Title of Paper: Effect of THPS on the structure and diversity of the microbial populations in a process of microbially influenced corrosion

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Abstract: The accumulation of water and sludge in oil storage tanks leads to microbial contamination. The study of these microbial communities is of particular interest, especially the sulfate reducing microorganisms (SRM) which are mainly responsible for microbiologically influenced corrosion (MIC). Usually, the development of those microorganisms is controlled by the addition of biocides. The objective of this work was to evaluate the effect of a biocide (THPS) on these communities in a batch fractionated assay. Fifty flasks containing sterilized tank water were inoculated with an enrichment culture from this water. A set of 25 flasks was treated with THPS (250 ppm) leaving the rest as control. Finally, a volume of oil and two carbon steel coupons were added to all flasks and incubated under anoxic conditions. The population dynamics were analysed by counting of heterotrophic bacteria and SRB for 60 days, observing the reduction of the planktonic SRB and the absence of sessile SRB after 30 days with THPS. However, a low density of SRB was detected forming biofilm after 60 days. PCR-DGGE, with primers directed to the 16SrDNA of Bacteria and Archaea, and the gene aps of SRB, were used. From the analysis of the gel, differences in the community developed in the presence of THPS were observed. Mass sequencing analysis of 16SrDNA allowed the identification of the predominant genera of the resilient populations. The electrochemical tests together with the morphological analysis performed by SEM of the exposed coupons showed an inhibitory effect on the biofilms.