



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.

CLOSED-LOOP DRILLING WITHOUT RESERVE PITS



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.



The existing operating modes of this two-module line support closed-loop drilling without reserve pits or structural modifications. The line treats drilling sludge and recovers drilling-fluid components, reducing the need for fresh make-up fluid.

At a drilling site, thickened drill cuttings discharged from the drilling-fluid cleaning unit retain some drilling fluid as moisture. Freshly surfaced cuttings can remain chemically reactive because they have had little contact with atmospheric oxygen, and their water-soluble constituents may exceed permissible limits. Fresh water—or liquid hydrocarbons when oil-based drilling fluid is used—is continually added to replace fluid losses.

Modules 6 and 7 can be placed at the wellsite to wash and oxidize cuttings. Module 7 discharges thickened, fully oxidized cuttings whose water-soluble constituents meet applicable limits. Module 6 produces treated water containing drilling-fluid additives recovered from the cuttings and, when oil-based fluid is used, a separated hydrocarbon fraction. The recovered water or hydrocarbons can be reused to prepare drilling fluid.

Each treatment stage is equipped with an acoustic system. The acoustic field accelerates the dissolution of drilling-fluid and cuttings components in water and promotes oxygen transfer from air into water up to saturation. Cuttings pass between stages in thickened form, reducing residual chemicals in the treated solids and allowing the washed cuttings to oxidize completely. A self-cleaning acoustic filter removes colloidal suspended solids from the liquid.

MODULE 6 — REMOVAL OF HYDROCARBONS FROM SEDIMENT AND SOIL

Module 6 receives drill cuttings at the start of the line. It has two stages for the solids and two for the liquid fraction. Thickened solids pass through hydrocavitation treatment and, at the second stage, a vertical extractor with special reagents. The liquid fraction undergoes two stages in a hydrocavitation separator; the separated hydrocarbon and water fractions are collected in tanks for pumping. The thickened solids move by conveyor to Module 7.

MODULE 7 — SEDIMENT SETTLING AND DEWATERING

Module 7 receives the thickened cuttings from the Module 6 conveyor. An acoustic disintegrator treats them in an intense acoustic field. Two subsequent hydrocavitation stages complete the oxidation of the cuttings.

TYPES OF WASTE TREATED

Drilling sludge; drilling fluids; and unoxidized drill cuttings.



EQUIPMENT CONFIGURATION		
CLOSED-LOOP DRILLING WITHOUT RESERVE PITS		
Module		
Module 6	12.0 t — Removal of oil products from sediment and soil (integrated sediment treatment)	
Module 7	10.5 t — Sediment settling and dewatering (water treatment and final sediment treatment)	
Design processing capacity: <i>Treated output</i>	<i>Soil and drill cuttings</i>	3 t/h
Characteristics of waste 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>	35 kW
	<i>Steam</i>	600 kg/h
Consumables (indicative values, subject to confirmation):	<i>Demulsifiers</i>	250 g/t
	<i>Flocculants</i>	500 g/t
Achievable parameters for treated hydrocarbon concentrate:	<i>Water</i>	1–5%
	<i>Mechanical impurities</i>	0.1–0.5%
	<i>Hydrocarbons</i>	0.05–0.1%
Achievable parameters for treated soil:	<i>Degree of oxidation</i>	100%
	<i>Removal of water-soluble components</i>	100%
	<i>Hydrocarbons</i>	0.0005%
Achievable parameters for treated water: <i>May be reused to prepare drilling fluid</i>	<i>Hydrocarbons</i>	5 mg/L