BUVOCA

Case study

# Equipment for collection, treatment, and recycling of oil sludge, treatment of contaminated soils

# Modular Design

**Patent protected Modular Design:**

- High availability
- Scalable and expandable
- Advanced technology
- High profitability (very low production costs)

# About the Company

Scientific and Production Association BUVOCA is a pioneering company that specializes in equipment for collection and recycling of oil-slimes, drill cuttings, used mixed oil products and used lube oils.

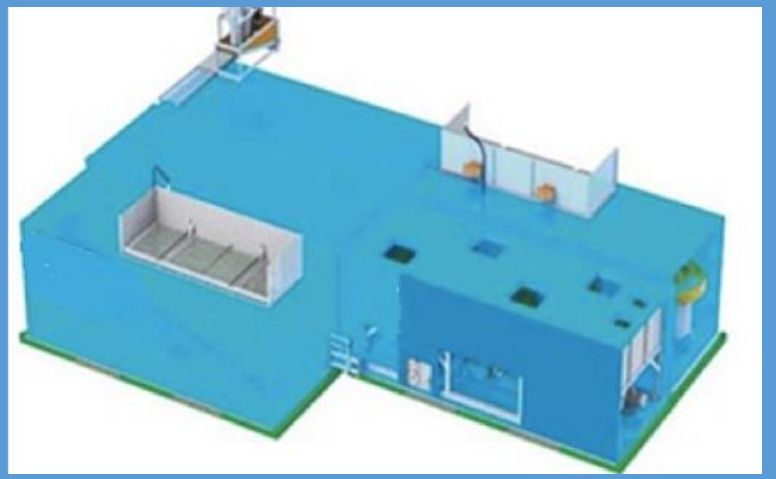
We have our own extended staff of production engineers and designers. When required, we collaborate with leading scientific organizations to meet our clients' demands. Our company designs and manufactures equipment for mass production as well as equipment for specific applications by individual order.

Our company is certified in accordance with ISO 9001:2008. All our products have necessary compliance certificates, while some of them have already undergone or are undergoing accreditation for industrial safety and commercials production.

Most of our unique developments are patented. Our products are used by majority of large oil-producing and servicing companies around the globe.

# Oil-sludge and oil-contaminated soil treatment units

- The units are capable of treating oil sludge and oil-contaminated soil regardless of percentage of water, hydrocarbons and mechanical impurities.
- The equipment can work both with liquid and solid oil sludge, outputting refined soil, water and separated oil products.
- The units are available with capacities from 4 to 40 m3/hour, for liquid, solid or mixed types of oil sludge.
- The patented technology of the variable geometry jet apparatus, installation provides unique technology of washing the soil with water to inaccessible to other technologies indicators 400-500 ppm (0,04-0,05%) residual oil content. In this installation separate the washed soil, unloading it in vehicles or containers of solid waste, and carry out a rough separation of colloidal water-oil phase. If necessary, due to the use of our water treatment units, can be made fine purification of water and hydrocarbons to the requirements of any environmental standards.
- The unit can comprise from 1 to 6 containers, depending on type of material to be processed of requirements. Time required to set up the unit on site is 1 to 2 days.



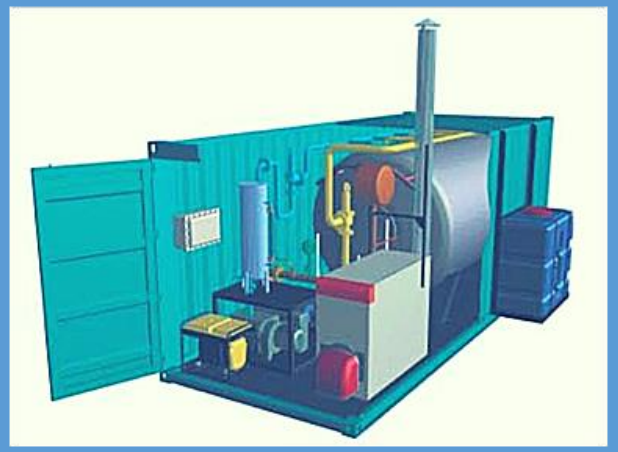
# Gravidynamic Separators

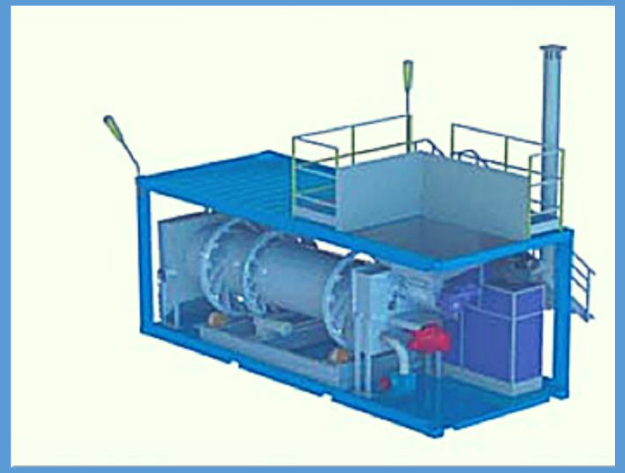
- Gravidynamic separators are designed for separation of two liquids having different densities and existing in the form of emulsion.
- Use of GDS units is the most cheap and simple method for separation of non-stable emulsions of water with oil products.
- Normally, GDS units are used to separate mixtures of hydrocarbons or vegetable oils with water. Main fields of application: removal the lube oil and oil products from waste water, scavenging and reclamation of washing and process fluids on machine-building and repair plants, collection and dehydration of oil products, including operations of tank cleaning and spills removal.
- The standard GDS units are available with capacities 1, 2, 4, 5, 10 and 20 m3/h. Production of optional GDS separator with any other capacity is possible by order. Moreover, the GDS separator of 2nd generation in which prismatic bottom of special design allows removing sand, chips and other mechanical impurities from the fluid

# Thermo-Destruction Unit

- Thermo-destruction unit is designed for continuous thermal utilization of oil-sludge with extremely high content of mechanical impurities, black oil-contaminated soil, drill cuttings and oily wastes produced during accidental spills of crude oil and oil products.
- The only drum-type furnace in the world mounted in 20 ft. container.
- This unit has no analogs on the market since it is mounted completely in standard 20 ft. container and can be relocated from one site to the other and put into operation within one day. Unit capacity is 500 to 1500 kg/h.

# Unit for Removal Bound Water





- The RBW unit allows removing water from some liquid oil products, including watered black oil, used mixed oil products and oil-slimes.
- The evaporation process is performed under vacuum condition, enabling high efficiency with low expenses. Average prime cost of dehumidification of black oil grade M-100, from humidity value 25% to 0.5% is about $10 per ton.
- The use of URBW is the only way to remove bound water from hydrocarbons without use of demulsifying agents or other chemicals.
- The RBW unit is mounted in 20 and 40 ft containers, in which reservoir, boiler with burner, diesel-generator set (optional), vacuum pump and transfer pump are located.
- The most of equipment components are imported. E.g., boilers, burners and vacuum pumps are delivered from Italy.
- The evaporation process is performed under vacuum condition, enabling high efficiency with low expenses, and temperature of black oil or used mixed oil products normally does not exceed 55$^{o}$C, improving operational safety of the unit.
- The RBW unit is manufactured in vacuum reservoir for 10, 20 and 40 m3 of product.

# Technology for cleaning oil contaminated ponds

Oil spill clean-up technology that applies the polymer foam HYPERSORB has been developed by Buvoca. Its principal competitive advantages are as follows:

- High efficiency of adsorbing of the polymer foam;
- Mobility, fabricability and low energy consumption;
- The polymer is environmentally friendly, it can be safely used even in nature reserves (hazard category 4);
- Technological effectiveness of the process of regeneration of absorbed oil products.

The productive capacity of the apparatus is 80 M3 of foam per hour, which corresponds to absorption of 160 to 240 tonnes per hour of oil products. The process of saturation of the oil product by foam takes from 5 to 22 mins. In the optimal variant the foam absorbs from 80 to 120 parts of oil product per 1 part by weight, i.e. it is 3-4 times more effective than the best, widely used domestic and international brands of absorbents.

Regeneration is at a pressure of 0.1-1.00 atm. 95-98% of the absorbed oil product is separated from the polymer by extrusion. The remaining polymer can be concreted, burnt as a solid fuel, or biodegraded.

Due to the properties described, the HYPERSORB polymer foam can be used to quickly absorb and neutralize spills of flammable, volatile and, especially, highly toxic liquid.

An important feature of the HYPERSORB- its ecological safety , the ability to regenerate the collected quantitative extraction of products in calenders, presses, centrifuges or other methods (Rogge ~ 1 ... 2 kg /cm2). These properties combined with ease of recycling of the residue (0.5 ... 2 wt.% Of the collected product) incineration, chemical destruction (dissolution in acid or alkali) or complete biodegradation.

Low cost of HYPERSORB production with high capacity combined with its unique properties, the availability of domestic raw materials for the polymer production and standard solutions of fixed and mobile foam generators should open the way for the widespread introduction of the foam in the national economy.