

5.0 THE COOLJARLOO INTEGRATED PROJECT

The typical extraction and beneficiation path for titaniferous feedstocks is illustrated by the integrated Cooljarloo project. (The total project concept is shown in Figure 9).

5.1 Cooljarloo Mine And Wet Concentrator

The Cooljarloo Orebody is located 25 kilometres inland from the present coastline and 170 kilometres north of Perth, the capital city of Western Australia.

Proven and probably reserves of 569 million tonnes with an average grade of 3.2% and total content of 18.3 million tonnes of heavy minerals put Cooljarloo in the major deposit class.

The typical heavy mineral assemblage is 60% ilmenite, 4.4% rutile, 9.1% leucoxene, 11.2% zircon and 0.6% monazite. Titanium dioxide contents of the titaniferous feedstock minerals are on average, ilmenite 62%, rutile 96% and leucoxene 25%, although the latter fraction encompasses a very broad range.

Mining is achieved with a low unit cost, bulk tonnage floating dredge operation. The bucket wheel suction dredge supplies sand to a feed preparation system of trommels to remove oversize material and hydrocyclones to remove light weight clay rich slimes. From feed preparation, the sand slurry is fed into a spiral concentrator which relies on differential specific gravities to separate valuable heavy minerals from the silicate gangue.

Treatment is via a three stage series of spirals which produce increasing concentration of heavy minerals with each stage up to approximately 92% heavy minerals in the final dewatered concentrate. The sand and slimes tailings from the concentrator are returned to the dredge pond for disposal. Any material with an SG less than 3 is separated in the cyclones and spirals then returned to the mine as waste.

5.2 Dry Separation Plant

In preparation for dry separation processing, surface contaminants are removed from the heavy mineral grains by several stages of attritioning.

The clean, dry, heavy mineral concentrate is selectively sorted into conductors, (ilmenite, rutile and leucoxene) and non-conductors, (zircon and monazite) by high tension electrostatic separators.