CHIEF GEOLOGIST

REPORT ON AN EXPLORATION OF A URANIUM DISCOVERY NEAR CENTRAL CREEK, NORTHERN TERRITORY

by J. H. LORD.

In July 1955, while prospecting along the Westmoreland valley from Queensland into the Northern Territory, a prospector, Arthur R. Blackwell, discovered uranium near Central Creek in the Northern Territory. The discovery, the position of which is shown on Plate I, is approximately 13 miles from the nearest known uranium mineralisation on Pandanus Creek and 11 miles from the nearest known radioactivity near Gorge Creek, both reported last year by R. T. Norris.

Blackwell's discovery is reached by leaving the Corinda to Westmoreland road 1.9 miles south of the Westmoreland station homestead, and by following a track, made by Blackwell, up the Westmoreland valley for approximately 32 miles. Roads and tracks are impassable during the "wet" season. The vehicle used for this inspection was the first to complete the trip from Burketown since January.

The discovery, which is being worked by the prospector, was inspected on 13th, 14th and 15th May, 1956.

Blackwell has pegged Mineral Lease No. 420 named Cobar II consisting of 16 acres, to cover the prospect.

GEOLOGY

Regional

The discovery is located in flat-lying volcanic rocks, with an estimated minimum thickness of 300 feet. These correlate probably with the Redbank volcanics of Upper Proterozoic age. To the east the volcanics are overlain unconformably by flat-lying conglomerate, grit and current-bedded sandstone, with a minimum thickness of 200 feet. These sediments may be correlated with the Robinson beds.

To the south quartzite occurs, which probably underlies the volcanics.

The Discovery

Volcanic rocks, probably representing a number of flows, crop out over the entire lease. Although the topography is rugged, there are few outcrops and most of the slopes are covered with rubble and soil.

The discovery of uranium mineralisation was made on the side of a ridge, where there is a slight flattening in the slope. It is some 150 feet above creek level.

The holes sunk by the prospector are in soft, weathered and fractured volcanic rock. There have been silicification, hematitisation and uranium mineralisation on several of the vertical fractures, which, having resisted weathering, now stand as vertical north striking veins within the decomposed volcanic rock. In places, the veins appear to dip steeply to the west but this is due to soil creep on the steep slope.

The volcanic rock, in which the veins occur, is so decomposed that the original rock type cannot be identified. Up slope from the discovery, some unweathered rock has been identified by R.D. Stevens as dolerite. His description of the rock is as follows: -

> "The least altered and darker coloured of the two specimens is most certainly a medium-grained, altered doleritic rock which was perhaps somewhat vesicular, as it contains numerous, irregular, cavity-filling masses of bladed chlorite. Of the original minerals, only highly altered feldspar (plagioclase) laths and skeletal crystals of titaniferous magnetite remain.
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> "The pale brown specimen with narrow, dark veins is a similar, but very much more altered rock, at the same time becoming considerably silicified. Little of the feldspar remains, and the rock is transected by narrow quartz veins. That these veins carried abundant iron-bearing solutions is shown by the heavy iron-impregnation of the country rock on either side of the veins. Though most of the original minerals have been almost completely altered, the primary doleritic texture remains, together with the chloritic cavity-fillings.
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> "A thin-section of the uranium ore shows that the country rock in which the vein of radioactive material is emplaced has been almost entirely replaced by iron oxides, so that it would be impossible to determine its original nature from this specimen alone. However, with some slight application of the "eye of faith" one can detect a possible relict doleritic texture similar to that of the preceeding specimens. Thus, it is very probable that the radioactive mineralisation has, as its host rock, a highly altered and almost completely ferruginised doleritic rock, but it is impossible to say from the thin-sections alone whether it is intrusive or extrusive."

Due to the rubble cover on the slope, it was not possible to identify a dyke and it is thought that the dolerite may occur as a sill amongst the volcanic rocks. Detailed plane-tabling mapping, with costeaning, is required to identify the sequence of rocks at the prospect.

The mineralised veins vary in width from 2 to 4 inches, except in the bottom of No. 1 shaft (see Plate 2), where one vein has increased to 15 inches in width. The uranium minerals within the veins are difficult to recognise macroscopically, but they are being leached into the adjacent rock, where they are being deposited as phosphuranylite, autunite and metatorbernite.

A microscopic examination was made of a specimen of the mineralised vein material by R.D. Stevens, who reports: -

> "The sample is a composite material made up of banded hematite, deep red radioactive material and occasional pockets of quartz grains. The whole is veined on our intricate pattern by secondary uranium minerals.
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> "The main radioactive material forming the body of the specimen is a sub-transparent, rather weakly birefringent, more or less massive mineral of red-brown colour and interspersed with hematite. It was first thought that this was one of the complex uranium columbo-tantalates or titanates, but spectrographic analysis carried out by J.F. Lovering has shown only very minor quantities of the rare earths, Ti, and Cb, and no tantalum whatever. It is now considered that the

mineral is an iron-stained gummite. Reticulating veins cut through the specimen in great profusion. These are filled mainly by the fibrous and micaceous copper uranium phosphate, metatorbernite, often with orange gummite.

"In some places the outer surface of the specimen (probably determined by imperfect incipient joint planes) are lightly coated with phosphuranylite. The latter is weakly to moderately fluorescent."

DEVELOPMENT

The prospector has sunk 3 pits and a shaft to 14 feet (see Plate 2), where originally he located radioactivity. These holes have disclosed the mineralised veins, which he has extracted and hand-picked for high-grade ore.

This high-grade ore is being bagged, and at the time of inspection there were about 3½ tons ready for despatch.

Due to the remoteness of the discovery, the grade of the ore must be high to offset the cost of cartage to the Rum Jungle treatment plant, a distance of 1,300 miles. The cost of cartage would probably be between £60 and £70 per ton.

The prospector, who has worked alone, has built a road up the steep ridge by hand methods, in order to cart his ore down by jeep.

Several potholes have been sunk to the north of No. 1 shaft, but these disclosed only floaters. Two small cuttings, in the slope to the south of No. 1 shaft, have disclosed vein material (see Plate 2).

RADIOACTIVITY

Although the surface area near the workings is contaminated due to blasting and ore stocks, it was considered worthwhile to grid the discovery radiometrically. The result, shown on Plate 2, discloses a definite extension of the radioactivity to the south, which, when considered with the vein material occurring in the two small cuttings, suggests that further prospecting is warranted to the south of the present workings.

In the workings, it is evident that all the radioactivity originates from the mineralisation in the veins and from the secondary uranium minerals which have been leached into the adjoining weathered volcanic rocks.

The intensity of radioactivity, within the veins, varies. This is shown in the assay result and also by the Geiger counter readings, which vary from 100 counts per second to off-scale (greater than 800 counts per second) on a Phillips geiger counter (background 1 count per second). The readings taken within the workings are shown in Plate 2.

Two chip samples were taken in the No. 1 shaft at a vertical depth of 12 feet. The results were: -

North face

West wall	to 3" east	Sample width	3"	Assay	9.2% e U_3O_8	
3" E	to 42" "	"	"	39"	"	0.22%	"
42" E	to 45" "	"	"	3"	"	5.0%	"
		Total Width		45"	"	1.14%	"

South face

West wall	to 30" east	Sample width	30"	Assay	0.42% e U_3O_8	
30" E	to 39" E	"	"	9"	"	3.09%	"
39" E	to 46" E	"	"	7"	"	9.0%	"
		Total Width		46"	"	2.71%	"

These chip samples were taken at a random depth. There are several spots in the veins where the ore is richer and a specimen sample was taken and assayed 21.6% e U_3O_8.

A chip sample was taken across the floor of No. 1 pit, four feet from the south end. The results were: -

West wall	to 12" east	Sample width	12"	Assay	0.25% e U_3O_8	
12" E	to 24" E	"	"	12"	"	1.3%	"
24" E	to 51" E	"	"	27"	"	0.4%	"
		Total width		51"		0.59%	"

Six bags of ore, selected at random, were opened and a grab sample was taken from each. The sample assayed 13.2% e U_3O_8.

A grab sample, taken from a heap of material, which was the discard from the hand sorting of the vein material, assayed 6.16% e U_3O_8.

A grab sample from the mullock heap at the mouth of No. 1 shaft assayed 0.54% e U_3O_8.

FUTURE PROSPECTING

The prospector, at present, is engaged in extracting the rich ore in No. 1 shaft and is endeavouring to obtain a 10 ton parcel for shipment to Rum Jungle. He is not interested in doing any other exploratory work at present.

It is suggested that costeaming to the south on the radiometric high should be done, in an attempt to prove a greater length to the mineralised veins. It is recommended also, that, when the shaft is deeper, cross-cuts should be driven in both directions to test for further parallel veins.

Blackwell claims to have prospected the surrounding area in considerable detail but he has located only one other locality, showing uranium mineralisation. Unfortunately, he did not peg the locality and now it is included in a large Authority to Prospect. The discovery is in weathered volcanics showing secondary uranium minerals, and a specimen sample from a small pothole assayed 0.2%.

CONCLUSION

In this remote locality a discovery of high-grade uranium ore has been made, which is suitable for development by a prospector or a small syndicate. Other similar small veins may be located, but it is doubtful if a deposit large enough to interest a company will be located in this geological environment.

The prospector, who located the uranium, has worked industriously under difficult conditions and it is recommended that he be rewarded for his discovery.