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Expansion Projects

Existing Operations

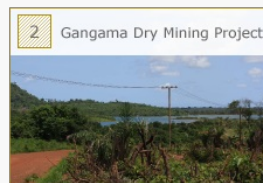
Sierra Rutile operates a well-established mining operation in southwest Sierra Leone, which currently consists of:

- A dredge capable of extracting 1,000 tonnes of ore per hour
- A floating concentrator plant capable of processing 850 tonnes of ore per hour
- A dry mining fleet capable of excavating 500 tonnes of ore per hour
- A dry mining concentrator plant capable of processing 500 tonnes of ore per hour
- A land-based mineral separation plant, capable of producing over 200,000 tonnes per annum of rutile
- A 23MW power plant
- A port and shipping fleet
- Final product storage facilities
- Extensive road and power network
- Engineering facilities
- High-quality on-site accommodations

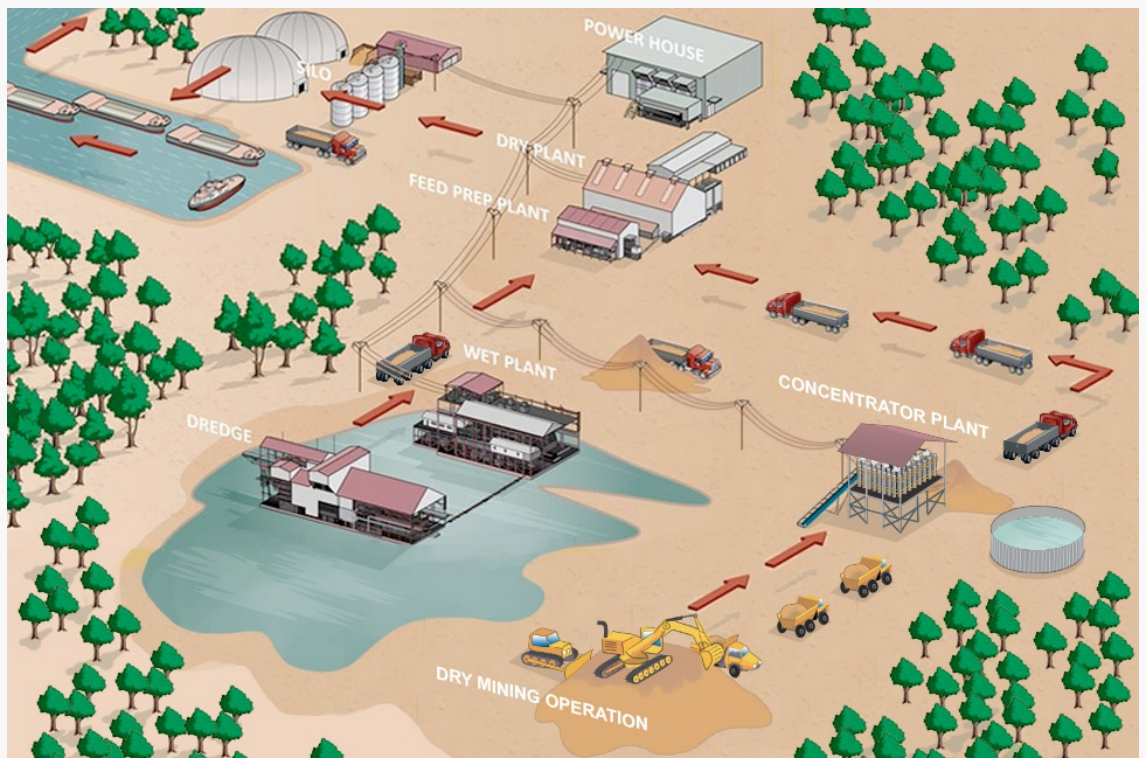
In addition to its extensive physical assets, Sierra Rutile also has a highly skilled and experienced workforce.

- Greater than 95% of the workforce is Sierra Leonean
- Many employees have been with the company for decades
- Significant recruitment from the premier universities of Sierra Leone, due to SRL's status as a leading national employer
- Highly-educated workforce including many Sierra Leonean nationals returning from abroad

Mine Schematic



Mining Process - Flow Chart



Lanti Dredge Mining Process

The Lanti Dredge is a 0.68 m³ electric bucket line dredge capable of mining 1,000 tonnes of ore per hour equating to approximately 7.2 million tonnes of ore annually.

Lanti Dredge and Concentrator Plant

The Lanti Dredge is linked to a wet concentrator plant by a 610 mm diameter pipeline. Scrubbing and screening of the ore takes place on the dredge and de-sliming is completed in the concentrator plant. This process produces a sand fraction (-1mm + 63µm) which then goes through a 3-stage upgrading process to produce a mineral concentrate containing about 70% heavy minerals.

Front-end loaders and 30-tonne dump trucks are then used to move the heavy mineral concentrate from the dredge to the feed preparation plant (FPP).

Lanti Dry Mining

The Lanti Dry Mining operation uses conventional earth moving equipment to mine 500 tonnes of ore per hour equating to approximately 3.6 million tonnes of ore annually.

- The heavy mineral concentrator for the Lanti Dry Mining project underwent its final performance testing and was commissioned successfully in April 2013, having achieved an average feed rate of 522 tonnes per hour ("tph") over a 168-hour period, exceeding the design specification of 500 tph. Production from this newly commissioned plant has also contributed to increased production, culminating in record annual production of 120,349 tonnes of rutile in 2013.

Dry Plant

Before material enters the dry plant, it is processed by the FPP which, involves: surface cleaning of dirty or stained grains in attrition scrubbers, further gravity concentration on spirals, and removal of iron sulphides in a sulphide flotation circuit.

Once in the dry plant, high tension rolls separate rutile and ilmenite (conductors) from zircon and quartz (non-conductors). Induced roll magnets then separate rutile from ilmenite. The non-magnetics are cleaned on electrostatic plate separators, producing a finished rutile product containing 95 to 96% TiO₂. Sierra Rutile's ilmenite typically contains around 60% TiO₂.

The dry process concludes with the screening circuit, which separates the finer industrial grade rutile (IGR) from the standard grade rutile (SGR).

Refurbishment

During 2011 and 2012, significant refurbishment of the existing facilities has been undertaken with the objective to increase both the throughput and efficiency of existing operations. These refurbishments include:

- Complete upgrade of the Wet Plant, including:
 - new rougher, mid and scavenger spirals
 - new de-sliming cyclones
- Upgrades to the Lanti Dredge bucket ladder
- Addition of auto-samplers
- Replacement of product barges
- Expansion of critical spare parts inventory

In April 2013, a planned three-week shutdown to overhaul certain critical components of the existing Lanti Dredge was undertaken. In some cases, this was the first time that a number of these components had been overhauled since the dredge was commissioned in 1979 and it is expected that these overhauls will extend the residual operating life of the dredge. This work was completed on time and with no lost-time injuries. Since the shut-down, there has been a significant increase in the mining rate of the dredge. These enhancements and substantial improvements in process recoveries have contributed to increased production, culminating in record annual production of 120,349 tonnes of rutile in 2013.