Donald Mineral Sands – Project Overview

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Donald Mineral Sands Pty Ltd (DMS), a fully owned subsidiary of Astron Ltd (ASX: ATR), is currently seeking approval from the Victorian government to develop the Donald fine grained mineral sands deposit in north western Victoria. The project would directly employ 75 people and produce up to 398,000 t of HMC annually equating to a mining rate of 7.5 Mt of ore per annum.

The fine grained planar deposits, often referred to as WIM style deposits, differ both chemically and physically from the more well known Coarse Grained strand type deposits.

In December 1999 an exploration company GDM Pty Ltd acquired both the Jackson and Donald license areas and conducted two major drilling campaigns In 2003 Astron Ltd acquired the rights to both tenements and extracted a bulk sample for extensive metallurgical testing as the start of the feasibility work on the Donald project.

In 2006 the Donald global resource was calculated (in accordance with JORC) to contain 693 Mt of ore (equivalent of 93 years of mining) containing 5.1% heavy minerals. Of this, the indicated resource is 477 Mt and contains 0.3% rutile, 1.1% zircon, 1.8% ilmenite and 1.1 % leucoxene. The Donald deposit is a planar, broad scale deposit covering an area of approximately 50 km NS and 8 km EW. An area of 5 km x 10 km was selected for the project feasibility studies.

Environmental Effects Statement

In December 2005 Victoria's Acting Minister for Planning advised Astron that the Donald mineral sands project required assessment under the Environmental Effects Act and that an EES would be required for government approvals. The project was also classified as a controlled action under the EPBC Act 1999 for which the Victorian EES process is accredited. Eleven studies have been undertaken including: radiation, flora & fauna, noise, air quality, greenhouse gases, traffic & transport, indigenous and non-indigenous cultural heritage, socio-economic, rehabilitation, water supply, surface water & groundwater. Economic modelling and the results of the flora and fauna study resulted in the project team selecting a smaller project area of 5 km x 5 km area to the north for the mine and plant location. This area represents the equivalent of at least 25 years of mining. This area has less vegetation, is closer to existing infrastructure as well as containing a higher assemblage of zircon. Zircon is the primary interest of parent company Astron. Several areas containing flora of both state and national significance could also be avoided by mining in the north.

A feasibility study undertaken by the Donald project team involving a complete review of mining, metallurgy, transport and infrastructure was completed in 2007. An operation including an ore mining rate of 7.5 Mtpa and an associated 13.5 Mt of overburden was studied for both the EES process and the feasibility study. At this mining rate approximately 398 kt per annum of HMC would be shipped to China for further processing and sale by Astron.

DMS has developed a good relationship with the surrounding community by frequently updating them on project progress through newsletters, press releases, community information evenings and opening an office in the area.

Geology and mining

The Parilla sands, host to the heavy minerals are generally found at a depth of 10-15 m lying below the clayey Shepparton formation and above the geera clay. The regional groundwater flows to the north west toward the Murray River and contains several aquifers and aquitards, including the Renmark Group aquifer underlying the ore host materials.

The low permeability of the stratigraphic materials does not allow for wet mining operations at the desired mining rate. Economic analysis of several dry mining techniques indicated that a traditional truck and shovel method is most appropriate for the deposit. However noise and greenhouse gas simulations conducted during the EES process indicated that due to the flat topography and the absence of any other continuous noise source that EPA guidelines would be continuously exceeded using this method throughout the mine.

Further investigation with mining contractors and engineering firms resulted in a revision of the mining method. Shovel and truck configurations will still be used for the overburden removal; however a fit for purpose track hopper and excavator will be constructed for ore removal. This will significantly reduce both the noise level and the greenhouse gas emissions of the project. Ore will be pumped to an MUP (Mining Unit Plant) located ex-pit before being pumped to a fixed position WCP (wet concentration plant) and CUP (concentrate upgrade plant) in the north west corner of the project area.

The planar nature of the deposit allows for a simple progressive mining pit configuration to be adopted. Small pits referred to as cells will move in a zig zag formation through the deposit from north to south. The deposit has been divided in two sections (east and west) with the western deposit to be extracted first. The cell operation allows for continuous backfilling and in-pit tailings dams while also reducing haul distance and clearing for stockpiles. The operation expects to employee 75 personnel full time on a live-in roster basis. Studies conducted by local development organisations have found an employment multiplier of up to 3:1 for similar projects in

similar areas resulting in an overall contribution to employment in the area of over 200 personnel.

Metallurgy and Processing

From results of a 300 tonne bulk sample extracted during 2005 and improved physical separation technologies, DMS has developed a mineral processing route capable of producing mineral sands products of acceptable quality and with high individual mineral recoveries.

Mined material is pumped from an in-pit mining unit into a WCP in which the mined material is upgraded from 5.1% heavy mineral to approximately 90% heavy mineral by removing silt, clay and silica (quartz). From the WCP the heavy mineral concentrate is pumped into a concentrate upgrade plant (CUP), which separates the heavy mineral concentrate into an ilmenite rich magnetic concentrate and a zircon/rutile/leucoxene rich non-magnetic concentrate. Ilmenite rich magnetic material is transported to an Ilmenite separation plant (IPP) for the production of ilmenite product. Non-magnetic material is transported to a mineral separation plant (MSP) for the production of zircon and HiTi-90 products.

The Ilmenite product from Donald contains >55% TiO_2 and <0.1% soluble Cr_2O_3 thereby making it ideally suited for use within the sulphate pigment production route.

HiTi-90 material contains >90% TiO_2 and is suited for use within the welding rod market.

Zircon material produced from Donald is of premium grade quality apart from the uranium and thorium levels, which exceed the industry preference of 500 ppm. However Astron in collaboration with Donald Mineral Sands has developed a process that will reduce the uranium and thorium levels to <500 ppm, thereby making the zircon suitable for the ceramic industry. A pilot plant has been constructed in Bayuquan – China and has operated since August 2007 producing bulk samples from Donald material and others for market evaluation.

Infrastructure

As water is a crucial compnenet for the process the deficit in process plant water supply is expected to be made up from one of two options:

a) A saline groundwater aquifer known as the Avon Deep Lead located 22 km from the project area; or
b) Purchase from the local water authority through savings from the construction and implementation of the Wimmera Mallee Pipeline.

Both options and their associated effects have been studied in the EES and negotiations with the state government and the local water authority are ongoing.

Several Australian port options are still being investigated. A copy of the EES and associated documents can be downloaded from: www.donaldmineralsands.com.au.
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