URANIUM POTENTIAL IN NIGERIA

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1. INTRODUCTION

The Nigeria Atomic Energy Commission was established by Decree 46 (now Act 46) in August 1976 and became operational in July 2006 as a specialized National Focal Agency with the mandate to promote and develop atomic energy and for all matters relating to the peaceful uses of atomic energy. The Nigeria Atomic Energy Commission was further mandated to prospect for, and mine, radioactive minerals, manufacture or otherwise produce, buy or otherwise acquire, treat, store, transport and dispose of any radioactive substances. The uranium potential in Nigeria is considered to be favourable, with several known uranium occurrences having commercial levels of mineralization [1, 2]. Given the limited uranium exploration carried out in Nigeria to date, significant potential is presumed to exist based on observations and the knowledge of favourable geological environments for hosting uranium deposits (sandstone and unconformity-related deposit types) [1, 3].

2. GEOLOGICAL SETTING OF NIGERIA

The geology of Nigeria comprises four main groups of strata [3, 4], namely:

1) The basement complex;
2) Younger granites;
3) Sedimentary series strata;
4) Tertiary–Recent volcanics.

The basement complex comprises the migmatite gneiss complex, pegmatites, schist belts composed of metasedimentary and metavolcanic rocks, and the pan-African granitoids comprising the older granites and the associated charnockitic rocks. The younger granites are of Jurassic age and are found as ring complexes cropping out within the basement complex areas [3, 4].

3. NIGERIAN URANIUM OCCURRENCES

Uranium potential in Nigeria is considered to occur as sandstone hosted and vein type mineralization. Sandstone hosted deposits occur in sedimentary/volcano-sedimentary sequences in the structurally controlled Bima sandstone at Zona and Dali, while the vein type mineralization occurs in the deformed migmatites and granitoids in the Gubrunde, Kanawa, Ghumchi, Mika and Monkin–Maza deposits [5–7]. Substantial uranium mineralization occurs in the Ririwai area of southern Kano. According to Obaje et al. [8], uranium occurs in peraluminous and peralkaline granites and the content of uranium in peraluminous granite is in the range 16–32 ppm U. The Mika, Gumchi, Zona and Mayo Lope areas of Adamawa State have good uranium exploration potential, localized in the mylonitized, sheared and brecciated fine-grained to porphyritic granites. Analysis of cores from 40 drill holes gave values of 2000 ppm U [2].
4. HISTORY OF URANIUM EXPLORATION IN NIGERIA

In Nigeria, uranium exploration started in 1973 and to date uranium has been recorded in six States, namely: Cross River, Adamawa, Taraba, Plateau, Bauchi and Kano. Uranium mineralization occurs at Guburende, Kanawa, Zona, Dali, Mika and Monkin–Manza and were all discovered by three Government agencies [9]:

1) GEOLOGICAL SURVEY DEPARTMENT:
   In 1974, the Geological Survey Department discovered uraniferous pyrochlore in Ririwai hills in Kano State and Kigo Hills in Plateau State. The grade is 0.012% uranium oxides;

2) THE NIGERIAN MINING CORPORATION:
   The Nigerian Mining Corporation (now defunct) had an exploration campaign in Kogi State (northern Nigeria) and collaborated with the Nigerian Uranium Mining Company in the exploration of some areas in north-eastern Nigeria in 1980;

3) NIGERIAN URANIUM MINING COMPANY:
   Established in 1979 with the mandate to explore for, and exploit, all available uranium ore deposits in Nigeria. It was in public/private partnership with Total Compagnie Miniere of France, which owned 40% of the company as a technical partner. In 1989, Total Compagnie Miniere pulled out of the partnership owing to lack of funding. The company carried out exploration programmes at reconnaissance and semi-detailed levels. Areas of activities covered about 112 346 km² in north-eastern Nigeria, in the area bordering Cameroon [2]. Areas of interest included Gubrunde, Mika and Ghumchi, which are all underlain by the rocks of the basement complex, and the Mayo Lope area, which is underlain by Cretaceous continental sedimentary rocks [9].

5. FINDINGS AND CURRENT PROGRESS

The following results have been summarized from the various exploration campaigns:

1) The uranium reserve at Mika is estimated at 52 tU at a grade of 0.63% U and a vertical extent of 130 m;
2) The uranium reserve at Ghumchi is estimated at 100 tU at a grade of 0.90% U and a vertical extent of 200 m. The cut-off grade is 0.03% U [2].

Currently, the mandate for exploration of uranium in Nigeria is vested in the Nigeria Atomic Energy Commission. The Nigeria Geological Survey Agency and three university research centres are currently carrying out limited exploration for uranium in the potential areas owing to restricted funds.

6. CONCLUSION

Uranium exploration in Nigeria is still ongoing and being carried out by the Nigeria Geological Survey Agency and three university research centres under the coordination of the Nigeria Atomic Energy Commission.

At present, the investigated deposit size and potential are still insufficient to encourage resource drilling and feasibility studies. A classical geophysical method applicable to fault detection is also needed. Economic viability of extraction has not been determined owing to insufficient information. The Nigeria Atomic Energy Commission is, therefore, encouraging serious investors in this area to come to Nigeria and invest in the uranium potential that is known to exist in commercial quantities.
REFERENCES


