Technical Bulletin #34

Using Organoclays for Efficient Dewatering

Organoclays have been used as a pre-polisher for activated carbon or as a post-polisher for oil/water separators and dissolved air flotation units for the removal of small amounts of oil, grease, PCB, PNA, BTX and other organic hydrocarbons of low solubility for cleanup of groundwater and wastewater. The end user can save 50 percent or more of operational costs by removing large hydrocarbons that plug the pores of activated carbon beforehand, allowing carbon to remove the last 5 ppm or less of volatile compounds. Organoclays can remove seven times as much oil and other organic hydrocarbons of low solubility, as does carbon.

What are Organoclays?

Organoclays, or organically modified clays, are a blend of a cationic surfactant and bentonite. This blend creates a new product, a nonionic surfactant with a solid base. The quaternary amine chains are, on the positive end, ion exchanged onto the bentonite clay, whilst the neutral end extends into the water column. By means of a partition process, this chain will fixate non-polar organic compounds. In contrast to activated carbon, by which organic compounds are adsorbed into pores in the carbon and quickly become fouled, the partitioning phenomena takes place outside of the clay particles, eliminating the fouling problem.

The organoclay is blended with anthracite to extend its performance life. The vessels, which are used for the organoclay, are the same ones as those used for activated carbon. The treatment train is thus the same, i.e. oil/water separator, possibly preceded by an equalization tank, a 5-micron bag filter, organoclay vessel and activated carbon vessel. The diagram shows how organoclays work compared to activated carbon.

There are 30 media vessels containing 120,000 pounds of an organoclay/ anthracite blend.

Case History: Dewatering

A California city installed a storm drain system in an area of shallow groundwater. The groundwater was contaminated with crude oil and diesel fuel, which had leaked from pipelines installed some 60 years ago. At first, activated carbon alone was used to remove these hydrocarbons. However, once construction began, it turned out the organic hydrocarbon levels where much higher than anticipated, and the activated carbon was spent within 48 hours. It became necessary to install a 5,000 gpm system within a very short time.

A thorough analysis of the situation suggested the following treatment train: an oil/water separator, five high-flow sediment filters, and 30 media filter vessels of 72 cubic feet each, which included 120,000 pounds of an organoclay/anthracite blend.

Two systems where set up half-a-mile apart with flow capacities of 1,800 and 600 gpm.

The setup of the system was complicated. A linear trench extended over a mile long and local traffic could not be interrupted during construction. It was decided to place the equipment along a railroad easement, which had height restrictions due to electrical wires. The project lasted two months and required no change-out of organoclay.

At the conclusion of the project, using organoclay as the main staple for water cleanup incurred a tremendous cost savings to the owner of the site over a traditional activated carbon system.

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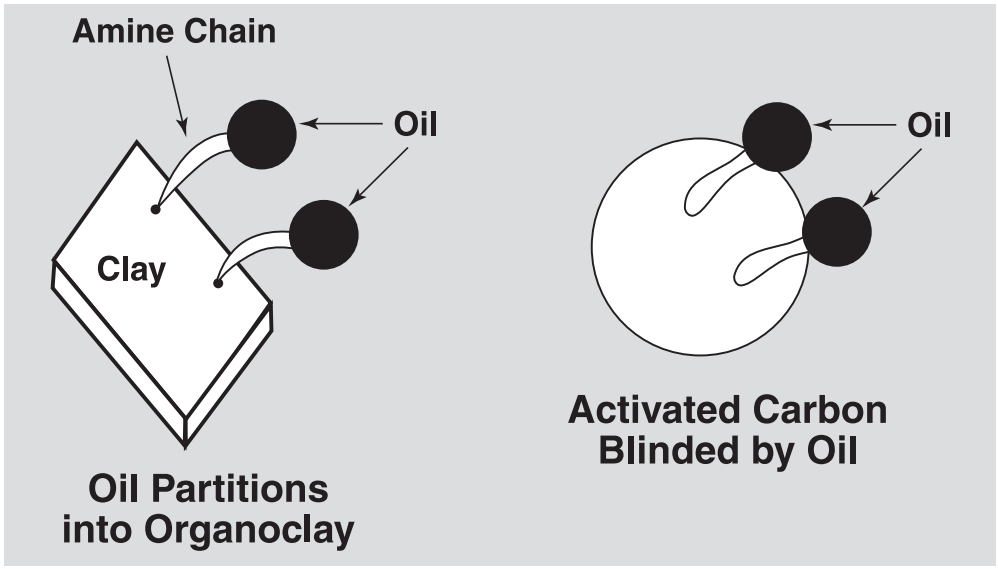

Comparison of carbon and organoclay hydrocarbon removal mechanism.