Analysis of Radioactive Concentrations in Metal Samples Irradiated by Neutron

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This study presents radioactive concentrations for Metal samples irradiated by neutron from reactor vessel in Kori nuclear power plant (Unit 1). The metal samples taken from a baffle-former bolt were dissolved in concentrated HNO3 1mL and concentrated HCl 3mL (aqua regia) on hot plate. The solution was evaporated to dryness and dissolved with small quantity of 3M HNO3. The stock solution was made from dissolved samples with distilled water weighing accurately the mass with a scale with 4 decimal places. A small amount of the sample taken from the stock solution was put in 20mL plastic vial.

The sample in plastic vial was put on plastic holder at 10cm distance between sample and detector, and, then, measured the gamma radioactive concentration by a HPGe gamma spectrometer. Pu and Am isotopes were measured by alpha spectrometer after radiochemical separation with anion exchange resin and TRU resin. Fe-55 and Ni-63/Ni-59 isotopes were measured by liquid scintillation counter after radiochemical separation with anion exchange resin and Ni resin. Tc-99 and Sr-90 isotopes were measured by liquid scintillation counter after radiochemical separation with TEVA resin and Sr resin.

The measured radioactive concentrations in metal samples irradiated by neutron were validated with measured by Pace Lab. in USA.

Keywords: Radioactive Concentration, Metal Samples Irradiated by Neutron, HPGe Gamma Spectrometer, Alpha Spectrometer, Liquid Scintillation Counter

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