competitors - particularly South African and Canadian operations - are bringing new production capacity on stream with strong Government support.

In 1997, the company carried out a detailed comparison of establishment costs in Australia and South Africa. The comparison showed that - all other factors being equal - the rate of return in South Africa would be four per cent higher than the return in Australia because of the disparity between investment incentives in the two countries. These investment policies placed Australian producers at a huge disadvantage. The equation will change - although not necessarily improve - as Australia's taxation structure is revised. If local industry is to take advantage of the potential for downstream processing, investment incentives will have to be competitive in the future.

3. Taxation changes

This submission was completed as the Ralph Report on taxation was being finalised. At the time, the detailed implications of the report were not clear. In general terms, Iluka would welcome plans for reduced company tax as a strategy to make Australian industry more competitive. However, the anticipated loss of accelerated depreciation allowances - to compensate for company tax reductions - could have a profound impact on new capital projects likely to increase Australia's value-adding capacity.

Most downstream processing projects in the titanium minerals sector involve a capital investment of more than \$100 million. As result, the investment framework for new projects can have a significant influence on where - or whether - new developments can go ahead.

It is likely that the number of new mineral projects will decline unless the depreciation incentives are replaced by an effective program of targeted assistance.

4. Waste disposal

Value-adding in the minerals sector begins with the removal of impurities from raw materials. Almost by definition, this element of value-adding means the creation of waste, or residue. Managing waste has become one of the most sensitive issues in planning new downstream processing projects. Iluka accepts that resource development should be approved only if projects can meet acceptable environmental standards. However, the company believes that investment decisions should be based on clear technical objectives and criteria for managing residues - not a subjective response to public perceptions.

During the past decade, many communities have become more assertive and influential in project assessment process. This make it more difficult for companies to plan ahead with confidence. In this context, Governments can facilitate more downstream processing by ensuring a system of clearly defined and rational environmental approval criteria during the early stages of project planning.

5. Greenhouse gas restrictions

One of the major environmental issues to be addressed in promoting the case for downstream processing is Australia's greenhouse gas commitments. Mineral processing requires substantial energy use and the inevitable generation of greenhouse gases. Most companies would welcome policies which encourage energy efficiency, but not the implementation of arbitrary restrictions.

In a global context, separate national greenhouse gas limits make no practical sense. World gas emissions can be reduced if mineral producers in countries like Australia develop efficient process plants to upgrade raw materials near the source of supply. This strategy cuts gas emissions by replacing the least efficient processing plants with modern facilities and reducing the volume of transport cargoes.

6. Potential conflict with customers

Mineral producers are the logical targets for policies to encourage downstream processing because the miners have access to resources. However, the options for mining companies can be complicated by the risk of competing with important customers. Most miners work hard to build up good relationships with their customers. These relationships will be strained if the miner wants to sell both raw materials - and processed minerals to the customers' major markets. This problem underlines the need for commercial savoir-faire in adopting value-adding strategies. In particular, Government policy needs to acknowledge that mineral producers - not governments - are the best judges of the market opportunities for successful downstream processing.

Conclusion

Experience at Iluka Resources shows that value-adding in the minerals sector has the potential to generate significant benefits for the company, the economy and the community. An expansion of downstream processing activities in Australia is feasible if new projects are developed in response to genuine commercial opportunities. The Government can help by increasing support for research and development; reintroducing more attractive investment incentives and ensuring a practical framework for project assessment and management.

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