

Tritium In-Bed Accountability For A Passively Cooled, Electrically Heated Hydride (PACE) Bed

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A nominal 1500 STP-L Passively Cooled, Electrically heated hydride (PACE) Bed has been developed and deployed into tritium service in Savannah River Site (SRS) Tritium Facilities. The bed design, absorption and desorption performance, and cold (non-radioactive) in-bed accountability (IBA) results have been reported previously. Six of these 12.6 kg PACE Beds were fitted with instrumentation to perform the steady-state, flowing gas calorimetric inventory measurement method. The IBA inventory calibration curve, flowing gas temperature rise (ΔT_{gas}) versus simulated or actual tritium loading, were generated for these beds. Results obtained from cold calibrations, using the internal electric heaters, versus tritium calibrations will be presented.

It was discovered during initial tritium calibrations, and subsequent tritium inventory measurements, the impact of jacket gas pressure on ΔT_{gas} . Changes in jacket pressure below 133 Pa (1 torr) impacted calibration of the beds during initial tritium calibrations. During subsequent tritium inventory measurements, apparent discrepancies were discovered between a bed's apparent inventory and its true inventory. The apparent discrepancy was related to changes in the jacket pressure from initial calibration conditions. The influence of jacket gas pressure and the bed's flowing gas pressure on PACE Bed IBA calibration results will be discussed.