## Environmental Impact Assessment of Jaduguda Uranium Tailings Ponds on Water Quality

A. K. Mohanty<sup>1#</sup>, G. Bage<sup>1</sup>, V. V. S. Gurunadha Rao<sup>1</sup>, L. Surinaidu<sup>1</sup>, D. K. Choudhary<sup>1</sup>, G. Thama Rao<sup>1</sup>, G. Ramesh<sup>1</sup>, R. Dhakate<sup>1</sup>, A. K. Sarangi<sup>2</sup> and R.N. Nair<sup>3</sup>

<sup>1</sup>National Geophysical Research Institute, (CSIR), Uppal Road, Hyderabad, 500 007
<sup>2</sup>Uranium Corporation of India Limited, Jaduguda, East Singhbhum, Jharkhand
<sup>3</sup>Environmental Assessment Division, BARC, Trombay, Mumbai 400 085

The environmental impacts of uranium mining and milling activities are of great concern in many countries for the last three decades. These impacts range from the creation of massive stockpiles of radioactive and toxic waste rock and sand-like tailings to serious contamination of surface and groundwaters with radioactive and toxic pollutants, and releases of conventional, toxic and radioactive air pollutants. The growing demands of metal grade uranium for the nuclear power industry, Singhbhum Thrust Belt in Jharkhand is India's the richest and most promising uraniferous province meeting the nuclear fuel requirement of the country. The tailings pond are selected at a site where the geological structure is almost unaffected by any hydro-geological processes. However the tailings pond may contaminate the groundwater regime by continuous seepage and leaching of radionuclides and other toxic metals due to interaction of rain water through in the tailings ponds. High resolution electrical resistivity tomography (ERT) surveys have been carried out to delineate the aquifer geometry. Uranium concentrations have been varied from 4 to 75  $\mu$ g/l, 13 to 102  $\mu$ g/l and 7 to 170  $\mu$ g/l, observed in the dug wells, surface water and monitoring wells around Tailing Ponds, respectively. Uranium oxide shows poor correlation with TDS, Cl, SO<sub>4</sub>, NO<sub>3</sub>, HCO<sub>3</sub>, Na, K, Ca and Mg, in ground water. This implies that, uranium concentrations in ground water are not directly governed by the geological controls on the host rock and surrounding media, which interacts with the ground water. Water quality analyses have provided an insight of the present groundwater quality status. Mass transport modeling has provided prognostic scenarios of contaminant migration in groundwater around the tailing ponds for next 20 years.

Key words: Uranium contamination, Tailing Ponds, Singhbhum Shear zone.

Corresponding author #: <u>atulyakmohanty@gmail.com</u>