SECRET

COMMONWEALTH OF AUSTRALIA.

BMR PUBLICATIONS COMPACTUS
(NON-LENDING-SECTION)

DEPARTMENT OF NATIONAL DEVELOPMENT.

BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS.

RECORDS.

1954/17

BUREAU OF MINERAL RESOURCES
LIBRARY
22 AUG 1984
CANBERRA, A.C.T.

THE CORONATION HILL URANIUM PROSPECT

KATHERINE-DARWIN AREA, NORTHERN TERRITORY.

Preliminary Report by R.B. Allen 1953.

CANBERRA.

THE CORONATION HILL URANIUM PROSPECT

KATHERINE-DARWIN AREA, NORTHERN TERRITORY

LIST OF CONTENTS PAGE

LIST OF PLATES

THE CORONATION HILL URANIUM PROSPECT KATHERINE-DARWIN AREA. NORTHERN TERRITORY.

SUMMARY

The uranium prospect at Coronation Hill is situated on the south side of the valley of the South Alligator River, 75 miles from the town of Pine Creek, from which it is accesible by trucks in the dry season. The surface showings consist of discontinuous exposures of autunite over an area approximately 400 feet square upon the north-eastern corner of Coronation Hill, an isolated feature within the river-valley. The rocks present are of Proterozoic age. Mineralization is found within two deeply-weathered members of a sedimentary-volcanic complex which forms the basal member of the Upper Proterozoic: the rocks of the prospect may be in part of Lower Proterozoic age. Sulphide mineralization accompanied by a secondary uranium mineral has been found at one point by diamond drilling: the sulphides are principally pyrite and the nickel sulphide bravoite. Mineralization is associated with a partly crushed and highly altered zone adjacent to a mass of Upper Proterozoic sandstone which overlaps the older and lower rocks. The structure is imperfectly understood and the control over mineralization has not been established. Development work, including costeaning, pitting, diamond drilling (1006 feet in two holes) and geophysical surveys (Radiometric, magnetic and electrical) has found no mineralization of economic grade, although it has shown the presence of alteration and sulphide mineralization which indicate that the full potentialities of the prospect have not yet been determined. Further work sufficient to complete preliminary exploration would require a minimum of 2500 feet of diamond drilling on underground operations at least equivalent to 1000 feet of drifting and crosscutting. Diamond drilling is somewhat preferable, since it can reach more deeply below the weathered zone. Only after completion of this additional work can it be determined whether or not the prospect is of economic value.

INTRODUCTION

1. Location and Access: The uranium prospect at Coronation Hill, Northern Territory, lies approximately in Latitude 13°35'S and longitude 132°36'E., upon the southern margin of the valley of the South Alligator River (See Plate 1). Access is easy only from the town of Pine Creek, 156 miles south of Darwin on the Stuart Highway. From Pine Creek a truck-road leads to the prospect, 75 miles distant, by way of the homesteads of Goodparla and Gimbat cattle-stations. The road is suitable for general traffic only in the dry season, although trucks of conventional type may travel as far as Gimbat homestead at favourable times during the wet season. Beyond Gimbat homestead, the track is suited only to vehicles with four-wheel drive, and is passable only during the dry season. The prospect may easily be found, since it lies closely adjacent to the river upon an isolated hill: the workings are distant 1000 feet from the river and lie 150 feet above it. At this point, the South Alligator River continues to flow throughout the dry season in quantity sufficient for the purposes of prospecting or small-scale mining operations.

2. Description of the Prospect: The workings of the prospect are situated upon the lower and middle slopes at the north-eastern corner of Coronation Hill, a mesa-like outlier of the plateau which bounds the river-valley on its southern and western sides. The slopes are steep and in great part covered by rubble spalled from the red sandstone bluffs which crown the hill. At the site of the prospect, the foot of the hill is formed by the cliff-like outcrop of a grey and white quartz reef. The reef, and associated showings of secondary copper minerals, is held under Mineral lease 3A by Mr. J. Callanan, owner of Gimbat Station. The uranium

showings are not directly associated with the reef, but lie above it on the middle slopes, in great part beyond the southern boundary of M.L. 3A. The showings are principally exposures of autunite mineralization within a brown-weathering slabby siliceous rock (See Plate 2, chlorite schist) which forms low ridge-outcrops, and within an adjacent soft-weathering white sedimentary breccia. Plate 2 shows the outcrops of the mineralized area, and in addition, radiometric "contours" or isorads which define the area of anomalous radioactivity. Plate 2 shows as well the location of the workings, which are individually referred to later in the report. No mining plant and no permanent camp has been established at the prospect: the only buildings constructed consist of two small wooden storage huts and an open kitchen built of screening and galvanized iron. The buildings lie upon a terrace 25 feet above the river, almost due north of the workings of the prospect: from them a rough truck-road leads to the collar-sites of the diamond drill holes. A permanent water-line of 2-inch galvanized pipe leads from the river to the site of D.D.H. No.1 (See Plate 2), but no pumping equipment is installed.

REGIONAL GEOLOGY

The geology of the region surrounding Coronation Hill is the subject of a separate report (Walpole, 1953). Plate 1 shows the major features of the area, and the position of the prospect within it. The rocks present range in age from the Lower to the Upper Proterozoic, with thin remnants of Cretaceous sandstone locally forming hill-cappings. In the immediate vicinity of the prospect the uppermost and youngest rocks are thick sandstone of Upper Proterozoic age (Mount Callanan Group, correlable in part with the older-named Buldiva Quartzite), which form extensive plateaus bordering the valley of the South Alligator River. The sandstones are underlain by a volcanic-sedimentary complex, which forms the base of the Upper Proterozoic sequence and unconformably overlies folded sediments of Lower Proterozoic age. Within the river valley, the older rocks are exposed as hill or ridge-outcrops often of large size and relief. The valley-floor, at the lower elevations, is a wide flood-plain with a nearly continuous cover of alluvium, diversified by small outcrops of Mount Callanan sandstone, Lower Proterozoic schist, and rhyolite flows and tuffs, together forming a complex pattern of inliers and outliers. Structural details are largely hidden by the cover of alluvium; and it is debatable whether the structure is a mosaic of fault-blocks or whether the heterogeneity of outcrop is due to partial re-exposure of a rugged topography developed upon folded Lower Proterozoic meta-sediments, later partially buried by lenticular rhyolitic flows and pyroclastics, and finally completely buried before peneplanation beneath the thick sandstone of the Upper Proterozoic: the two views are not incompatible, since both structures may be present. Outside the immediate area of the prospect, the Lower Proterozoic rocks are intruded by granite and diorite. The prospect lies adjacent to a zone of regional faulting (South Alligator Fault, See Plate 1) which trends with the regional strike of the Lower Proterozoic: the fault-line is marked by a complex belt of silica-replaced and injected rocks. Siliceous rocks belonging to the belt form a great part of the western edge of Coronation Hill, and of its north-western and south-western corners.
The mineral showings of the prospect lie within the sedimentary-volcanic complex interposed between the Lower Proterozoic folded slates and the Upper Proterozoic sandstone, at a point where the volcanic complex is thin and where the irregular surface of the oldest group is close to and partly interlocked with the irregular underface of the sandstone. The uranium mineralization is considered to be of late Upper Proterozoic or post-Upper Proterozoic age, since it apparently post-dates the folding and faulting of the Upper Proterozoic rocks of the Mount Callanan Group. The

The occurrence cannot be related directly to any intrusive igneous rock; a genetic relation to the rhyolite extrusives is possible, but has not been demonstrated.

LOCAL GEOLOGY.

1. Rock-Types and Stratigraphy: The local sequence within the area of the prospect is normal and conforms to the regional dip:it comprises a lower series of altered shales and siltstones, in part silicified, an intermediate member of lenticular habit composed of angular fragments of slate, schist, sandstone, rhyolite and volcanic detritus, and an upper member of thick cross-bedded sandstone. Essentially the structure is that of a steepened south-west-dipping monocline, with the sandstone member dipping more flatly than the remainder. The surface exposure of the sandstone overlaps and transgresses the lower members as if separated from them by an irregular and tilted plane of unconformity: an unconformable relation between upper and lower members is further indicated by the fact that the average strike of the bedding of the sandstone is N60°W (300°) in contrast to an average strike of N35°W (325°) within the lower shales, and by the presence of the intermediate conglomerate member, differing in origin and composition from both sandstone and shale. Local alteration is intense: it is therefore difficult to separate age-groups on the criteria of regional metamorphism, and the prevalence of overburden makes lateral correlation impossible: this must qualify the writer's opinion that the lower series represents an inlier of Lower Proterozoic sediments within volcanics and sandstone of the Upper Proterozoic. The irregular interrelation of the three members makes for a lenticular and discontinuous distribution. Much of the information on the stratigraphy and rock types has been gathered from the study of diamond drill core, which provides an uninterrupted sequence free from the grosser effects of weathering: descriptive logs of the two holes drilled are given as Appendices I and II. So far as is known at present, only the silicified uppermost members of the lower series and the angular conglomerate are important host-rocks to uranium, and they alone will be described at length.

The rocks exposed lowest upon the north and north-east flanks of the hill are altered shales and siltstones, dipping south-westward and striking N35°W. The upper exposures are silicified and form the rock described immediately below. At a small distance eastward and south-eastward from the hill, the shales are observed to pass beneath a rhyolite flow. To the north and north-east of the hill, the shales are overlain by sandstone or by alluvium.

The chlorite schist marked upon Plate 2 is a complex metasomatic differentiate from the shale and siltstone of the lower series: its attitude and persistence are therefore no predictable as sedimentary structures. The rock is predominantly silica with varying but subordinate quantities of chlorite and clay minerals and with a minor but universal con ent of iron. Remnants of bedding are preserved in the less siliceous portions: the more completely silicified rock is massive and quartzite except for a mottling with segregated iron oxide/silicate (See Appendix II) It is possible that the more siliceous representatives include portions of the base of the upper sandstone, since field evidence has not been decisive in fixing the age of the silicification relative to the Upper Proterozoic. The rock as seen upon surface is brown-coated with limonite, and shows a course irregular foliation of slabby structure: locally breccia structure is visible, with angular fragments weathered in slight relief. Autunite is locally present in the form of thin flakes or films upon the surface of planes of bedding, foliation or jointing, usually in company with limonite. In its present form, the autunite post-dates the period of silicification.

or iron

The contact between the chlorite schist and the angular conglomerate, as seen upon surface, stands vertically and is faulted. The fault strikes N35°W, and is apparently of minor intensity. Within the angular conglomerate, a verticlal jointing parallel to the fault is observable: the fault, and the associated jointing, have locally but not generally concentrated autunite.

The angular conglomerate is scarcely recognizable in outcrop since it tends to weather recessively, and to loosen to a talus-like mass closely resembling rubble of the current erosion cycle. In the weathered state, it is conspicuous by its whiteness and kaolinization. Unweathered material is known only from the core of Diamond Drill Hole No. 1 (See Appendix I). The lower portion of the conglomerate contains slabs and angular fragments of soft, possibly pre-weathered grey or black slates and phyllites, together with sub-angular to sub-rounded fragments of grey micaceous sandstone and of red sandstone, set in a friable grey siliceous matrix which weathers or alters readily to kaolin or sericite. Rarely, well-rounded quartzite pebbles occur. The rock absorbs water fairly readily: core from below the water-table cracks and exfoliates slightly after exposure upon surface. In higher portions of the conglomerate, blocks or slabs of vesicular rhyolite appear accompanied by a grey siliceous mass suggesting altered pumice. The upper portions of the conglomerate become increasingly arkosic and eventually difficult to distinguish from the brecciated portion of the overlying sandstone. The rock is probably composed of the weathered rubble and pebbles of an old hand-surface, heterogeneously mixed with detritus from the softer products of vulcanism. Chemical weathering could have affected the rock only slightly before deposition and burial.

The Upper Proterozoic sandstone surrounds the mineralized rocks on the South, west and North sides, limiting their exposure, as if by overlap. The upper portion of the andstone is a dense red ferruginous quartz-sandstone with imp rfect bedding, locally conglomeratic and locally current-bedded, ith a dip constantly to the west of south at angles averaging 35° to 40°, and with little observable alteration or mineralization.

The lower portion of the sandstone is known only from diamond drill core: where it occurs upon surface it apparently weathers recessively and becomes covered by the rubble of the upper layers, so that it cannot be determined whether the diamond drill intersections are typical of the base of the sandstone, or whether local agencies have been respondible for its local condition. The lowest known portion of the sandstone, which forms the northern margin and is tentatively considered its base, consists of interbedded sandstone and shale, intensely altered and brecciated, with local patches of earthy red hematite and with veinlets of specularite. It is improbable that the alteration can be due to meteoric water, since it occurs well below the water-table. The brecciation is not accompanied by observable rotation or stringing-out (mylonitization), and the altered shale shows few shear-structures. The dip of the lower margin of the sandstone, as fixed by diamond drilling, is steeper than any nedding dip observed upon surface. This margin is noted because it forms the southern border of the mineralized zone and to some extent controls its attitude.

2. Alteration and Mineralization: Weathering of the present erosion cycle penetrates to depths which vary with the elevation of the surface. The water tables lies 110 feet below the collar of D.D.H. No.1 situated on the 350-foot topographic contour (See Plate 2). Below the 500-foot contour near the top of the hill, the depth of weathering probably exceeds 200 feet. Throughout the mineralized zone, the level of the water-table may be taken to be approximately the elevation of the 250-foot

topographic contour. Within the more siliceous rocks, the effects of weathering are not great, and are scarcely noticeable at a depth below 80 feet from the surface: it is to be expected that sulphide minerals would be more severely weathered than the rock but that they would leave clear traces of their former presence within it. The effects of weathering upon the angular conglomerate are pronounced and reach fully to the water-table: the rock is softened and bleached, and portions of it are rotted to a fine incoherent sand which may hinder diamond drilling. The intensity of the effect indicates an inherent porosity in the rock and suggests that the components, as deposited, were not fully weathered.

The silicification present within the chlorite schist has not been completely studied. It is earlier than a period of quartz injection which is visible in the rock as stringers and veinlets roughly following the foliation, but occasionally transgressing the rock-structure. So far as is known the quartz of neither period is genetically connected with the uranium mineralization which is probably later than both. The silica replacement is assigned on general grounds to the period or periods of silicification within the zone of influence of the South Alligator Fault.

Alteration of the angular conglomerate, other than weathering, has taken the form of sericitization and the formation of clay minerals, particularly within the matrix. The alteration is described by Dallwitz (1953) from microscopic study as probably of hydrothermal origin, and this conclusion is supported by the field evidence.

Within the base of the upper sandstone, diamond drilling has found an altered condition at depths too great for the action of ground-water. The alteration has not been studied microscopically. It has resulted in a leached and rotted appearance within both sandstone and shale: the latter is completely altered to serpentine, chlorite and talc. The redistribution of iron originally present is marked by the frequent irregular patches of red hematite; specularite, present in distinct veinlets, appears to be additive to the rock. The nature of the alteration, and the depth at which it is observed, make it probable that the rock has shared in the hydrothermal alteration of the adjacent angular conglomerate.

Secondary mineralization with autunite is invariably in the form of thin flakes or films upon joint or parting-planes, irregularly distributed throughout the mass of the rock in a manner for which no consistent control can be seen. Torbernite occurs infrequently but in the same manner as does autunite. Because of the ease with which these minerals may be transported, their distribution cannot be relied upon to reflect the distribution of the primary minerals from which they may have been derived.

Only one instance of sulphide mineralization is known, from the core of Diamond Drill Hole No. 1. The mineralization occurs within the angular conglomerate, below the zone of weathering (See Appendix I). Pyrite alone is visible megascopically, in small lenses or small rounded aggregates. Mineragraphic examination (Roberts, 1953) discloses the presence additional to pyrite of a nickel sulphide (Bravoite, $NiFeS_2$) frequently associated with marcasite, together with small quantities of chalcopyrite, sphalerite and galena. Associated with the sulphides, but independently disseminated throughout the rock in a very fine dispersion, is a uranium mineral, as yet unidentified but presumably of secondary origin. The association suggests mineralization by hydrothermal agencies, probably recurrent or serial. This is in accordance with the field evidence, and with the microscopic study of the unweathered core (See above, Dallwitz 1953). The writer considers it probable that the uranium mineral present has been derived from an early-deposited primary mineral by paulopost alteration accompanying a later phase of a long mineralising sequence, and that the pyrite owes its rounded shape to corrosion by a similar agency. The Mount Callanan sandstone has shown only a few small radioactive patches, which have been found to be of negligible significance. Fluorescence occurs upon joint-planes in the sandstone, apparently due to the presence of wavellite. Thin veinlets composed of hematite and apatite are also present. (Dallwitz, 1953)

Further information on mineralization is given below under Samples and Assays, and in Appendices I and II.

3. Structure: The gross structure of the rocks, and the factors which tend to obscure the details, have been described briefly under Stratigraphy. In general terms, the prospect consists of a hill or hump of relatively old steeply-dipping slates and siltstones together with their silica-chlorite derivatives, enclosed within an embayment in a thick mass of sandstone, which lies upon the south, west and north of the shales at topographic levels both above and below the shale outcrop. To the eastward the shales decrease in topographic elevation and pass beneath a cover of rhyolite, part of an extensive flow. Interposed between sandstone and altered shale, and occupying the south-western and western portions of the prospect, is a thick lense of angular conglomerate, composed of fragments of sedimentary and volcanic rocks enclosed within a matrix of fine sedimentary and volcanic detritus. As previously stated under Stratigraphy, the shales are considered an irregular inlying peak of Lower Proterozoic rocks, the flanks of which are partly covered by volcanic and associated sedimentary volcanic detritus, of extremely variable thickness. The irregular resultant surface is partly exposed through its sandstone cover. The mineralized portions of the prospect, and the rocks enclosing them, dip steeply south-westward at an angle approaching the vertical: the overlying and enclosing sandstone shows bedding dips ranging between 25° and 40°, but its margin dips at an angle approaching 80°. Within the area known from diamond drilling, a crushed and hydrothermally altered zone includes the angular conglomerate and the adjacent margin of the sandstone: within and adjacent to the crushed zone secondary uranium minerals and sulphides occur. The cause of the crushing, and the linear extent of the zone, have not been determined. The mineralised rocks presumably pass beneath the sandstone at the western side of the prospect, but this point has not been investigated and remains unknown.

The massive sandstone on the south and west of the mineralized rocks is interposed between the prospect and the ridge-outcrop of silicified rocks which marks the South Alligator Fault zone. The relationship of the prospect to the Fault is thereby obscured, although it is probable that the silicification of the older rocks is related to the silicification of the Fault zone. At present, no direct connection is demonstrable between the Fault and the local mineralization.

Within the area of the prospect, localized folding is apparently absent: although the general structure approximates to an anticlinal nose or to a hemi-dome, this is considered to be essentially an original structure present at the time of deposition of the sandstone, subsequently modified by a regional tilt towards the south or south-west and probably by local faulting. The altered condition of the rocks, and the extensive cover, has concealed the effects of minor faults within the area of the prospect: considerable local faulting is probably present, but the only fault which can be described is that noted above under Stratigraphy as marking the contact between angular conglomerate and silica-chlorite schist. This fault appears to be of minor magnitude and its persistence is known for only a short way: its presence and its possible effect upon mineralization below the weathered zone have not been established. With this possible exception, no discovered fault can be stated to have had a critical effect upon mineralization.

Knowledge of the structure is indefinite, as the foregoing description implies. The presence of an irregular original structure, embodied in the roughly unconformable ancient surface and the lenticular character of the intermediate volcanic-sedimentary series, obscures the presence of later structures, which can be delineated only by investigation in detail. The structure of greatest importance is the crush-zone bordering the sandstone and including the mineralized portions of the angular conglomerate, though not observably including the silica-chlorite rocks. This zone is known only at two points, through diamond drilling, and its size, attitude and ultimate cause are unknown. It may safely be said, therefore, that the structure governing the mineralization is yet undetermined.

GEOPHYSICAL INVESTIGATIONS

Geophysical study of the prospect included radiometric, magnetic and electrical (Self-potential) surveys controlled by a closely-spaced grid. Study of the results of the magnetic and self-potential measurements are not complete and are not included in this report. Radiometric surveying involved gridding of the surface exposures in order to establish the distribution of radioactivity, measurement of the intensity of radiation within the pits and costeans, and radiometric logging of the bores, sludges and core of the diamond drill holes. The results are shown graphically on Plates 2, 3, 6 and 7. The measurements upon surface and in the costeans are of relative value only since they afford a comparison of intensity of radiation between different parts of the surface without establishing the quantity of uranium present at any one place. The measurements of radioactivity in the bore-walls and core are, however, related to absolute values established by laboratory assays (See Plates 6 and 7).

DEVELOPMENT WORK

In addition to geological mapping, and to the geophysical investigations described above, the radiometric anomalies of the surface were tested by seven costeans and several pits, and by two diamond drill holes. The distribution of the costeans appears upon Plate 2: in general they are shallow in depth and are not sunken far into the bedrock, since their purpose was to remove the rubble cover of the hillside and to establish the nature and condition of the bedrock at selected points. Of the seven costeans shown upon Plate 2, only Costeans Nos. 2 to 5 inclusive were able to penetrate to bedrock through the rubble: they were all sited within the outcrop area of the angular conglomerate and within the most uniform and consistent portion of the surface radiometric anomaly. All four exposed autunite in place within the bedrock: in addition, showings of torbernite were present in Nos. 2 and 3. Depth-profiles of the costeans appear upon Plate 3. A vertical pit was subsequently sunk in the floor of No.5 Costean to a depth of 14 feet below the surface, exposing weathered bedrock within which flakes of autunite were sporadically visible. Of several smaller pits, only two (A and B, Plate 2) were in bedrock: both exposed small showings of autunite.

No attempt was made to sink pits below the weathered zone, which lies approximately 150 feet below the surface at No.5 Costean. Diamond drilling was relied upon for deep exploration, and for sampling. Two diamond drill holes, each 503 feet in length and inclined at 35° below the horizontal, were drilled on parallel bearings from collar-sites 150 feet apart (See Plates 2, 4 and 5). The holes pass across and below the principal anomaly: because of the limited choice of drilling-sites, the holes were drilled in the direction of the structural dip, though at a flatter inclination, rather than in thr preferred direction normal to the dip. Because of the prevailing steepness, reasonably satisfactory transection of the rock-sequence was obtained, in succession from lower beds to higher. Diamond Drill Hole No.1 tests below the pit in No. 5 Costean: Diamond Drill Hole No.2 tests the zone to the south-east of No.1. Geological logs of the holes are appended (See Appendices I and II); and vertical sections are shown on Plates 4 and 5. The results of the drilling is further discussed under Geology and under Sampling and Assays. No great difficulties were encountered in drilling, which progressed at an average rate of one foot per working-hour. Core recovery in D.D.H. No.1 averaged 80%: D.D.H.

No.2 recovered 95% of core in more siliceous rocks. Water and sludge recovery was excellent from both holes.

SAMPLING AND ASSAYS

With the exception of a series of channel-samples cut within the deep pit in No.5 Costean, no systematic sampling was undertaken upon the surface exposures: a measure of the relative distribution of radioactive minerals, given by close-spaced radiometric surveys, was considered sufficient to guide exploration. The relative distribution of mineralization within the costeans is known only from the radiometric profiles measured along the length of each costean: these profiles appear upon Plate 3.

The percentages of uranium oxide quoted in this report are based upon radiometric assays, and are stated as the radiometric equivalent of the standard oxide, U_3O_8 (abbreviated e U_3O_8). The presence of uranium has been confirmed chemically in a few cases, and the visible presence of autunite and torbernite has been accepted as confirmation that at least the greater part of the radioactivity is produced by uranium.

Channel sampling of the deep pit tested only weathered material, and the results are impossible to assess at present as an indication of conditions likely to be found below the weathered zone. Twelve samples average 0.129% e U_3O_8 in grade: the values are erratically distributed and the average is made of ten samples averaging 0.033% and two samples averaging 0.607% e U_3O_8.

The greater number of systematic samples, and the only samples including tests of unweathered material, were taken from the sludges and cores of the two diamond drill holes. Sludge samples were taken continuously, each sample representing 5 feet of bore-length. Core samples were split at selected lengths to afford checks upon the sludge assays. The walls of the bore were scanned by a geiger-muller probe, and a continuous log of the radioactivity present was measured and plotted graphically. The process was repeated with the core, which was scanned throughout its length by a ratemetered g.m. counter. The results of the various assays and measurements were plotted graphically and appear upon Plates 6 and 7. Lists of assays of diamond drill hole samples are given in Appendices III and IV: particulars of the mineralization are given in the descriptive logs of the core (Appendix I and II).

Diamond Drill Hole No. 1 found traces of autunite in weathered material beneath the deep pit, 75 to 100 feet deeper within the zone of weathering. Sludge and core assays over a length of 35 feet, however, average little more than 0.010% e U_3O_8. (Appendix III, 70-105, and Plates 4 and 6). Sulphide mineralization, recovered from below the zone of weathering, averages 0.047% e U_3O_8 over a bore length of 45 feet in sludge samples (Appendix III, 245-290). A representative section of core 29'6" in length from the same part of the bore averages 0.051% e U_3O_8 (Appendix III, 248-277).

Diamond Drill Hole No.2 found mineralization only in the zones of weathering. Two zones were cut, of which the lower and larger averaged 0.041%, e U_3O_8 over a bore length of 20 feet. Core samples, over a more accurately determined length of 17 feet, averaged 0.077% e U_3O_8 in the same zone. (Appendix IV, 95-115, and Plates 5 and 7).

The relation between bore-length and the true horizontal width of a mineralised zone is not accurately known. The zones appear to dip nearly vertically: if this is generally true, horizontal widths are approximately 80%, of the bore-length. In view of the imperfect knowledge of the structure, no attempt is made to estimate the size of the mineralized lenses, or to link them together in a single defined orebody.

CONCLUSIONS AND RECOMMENDATIONS

The prospect at Coronation Hill cannot be evaluated unless further work is done upon it. The investigation completed up to the present has shown an increasing promise without disclosing the presence of an exploitable orebody, or fixing the limits and source of the mineralization. Further work, if undertaken, must have as its object the search for continued improvement at greater depth or laterally beyond the limits of the known area. It is considered improbable that an orebody exists within the limits marked by the two diamond drill holes, despite the presence of small lenses or pockets of good-grade secondary minerals. The number of such lenses, and their aggregate value, can only be determined by an underground operation or its equivalent in close-spaced deep pitting or drilling: a programme of work of this nature is not recommended at the present time, since it would require concentration of effort within an area of doubtful value which may represent a detatched fringe of a larger mineralized zone. The value of the prospect remains speculatively dependent upon the existence of such a zone, as yet undetermined but adumbrated by the degree of hydrothermal alteration observable within the rocks of the known area.

What is required, therefore, is a continuation of the exploratory programme beyond the limits of the completed work, rather than intensive development within them. As its primary object, the work should aim at finding and testing possible extensions of the sulphide zone encountered in Diamond Drill Hole No.1, at greater depth beneath the present hole and within the area to the north-west of it. An effort should be made to test the unweathered zone beneath the chlorite schist outcrop and beneath the deep pit, for the possible presence of sulphides.

It is considered that five more diamond drill holes, each between 500 feet and 600 feet in length, would suffice to disclose the potentialities of the prospect. It would be most convenient, and probably most effective, to drill these holes parallel in bearing and inclination to the two holes already completed. It would be necessary to collar them as low on the hillside as practicable in order to get below the weathered zone as quickly as possible. The point of most immediate interest, as noted above, is the area lying below D.D.H. No.1 and extending some 200 feet to the north-west of it: three diamond drill holes may be required here, with the remaining two holes testing the area below D.D.H. No.2 and to the south-east of it. In all a minimum of 2500 feet of diamond drilling would be necessary, or six months work for one diamond drill working two shifts per day.

The work may also be accomplished by mining operations. A shaft, if collared just below the surface showings, would reach below the weathered zone at a depth of 100 to 125 feet. Exploration by adit is feasible, but an adit level could not be established conveniently at a greater depth than 90 feet below the collar of D.D.H. No.1. The level would therefore be slightly above the water-table throughout the greater part of its length. The xxx crosscut leg of the adit would be approximately 500 feet long if carried through to the sandstone. Drifting length would vary from a minimum of 500 feet to a maximum of 900 feet, depending on the requirements of an initial test.

Of the two methods, the underground test would be the more certain within the scope of the workings, but it would not reach as deeply as the diamond drill: it has been noted that an adit level would scarcely test the unweathered zone at all, unless winzing were resorted to. It would seem preferable to continue exploration with the diamond drill, rather than to sink a deep shaft or develop an adit level which may be too shallow to be effective. Because the closely-adjacent private holdings upon ML 3A form the only convenient base for further operations, future exploration and development can be carried out most expeditiously by a non-governmental organization capable of entering into negotiated agreements without the restraints necessarily imposed upon the public service.

In conclusion, it may be said that while the work so far completed at Coronation Hill has not proved the prospect to be of economic calue, certain features are present which indicate the possibility of improved conditions in adjacent parts of the mineralised zone. The favourable features are the widespread occurrence of secondary uranium minerals and the relative concentration of intense hydrothermal alteration, coupled with the occurrence of sulphide mineralization of a varied and complex type. Their presence must qualify the otherwise unfavourable conclusions suggested by the low grade and by the lack of any easily identifiable controlling structure.

APPENDIX I

CORONATION HILL, NORTHERN TERRITORY.

DIAMOND DRILL HOLE NO. 1.

LOCATION : COORDINATES 02+40S 01+65W

ELEVATION OF COLLAR :

BEARING : 230 degrees T.

DEPRESSION : 35 degrees.

LENGTH : 503'4" BEGUN 16 SEPT. 1953. FINISHED 20 OCT. 1953.

CORE SIZES : NXO-10, NM 10-31, BX 31-244, AX 244-503.

0 -10 :	Casing (weathered chloritic Schist, as below)
10'0" - 48'3"	Siliceous chloritic schist : approximate composition silica 75%, chlorite 20%, iron oxides 5%. Weathered, somewhat limonitic. Prevalently brecciated with angular fragments: Locally shows faint bedding crossing the core at 30 degrees. Many thin quartz stringers: Pronounced weathering is localized 36'0" to 40'0" and 45'0" to 48'0". No radioactivity was detected in the core, sludge or bore-walls. The contact at 48'3" is steeply across the core and its vicinity is marked by broken core, closely jointed or slightly sheared. Fault material was not noted, but the contact is probably faulted.
48'3" - 174'0"	Angular conglomerate. Groundmass composed of grey-green porous sandstone (porosity judged by gain in weight after immersion in water) : Abundant sub-angular fragments of grey micaceous sandstone and red sandstone. Sparse well rounded quartzite pebbles. Abundant sharply angular fragments of black slate or phyllite to 103'0"; thereafter slate fragments sparse. Abundant fragments of white or grey slate to 75'0" only. Core weathered, kaolinitic and limonitic to 104'0", weathering particularly marked 48'3" to 80'0" and 97'0" to 104'0". Below 104'0" the core appears fresh and solid. Traces of limonite persist to 134'0" : The water table probably lies at 140 feet. Radioactivity detectable in core, sludge and bore-walls between 58'0" and 105'0". Generally of low order, 1½ times background. Autunite fluorescence (specks) noted at 63'5", 69'9" intermittently to 71'8", 98'6" intermittently to 100'6", and 103'0" to 103'8". The autunite could not be detected without ultra-violet light, and could not be found below 103'8". The mineralized zone, 59'-104' is vertically below the deep pit in No. 5 costean, and corresponds in appearance to the material exposed in the pit. Core losses were marked between 80'0" and 95'0", where only 5'3" of core was recovered. Considerable loose sand was encountered at this point, nearly directly below the deep pit. No evidence of sulphide mineralization was noted. Coarse limonitic vugs (after carbonate?) noted 80'-91'.
174'0"-239'0"	Interbedded grey porous sandstone (as in the groundmass of the foregoing section) with gritty chlorite schist (altered shale?) The rock is brecciated, and is prevailingly rotten and crumbly.

Red earthy hematite noted 221'0" to 239'0". The core, though from below the water table, appears leached and weathered, in part due to water wash from the drill. Shale predominates 179'0" - 183'0" and 196'0"-207'0".

A single isolated rise in radioactive count was noted at 216'0". The effect is slight and no reason could be seen.

239'0" - 277'8" Angular conglomerate:
Nearly identical with the conglomerate 48'0" - 174'0" but greater proportion of red sandstone, and groundmass more nearly normal sandstone or arkose: Core has prevalent reddish colour. Black slate fragments present, not abundantly. No white or grey slate. Green chloritic shale fragments present, not abundant. Fragments prevalently small, up to 1" maximum dimension. Irregular soft flaky green streaks and patches (sericitic?) frequent as if alteration products.

The core shows little evidence of jointing or shearing. It is fairly soft and cracks slightly on exposure to sun and air.

Small anhedral masses of pyrite are found sporadically, in aggregate mass less than 5% of the total core, throughout the length 245'-278'. The pyrite tends to occur in the black slate fragments, as if replacing them. Radioactivity is noted in close association with the pyrite. Ratemeter readings up to 3 times background noted 250'-270'.

277'8" - 287'9" Dark red amygdaloidal volcanic (rhyolite) in sections up to 24" in length, with grey porous sandstone interstitial. It appears that these are blocks or boulders in the conglomerate, but the evidence is not conclusive. The core is broken in short pieces, and has a slightly water-weathered appearance.

Traces of radioactivity exist at 287'. No reason could be seen.

287'9" - 305'0" Angular conglomerates:
As 239'0" - 277'8". Very few small fragments of black shale could be noted, accompanied by sparse pyrite mineralization. Core soft, somewhat kaolinitic, with patches and streaks of red earthy hematite: Few breaks in core. No definite boundary between this and following rock-type.

Radioactivity was noted throughout, of low order (1½ times background). The source appears associated with the pyrite.

305'0" - 335'0" Brecciated porous sandstone, or brecciated fine conglomerate. Much patchy and streaky red hematite. The core has an altered appearance, and is broken in short lengths. There are no vugs. This horizon probably correlates with No. 2 D.D.H. at 249'0" - 282'0".

335'0" - 367'0" Green chloritic shale, variegated with streaks of yellow and olive talc or serpentine. The core is soft and broken into short lengths. Brecciation has occurred after formation of the serpentine. Some short sections of brecciated sandstone stained with red earthy hematite are present.

367'0" - 436'0" Sandstone with partings of green chloritic shale and thin shale beds. Brecciated throughout - Sandstone and shale are mottled with red earthy hematite.

Thin veinlets of specular hematite cut the shale beds frequently but are rare in the sandstone.

Brecciation is intense 367 - 390, with much red hematite.

A trace of radioactivity was noted 370 - 375.

436'0"-503'4" Sandstone, reddish-brown with sparse fine bedding and a few green shale partings which cross the core at an angle of 45 degrees. Pebbles, sometimes angular, sparsely present but no defined conglomerate beds. This is the first intersection of sandstone typical of the Buldiva (Mt. Callanan) outcrop. Fissuring and slight brecciation with red-brown hematite cement are noted throughout.

D.D.H. No. 1 ended at 503'4".

(R.B. Allen)

APPENDIX II

CORONATION HILL, NORTHERN TERRITORY

DIAMOND DRILL HOLE NO. 2

LOCATION : COORDINATES 03+60S, 00+ 90W

ELEVATION OF COLLAR

BEARING : 224 degrees T

DEPRESSION 35 degrees

LENGTH : 503'3"

BEGUN : 19th Sept. 1953. Finished 14th October, 1953.

CORE SIZES : NX 0-121'8", BX 121'-8" TO 503'3".

0 - 162'6" Siliceous chloritic schist:
As for the chloritic schist of D.D.H. No.1. but with less brecciation or fragmental structure and fewer quartz stringer-veinlets. Generally green in colour, weathering brown and patinated or mottled. Principal constituents silica (75%), chlorite (20%), iron oxides (5%). Locally shows bedding, when it resembles a cherty siltstone. The texture is often finely arenaceous. Possibly a reworked and water-sorted tuff probably a hydrothermally silicified argillitic schist.
0 - 80 : Core deeply weathered but not crumbly. Much limonite in joint-cracks.
80 - 162'6": Weathering largely confined to limonite deposition in joints, and formation of irregular vugs lined with red hematite, probably by leaching of carbonate. Core is frequently dark red due to hematite staining; limonite is not observed below 146'. Hematite most notable 126-130, 141-145
Sharply defined seam of clay gouge with angular fragments at 121, with broken core 120-122: probably fault.
Radioactivity was detected in the core 65'-72' and 96'-112' which checked closely with the bore probing.
Autunite was noted in thin films on joint planes or bedding planes at 49'6" and again intermittently between 64'6" and 71'6", again between 86'5" and 97'10", at 101'3", at 108'3", between 110'6" and 111'10", and at 145'3". The latter is near the water table (approx. at 150') and was the deepest point at which autunite could be detected. The autunite is transported and not residual. At 98'1" a vug was noted, suggesting a weathered iron mineral. Autunite and possibly torbernite is present in the vug. Very thin quartz veinlets with red crystalline hematite occur sparsely between 100' and 106'.

The core was split for assay in 12" lengths, continuously 64'6" to 72'6", and continuously 89'6" to 112'6". Spot samples were split at 49' and at 145'.

The contact at 162'-6" is bleached in colour; its attitude was indeterminate. No faulting is indicated.

162'6"-170'0" Siliceous Metamorphic: Grey, with a rough pumiceous feel. Fine groundmass of brown hematite. Spotted with white quartz aggregates. Solid and quartzitic.

170'0"-176'6" Siliceous chloritic schist as before: Colour pale and of altered appearance. Core somewhat broken. Trace of radioactivity at 174'.

176'6" - 247'0"	Siliceous metamorphic: Grey to brown. Feels rough. Somewhat granular. Brown hematite generally present as if filling fine pore-spaces. Characterized by presence of finely granular aggregates of quartz, often surrounded by reddish-brown halo of iron oxides. These are derived from a green translucent porphyroblastic mineral, essentially iron and silica, present in grains, laths and rarely as fine seams bordering quartz veinlets. The rock is spotted and flecked with white, pale orange or dark green. Silica (90%+) and iron are the only recognisable constituents: The parent rock and manner of origin cannot be identified. 176'6" - 179'0": fine angular breccia, with brown hematite cement. 179'0" - 200'0": Dense, highly siliceous, very fine in texture: Probably added silica. Resembles a rhyolite superficially. 208'0" - 213'0": Red colour pronounced in hematite. 235'0" - 236'0": Bright red, very fine clay gouge possibly marking a fault. Sharply defined. A trace of radioactivity was noted at 203' No reason could be observed.
247'0" - 249'0"	Green chlorite-serpentine, probably altered shale.
249'0" - 282'0"	Quartzitic sandstone: As 176'6"-247'8" but faintly streaked locally at 40 degrees to the core: Bedding or alteration. Locally brecciated, with hematite cement. There is no sharp difference from the rock 176'6"-247'0".
282'0" - 286'6"	Gritty chlorite-serpentine schist, probably altered shale with rotten sandstone. Irregular streaks of red hematite abundant. No regular structures.
286'6" - 295'6"	Brecciated hematized sandstone.
295'6" - 303'6"	Gritty chlorite-serpentine schist, contorted. Impregnated with red hematite. Numerous veinlets specular hematite Probably a sheared, rotted shale-sandstone bed.
303'6" - 385'0"	Brecciated and altered sandstone. 303'6" - 309'0": Breccia impregnated with red earthy hematite. 309'0" - 348'0". Sandstone, resembling Mt. Callanan: Colour variegated, bleached. Hard, quartzitic. Brecciated throughout with patches and seams red hematite. Patches green shale locally present: Probably disrupted beds. Few vugs filled with cream-coloured bladed carbonate, unidentified (Non-fluorescent). 348'0"-356'0" : Rotten sandstone, hematite-impregnated and cut by many veinlets of specular hematite. Some crumpled chloritic material present. Bounderies of this zone are generally at 30 degrees to the core. 356'0" - 364'6": Sandstone as 309' - 348' above. 364'6" - 368'6": Rotten sandstone with green chloritic material, impregnated with red hematite. Many irregular veinlets of specular hematite. Fairly regular structure at 30 degrees to core: bedding or shearing. 368'6" - 385'0": Brecciated sandstone as 309 - 348, but brecciation more intense. Red hematite prominent to 378'.
385'0" - 392'0"	Chlorite schist with broken sandstone fragments. Schistosity 45 degrees to core. Probably sheared shale.
392'0" - 414'0"	Brecciated sandstone, quartzitic. Patchy red hematite.

414'0" - 423'0"	Green chlorite schist. Solid, structureless except for schistosity.
424'0" - 428'0"	Red vuggy breccia: fragments green shale and sandstone. Highly ferruginous, red earthy hematite. Cause of vugs not determinable, probably carbonate leaching.
428'0" - 444'0"	Sandstone, quartzitic. Coarsely brecciated, cemented brown hematite. 4" wide fault breccia at 434.
444'0" - 453'0"	Rotten sandstone with chloritic material. Core crumbly, moderately ferruginous with hematite. Traces of radioactivity noted.
453'0" - 503'3"	Brecciated sandstone: breccia not intense, but fissuring prevalent throughout. Veined and recemented with brown hematite. Locally finely bedded at 40 degrees to core, locally shows pebbles, angular to sub-angular. Prevalent colour reddish brown.
	468'0" - 469'0": Rotten, leached and crumbly. Trace radioactivity.
	D.D.H. No. 2 ended at 503'3".

R.B. Allen.

APPENDIX III

CORONATION HILL, N.T.

SLUDGE SAMPLE ASSAYS (RADIOMETRIC) DIAMOND DRILL HOLE NO.1.

Sample No.	Bore Length Feet From	Bore Length Feet To	Sample Length Feet	Assay % U_3O_8 Equivalent
-	0	20	-	Not sampled
A6202	20	25	5'0"	Trace
6207	25	30	"	"
6208	30	35	"	"
6209	35	40	"	"
6213	40	45	"	"
6220	45	50	"	"
6221	50	55	"	"
6222	55	60	"	"
6223	60	65	"	"
6224	65	70	"	"
6235	70	75	"	"
6244	75	80	"	0.015
6245	80	85	"	Trace
6246	85	90	"	0.011
6247	90	95	"	0.013
6248	95	100	"	Trace
6259	100	105	"	0.030
6260	105	110	"	Trace
6263	110	115	"	"
6264	115	120	"	"
6265	120	125	"	"
6266	125	130	"	"
6267	130	135	"	"
6268	135	140	"	"
6269	140	145	"	"
6270	145	150	"	"
6271	150	155	"	"
6273	155	160	"	"
6274	160	165	"	"
6275	165	170	"	"
6276	170	175	"	"
6277	175	180	"	"
6278	180	185	"	"
6279	185	190	"	"
6280	190	195	"	"
6281	195	200	"	"
6282	200	205	"	"
6286	205	210	"	"
6287	210	215	"	"
6288	215	220	"	"
6290	220	225	"	"
6293	225	230	"	"
6294	230	235	"	"
6295	235	240	"	"
6309	245	250	"	0.058
6310	250	255	"	0.014
6311	255	260	"	0.090
6312	260	265	"	0.086
6313	265	270	"	0.063
6314	270	275	"	0.017
6321	275	280	"	0.021
6322	280	285	"	0.014
6323	285	290	"	0.058
6327	290	295	"	0.014
6333	295	300	"	Trace
6334	300	305	"	"
6335	305	310	"	"
6336	310	315	"	"
6344	315	320	"	"
6345	320	325	"	"
6346	325	330	"	"

Note: "Trace" indicates assays of less than 0.010% e U_3O_8.

Sample No.	Bore Length Feet From	To	Sample Length Feet	Assay % U_3O_8 Equivalent
6349	330	335	5'0"	Trace
6350	335	340	"	"
6351	340	345	"	"
6352	345	350	"	"
6353	350	355	"	"
6357	355	360	"	"
6358	360	365	"	"
6359	365	370	"	"
6365	370	375	"	"
6366	375	380	"	"
6367	380	385	"	"
6368	385	390	"	"
6369	390	395	"	"
6370	395	400	"	"
6371	400	405	"	"
6372	405	410	"	"
6373	410	415	"	"
6374	415	420	"	"
6375	420	425	"	"
6376	425	430	"	"
6377	430	435	"	"
6378	435	440	"	"
6379	440	445	"	"
6380	445	450	"	"
6381	450	455	"	"
6382	455	460	"	"
6383	460	465	"	"
6384	465	470	"	"
6385	470	475	"	"
6386	475	480	"	"
6387	480	485	"	"
6388	485	490	"	"
6389	490	495	"	"
6390	495	500	"	"
6391	500	503	3'0"	"
	Core Samples No.1.		D.D.H.	
A6396	68'6"	70'6"	2'0"	0.014
6397	70'6"	72'6"	"	0.011
A6398	72'6"	74'6"	"	0.019
A5601	80'0"	85'0"	5'0"	Trace
5602	85'0"	90'0"	"	"
5603	90'0"	95'0"	"	0.011
5604	95'0"	97'0"	2'0"	0.013
5605	97'0"	100'0"	3'0"	0.017
5606	100'0"	102'0"	2'0"	Trace
5607	102'0"	105'0"	3'0"	0.017
5608	248'0"	250'0"	2'0"	0.045
5609	250'0"	252'0"	"	0.103
5610	252'0"	254'0"	"	0.025
5611	254'0"	256'0"	"	0.028
5612	256'0"	258'0"	"	0.126
5613	258'0"	260'0"	"	Trace
5614	260'0"	262'0"	"	0.033
5615	262'0"	264'0"	"	0.117
5616	264'0"	266'0"	"	0.073
5617	266'0"	268'0"	"	0.068
5618	268'0"	270'0"	"	0.071
5619	270'0"	272'0"	"	Trace
5620	272'0"	274'0"	"	0.013
5621	274'0"	276'0"	"	0.014
5622	276'0"	277'6"	1'6"	0.046

APPENDIX IV

CORONATION HILL, N.T.

ASSAY RESULTS D.D.H. NO. 2.

Sample No.	Bore Length Feet From	To	Sample Length Feet	Assay % U308 Equivalent
-	0	10	-	Not sampled
6201	10	15	5'0"	Trace
6203	15	20	"	"
6206	20	25	"	"
6204	25	30	"	"
6205	30	35	"	"
-	35	50	"	Not sampled
6210	50	55	"	Trace
6211	55	60	"	"
6212	60	65	"	"
6214	65	70	"	0.028
6215	70	75	"	0.021
6216	75	80	"	Trace
6218	80	85	"	"
6219	85	90	"	"
6217	90	95	"	"
6227	95	100	"	0.043
6225	100	105	"	0.036
6226	105	110	"	0.07
6228	110	115	"	0.016
6229	115	120	"	Trace
6231	120	125	"	"
6232	125	130	"	"
6230	130	135	"	"
6233	135	140	"	"
6234	140	145	"	"
6236	145	150	"	"
6237	150	155	"	"
6238	155	160	"	"
6239	160	165	"	"
6240	165	170	"	"
6241	170	175	"	0.022
6242	175	180	"	Trace
6243	180	185	"	"
6249	185	190	"	0.011
6250	190	195	"	Trace
6251	195	200	"	"
6252	200	205	"	0.019
6253	205	210	"	Trace
6254	210	215	"	"
6255	215	220	"	"
6257	220	225	"	"
6256	225	230	"	"
6258	230	235	"	"
6261	235	240	"	"
6262	240	245	"	"
6272	245	250	"	"
6283	250	255	"	"
6284	255	260	"	"
6285	260	265	"	"
6289	265	270	"	"
6291	270	275	"	"
6292	275	280	"	"
6296	280	285	"	"
6297	285	290	"	"
	290	295	"	
6299	295	300	"	"
6298	300	305	"	"
6300	305	310	"	"
6301	310	315	"	"
6302	315	320	"	"

Sample No.	Bore Length Feet From	To	Sample Length Feet	Assay %, U_3O_8 Equivalent
6303	320	325	5'0"	Trace
6304	325	330	"	"
6305	330	335	"	Nil
6306	335	340	"	Trace
6307	340	345	"	"
6308	345	350	"	"
6315	350	355	"	"
6316	355	360	"	"
6317	360	365	"	Nil
6318	365	370	"	Trace
6319	370	375	"	"
6320	375	380	"	"
6324	380	385	"	"
6325	385	390	"	"
6326	390	395	"	"
6328	395	400	"	"
6329	400	405	"	"
6330	405	410	"	"
6331	410	415	"	"
6332	415	420	"	"
6337	420	425	"	0.011
6338	425	430	"	Trace
6339	430	435	"	"
6340	435	440	"	"
6341	440	445	"	"
6342	445	450	"	0.017
6343	450	455	"	0.014
6347	455	460	"	Trace
6348	460	465	"	"
6354	465	470	"	"
6355	470	475	"	0.013
6356	475	480	"	Trace
6360	480	485	"	"
6361	485	490	"	"
6362	490	495	"	"
6363	495	500	"	"
6364	500	503	3'0"	"
	Core Samples No.2.		D.D.H.	
A6394	49'0"	50'0"	1'0"	0.015
A 403	64'6"	65'6"	"	0.071
404	65'6"	66'6"	"	0.060
405	66'6"	67'6"	"	Trace
406	67'6"	68'6"	"	0.117
407	68'6"	69'6"	"	Trace
408	69'6"	70'6"	"	"
409	70'6"	71'6"	"	0.050
410	71'6"	72'6"	"	Trace
426	89'6"	90'6"	"	"
427	90'6"	91'6"	"	"
428	91'6"	92'6"	"	Nil
429	92'6"	93'6"	"	Trace
430	93'6"	94'6"	"	"
411	94'6"	95'6"	"	"
412	95'6"	96'6"	"	0.013
413	96'6"	97'6"	"	0.232
414	97'6"	98'6"	"	0.019
415	99'6"	100'6"	"	Trace
416	100'6"	101'6"	"	0.025
417	101'6"	102'6"	"	0.032
418	102'6"	103'6"	"	0.013
419	103'6"	104'6"	"	0.287
420	104'6"	105'6"	"	0.127
421	105'6"	106'6"	"	0.085
422	106'6"	107'6"	"	0.020

Sample No.	Bore Length Feet From	To	Sample Length Feet	Assay % U_3O_8 Equivalent
423	107'6"	108'6"	1'0"	0.119
424	108'6"	109'6"	"	0.075
425	109'6"	110'6"	"	0.023
A6392	110'6"	111'6"	"	0.094
6393	111'6"	112'6"	"	0.065
6395	145'0"	146'0"	1'0"	Trace
A 431	444'6"	446'6"	2'0"	0.055


PLATE I
RECONNAISSANCE GEOLOGICAL MAP
CORONATION HILL - GOODPARLA AREA
SCALE
0 1 2 3 4 5 6 7 8 9 10 miles
REFERENCE
Lower Cretaceous Klm Mullaman Group
Upper Proterozoic Puc Mount Callanan Group
Pue Edith River Group
Pug Gerowie Beds
Lower Proterozoic Plb Brocks Creek Group
Middle Creek Granite
Diorite
Basic Volcanics
Intermediate Volcanics
Rhyolite
Porphyry sills and flows.
Dolerite
Major Faults and Fractures
Mineral Lease
Track
Homestead
Airborne Scintillometer Anomaly.
LOCALITY MAP
CORONATION HILL URANIUM PROSPECT
Darwin
Mt Evelyn 4-mile
Coronation Hill
Daly R.
Roper R.
NORTHERN
TERRITORY
Tennant Ck.
SCALE
MILES
True N
to Cannon Hill
Goodparla H/S.
To Pine Creek
South Alligator Fault Zone
Gerowie Fault
Mount Callanan
Coronation Hill
Tabletop Mountain
Middle Creek Granite
Zamu Creek
Turtle Hole
undifferentiated Gerowie Beds ?
Klm
Pue
Puc
Pug
Plb
Based on traverse information and photointerpretation
Geology by B.P. Walpole, B.J. Drew, D. White and R. Britten
Bureau of Mineral Resources Geology and Geophysics 1953
NT63-1

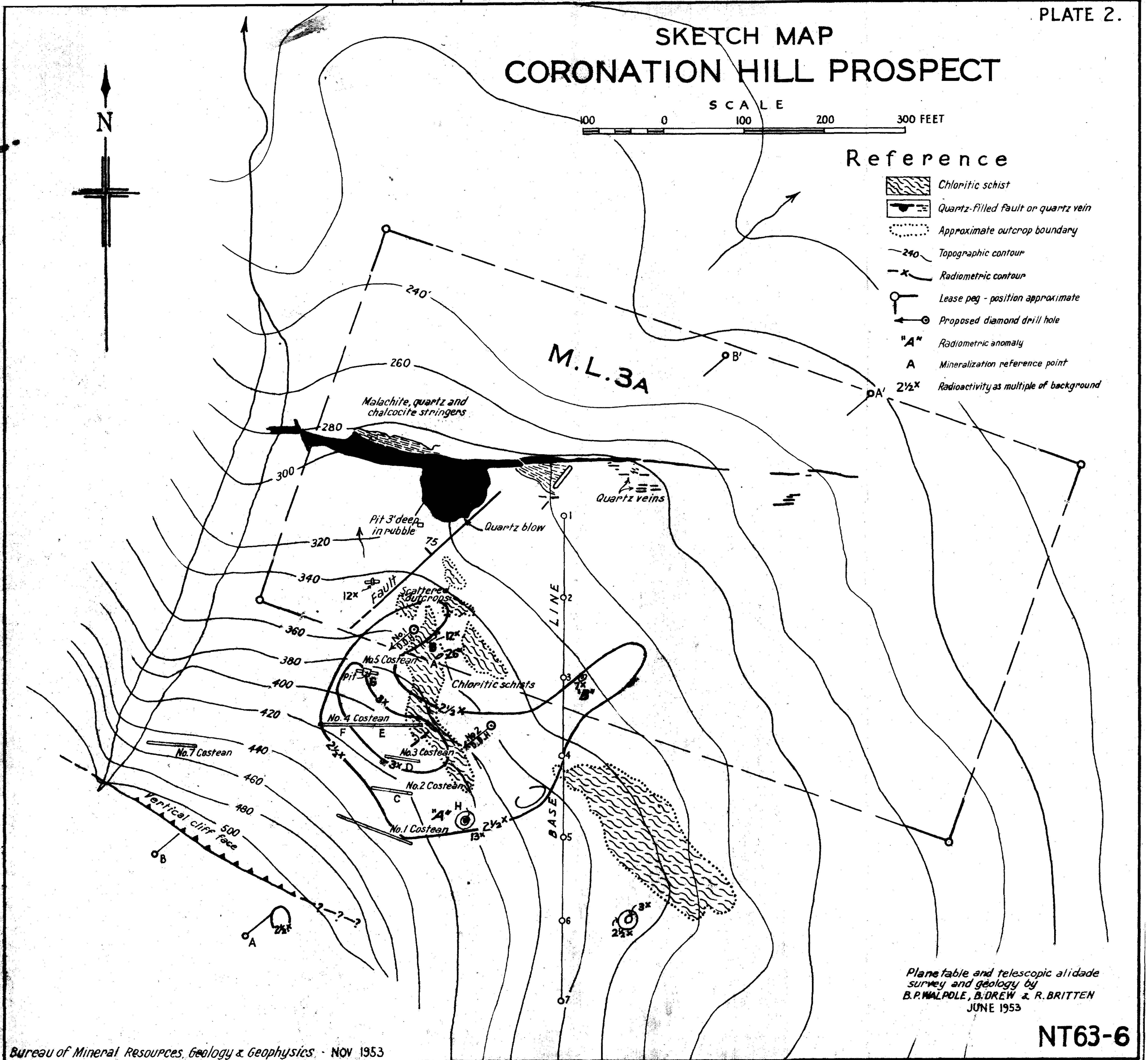


PLATE 2.
SKETCH MAP
CORONATION HILL PROSPECT
SCALE
100 0 100 200 300 FEET
Reference
Chloritic schist
Quartz-filled fault or quartz vein
Approximate outcrop boundary
Topographic contour
Radiometric contour
Lease peg - position approximate
Proposed diamond drill hole
"A" Radiometric anomaly
A Mineralization reference point
2½x Radioactivity as multiple of background
N
M.L.3A
240'
260
280
300
320
340
360
380
400
420
440
460
480
500
Malachite, quartz and chalcocite stringers
Quartz veins
Quartz blow
Pit 3' deep in rubble
Fault
Scattered outcrops
Chloritic schists
No.5 Costean
No.4 Costean
No.3 Costean
No.2 Costean
No.1 Costean
No.7 Costean
BASE LINE
Vertical cliff face
B'
A'
Plane table and telescopic alidade survey and geology by
B.P. WALPOLE, B. DREW & R. BRITTEN
JUNE 1953
NT63-6
Bureau of Mineral Resources, Geology & Geophysics · NOV 1953

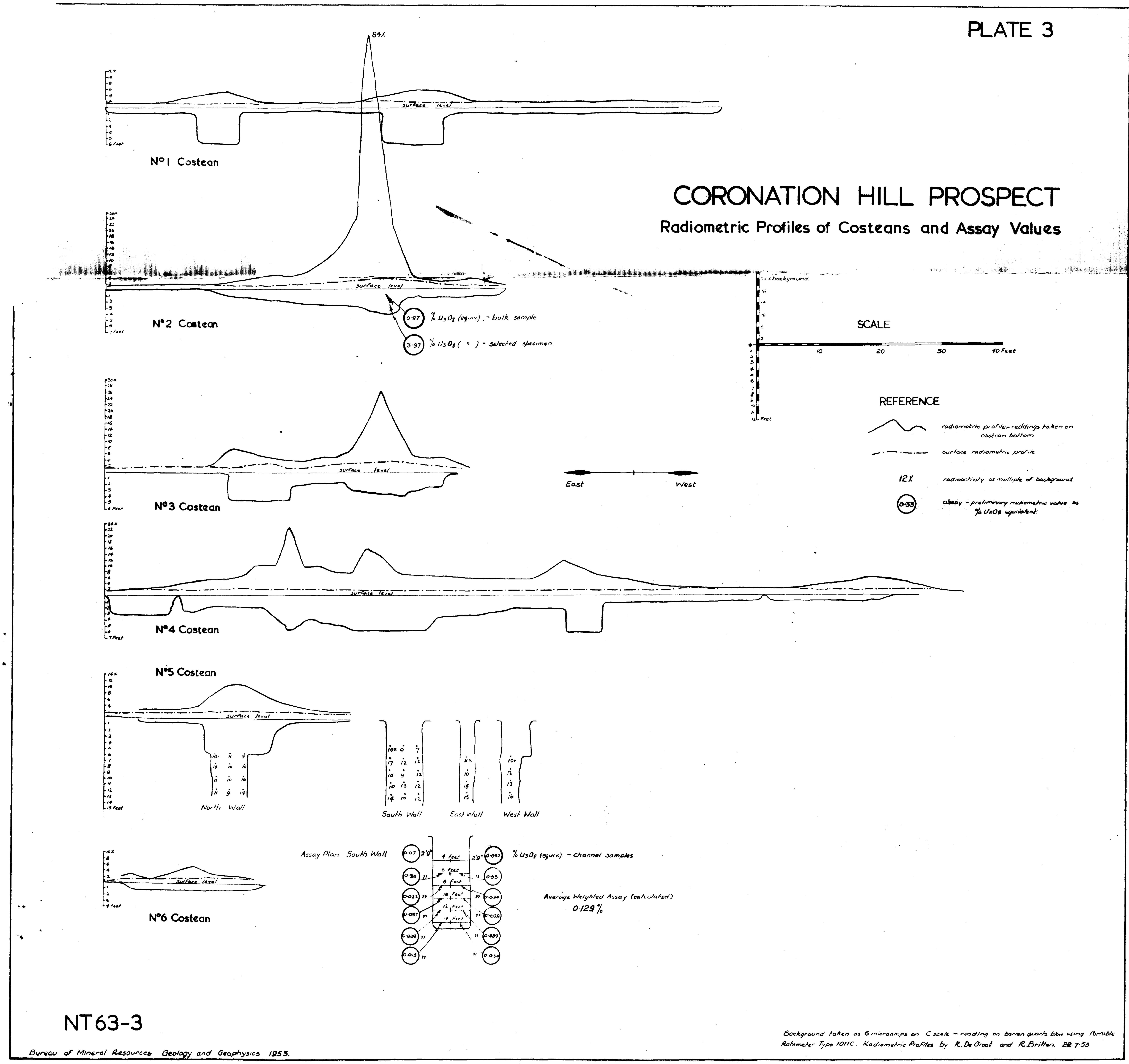
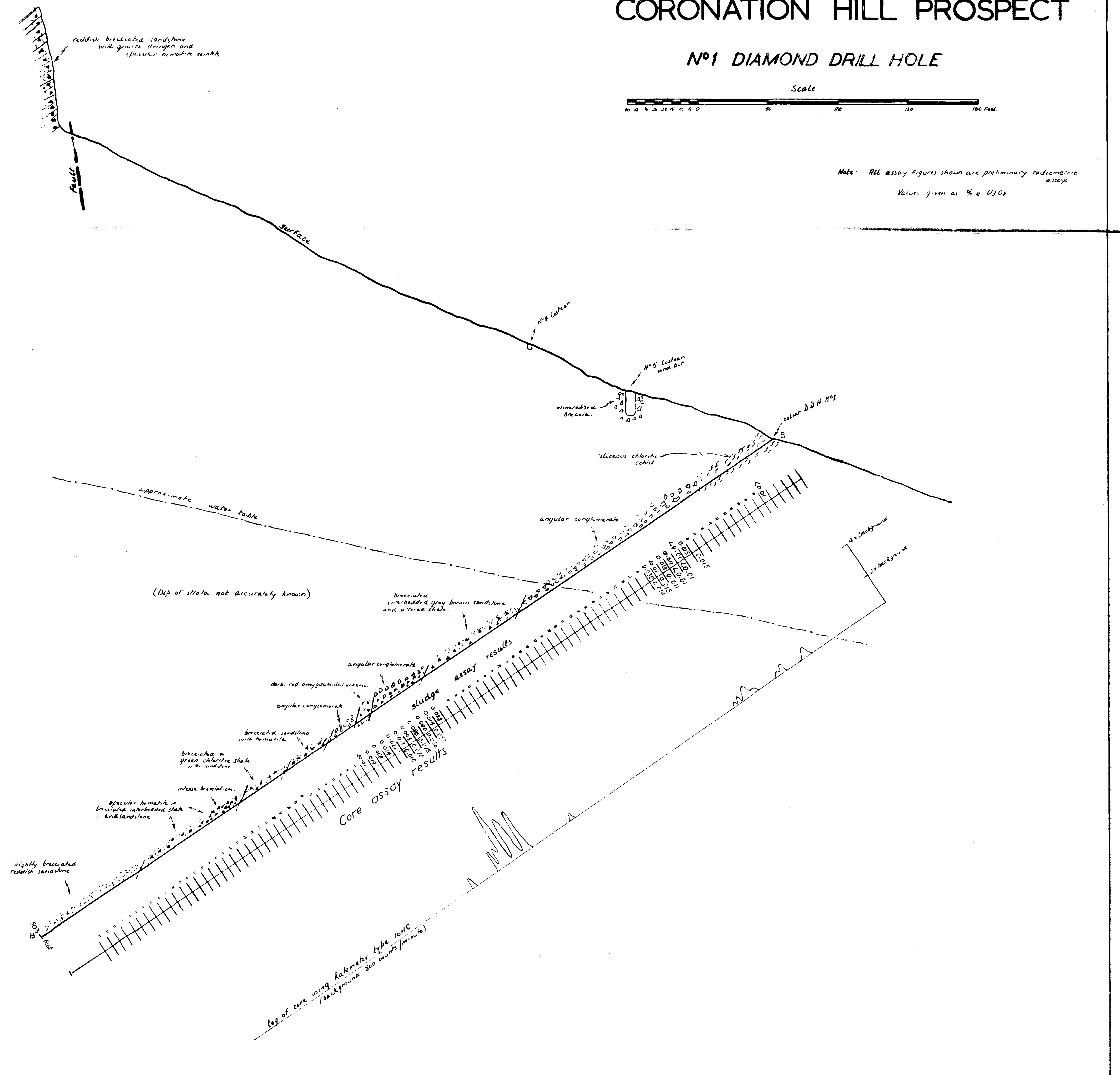


PLATE 3
CORONATION HILL PROSPECT
Radiometric Profiles of Costeans and Assay Values
84X
surface level
N°1 Costean
N°2 Costean
0.97 % U3O8 (equiv.) - bulk sample
3.97 % U3O8 (") - selected specimen
SCALE
10
20
30
40 Feet
REFERENCE
radiometric profile - readings taken on costean bottom
surface radiometric profile
12X
radioactivity as multiple of background.
0.33
assay - preliminary radiometric value as % U3O8 equivalent.
East
West
N°3 Costean
N°4 Costean
N°5 Costean
North Wall
South Wall
East Wall
West Wall
Assay Plan South Wall
% U3O8 (equiv.) - channel samples
Average Weighted Assay (calculated)
0.129 %
N°6 Costean
NT63-3
Background taken as 6 microamps on C scale - reading on barren quartz blow using Portable Ratemeter Type 1011C. Radiometric Profiles by R. De Groot and R. Britten. 22.7.53
Bureau of Mineral Resources Geology and Geophysics 1953.

PLATE 4

CORONATION HILL PROSPECT

Nº1 DIAMOND DRILL HOLE



NT 63-4

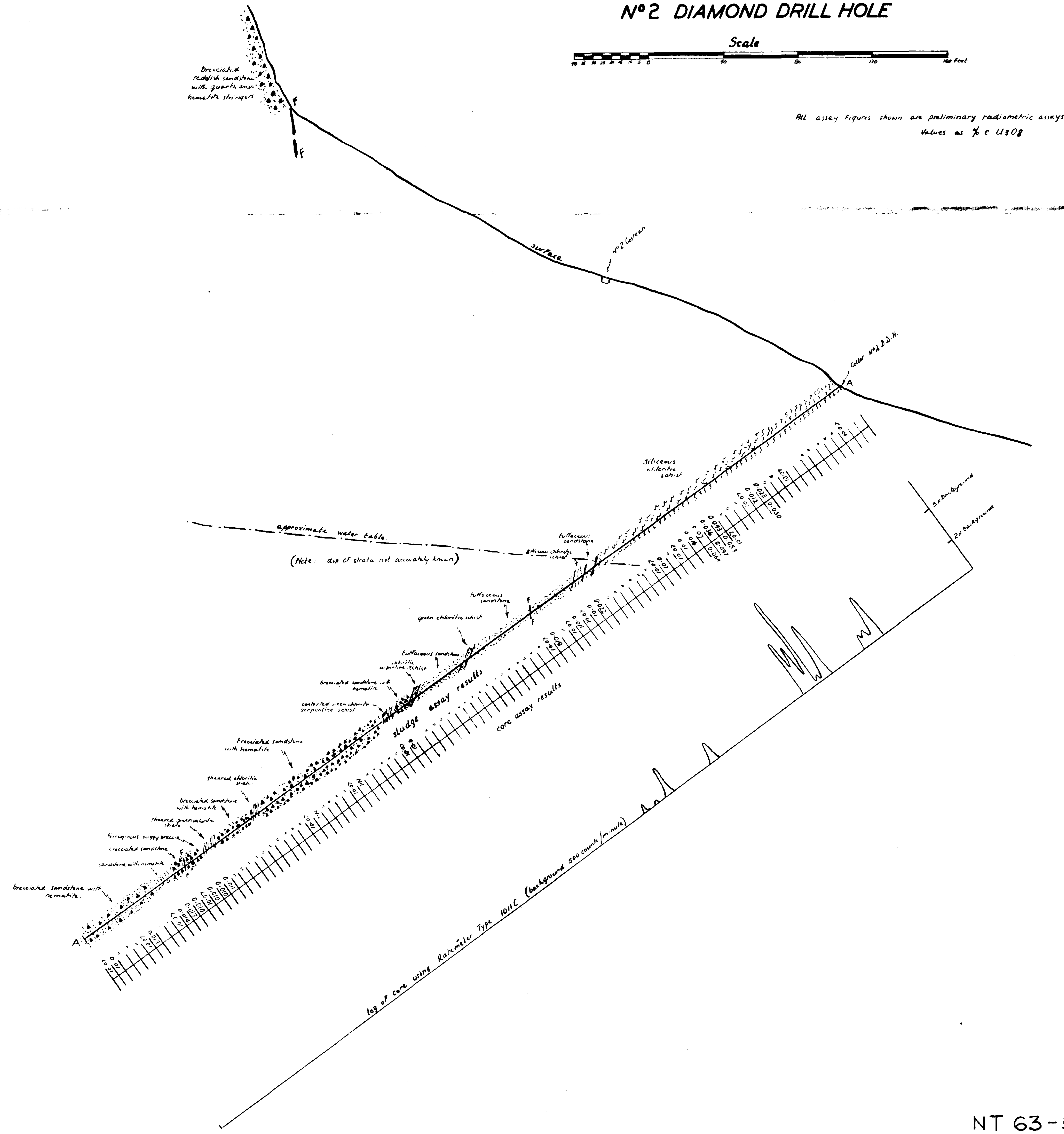
Bureau of Mineral Resources Geology and Geophysics 1953

PLATE 5

CORONATION HILL PROSPECT

No 2 DIAMOND DRILL HOLE

All assay figures shown are preliminary radiometric assays
Values as % e U_3O_8



NT 63-5

Bureau of Mineral Resources Geology and Geophysics 1953

RADIOMETRIC GRAPHS

CORONATION HILL-Nº1.D.D.HOLE

Radiometric work by A.J. Barlow

Bureau of Mineral Resources, Geology & Geophysics

NT 63-7

RADIOMETRIC GRAPHS

CORONATION HILL
Nº 2 D.D.HOLE

Radiometric work by A.J. Barlow