

Bioaugmentation for In Situ Discard of Clean Water from a Slop Tank

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Background/Objectives. The offshore oil and gas industry uses floating vessels for the production and processing of the crude oil extracted at subsea platform. To prevent pollution of the sea, the operation of this vessels transfers oil waste from dirty ballast residue, tank washings or other oily wastes to a slop tank. The objective is to operate the tank allowing the separation of as much oil from water as possible and the discharge of clean water at the sea. At some points the concentration of oil-in-water at the slop tank is so high that the discharge of the water is not possible, compromising the entire operation. Our objective was to treat the water inside the slop tank injecting a blend of specific microorganisms to degrade the emulsified and free-phase crude oil, allowing the constant discharge of water and the reduction of treatment costs.

Approach/Activities. The slop tank treated in this case were capable to store 5.000 cubic meters of oily water. The operation worked with a volume of 2.800-3.300 at the slop tank and the oil-in-water were separated by skimmer in the free-phase. We applied a microbial blend with 6 different species of bacteria. They were selected to degrade crude oil and dissolved hydrocarbon. Those species were selected from a culture collection due to its capacity to produces surfactant and other hydrocarbon degrading enzymes.

Results/Lessons Learned. The slop tank treated had a maximum oil concentration of 90 ppm. The oil-in-water separation process was not working due to high emulsified oil, preventing the discharge of water from the slop tank for more than 90 days. The first discharge was made 9 days after the beginning of the microbial blend injection on the slop tank. Every new contribution of oily water in the tank were degraded in 2-13 days. The volume of the slop tank was completely discharged in the first 60 days of treatment due to bacterial degradation.