

## **Preliminary Investigation of Critical Elements in Bauxite Stock Piles, Saline County, Arkansas**

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### **Abstract**

The former mining town of Bauxite, Arkansas is in the Saline County Mining District, approximately 40 kilometers southwest of Little Rock. This area has extensive deposits of bauxite ore and nepheline syenite, previously mined by the Aluminum Company of America (ALCOA) using open pit and subsurface mining methods. Mining of nepheline syenite and bauxite still occur in the area but at significantly lower rates than its peak during World War II. Twenty-five piles of bauxite remain at the site and are categorized by grade content. These stock piles are currently not processed for alumina because of the high energy required for extraction in the lower grade ore.

Over the past several years, there has been renewed economic interest in minerals that can be derived from bauxite and related residues. Many minerals, now identified as critical minerals, were not commonly utilized in the past but now are crucial to advancing technology. Preliminary X-ray fluorescence (pXRF) results from this study identified critical elements in economic concentrations such as uranium (U), thorium (Th), arsenic (As), tungsten (W), and lanthanide series elements including cesium (Ce), praseodymium (Pr), and neodymium (Nd). The concentration of these elements within bauxite piles and/or residues could provide economic resources for the future as demand for critical minerals continues to increase.