



The Way Forward at the QNI BHP Billiton
Materials Handling Facility.
Townsville, North Queensland, Australia.

Steve Carkeet
Materials Handling Superintendent

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Abstract.

Ore Supply manages the purchase and supply of Nickel Ore as a feedstock to the Yabulu Refinery, near Townsville, Australia.

Ore Supply is a unique and dynamic supply chain. Due to weather reliant mining and ship loading and unloading operations, requires specialised vessels.

QNI Limited began importing nickel ore through the Port of Townsville in 1986 to supplement declining supplies from its Greenvale mine in North Queensland. Following the closure of the Greenvale mine in 1992 and the Brolga mine in 1995, QNI has relied solely on importing approximately 3.7 million tonnes per year of nickel ore from New Caledonia, Indonesia, and the Philippines to feed its refinery at Yabulu, 32 km north-west of the Port of Townsville.

Strict compliance for overseas stockpiling and handling of Nickel Ore is monitored by AQIS. AQIS inspect the ore on arrival at Townsville and during unloading and loading into rail wagons where the ore is railed to Yabulu Refinery.

Initially the ore was unloaded by a combination of ship's cranes and a land based container crane equipped with grabs and dumped directly onto the wharf from where it was loaded by front end loaders into rail wagons and hauled to the Yabulu refinery.

This method of unloading was not efficient and involved the double handling of ore. In addition, the stockpiling of ore on the wharf was environmentally unacceptable for two main reasons:

- rainfall run-off could carry ore fines into the harbour, and
- generation of dust from front end loader operations.

QNI's Berth 2 Development was designed to solve these problems by providing an automated materials handling system taking ore directly from ship to train. In addition run-off from the entire operation is contained within bunded areas and then flows or is pumped to settlement and evaporation ponds. Dust suppression systems are installed and used when required.

The QNI Materials Handling Facility was commissioned in September 1996.

The Handling Facility consists of a purpose built grab unloader, a container crane adapted when required for grabbing duties, two travelling wharf

hoppers, a screening/crushing station, five conveyors, a train loading system incorporating a major storage bin and an ore reclaim system.

Ore is unloaded from ships by the two rail-mounted ship unloaders using large grabs which dump into two travelling hoppers which feed the ore onto the wharf conveyor. The hoppers automatically follow the ship unloaders as they move along the wharf. The ore then travels through a transfer station onto a transfer conveyor to a screening/crushing station comprising a vibrating grizzly screen and a crusher.

From the screening/crushing station the ore is conveyed to an elevated 600 tonne capacity surge bin above a train loading facility. If no trains are present or the bin is full, a stockpile conveyor with a shuttling tail diverts the ore to a 28,000 tonne capacity stockpile. A Cat 990 front-end loader reclaims the ore into a hopper that feeds the reclaim conveyor. This conveyor transfers the ore back onto the surge bin conveyor for return to the surge bin.

When train loading is required the shuttling tail of the stockpile conveyor is retracted allowing ore from the surge bin conveyor to be discharged into the surge bin. Trains are loaded by an apron feeder beneath the surge bin which can be controlled to load the wagons manually or automatically.

A water management modelling study was conducted as part of the design of the environmental containment system for wash-down water and run-off from the entire plant and wharf. All the existing drains on the wharf were blocked and a series of kerbs are provided to contain rainfall and wash-down run-off.

Run-off from the wharf and other plant areas is directed to a series of clean-out pits and sumps from which it travels by gravity or is pumped to a central settling pond. These pits are cleaned out weekly to reduce sediment going to the settling pond.

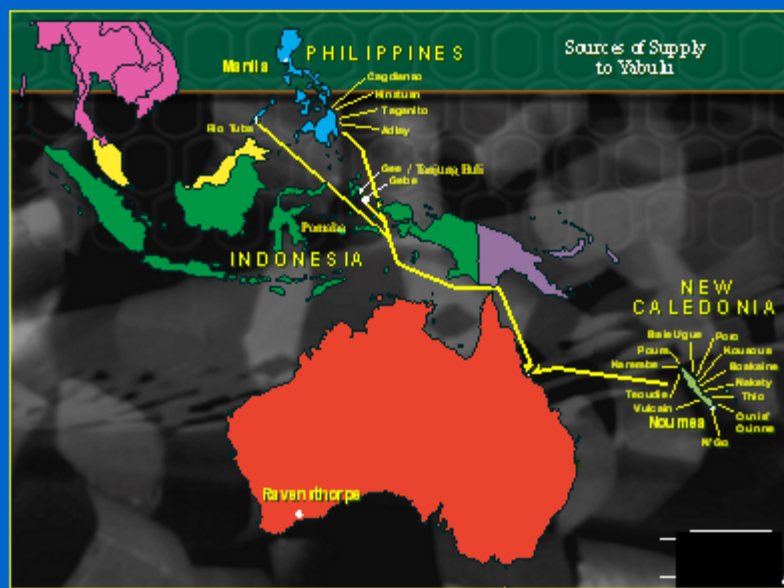
Sediment screens were fabricated and fitted at the drains to also reduce solids entering the pond. Once the drain is full of solids the wash water is diverted to another drain, which is also fitted with a screen.

Trees and shrubs have been planted to enhance the appearance of the facility. All trees and shrubs have an irrigation system, which is watered regularly with the facilities recycle water.

The facility is currently upgrading the water sampling at the evaporation pond. An ISCO bubble flow meter, portable sampler and rain gauge, which records to the flow meter memory which has been installed.

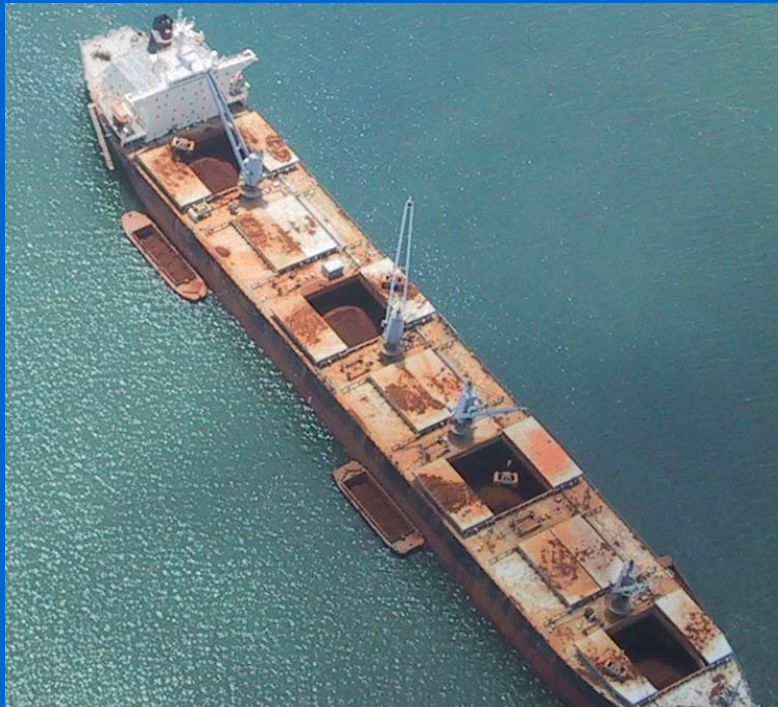
The flow meter level indicator triggers the sampler to start sampling when the pond level starts to overflow and samples are taken for analysis.

Introduction



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Introduction



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Quarantine



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History



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Materials Handling Facility

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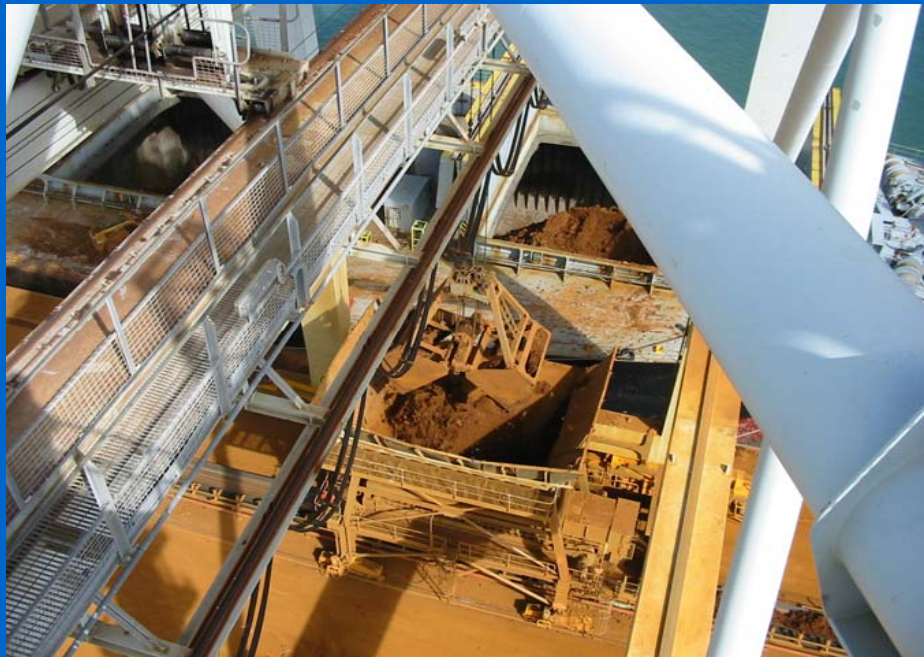


Materials Handling Facility



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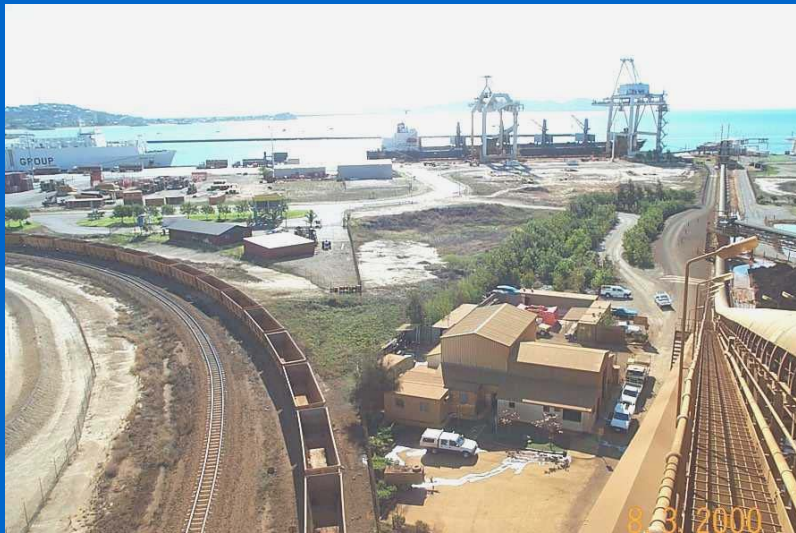
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Vegetation



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Water Sampling



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Questions