POLLUTION OF WATER RELATED WITH AN ABANDONED URANIUM MINE AND HEALTH EFFECTS

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The Vale de Abrutiga uranium mine is located close to the reservoir of the Aguieira dam. The mine is an open pit and the tailings and rejected ore were deposited on permeable ground, and are not covered by vegetation. The open pit mine was closed, filled with water, and a lake was formed. The newly formed acid waters caused dissolution of metals and flowed to the reservoir of the Aguieira dam. Drainage waters from the open pit lake, mine tailings and rejected ore have pH values close to 2.5, high conductivity, and high concentration of U, SO42-, Zn, Fe, Mn, Ra and Cu, and groundwater shows high conductivity and contamination of U, Fe, Mn and Ra. Exposure to U can result in both chemical and radiological toxicity, for which the lung and the kidneys are the main target organs. The major chemical effect is kidney toxicity, causing damage to the kidney cells, and even kidney failure and death. Human exposure to U-radiation, and its coumpounds, increases the possibility of developing cancer during their lifetime. Correlation between radon exposure and lung cancer in the U-miners is well documented. Inhalation, injection, ingestion or body exposure to Ra can cause cancer and other body disorders. Manganese in excess is toxic. Recent studies suggested a connection between Mn inhalation and central nervous system toxicity in rats. A form of Parkinson's Disease-type neurodegeneration called "manganism" has been linked to manganese exposure. Excessive intake of iron can damage the cells of the gastrointestinal tract directly, and can enter the bloodstream by damaging the cells that would regulate its entry. Once there, it causes damage to cells in the heart, liver, etc. Too much ingested zinc can promote deficiency in other dietary minerals. In toxicity, copper can inhibit the enzyme dihydrophil hydratase, an enzyme involved in haemopoiesis. Most Cr(VI) compounds are irritating to eyes, skin and mucous membranes. Chronic exposure to Cr (VI) compounds can cause permanent eye injury. Chromium(VI) is an established human carcinogen.

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