GLOBAL OIL

GOES

ENVIRONMENTAL SERVICES

# MEMORANDUM MOBILE WATER TREATMENT PLAN

handle a vast number of waste streams with a single unit.

Unit Types

- Flowback/Produced Unit - Capable of treating all water wastes, light oily/solids water, low solid content contaminated crude, and recycling all manners of spec water for reuse. This unit utilizes SCADA controlled chemical and physical treatment that requires only one operator per shift for machine use. GOES consistently meets Indirect Discharge Permit requirements for US States including heavy metals.
- Heavy Solid Content Waste Crude/Synthetic Oil Unit - This unit is designed to treat large quantities of solid and water heavy crude, synthetic oil, and other solid and sand heavy waste volumes. Utilizing proprietary chemical treatment, and refined mechanical separation, this unit can take 60+% solid content crudes and synthetic oils and return <1% BSW oil, and <.5% oil contaminated sands and muds. GOES has successfully recovered synthetic oil from Oil Based Mud for further use to dilute OBM on future projects, or for the use of manufacturing new OBM for our vendors, at a much-reduced price.

The two types of MTU's are capable of being delivered on 18-wheeler trailers, or in ISO containers for easier shipping overseas. Both units require 440 power input and can be priced with lease or purchase option of high efficiency, low audible generators.

## PROCESS DESCRIPTION

As the drilling operations are normally out in the field, GOES technology is based on mobile plant built in 4 different ship containers. Following is a description of the containers and their equipment:

Data Specifications

- The maximum flow of treatment plant is 220/gpm or up to 7,500/bpd, depending on waste
- Working 3 shifts
- 350 days a year
- Plant availability 90%

The treatment process consists of the precipitation of metals in different concentrations, at various stages and different pH's. The processes are:

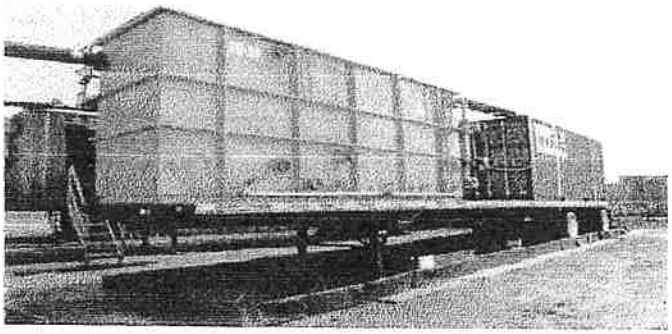
1. Chemical Treatment.
2. Decanting for final stream of clarified water (free of TSS, particle size<50 micron.
3. Dehydration of sludge formed in the previous stages. The requested minimum capacity of sludge production is 3.5 m3 for a planned cycle of 1 hour.
4. Neutralization of the final effluent with carbon dioxide or sulfuric acid.

The process is a full installation of water purification. The plant is installed on 4 different flatbeds to be mobile as the one shown in the picture

## 2.1. COAGULATION-FLOCULATION

The first trailer contains a 20 ft. maritime container and a chemical mixer; the dimensions and engineer drawings are attached in the next section.

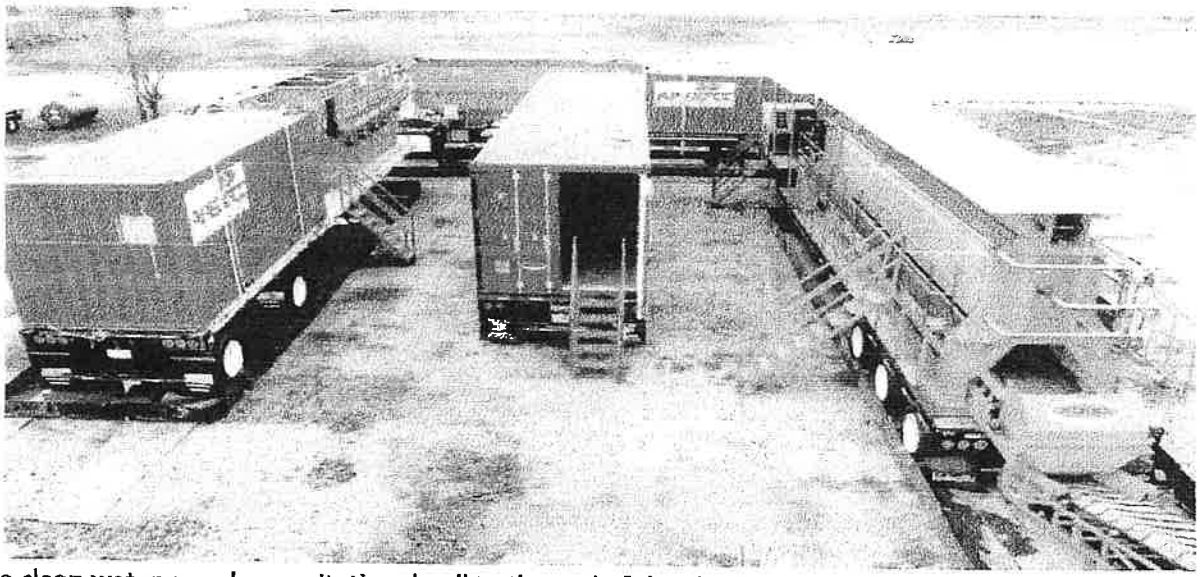
The chemical additions are based on Ph and redox levels that are set and controlled by the SCADA, being fully automatic.



## 2.2. LAMELLAR CLARIFIER

The next step for the treatment is to separate the solids precipitate in the chemical mixer from the clean water. This step is done in a lamellar clarifier, of which dimensions and drawings are shown in the next section.

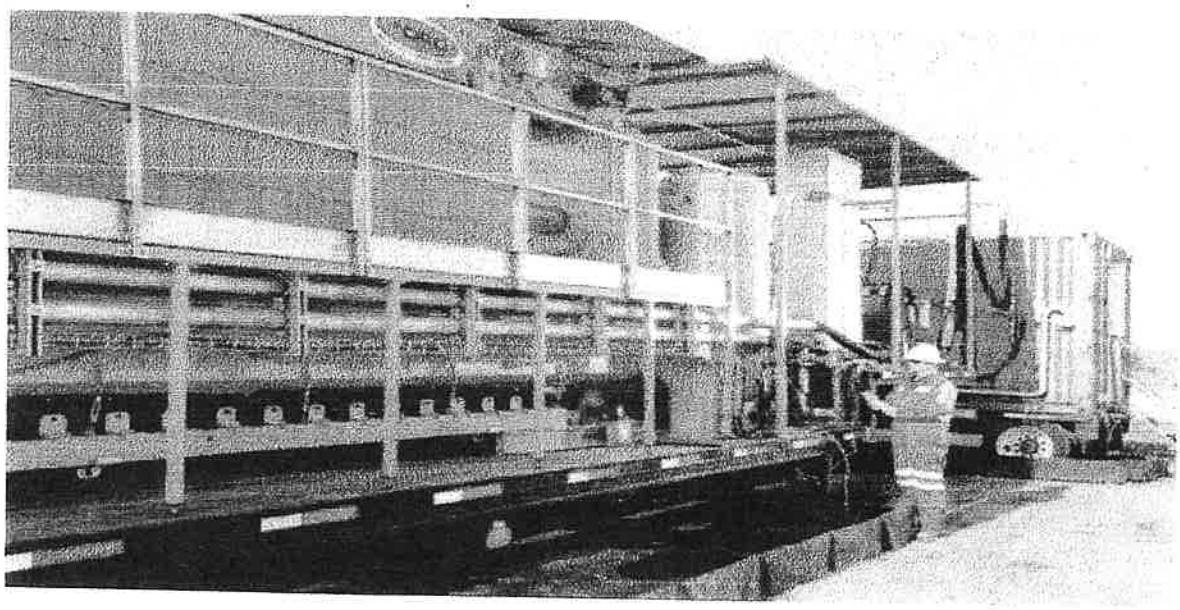
The clarifier contains a series of lamels that helps to improve the decantation process. Once the solids hit the lamels, they fall into a conic section. The decanter has two different conic sections, to improve the distribution of the sludge. At the bottom of each cone is a purge control electrovalve directly connected to the SCADA. Both purges open and close automatically for a certain time that can be set, depending on the number of solids generated, to be lower or higher in seconds.



The clean water goes by gravitational pull to the end of the clarifier where there is a chamber that has a pH soda to control the pH of the effluent. There is also the possibility of chemical addition in this chamber in case the pH requires adjustment. This addition is also fully automatic and controlled by the SCADA. This chamber contains as well a turbidimeter to monitor the efficiency of the treatment. Finally, there is the level control and alarms, to avoid any kind of flooding or spill due to an over flow.

pneumatic pump that connects this tank with the filter press.

The press filter is made up of a set of channeled plates covered with filtering cloths and placed in a vertical position that juxtapose and strongly support each other with hydraulic screws disposed at the extremes of the battery. The sludge is pumped into the filter by a pneumatic pump and through some communication holes situated in the center of each plate. The fluid occupies the space between the plates



The filter press is operated by a hydraulic cylinder that submits the sludge between the plates at a high pressure. The dehydration is produced by separating the water that is filtered through the pores of the cloth that covers the plates. Once the press reach certain pressure the filter is finished and the dehydration of the sludge is accomplish. The filter then is open automatically and the cakes fall down into a conveyor that discharges in a final deposit.

Filter press specifications

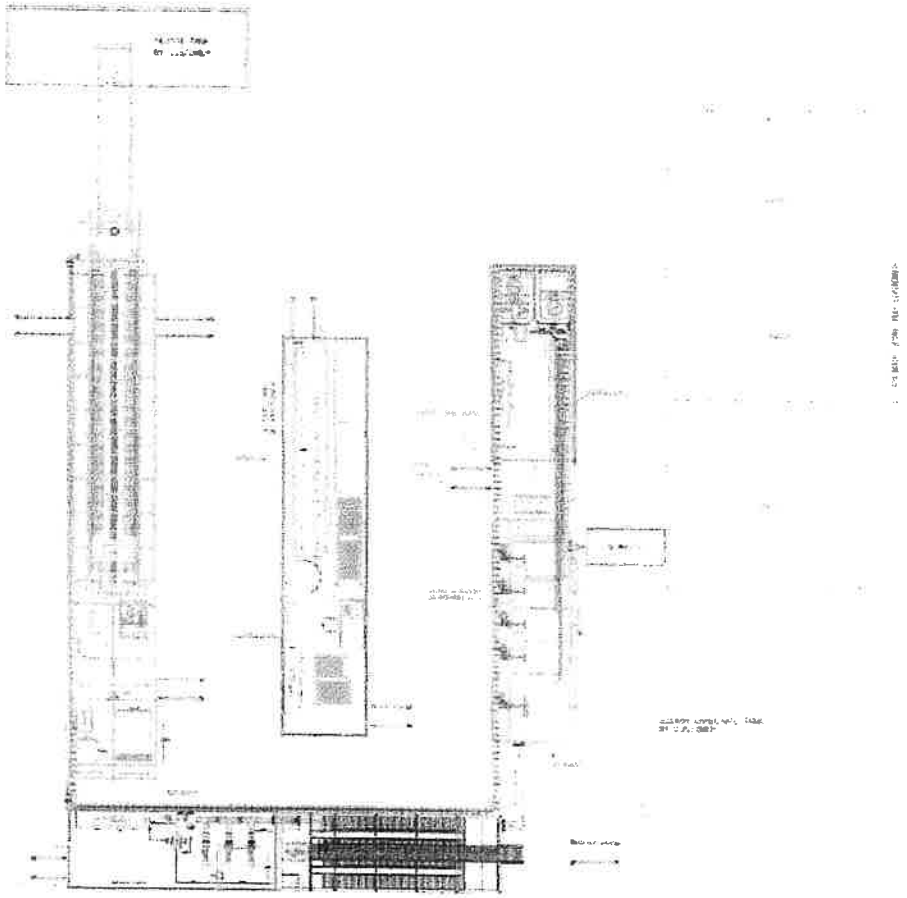
- 115 plates
- 3.5m3 total volume of cakes
- 10 meter conveyor
- Additional mobile conveyor 10 meter.

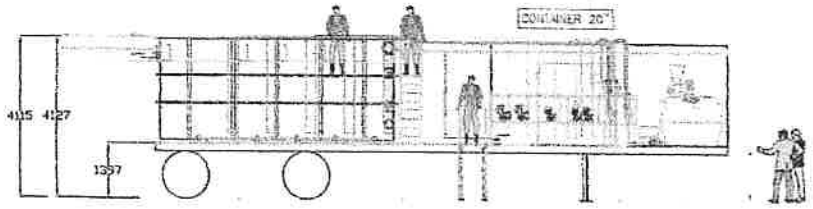
The water recovered from the filter press is recirculated to the entry of the clarifier.

The filter press is fully automatized and is controlled by the SCADA. The program is design to make a complete cycle (close the plates, reach the correct pressure, open the plates and start the conveyors) The fourth trailer is a 40 ft maritime container divided into two different compartments. One of them is a little office with the SCADA and the main electrical box and PCL panel. The other one is an empty space to store all the auxiliary equipment needed for the operation of the plant. (Stairs, catwalks, pipes connections, wirings, mobile conveyors etc.).

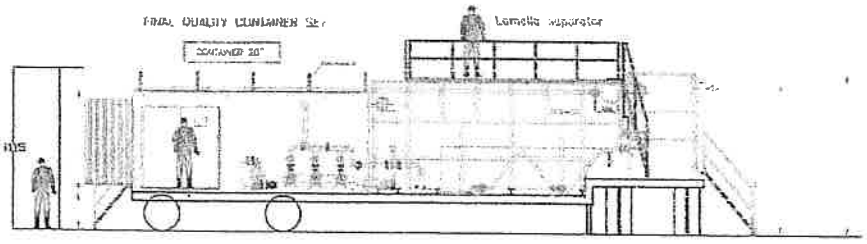
The four trailers are connected by easy fast-connecting wiring and piping. The entire plant is designed to be set up in less than a day and to be easy to move. The plant contains the latest technology in the

## BASIC ENGINEERING SPECS DRAW

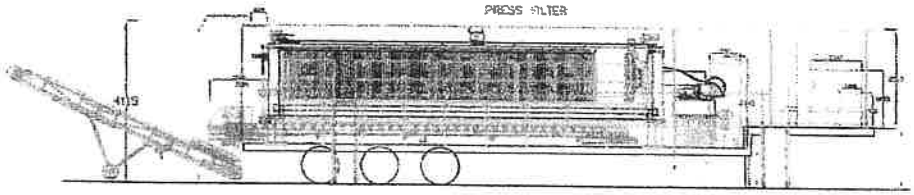





DROP DECK DECANTER




ALZADO DROP DECK PRESS FILTER

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