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## ORAL PRESENTATION - Analysis of Radioactive Waste Waters and Sludges in the Hungarian VVER NPP Paks

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There are some tanks at the nuclear power plant in Paks, Hungary containing sludge type radioactive waste containing more or less liquid phase too. The general physical and chemical characteristics (density, pH, total solid, dissolved solid etc.) and chemical and radiochemical composition of these sludges are important information for volume reduction and solidification treatment of these wastes. Based on the literature sources we have investigated and constructed a complex analysis system for the radioactive sludge and supernatant analysis, including the physical, as well as the chemical and radiochemical analysis methods. Using well known analysis techniques as ion chromatography, ICP-MS, AAS, gamma- and alpha-spectrometry and chemical alkaline fusion digestion and acidic dissolution methods we could analyze the main inorganic, organic and radioactive components of the sludges and supernatants. Determination of the mass and charge balance for the sludge samples were more difficult than for the supernatant samples. Not only are there assumptions required about the chemical form and the oxidation state of the species present in the sludge, but many of the compounds in the sludge are mixed oxides which are not directly measured. Also, the sludge is actually a slurry with a high water content. The interstitial liquid is in close contact with the sludge, and there are many ionic solubility equilibria. The anion data for the sludge samples are based on the water soluble anions that would be available to a water wash. The water wash would not account for the insoluble hydroxides, carbonates, and mixed oxides present. The insoluble species do not contribute to the charge balance, and the cation charge is not used in the calculation. Most of the nitrate reported for the sludge is due to the interstitial liquid. Considering the limitations of these calculations, the mass balance was within the analytical error ( $\pm 20\%$ ) for the sludge samples. There were three sample preparation methods used to investigate the total anion content of the sludge samples, which included water leach, potassium-hydroxide and/or sodium peroxide/sodium hydroxide fusion and acidic dissolution.

**Primary author:** Prof. PÁTZAY, György (BME KKFT, Hungary)

**Co-authors:** Mr FEIL, Ferenc (NPP Paks); Mr PATEK, Gábor (NPP Paks); Mr WEISER, László (BME KKFT)

**Presenter:** Prof. PÁTZAY, György (BME KKFT, Hungary)

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