

Session III: **Safety & Environment**

Preparation of bagasse fly ash for the removal of Strontium and Cobalt from liquid waste

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ABSTRACT

The aim of this work is to protect human health and environment from exposure to and discharge of liquid radioactive waste. In this study, bagasse fly ash, a waste produced in sugar industries, has been converted into an inexpensive and effective adsorbent. The product was characterized by different chemical and physical methods and has been used for the removal of strontium from liquid radioactive wastes to level permitting their discharge into the environment. Batch equilibrium techniques have been performed. The amount adsorbed of Strontium ions has been studied as a function of initial pH of solution, agitation time, adsorbate concentration and temperature to find that the amount adsorbed of Strontium and Cobalt increases with increasing initial Sr and Co ion concentration. Maximum adsorption of Strontium and Cobalt was found at pH 5, 6 in an equilibrium time of 120, 140 minutes respectively. The maximum adsorption capacity of strontium using Bagasse (as a blank), bagasse treated by 1M HCl and bagasse treated by 1M KOH was found to be 5.72, 5.68 and 5.79 mg/g, respectively. While, the maximum adsorption capacity of Cobalt using bagasse (as a blank), bagasse treated by 1M HCl and bagasse treated by 1M KOH was found to be 2.03, 2.01 and 3.3 mg/g, respectively. The kinetic sorption of Sr and Co onto bagasse (blank) and bagasse (treated) were studied using Lagergren equation and the equilibrium rate constant for sorption was calculated. The results obtained in this study illustrate that bagasse as a blank, bagasse treated by 1M HCl and bagasse treated by 1M KOH is expected to be an effective and economically viable adsorbent for Sr and Co removal from aqueous system.

Key words: Radioactive Waste, Cobalt, Strontium, Bagasse, Adsorption, Limits of Discharge.

Analytical Architectural Study on Nuclear Power Plants

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ABSTRACT

This paper aims to study the architectural design and components of Nuclear Power Plants (NPPs). It is also focusing on the simulation system. Its main objective is to set general guidelines for architects. They should be aware of the basics of nuclear facilities designs and components. A traditional nuclear power plant consists of a nuclear reactor, a control building, a turbines building, cooling towers, service buildings (an office building and a medical research center) and a nuclear and radiation waste storage building. "Bushehr" nuclear power plant in Iran and "Angra" nuclear power plant in Brazil have been chosen as examples. Furthermore, this paper presents design analyses for "Bushehr" nuclear power plant and "Angra" nuclear power plant that include design theory (linear design and radial design) and positive and negative aspects of these designs. At the end of this paper, results and recommendations on the architectural and urban aspects of nuclear power plants are revealed.

Key words: *Analytical study, architectural study, nuclear power plants, nuclear power reactors.*

Role of the Regulatory Body in Implementing Defence in Depth in Nuclear Installations; Regulatory Oversight in Egypt

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ABSTRACT

The fundamental objective of all nuclear safety regulatory bodies is to ensure that nuclear facilities are operated at all times in an acceptably safe manner including the safe conduct of decommissioning activities. Defence in depth is recognized as one of the fundamental safety principles that underlie the safety of nuclear power plants. Defence in depth is implemented to provide a graded protection against a wide variety of transients, incidents and accidents, including equipment failures and human errors within nuclear power plants and events initiated outside plants. The Regulator Body plays an important role in implementing defence in depth in nuclear installations in the context of a clear allocation of responsibilities with an operating organization. This role starting with setting safety objectives and by its own independent review and technical assessment of the safety justifications provided by the operating organization in addition to safety culture investigating within relevant organizations. This paper is briefly reviews this role in normal operation and post accidents, and its effects on overall nuclear safety in nuclear installations with referring to Egyptian regulatory oversight.