

Oxygen Release Compound, ORC®

Microbial Enhancement of Aquifer Populations

Various investigators have pointed out that the disappearance of hydrocarbon contamination is only circumstantial evidence for bioremediation as the responsible mechanism. Measurements of enhanced microbial activity, or the presence of byproducts of microbial activity such as carbon dioxide or signature biochemical compounds, are often sought as a proof that bioremediation has taken place. Regenesis has investigated the status of microbial activity at major installations of ORC technology.

At an oxygen barrier site in Belen, New Mexico, (Technical Bulletin 3.2.2), microbial degrader populations were measured in a transect through the barrier 93 days after ORC was installed in the wells, as presented in Figure 1. Background conditions in the anoxic aquifer show a very limited presence of aerobic microbial degraders. In contrast, degrader populations were over four orders of magnitude higher at the barrier. Since the aquifer velocity is very slow (.1 feet/day), diffusion of oxygen upgradient can be implicated in a three order of magnitude increase in populations at 4' upgradient. At a point 10' downgradient populations are more than two order of magnitude higher - returning to slightly higher than background at 20' downgradient.

At a source treatment site in Dexter, Michigan (Technical Bulletin 3.1.2), an examination of microbial degraders was made at 100 days. The results in Figure 2 show that large increases in microbial degrader populations occur in monitoring wells that are in proximity to ORC applications. Each of the wells in the study are 5-10 feet from a source of ORC.

Both of these studies clearly demonstrate that ORC provides diatomic oxygen that remediates compounds through biological oxidation and not free radical oxygen, like hydrogen peroxide, that chemically oxidizes compounds. The large increase in populations of degrading microorganisms correlates with an addition of ORC to the aquifer, elevated measurements of oxygen in the monitoring wells and a marked reduction of BTEX in those same wells.

Figure 1

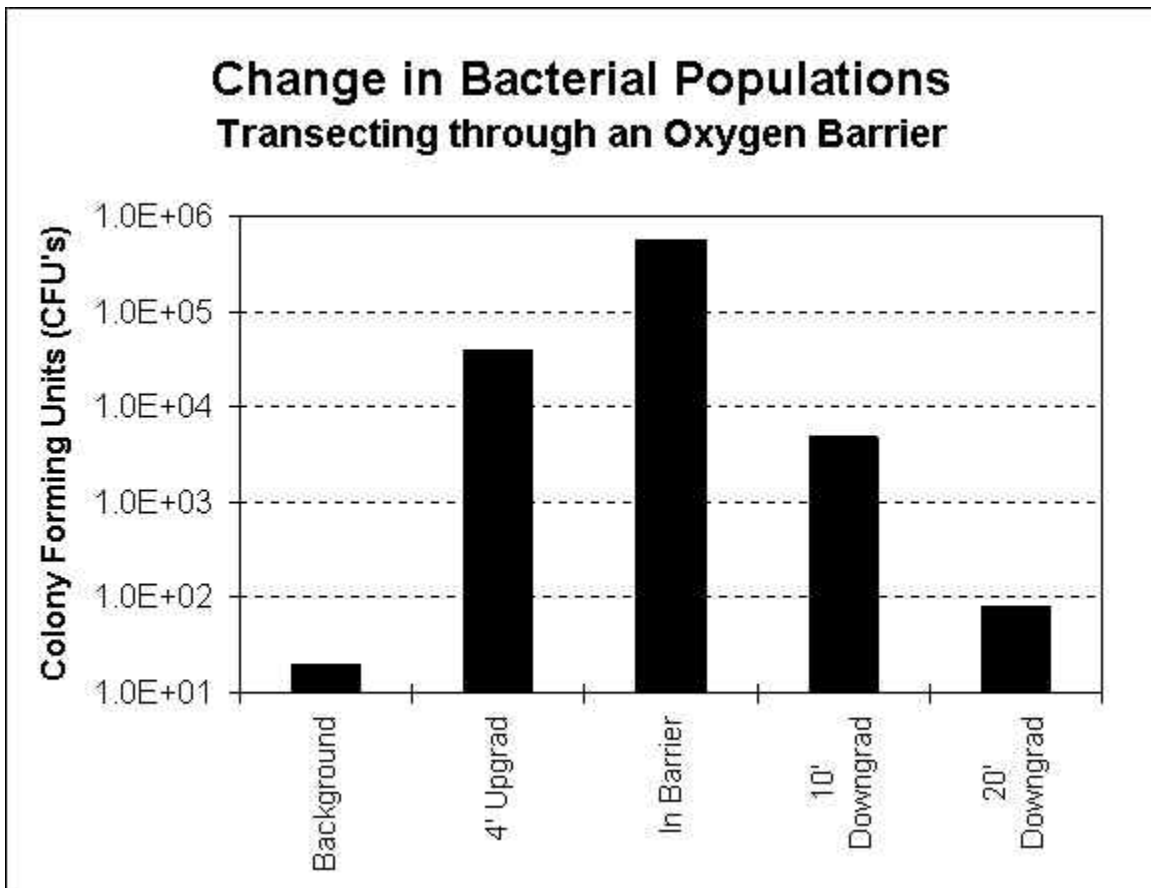
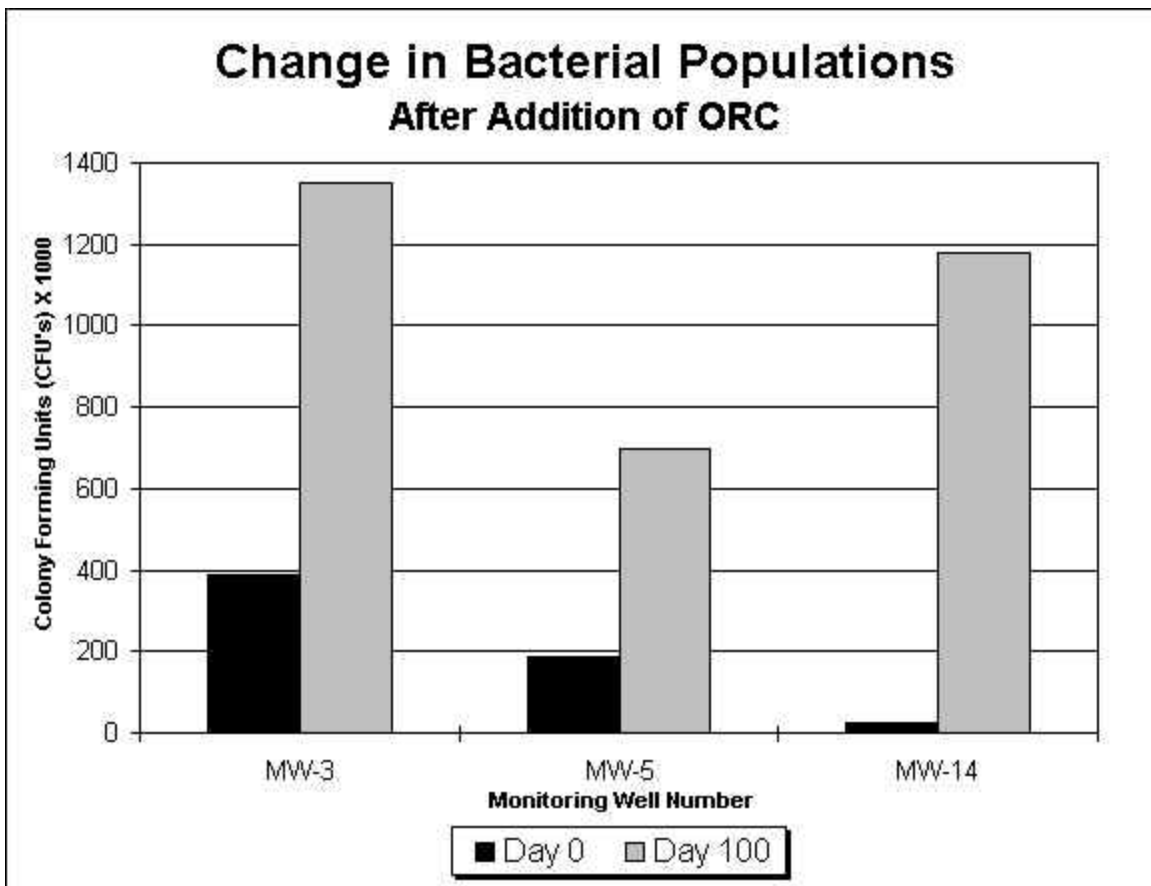


Figure 2



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