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Spectrophotometric Determination of Uranium in Waste Water of Phosphoric Acid and Fertilizer Manufacturing Process

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Abstract: In this study, waste water drains and produced phosphate fertilizers of conventional wet-process (hemihydrate) phosphoric acid and phosphate fertilizer plants were investigated to determine the average uranium contents in the active manufacturing period. The method chosen for the determination of uranium was an extension of an existing spectroanalytical method and was adopted for waste water analysis as described. The results show that average uranium contents (mg m^{-3}) in a three-month period are appreciable in the waste water channel of the H_3PO_4 unit, produce acid containing 28% P_2O_5 (20.75), H_3PO_4 unit, produce acid containing 54% P_2O_5 (35.69), NPK (Nitrogen, Phosphorus, Potassium fertilizer) process (23.94), DAP (diamonium phosphate fertilizer) process (58.26) and dilution with the factory's other waste water streams which contain no uranium do not help to reduce the content to the EPA's (Environmental Protection Agency) stated permittable U level (for underground waters 20 mg m^{-3}) in the sea discharge joint waste channel (34.01). The phosphate fertilizers such as composite NPK with 15% P_2O_5 were also found to contain appreciable amounts of uranium, 25.28 and 51.76 respectively (mg kg^{-1}).

Key Words: Phosphate rocks, fertilizers, uranium, waste water, TOPO

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