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Qualitative Assay Of Radionuclide Species In Ash From Coal Combustion
Coal combustion is a primary energy source creating more than 52 % of the energy in the United States. A by product of coal combustion is fly ash and bottom ash. Coal is known to contain trace elements, such as Uranium-235 and Potassium-40. Coal mineral residues such as fly ash and bottom ash are used in public vehicular accessible locations such as parking lots, drive ways, and roads. Bottom ash and fly ash are used in several other applications; fertilizer stabilizer and various polymers. The public has access to most places in which bottom ash and fly ash is used, which may pose a health risk for people. Therefore the objective is to determine if radioactive elements are present in measurable quantities of fly and bottom ash and if so do they exceed acceptable EPA radiation levels. It was hypothesized that trace amounts of radioactivity would be detected. It was found that all samples contained radioactive nuclides from three naturally occurring decay series with the uranium-228 and thorium the most obvious nuclides present. The hypothesis was supported. Further research could include a qualitative assay and evaluation to determine if the nuclides are present in quantities that exceed EPA limits. The estimated concentration generally agreed with published values for the thorium series. Although a qualitative assessment was not performed, the low number of counts associated with each sample indicated that a health hazard was unlikely.