Recent pilot plant experience on alkaline leaching of low grade uranium ore in India

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Uranium deposits in India are low grade and are relatively smaller in extent as compared to present world wide commercial practice. So far, the vein type deposits of Singhbhum Thrust belt are being exploited for meeting the Indian requirements of uranium. The deposits are currently being processed by acid leaching in the mills located at Jaduguda and Turamdih near Jamshedpur in Jarkhand state of India. The deposits at Jaduguda and Narwapahar are being mined by underground mining and are being processed in Jaduguda mill using air agitated Pachukas. The deposits at Banduhurang and Turamdih are being mined by open cast and underground mining respectively and are being processed at Turamdih by acid leaching in mechanically agitated reactors. The occurrences of uranium in North East and in northern part of Kaddapah basin are relatively moderate in size and are expected to be processed in the near future by acid leaching.

Uranium is also found to occur near Tummallapalle in granitic and lime stone host rocks in southern part of Kaddapah basin [Andhra Pradesh] and in Gogi in Bhima basin [Karnataka]. The deposit in Tummallapalle is relatively lower in grade [~ 0.042% U_3O_8] but is a reasonably large reserve whereas that in Gogi is rich in uranium content [~0.18%] but is relatively a small reserve. Laboratory tests based on alkaline leaching have been carried out on both the type of deposits. Studies for Tummallapalle deposits have been extended to pilot plant level and a complete flowsheet has been established with the regeneration and recirculation of lixiviants and recovery of sodium sulphate as a byproduct. The process involves alkaline leaching under oxygen pressure in batch type and/or continuous leach reactor using sodium carbonate/bicarbonate as a leaching media and uranium is recovered as sodium diuranate. Based on the technoeconomic evaluation of the process, a large scale mill is being set up at Tummallapalle in Andhra Pradesh by Uranium Corporation of India Limited. This paper would present the experimental results of laboratory studies and also the pilot plant experience on alkaline leaching of Tummallapalle deposits.