

Presentation code:

E15

Industrial Radiotracer Application for Flow Rate Measurement Using Ba-137m Radioisotope

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Abstract. Measurement of discharge rates of fluids and solids is an essential requirement in industrial systems. Industrial processes worldwide are progressively recognizing the value of industrial radiotracer application in studying the operation of the on-line plant. Radiotracer techniques are widely used for measurement of fluids/solids in situations where conventional techniques cannot be applied. This present report describes the flow rate measurement using radioisotope technique using unsealed radioactive source to calibrate the installed flowmeters and to measure the flow rate in systems, which does not influence the on-line process. An investigation was performed by the injection of a radiotracer inside the multiphase flow rig system to provide fluid flow rate information. In this study, the multiphase rig was filled up with mixed oil-water, and the Coriolis flowmeter was installed in the system for efficiency validation. Cs-137/Ba-137m radioisotope generators were used to prepare the radiotracer and Ba-137m radioisotopes having activity about 0.2 mCi. The peak to peak method was applied for the radiotracer techniques. The average volumetric flow rate of multiphase flow rig was measured to be 6.43 m³/h. This study has proved that Coriolis flowmeter is not functioning in good condition due to different flow rate value from the experimental works and suggested to be recalibrated or replace.

Keywords: radiotracer, flowrate measurement, multiphase flow rig, industrial process, radioisotope