OILSORB GUARDIAN

Biomin, Inc.
Our 15th Year of Excellence

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THE FOULING PROBLEM: SOLVED WITH "OILSORB"

"FOULING", A DEFINITION: Media fouling results from the presence of an excessive amount of chemical compounds which have a low solubility. These compounds are usually oil and grease, natural organic matter (humic acids), fine particulate material, and inorganic salts such as calcium carbonate and iron. These compounds will blind the pores of activated carbon, ion exchange resins, and membranes. A media such as "Oilsorb" organoclay is used as an effective prepolisher to remove oil and grease, which results in a great cost savings (For a description of organoclay, study our articles on the web site). Activated carbon will now last 7 (seven) times longer, resulting in a 50% savings in operation costs. One cubic foot of "Oilsorb" (50 lb) removes approximately 4 million mg of oil, or 50%+ of its weight. This means that 1,000 lbs. of "Oilsorb" removes 500 lb of oil, or more, from water. If the oil content is above 1 or 2 ppm, the use of "Oilsorb" as a prepolisher becomes an economic necessity.

It is not only the cost of frequent replacement or cleaning of the media (resins, membranes), but the disruption of a manufacturing process, or the requirement of constantly watching a pump and treat system in the field, which needs to be considered. Some ion exchange resins oxidize due to the effect of oils, resulting in a 20% loss of its capacity. Even biological systems can benefit by pre- or post treatment to remove oils and other low solubility organics. It makes the process more effective, and does not require a separate set of bacteria to remove the oils. Since bio-treatment requires a specific temperature and pH, it is very susceptible to upsets by oils. In the case of membranes, almost half of the water filtration cost arises from clogged and fouled membranes (Business Week, Febr. 26, 2001). The problem with membranes is that they are composed of polymers which readily adsorb oily molecules and other organic hydrocarbons. RO membranes are particularly susceptible to fouling due to their small pore size. So, these membranes must be frequently cleaned. Membranes eventually degrade due to contact with the cleaner. This results in costly replacements and operations disruption. Evaporators also are plagued by build up of oils on their elements, resulting in liquid waste oil that must be disposed of at cost of $0.20-0.40/gallon.

Oil and grease are found in most waters in some form or another, including in groundwater near UST sites, landfill leachate, MGP storage sites, wood treating sites (creosote), processing water, refineries, storm water runoff (parking lots) and so on. Oils and surfactants can develop naturally in groundwater as a result of the decay of grass and other organic matter and humic materials such as trees.

Effective removal practices are dependent on a detailed knowledge of oil types and other organics found in the water. A Bunker C oil, which is the heaviest one, and has the lowest solubility in water, is much easier to remove from water via physical separation than some motor oils, which contain a number of additives for engine cleaning and which increase the solubility, or polar synthetic lubricating oil. Crude oils, both mineral and plant types, consist of some 100,000 chemical compounds of which many are polar. This makes removal difficult. Refined oil, on the other hand, has the polar compounds removed and thus becomes only mechanically emulsified. Therefore, knowledge about the various types of emulsions, and how to break them, is required (ask for our emulsion breaking guide).

Figure 1 shows the ability of "Oilsorb" to remove a variety of oils from water. Figure 2 is a bar chart comparing the costs of removing oil from water using "Oilsorb" versus granular activated carbon. "Oilsorb" systems are also set up in a stand-alone mode, as a post polisher to oil/water separators, DAF units, and centrifuges. Such devices remove oil down

Fig. 1

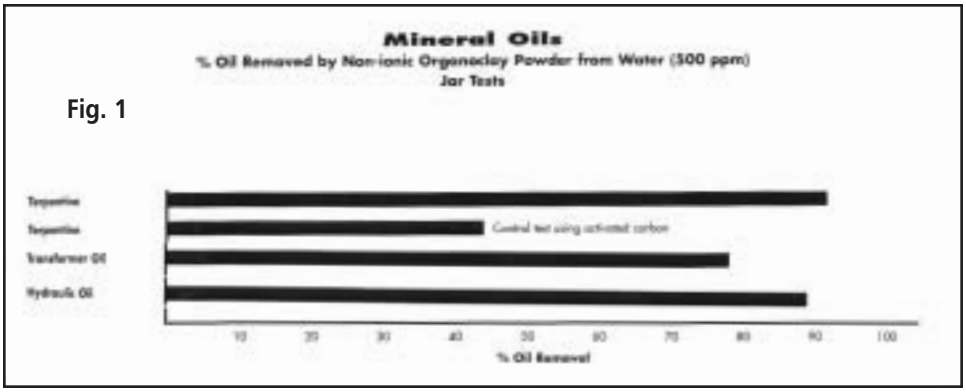
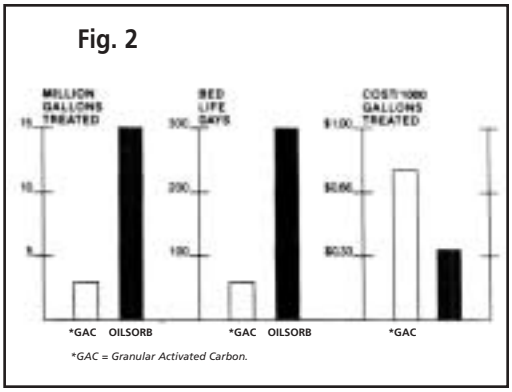


Fig. 2



the Fouling Problem continued from front

to between 10-20 ppm. "Oilsorb" is then used as protection against spikes. If the discharge limit for oil is between 5-10 ppm, carbon may not be needed. Depending on the flow rate, use "Oilsorb" below about 60 ppm of oil; above that, include an oil/water separator.

The benefit of using "Oilsorb" as a pre-polisher extends into the following areas: If you have to remove VOCs or heavy metals, get the oil out of the way first, it will save you a lot of money. Also, if your COD is out of compliance, the simplest solution is often to remove the oil. To get optimum results with "Oilsorb", insist on a retention time of 6-10 minutes. A treatment train is shown on one of our "Technical Advisories" on the web site. Keep the pH between 5-9, and try to align it with the pKa value of the major constituent (see our guide on pKa on the web site.) To calculate the amount of "Oilsorb" required and cost savings when used in front of carbon, request our calculation spreadsheet.

To order OILSORB, please call us at (248) 544-2552, fax your order to (248) 544-3733 or e-mail us at biomin@aol.com.

References and a performance guarantee are available on request.

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Another Case History for
Oilsorb EC-100 Organoclay

Save 50% of Operations Costs!

by extending the life of activated carbon

by 7 times.

Topic: THE FOULING PROBLEM: SOLVED WITH OILSORB

COST SAVINGS EXAMPLE:

Flow rate: 30 gpm; 24 hrs/day, 7 days a week.

Oil concentration: 10 ppm. BTEX= 5 ppm

Activated carbon amount= 1,071.3 lb: changed out 7 times a year for a total of: 7,499.1 lb plus 7% of its weight adsorbed in oil= 8,024 lbs, at a cost of: $6,374.24 or $0.85/lb delivered.

Labor cost for change out= $0.90/lb or $7221.60/year.

Total cost for carbon alone/year= $13,595.84/year.

Add an extra tank of "Oilsorb": 2,000 lb @ $1.60/lb= $3,200/year for one replacement. Labor for one change out 3,200 lb of spent "Oilsorb"= $0.90/lb x 3,200 lb =$2,880.

Disposal cost of 3,200 lb @ $0.25/lb "Oilsorb" (in California)= $800. In most other state this cost is $40/ton plus freight.

Operations (Labor) cost savings per year by pre-filtering with "Oilsorb"= $6,715.84/year or 50%. This does not include reducing the disruptions due to change out activities by 6 times per year.

By special request, the following documents are available:

- "An Emulsion Breaking Guide"
- A CD with a report titled: "Oils in wastewater; what are they?"
- Case histories are found on the web site.
- Our "Oilsorb, Cost Savings Calculation Spreadsheet", can be E-mailed to you or sent via parcel post on a floppy.

For review of other newsletters, particularly No. 1, MG&P sites, check our web site, www.biomininc.com, under "Newsletter".