

2.1 General Description of the Mining Process

2.1.1 Introduction

Twin Pines has developed a mineral sand mining technique using a dragline excavator and/or conventional excavator/dozer trap, conveyor system for materials transport, and land-based permanent processing plants. This mining technique is different from conventional "wet mining", which utilizes a dredge and floating concentrator to mine and process heavy mineral-bearing sands. Dragline mining involves a large crane-like earthmoving machine equipped with a bucket to scoop material. Draglines can efficiently move large quantities of material. A large-capacity bucket swings from cables on the end of the boom, scooping material that is then moved to adjacent areas. Draglines are electrically powered and run by two employees, an operator and an oiler. When mining is occurring measures must be taken to protect the areas adjacent to the mine property. Berms are constructed to ensure that muddy water does not leave the mine property and affect local waterways.

A conveyor system is utilized to transport mined material to the mineral processing plants. The mineral processing plant locations are depicted on Figure 4. The mineral processing plant locations allow mineral processing activities to be located in a central location of the mining blocks, which decreases material transport distance and energy demands. Recycled process water ponds will also be constructed adjacent to each processing plant creating an efficient method for process water reuse and recirculation. Attachment A depicts the Saunders Mine - Process Flow Diagram. The flow diagram depicts the process water and mined materials flow through the mineral processing facility for the proposed mining and mineral processing operation under normal operating conditions.

Mining will commence after the topsoil is removed from the mining area. Once the topsoil removal process has been completed the conveyor system will be installed. The dragline excavator will then excavate and temporarily stockpile the mined material. The material will then be transferred onto the conveyor system for transport to the processing plant. After processing the tailings will be temporarily stockpiled adjacent to the processing plant. The tailings material will then be transported back to the open mining cut via a tailings conveyor system. The reclamation area will then be recontoured, covered with topsoil and revegetated to meet reclamation standards. The operation is a continuous process and while the dragline is operating, backfilling of the cut is occurring as well once the operation gets under way. On the TIAA Mining Block of the proposed mining area, excavator/dozer trap mining method will be utilized, instead of the dragline method, due to the shallower depth of mineral resource.

2.1.2 Mine Progression

The mining sequence will be divided into separate phases, which will be active concurrently within each mining block. The activities are described as follows:

Site Preparation

- Clearing
- Topsoil Removal
- Construction of Permanent processing plants and infrastructure

Mining

- Excavation
- Heavy Mineral Sand Processing