SECRET

DEPARTMENT OF MINES

SOUTH AUSTRALIA

PROGRESS REPORT ON DIAMOND DRILLING VICTORIA HUT DAVIDITE PROSPECT CROCKER WELL AREA

by

D. King, Geologist.

Report C.W.21

U.P.111

DEPARTMENT OF MINES SOUTH AUSTRALIA

PROGRESS REPORT ON DIAMOND DRILLING VICTORIA HUT DAVIDITE PROSPECT CROCKER WELL AREA

BY

D. King, Geologist.

SUMMARY

There are 4 outcropping mineralised zones or lode formations each of average width greater than six feet, and dipping consistently at 60° south. The Main Lode is 250 feet long.

Diamond drilling has revealed that these deposits extend similarly in depth to at least 100 feet vertically.

The total tonnage of ore to the depth drilled is of the order of 34,000 tons, with an overall grade of 6.4 pounds U_3O_8 per long ton - calculated from 63 feet of borehole samples. Individual lode assays vary from a minimum of 1.8 to a maximum of 9.0 pounds U_3O_8 by radiometric assay per long ton.

A future programme of drilling is proposed which will test the deposit to a depth of approximately 300 feet down dip. This includes some positions where both 45° and 70° holes are to be drilled.

1. INTRODUCTION

A total of eight diamond drill holes are now complete at the Victoria Hut davidite prospect. This almost concludes the preliminary programme of drilling which was laid out soon after discovery of the deposit by Departmental Prospectors in March, 1954. The results are highly promising and those available are detailed in this report, together with proposals for future exploration.

2. PLANS

Fig. 1 Plan showing Surface Geology and Bore Location U.S. 336.

Fig. 2 Geological Cross-sections U.S. 365.

3. GEOLOGY.

The surface geology is described in a previous report (Report C.W. 18) by U.S.A.E.C. Geologist R.K. Pitman, and an enlargement of the geological map prepared by him accompanies this report (Fig. 1.).

The ore mineral davidite is found intergrown with hematite and silicates as disseminations throughout several elongated mineralised zones which are distinctively dark-coloured in outcrop due to a high content of schistose biotite. The enclosing rocks are complex hybrid granites and metasediments.

There are four distinct lodes (or mineralised zones) each of which strike E-W and outcrop within an area measuring 300 feet (E.W.) by 150 feet (N.S.). The northern one - described as the Main Lode - is the largest, extending in outcrop for a distance of 250 feet with an average width of 10 feet. Of the others, the South Limb is 100 feet long and converges to meet the Main Lode at its eastern extremity; the Central Lode and South Lode are smaller bodies which are elliptical in plan.

Exploratory drilling completed to date has shown that these ore-bodies are actually tabular lode-type formations dipping regularly at 60° south and generally consistent in depth with the surface cross-section of the deposit. The Main Lode, for example, maintains a similar length and width to a proven depth of 120 feet down dip, and apparently with a very steep pitch (near vertical).

On present evidence, the mineralisation is considered to follow along zones of locally intense shearing which converge in places. Alternatively it has been suggested that the convergences of the Main Lode and South Limb at the surface, and the Main Lode and Central Lode in depth, are suggestive of folding of a favourable (mineralised) horizon. Additional detailed surface mapping and deeper drilling will be necessary before the structures controlling the mineralisation are understood.

4. THE LODE MINERALS

The uranium mineralisation is chiefly confined to the schistose

biotite lode formations in which the ore mineral davidite occurs as disseminated grains. The margins of the lodes are commonly featured by veins of granular magnetite and pyrite of low radioactivity, and pyrite is also found generally disseminated over the entire width of mineralisation. Chalcopyrite has been observed in occasional bore intersections, particularly in bore V.H. 9 where it occurs in the Main Lode as large slugs intergrown with davidite.

Uranium minerals torbemite and uranophane have been found in small amounts in the surface outcrops.

The Petrologist (A.W. Whittle) reports that the davidite grains contain a high proportion of hematite and rutile intergrowth - the davidite comprising 50% - 90% of each grain. Details of samples reported on mineralogically are as follow:-

P37/54 Surface Sample of Lode Outcrop: This is a biotite schist with accumulations of fine rutile and a small amount of opaque minerals (davidite) associated with rutile and biotite. The rock includes also such minerals as quartz, feldspar, muscovite, chlorite, apatite and zircon.

P47/54 Borehole V.H.2: Lode Samples: Samples taken at 35'2", 36'6" and 37'9" showed in polished section a high content of davidite in nodules 1 - 3 m.m. in size. These are of irregular shape, contain inclusions of haematite and silicate minerals and variable davidite comprising 50 - 90% of the nodule.

Samples taken at 75'6" revealed no davidite, but the rock contains scattered minute rutiles.

Samples taken at 144'6" contained nodules 1.5 c.m. x 0.5 c.m. consisting of a complex of davidite, haematite and silicate. Davidite is dominant.

P47/54 Borehole V.H.4: Lode Samples: At 41'5" small nodules 1 - 2 m.m. in size consist mainly of haematite containing silicate inclusions. There is evidence of very slight davidite replacement.

At 68'6" irregular nodules several c.m. in size consist of a core of magnetite surrounded by intergrown rutile and davidite. Davidite replaces rutile and is dominant.

5. SIZE OF THE DEPOSIT.

The total of eight diamond drill holes completed to date were designed to test the exposed lode formations to a depth of approximately 100 feet vertically. These are spaced at 50 feet intervals along the length of the mineralised area and directed north normal to the dip. Each bore intersected lodes of comparable width and

grade to those outcropping along corresponding grid lines, as shown in the geological cross-sections (Fig. 2.), indicating that in a general way the surface outcrop is an average cross-section of the deposit at least to the depth drilled. Preliminary tonnage estimates based on this assumption are calculated below to the depths of intersection of the completed bores:-

LODE	AREA OF SURFACE OUTCROP squ. ft.	DEPTH PROVED BY BORING (Down-Dip.) ft.	VOLUME cubic feet	TONNAGE long tons
Main Lode	2,700	115	310,500	24,500
South Limb	990	80	79,200	6,200
Central Lode	329	70	23,030	1,800
South Lode	530	35	18,550	1,500
	Factor - 12.7 cubic feet of ore to the long ton.		Total	34,000 tons

Total tonnage proved is 34,000 long tons.

6. ASSAYS OF BOREHOLE SAMPLES

Selected portions of the bore cores are being split and separately parcelled for assay, including the lode formations, and a few feet of adjacent country rock.

Radiometric assays are available for 5 boreholes Nos. V.H.1, V.H.2, V.H.4, V.H.5 and V.H.10, and some chemical checks are also complete. The radiometric figures can be considered reliable as similar or even higher results were obtained for radiometric and chemical assay of samples from Bore V.H.4 and surface samples. The grade of the main lode intersections are listed hereunder, and other details are shown in the assay sheets together with geological logs appended to this report.

ASSAYS.

BORE NO.	MAIN LODE		SOUTH LIMB		CENTRAL LODE		SOUTH LODE	
	Width ft. in.	Assay (Pounds)	Width ft.in.	Assay (Pounds)	Width ft. in.	Assay (Pounds)	Width ft. in.	Assay (Pounds)
V.H.1	9 - 4	10.6	1-11	4.9	---	---	---	---
V.H.2	4 - 6	1.8 (3.1 chem.)	---	---	---	--- (6.4 chem.)	18 - 0	5.3
V.H.4	2 - 2	3.1	---	---	6 - 8	5.4	---	---
V.H.5	6 - 2	8.7	7 - 0	9.0	---	---	---	---
V.H.10	6 - 0	3.8	1 - 4	8.1	---	---	---	---
	note - assay figures represent pounds U_3O_8 per long ton.							

The overall weighted grade of the lode intersections based on these figures - representing 63 feet of sample - is 6.4 pounds U_3O_8 per long ton.

7. CORE RECOVERY.

The samples being provided by diamond drilling are highly satisfactory. Core recovery in the lode formations is greater than 95%, and there is no apparent loss of ore mineral which is non-brittle and firmly fixed in the matrix of the lode.

Sludges are not being recovered as they are regarded as unnecessary in this case where representative core samples are being obtained. This means that the need for cementing holes is less frequent and a higher drilling rate can be maintained.

At this stage there is no need for radiometric logging of the boreholes.

8. METALLURGICAL INVESTIGATIONS.

At the request of the Chief Metallurgical Engineer (Mr. Jackson), the preparation of samples for assay is being carried out at the Metallurgical Laboratory so that the bulk of the material can also be used for ore recovery experiments.

Flotation tests that are proceeding show that concentrates can be obtained of similar grade to that at Radium Hill.

9. FUTURE DRILLING PROGRAMME.

Seven new boresites have been pegged in the field. Several of these, including V.H.11 - 70, V.H.12, V.H.13 and V.H.3, are designed to test the eastern and western extremities of the lode and to provide data on the pitch of mineralisation. The remainder involve deep drilling which will test the depth of the main ore-bodies up to 300 feet down dip.

The sites for the bore collars are shown on the accompanying plan and sections (Fig. 1. & 2.). At these points it is proposed that firstly 45° holes (directed north) be drilled as in the previous programme. By drilling to approximately 200 feet these should intersect the deepest target - the Main Lode - at 160-200 feet down dip. If the results are as expected, then a second hole at a 70° angle is to be sunk at the same site to approximately 220 feet as a means of proving a further 100 feet depth to the deposit.

This proposal for drilling 45° and 70° holes on the ore site should satisfactorily intersect the lodes at equally spaced intervals now that the upper and lower lodes will be cut at bore depths greater than 100 feet; and will achieve the same result as additional 45° holes without time lost in shifting the plants.

The future programme is listed below, with tentative data on target depths.

VICTORIA HUT PROSPECT

BORE TARGET DEPTHS.

VH11-70	Target depth approx. 170 ft. - narrow extremity of main lode? drill to 200 ft. at depression of 70°.	
VH12	Target depth main lode extremity at 130 feet. May be barren - drill to 150 feet.	
VH13	Target depth main lode extremity at 130 feet. Don't drill until results of VH12 available to Geologist.	
VH18	Must await result of VH3.	
VH17	Minor lode possibly at 140-150 feet. Main lode 195 feet. Drill to 220 at least.	Drill 70° holes on same site if lodes cut where expected. Otherwise shift.
VH19	Main lode 210 feet. Drill to 230 at least.	
VH16	Possibly narrow lode 150 feet. Main lode 220. Drill to 240 feet.	
VH15	South limb lode 185 feet. Main lode 220 feet. Drill to 240 feet.	

Bores in progress. - Boreholes V.H.3 and V.H.7 of the original programme are in progress, as well as a 70° hole (Bore No. V.H.11 - 70) being drilled at site V.H.11.

D. King

9/7/54 Geologist.

VICTORIA HUT PROSPECT

VH1

\- -

254½S : 210W

north 45°

30/4/54

\-\-

40-54

US 336

81.43

A. Leechen

6/5/54

0	- 0	9'	9"	Sheared granite and migmatite. Traces of davidite at 2'0" and torbernite at 8'0".
9'	9"	20'	0"	Torbernite at 10'0" and davidite at 11'6", 13'0" and 14'6".
20'	0"	26'	8"	Sheared migmatite with occasional radioactive points. Large core loss.
26'	8"	27'	5"	Quartz pegmatite with limonite stains. Low radioactivity.
27'	5"	29'	4"	Sheared migmatite, with plentiful davidite with biotite (South Limb).
29'	4"	34'	0"	Sheared migmatite.
[illegible]'	0"	37'	10"	Siliceous migmatite with little biotite.
37'	10"	52'	9"	Sheared migmatite. Traces of radioactive minerals.
52'	9"	62'	1"	Sheared migmatite with plentiful biotite and [illegible] rich davidite disseminations (Main Lode).
62'	1"	67'	0"	Feldspar pegmatite. Low radioactivity.
67'	0"	151'	4"	Sheared migmatite. Occasional biotitic zones and traces of radioactive minerals.

D. King.

7/6/54.

VICTORIA HUT PROSPECT

BORE VH1

A S S A Y S.

Footage From Ft.	ins.	To Ft.	ins.	Thickness Ft.	ins.	Sample No.	ASSAYS U_3O_8 pounds per long ton. Radiometric Chemical	Remarks.
0	0	10	0	10	0	U4/5446	1.2	
10	0	20	0	10	0	U4/5447	2.1	
20	0	27	5	7	5	5448	0.2	
27	5	29	4	1	11	5449	4.9	South Limb.
29	4	37	10	8	6	5450	0.8	
37	10	52	9	14	11	3455	0.3	
52	9	62	1	9	4	3456	10.6	Main Lode.

VICTORIA HUT PROSPECT

VH2 — — 41-54

3358 ; 360W — — US 336

north 45° 92.04

10/5/54 C. Serras

20/5/54

0	0	10	0	Migmatite with little biotite. Occasional pegmatite lenses.
10	0	25	0	Sheared migmatite. Weak radioactivity.
25	0	43	0	Sheared migmatite with much biotite. Strongly radioactive (South Lode)
43	0	134	0	Sheared migmatite with little biotite
134	0	143	0	Pegmatite and sheared migmatite.
143	0	147	6	Sheared moderately radioactive migmatite (Main Lode)
147	0	162	0	Sheared migmatite. Weakly radioactive.
162	0	189	0	Migmatite and granite gneiss.

D. King

16/6/54

VICTORIA HUT PROSPECT

BORE VH2.

A S S A Y S

Footage From Ft.	ins	to Ft.	ins.	Thickness Ft.	ins.	Sample No.	ASSAYS U_3O_8 pounds per long ton. Radiometric	Chemical	Remarks.
0	0	10	0	10	0	U4/3457	0.1		
10	0	25	0	15	0	U4/3458	0.9		
25	0	33	0	8	0	3459	2.6	5.3 weighted	South Lode
33	0	43	0	10	0	3460	7.4		
43	0	50	0	7	0	3461	0.8		
134	0	143	0	9	0	3462	0.2		
143	0	147	6	4	6	3463	1.8		Main Lode
7	-	162	0	14	6	3464	Nil		

VICTORIA HUT PROSPECT

VH4 — —

2608 : 390W

north 45°

24/5/54

48.54

US 336

100.0

N. Stack

28/5/54

0	0	18	4	Fractured leucogranite with biotite segregations
18	4	38	8	Migmatitic granite. Several large slugs of davidite at 21'5".
38	8	41	4	Banded biotite migmatite foliation 50°. Traces of davidite mineralisation.
41	4	43	4	Biotite migmatite with rich davidite disseminati (Central Lode)
43	4	48	0	Banded biotite migmatite. Traces of davidite mineralisation.
48	0	64	0	Leucogranite with streaky biotite segregations.
64	0	66	10	Biotite migmatite traces of davidite mineralisation.
66	10	69	0	Fractured biotite migmatite with rich davidite disseminations (Main Lode)
69.	0	70	0	Biotite migmatite. Traces of davidite mineralisation.
70	0	77	5	Migmatite leucogranite.
77	5	83	0	Biotite schist metasediment.
83	0	116	0	Leucogranite with streaky biotite segregations.
116	0	116	9	Biotite schist metasediment.
116	9	151	0	Leucogranite. Narrow bands of schistose metasediment at 50° between 124' and 127'

D. King

6/6/54

VICTORIA HUT PROSPECT

BORE VH4.

A S S A Y S.

Footage From	ins	To Ft.	ins.	Thickness Ft.	ins.	Sample No.	ASSAYS U_3O_8 pounds per long ton Radiometric	Chemical	Remarks.
38	3	41	4	2	8	U4/3468	1.2	1.6	
41	4	43	4	2	0	3469	6.7	7.4	Central
					6'8"		5.4 weighted		
43	4	48	0	4	8	3470	4.9	5.4	Lode
64	0	66	10	2	10	3471	0.6	0.7	
66	10	69	0	2	2	3472	3.1	3.1	Main Lode
69	0	70	0	1	0	3473	0.2	0.2	

VICTORIA HUT PROSPECT

VH5

-

336S : 198W

north

45°

24/5/54

-

50.54

Us.336

80.44

A. Leschen

2/5/54

0	0	13	4	Biotitic migmatite. Magnetite vein at 9'4".
13	4	29	5	Pink pegmatitic granite.
29	5	45	6	Medium - grained granite with occasional biotite streaks.
45	6	93	0	Hybrid granite - irregularly distributed biotite.
93	0	100	0	Biotitic migmatite. Some magnetite - slightly radioactive.
100	0	107	0	Schistose biotite - davidite lode with some pyrite South Limb
107	0	111	0	Schistose biotitic migmatite with abundant disseminated pyrite and magnetite veins, 60-70° foliation.
111	0	118	0	Medium - grained granite.
118	0	129	7	Schistose biotitic migmatite with magnetite veins
129	7	133	7	Magnetite - pyrite veins.
133	7	139	9	Schistose biotite - davidite lode. Main Lode some pyrite.
)	9	150	8	Hybrid granite with irregularly distributed biotite.

D. King

6/7/54

VICTORIA HUT PROSPECT

BORE VH5

A S S A Y S

Footage From	ins.	To Ft.	ins.	Thickness Ft.	ins.	Sample No.	ASSAYS U_3O_8 pounds/long ton Radiometric	Chemical	Remarks.
97	0	100	0	3	0	U4/3489	4.0		
100	0	107	0	7	0	3490	9.0		South limb.
107	0	110	0	3	0	3491	1.6	2.0	
130	7	133	7	3	0	3492	0.2	0.2	
133	7	139	9	6	2	3493	8.7		Main Lode
139	9	142	9	3	0	3494	0.5	0.6	

VICTORIA HUT PROSPECT -

VH 6 57.54

\- - US 336

3758 : 391W 96.0

north 45° C. Serras

7/6/54 11/6/54

0	0	17	0	Foliated hybrid granite 50°.
17	0	20	8	Magnetite veins.
20	8	29	2	Foliated hybrid granite
29	2	32	0	Hybrid granite with numerous magnetite veins.
32	0	60	6	Foliated hybrid granites at 70°. Veinlets of magnetite.
60	6	63	0	Biotitic hybrid granite.
63	0	64	6	Biotitic hybrid granite with rich davidite, ~~central - Main Lode convergence~~. South Lode
64	6	76	6	Biotitic foliated hybrid granite.
76	6	77	6	Biotitic hybrid granite with traces of davidi
77	6	110	0	Biotitic hybrid granite foliation 70°- 80°. Rich magnetite - pyrite veins from 82' - 7 to 83' 7".
110	0	115	6	Schistose biotite rich migmatite. sparse davidite. { Central Lode / Main Lode / Convergence
115	6	141	0	Biotitic hybrid granite.

D. King

6/7/54

VICTORIA HUT PROSPECT -

VHS

- -

256½S : 300W

north 45°

15/6/54

60-54

US 336

90.05

C. Serras

21/6/54

0	0	5	3	Pink granite - coarse grained pegmatitic.
5	3	19	6	Medium grained mafic granite.
19	6	29	0	Foliated biotitic hybrid granite at 60° - 80° thin magnetite vein at 22'2".
29	0	31	0	Biotite rich hybrid granite. Traces of davidite in biotite segregations at 30'10".
31	0	42	6	Foliated biotite migmatite at 70°. Pyrite crystal at 32'8".
42	6	49	6	Schistose biotite migmatite. Disseminated pyrite and numerous magnetite-pyrite veinlets.
49	6	50	0	Schistose biotitic migmatite with small amount of davidite. Main Lode.
50	0	132	0	Hybrid granite. Foliated biotite streaks at 60° - 70°.

D. King

6/7/54

VICTORIA HUT PROSPECT

VH9

\- -

3808 : 300W

north 45°

15/6/54

59-44

US.336

54.58

A. F. Leechen

23/6/54

	0	10	9	Massive pink leucogranite.
10	9	17	6	Hybrid biotite granite. Numerous inclusions of fine-grained feldspar - biotite metasediment.
17	6	20	0	Mafic granite. Numerous biotite and disseminated large inclusions of magnetite.
20	0	34	9	Migmatitic granite.
34	9	36	0	Slatey biotite schist with pyrite inclusions.
36	0	44	6	Leucogranite.
44	6	67	10	Migmatite. Mostly strongly foliated (sheared) at 60°.
67	10	69	0	Leucogranite.
69	0	151	0	Biotitic migmetite and leucogranite. Rich magnetite - pyrite veins at 134' 3", 138'6", 142'3", and pyrite clot at 140'6".
151	0	152	3	Magnetite - pyrite veins in migmatite.
152	3	154	0	Weakly radioactive migmatite carrying abundant magnetite and pyrite.
4	0	158	6	Biotite-davidite lode. Abundant pyrite and some chalcopyrite - davidite. Main Lode.
158	6	161	6	Weakly mineralised lode with magnetite, davidite and pyrite. Main Lode.
161	6	170	0	Biotite migmatite (60°) with pyrite at 162'
170	0	203	0	Mainly leucogranite with migmatite inclusions.

D. King

6/7/54

VICTORIA HUT PROSPECT -

VH 10 56-54

\- - US 336

353S : 250W 83.36

north 45° A. F. Leechen

7/6/54 11/6/54

0	0	28	6	v	Pink pegmatitic granite.
28	6	38	9		Hybrid biotitic granite. Not foliated. Magnetite clot at 29'1".
38	9	44	0		Strongly foliated migmatite. Magnetite-pyrite veins from 41 to 42'.
44	0	89	11		Hybrid granite with irregularly distributed biotite. Magnetite-pyrite veins at 50-52', 56'3", 57'5", 62-65', 73'8", 83-54'. Chalco-pyrite grains between 68'6" and 69'9".
89	11	91	3		Biotite rich lode carrying davidite. <u>South Lode</u>
91	3	97	0		Hybrid granite numerous clots of pyrite.
7	0	120	0		Hybrid granite.
120	0	138	0		Hybrid granite rich in biotite. Foliation 70° magnetite at 124'0" to 124'6".
138	0	144	0		Biotite-rich lode carrying davidite and pyrite <u>Main Lode</u>.
144	0	158	0		Hybrid granite with foliated biotitic inclusions at 70°.

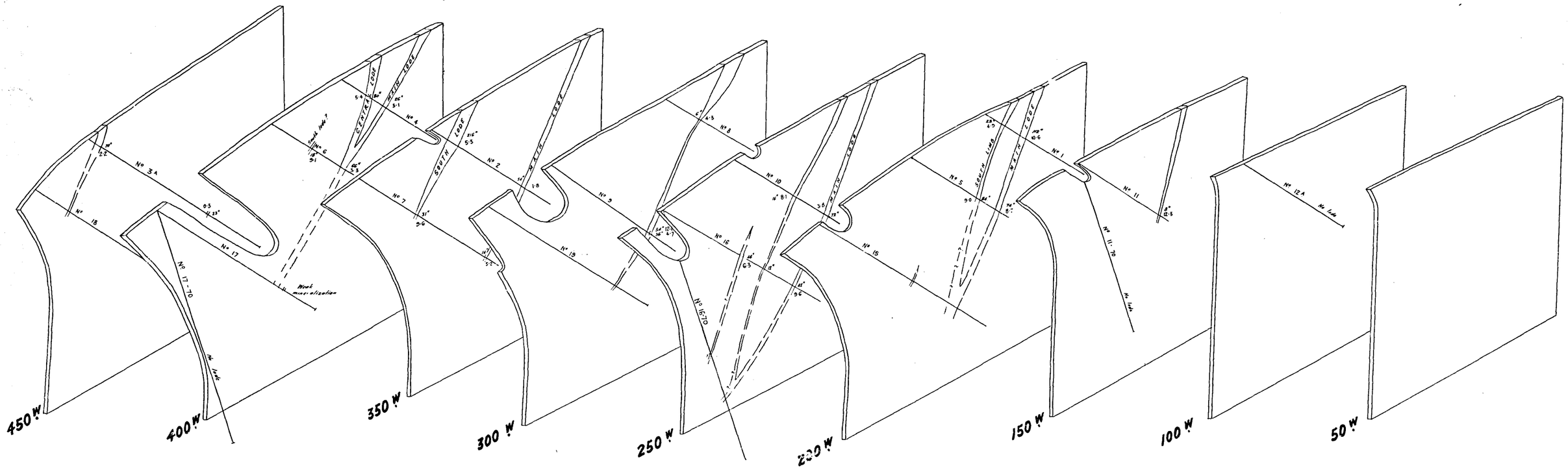
D. King

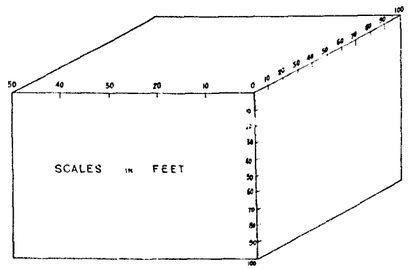
VICTORIA HUT PROSPECT.

BORE VH 10

A S S A Y S.

Footage from Ft.	ins.	To Ft.	ins.	Thickness Ft.	ins.	Sample No.	ASSAYS U_3O_8 pounds/long ton Radiometric	Chemical	Remarks.
86	11	89	11	3	0	U4/3495		0.3	
	11	91	3	1	4	3496		8.1	South Limb
91	3	94	3	3	0	3497		0.2	
135	0	138	0	3	0	3498		0.6	
138	0	144	0	6	0	3499		3.8	Main Lode
144	0	147	0	3	0	3500		0.5	





To accompany report by D. King, Geologist.

S.A. DEPARTMENT OF MINES

VICTORIA HUT PROSPECT

ISOMETRIC DIAGRAM

SHOWING

CROSS-SECTIONS ALONG BOREHOLES

Associated Drawing	No.	No.	Amendment	Exd.	Date

Req. No.
D.M.
Compiled from

Approved
Director of Mines

Passed

Drn.
Tcd.
Ckd.
Exd.

Scale –

US·365

Date 26 8 54

500W 450W 400W 350W 300W 250W 200W 150W 100W 50W

150 S 200 S 250 S 300 S 350 S 400 S 450 S 500 S

MAIN LODE

CENTRAL LODE

SOUTH LODE

SOUTH LIMB

VH1 VH2 VH3 VH4 VH5 VH6 VH7 VH8 VH9 VH10 VH11 VH12 VH13 VH15 VH16 VH17 VH18 VH19

100 95 90 85 80 75

4·0 9·9 10·1 13·0 11·0 8·1 3·6 7·2 7·4 5·8 8·5

N

LEGEND

MINERALIZED OUTCROP

MIGMATITE

MASSIVE RED GRANITE + +

LEUCO GRANITE +

ALLUVIUM & SCREE

QUARTZ

BOREHOLES VH 5

SAMPLES 74

Assoc. Drawing	No.	No.	Amendment	Exd.	Date	Req. No. D.M. Compiled from	S.A. DEPARTMENT OF MINES
							VICTORIA HUT
							DAVIDITE PROSPECT
							SURFACE PLAN

Approved	Passed		
Director of Mines		Drn. Tcd. J.McC Ckd. A.A. Exd.	Scale: 20 feet to 1 inch US 336 Date 9-6-34 Fd (ES)