

# International Symposium on Uranium Raw Material for the Nuclear Fuel Cycle: Exploration, Mining, Production, Supply and Demand, Economics and Environmental Issues (URAM-2018)



Contribution ID: 59

Type: ORAL

## Uranium potential in Nigeria

*Wednesday, 27 June 2018 11:20 (20 minutes)*

### INTRODUCTION

The Nigeria Atomic Energy Commission (NAEC) was established by Degree 46 (Now Act 46) in August, 1976 and became operational in July, 2006 as a specialized National Focal Agency with the mandate for the promotion and development of atomic energy and for all matters relating to the peaceful uses of atomic energy.

The 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 in commercial quantity with several known uranium occurrences [1-2]. Given the limited uranium exploration carried out in Nigeria to date, a greater potential is presumed to exist based on spot observations and the knowledge of favorable geological environment for uranium deposits (sandstone and unconformity-related deposit types) [1,3].

### GEOLOGICAL SETTING OF NIGERIA

The geology of Nigeria is composed of 4 main groups [3-4], namely:

1. The Basement Complex,
2. Younger Granites,
3. Sedimentary series and
4. Tertiary-Recent volcanic rocks.

The Basement Complex is made up of the migmatite/tegnesis complex, pegmatites, the 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 they are found as ring-complex outcrops within the Basement Complex areas [3-4].

### NIGERIAN URANIUM OCCURRENCES

Uranium potential in Nigeria occurs in sandstone-hosted and vein-type mineralization. Sandstone-hosted deposits occur in sedimentary/volcano sedimentary sequences in structurally controlled Bima sandstone at Zona and Dali, while the vein-type mineralization occurs in the deformed migmatites and granitoids at 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 occurred in peraluminous and peralkaline granites and the content of uranium in peraluminous granite lies between 16 and 32 ppm.

Mika, Gumchi, Zona and Mayo Lope areas of Adamawa State have good uranium exploration prospect localized in the mylonitized, sheared and brecciated fine-grained to porphyritic granites. Analysis of cores from 40 drilled holes gave values of 2,000 ppm uranium content [2].

### HISTORY OF URANIUM EXPLORATION IN NIGERIA

In Nigeria Uranium exploration started in 1973. Uranium has been found in six states of the country. The six states are Cross River, Adamawa, Taraba, Plateau, Bauchi and Kano. The mineralizations are Guburende, Kanawa, Zona, Dali, Mika, and Monkin-Manza and were all discovered by three government agencies [9]:

## 1. GEOLOGICAL SURVEY DEPARTMENT (GSD)

In 1974, GSD discovered the uraniferous pyrochlore in Rirawai hills in Kano State and Kigo hills in Plateau State.

The Grade is 0.012% uranium oxides.

## 1. THE DEFUNCT NIGERIAN MINING CORPORATION

The Defunct Nigerian Mining Corporation Exploration campaigns in Kogi State (North Central Nigeria) collaborated with NUMCO in the exploration of some areas in North Eastern Nigeria in 1980.

## 1. NIGERIAN URANIUM MINING COMPANY (NUMCO)

Established in 1979 with the mandate to explore 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 pulled out of the partnership as a result of lack of funding.

The company carried out exploration programmes at both the reconnaissance and semi detailed levels. Areas of activities covered about 112,346 Km<sup>2</sup> in the North Eastern Nigeria bordering the Cameroun [2].

Areas of interest include Gubrunde, Mika and Ghumchi all underlain by the rocks of the basement complex; and Mayo Lope area which is underlain by the Cretaceous continental sedimentary rocks [9].

## FINDINGS AND CURRENT PROGRESS

At the end of the various exploration campaigns;  
Uranium reserve at Mika was put at about 52T U.  
Grade was 0.63% U. At a vertical depth of 130m.  
Uranium reserve at Ghumchi was estimated at 100T U  
Grade was 0.9 % U. At a vertical depth of 200m  
Cut-off was 0.03% U [2].

Presently, the mandate for the exploration of Nigeria Uranium is vested in the Nigeria Atomic Energy Commission. Currently the Nigeria geological Survey Agency (NGSA) and three university research centres are carrying out limited exploration of uranium in the potential areas due to limited funds.

## CONCLUSION

Uranium exploration in Nigeria is still in progress. They are being carried out by NGSA and three universities research centers under the coordination of NAEC with limited funds.

At present the investigated deposit size and potentials are still insufficient to motivate the resource drilling and feasibility studies. A classical geophysical method applicable to faults detection is also needed. Economic viability of extraction has not been determined due to insufficient information. NAEC is therefore, calling on all serious investors in this area to come to Nigeria and invest in this uranium potential that exist in commercial quantity.

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## **Country or International Organization**

Nigeria

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**Session Classification:** Uranium Newcomers

**Track Classification:** Track 12. Uranium newcomers