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Characterization and radiation protection approaches for the management of NORMs in oil and gas production

Veolia provides integrated solutions to manage the NORM waste at every step of the production process from the waste handling and analysis to the final disposal.

At all levels of the production process, it appears that the set-up of appropriate radiological characterization methods, implemented by a highly skilled workforce, is essential to optimize the NORM management:
• Upstream by using in-situ and sampling measurements means: first in order to ensure a better knowledge of the NORM materials'nature. It also helps to define an efficient policy for NORM management in order to guarantee exposed workers and environmental safeties;
• Downstream by using in-situ measurement, means, and method, to segregate NORM from NORM free materials (waste quantities optimization) and to provide required information to dispatch them to the specific disposal sites.

To illustrate how significant is the impact of qualified staff using high-level technology equipment in NORM management, three practical feedbacks are presented in this paper.

To begin with, the need to know the nature of the NORM is detailed to get a full understanding of the risk involved. Indeed, non-nuclear industries establish policies for the NORM management which generally clearly identify and prevent radiological risks. However, on-site risk analysis and methods might too often be focused on the radiation risk (leading to external exposure for workers), and underappreciate the internal risk of exposure by potential contamination which is often minimized while alpha ray radionuclides are manipulated. Workers PPE dressing and undressing methods and abilities to avoid contamination spreading need to be at a high level to prevent chronic internal exposures.

To guide the decision-makers, a position analysis will be shown. The example comes from a welding operation on O&G tube without significant radiation risk but an inhalation hazard must be taken into account.

Then, methods and criteria usually used to segregate NORM contaminated material from NORM free contaminated materials will be discussed. This separation is too often based on a count-rate method and criteria expressed as a multiple of the background level.
Depending on the context, these methods can lead to either a high level of false-positive detection of NORM (over cost for the company) or some false-negative detections. The second case may conduct a possible dispersion of radioactive materials that pose health risk to the population and the environment. Such event could also have consequences on the company's reputation.
We will illustrate the great variability of these methods based on count rate and will present some easily implementable solutions. Our measurement solutions are robust, practical and can quickly deliver results for a real optimization of the radioactive waste management process.

To finish, we would present measurement methods that can be deployed on buried piping networks in order to carry out internal measurements to assess the contamination inside piping. This kind of measurements can, for example, be useful to establish an initial contamination state and a final state before and after a decontamination processing which doesn't require pipes removing from the ground

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