PROTOCOL FOR EVALUATING THE EFFECTIVENESS OF ANTIFOULING PAINTS APPLIED TO THE INTERNAL SURFACE OF THE SEA WATER DISCHARGE TUNNEL COOLING THE MAIN STEAM SYSTEM OF THE ANGRA 1 NUCLEAR POWER PLANT

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The Angra 1 nuclear plant, located at Angra dos Reis RJ, generates electric energy from the heat transfer produced in the reactor to two steam generators that are heat exchangers in the form of pressure vessels. They are composed of tube bundles where the water in it, get in contact with the outer surface of the tube bundles and becomes vapor by the absorption of the heat transferred by the water, which cools the reactor and circulates internally to the tube bundles. The generated steam drives a turbine that coupled to the shaft of an electric generator produces electric energy. After turning the turbine shaft, it loses energy and it is directed to the condenser, which are heat exchangers, composed by tube bundles where this vapor is condensed by contact with the outer surface of the tube bundles. The seawater collected from the beach of Itaorna flows through the tunnel of admission and exchange heat with the steam that turned the turbines and it is discharged at Piraquara de Fora beach through the discharge tunnel where biofouling grows on the internal surface. It increases the roughness, hampering the inspection of the concrete structures, and making difficult the early intervention to avoid the occurrence of anomalies. The objective of this research is to evaluate the development of biofouling on the inner surface of the discharge tunnel and the effectiveness of antifouling paints that were applied in 2017 and 2018. The following methods were performed: selection of six areas in the region of intense growth of biofouling in 2017; removal of biofouling in six frames of 3m x 3m in the region of intense biofouling growth in 2017 and 2018; taxonomic classification of biofouling in 2018, where barnacles of the species *Megabalanus coccopoma* and the gastropod mollusk *Petaloconchus varians* of the Vermetidae family were found; application of six types of antifouling paints from four different suppliers in five of the six 3m x 3m frames. To evaluate the development of biofouling and the effectiveness of antifouling paints, an inspection was scheduled in 2018 and 2020. In the inspection performed in 2018, it was observed that one of the paints showed an indication of pullout and another paint presented roughness to the manual touch as an alert for the development of biofouling. For the 2020 inspection, we planned: Photographic register of biofouling; estimative of biofouling in the frame where no paint was applied and in the five frames with the six paint samples; blistering, adhesion and grinding tests on the samples of the six applied paints. Although it has not been observed a pronounced development of biofouling in the six frames, we concluded from the preliminary results that at least two paints will be less effective: one because of pullout effort and another because of development of biofouling, which will be confirmed in the inspection of 2020.