



## **BIOMIN, INC.**

*State of the art water filtration media*

*We will lower operations costs by 50%, and bring them into compliance with discharge regulations.*

P. O. Box 20028 . Ferndale, MI 48220

(248) 544-2552 . Fax: (248) 544-3733

E-Mail: [biomin@aol.com](mailto:biomin@aol.com)

Web: [www.biomininc.com](http://www.biomininc.com)

### Technical Advisory #8

#### **BIOMIN'S "TIP OF THE MONTH": REMEDIES FOR THE FOULING OF OILSORB AND CARBON BY: CALCIUM AND IRON**

Groundwater contains calcium, magnesium, manganese and iron. The most prevalent compounds are:  $\text{CaCO}_3$  and  $\text{CaSO}_4$ ;  $\text{Mg}(\text{OH})_2$  and  $\text{MgCO}_3$ ;  $\text{MnO}(\text{OH})_2$  and  $\text{Fe}(\text{OH})_3$ . When calcium and magnesium compounds exceed their solubility limits, they begin to precipitate immediately regardless of pH. Iron and manganese compounds oxidize into their insoluble forms as soon as they contact air. Solubility limits vary by component. Calcium carbonate is 10 ppm, Calcium sulfate is 2,000 ppm. In the case of iron and manganese it is 0.30 ppm. Precipitation of these compounds results first in blinding of the interstitial pores within the filtration media. Eventually, cementing takes place and the entire bed develops into a solid block, if backwashing is not conducted frequently. 75% of early change outs of activated carbon are due to mineral fouling. If preventive action is taken, change outs can be reduced by 50%, and labor costs can be cut by 75%.

One preventive method may be the use of inline magnetism. The calcite is converted to soluble aragonite. The magnets reduce the polarity of the minerals, and neutralize them, which means they will stay in solution. Contact Biomin if you are interested in using this method.

A second method involves lowering the pH to 5, at which point 80% of the carbonate ion (including bi-carbonate) breaks down into  $\text{CO}_2$ , which can be vented or scrubbed. Carbon dioxide addition is the cheapest and safest method for lowering pH, which will protect an air stripper.

Thirdly, an anti-scalant can be metered into the water, including sodiumhexametaphosphate (3-5 ppm) or polyacrylates (1-2 ppm), available from such firms as Betz or Nalco, which will also protect an air stripper. However, in many circumstances, such as when removing PCE,  $\text{CO}_2$  or radon, a venturi aeration system can be installed. These systems operate under a low pressure gradient (20 psi), and strip substances with low Henry's constant. Contact Biomin for further information.

One tip, if you place OILSORB in one vessel on top of activated carbon to save on an extra vessel, the pH will rise by as much as 2 units due to the carbon, which can result in precipitation of iron and calcium, as well as upset the pKa relationships. In such a case, it makes sense to keep the pH down with CO<sub>2</sub> or an acid, or to add sodiumhexametaphosphate to prevent fouling problems. Another option is to use a specially treated activated carbon where the pH does not rise when in water. Even though it costs more, it may be worth it if no special equipments and ingredients are needed to deal with fouling.

Organic iron, i.e. iron that is attached to a humic acid, is removed by OILSORB. Iron bacteria are removed by chlorination.

Last but not least, OILSORB has the capacity, on a percent by weight basis, to remove 0.28 % soluble iron due to cation exchange and reaction with the anthracite that is part of the media. This has been shown with column tests at U of VA. That means, 1,000 lb Oilsorb removes about 2.8 lb of soluble iron.

For more questions about fouling and Oilsorb organoclay, contact us at:

[Biomin@aol.com](mailto:Biomin@aol.com). Finally, Google is a good search engine to use for this topic: [www.google.com](http://www.google.com)

For other newsletters and technical advisories, look at our web site, Also check us out on our web site: [www.biomininc.com](http://www.biomininc.com) You may wish to download them and start a folder. *Additional technical advisories are in process and will be released throughout the coming year.*