Characterisation of NORM Contaminated Objects: Reliable and Efficient - DTU Orbit (16/12/2018)

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The predominant contributors to the production of Technologically En-hanced Naturally Occurring Radioactive Material (TENORM) and NORM-waste in the Nordic countries are the on- and offshore oil and gas producers. In oil and gas production processes, host rock formation water containing low concentrations of NORM is mixed with seawater containing high concentrations of sulphate. This leads to precipitation of NORM (Ra, Pb, Po)SO4, which is deposited as either scale or sludge in the production equipment. NORM contaminated pipes, tubes, pumps and tanks, etc. are therefore subject to radiological characterization in order to ensure safe reuse or recycling as well as safe NORM waste handling. The procedures and measurement techniques may significantly affect the amount of material that is categorized as NORM contaminated equipment and NORM waste. At present, different procedures are used for categorization by the individual operators in the North Sea. A number of parameters considerably influence the measurement accuracy and may cause false categorization of the materials, for instance abnormal geometry of objects, various density and composition of the scale and sludge, inhomogeneous distribution of NORM, and measurement sensitivity and uncertainty. Incorrect characterization can however be prevented by the use of well-certified methods and inappropriate handling of these materials can be avoided. The current report is partly a review of existing methods to perform initial characterization of NORM contaminated equipment and partly an experimental section dealing with the basic investigations required to evaluate factors affecting external dose rate measurements.

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