PLANNING GROUP

COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF NATIONAL DEVELOPMENT.

BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS.

RECORDS.

1960/10

RESULTS OF DEVELOPMENT WORK, GEORGE CREEK URANIUM PROSPECT, N.T.

by

J. Arkin and B.P. Walpole.

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INTRODUCTION.

The George Creek Uranium Prospect is located south of Darwin, about 500 yards west of the Stuart Highway, between the 80 mile peg and George Creek. It is within a reserve of about 2 square miles which was placed over the area after the discovery of the prospect in 1954. The reserve was mapped and radiometrically gridded by the Bureau of Mineral Resources in 1955. Seven diamond drill holes bored on the prospect in 1954 and 1955 intersected an aggregate of 34 feet of mineralized rock.

The mapping and drilling suggested that the mineralization was localized by a weak shear, trending about north and dipping steeply east. The shear cuts interbedded siltstone and greywacke of the Lower Proterozoic Burrell Creek Formation.

In 1958 and 1959 two contracts were let for underground exploration at th prospect. The first contract was commenced in August 1958 and involved sinking the shaft to 76 feet and crosscutting and driving from it for a total of 95½ feet; this work revealed some ore. The second contract, begun in January 1959, deepened the shaft to 126 feet at which level 30 feet of crosscutting was carried out without intersecting either the lode shear or any more ore; a further 68½ feet of driving was carried out at the 76-foot level.

The exploratory work yeilded approximately 120 tons of development ore with an average grade of about 0.26% U_3O_8.

RESULTS OF UNDERGROUND DEVELOPMENT.

The shaft was collared in siltstone and designed to intersect No. 5 drill hole at 76 feet. At this depth the drill core contained pitchblende, coating joints and associated with a quartz veinlet striking at 300° and dipping 70° north-east. This veinlet was followed in the east and west crosscuts from the shaft. The west crosscut intersected the main lode-shear at 8 feet from the shaft; north and south drives were then extended along the shear to test the extent of the mineralization. It was found that the lode-shear strikes between 340° and 350° and cuts through interbedded siltstone and greywacke; the pitchblende mineralization was confined to the greywacke bands.

The second contract deepened the shaft a further 50 feet but 30 feet of crosscutting at the 126 foot level did not locate the main lode-shear. It was concluded the shear had died out, and prospecting was then concentrated on the 76 foot level (Plate 2.)

The South Drive off the 76 foot level is 50 feet long and has yeilded most of the ore broken. Pitchblende occurred in the shear as small stringers, or in pods of ore (Plate 2); the richest ore appears to be underfoot. Beyond 45 feet the shear narrowed to less than 3 inches and showed little mineralization. Over the last 5 feet the shear is identified only as a number of minor quartz veins. The mineralization appeared to finish on a joint-plane coated with non-radioactive coloured clays. Throughout the length of the drive, pitchblende coated joint planes and was in many places, accompanied by secondary products such as torbernite.

The North Drive is 59 feet long; from the shaft crosscut to the contact of a major siltstone bed over-lying grey-

wacke. A 30-foot crosscut to the north-east at the end of the drive was made to intersect drill hole No. 4. The mineralization is localized in the greywacke bands.

High counts registered 12 feet from the shaft crosscut proved to be due to a small patch of ore localized on the intersection of a joint and the lode shear; the ore was removed during development.

A pod of ore, intersected in the drive 45 feet north of the crosscut, was about 2 - 3 feet wide over a length of 15 feet; it contained pitchblende, torbernite and metatorbernite, and accessory marcasite, pyrite and chalcopyrite.

North of this pod the lode-shear is a marcasite-bearing brecciated zone about 6 inches to 1 foot wide.

At the siltstone greywacke contact at the north end of the drive, the basal band of the siltstone is weathered and fractured over a width of 1 foot to 1½ feet. Pitchblende, torbernite and metatorbernite coat some of the fractures. This band averages 20-30 counts/min., (Phillip's), with occasional higher spots of 100 counts/min. The band was traced, approximately along the strike, for 20 feet but the mineralized rock did not constitute ore.

Two spots of high radioactivity were observed in the end of No. 2 East Crosscut (Plate 2). Pitchblende was associated with a small set of quartz veins striking 240° and dipping 65° south-east. The siltstone-greywacke contact was exposed in the backs and was coated with torbernite and pitchblende. In the north drive the main lode-shear, apart from the area noted above, ranges in width from ¼ inch to 2 feet; and in places contains marcasite, pyrite and chalcopyrite. Pitchblende is rare and occurs as minute coatings on the major joints. Where it crosses the siltstone bands the lode shear divides into many stringers of marcasite.

GRADE OF ORE.

Each kibble of broken material was probed using a GM5 special geiger tube and an Austronic BRV1M Ratemeter. A cut-off value of 6,600 counts/min. (0.18% eU_3O_8) was originally used to determine ore. Ninety-four tons of ore was despatched for treatment and the final grade was determined as 0.22% U_3O_8. The cut-off value was raised to 10,000 counts/min. and all material between 6,600 and 10,000 counts/min. was hand sorted. In this way, approximately 26 tons of ore, averaging 0.4% eU_3O_8, was mined.

PROSPECTS OF FURTHER ORE.

The prospects of finding substantial quantities of ore are not good. The pattern of mineralization and radioactive anomalies strongly suggests a series of en echelon shears carrying veinlets of pitchblende and other minerals. These shears have every indication of being small. The largest known is the one which was developed and it is apparent that the value of ore won or available will not meet the cost of exploration. Drill Hole No. 4 (Plate 2) appears to be on an en echelon shear and this shear is worth investigating north to the siltstone contact, should the ore exposed in the drive ever be mined.

CONCLUSIONS

The uranium mineralization at George Creek is localized by weak shears in greywacke; it closely resembles the nearby

Adelaide River type of deposit, but is likely to be much smaller.

The shoot of ore exposed by underground development, consists of a series of small pods linked by thin stringers of pitchblende or separated by bands of unmineralized siltstone. This shoot of ore is probably connected with the secondary mineralization exposed in the costean immediately west of the shaft collar; but the weak nature of the mineralization at the surface suggests that only part of the backs can be assumed to contain ore.

The shear was not intersected in the shaft or crosscuts at the 126 foot level. It may have been faulted off; but there is no evidence of this and it seems more likely that it dies out a short distance below the 76 foot level.

The mineralized sections have an aggregate length of about 60 feet. The grade, over a stoping width of 5 feet, is not likely to exceed 0.26% U_3O_8, and the ore will probably require hand sorting if this figure is to be maintained.

There are no proved reserves. Assuming 10 feet of ore underfoot, 20 feet in the backs and 12 cubic feet of ore per ton, possible ore may aggregate about 250 tons - worth about £2,700 at Rum Jungle.

RECOMMENDATIONS.

1. No further exploratory work or underground development is warranted.

2. Possible ore reserves are about 250 tons. It is unlikely that the value of this ore would exceed mining costs if it were remined by contract. The ore could also be mined by tribute; but tentative enquiries have indicated it is most doubtful it a tributor could be found to extract such a small tonnage - unless the Bureau provided equipment. In this case the cost to the Bureau would possibly exceed the return from the tribute. The alternative appears to be to lift the reservation over the prospect and abandon the workings. If this were done it is probable that the remaining ore will eventually attract the attention of a gouger and will be recovered without further cost to the Commonwealth.

REFERENCES.

FIRMAN, J.B., and CLARKE, G.F. 1956 - Geological and Geophysical Investigations at the George Creek Uranium Prospect N.T. Bur. Min. Resour. Aust. Rec. 1955/83.

ROBERTSON, W.A. 1956 - The George Creek Reserve and Uranium Prospect N.T. Bur. Min. Resour. Aust. Rec. 1956/57.

PLATE I

700 S.

800 S.

900 S.

1000 S.

1100 S.

True North

Mag. North

D.D.H Nº3
R.L 200'
-45°

DATUM PEG
200 FT.

200 ft.

D.D.H Nº2
R.L 165'
-30°

D.D.H. Nº1
R.L 165'
Vertical

SHAFT

D.D.H. Nº4
R.L. 157'
-45°

D.D.H. Nº5
R.L 153'
-75°

D.D.H. Nº7
R.L. 129'
-45°

D.D.H Nº6
R.L 129'
-56°

1100 W

1000 W

900 W

800 W

700 W

CREEK

REFERENCE

Alluvium.

LOWER PROTEROZOIC

Greywacke.

Siltstone.

Geological boundary, position accurate

Geological boundary, position approximate

Probable geological boundary.

Alluvium boundary.

Shear

Strike and dip of strata.

Joints.

Quartz filled fractures.

Radiometric contour.

Shaft, accessible.

Prospecting pit.

Trench.

Bulldozed bench or track.

Rim of excavation.

D.D.H.Nº6 Diamond Drill Hole.

To Torbernite

Datum assumed height 200 feet (Mining grid.)

200 feet (for radiometric grid.)

150 Topographic contour.

Drainage.

SCALE

40 0 40 80 FT.

GEOLOGICAL MAP
GEORGE CREEK PROSPECT
N.T.

Based on Geological Plan of Feb. 1956 (G 50)

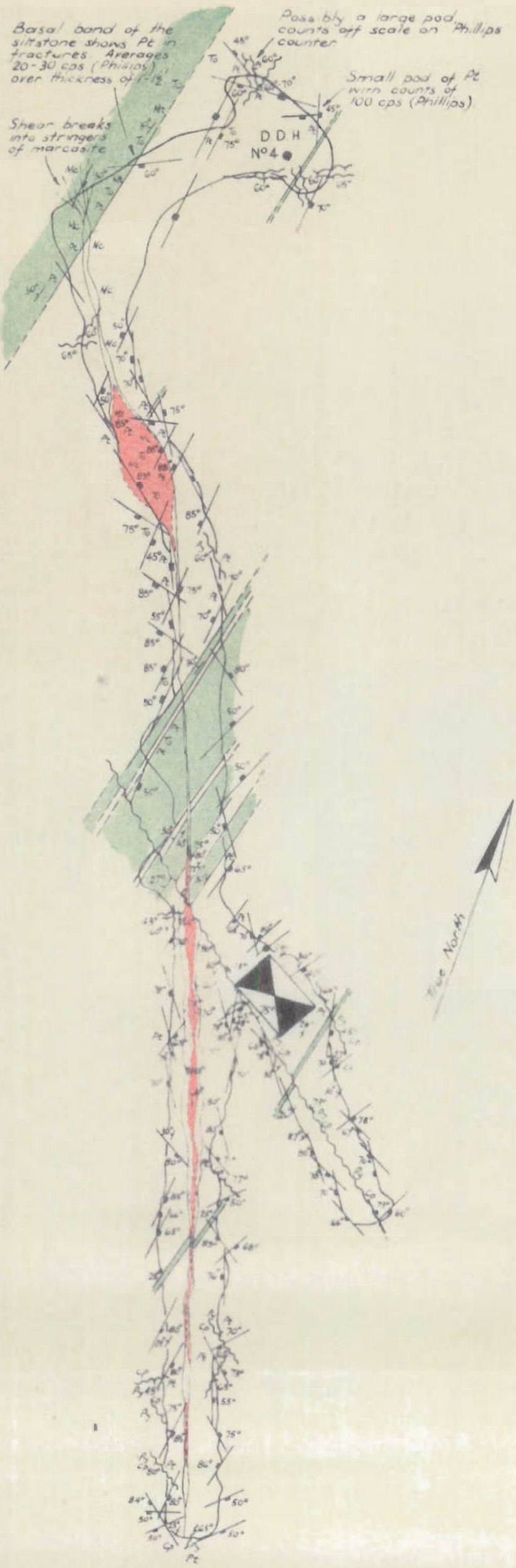
Bureau of Mineral Resources Geology & Geophysics, Darwin, Dec. 1958

NT 50-1

PLATE 2

1020 W | 1010 W | 1000 W | 990 W | 980 W

920 S
930 S
940 S
950 S
960 S
970 S
980 S
990 S
1000 S
1010 S
1020 S
1030 S
1040 S
1050 S



REFERENCE

LOWER PROTEROZOIC

- Greywacke with minor siltstone bands
- Siltstone
- Shear zone showing approx zone of rich pitchblende
- Geological boundary, position accurate
- Geological boundary, position approx
- Quartz vein and minor shear
- Major joints
- Strike and dip of strata
- Outline of level
- Shaft, extending above and below level.

Pt Pitchlende coatings. Mc Marcasite
Py Pyrite. Mt Meta-torbernite
Cp Chalcopyrite. To Torbernite.

SCALE

10 0 10 20 FT.

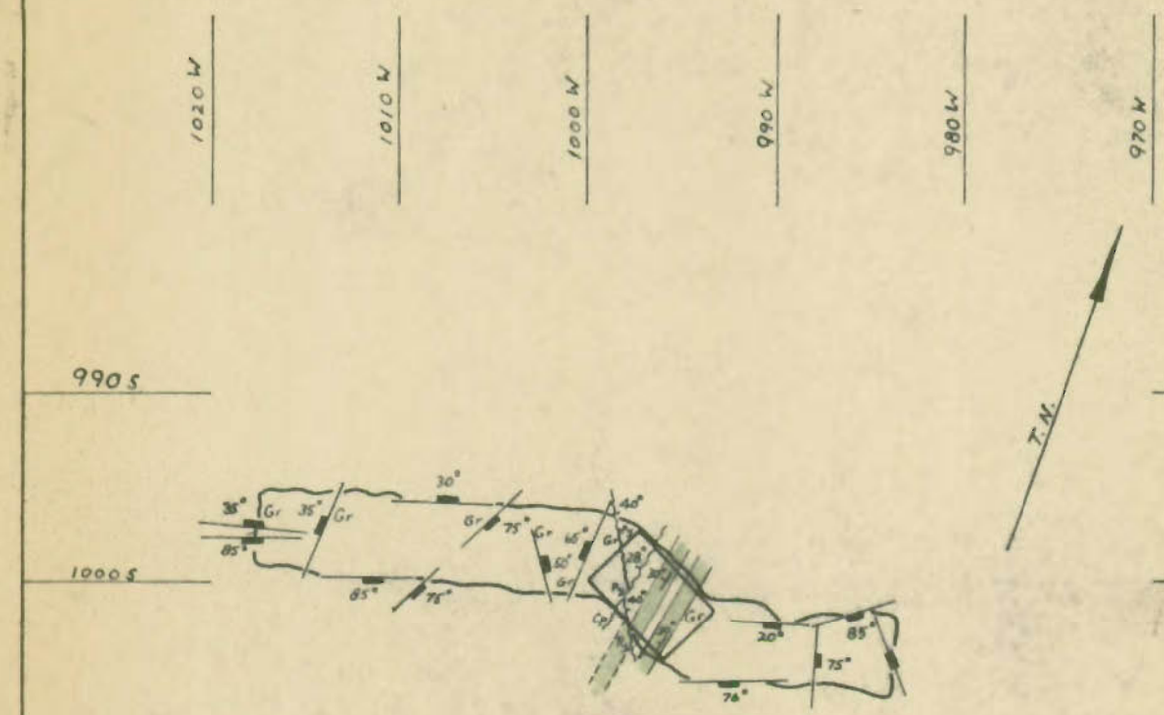
76 FT. LEVEL

GEORGE CREEK PROSPECT N.T.

Bureau of Mineral Resources, Geology and Geophysics, Darwin, April, 1959

NT90-2

PLATE 3



REFERENCE

- Greywacke with minor siltstone bands
- Siltstone
- Geological boundary, position accurate
- Geological boundary, position approx.
- Quartz vein and minor shear.
- Major joints.
- Strike and dip of strata.
- Outline of level
- Shaft extending above level
- Gr Graphite.
- Py Pyrite.
- Cp Chalcopyrite.

SCALE

10 0 10 20 FT

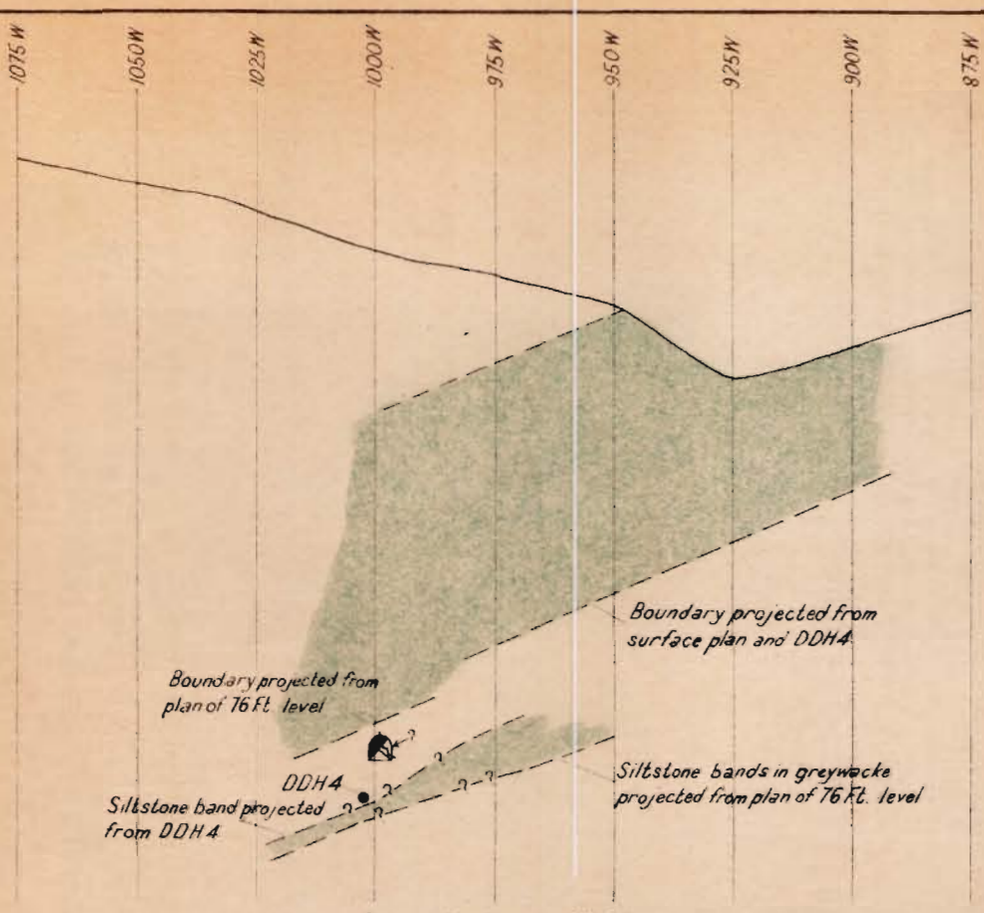
126FT LEVEL PLAN

GEORGE CREEK PROSPECT
N. T.

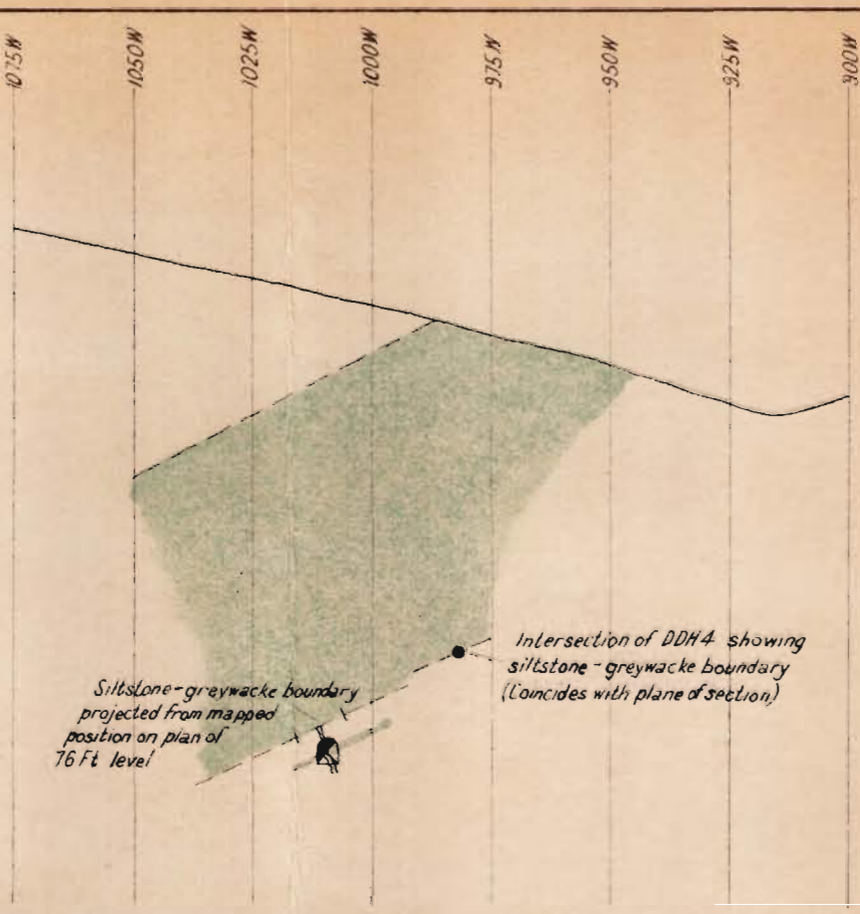
Bureau of Mineral Resources
Geology and Geophysics, Darwin, April, 1959.

NT90-3

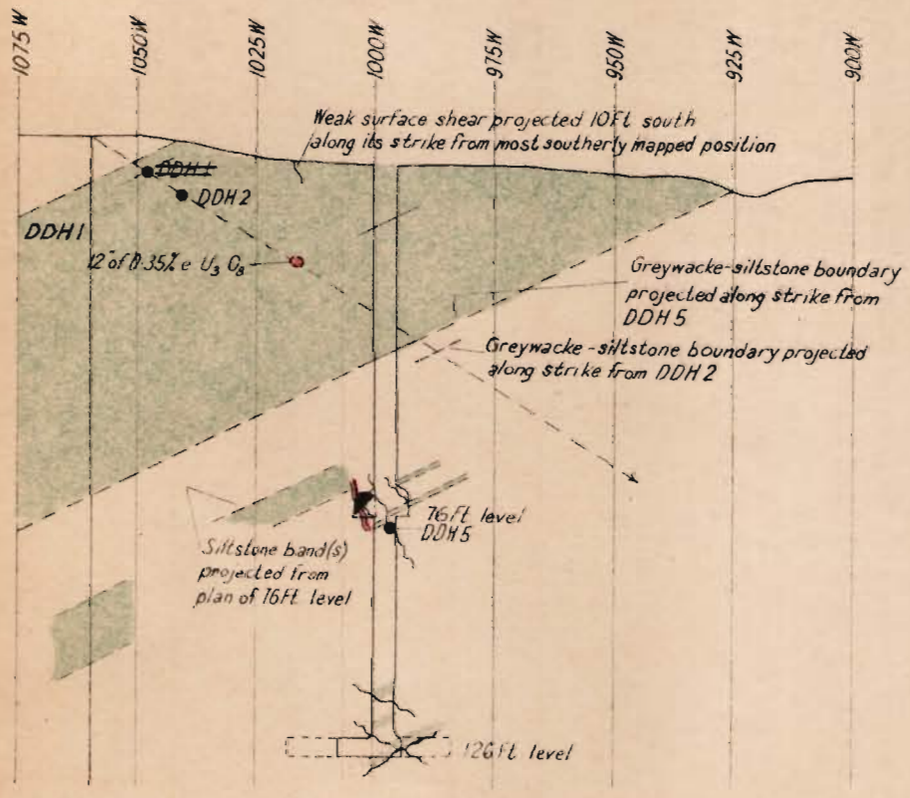
PLATE 4



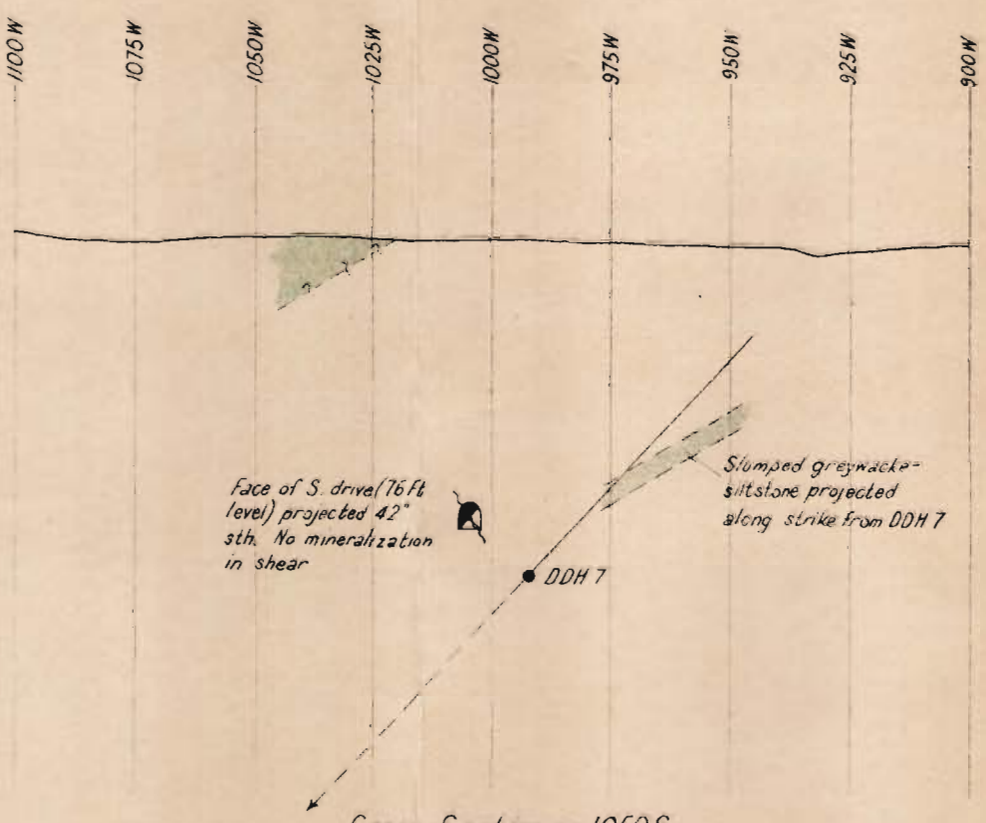
Cross-Section on 925 S



Cross-Section on 950 S



Cross-Section on 1000 S



Cross-Section on 1050 S

Cross-Sections on 925 S, 950 S, 1000 S, 1050 S

GEORGE CREEK PROSPECT N.T.

Scale

40 0 40 80 120 160 FEET

Reference

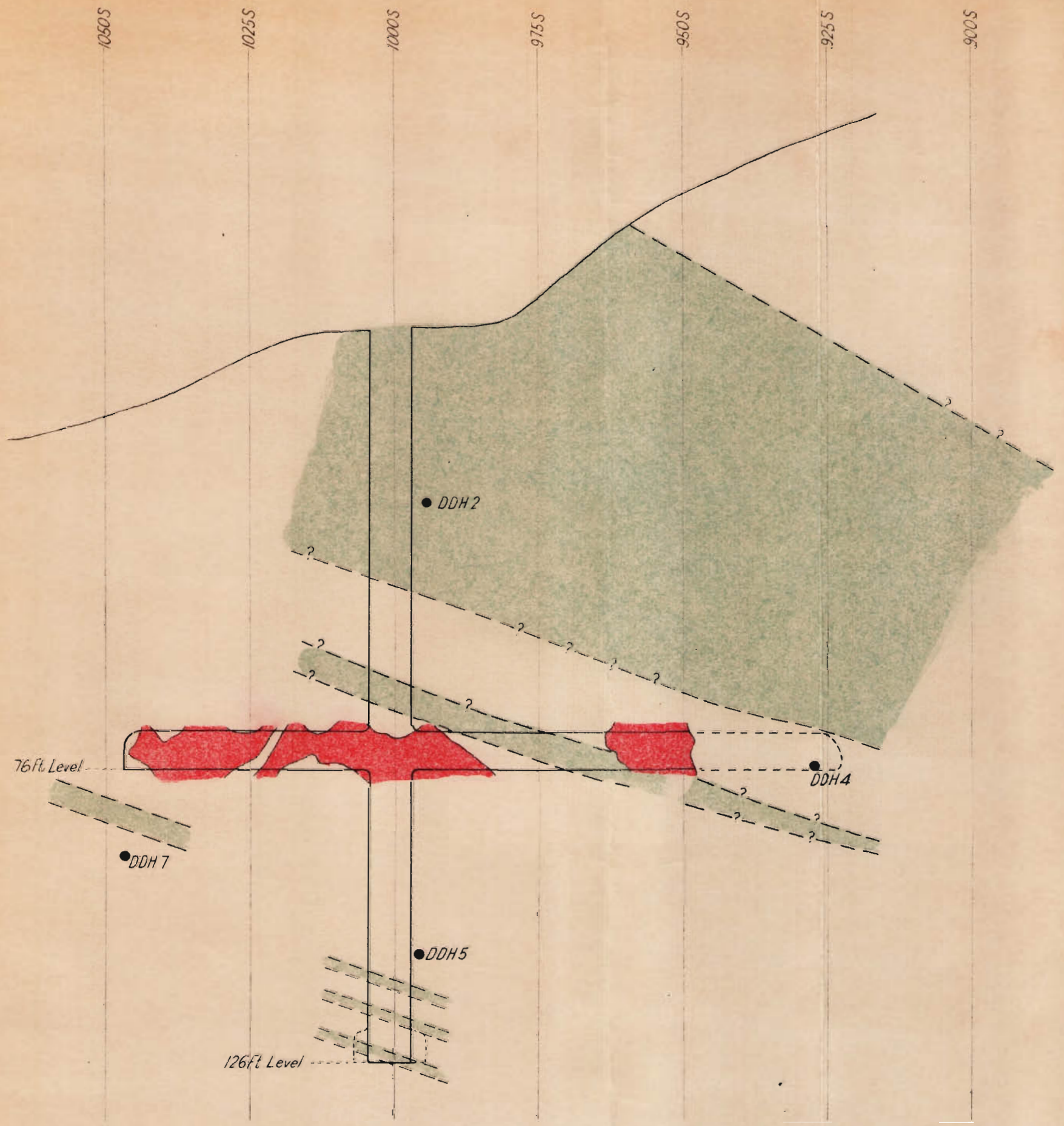
Siltstone

Ore

Bureau of Mineral Resources, Geology and Geophysics, Canberra, Feb 1960

N.T 90 -4

PLATE 5



Longitudinal Projection on 1000W

GEORGE CREEK PROSPECT N.T.

Scale

20 0 20 40 60 80 FEET

Reference

Siltstone

Ore

Intersection of DDH in Plane of Projection

Bureau of Mineral Resources
Geology & Geophysics, Canberra Feb 1960

N.T 90-5