SRB-BART Reaction Patterns

Quick Break Training **13 March 2009**

Sulfate reducing bacteria (SRB) have been linked to the production of hydrogen sulfide which in turn leads to electrolytic corrosion, “rotten” egg odors, and black slimes. In industry the SRB are most commonly linked to the corrosion of steels and other metal alloys. The trigger for the generation of hydrogen sulfide is commonly believed to be sulfate but there are many bacteria that can generate hydrogen sulfide reductively from organic matter. The SRB-BART tester is able to detect both groups (the sulfate reducers and the organic protein reducers). These are displayed distinctly in the SRB-BART tester as either a jet black base in the tester’s cone (BB, black base) or as growing jet black granules that commonly grow into a ring around the submerged part of the BART ball (BT, black at the top).

BB reactions are most likely to be associated with sulfate reduction. Examination of the water chemistry will commonly show that when the SRB are present the sulfates exceed 10ppm in the water. Generally if the SRB-BART shows BB reaction first then there are covert SRB growing deep within the attached biomass. These are most likely to be associated with pitting and corrosive process on steel. When BB reactions are observed in water samples then that means the SRB are deeply entrenched and difficult to control.

BT reactions on the other hand are more associated with the SRB growing within a biomass which has a significant organic component. Here the SRB thrive on the sulfur forms of proteins breaking them down with the releases of hydrogen sulfide. Because these SRB are entrenched within a biomass they are more vulnerable to treatments and can even be eliminated from the local environment.

Both BT and BB reactions can indicate that corrosion (pitting and perforation) is occurring. For the BB reaction it is more likely that the SRB are deeply entrenched in the pitting process and perforation is a likely terminal event. For the BT reaction, there is a lower likelihood of perforation but a higher potential for generalized pitting of the impacted metal alloy. It is therefore easier to obtain control of SRB displaying a primary BT reaction than those that signal a BT reaction. Both reactions can be associated with the generation of “rotten” egg odors and black slimes but this type of event is more common where there is a richer organic loading which would normally trigger the BT reaction first. It is very difficult to eliminate SRB from an environment and generally a BT reaction type has a greater potential to be controlled than the BB.

Quite a few anaerobic bacteria can grow in the SRB-BART tester causing the sample culture to become cloudy. While this is a positive indication of activity by these bacteria they do not necessarily relate to the SRB activity and so are now no longer recognised as significant reactions in the SRB-BART tester.

Droycon Bioconcepts, 315 Dewdney Avenue, Regina, Canada
(306) 585 1762 fax: (306) 585 3000 www.dbi.ca