

Paper Number: 5237

Uranium in Africa

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Africa has been a significant world producer of uranium since 1945 when it was discovered in the DRC. There are four major types of deposits that produce the majority of the uranium in Africa: Archaean quartz conglomerate-hosted gold-uranium deposits of the Witwatersrand Basin South Africa; Neoproterozoic end-orogeny sheeted leucogranites and small stocks of Namibia; Mesozoic sandstone-hosted roll-front deposits of Niger and Malawi; and Pleistocene to Recent channel-hosted calcrete and alluvial deposits in Namibia. Minor unconformity-style deposits occur in Algeria and Malawi, phosphate-hosted deposits in Morocco and offshore South Africa, as well as vein-hosted deposits at Shinkolobwe in DRC and Lumwana in Zambia.

Namibia constitutes a uraniferous province with known uranium enrichment occurring over a period of 2000 Ma ranging from Eburnean basement granite gneiss, through Neoproterozoic Damaran metasedimentary rocks and intrusives, Mesozoic granite complexes related to Gondwana fragmentation and carnotite-rich calcrete and siliciclastic hosted surficial deposits which developed from late Tertiary. Similarly, in South Africa, uranium deposits occur in Archaean quartz pebble conglomerates, in a Palaeoproterozoic carbonatite, in Permo-Triassic Karoo sandstones, with concentrations also in granites of the Cape Suite that are late Proterozoic to Cambrian in age, in granite gneiss and pegmatites of the Namaqualand Metamorphic complex and in Recent lacustrine deposits as at Henkries and pedogenic concentrations and marine phosphates.

Africa has been a significant world producer of uranium since 1945 when it was discovered in the DRC, at Shinkolobwe. This first uranium was used for medical treatment of certain cancers. Following a brief closure in 1937, Shinkolobwe was reopened and the US government purchased around 30 000 tU for the Manhattan Project in the early 1940's. About 25,000 tU was produced over two decades from this vein-hosted deposit, but ceased on independence in 1960, when the shafts were sealed. The deposit has been unofficially mined since 1997 for cobalt but there is no current mining of uranium.

Granite-hosted uranium mineralisation in Namibia was first noted in the early 1920s by the occurrence of heliodor and davidite in the vicinity of Rössing Mountain. Rio Tinto discovered numerous uranium occurrences and in 1966 obtained the rights over the low-grade Rössing deposit, and a mine has been in operation since 1976. Two other significant deposits found in early exploration were Trekkopje, a calcrete-hosted deposit 80 km NE of Swakopmund, and Langer Heinrich, a calcrete-hosted deposit discovered in 1973, 80 km inland from Walvis Bay. More recently, several primary hosted deposits have been developed including the world-class Husab deposit. In Niger, uranium was discovered at Azelik in 1957 by the French BRGM. Further discoveries were made in the late 50's and 60's including Abokurum (1959), Madaouela (1963), Arlette, Ariege, Artois & Tassa/Taza (1965), Imouraren (1966) and Akouta (1967), and on the basis of these discoveries Niger's uranium industry was founded in 1968 with the first production from Arlit in 1971. Capacity was expanded to ~2,100 tU /yr in 1981 and at its peak in the 1980's, 40% of world uranium production came from Arlit, and uranium represented 90 % of Niger's exports by value. In 1981 production was cut by half and in the late 1980's, Arlit suffered from a steep decline in world uranium prices and the value of Niger's uranium "boom" has never recovered to pre-

1980 levels. In South Africa, radioactivity was noted in the gold-bearing conglomerates in 1915. Uranium production began in 1951, peaking in 1959 when 26 mines supplied 4954 tU for the nuclear weapons programme but output was reduced until the world oil crisis in 1973, when production resumed as a source for nuclear energy so that by 1980, 20 mines produced 6000 tU. The price slump in 1980 led to reduced outputs so by 1994 only 3 producers remained. Most uranium has been a by-product of gold mining, from the Witwatersrand Basin, although there has also been production as a by-product of copper mining from the carbonatite at Palabora and uranium resources have previously been evaluated in the Permo Triassic-aged Karoo Basin.

