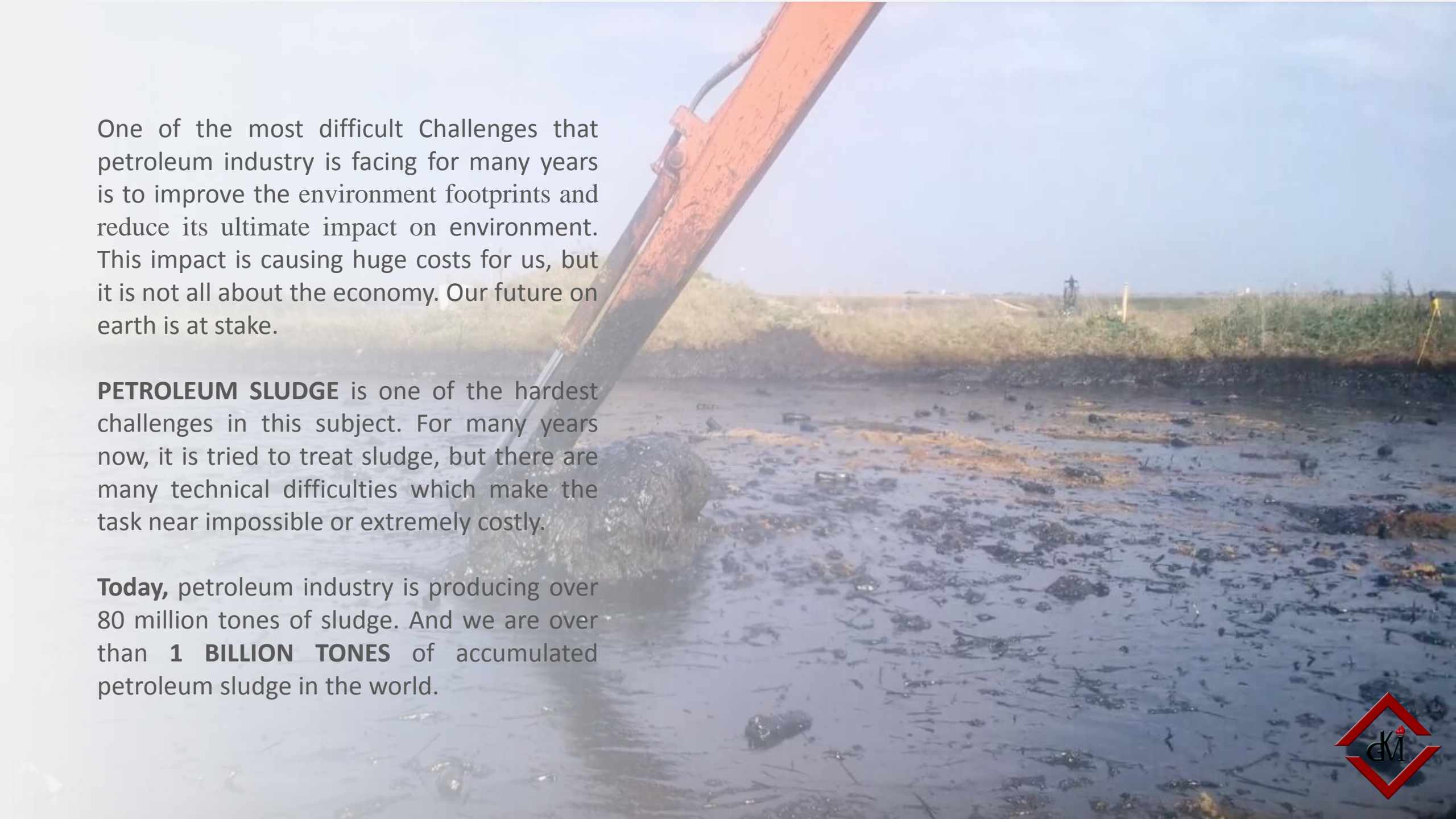


An aerial photograph of an industrial facility, likely a wastewater treatment plant, featuring several large white cylindrical storage tanks, a large rectangular pond, and various industrial buildings and structures. The scene is set in a flat, open landscape under a clear sky.

Sludge

Transmutation

By KGM HOLDING GROUP
November 2019



One of the most difficult Challenges that petroleum industry is facing for many years is to improve the environment footprints and reduce its ultimate impact on environment. This impact is causing huge costs for us, but it is not all about the economy. Our future on earth is at stake.

PETROLEUM SLUDGE is one of the hardest challenges in this subject. For many years now, it is tried to treat sludge, but there are many technical difficulties which make the task near impossible or extremely costly.

Today, petroleum industry is producing over 80 million tones of sludge. And we are over than **1 BILLION TONES** of accumulated petroleum sludge in the world.





PETROLEUM SLUDGE, ITS TREATMENT AND DISPOSAL

Petroleum Sludge:

Description

In general, oily sludge is a recalcitrant residue characterized as a stable W/O mixture of water, solids (clay), PHCs, and metals. The stability of W/O mixtures depends mainly on a protective film that inhibits water droplets from coalescing with each other. The pH value of oily sludge is usually in a range between 4 to 8 and its chemical composition varies over a wide range, depending on crude oil source, processing scheme, and equipment and reagents used in refining process.

Generally, the refinery sludge contain oil content about 60%.



Petroleum Sludge:

Generation

Oil Sludge is generated during: Drilling, Transportation, Storage and Refining.

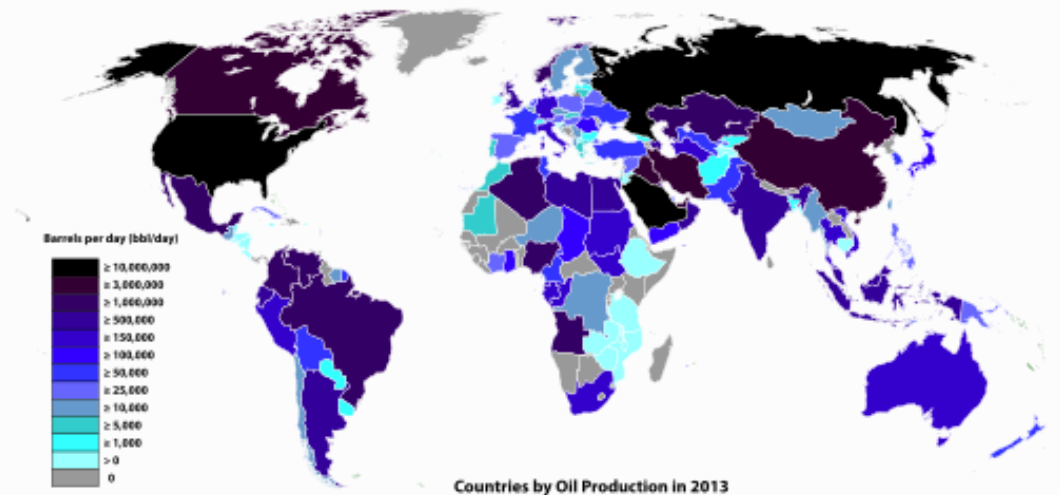


A variety of oily sludge sources exist in downstream operation, including:

1. slop oil solids emulsion;
2. heat exchange bundle cleaning sludge;
3. residues from oil/water separator, such as the American Petroleum Institute (API) separator, parallel plate interceptor, and corrugated plate interceptor (CPI);
4. sediments at the bottom of rail, truck, or storage tanks;
5. sludge from flocculation-flotation unit (FFU), dissolved air flotation (DAF), or induced air flotation (IAF) units;
6. excess activated sludge from on-site wastewater biological treatment plant



Global status:



Due to the fact that there simply haven't been many good options for dealing with this type of waste, it has been accumulating at an alarming rate.

It is estimated that more than 80 million tons of oily sludge can be produced every year and more than 1 billion tons of oily sludge has been accumulated worldwide. The general ratio for production of petroleum sludge is about 1.5% to 2.5% of annual oil production.

It is also expected that the total oily sludge production amount is still increasing as a result of the ascending demand on refined petroleum products worldwide.

For example, according to statistics, China's annual oil sludge production had reached nearly 3 million tons, and only three major oil fields in Daqing, Shengli, and Liaohe produce more than 2 million tons of oil sludge each year.



Usual methods:

Processing-Traditional

All of the more traditional methods for waste disposal and treatment don't really work on oil sludge:



Typically, oil sludge can't be incinerated because it contains too much water, making it almost impossible to incinerate.

In most of the cases, it is not cost effective to apply thermal treatment because the waste contains too much water and needs a lot of heating value to boil it. The oil sludge can't be filtered because the solids content is too high, and attempts at filtering will just clog the filtration systems.

The oil sludge can't be pumped to a waste water treatment facility because of the high viscosity oil and solid content, and the waste has too high COD/BOD.

Because it is a liquid, the oil sludge can't be disposed of, in traditional hazardous waste landfills, only solids can go to landfills.



Processing-Traditional



Studied and Commercialized Processes include 2 stages:

- Physical remediation
- Chemical remediation
- Biological remediation



Sludge treatment Methods- Reclamation

The various technologies for oil recovery and redemption of the crude sludge include chemical treatments, various distillation processes, cracking, hydro-treating, solvent treatment and bioremediation. Some of the conventional methods of sludge treatment are as follows:



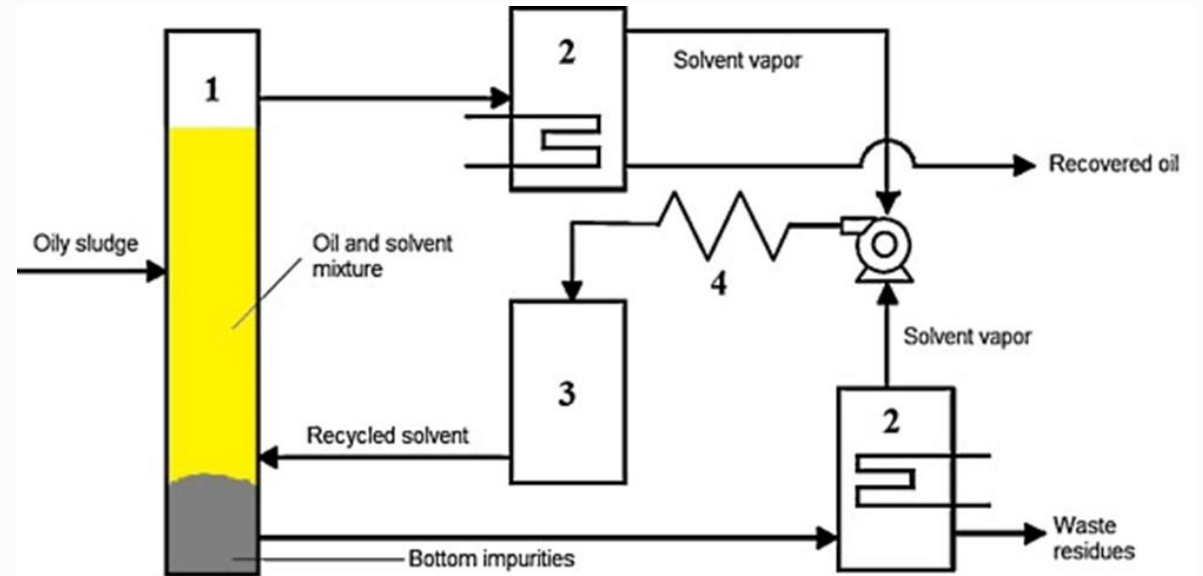


Reclamation- Ultra high temperature gasification

In this method, thermal oxidation of sludge is carried out. The sludge is heated to a very high temperature (1000o C) using plasma arc without oxygen. The sludge is converted to pyrogas by this method and this can be used as fuel.

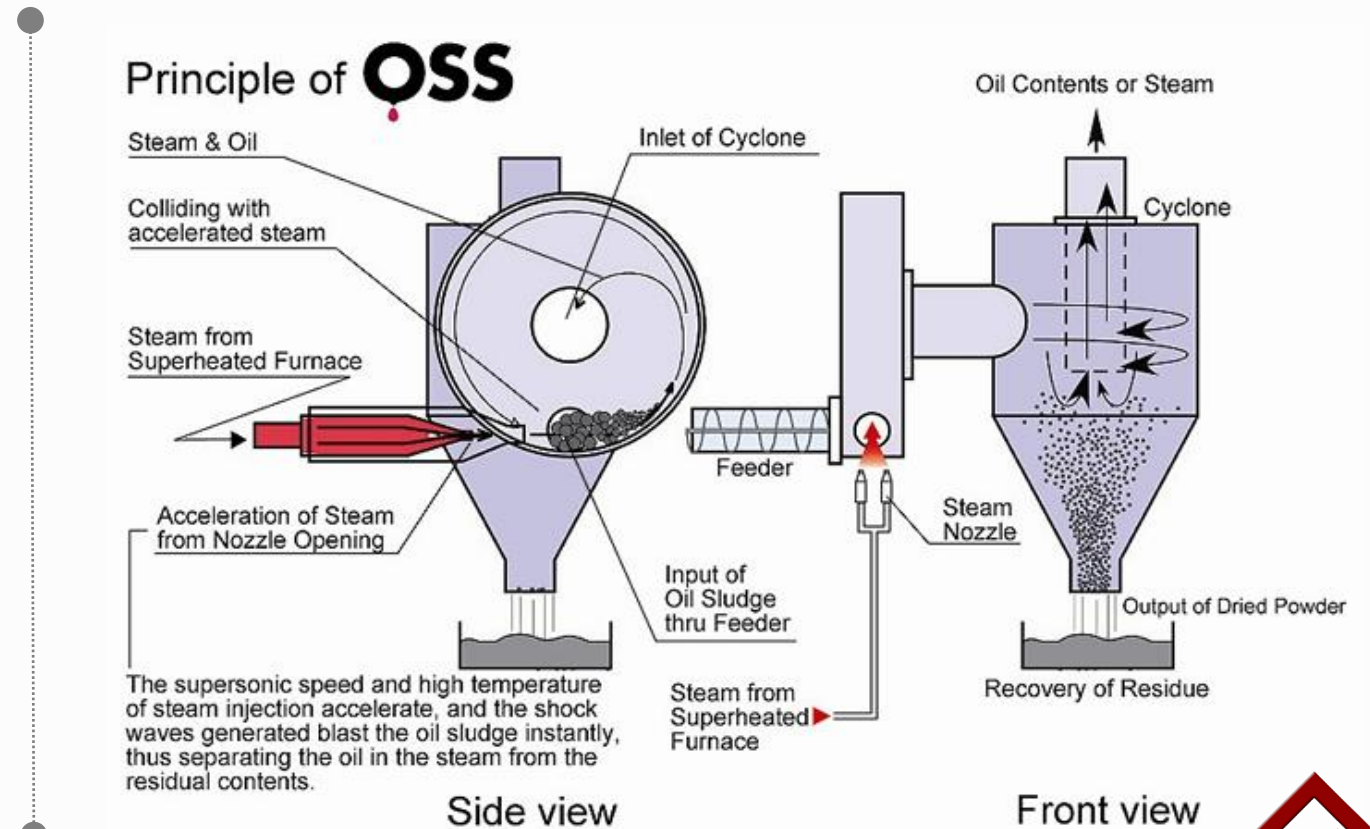
Reclamation- Solvent extraction method

Various solvents are used in this method, which are able to break down complex molecules present in the sludge into their basic constituents - water, crude oil and particulate. This method requires mixing and agitation apparatus. Sludge has waxy and non waxy (asphaltene) organic components along with salt, oxides and other inorganic materials. These may be dissolved by selecting appropriate solvent.



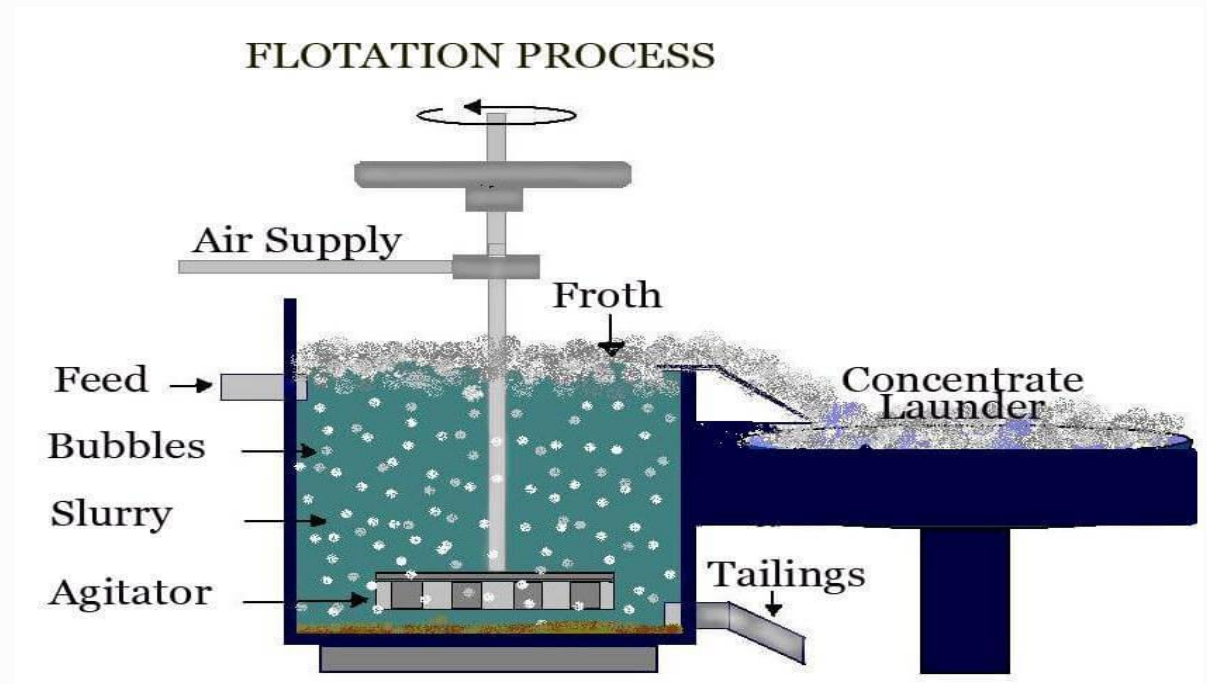
Reclamation- Oil sludge separation using cyclone

By this method, oil is recovered from the oily sludge and residue is separated.



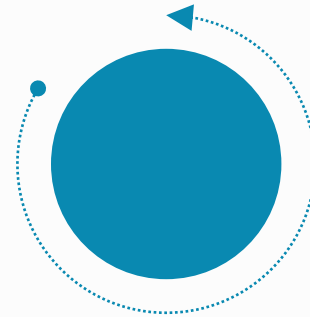
Reclamation- Froth flotation method

This method involves the capture of oil droplets or small solids by air bubbles in an aqueous slurry followed by their levitation and collection in a froth layer.



Sludge Treatment Methods: Disposal

Oily sludge after the recovery of oil should be disposed of by a number of methods such as incineration, stabilization/solidification, oxidation and biodegradation



Disposal

Stabilization By this method, contaminants are immobilized by converting them into a less soluble or less toxic form (stabilization). The contaminants can be encapsulated by creating a durable matrix (solidification). Inorganic wastes are easily disposed of by this method. This method is less compatible with organic wastes.

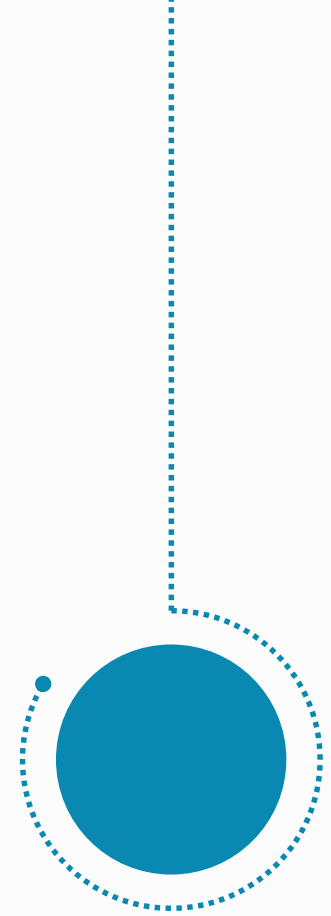
Incineration In this method, complete combustion of oily wastes is carried out in presence of excess air and auxiliary fuels. The commonly used incinerators are rotary kiln and fluidized bed incinerator. The combustion temperature range for rotary Kelvin is 980-1200o C and residence time is around 30 min.



Disposal

Oxidation

Oxidation treatment is useful method to degrade a number of organic contaminants through chemical or other oxidation processes. Chemical oxidation is carried out by adding reactive chemicals into oily wastes, which oxidize organic compounds to carbon dioxide and water or transform them to other non-hazardous substances such as inorganic salts.



KGM SLUDGE TRANSMUTER TECHNOLOGY



petroleum sludge is one of the biggest environmental and economic disasters in petroleum industry.

Our sludge recovery technologies provides a new series of catalysts to recover sludge by combination with fuel oil and produce new fuel oil from it. This technology helps you to crack and decompose water content and chemically mix it with Carbon chains of petroleum sludge and produce fuel oil with an acceptable quality.

Condition:

These catalysts are generally in form of powder and it's completely biodegradable with no special toxin effects on nature and environment.

These technology can work in almost every kind of sludges. We design the arrangement of equipments for using the tailor-made catalysts. In low clay content sludges, we easily can settle clay and remove it from sludge within the process. But in high clay content sludges, we need to remove clay with other usual methods, then we can use transmuter catalysts to perform hydration reaction and atomizing water molecules and combining with carbon chains.

This technology has lots of benefits:

- Saving environment and environmental costs
- Turning costly sludge to profitable fuel
- Provide a real solution to sludge problem



Mixing method:

Using this technology is extremely easy and user friendly (of course with lots of important technical details). Our technical team will provide a tailor-made how to use plan for every project and also will stay in touch as technical supervisor as long as they are needed.

The fitting plan and mixing method can be figured out after a consult and reviewing the situation of every project.

Result:

We will have 100% fuel oil with the same spec of the feeding fuel oil (sometimes even better). It means we can recover sludge to valuable fuel oil.


General equipment requirements:



Generally this technology can be used by common equipments in refineries and mini-refineries such as:

- Tanks (feed – process – rest – final product)
- Pumps (residue pumps – dosing pumps – etc)
- Mixing devices (mixing tanks – static mixers - etc)
- Filters (depends on the situation of project)
- Heaters (depends on the situation of project)
- Quality control devices





We believe in a partnership which is built on friendship. So we are open for almost any kind of cooperation. We can provide catalysts based on your needs. We can suggest our services and we will not leave our customers if they need us for our services. And we also are open for any kind of partnership cooperation in petroleum industry projects.

We have the ability to trade petrol products which are produced by our current partners or customers and with our technology. Our market is growing and we can join our customers for petroleum products trading.



KGM TECHNOLOGIES

Example of a running project

Kermanshah Oil Refinery









The background of the image is a blue-tinted photograph of an oil rig. In the center, a large cylindrical component is being hoisted by a crane. To the right, a worker in a hard hat and safety vest is visible, holding onto the rig's structure. On the left side, there are several circular gauges or pressure indicators. The overall scene is industrial and captures a moment of heavy machinery operation.

THANKS FOR WATCHING