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On-site NORM Waste Treatment For Safe Final Disposal

NORM wastes, especially those originating from the oil and gas industry, often also contain other contaminants such as oil and mercury. This mixture poses challenges for transport, treatment, and safe final disposal. As a result, there are few disposal solutions for this waste stream leading to NORM wastes currently being stored in numerous temporary storage facilities. As a consequence, removing the water and oil present in the NORM wastes, followed by chemical immobilization of the remaining solids, emerged as state-of-the-art treatment in Europe. The drying process of the material has two main benefits. First, the reduction of NORM waste volume, and second the de-oiling of the material, which is required to allow an effective curing and therefore long-time stable immobilisation with chemical binders. The VacuDry® indirect heated vacuum distillation technology is used to evaporate water, oil, and mercury from the waste matrix. As relevant radionuclides are mostly present in the solids, the VacuDry® principle is designed to ensure that there is no carry over of solids into the vapour treatment system, which is the major difference to other thermal treatment options. This is achieved by the low exhaust volume flow of « 100 Nm^3/h, which passes a highly effective vapour filter system and makes other separators such as bag filters and scrubbers, unnecessary. Also, the vapor filter system prevents carry over of dust containing radionuclides into the recovered condensates (e.g. water, oil, mercury). Subsequently, the immobilization of the dried solids, containing the radionuclides, is achieved, for example, by utilizing special geopolymer cement. The latter treatment not only increases mechanical and chemical stability, but also significantly reduces emission potential and leachability. The main scope of the paper is to present the results of a proof of performance test conducted in a VacuDry® indirect heated vacuum distillation unit.

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