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## Comparative study for Inventory Estimation for Halden BWR Spent Fuel

The paper presents theoretical and experimental results of investigation of the possibility of using nondestructive gamma-ray spectroscopy to estimate long-lived radionuclide inventories of Halden BWR spent fuel. An accurate estimation of long-lived actinides and fission products inventories are important for long-term safety analysis, as well as to account the radiological impacts on the public and the environment.

The study has been performed at the Halden Boiling Water Reactor in Halden, Norway. The five rods fuel assembly with burnup of 50.6 MWd/kgUO<sub>2</sub> is selected for this study. All the data for the theoretical study is generated using SCALE-6.2.2 codes system and ENDF/B-VII.0 nuclear data library. 972 computational data sets are made by variations of various operational parameters and 80 gamma measurements of photon-emitting caesium nuclides are analyzed for the study.

The <sup>134</sup>Cs/<sup>137</sup>Cs ratio is used for the radionuclide inventory estimation of Halden spent fuel with real power history, by comparing gamma scan isotope ratios to the calculated actinide and fission product inventories. Preliminary results of the comparison have shown that 38 of 972 and 79 of 972 data sets are within ±5% and ±10% of the measured value of the <sup>134</sup>Cs/<sup>137</sup>Cs ratio.

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