

## RADIOACTIVE DISEQUILIBRIUM IN THE CRETACEOUS SERGI SANDSTONE, RUA NOVA, JORRO AREA, TUCANO, BAHIA

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**RESUMO:** Strong radioactive anomaly detected in black, ferruginous sandstones of the Sergi Formation, occurring at the river banks in the right margin of the Itapicuru River constitutes a clear example of radioactive disequilibrium. The Anomaly area described as "radioactive sandstone" (Haynes, 1964) is distributed exclusively within and along the stratification of the sandstone underlain by yellow sandstone displaying typical roll front type structure for about 250m and an exposed thickness of about 2m, that could be classified as sandstone-type. Conglomerates with reworked ventifacts of quartz, sandstone, rare tourmalinite, grade to north to the referred sandstones. No significant radioactive values were detected in the yellow sandstone. Other exposures of radioactive black sandstones ("manganiferous sinter") are exposed at Mosquete and along the Itapicuru River within the fault zone. Along the fault zone are the thermal springs of Jorro, Jorinho and Cipó, all radioactive at the fountain. Wells for drinking water perforated in the Tucano region are not radioactive at the fountain, revealing a relation between uranium dissolution, thermal springs and the fault zone. We assume that the alkaline character of the water produced the dissolution of uraninite, and perhaps the existing vanadium minerals (carnotite, montroseite and tyuyamunite) from the sandstones, also triggering the decayment process. Along a possible branch of the fault zone, in nine CNEN-wells uranium and vanadium have been found, in the ranges 0.30-17.40% V<sub>2</sub>O<sub>5</sub> and 0.005-0.75% U<sub>3</sub>O<sub>8</sub>, interpreted as radioactive anomalies (Saad & Munne, 1982). Despite the small amount of data, it could be conceived that the wide range of values found represent extremely irregular dissolution, which may dispersed U and V, jeopardizing the possibility of forming economic deposits of that elements. About 6 km north of Rua Nova, at Poção Village, in the two wells at depth of 26-30m, it was detected through gamma spectrometry, SP-Spontaneous potential and density tests several horizons interpreted as high U-V anomaly within the Sergi sandstone. The long-lived heavy radioactive elements decay into daughter radioactive products, near equilibrium conditions, but in some instances they may be not (Marble, 1954). As <sup>238</sup>U, <sup>235</sup>U and <sup>232</sup>Th decay in <sup>226</sup>Ra (t<sub>1/2</sub>=1599 years) and <sup>222</sup>Rn (t<sub>1/2</sub>=3.8 years) it may happened the dissolution of uraninite, transformation of U<sup>4+</sup> into U<sup>6+</sup>, in the sandstone, transport out of the system of the oxidized phase, huge deposition of Fe as goethite and retention of <sup>226</sup>Ra and perhaps <sup>222</sup>Rn in the goethite. Nevertheless radionuclide <sup>226</sup>Ra is highly soluble it could be retained as a sulfate, detected in the analyses. Radioactive values as high as 30 000 cps (3400 ppmU eq; 130 ppmTh eq) have been found, although the chemical analyses for U<sub>3</sub>O<sub>8</sub> and ThO<sub>2</sub> resulted in extremely meager or zero values in all samplings, thus characterizing the radioactive disequilibrium. In the yellow sandstones with roll structures, the values were below 200 cps (2 ppmU eq; 13 ppmTh eq).

**PALAVRAS-CHAVE:** RADIOACTIVE; DISEQUILIBRIUM; ROLL-TYPE.