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A. 2000 Diamond Drill Logs
Summary

The Tin Camp Creek tenements are located in Arnhem Land about 250 kilometres east of Darwin. Exploration is being conducted by a joint venture that consists of AFmeco Mining and EXploration Pty Ltd (operator), Cameco Australia Pty Ltd, SAE Australia Pty Ltd and West Arnhem Corp Pty Ltd.

This report describes the results of the fifth year of exploration on the tenements.

Five drillholes were completed during the year totaling 1353m of helicopter assisted diamond drilling. All of the drilling was conducted within the South Horn area (EL 2506).

While no significant uranium mineralisation was found during the year, the further confirmation of secondary uranium mineralisation within the metamorphic lithologies is encouraging.
1. INTRODUCTION

The Tin Camp Creek tenements are being explored in joint venture by AFmeco Mining and EXploration Pty Ltd (operator), Cameco Australia Pty Ltd, SAE Australia Pty Ltd and West Arnhem Corp Pty Ltd.

The tenements included in the Tin Camp Creek joint venture are shown on figure 1. All of the tenements are located within the Arnhem Land Aboriginal Reserve.

This report details the work carried out during 2000.

2. LOCATION AND ACCESS

The tenements are located in West Arnhem Land about 250 km east of Darwin in the Northern Territory of Australia.

Access is either by air to the Nabarlek airstrip which is located about 20km to the north of the tenements, or by road via the Arnhem Highway to Jabiru and then via Cahills Crossing and unsealed roads to Myra Camp.

The sandstone escarpment country is only accessible by helicopter or on foot. The rest of the area is served by 4-wheel drive tracks, which become impassable during the wet season from November to April.

3. TENURE

Exploration licences 2505, 2506, 2507, 2516, 2517, 7029 and 9354 were granted to Queensland Mines Pty Ltd on 12th September 1995 for a period of six years. The tenements are currently being explored in joint venture by AFmeco Mining and EXploration Pty Ltd – operator (24.5%), Cameco Australia Pty Ltd (49%), S.A.E Australia Pty Ltd (24.5%) and West Arnhem Land Corporation Pty Ltd (2%).
joint venture partners acquired the tenements from Queensland Mines Pty Ltd in February 1998.

Reductions were waived at the end of years 2 and 3 of tenure. Partial reduction of tenement was carried out at the end of the fourth and fifth years. For details of the partial relinquishment in years 4 and 5 refer to the relinquishment reports previously submitted to the Mines Department.

4. **Geology**

The regional geology of West Arnhem Land has been described in detail in many previous reports and only a brief overview will be given here. The regional geology is shown on figure 2 and a stratigraphic chart is shown on figure 3.

The oldest rocks exposed in the area are gneisses belonging to the Mount Howship Gneiss of the Kakadu Group of lower Palaeoproterozoic age. Further to the west in the Alligator Rivers uranium field, similar rocks overlie the Archaean Nanambu complex. The Mt Howship Gneiss is overlain by the Kudjumarndi Quartzite, which is one of the main marker horizons in the region.

The psammitic rocks of the Kakadu Group are overlain by the Cahill Formation also of lower Palaeoproterozoic age, which is the host of the main uranium ore bodies in the area. The Lower Cahill Formation consists of a basal calcareous unit, which is overlain by a sequence of pelitic schists, meta-arkose and amphibolite. A well-defined amphibolitic unit at the top of the Lower Cahill Formation hosts the Nabarlek uranium deposit. The Upper Cahill Formation and Nourlangie Schist consist of a monotonous sequence of meta-arkose, schist and amphibolite.

East and south of the area of the Palaeoproterozoic sediments lie the granitoid rocks of the Nimbuwah Complex. These granitoids were extensively migmatised during the Top End Orogeny, which is dated at about 1800my. The relationship between the Cahill Formation and the Nimbuwah Complex is little known. Limited field observations show the contact to be gradational and migmatitic in nature.
Later post-orogenic Proterozoic granites, such as the Nabarlek and Tin Camp Granites have intruded the meta-sediments in the east of the area.

The upper Palaeoproterozoic Kombolgie Formation overlies the older rocks unconformably. This formation consists of sandstones with a prominent basaltic horizon (Nungbalgarri Volcanic Member). These flat-lying sandstones form the Arnhem Land escarpment.

The Oenpelli Dolerite (1700my) intrudes the early Palaeoproterozoic metasediments and the Kombolgie Formation, and forms large lopolithic bodies. It is the youngest Precambrian rock outcropping in the area.

5. **Previous Work**

Queensland Mines Pty Ltd previously explored the area in the early 1970’s. During this time the Caramal prospect was discovered by an airborne survey and was tested by drilling.

No exploration was carried out in the area from September 1973 until September 1995 when the current exploration licences were granted.

An airborne geophysical survey was flown over the tenements in 1996. The survey acquired EM, radiometric and magnetic data, and delineated a series of radiometric anomalies in the South Horn area, while some shallow conductors were discovered elsewhere in the region.

Regional stream sediment surveys have been conducted in 1996, 1997 and 1998 throughout much of the joint tenements. Soil surveys designed to test EM anomalies and stream sediment anomalies (Au) were conducted in 1999.

RAB drilling was conducted in the South Horn area and also in the western parts of EL 2516. Conventional dual-purpose (RC/Diamond) drilling and helicopter-supported diamond drilling have been conducted every year since 1996. Areas tested
by either of these methods include Caramal (EL 2505), South Horn & South Horn West (EL 2506), Gurrigarry (EL 2516) and Algodo (EL’s 2517, 9354).

Details of the work completed in the past can be found in previous annual reports submitted to the Mines Department.

6. WORK COMPLETED DURING 2000

The only work completed in the fifth year of tenure was helicopter-supported diamond drilling, all within the EL 2506 tenement.

6.1. DRILLING

Five diamond drillholes were completed at the South Horn prospect (EL 2506) totaling 1353m.

Details of the drillholes can be found in table 1, while a drillhole geological summary is presented in table 2. Diamond drillhole logs are presented in appendix A.

All of the holes were probed with a downhole natural gamma Auslog tool. A summary of all sampling conducted on the drillcore can be found in table 3. Sandstone drillcore was composite sampled over 10 metre lengths and the samples were sent to Ultratrace Pty Ltd to be analysed for Al2O3, CaO, Fe2O3, K2O, MgO, Na2O, TiO2, P2O5, U, Th, As, B, Ni, Pb, V and Zn by ICP-MS/OES (see table 4). Where the original U value was >2 ppm the sample was reanalysed using an aqua-regia digest to return a value for labile uranium (U-AR).

XRD and PIMA mineralogical analyses were conducted on sandstone and basement (PIMA only) core at regular intervals, and results are shown in tables 5 and 6, respectively. Details of the PIMA method have been detailed in previous reports submitted to the Mines Department.
6.1.1. South Horn (EL 2506)

Radiometric anomalies were discovered in the South Horn area by the 1996 airborne radiometric survey. The area is located within EL 2506 approximately 5km south of the Caramal prospect. Sub-economic uranium mineralisation was intersected in Oenpelli Dolerite during the 1997 drilling programme. The area is crosscut by a number of favourable structures including the Khyber Pass structure and the Beatrice fault.

Five drillholes were completed in this area during 2000. The locations of the holes are shown on figure 4. Most of the drillholes (SHD28 to SHD31) were sited to test stratigraphic continuations of graphitic mica schists of the Lower Cahill Formation. This lithology was the host to minor uranium mineralisation intersected in 1999 drilling. SHD32 was sited to test a zone proximal to the intersection between a Khyber Pass-parallel structure and the Beatrice fault.

**SHD28** was collared within the Lower Kombolgie Formation, which continued down to 200.6m. The sandstone is moderately to strongly silicified, hematite-altered and fine-grained throughout much of the hole. The sandstone becomes pebbly from approximately 150m, and is moderately to strongly chloritised from 175.0m onwards. Two dolerite intrusions crosscut the sandstone – a thin dyke between 180.8 and 182.6m and a slightly wider intrusion between 200.6 and 205.5m. Both dolerites are aphanitic and strongly chloritised. Metasediments of the Lower Cahill Formation continue downhole from the lower contact of the dolerite intrusion hence masking the exact unconformable contact between the sandstone and the metasediments. The metamorphic lithologies include meta-arkose and garnet-mica schist. Hematite, illite and chlorite alteration is observed throughout the metasediments and quartz segregates and mobilisates are common. From 242.7m to the EOH the metasediments are migmatised, with narrow schist and meta-arkose remnants scattered throughout the migmatite.

**SHD29** was collared within the Lower Kombolgie Formation, which continued down to the unconformity at 204.4m. Much of the sandstone is silicified, hematite-altered
The sandstone contains small kaolinite-hematite filled voids (‘spots’), possibly after chlorite alteration. From 184.2m to the unconformity the sandstone is chlorite altered and partially brecciated. A narrow chlorite rock (after dolerite) was intersected between 188.6 to 190.3m. The basement lithologies are interpreted to be within the Lower Cahill Formation, and include meta-arkose and (garnet)-mica schist. This unit is migmatised between 235.2 and 255.7m and at narrow intervals throughout the remainder of the drillhole. The metasediments are hematite, chlorite and illite altered in varying proportions. A narrow porphyritic dolerite intrusion crosscuts the metasediments between 220.3 and 220.7m.

**SHD30** was collared within the Lower Kombolgie Formation, which continued down to the unconformity at 199.6m. Down to 131.6m the sandstone is fine to medium grained, hematite altered and silicified. Clay-filled ‘spots’ (millimetric voids) and stylolites are common within this zone. From 131.6m to the unconformity, coarse-grained to pebbly sandstone dominates. Dolerite crosscuts the sandstone between 177.4 and 183.4m and is chlorite altered and brecciated. The sandstone beneath the dolerite contact is chlorite altered and brecciated. Hematite altered basement rip-up clasts occur proximal to the unconformity. The basement comprises Lower Cahill Formation metasediments, including meta-arkose and (graphite)-garnet-mica schist. Moderate hematite alteration occurs in a narrow zone immediately beneath the unconformity, while the remainder of the basement lithologies are mild to moderately chlorite and illite altered. Minor uranium anomalism (?secondary mineralisation) occurs at 224.7m within fractured, moderately chlorite-illite altered garnet-mica schist. Two thin dolerite intrusions within the basement are sub-parallel to foliation. The dolerite is moderately chlorite and illite altered and contains numerous quartz-pyrite veinlets.

**SHD31** was collared within the Lower Kombolgie Formation, which continued down to the unconformity at 181.5m. Down to 107.6m the sandstone is fine-grained and silicified. Minor spotting and patchy hematite alteration are also present in this zone. From 107.6m to the unconformity there are two packages of coarse-grained, pebbly sandstone separated by a zone of fine-grained, silicified sandstone. The upper coarse-grained package is hematite altered, silicified and bleached. The fine-grained sandstone and basal coarse-grained package are chlorite altered throughout, with
numerous, extremely narrow chlorite replaced dykelets, probably after dolerite. Some brecciation occurs within the sandstone. The basement lithologies comprise Lower Cahill Formation metasediments, migmatised metasediments, and possible Nimbuwah Complex granitoids. A narrow dolerite intrusion occurs between 208.5 and 208.6m. The metasediments include garnet-mica schist and meta-arkose. Towards the base of the drillhole, strongly silicified biotite gneiss was intersected, containing narrow selvages of illitised migmatite and meta-arkose. The silicified gneiss is interpreted to be possible Nimbuwah Complex.

SHD32 was collared in Lower Kombolgie Formation, which continued until the unconformity at approximately 205.0m. The sandstone down to 141.5m is silicified, fine to medium grained and hematite altered. Clay-filled ‘spots’ are common throughout the fine-grained sandstone. From 141.5m to the unconformity the sandstone is coarse-grained to pebbly. Zones of moderate to strong fracturing/jointing with associated hematite-limonite-kaolinite alteration occur at various intervals closer to the unconformity. Chlorite alteration and mild brecciation occurs from approximately 197m to the unconformity. The zone immediately surrounding the unconformity is strongly altered and fractured, slightly offsetting the unconformity. The basement is predominantly comprised of migmatised Lower Cahill Formation, with metasediments present at depth. The migmatite occurs from the unconformity to 253.0m and is moderately to strongly hematite, chlorite and illite altered. Secondary uranium mineralisation occurs within fractured, strongly chlorite altered migmatite between 220.6 – 221.6m. Lower Cahill Formation metasediments occur from 253.0m to the end of the hole, including (graphite)-garnet-mica schist and meta-arkose. The metasediments are mildly to moderately illite and chlorite altered.

7. CONCLUSIONS

The drilling conducted within the South Horn area this year further confirmed the presence of secondary uranium mineralisation, both within graphitic-garnetiferous mica schist and strongly altered migmatised Lower Cahill Formation. The definition of zones of strong alteration and prospective lithology within and around South Horn enhances the prospectivity of this area.