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Radiotracer Applications in Industry and Environment

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Radiotracer techniques are widely used for troubleshooting, measurement of hydrodynamic parameters, flow visualization and evaluation of design of process equipment in industry and environment because of their many advantages over conventional tracers. The main advantages of radiotracers are their physico-chemical compatibility, high detection sensitivity, ability of in-situ detection, availability of a wide range of radiotracers for different phases, non-degradability in harsh industrial environment and limited memory effects. In a radiotracer application, the radioactive material in a suitable physico-chemical form, similar to that of the process material, is instantaneously injected into the system at the inlet and its passage is monitored at the outlet or along the system at strategically selected locations using collimated radiation detectors. The monitored tracer concentration data is plotted as a function of time and interpreted to obtain qualitative as well as quantitative information about process parameters, hydrodynamic behavior of the system and occurrence of malfunctions, if any. The commonly carried out applications of radiotracers in industry and environment across the world include:

- Leak detection in buried pipeline and heat exchangers
- Mixing/blending studies
- Flow rate measurements
- Studies on residence time distribution in process vessels
- Sediment transport investigations in port
- Effluent dispersion studies in water bodies
- Wear rate measurements
- Radioactive particle tracking technique for flow characterization
- Radiotracer applications in oil field investigations

These applications across the world are either carried out by private companies or atomic energy establishments of the different countries. The end-user industries have been enormously benefitted from these applications. In recent years, some new developments have also taken place in tracer techniques. During the presentation, a few case studies recently conducted in India and emerging trends in radiotracer applications in industry and environment will be discussed.

Country/Organization invited to participate

India

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