



This equipment package includes descriptions of the process lines, the technologies used, and the overall equipment configuration. Processing parameters and conditions are presented in summary form. A process material balance and a list of consumables for a specific process line must be developed through laboratory testing based on the information provided by the customer in the technical specification.

COARSE TREATMENT OF DRILLING SLUDGE AND OIL-CONTAMINATED SOIL



Mobile configuration: Each plant module may be fitted with a semitrailer of suitable load capacity for transport on public roads. The plant may also be fitted with equipment for unloading some modules from their transport vehicles during operation.

Time required to prepare the equipment for transport: 1 day.

Stationary configuration: The equipment is supplied with the utility connections needed to link the modules, taking into account possible placement constraints at an industrial site. No transport vehicles are included, but all modules remain mobile.

Time required to prepare the equipment for transport: 2 days.



Treating soil contaminated by oil or petroleum-product spills, and cleaning, decontaminating and oxidizing drilling sludge, are major challenges in industrial environmental management.

This coarse-treatment configuration combines three mobile modules (5, 11 and 12) into one process line for waste consisting mainly of soil. The process comprises four treatment stages.

MODULE 5 — SOIL PREPARATION FOR TREATMENT

Treatment begins in Module 5, which prepares a pumpable slurry from bottom sediment and soil excavated from a sludge lagoon. The receiving and feeding unit crushes and heats the material, screens out stumps and boulders, and feeds it by open screw into an active drum 2 m in diameter.

Steam-jet hydrocavitators and acoustic systems operate in the active zone, while a blending component is added to the feed. Their combined action liquefies hydrocarbon clumps and washes stones. A pump transfers the prepared material to Module 11.

MODULE 11 — SOIL CLEANING BY SOLVENT EXTRACTION

Module 11 is similar in design to Module 5 and provides an additional soil-treatment stage. Thickened soil from Module 5 enters its receiving unit automatically. The material is then washed with special solvents in a horizontal extractor.

MODULE 12 — ACOUSTIC TREATMENT OF SOIL

Module 12 completes treatment of soil and drill cuttings. Thickened material from the Module 11 conveyor enters an acoustic disintegrator, where an intense acoustic field separates residual hydrocarbons from the soil. The hydrocarbons then form an emulsion with water.

The emulsion and soil then undergo combined hydrocavitation and acoustic treatment using acoustic emitters and steam-jet hydrocavitators. The washed soil is discharged in thickened form by screw conveyors. Water flows by gravity to either a recirculation tank or process-water treatment.

TYPES OF WASTE TREATED

Drilling fluids; drilling sludge; unoxidized drill cuttings; aged oil sludge with high concentrations of asphaltene-resin-paraffin deposits; and oil-contaminated soil.



EQUIPMENT CONFIGURATION		
Module	COARSE TREATMENT OF DRILLING SLUDGE AND OIL-CONTAMINATED SOIL	
Module 5	6.5 t — Soil preparation for treatment (heating and blending oil-contaminated soil)	
Module 11	6.2 t — First-stage soil cleaning (solvent washing)	
Module 12	6.0 t — Second-stage soil cleaning (acoustic removal of hydrocarbons)	
Rated throughput: <i>Measured at the outlet</i>	<i>Soil and drill cuttings</i>	8 t/h
Feed composition accepted for treatment:	<i>Hydrocarbons</i>	No limit
	<i>Water</i>	No limit
	<i>Soil</i>	Predominant
Utility requirements at maximum processing load:	<i>Electric power</i>	30 kW
	<i>Steam</i>	900 kg/h
Consumables (indicative values, subject to confirmation):	<i>Blending components</i>	7 kg/t
	<i>Solvents</i>	7 kg/t
	<i>Water</i>	5%
Achievable parameters for treated hydrocarbon concentrate:	<i>Mechanical impurities</i>	0.5%
	<i>Hydrocarbons</i>	0.05–0.1%
Achievable parameters for treated soil:	<i>Oxidation of washed solids</i>	100%
	<i>Removal of water-soluble components</i>	100%
	<i>Hydrocarbons</i>	0.035%
Achievable parameters for treated water:	<i>Hydrocarbons</i>	350 mg/L