

**BOILER  
MASTER**

# A No Man Entry Tank Cleaning Technology System

Designed for large-volume aboveground oil storage tanks

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MASTER**

## Product and Crude Oil Storage Tank Cleaning

### FASTER

#### 1. Rapid Mobilization and Demobilization

##### a. Rapid Mobilization

The process is split into seven separate modules mounted on 20-foot containers that can be easily spread on site and integrated by quick piping systems; allowing quick mobilization, minimum footprint of intrusion and rapid commencement of work progress.

##### b. Rapid Demobilization

Similarly the modular system allows rapid recovery and quick exit.

#### 2. Automatic, integrated continuous process

Without accounting for the built-in hydrocarbon recovery process, the cleaning process of this fully automatic system is up to 5 times faster than manual cleaning. Cleaning is a continuous process.

##### a. Desludging & Cleaning

A selected cleaning media is continuously circulated through the tanks to recover hydrocarbons, remove wastes or sludges, in an around-the-clock process monitored by metering and control instruments.

##### b. Oil Separation

Useful oil is recovered by separating away wastes and sludges during the circulation process and resulting in less water and effort required to clean the almost-empty tank.

##### c. Water Wash and Cleaning Result

An indexed washing pattern is used to completely cover tank interior surface area by cleaning from the top. Again time is gained by the ease and completeness of cleaning by water for inspection.

### SAFER

##### a. Risk Analysis

Risks analyses are carried out together with operators prior to works being carried out, meeting corporate governance and local jurisdictions.

##### b. Tank Nitrogen Blanketing

Nitrogen supplied by a nitrogen generator will be used to protect the tank from flash explosion during the process, allowing tanks and works nearby to perform their routine operations.

##### c. Operators' Health and Safety

This process offers operators an improved working environment and conditions. No staff would be required to be in the tank during cleaning process (manless entry); and all operations are under control by continuous monitoring and automatic shutdown features, ensuring environmental safety. Operators are thoroughly trained on safety requirements, working in cleaner and safer areas.

### GREENER

With almost 95% recovery of hydrocarbons, the wastage and hence disposal requirements are reduced. Using the closed-loop system, there is minimal hydrocarbon emissions to atmosphere. Reduction in logistics and elimination of further separate oil recovery processes lead to lower consumption of water, electricity and air. Indeed the process is designed to meet all internal EHS requirements and provision of a greener tank cleaning process.

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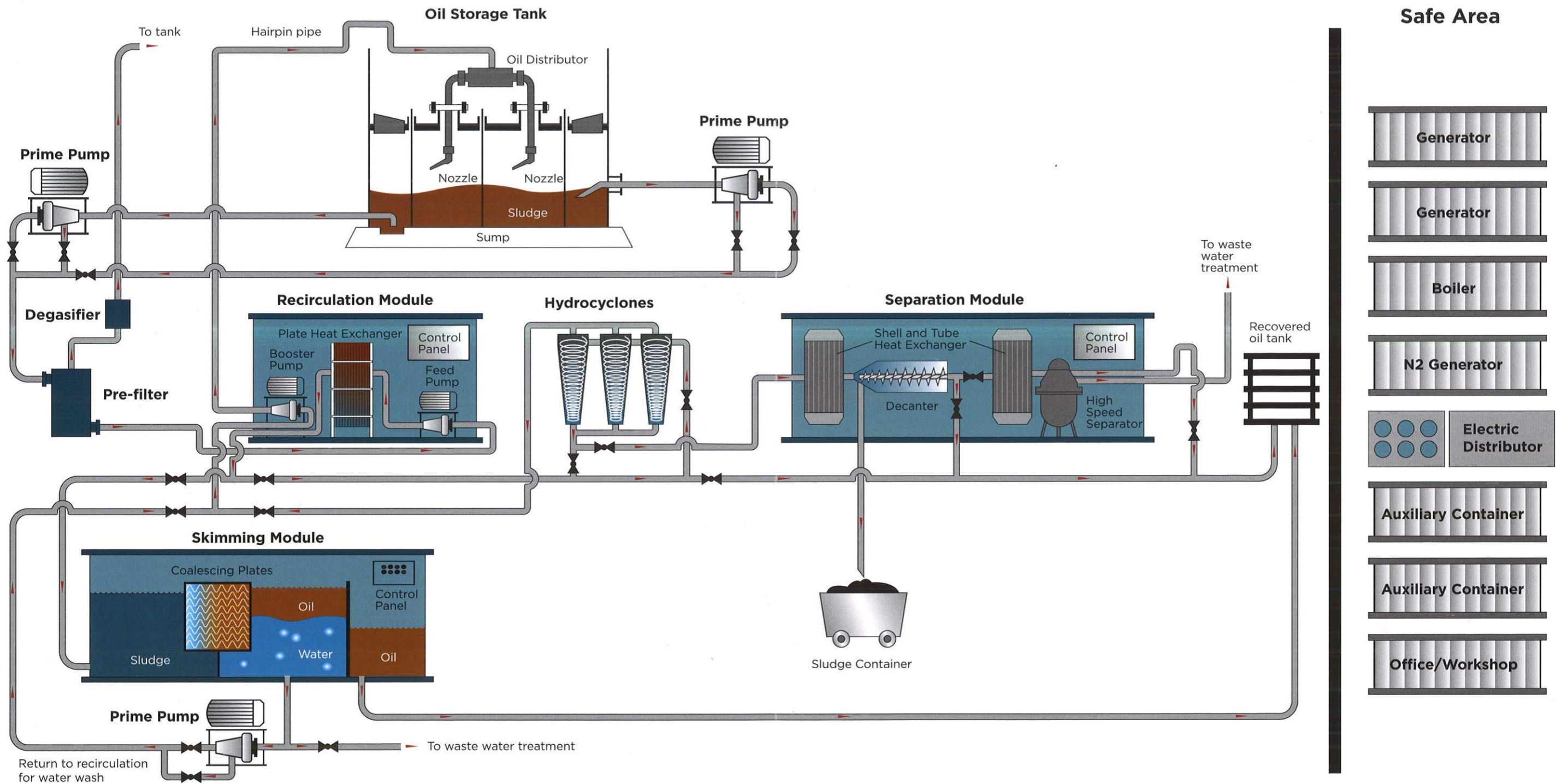
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# Manless Entry Tank Cleaning and Oil Recovery System



## A Faster, Safer, More Economical and Greener Process

Current industry practice requires internals of oil storage tanks to be regularly cleaned and inspected by approved inspectors, usually within 10 years.

Traditional manual cleaning of tanks expose workers to health and safety risks which requires them to enter enclosed and uncomfortable spaces; with huge volume of collected wastes creating downstream problems for disposal.

BoilerMaster uses a patented state-of-the-art tank cleaning technology for crude oil and heavy fuel oil storage tanks. This process incorporates a non-man entry operations with simultaneous recovery of up to 95% of hydrocarbons and therefore waste disposal is minimised.

The process is about 80% faster than conventional labour intensive method, is therefore a safer, faster and greener process.

Tank contents best suited for this cleaning system are:

- (i) Crude oil
- (ii) Heavy Fuel Oil (HFO)
- (iii) Heavy Gas Oil (HGO)
- (iv) Catalytic cracker residue
- (v) Slop oil

Typical tank capacity of up to 200,000 m<sup>3</sup>, for diameters up to 120m can be cleaned using this system.