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**DEPARTMENT OF NATIONAL DEVELOPMENT.  
BUREAU OF MINERAL RESOURCES  
GEOLOGY AND GEOPHYSICS.**

**RECORDS.**

1961/39



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**RESULTS OF DIAMOND DRILLING AT SAUNDERS CREEK,  
NEAR HALLS CREEK, WESTERN AUSTRALIA.**

by

**R. Mercer.**

The information contained in this report has been obtained by the Department of National Development, as part of the policy of the Commonwealth Government, to assist in the exploration and development of mineral resources. It may not be published in any form or used in a company prospectus without the permission in writing of the Director, Bureau of Mineral Resources, Geology and Geophysics.

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SUMMARY

At Saunders Creek approximately 25 miles north-east of Halls Creek, Western Australia, one diamond drill hole was bored by the Bureau of Mineral Resources to test conglomerate bands in quartz greywacke for uranium.

The target bed was intersected between 520 and 618 feet. Logging of the core indicated less conglomerate than is present in outcropping sections.

The highest core assay was 0.16%  $eU_3O_8$  over four inches, and the principle radioactive mineral is thorogummite.

Access

Access to the drill site is by the Halls Creek to Wyndham road for 16 miles north from Halls Creek and then 15 miles east on a bulldozed track towards Ding Dong Downs Homestead. The site is in the east part of the Halls Creek 1-mile sheet area.

Topography, Vegetation and Water Supply

The topography near the drill site is rugged with steep hills and ridges trending about  $20^\circ$  magnetic.

The vegetation consists almost wholly of spinifex and snappy gums.

Water for drilling was transported by truck from Ding Dong Downs Homestead bore and pumped up the hill to the site by an auxiliary pump.

History

The Saunders Creek prospect occurs within the Lower Proterozoic Halls Creek Metamorphics (Traves, 1955).

A report and ~~photo~~ photo-geologic map of the Saunders Creek area by B.P. Walpole and C.E. Prichard in 1958 gives further details of the stratigraphy and structure of the area and discusses the radioactive quartz greywacke with associated pebble conglomerate bands which constituted the drilling targets.

In 1959, R.A. Ruker and R. Connolly (W.A. Department of Mines) produced a map of the eastern section of the Halls Creek 1-mile area which is included as Plate 1 of this report. Ruker named several units within the Halls Creek Metamorphics; the drilling was in his Saunders Creek Formation on the western limb of a major, overturned anticline. The radioactive beds lense out three miles south of Saunders Creek into non radioactive sandstone. Elsewhere in the area there are a number of other occurrences of radioactive conglomerate, all smaller in size and showing lower radioactivity at the surface than the Saunders Creek lense.

Ruker selected two drill sites. One was located 1-mile south of Saunders Creek and another 2-miles south of Saunders Creek. Both holes were designed to intercept the radioactive beds below the weathered zone. The hole drilled was at the northern site. (DDH No. 1 plate 1).

An Authority to Prospect was held over the area by United Uranium N.L. when the drilling was in progress. The hole was drilled by Australasian Drilling and Exploration Limited, contractors to the Bureau.

#### REGIONAL SETTING

All the rocks drilled are included within the Saunders Creek Formation. The Formation consists of fine-grained laminated quartz greywacke, shale, slate, and quartz greywacke with pebble conglomerate beds. The strata have been folded, faulted, and subjected to low-grade regional metamorphism.

The target bed crops out in a breached over-turned anticline at the Saunders Creek waterhole. From here it crops out sporadically south for about 3 miles, forming part of the western limb of a closed regional anticline over-turned to the east. The formation is absent in at least two places due to faulting, and is offset to the west by folding (see Figure 1).

The target bed is coarse to medium-grained quartz greywacke containing pebbles of quartzite  $\frac{1}{4}$ " to 1" in diameter in lenses 6" to 12" thick. Cross bedding is common and dark heavy minerals are disseminated throughout. These comprise about 5% of the rock but have been concentrated at some horizons into laminae several inches thick in which they form up to 50% of the rock.

#### DRILLING RESULTS

One hole was drilled to 734 feet. The target was intersected between 520 feet and 618 feet. Core recovery from the target bed was 97%.

Plate 2 is a section along the drill hole and shows that the target bed was intersected between 400 and 450 feet below the surface. Pyrite in the core at various places below 350 feet drill depth indicates that this is well below the weathered zone.

Radiometric logging showed that the target bed has radioactivity appreciably higher than the rest of the hole. It averages about 0.02%  $eU_3O_8$  with maxima less than 0.03%  $eU_3O_8$ .  
**over most of the hole.**

Plate 3 shows the results of core logging and radiometric logging of the target formation. Plate 4 is the electric log.



### GEOLOGICAL RESULTS

The quartz greywacke section drilled contained less conglomerate bands and less concentrations of heavy minerals than the outcrops in Saunders Creek and near the drill site. The paucity of pebble conglomerates and dark minerals in the core suggests that the drilled section is not altogether typical of the prospect as revealed in outcrop.

Five pieces of core were mineragraphically examined by W.M.B. Roberts in Canberra. The principle cause of the radioactivity was thorium; the two richest samples examined had thorium/uranium ratios of 3:1 and 2:1. A mineral separated from the heavy minerals in the most radioactive specimen was identified by its X-ray diffraction pattern as thorogummite.

The two highest radiometric analyses made in Darwin (based on the assumption that uranium in equilibrium is responsible for all the radioactivity recorded) were 0.16%  $eU_3O_8$  from 543 feet to 543 feet 4 inches and 0.04%  $eU_3O_8$  from 538 feet to 539 feet 4 inches. Spectrographic assay of the richest sample was 0.13%  $U_3O_8$  and 0.055%  $ThO_2$ . These assays refer to only four inches of core. The remainder of the core was too low grade to warrant precise assay.

### CONCLUSIONS AND RECOMMENDATIONS

The radioactive mineral is thorogummite, a refractory with a low uranium and high thorium content. This feature, coupled with the very low assay values, indicate that the prospect is of no further immediate interest.

The core suggests that the conglomerate bands have partly lensed out down dip. As these are the most highly radioactive sections of the formation, it can be suggested that the drill section is not truly representative. But lensing out of the mineralized bands in the few hundred feet from surface to drill section is in itself a feature which would substantially reduce potential tonnage and make the prospect less attractive.

No further investigation is recommended.

#5

REFERENCES

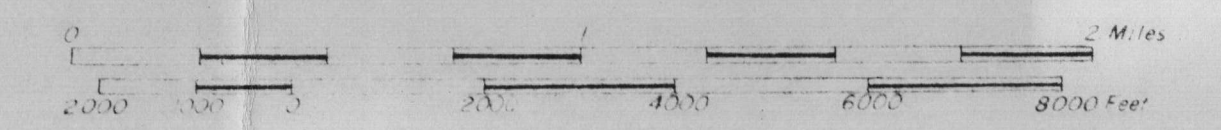
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Resour. Records 1958/79.



# REGIONAL GEOLOGY SAUNDERS CREEK RADIOACTIVE PROSPECT WESTERN AUSTRALIA

Geology by RA Ruker and R Connolly

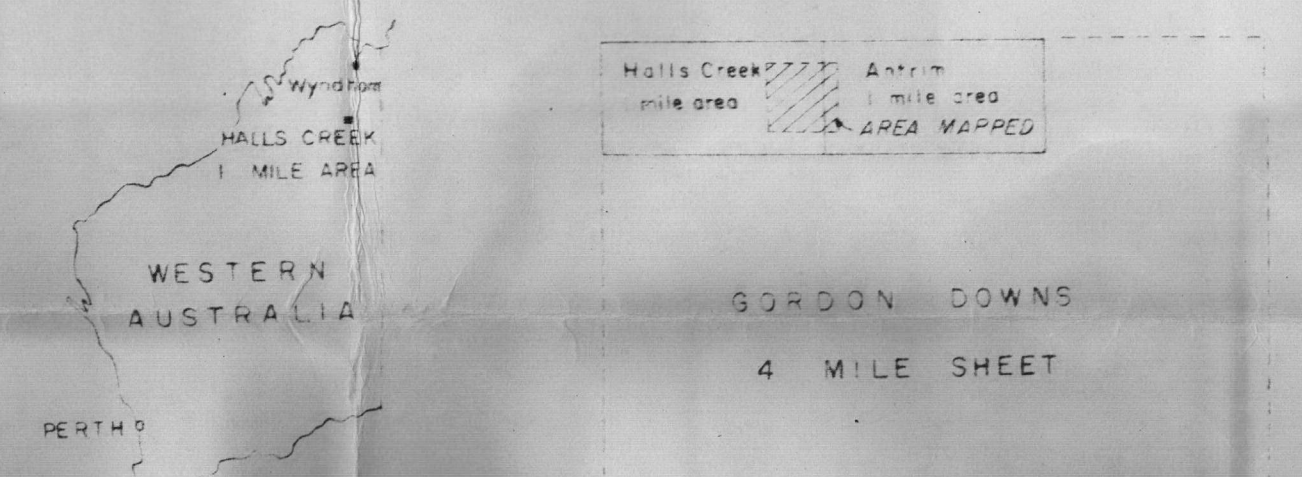
Scale



Reference

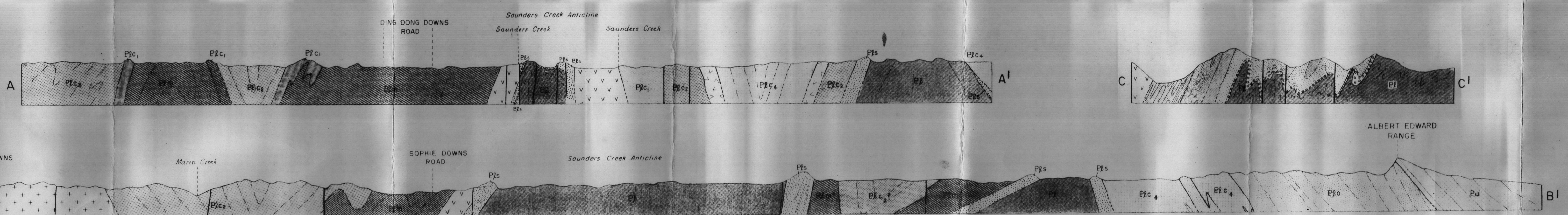
UPPER PROTEROZOIC	Unconformity - basal Proterozoic conglomerate overlain by sediments and volcanics
LOWER PROTEROZOIC	
AGICORDIAN SYSTEM	
Sophie Downs Granite	Fine to medium grained granite with xenoliths of schists and slate
Halls Creek Metamorphics	
Olympic Creek Greywacke	Thin bedded medium grained greywacke grading to fine coarse greywacke
Castle Creek Beds	
EBc4	Carbonaceous siltstone ferruginous chert carbonaceous siltstone rhythmic bedded black slate and quartz greywacke
EBc3	Basic volcanics
EBc2	Grainy fine grained siltstone siltstone sandstone and calc siltstone rocks in western part of map area
EBc1	Thin bedded ferruginous chert laminated siltstone and minor quartz greywacke
Marin Creek Beds	
	Green laminated greywacke quartz greywacke basic volcanics dark grey and red slate
Saunders Creek Formation	
	Basic silt laminated greywacke massive greywacke felsic siltstone sandstone and basic volcanics
	Unconformity greywacke and basic volcanics cross bedded sandstone with basic radioactive conglomerate
Undifferentiated	Green schistose greywacke phyllite mica-schist slate basic and amygdaloidal volcanics

Established geological boundary position accurate
Geological boundary determined by photo-interpretation
Inferred geological boundary
Strike and dip of strata
Strike and dip of strata determined by photo interpretation, dip over 45°
Intersected bedding trends
Plunge of structure from air-photo interpretation
Established fault position accurate
Established fault position approximate
Inferred fault
Synclinal axis position approximate
Anticlinal axis
Joint pattern from air photo interpretation
Track position approximate
Proposed shoreline
A-some (DCS) radiometric anomaly
A-some (DCS) radiometric anomaly
A-some (DCS) radiometric anomaly
Photo centre points

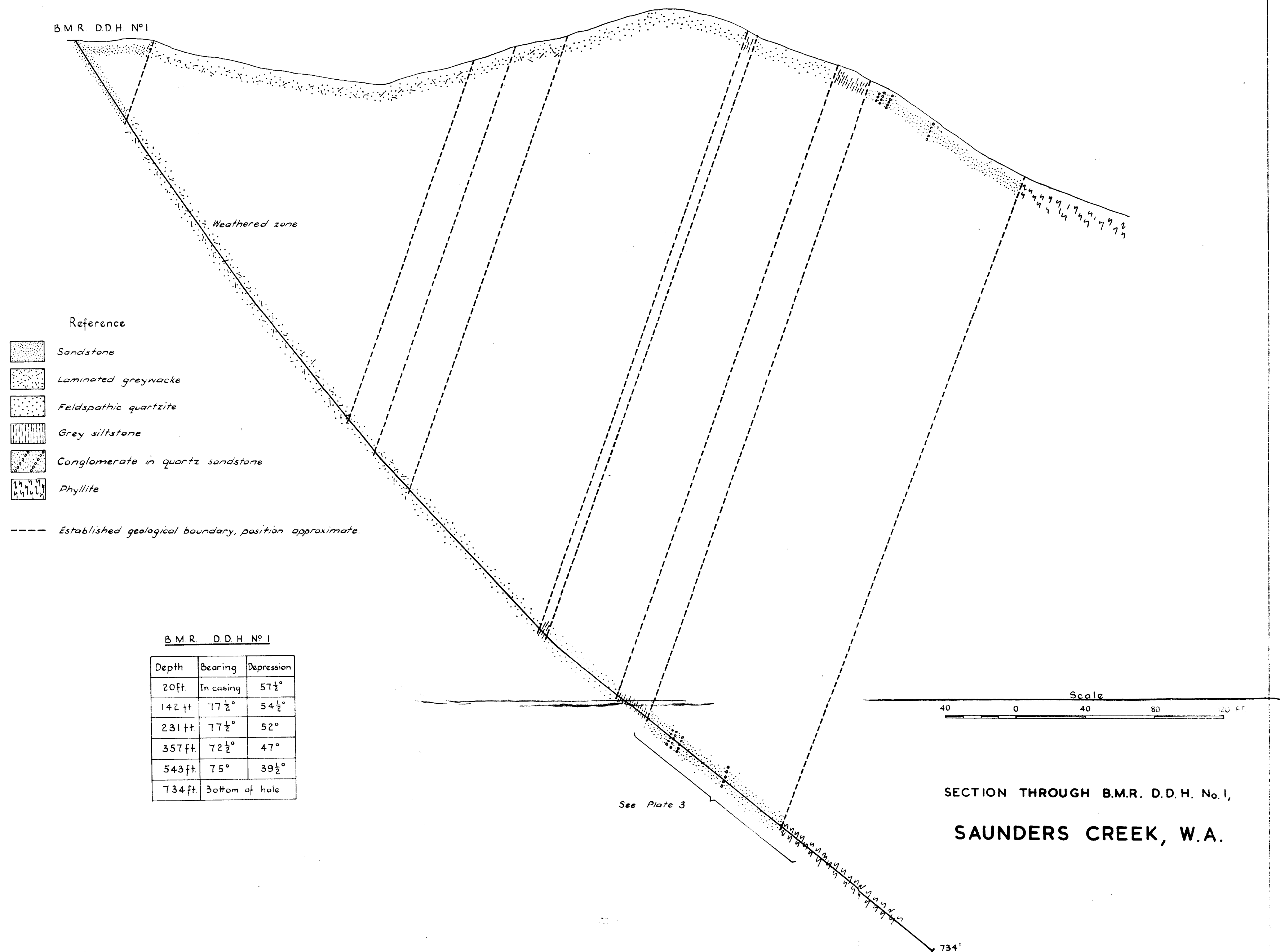


SECTION CC' (by Abney & Tape survey)

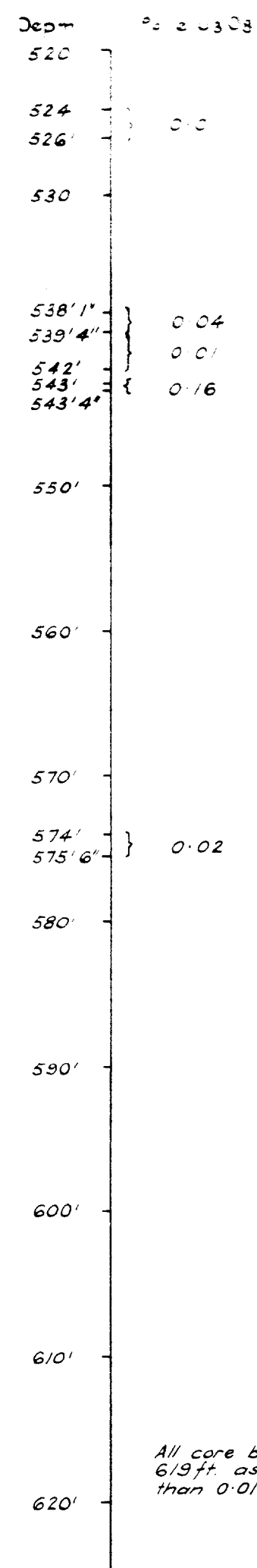
DIAGRAMMATIC CROSS SECTIONS A A', B B'





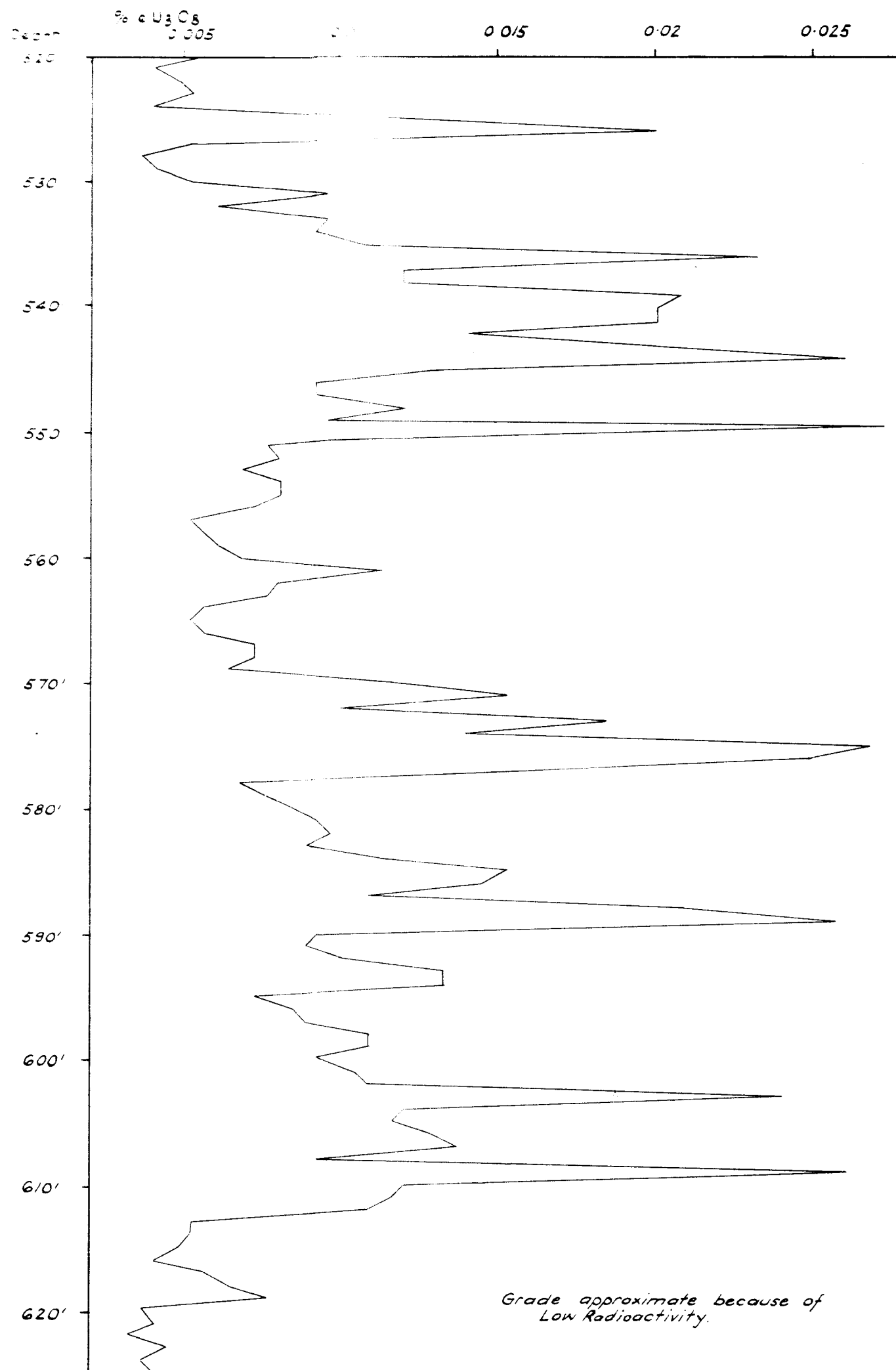


# RADIOMETRIC ASSAYS



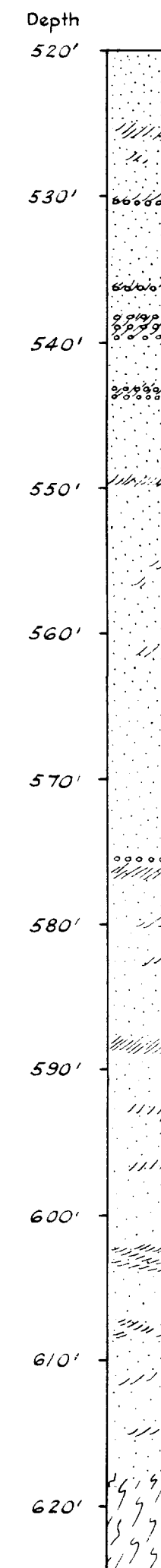
All core between 522 ft. and 619 ft. assayed. Results less than 0.01% eU<sub>3</sub>O<sub>8</sub> not shown.

# RADIOMETRIC LOG



Grade approximate because of Low Radioactivity.

# LITHOLOGIC LOG



## Reference

- Quartz greywacke
- Pebble bands
- Heavy mineral concentrations
- Phyllite

RADIOMETRIC ASSAYS,  
RADIOMETRIC & LITHOLOGICAL LOGS  
D.D.H. No.1,  
SAUNDERS CREEK, W.A.

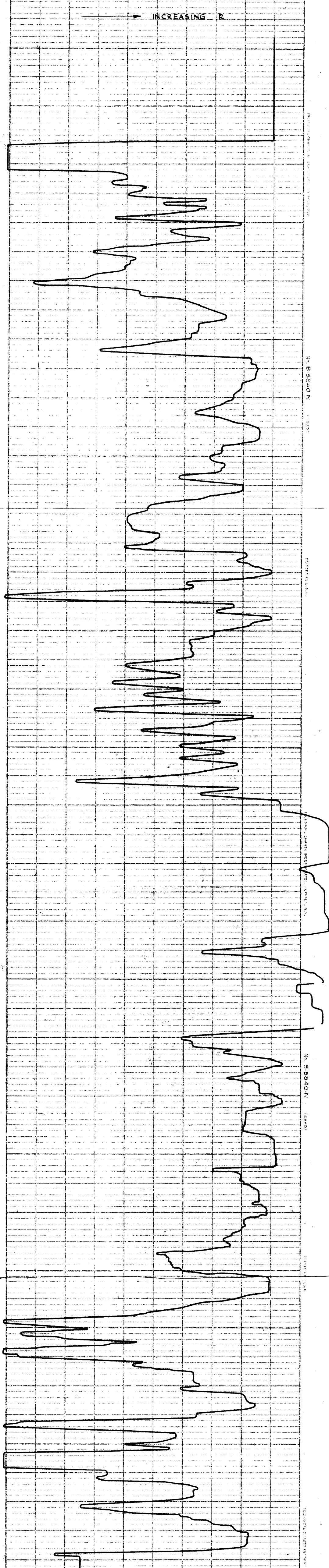
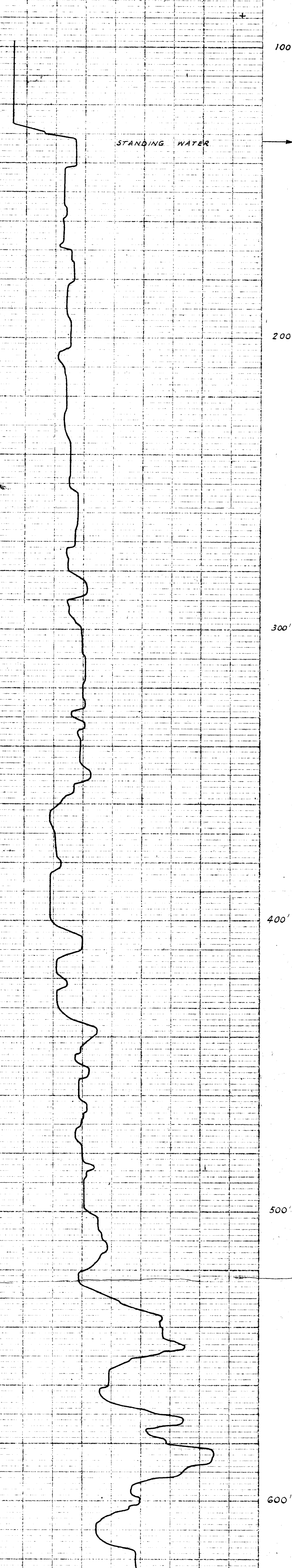
WIDCO ELECTRIC LOGS  
B.M.R. D.D.H. I - SAUNDERS CREEK,  
W.A.

POTENTIAL LOG

SCALE: 1 INCH = 50 MILLIVOLTS

RESISTANCE LOG

SCALE: 1 INCH = 200 OHMS



B.M.R. D.D.H. I. SAUNDERS CREEK

AZIMUTH 75° MAGNETIC  
DEPRESSION 60°  
HOLE DIAMETER 8X AX. AX.  
DRILLED TO 734 FEET

DATE LOGGED 29 5 60  
DEPTH LOGGED 620 FEET  
INSTRUMENT WIDCO 1000 FT. ELECTRIC  
LOGGER  
OPERATOR N. HAMILTON

BUREAU OF MINERAL RESOURCES  
GEOLOGY AND GEOPHYSICS, DARWIN

PLATE 4