

International Symposium on Uranium Raw Material for the Nuclear Fuel Cycle: Exploration, Mining, Production, Supply and Demand, Economics and Environmental Issues (URAM-2018)



Contribution ID: 211

Type: ORAL

Cost Effective Heap Leaching, the case study of Mutanga, Zambia

Tuesday, 26 June 2018 17:00 (20 minutes)

GoviEx Uranium Inc (“GoviEx”) holds several contiguous mining and prospecting licences in Southern Zambia that are grouped as the Mutanga Project. The deposit comprises of shallow sandstone hosted uranium ore. The Mutanga Project contains a mineral resource of 96.2 million tonnes (“Mt”) of ore at an average grade of 283 ppm U₃O₈ containing 60.0 million pounds (“Mlb”) of U₃O₈ in six deposits (Mutanga, Dibwe East, Dibwe, Gwabe, Njame, and Njame South), located over 65 km strike.

Processing of the ore has been demonstrated to be effective using sulfuric acid leaching with ion exchange recovery of uranium. Test work has confirmed heap leaching is viable and permeability of the ore is good with low acid consumption at 3-18 kg/t. The process is robust, simple and has a low environmental profile. Overall uranium recovery varies with recoveries from each of the deposits averaging 74 to 94%.

An important aspect of improving project economics is to rely on a central process recovery close to the main deposits of Mutanga and Dibwe East and using satellite heaps and adsorption circuits to obtain uranium and transport to the main recovery plant. This allows a large cost saving in transport of ore and allows for optimization of heap conditions in each of the heaps focused on the locally mined ore. For Mutanga-Dibwe East leach pad, pregnant leach solution will be pumped to the adjacent central process plant for stripping and concentrating uranium. For the other deposits pregnant leach solution will be pumped to an adsorption plant where uranium will be stripped of uranium and loaded onto resin. Approximately 24,000 litres per day of resin will be transported by truck to the central process plant for concentrating, barren resin will be trucked back to satellite operations. Uranium production recovery is expected to be on average of 2.4 Mlbs U₃O₈ per annum of uranium contained in uranium oxide. Life of mine capital cost for the project is low at USD167M and operating costs of approximately USD20/t of ore processed (equivalent to USD31/lb). The return on the project has reasonable post tax Net Present Value of USD114M (at 8% discount) and internal rate of return of 25% based on a uranium price of USD58/lb U₃O₈. In order to achieve this with a low grade deposit required lateral thinking about exploiting efficiencies of the different ores and removing redundant processes in order to deliver a realistic project. Such an approach can improve project economics (even at low uranium prices) and provide sustainable mining operations.

Country or International Organization

UK

Primary author: Mr BOWELL, Robert (SRK Consulting (UK))

Co-authors: Mr WILLIAMS, Carl (SRK Consulting (UK)); Mr MAJOR, Daniel (GoviEx Uranium Inc); Mr RANDABEL, Jerome (GOVIEEX); Mr LUSAMBO, Victor (Govix (Zambia) Limited, Lusaka, Zambia)

Presenter: Mr BOWELL, Robert (SRK Consulting (UK))

Session Classification: Underground and Open Pit Uranium Mining and Milling

Track Classification: Track 6. Underground and open pit uranium mining and milling