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科研成果报告

Ngalia盆地铀成矿条件分析 和找矿靶区优选



完成单位：核工业北京地质研究院（乙方）
Energy Metals Limited（甲方）

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Ngalia盆地铀成矿条件分析 和找矿靶区优选

Analysis of Uranium Metallogenic Conditions and Optimization of Exploration Targets in the Ngalia Basin

项目负责人：范洪海

报告编写人：王生云 孙远强 罗毅 许强 顾大钊 谷雨

报告审查人：范洪海 罗毅

单位负责人：李子颖

项目完成单位：核工业北京地质研究院

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Executive Summary

The study area is located at the northern margin of the Ngalia Basin and contains 17 granted ELRs and ELs, covering an area of about 2400 km², within which the Bigrlyi deposit is located at 131°02'26"E and 22°13'11"S.

An approximately E-W trending uranium belt occurs along the northern margin of the Ngalia Basin with the mineralization hosted in sandstone; it is one of Australia's important prospective uranium provinces. The uranium deposits and mineralization are closely related in space to Unit C of the Carboniferous Mt Eclipse Sandstone located on the northern margin of the Ngalia Basin. The uranium mineralization is controlled by approximately E-W trending redox zones within arkosic sandstone and shows typical characteristics of lithological control and thus the arkosic sandstone of the Unit C of Mt Eclipse Sandstone (and its equivalents in other parts of the Basin) is the major target zone for uranium in the Ngalia Basin.

The Bigrlyi deposit is a sandstone-hosted uranium deposit associated with vanadium distributed within the Carboniferous sedimentary rocks in the Ngalia Basin. The Bigrlyi deposit is hosted in grey arkosic sandstone deposited in a braided river system. The uranium mineralization in the Ngalia Basin can mainly be subdivided into two phases: one is syn-deposit and diagenesis mineralization and the other is post-diagenesis mineralization. During the course of deposition, diagenesis and compaction, uranium and vanadium were precipitated along the grain margins of clay clasts in the arkosic sandstone with a relatively good permeability in Unit C of the Carboniferous Mt Eclipse Sandstone to form the uranium mineralization associated with vanadium with the formation age of possible Carboniferous. Fault structures at associated with the late Alice Springs Orogeny (late Carboniferous) may have acted as conduits for the up-flow of reductive fluid from the deep basin into the overlying Carboniferous Unit C . Uranium- and oxygen-bearing fluids from the source regions flowed through the sand body of Unit C resulting in uranium accumulation close to the upper and lower sandy mudstone contacts of Unit C to form redox-controlled "tabular" high-grade uranium ore bodies. Basin compression associated with thrust structures subsequently uplifted

the Mt Eclipse Sandstone to the surface.

The Ngalia Basin is underexplored as a whole. However, many uranium deposits, occurrence and anomalies have been discovered and defined and thus it has large potential for uranium. Through five-years' exploration work, three small deposits known as A15 East, Bigwest and Camel Flat have been discovered in the peripheral areas of Bigrlyi uranium deposit. At the same time, 10 exploration target areas have been defined in the Ngalia Basin, which can be subdivided into three categories (Figure 1): (1) Category A, where the uranium mineralization has been previously discovered and a resource has in some cases been estimated: four areas have been defined containing the Bigrlyi, Walbiri, Malawiri, A15 East, Bigwest and Camel Flat deposits and Dingo's Rest, Penrynth and Coonega prospects as well; (2) Category B, where the Mt Eclipse Sandstone is well developed and close to granite basement with high U, Th and K contents, three areas have been defined containing the Karins deposits and Smiths Gift and CB-43 (Cassidy) anomalies as well; (3) Category C, where the Mt Eclipse Sandstone is associated with regional radiometric anomalies, three areas have been defined in the western Ngalia Basin.

Through five-years' exploration work, the Bigrlyi, Cappers, A15 East, Bigwest and Camel Flat deposits now have JORC-compliant resources of 13,508t U₃O₈, with an increase in uranium resource of 4,168t U₃O₈ (equivalent to uranium metal of 3,534t U) compared with the uranium resource when CGNPC acquired the major equity of EME in 2009. The percentage of indicated resource in the Bigrlyi deposit area has increased from 44.9% to 66.5%, providing a reliable resource base for the subsequent mining design and economic assessment in the course of a feasibility study. The increase in the percentage of indicated resource and the progression of the project from scoping study level to pre-feasibility level have further enhanced the resource value of the Bigrlyi deposit. The value of uranium resource of the Bigrlyi deposit has been calculated by the 'unit resource value estimation method' which refers to the transaction cost when acquiring EME in 2009 combined with an evaluation of world-wide uranium transactions ; the results show that its total value has increased by 38.9% during the period from 2010 to 2013.

There is significant potential for additional uranium to be located at depth in the Bigrlyi deposit and also in surrounding areas. The exploration results show good mineralization at depth at Bigrlyi and the grade improves as the depth increases. At present, the best result of approximately 5% U_3O_8 grade has been returned from samples at depth of about 500m. Also several uranium deposits have been discovered and a number of additional uranium prospects have been identified in the Ngalia Basin. Thus, a significant increase in uranium resources can be expected as exploration work proceeds in the Ngalia Basin.

The prefeasibility study results of the Bigrlyi deposit show good technical and environmental indicators: excellent mining recoveries, excellent metallurgical recoveries (>95%), excellent geotechnical conditions, the existence of a water source within the mining area and no environmental impediments to development and further there is significant potential for optimization of technical parameters.

Key Words: Resource Estimate, Detailed Exploration Stage, Sandstone-hosted Uranium Deposit, Bigrlyi Deposit

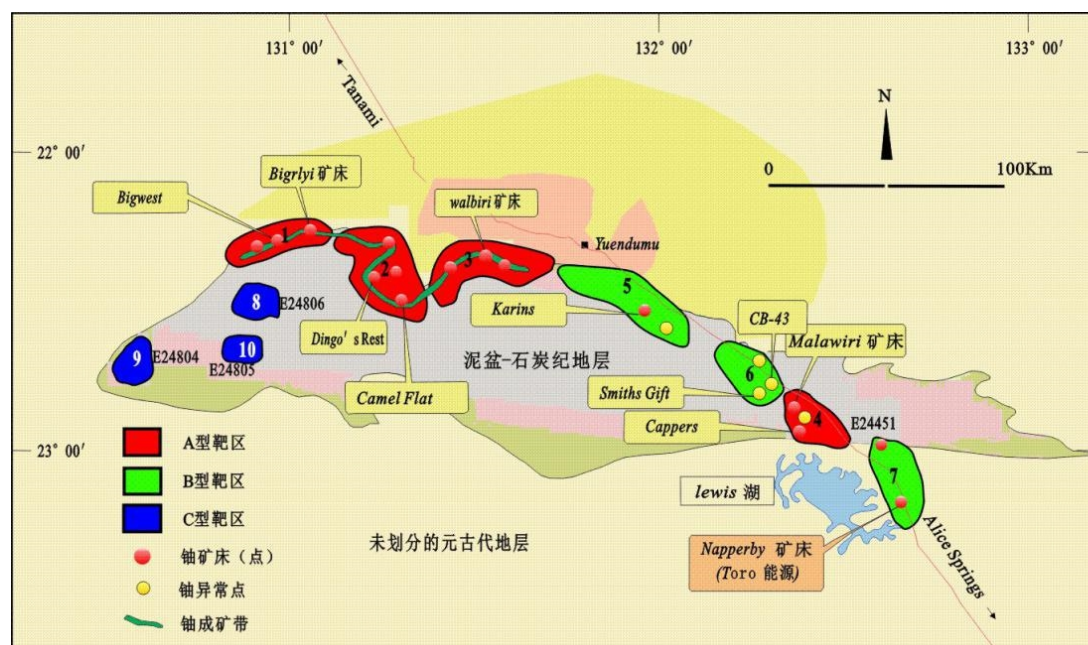


Figure 1 Map showing uranium exploration target areas in the Ngalia Basin, Category A areas in red, Category B areas in green and Category C areas in blue.