COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

COMMONWEALTH OF AUSTRALIA.

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BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS.

[illegible]

RECORDS 1952/54

TUNGSTEN DEPOSITS AT RYE PARK, N.S.W.

by

C.J. Sullivan and W.B. Dallwitz.

CANBERRA

1st July, 1952.

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PLATES

TUNGSTEN DEPOSITS AT RYE PARK, N.S.W.

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SUMMARY

1. By combined geological, geophysical, and diamond drilling investigations approximately 82,500 long tons of tungsten ore assaying 1.52 per cent. WO_3 have been discovered. The main known orebody occurs as a sub-horizontal sheet which is not cut by the present land surface. The orebodies are replacement-deposits in favourable beds interstratified with dacitic volcanic rocks and limestones; mineralization is most intensive in close proximity to granite and greisen which intrude these beds.

2. In addition to the ore mentioned above, there are six areas from which lower-grade ore, ~~xxxxxxxxxxx~~ could possibly be profitably mined.

3. The geology of the Rye Park district is quite incompletely known, and it is desirable that more geological surveys should be undertaken with a view to finding further favourable positions for ore. Geophysical investigation should accompany or follow this geological work. Tentative criteria for the discovery of new ore are described, and attention is drawn to six areas where further prospecting is warranted.

INTRODUCTION

The village of Rye Park is about 26 miles by road north-north-west of Yass, and 12 miles east-south-east of Boorowa. The tungsten deposit is approximately 2 miles by road from the village, and the main workings are situated in portion 34, Parish of Ware, County of King, on the right bank of White Rock Creek, 200 feet from its junction with Pudman Creek.

The mine is held under lease by Messrs. J.O. and L.A.C. Edgerton, and H.J. Gordon, all of Rye Park, and is at present under testing option to Tungsten Consolidated Limited.

The existence of wolfram in the deposit has been known since about 1915, and mining was carried out intermittently from that time until about 1938. Profitable working of the ore has been hampered by the difficulty of separating magnetite from scheelite and wolfram. Notes on wolfram mining at Rye Park have appeared from time to time in the annual reports of the Department of Mines between the years 1915-1938, and Harper (1917) prepared a brief geological report on the deposit. Unpublished notes (Mulholland, 1943) and unpublished reports (Whalan, 1942; Rudd, 1942, and Lloyd, 1951) are also available for reference.

It was not until June, 1951, when the deposit was visited by us, that the existence of scheelite in important quantity in the known ore was established.

During this visit, also, a study of the structure of the deposit convinced us that, although only a little ore was exposed, considerable quantities of non-outcropping ore might be found. As magnetite is one of the gangue-minerals, a request was made for a magnetic survey. This survey was carried out by the Geophysical Section of the Bureau of Mineral Resources; the results obtained were plotted on the general geological plan (Plate 1), and tended strongly to confirm geological ideas concerning the existence of non-outcropping ore, and, in addition, established the probable position of this ore. Subsequent diamond drilling by Tungsten Consolidated Limited has shown that substantial bodies of scheelite and wolfram ore exist in the area under the structural conditions originally postulated; these conditions are outlined below.

GEOLOGY OF THE DEPOSITS

In the vicinity of the deposits an area measuring approximately 2,400 feet in diameter has been geologically mapped; this mapping was carried out by J.C. Lloyd and F.C. Loughnan (Lloyd, 1951) of the New South Wales Mines Department, and their map is reproduced, with slight modification, as the basis of Plate 1 of our report. In his report Lloyd recommended a programme of geophysical work and diamond drilling, which agreed substantially with that previously formulated by us.

Dacitic volcanic rocks, both lavas and tuffs, with interbedded limestones and quartzites, all of Silurian age, are intruded by two cupolas of granite. The granite has been partly altered to greisen, and also strongly silicified along wide, but discontinuous, marginal zones. Such silicification is prominent, for example, at the junction of White Rock and Pudman Creeks; in fact, White Rock Creek derives its name from the large mass of quartz at its confluence with Pudman Creek. Much of the larger (south-western) cupola, known locally as Mica Hill, has been converted to greisen. Payable ore appears to be associated only with the smaller (north-eastern) cupola, but scattered wolfram has been found at numerous places on Mica Hill.

In the vicinity of the ore-deposits the volcanic and sedimentary rocks dip at low angles to the west or east; (see cross-sections B-B' to H-H'); in the northern part of the No. 2 orebody the westerly dip increases to about 15° (see cross-section F-F'). The granite surface on the eastern flank of the cupola has a general easterly dip, but local steepenings and flattenings became apparent on contouring the surface from data provided by diamond drilling. Particular beds within the volcanic suite have been selectively replaced by ore for distances ranging from about 70 to 150 feet eastwards from the granite; it is tentatively suggested that the ore-bearing beds were originally calcareous tuffs. Much of the best ore occurs where the granite dips flatly or forms shallow basins beneath the main ore-bearing bed (No. 2).

The ore is of the contact or skarn type, and is variable in composition; more than 20 minerals have so far been observed in the course of study of thin sections of ore. Most plentiful of these are quartz, hornblende, pyroxene, magnetite, fluorite, epidote, biotite, felspar, and apatite. Scheelite, which is the most important tungsten mineral, has a grain-size range of 0.03 to about 1.2 mm., and the average grain-size is much closer to the lower of these limits than to the upper. Most of the scheelite occurs as aggregates of fine grains. Where wolfram is present it is invariably bordered by a shell of scheelite, which may be very thin, or may almost entirely replace the wolfram. Generally the scheelite fluoresces blue under short wave ultra-violet light, but white, yellow, and golden fluorescence, due to increasing quantities of molybdenum in the scheelite molecule, are occasionally seen.

ORE RESERVES

The testing of the deposits was carried out between November, 1951, and May, 1952, by Tungsten Consolidated Limited. Thirty diamond drill holes totalling 3,060 feet were drilled. The positions of these holes are shown on the surface contour plan (Plate 2), and the assay results obtained for all but three of the holes (Nos. 4, 17, and 33) are shown on the cross-sections (A-A' to I-I') and on the longitudinal projection KLM.

All diamond drill core assay data used in the compilation of this report and the accompanying plan and sections have been supplied by Tungsten Consolidated Ltd.

As shown on the longitudinal projection (Plate 3) and on Plate 2, two principal beds of ore have been found.

Tests on ore from No. 1 orebody showed that 10.6 cubic feet of ore weigh one long ton. Ore reserve tonnages given in this report are based on the figure of 11 cubic feet to the long ton.

None of the ore-tonnages given in the reserves can be placed in the strict category of proved or blocked-out ore; however, from diamond-drilling results, and on geological grounds - the most important of which is the virtually proved assumption that the ore in each bed will continue to the granite surface - the ore reserves can safely be designated as "indicated".

Proof that the ore extends to the granite is provided by diamond drill holes Nos. 2, 4, 5, 7, 22, and 12 (see cross-sections B-B', C-C', E-E', F-F', and I-I'), and from this evidence, and by reason of the general nature of the deposit, similar conditions can be expected along the full length of each orebody. From diamond drilling intersections and the probable position of the granite boundary on the surface, a contour plan of part of the eastern flank of the granite cupola has been prepared, and, in drawing the cross-sections for each orebody, the ore has been continued westwards to the granite profile obtained from the subsurface contours.

In calculating tonnages, volumes were obtained by multiplying the mean weighted thickness of the ore occurring between two successive cross-sectional planes in the orebody by the area bounded by the traces of those planes in plan and the line showing the mean limit of ore (Plate 2), and continuing this procedure until the complete mean plan area of the orebody was covered.

No. 1 Orebody

The uppermost part of this ore-bearing bed was originally exposed in White Rock Creek. The ore has been mined from time to time in a small way by shaft-sinking, cross-cutting, and open-cutting.

The extent of the orebody outwards from the granite and laterally in a north-south direction has been based on information provided by diamond drill holes 1, 2, 6, 3, 4, and 5 (see Plate 2 and cross-sections B-B', C-C' and E-E'), and on exposures in the open cut, which has recently been enlarged beyond the limits shown on Plate 2. Only one diamond drill hole (No. 22) has actually intersected the orebody.

The No. 1 orebody occurs within the limits of a much thicker and more extensive body of mineralized and metasomatized rock, which is exposed in the trench 60 feet south of the open cut, and which was also intersected by diamond drill holes Nos. 1 and 2. This rock assays between 0.2 and 0.25 per cent. WO_3, but contains a few richer seams and patches of ore. The lease-holders, in June of this year, followed a promising biotite-rich seam northwards from hear the western end of the trench, and uncovered some very rich, weathered, scheelite ore immediately underlying volcanic rocks. This discovery of ore outside of the limits of No. 1 orebody as delineated in the plans and sections shows that close ultra-violet light inspection of all mineralized rock in the neighbourhood of both orebodies should be made as mining proceeds (see also below).

Diamond drill hole No. 22 in No. 1 orebody intersected 7 feet 7 inches of ore assaying 3.3 per cent. WO_3. Two grab samples taken by us from old dumps on the left bank of White Rock Creek opposite the open cut, and assayed by the New South Wales Department of Mines, yielded 2.7 and 2.9 per cent. WO_3. The best wolfram-bearing material had undoubtedly been removed from the ore by hand-picking at the time of mining; furthermore, one of the dumps is a large one, consisting mainly of volcanic rock carrying some scheelite, particularly in joints and cracks, and this rock was included in the sampling; for these two reasons it is probable that the grade of ore indicated by these samples is somewhat low. A bulk sample of 25 tons of ore taken from the open cut by Tungsten Consolidated Limited assayed 3.2 per cent. WO_3, and a sample of two hundredweights of ore taken at random in the open cut and submitted to C.S.I.R.O. for treatment tests assayed 3.3 per cent. WO_3. Extending into the volcanic rocks above the main portion of No. 1 orebody as exposed in the open cut are steep to flat-lying biotite-rich veins up to about two feet wide and containing uneventlly distributed wolfram and scheelite; these veins probably follow joint planes. Immediately below the biotitic veins lies a very rich section of the orebody. It is two or three feet thick, and contains both wolfram and scheelite in a gangue of felspar, biotite, apatite, and grossularite; a grab sample of this ore, taken by one of us (W.B.D.) from several hundredweights of coarsely-crushed material, assayed 8.5 per cent. WO_3 (N.S.W. Department of Mines Laboratory). Details of additional samples taken by us, and assayed by the N.S.W. Department, are set out below:

a. Several samples of volcanic rock, overlying the orebody proper in the open cut yielded the following percentages of WO_3 over the widths stated in parentheses:
0.20 (4'), 0.10 (4'6"), 1.30 (6'), 0.85 (8').
The volcanic rock contains thin veinlets and disseminated grains of scheelite.

b. A chip sample over 19 feet along the northern wall of the open-cut, taken along a line making an angle of about 45 degrees with the horizontal, assayed 2.1 per cent. WO_3. From the evidence provided later by Nos. 3, 4, 5, and 22 diamond drill holes it is evident that much of this sample was taken from the mineralized volcanic rock lying between Nos. 1 and 2 orebodies.

c. A chip sample taken in an underground opening extending westward from the open-cut assayed 2.7 per cent. WO_3. According to the drilling results mentioned above this sample locality lies entirely within the bed of silicified volcanic rock between Nos. 1 and 2 orebodies.

d. A composite chip sample from numerous places in the open cut, but mainly within what was subsequently found to be volcanic rock (see b. and c. above) assayed 1.55 per cent. WO_3.

The evidence described immediately above (a., b., c., and d) shows that, in the southern end of the deposit, at any rate, where Nos. 1 and 2 orebodies overlap appreciably, but probably inconstant, scheelite mineralization occurs in volcanic rock outside of the limits of the orebodies as shown on the sections, and again emphasizes the necessity of inspecting all mine openings frequently with the ultra-violet light.

It should be noted that nearly all drill holes which penetrated No. 2 orebody close to the granite revealed ore richer than that farther away from the contact. Therefore, as the open-cut is near the eastern extremity of No. 1 orebody, it is possible that richer ore will be found towards the granite.

On all of the above evidence an average grade of 3 per cent. WO_3 has been attributed to the No. 1 orebody. The average thickness of the orebody is taken as 7 feet 6 inches and it is estimated to contain 7,500 long tons of ore. This ore could be readily open-cut.

No. 2 Orebody

The longitudinal projection KLM (Plate 3) clearly shows that the main orebody, occurring in No. 2 bed, nowhere reaches the surface; it was discovered by the recent drilling. Its length is approximately 400 feet, its average width about 100 feet, and/thickness about 20'0". Its northward extent beyond section-line H-H' is not known.

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erage
ighted

From section G-G', it can be seen that, in diamond drill hole No. 8, a vertical thickness of 25'6" of ore assaying 0.7 per cent. WO_3 cannot be satisfactorily tied up to the ore indicated in hole 11. The most probable explanation of this discrepancy is that there is a local upward bulge of ore in this place, possibly along a pre-mineralization fault-zone.

Further testing may be warranted later to ascertain how far the ore extends north of section-line H-H' (see Plate 3); however, as indicated by the outline of the magnetic anomaly, this distance would probably be not more than 50 feet, especially if the ore-bearing bed dips into the granite instead of continuing northwards.

From the narrowing and weakening of the geophysical anomaly near No. 2 Shaft (Plate 1) it appears that two distinct orebodies may be present, one north, and the other south of the shaft. However, as low-grade ore was intersected by diamond drill hole No. 32, the No. 2 orebody has here been shown merely as extending a shorter distance outwards from the granite (see Plate 2). It is virtually certain that the ore-bearing bed is continuous throughout the lean zone (see Longitudinal Projection, Plate 3); in any case, if the ore is to be open-cut this zone can scarcely be avoided in mining, and so the width of intersection and assays obtained in hole 32 have been given their full weight in calculating tonnages and grade.

The relatively small areal extent of the most intensive section of the northern part of the geophysical anomaly as compared with that near the open-cut is probably due to two main factors, viz.,

a. The greater depth of overburden covering the northern part of the orebody see Plate 3, Longitudinal Projection).

b. The superposition of No. 1 orebody over the southern part of No. 2 orebody (see Plates 2 and 3).

The western limit of No. 2 orebody has been set by the granite surface as contoured, and by diamond drill-holes Nos. 2, 4, 5, 7, and 22 which have penetrated the orebody at the granite contact. The eastern limit is based on information provided by diamond drill holes Nos. 1, 6, 10, 29, and 31, which indicate either lowering of grade or thinning, as the case may be. The northern limit is suggested by the thinning of payable ore in holes 9 and 10, and the southern limit is indicated by the thinning of ore in hole 1, and the presence of only traces of scheelite in holes 26, 27, and 28.

The outline of the orebody as demarcated by the drilling information cited above shows a very reasonable general correspondence with the outlines of the geophysical anomalies (compare plates 1 and 2).

Taking into consideration the outline of the orebody as determined above, tonnage and grade have been based on information supplied by diamond drill holes which intersected the whole or a substantial part of the orebody. These holes are Nos. 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 18, and 21. Hole No. 22 (see cross-section C-C') intersected only a small part of the orebody before strikinggranite, and has, therefore, not been considered in the calculations.

Tonnages were calculated by weighting the average thicknesses of adjacent cross-sections according to the areas of those cross-sections, and multiplying the weighted thickness by the plan area of orebody between the traces of the cross-sections as obtained from Plate 2. For purposes of calculation, subsidiary cross-sections at right angles to the granite contact were drawn through holes 20 and 32.

The average grade of the whole orebody was obtained by weighting relevant assays according to tonnages of ore between the various cross-sectional lines.

In summary it may be stated that the limits of this orebody are based on information provided by 14 diamond drill holes, and by preparing subsurface contours of the eastern flank of the granite cupola, and that calculations of tonnage and grade are based on widths of intersection and assay results for 12 holes. From this information it appears that the southern part of the orebody is of somewhat lower grade than the northern.

Taking into consideration all of the available data, the indicated tonnage in No. 2 orebody is 75,000, and the average weighted grade is 1.36 per cent. WO_3.

<u>Ore in Nos. 1 and 2 orebodies</u>

The combined tonnage of ore in indicated for Nos. 1 and 2 orebodies is 82,500, and the average weighted grade is 1.52 per cent. WO_3.

<u>Additional available ore of lower grade.</u>

Apart from the previously described ore lying between Nos. 1 and 2 orebodies and above No. 1 orebody several sources of low-grade ore exist in the areas tested. These are as follows:

1. Ore carrying 0.2 to 0.3 per cent. WO_3, and lying outside of the limits of No. 2 orebody. Most of this ore lies immediately below or east of the orebody as delineated in the plans and sections, and may be worth mining (see holes 11 and 20 on the longitudinal projection, and holes 8, 11, and 21 on cross-sections G-G' and E-E'). Eight feet of ore assaying 0.25 and 0.4 per cent. WO_3 lie below the main portion of the orebody as intersected by hole 4.

   In all, several thousands of tons of ore assaying about 0.3 per cent. WO_3 would be readily accessible in the course of open-cutting. Regular inspection of working faces with the ultra-violet light will be the best guide as to where to cease mining.

2. Drilling on lines I-I' and J-J' yielded rather disappointing results, and the geophysical testing was correspondingly discouraging. However, some ore assaying 1.6 per cent. WO_3 was revealed in diamond drill hole No. 12; the highest assay in hole No. 16 was 0.3 per cent. WO_3. In each case

the best ore is near the bottom of the hole, which means that the overlying lower-grade material would have to be removed to allow access to the better ore. As the average depth of the top of this orebody below the surface is only 40 feet, the ore could readily be removed by open-cutting.

This body of ore has been called No. 3, and it contains about 5,000 long tons of average grade 0.36 per cent. WO_3. Its suggested outlines are shown on plate 2, cross-section I-I', and the longitudinal projection KLM (plate 3).

3. There should be some ore assaying about 0.7 per cent. WO_3 in the vicinity of diamond drill hole No. 8 (see Section G-G').

4. Ore carrying about 0.2 per cent. WO_3, in and near the costean 60 feet south of the open cut and intersected also in diamond drill hole No. 1. As this will have to be removed before exposing No. 1 orebody, it may be worth milling.

5. Ore is exposed in a shaft about 120 feet east-north-east of No. 3 orebody. Although magnetite is present in the ore, only weak geophysical indications were recorded. The probable attitude and vertical extent of the orebody are shown on section J-J'. As the ore is merely soil-covered, its removal would be easy; the grade, however, is probably little better than 0.2 per cent. WO_3.

UNTESTED AND INADEQUATELY TESTED PROSPECTS

Geological, geophysical, and diamond drilling investigations have shown clearly that non-outcropping ore deposits are present in this district; thus, No. 2 orebody, the main deposit so far discovered, lies 40 to 100 feet below the surface. The deposits are localized at and near the junction of granite and certain favourable beds, and as similar beds are likely to be intruded by granite elsewhere in the district, it is possible that other deposits remain to be found. From thin sections of ore so far studied it appears that the following changes in gangue mineral content, concomitant with decreasing tungsten percentage, take place in any ore-bearing bed outwards from the granite:

A quartz hornblende magnetite association is modified by the incoming of fluorite and epidote. The next mineral to appear is pyroxene, and thereafter hornblende disappears. At the next stage quartz is reduced, and then the magnetite percentage is substantially lowered, so that we have a pyroxene-fluorite-epidote-quartz rock. The changes from here onwards are rather less well established, but the final stages so far observed are typified by epidote-quartz rocks, with or without actinolite. To what extent, if any, the observed changes are due to variation in the original composition of the ore-bearing rocks is not known. Stated in the broadest way, the following succession outward from the granite is fairly well established:

a. Quartz-hornblende-magnetite.
b. Pyroxene-fluorite.
c. Epidote-quartz (-actinolite).

This last association, generally with very sparsely disseminated scheelite, has been found in various rock outcrops in the district, and, if it has the significance implied above, its importance in pointing to possible new ore deposits is obvious. However, before it can be used as an established criterion, some further study would be advisable.

Although magnetite is associated with the payable ore so far found at Rye Park, this association may not necessarily be universal in the district as a whole; thus, scheelite, mineralization without magnetite is found in several places at Rye Park (see below). Tungsten mineralization without appreciable magnetite could not be located by the magnetometric method, so that prospects which appear encouraging, but are not magnetically susceptible, may still be worth testing by trenching, shaft-sinking, or drilling. As stated previously in this report, magnetite mineralization appears to be confined fairly closely to the vicinity of granite; therefore any possible orebodies which are deep below the surface may well be out of range of conclusive detection by a magnetometer, or may yield such a weak anomaly, compared with some of the known anomalies, as to be discouraging. Several of the prospects mentioned below, especially Nos. 6, 2, 3, and 5, may have to be considered in the light of possibilities outlined in this paragraph.

Following is a list of the areas where further investigation, on geological and geophysical evidence at present available, appears to be warranted:

1. The magnetic anomalies on Mudman Creek, about 300 feet downstream from the place where it is joined by White Rock Creek (see Plate 1). Diamond drill hole No. 17 yielded unpromising results, but the drilling of one or two more holes is justifiable because the anomalies are intense, and they occur close to the productive granite contact.

2. The small and relatively weak magnetic anomaly near the left bank of Mudman Creek, and about 450 feet south-west of the open cut (see Plate 1). The weakness and small extent of this anomaly may indicate either a small, low-grade orebody at fairly shallow depth (c.f. No. 3 orebody) or a larger and better orebody at greater depth.

3. Traces of scheelite may be obtained by panning the surface soil on two hills about ½ mile east of the open cut. These hills consist mainly of quartzite and slate, which are probably stratigraphically below the volcanic rocks containing the known ore to the west. Dacite outcrops at the foot of the western slope of the hills, and granite is exposed on the southern part of the more southerly hill, about ½ mile south-east of the open cut. The source of the scheelite in the soil has not been found, but the mineral may have been derived from an ore-bearing bed within the quartzite or slate. This area should be studied more closely, and also magnetically surveyed, as payable, non-outcropping ore may be associated with the known granite, or with an unexposed granite mass in the vicinity.

   This is wrong. Quartzite & slate are boulders. N.B.D.

4. Traces of scheelite have been found in steeply-dipping epidote- and actinolite-bearing rock about 750 feet south of the open cut. The magnetic survey did not extend quite into this area, and so further testing may be warranted.

5. Scheelite is associated with epidote- and actinolite-bearing rocks outcropping among volcanic rocks over a fairly wide area about 1,200 feet north-west of the old northern shaft (Plates 1 and 2). Some trenching and pit-sinking have been carried out here; traces of scheelite are visible in the rocks, and may also be obtained by panning the soil. There is no definite suggestion that the scheelite-bearing rocks are parts of ore-bearing beds; instead it is thought that they may represent irregular upward extensions of weak mineralization

from an unexposed granite cupola underlying the area at no very great depth. Favourable ore-bearing beds may be associated with the volcanic rocks in the neighbourhood of the postulated granite, and for this reason a geophysical survey, at least, seems justified.

6. Scheelite-bearing actinolite-epidote rock, containing up to 1 per cent. WO_3, occurs approximately $\frac{3}{4}$ mile west of Mica Hill, and 300 to 500 feet south of Pudman Creek, in portion 106, Parish of Olney. No magnetite is associated with this material at the surface. The ore was tested many years ago by a few shallow trenches, but most of the area is soil-covered. As the old investigators had no idea that scheelite existed in the ore, this area warrants extensive costeaning, which would give useful information about the size and grade of the deposit near the surface, and would also yield geological data of importance. If it is found that the beds are likely to extend down to granite, it may be possible to discover important new ore deposits there.

BY-PRODUCTS OF MILLING.

As stated earlier in this report, the ore contains fluorite and magnetite. Due to the variable composition of the ore it is impossible to state, at this stage, the percentages of these minerals, but they are appreciable.

It may be worth investigating the economics of recovering one or both of them as by-products. A high proportion of the magnetite will probably remain in gravity-concentrates of scheelite and wolfram, and, as it will have to be removed, it may be feasible to make a saleable concentrate, which could possibly be used in the sink-float method of cleaning coal. To prepare a fluorite concentrate flotation would be necessary.

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CANBERRA,
1st July, 1952.

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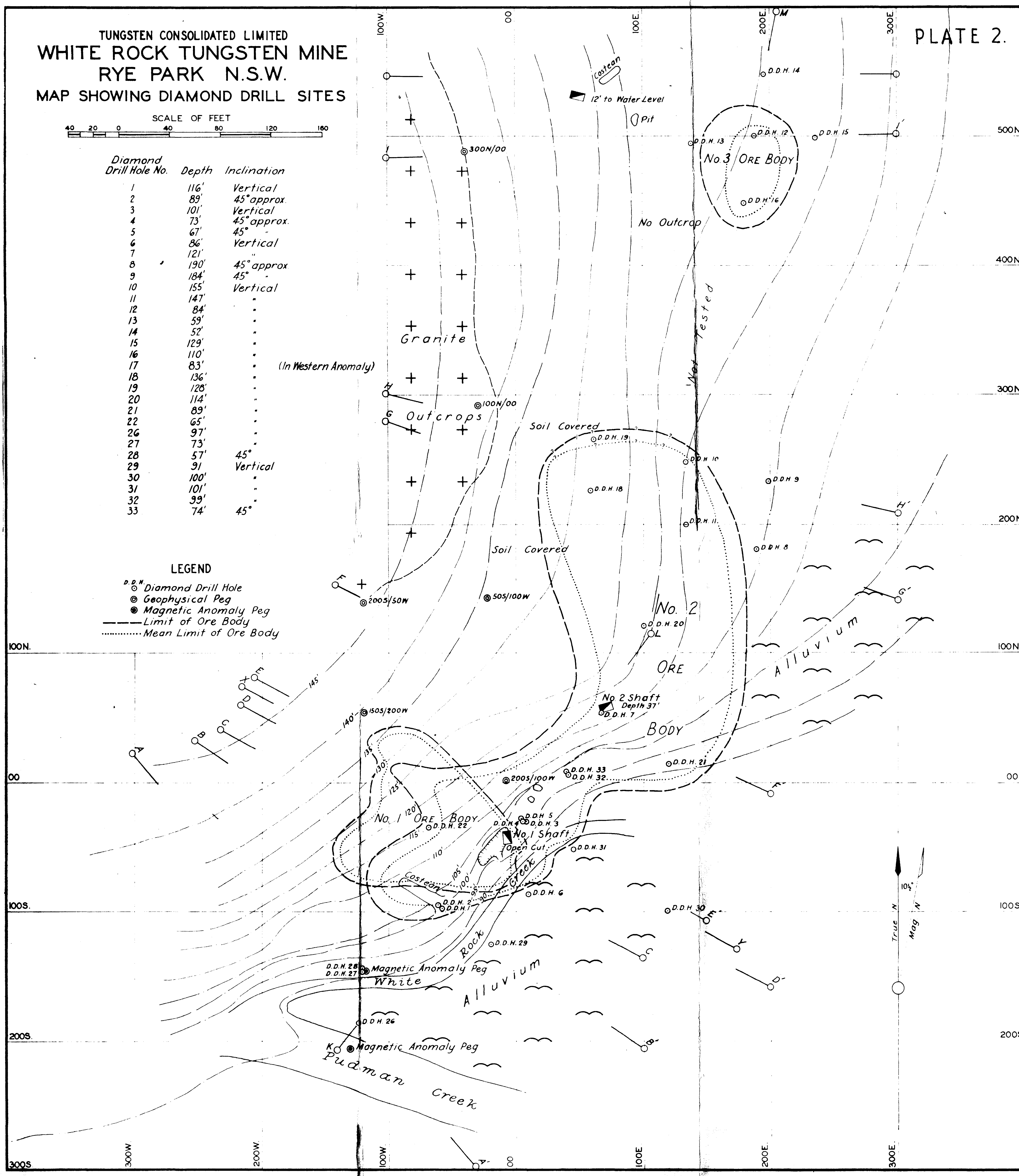
PLATE I.

TUNGSTEN CONSOLIDATED LIMITED
RYE PARK SCHEELITE DEPOSITS
N.S.W.
MAP SHOWING MAIN OUTCROPS
AND
PRINCIPAL MAGNETIC ANOMALIES
(After Bureau of Mineral Resources and Dept of Mines N.S.W.)
SCALE OF FEET
100 0 100 200 300 400
LEGEND
Alluvium
Granite
Outcrop
Inferred
Greisen
Outcrop
Inferred
Porphyry
Outcrop
Inferred
Geophysical Traverse with Observation Points
Contour Interval 500 Gammas
Positive Magnetic Intensity Value
Negative " " "
Pudman Creek
Blacksmith Shop
Tank
Kitchen
Scheelite Ore Heaps
N. Shaft
MICA HILL
Track
TRUE N.
MAG. N.



Diamond Drill Hole No.	Depth	Inclination
1	116'	Vertical
2	89'	45° approx.
3	101'	Vertical
4	73'	45° approx.
5	67'	45° "
6	86'	Vertical
7	121'	"
8	190'	45° approx.
9	184'	45° "
10	155'	Vertical
11	147'	"
12	84'	"
13	59'	"
14	52'	"
15	129'	"
16	110'	"
17	83'	" (In Western Anomaly)
18	136'	"
19	128'	"
20	114'	"
21	89'	"
22	65'	"
26	97'	"
27	73'	"
28	57'	45°
29	91	Vertical
30	100'	"
31	101'	"
32	99'	"
33	74'	45°

PLATE 3

TUNGSTEN CONSOLIDATED LIMITED

WHITE ROCK TUNGSTEN MINE
RYE PARK N.S.W.
LONGITUDINAL VERTICAL PROJECTION K-L-M

HOR. & VERT. SCALE OF FEET

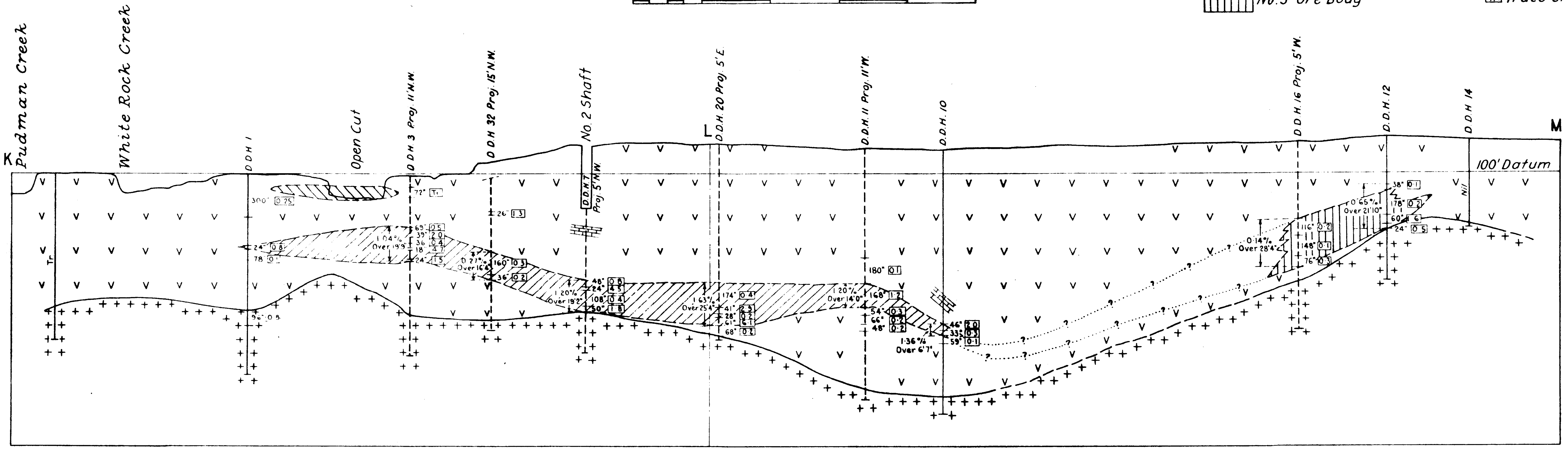
40 20 0 40 80 120 160

LEGEND

- V V — Acid Volcanic Rocks with Interbedded Limestones
- + + + — Granite
- No. 1 Ore Body
- No. 2 Ore Body
- No. 3 Ore Body
- Diamond Drill Hole
- Diamond Drill Hole Projected

ASSAY RESULTS

- 120" Length of Sample
- 0.3 % of WO_3
- Tr Trace of WO_3



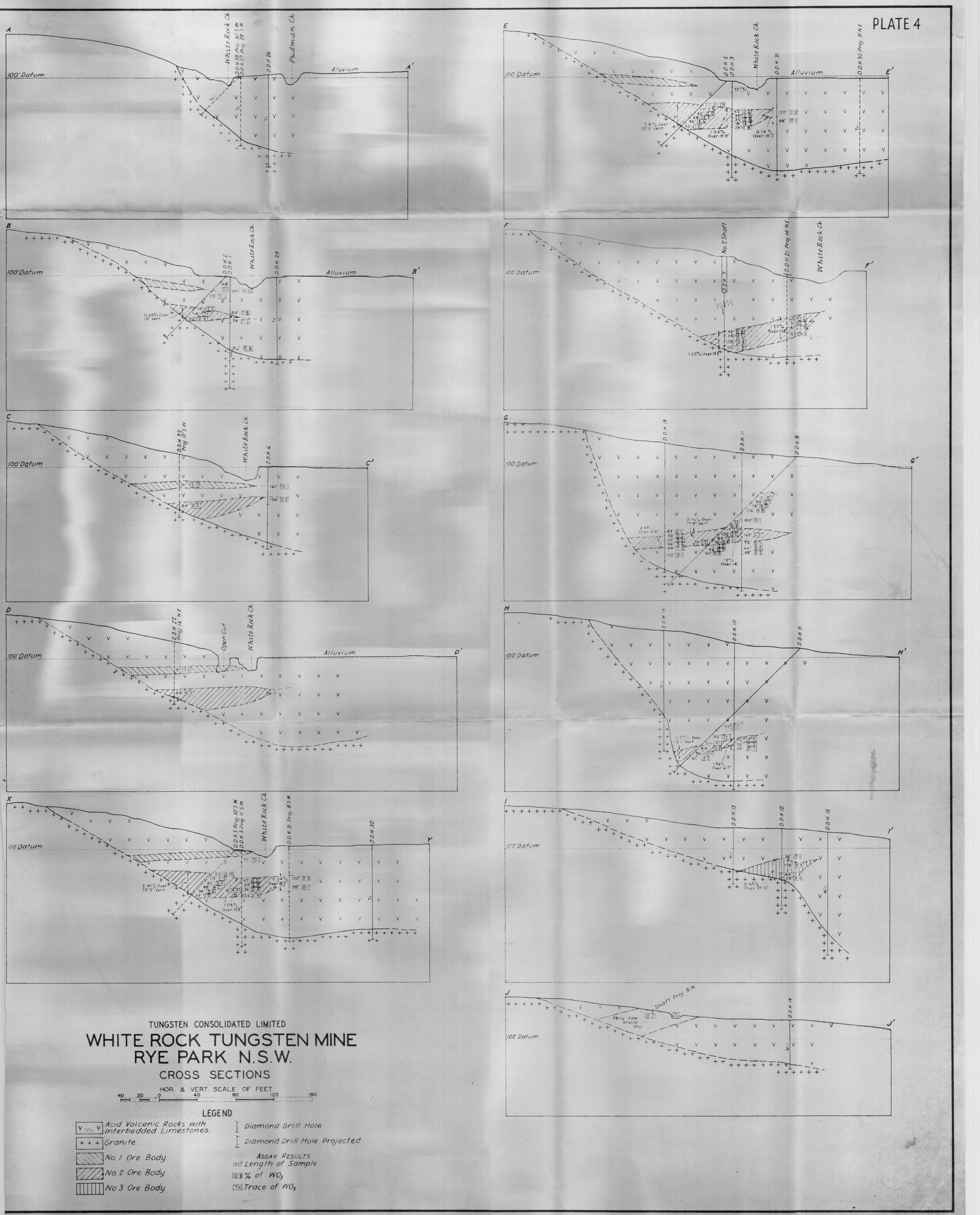


PLATE 4
A
A'
100' Datum
White Rock Ck
D.D.H. 28 Proj. 30' S.W.
D.D.H. 27 Proj. 28' S.W.
D.D.H. 26
Pudman Ck
Alluvium
B
B'
D.D.H. 2
D.D.H. 1
White Rock Ck
D.D.H. 29
0.69% Over 10' Vert.
C
C'
D.D.H. 22 Proj. 10' S.W.
D.D.H. 6
D
D'
D.D.H. 22 Proj. 16' N.E.
Open Cut
X
Y
D.D.H. 5 Proj. 10' S.W.
D.D.H. 3 Proj. 15' S.W.
D.D.H. 31 Proj. 8' S.W.
D.D.H. 30
2.41% Over 22.3' Vert.
1.04% Over 19.9'
E
E'
D.D.H. 5
D.D.H. 3
D.D.H. 31
D.D.H. 30 Proj. 9' N.E.
0.24% Over 16.2'
F
F'
No. 2 Shaft
D.D.H. 21 Proj. 14' N.E.
1.22% Over 13.6'
1.20% Over 13.6'
G
G'
D.D.H. 18
D.D.H. 11
D.D.H. 8
2.49% Over 12.6'
0.76% Over 17.5' Vert.
1.2% Over 14'
H
H'
D.D.H. 19
D.D.H. 10
D.D.H. 9
I
I'
D.D.H. 13
D.D.H. 12
D.D.H. 15
0.65% Over 21.10'
J
J'
Shaft Proj. 15' N
Very Low Grade Ore
D.D.H. 14
Nil
TUNGSTEN CONSOLIDATED LIMITED
WHITE ROCK TUNGSTEN MINE
RYE PARK N.S.W.
CROSS SECTIONS
HOR. & VERT. SCALE OF FEET
40 20 0 40 80 120 160
LEGEND
Acid Volcanic Rocks with Interbedded Limestones.
Granite
No. 1 Ore Body
No. 2 Ore Body
No 3 Ore Body
Diamond Drill Hole
Diamond Drill Hole Projected
ASSAY RESULTS
120' Length of Sample
0.3 % of WO_3
Tr Trace of WO_3

ATTACHMENT. PLATE 4. RYE PARK REPORT.

Diamond drill holes 4 and 33 have not been plotted on the cross-sections or on the longitudinal projection. Hole 33 entered granite before intersecting No. 2 orebody; it showed only traces of scheelite, and therefore no samples were taken for assay.

The bearing of hole 4 is such as to lie midway between the bearing of the nearest cross-sectional plane and the direction of the longitudinal projection - i.e., it makes an angle of approximately 45 degrees with each. Nevertheless the assay information provided by this hole has been used in calculating grade, and, as the ore intersected fell closest to cross-section D-D', the data have been applied to that section. Following are details of the assays:

Interval	Percentage WO_3	Length of Sample	
31'0" - 34'3"	0.44	3'3"	0.96% WO_3 over 16'1" vertically (first four samples)
34'3" - 38'9"	1.28	4'6"	
38'9" - 50'0"	0.46	11'3"	
50'0" - 53'9"	2.50	3'9"	
53'9" - 60'0"	0.25	6'3"	
60'0" - 66'6"	0.40	6'6"	

W.B. Dallwitz

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