Desalination and Water Treatment
www.deswater.com

38 (2012) 135–137
January

doi: 10/5004/dwt.2012.2552

Taylor & Francis
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Polishing of spent fuel storage bay, dhruva water using synthetic zeolites

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Received 9 December 2010; Accepted 28 June 2011

ABSTRACT

Spent Fuel Storage Bay at Dhruva Research Reactor is meant to store spent fuel from the reactors for cooling purposes. Activity level and quality of the pool water is maintained within prescribed limit. Activity levels of the pool water were found to be much higher than the permissible level. Samples of the contaminated water were withdrawn from the SFSB and studies were carried out for characterization and selection of treatment method. Based upon the results obtained for chemical and radiochemical analysis of the pool water and from earlier experiences for treatment of such type of radioactive waste liquid, mixture of two different grades of synthetic zeolites i.e., 4A & 13X were selected for use in decontamination of the pool water. A 5 ml column bed was prepared by mixing synthetic zeolite 4A (90%) and 13X (10%). The feed solution was passed at a flow rate of 12Bvs/h. Samples were collected periodically and analyzed for gross beta as well as radionuclides. The column operation was terminated at 1% breakthrough with respect to radio cesium was achieved. The results revealed that gross beta activity can be brought down to <20 Bq/ml from 300–520 Bq/ml, no radiocesium or radiostrontium was detected in the effluent till 7000 bed volume. The effluent activity is mainly due to ^{125}Sb, the radionuclide which was not picked up the zeolites. Thus a mixed bed of synthetic zeolites 4A and 13X can be used efficiently to treat the pool water from SFSB, Dhruva.

Keywords: Spent Fuel Storage Bay; Synthetic zeolite 4A; Synthetic zeolite 13X; Radiocesium; Radiostrontium

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Proceedings of DAE-BRNS Biennial Symposium on Emerging Trends in Separation Science and Technology, Kalpakkam, India, March 1–4, 2010