A Portable Gamma Spectroscopy System for In-Situ Measurements and Examples of its Use for Continuous On-Line Assay of Primary Coolant.

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The gamma sensor is a 1 cm3 CZT detector, surrounded by a tungsten shield/collimator set [9 kg] with an optional tripod for support. Efficiency calibrations are made using the ISOCS mathematical efficiency calibration software, which does not require any radioactive sources. This CZT package is very suitable where the full power and sensitivity of HPGe detectors are not needed. Operating nuclear power plants or facilities in the initial phases of decommissioning are prime examples to use the benefits of portability and quick setup. It can be used to assay pipes or tanks, spills on floors, activity on filters, and waste in drums. In the event of an emergency, it can be quickly deployed to measure gas or liquid effluent streams, air particulate and iodine filters in the field, or even in-vivo thyroid activity.

An accessory device is the small low-power Data Analyst [DA]. This allows the CZT [or Scintillation or HPGe] detector to automatically generate a continuous repeating series of quantitative gamma spectral assays. This could be useful to evaluate measurements of fluid going through a pipe, of items on a conveyor passing under a detector, a detector aimed at the ground on a moving platform, or a detector in free air as a plume of radioactivity drifts by. The DA controls the acquisition cycle, analyzes the results, and transmits them to the outside world when needed. The exported spectral files can be reviewed and confirmed by Experts, and reanalyzed if needed. The DA operates autonomously. A PC is used to setup the DA, and to readout the results, but is not required for operation. The DA can also accept the EcoGamma wide-range dose-rate sensor. Data from recent deployments to measure primary coolant during plant outages will be shown.