# Murray Basin mineral sands infrastructure planning study

*John Fargher (Manager, Resource Development, Department of Industry and Trade)*

## Introduction

The final report of the Murray Basin Mineral Sands Infrastructure Planning Study was presented to Senator Nick Minchin and the three State Ministers responsible for Mines and Energy Resources on 3 August at Mildura. The study, by consultants Sinclair Knight Merz, has identified the need for infrastructure investment to facilitate development of exciting heavy mineral sands discoveries in the three States covered by the Murray Basin — SA, NSW and Victoria.

Australia is the world's leading producer of titanium and zircon minerals but to remain in that position will require continuing successful exploration and mine development. The industry, which had its origins in the east coast beaches of Australia in the 1930s, is now predominantly active in WA, and in 1999 accounted for 26% of the world's titanium feedstocks and 38% of the world's zircon. The industry is worth $1.2 billion in annual export income and provides direct employment to ~3000 Australians.

The study has defined five zones in the Murray Basin which already show potential for mineral developments (Fig. 1), although it is acknowledged that the region is still relatively unexplored and the selection of zones, to add focus to the report, should not be a limitation on exploration.

## SA perspective

SA is most actively represented by Murray Basin Minerals NL, which has reported resources of 65.6 Mt grading 3.3% heavy minerals at a cut-off of 1.32%, in the Murraylands region around Mercunda and Mindarie. Zircon will be an important export for this company, which is making regular additions to its reserve status in quarterly reports. The company has announced the results of a first-stage prefeasibility study for the Mindarie Mineral Sand Project. The annual mining rate would be 6 Mt, producing:

- Zircon 37 000 t
- Rutile 1 700 t
- Hi Ti (leucoxene) 15 000 t
- Ilmenite 86 000 t

The location of the mineral or dry separation plant could be at Karoonda or, alternatively, Murray Bridge or Tailem Bend, and export through the Port of Adelaide.

SA's participation in the industry is not limited to exploration and mining within the State. Major resources found in nearby NSW and Victoria would use available rail and road infrastructure to export through either Port Pirie or Port Adelaide. Both SA ports have land available for processing and storage as required, together with natural gas and high voltage power supply. Both ports present an opportunity to utilise grain handling facilities where automated handling equipment is available through South Australian Co-operative Bulk Handling.

## Downstream processing

Consultants Sinclair Knight Merz were asked to consider down-stream or value-adding processes that could flow from the new mining industry. Ilmenite will need to be handled very efficiently to be competitive in world markets. However, it is possible that after the industry establishes, and demonstrates a long-term capacity to supply ilmenite for pigment producers, it should prove commercially attractive to establish a world-scale pigment plant in SA. A project similar in scale to that proposed by Tioxide a few years ago north of Whyalla could re-emerge given a guaranteed supply of ilmenite that could be delivered via a railway connection, thus avoiding port and shipping costs for that commodity.

Furthermore, an intermediate step in value adding could be to process ilmenite to synthetic rutile, taking advantage of Australia's energy resources of either natural gas or coal to upgrade to a higher value product before export.

## Infrastructure improvements

### Railways

The report notes that infrastructure will be a determining factor for the industry's development and governments should expect to make improvements to facilitate that development.

A typical mineral sands development will need to move ~400 000 t/year to port, so rail will be the most cost effective transport form. Railway transportation has had a perennial gauge problem, which has been further increased by partial standardisation in Victoria and SA during the 1990s. The report identifies problems in linking to ports, so this industry may provide the opportunity to budget further extensions to the standard gauge network, which will benefit grain, fruit and wine industries as well as facilitating the development of mineral sands mining and processing.

### Road transport

Transport to railheads, and to nearby mineral separation plants prior to dispatch to ports, will require road infrastructure that can accommodate the largest trucks possible. In addition to connecting roads to mine sites which may be a project investment, the local public roads may need upgrading, but that would in most cases have wider benefits for the rural communities.

### Electrical power

The report notes that power transmission infrastructure will need to be extended as most new mineral developments are likely to be remote from the grid which links major centres of population. A typical power requirement will be ~3 MW at a mine site and ~2 MW at a mineral separation plant. Companies expect that the mine site supply may need to be on-site generated from diesel fuel, but a grid connection would be preferable.

### Process water

The report should be reassuring for established agricultural industries by confirming that competing demand for scarce water resources should not be a problem. The Murray Basin has extensive sources of underground saline water that can be used for 99% of mineral sands mining and processing needs.


***Fig. 1*** *Major known mineral sands prospects and transport infrastructure of the Murray Basin, and the five opportunity zones (derived from the Executive Summary, Murray Basin Mineral Sands Infrastructure Planning Study).*

The industry will strengthen nearby agriculture by lowering saline water-tables, with wastes disposed of by evaporation.

## Employment impact

The region will welcome the employment impacts of the industry, which will add to populations in existing nearby towns and cities and provide direct and indirect work opportunities amongst rural communities. A typical base-case development of 400 000 t/year of concentrate would engage 100–110 direct employees at the mine site and a further 60–70 at the separation plant. The impact will be significant in the regions, and within a few years there could be several such developments.

*For further information contact John Tobin, Senior Investment Manager, Invest SA (ph. 08 8303 2502, email tobin.john@saugov.sa.gov.au). The executive summary of the final report of the Murray Basin Mineral Sands Infrastructure Planning Study can be found on the Internet at www.isr.gov.au under Resources/Regional Minerals Program.*