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MINES BRANCH

Progress Report
Investigations of Iron - Vanadium Prospect

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Hidden Valley, Northern Territory
for
Tin Creek Mining Corporation Limited

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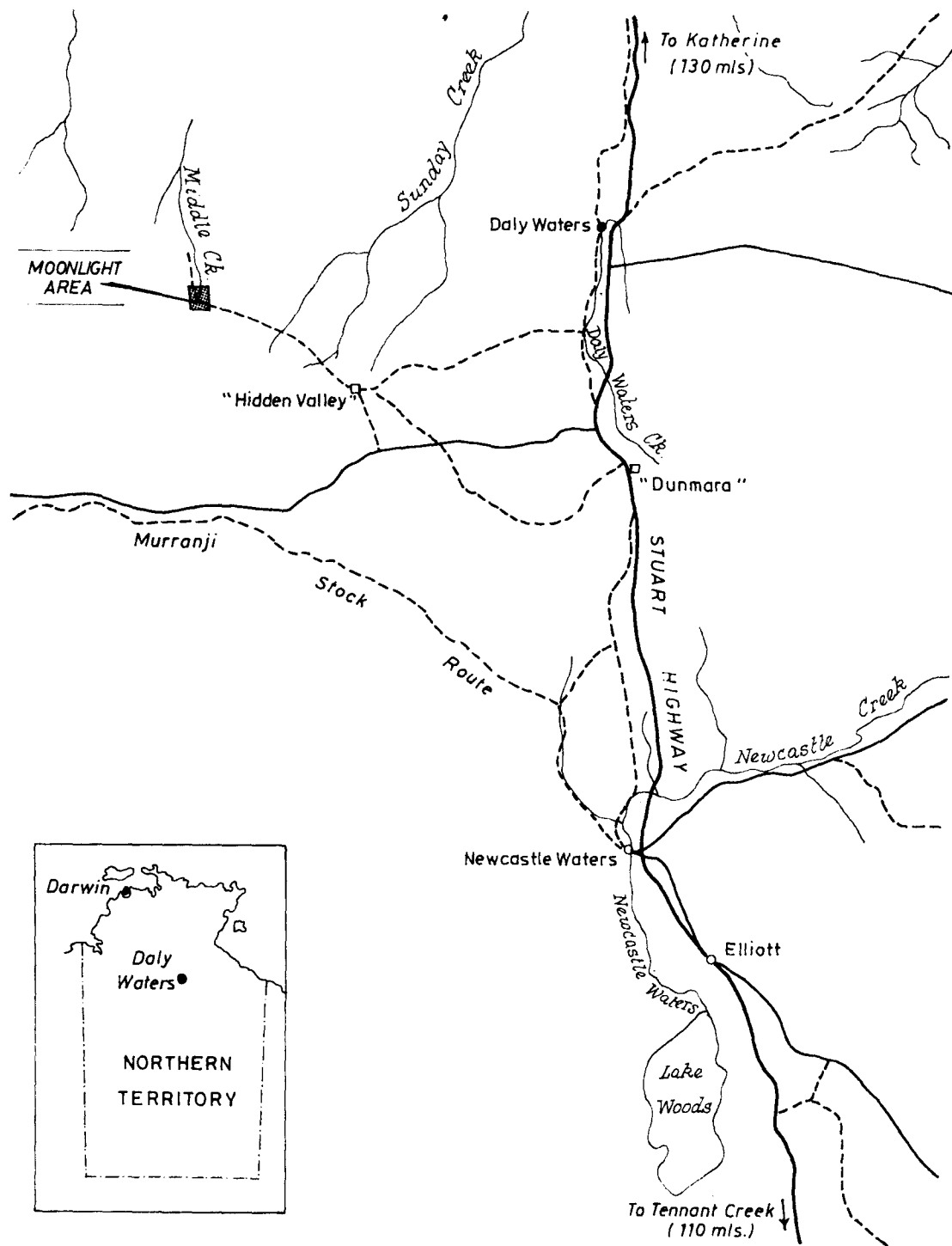
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James B. Croft M. R. W. Garman

Sydney
April 23 1971

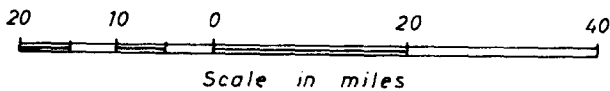
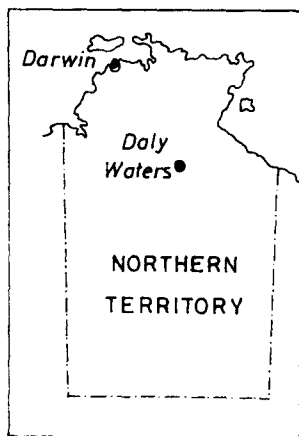
James B. Croft, B. E. (App. Geol.), Ph. D., A. M. Aus. I. M. M.
M. R. W. Garman, B. Sc.
Watts, Griffis and McQuat (Australia) Pty. Limited

133°00'



17°00'

17°00'



WATTS, GRIFFIS AND McQUAT (AUSTRALIA) PTY. LIMITED
 CONSULTING GEOLOGISTS & ENGINEERS
 56 PITT STREET, SYDNEY

TIN CREEK MINING CORP. LTD.
 — Moonlight Area - Hidden Valley N.T. —
LOCALITY MAP

SCALE: 1" = 20 ml.	DATE: March '71	DRAWING No.:
DRAWN: J.M.C.	APPROVED: M.G.	1680-3/1

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INTRODUCTION

At the request of Tin Creek Mining Corporation Limited, the writer spent approximately one month, from January 27 to February 25, 1971, at Hidden Valley Station in the Northern Territory.

The aim of the visit was to investigate and appraise the iron ore potential of the area and advise Tin Creek Mining Corporation Limited as to what exploration procedures should be followed.

It became apparent during the investigations that vanadium and not iron would be of most interest in the area, so the investigations became biased towards vanadium.

INVESTIGATIONS

The investigation was undertaken over only a small fraction of the total 1,400 square miles under Authority to Prospect application by Tin Creek Mining Corporation Limited. The area investigated, which is known as the Moonlight area, was chosen because preliminary sampling by Tin Creek Mining Corporation Limited gave the best results in this area.

The work undertaken was in the form of an orientation survey to determine exactly what type of deposit was being investigated, the form of the mineralization and the controls on the mineralization.

A 10,000 foot base line was bulldozed through the centre of the Moonlight area and 8,000 foot cross lines were bulldozed every 2,000 feet along the base line.

Rock chip samples were taken at 100 foot intervals, where the ironstone was outcropping, along lines 1020N. and 1040N. (See Drawing No. 1680-3/2.)

Percussion drill holes were drilled at 1,000 foot intervals along the same lines to give an indication as to the vertical extent and grade of the mineralization.

MINERALIZATION

The mineralization being investigated was conclusively proven by the drilling to be a lateritic-type enrichment of iron and vanadium. The laterite was developed from the white to pale purple silty claystones of the Lower Cretaceous Mullaman Beds.

It is common for such materials as bauxite and various clays also to occur in laterites, so although no deposits have yet been found in this area, it is possible that they may exist. During any further investigations, this should be kept in mind. No mineralization, other than the lateritic type, has yet been found in this area.

Laterites are formed during the weathering of areas not being actively eroded. As the area is weathered, some minerals and elements are leached while others, such as iron, aluminium, etc., tend to remain behind. If this process is kept up over a long enough period a surface concentration builds up which can be many times the original concentration of the particular element in the rock. For example, the vanadium content of the silty claystones beneath the laterites is only 0.04% V_2O_5 , while values of up to 1.5% V_2O_5 have been recorded in the ironstone, a concentration of $37\frac{1}{2}$ times.

The most highly mineralized material consists of a purple - red ironstone which often shows an iridescent tarnish. The ironstone is formed as a result of the lateritization process concentrating the iron and vanadium of the original silty claystone.

The arithmetical average of the 51 rock chip samples taken is 0.23% V_2O_5 , with maximum and minimum values of 0.57% and 0.10% V_2O_5 respectively, although grab samples have been recorded up to 1.5% V_2O_5 . These figures give a rough indication of the grades of mineralization in the area.

Three costeans were bulldozed in non-outcrop areas near areas of outcropping ironstone and an earthy nodular laterite was found. The earthy nodular laterite was found to contain 0.13% V_2O_5 .

The drilling proved further that the vanadium concentration, while always associated with the purple - red hematitic ironstone, was not always found at the surface. In a number of drill holes, a vanadium and iron-rich hematitic ironstone zone was found below the nodular earthy laterite. Variable features such as this are common in laterites.

At the request of Dr. Sweatman of Sheen Laboratories of Perth, a polished

section of the ironstone was examined by the C. S. I. R. O., using an electron-probe micro-analysis technique. In a discussion with Dr. Sweatman, he indicated that the vanadium was concentrated in fine joints which sometimes showed a zoning of limonite in the centre and hematite on the outside. Where limonite was present at the centre, it contained the highest vanadium values, up to 6% V_2O_5 , while the hematite contained 3% V_2O_5 , and the surrounding rock contained about 1% V_2O_5 .

INVESTIGATIONS CARRIED OUT BY AMDEL

A series of rock chip samples was sent to AMDEL to determine the concentrations of various elements and the mineralogical assemblage in the ironstone. No significant concentrations of any metallic elements, other than those already known, namely iron, titanium, vanadium and aluminium, were found in the samples.

Mineral identification was undertaken on five of the samples using an X-Ray diffraction technique. Four samples were reported to contain varying amounts of hematite, quartz and kaolin, with minor goethite and a trace of mica. The other sample was reported to consist mostly of opaline silica and kaolin with moderate amounts of quartz and a trace of mica.

CONCLUSIONS AND RECOMMENDATIONS

In conclusion, it is felt that the results of the work completed are disappointing and indicate that vanadium grades so far encountered are sub-economic. However, some justification for further work can be found in that only a very small portion of the area available has been looked at and the investigations to date can only be regarded as being of a preliminary nature. Laterite deposits are notoriously variable in their composition and pockets of high-grade material can sometimes be found in otherwise low-grade masses. A more extensive survey may be successful in outlining a number of small, sufficiently high-grade deposits whose total tonnage would support a mining operation.

In order that further work on the prospect can be evaluated thoroughly, details of the metallurgy and extraction of vanadium must be known. So far, our literature research has revealed no information on the recovery of

vanadium from lateritic ores; hence, some laboratory experimentation may be required prior to metallurgical testing. It would also be necessary to find a laboratory capable of undertaking this work. For a study of this kind, a bulk sample will need to be taken as part of the programme for the next stage of exploration.

To obtain bulk samples for metallurgical testing, a number of test pits should be sunk to about 6 or 8 feet deep and bulk samples taken. It would be advantageous to take drill samples and chip samples in or around these test pits so that a better assessment of any sampling programme could be made.

It is Watts, Griffis and McCuat (Australia) Pty. Limited's recommendation that further investigations can be justified; however, the establishment of a viable mining operation in this area should not be presupposed. A detailed programme of proposed further work is at present being prepared.

Briefly, the intended exploration should take the form of visiting and sampling any areas thought to be of interest, as mentioned in your letter of April 1, 1971, followed by detailed geological investigation of any encouraging areas. If a number of areas prove to be interesting and still only a small part of the area has been covered, it will be necessary to use a small helicopter to prospect the remainder of the area because of the difficulty of driving across the virgin bush and of locating positions on the ground.

Once areas have been found to be of interest, reasonable access should be made to them by bulldozer. Detailed mapping and sampling would then be undertaken, followed by percussion drilling of the most encouraging areas.

P E R C U S S I O N D R I L L I N G

PROJECT 1080-3
 Property Moonlight Prospect Hidden Valley, N. T.
 Company Tin Creek Mining Corp. Ltd.,
 Hole location Approx. 1094N/997E

HOLE No. EDJU
 Hole size 6"
 R.L. of collar -
 Dip at collar Vertical
 Depth 70'

Date started 22. 2. 71.
 Date completed 22. 2. 71
 Logged by M. Garman

From	To	Description	From	To	Assay Results						
					LOI	Al ₂ O ₃	SiO ₂	TiO ₂	Fe	Fe ₂ O ₃	V ₂ O ₅
0	5	Ironstone pebbles in clayey soil.	0	5	8.6	16.4	37.0	0.8	25.9	37.0	0.18
5	35	White to light purple-grey silty claystone with some iron oxides in fine joints.	5	10	9.8	20.1	59.0	1.0	6.8	9.7	0.06
			10	15	7.8	16.1	51.6	0.8	15.6	22.3	0.03
			15	20	7.3	17.6	67.8	0.9	3.7	5.3	0.03
			20	25	8.3	19.7	63.7	0.9	3.9	5.6	0.03
			25	30	8.4	18.6	55.3	0.9	10.9	15.6	0.04
35	45	White to cream silty-claystone with some iron oxides on a few fine joints.	30	35	8.6	20.9	61.1	1.0	4.7	6.7	0.04
			35	40	9.1	22.5	61.9	1.0	3.3	4.7	0.03
45	70	Light purple grey silty claystone with some iron oxides on fine joints. Section 50'-55' fine dust more yellow coloured, probably due to a slight increase in limonite content.	40	45	8.9	21.0	58.2	0.9	6.3	9.0	0.03
			45	50	9.4	22.7	60.4	1.0	4.6	6.6	0.03
			50	55	10.1	20.6	51.1	0.9	11.3	16.2	0.07
			55	60	9.3	23.7	59.9	1.0	4.0	5.7	0.03
			60	65	9.0	22.9	62.2	1.0	2.8	4.0	0.03
			65	70	9.4	24.6	62.2	1.0	1.5	2.2	0.04

P E R C U S S I O N D R I L L I N G

PROJECT 1680-3
 Property Moonlight Prospect Hidden Valley N. T.
 Company Tin Creek Mining Corp. Ltd.
 Hole location Approx. 982N/1027E

HOLE No. PDH2
 Hole size 6"
 R.L. of collar -
 Dip at collar Vertical
 Depth 40'

Date started 22. 2. 71
 Date completed 22. 2. 71
 Logged by M. Garman

From	To	Description	From	To	Assay Results						
					L.O.I	Al ₂ O ₃	SiO ₂	TiO ₂	Fe	Fe ₂ O ₃	V ₂ O ₅
0	5	Dark purple-brown silty ironstone with about 10% white clay.	0	5	8.3	17.2	44.0	1.0	20.6	29.5	0.61
5	10	White to cream silty claystone with iron oxide on joints, fine dust is yellowish, probably due to an increase in limonite.	5	10	10.1	23.8	53.5	1.2	7.2	10.3	0.06
10	20	Cream to light purple-grey silty-claystone with iron oxide on joints also about 10% brown clay.	10	15	9.0	19.2	48.6	0.9	15.1	21.6	0.18
			15	20	7.5	16.4	57.5	0.8	11.7	16.7	0.08
20	30	White and light purple-grey silty claystone with minor iron oxides on fine joints.	20	25	7.5	17.4	64.1	0.9	6.6	9.4	0.06
			25	30	8.2	19.2	61.0	0.9	7.2	10.3	0.03
30	35	White silty-claystone.	30	35	8.5	21.2	64.6	1.0	3.2	4.6	0.03
35	40	Light purple-grey silty claystone and some white silty claystone.	35	40	8.8	21.4	64.6	1.0	2.8	4.0	0.03

P E R C U S S I O N D R I L L I N G

PROJECT 1680-3
 Property Moonlight Prospect Hidden Valley, N. T.
 Company Tin Creek Mining Corp. Ltd.
 Hole location 1021N/1012.5E

HOLE No. PDH3
 Hole size 6"
 R.L. of collar -
 Dip at collar Vertical
 Depth 70'

Date started 24.2.71
 Date completed 24.2.71
 Logged by M. Garman

From	To	Description	From	To	Assay Results						
					L.O.I.	Al ₂ O ₃	SiO ₂	TiO ₂	Fe	Fe ₂ O ₃	V ₂ O ₅
0	6	Sandy partly lateritic with fragments of dark purple brown ironstone some still showing remains of light purple-grey silty claystone. About 15% white silty claystone after 4' depth.	0	2	8.4	15.0	36.4	0.8	27.3	39.0	0.27
			2	4	8.8	15.8	34.5	0.8	28.0	40.0	0.24
			4	6	9.2	19.3	47.3	1.0	16.2	23.2	0.17
6	22	Iron enriched highly jointed light purple grey silty claystone with iron oxides along joints. Some hard dark purple-red ironstone and white claystone are present. Deep reddish-purple dust from 8-12, probably due to higher hematite content.	6	8	8.2	14.9	34.1	0.8	29.3	41.9	0.25
			8	10	7.4	12.7	28.4	0.7	35.2	50.3	0.22
			10	12	7.4	12.9	32.2	0.8	32.7	46.8	0.21
			12	14	6.9	12.1	33.5	0.7	32.6	46.2	0.14
			14	16	7.3	14.1	42.2	0.8	24.7	35.3	0.08
			16	18	8.4	16.2	43.9	0.9	21.1	30.2	0.08
			18	20	8.2	16.2	44.9	0.8	20.7	29.6	0.07
20	22	7.7	14.7	40.4	0.8	25.0	35.8	0.06			
22	24	Dark purple-red ironstone showing remains of light purple-grey silty-claystone about 20% fresh light purple-grey silty claystone.	22	24	7.9	14.8	41.0	0.8	24.4	34.9	0.07
24	30	Light purple-grey silty claystone with about 20% hematitic ironstone.	24	30	8.1	16.0	49.0	0.8	18.1	25.9	0.03
30	45	Very light purple-grey silty claystone.	30	35	8.2	19.3	55.9	0.8	10.3	14.7	0.06
			35	40	9.1	20.8	53.8	0.9	9.8	14.0	0.06
			40	45	9.4	23.8	57.9	0.9	4.3	6.2	0.06
45	50	White to cream silty claystone with minor iron oxides on joints fine dust rather yellowish.	45	50	10.2	19.5	46.3	0.8	15.5	22.2	0.06
50	70	White to cream silty claystone some with very slight tinge of purple.	50	55	10.0	24.5	57.1	1.0	4.4	6.3	0.04
			55	60	9.8	25.3	58.2	1.0	2.7	3.9	0.06
			60	65	9.9	26.5	57.1	1.0	3.1	4.4	0.06
			65	70	10.0	26.3	57.4	1.0	2.1	3.0	0.03

P E R C U S S I O N D R I L L I N G

PROJECT 1680-3
 Property Moonlight Prospect Hidden Valley, N. T.
 Company Tin Creek Mining Corp. Ltd.
 Hole location 1021N/1014E

HOLE No. PDH4
 Hole size 6"
 R.L. of collar -
 Dip at collar Vertical
 Depth 50'

Date started 24.2.71
 Date completed 24.2.71
 Logged by M. Garman

From	To	Description	From	To	Assay Results						
					L.O.I.	Al ₂ O ₃	SiO ₂	TiO ₂	Fe	Fe ₂ O ₃	V ₂ O ₅
0	2	Hematitic ironstone some showing remains of light purple grey silty claystone and some rather earthy lateritic ironstone.	0	2	9.6	18.1	33.3	0.9	26.3	37.6	0.03
2	4	Hematitic ironstone some lateritic earthy ironstone and about 10% white clay.	2	4	11.5	24.8	44.0	1.3	12.6	18.0	0.03
4	6	Approximately 20% hematitic ironstone, remainder white claystone with red and yellow iron oxides along fine joints.	4	6	10.7	24.9	50.9	1.4	7.9	11.3	0.06
6	20	Approximately 5% hematitic iron oxide, remainder white claystone with red and yellow iron oxides along fine joints.	6	8	10.3	25.5	56.1	1.5	4.0	5.7	0.01
			8	10	8.8	20.5	59.3	1.2	6.3	9.0	0.04
			10	12	7.7	18.5	68.7	1.1	2.4	3.4	0.03
			12	14	8.2	20.2	67.3	1.0	1.8	2.6	0.03
			14	16	7.9	19.7	66.7	1.1	2.3	3.3	0.03
			16	18	8.1	20.5	64.0	1.2	4.4	6.3	0.06
20	35	Hematitic ironstone some showing remains of light purple grey silty claystone also about 20% white claystone.	18	20	8.5	20.6	62.6	1.2	4.2	6.0	0.04
			20	25	7.6	16.5	50.2	1.0	16.9	24.2	0.13
			25	30	7.2	14.0	41.0	0.9	25.5	36.5	0.13
35	40	White and very light purple grey silty claystone with about 20% hematitic ironstone.	30	35	7.1	14.5	44.6	0.9	32.9	32.8	0.11
			35	40	8.1	18.3	50.5	0.9	14.7	21.0	0.08
40	45	White silty-claystone, some stained slightly yellow by minor iron oxides.	40	45	8.6	21.5	56.6	1.0	7.8	11.2	0.03
45	50	White and light purple-grey silty-claystone and traces of iron oxides on joints.	45	50	8.3	19.6	56.4	1.0	9.9	14.2	0.04

PERCUSSION DRILLING

PROJECT 1680-3
 Property Moonlight Prospect Hidden Valley, N. T.
 Company Tin Creek Mining Corp. Ltd.
 Hole location 1020N/1040E

HOLE No. PDIH5
 Hole size 6"
 R.L. of collar _____
 Dip at collar Vertical
 Depth 19'

Date started 24. 2. 71
 Date completed 24. 2. 71
 Logged by M. Garman

From	To	Description	From	To	Assay Results						
					L. O. I.	Al ₂ O ₃	SiO ₂	TiO ₂	Fe	Fe ₂ O ₃	V ₂ O ₅
0	2	Earthy nodular lateritic ironstone.	0	2	12.3	27.4	42.3	1.4	11.2	16.0	0.08
2	6	Cream silty clay with about 40% nodular earthy lateritic ironstone (mottled zone of laterite profile).	2	4	13.1	30.3	44.5	1.7	3.8	9.7	0.04
			4	6	12.0	27.4	49.6	1.6	5.7	8.2	0.06
6	8	Cream silty clay with about 25% nodular earthy lateritic ironstone.	6	8	10.9	25.2	54.8	1.5	4.9	7.0	0.04
8	19	Cream silty claystone some with trace of yellow iron oxide on joints some stained yellowish.	8	10	9.1	22.1	62.6	1.3	2.4	3.4	0.10
			10	12	8.9	22.7	64.2	1.3	1.1	1.6	0.04
			12	14	8.3	21.0	66.3	1.3	1.1	1.6	0.03
			14	16	8.4	21.6	65.6	1.1	1.1	1.6	0.03
			16	19	8.4	21.4	66.2	1.1	1.2	1.7	0.06

PERCUSSION DRILLING

PROJECT 1680-3
 Property Moonlight Prospect Hidden Valley, N. T.
 Company Tin Creek Mining Corp. Ltd.
 Hole location 1020N/1030E

HOLE No. PDH6
 Hole size 6"
 R.L. of collar -
 Dip at collar Vertical
 Depth 19'

Date started 24. 2. 71
 Date completed 24. 2. 71
 Logged by M. Garnier

From	To	Description	From	To	Assay Results						
					LOI	Al ₂ O ₃	SiO ₂	TiO ₂	Fe	Fe ₂ O ₃	V ₂ O ₅
0	2	Earthy nodular lateritic ironstone.	0	2	11.7	25.5	46.0	1.4	10.1	14.5	0.08
2	8	Earthy nodular lateritic ironstone with some mixed red-brown and white clay (mottled zone of laterite) proportion of white claystone increases after 6'.	2	4	12.8	29.8	45.2	1.7	6.8	9.7	0.06
			4	6	12.3	29.2	50.7	1.8	3.6	5.2	0.06
			6	8	11.8	28.1	52.9	1.7	2.9	4.2	0.03
8	19	White to cream silty claystone with some red and yellow iron oxides on joints.	8	10	11.4	28.0	54.9	1.8	2.2	3.2	0.03
			10	12	11.2	27.5	55.9	1.8	1.9	2.7	0.03
			12	14	11.3	27.1	55.8	1.7	1.9	2.7	0.03
			14	16	11.0	27.4	55.7	1.7	1.8	2.6	0.04
			16	19	11.0	27.1	56.7	1.7	1.5	2.2	0.03

P E R C U S S I O N D R I L L I N G

PROJECT 1380-3
 Property Moonlight Prospect Hidden Valley, N. T.
 Company Tin Creek Mining Corp. Ltd.
 Hole location Approx. 1020N/1020E

HOLE No. PDH7
 Hole size 6"
 R.L. of collar -
 Dip at collar Vertical
 Depth 35'

Date started 24. 2. 71
 Date completed 24. 2. 71
 Logged by M. Garman

From	To	Description	From	To	Assay Results						
					L. O. I.	Al ₂ O ₃	SiO ₂	TiO ₂	Fe	Fe ₂ O ₃	V ₂ O ₅
0	8	Iron enriched silty-claystone showing some remains of light purple-grey silty claystone. Some silty soil in 0-2 section and some white clay in 6-8 section.	0	2	8.9	16.1	33.9	0.9	28.1	40.2	0.22
			2	4	9.0	16.4	37.0	0.9	25.6	36.6	0.22
			4	6	8.6	17.6	42.2	1.0	21.4	30.6	0.17
			6	8	8.3	16.7	41.4	0.9	22.7	32.5	0.14
8	10	Yellow, brown and dark red-purple ironstone and some white clay mostly stained yellow.	8	10	8.2	16.2	46.2	0.9	19.6	28.0	0.17
10	12	Yellow and white silty claystone with about 20% red-purple ironstone.	10	12	7.8	17.2	51.6	1.0	15.2	21.7	0.07
12	18	Light purple-grey silty claystone with about 20% dark red-purple ironstone.	12	14	8.6	19.2	56.7	1.0	9.3	13.3	0.08
			14	16	8.8	18.0	54.2	0.9	12.4	17.7	0.07
			16	18	8.0	17.6	50.1	0.8	16.1	23.0	0.07
18	35	Light purple-grey silty claystone with minor limonitic clay.	18	20	8.7	20.4	54.1	0.9	10.6	15.2	0.07
			20	25	8.3	18.5	51.3	0.9	14.0	20.0	0.07
			25	30	8.0	17.9	53.0	0.9	12.9	18.5	0.04
			30	35	7.5	17.5	62.3	0.9	7.0	10.0	0.04

P E R C U S S I O N D R I L L I N G

PROJECT 1680-3
 Property Moonlight Prospect Hidden Valley, N. T.
 Company Tin Creek Mining Corp. Ltd.
 Hole location 1020N/1010E

HOLE No. PDH8
 Hole size 6"
 R.L. of collar -
 Dip at collar Vertical
 Depth 18'

Date started 24.2.71
 Date completed 24.2.71
 Logged by M. Gorman

From	To	Description	From	To	Assay Results						
					L.O.I.	Al ₂ O ₃	SiO ₂	TiO ₂	Fe	Fe ₂ O ₃	V ₂ O ₅
0	2	Dark red-purple ironstone with some brown clay some silty soil and some white clay.	0	2	9.1	17.7	53.7	0.9	12.0	17.2	0.06
2	6	About 50-50 white silty claystone and light purple grey silty claystone.	2	4	7.7	17.6	63.0	0.9	6.7	9.6	0.04
			4	6	7.4	16.2	59.2	0.8	10.6	15.2	0.03
6	8	White silty-claystone with about 5% dark red-purple ironstone.	6	8	7.5	17.5	63.1	0.8	7.0	10.0	0.08
8	18	Light purple-grey silty claystone.	8	10	8.0	19.2	63.6	0.9	5.1	7.3	0.03
			10	12	8.1	19.3	60.6	0.8	6.9	9.9	0.06
			12	14	8.2	18.4	55.0	0.8	11.7	16.7	0.04
			14	16	8.2	20.3	60.7	0.9	5.8	8.3	0.04
			16	18	8.2	20.7	62.2	1.0	4.2	6.0	0.04

P E R C U S S I O N D R I L L I N G

PROJECT 1680-3
 Property Moonlight Prospect Hidden Valley, N. T.
 Company Tin Creek Mining Corp. Ltd.
 Hole location 1020N/1000E

HOLE No. PDH9
 Hole size 6"
 R.L. of collar -
 Dip at collar Vertical
 Depth 30'

Date started 24.2.71
 Date completed 24.2.71
 Logged by M. Garman

From	To	Description	From	To	Assay Results						
					LOI	Al ₂ O ₃	SiO ₂	TiO ₂	Fe	Fe ₂ O ₃	V ₂ O ₅
0	6	Mustard coloured earthy laterite with minor fine veins of red oxides.	0	2	9.7	20.0	61.2	1.3	4.4	6.3	0.06
			2	4	10.5	21.9	56.9	1.3	5.6	8.0	0.06
			4	6	10.1	20.9	58.4	1.2	5.8	8.3	0.04
6	16	Mustard coloured fine dust with white and very light purple-grey claystone with minor red iron oxides.	6	8	9.9	19.8	56.9	1.1	8.0	11.5	0.04
			8	10	10.1	20.6	55.9	1.0	8.0	11.5	0.03
			10	12	10.9	23.2	55.0	1.1	5.8	8.3	0.04
			12	14	10.7	21.3	55.5	1.0	7.5	10.7	0.07
			14	16	10.2	19.1	51.5	0.9	12.5	17.9	0.07
16	18	30% white claystone with about 20% dark red-purple ironstone, the remainder being mustard coloured fine dust.	16	18	9.9	18.5	42.3	0.8	19.7	28.2	0.11
18	30	Cream silty claystone.	18	20	9.8	21.5	49.4	0.9	12.0	17.2	0.06
			20	25	9.9	24.2	58.8	1.0	3.0	4.3	0.03
			25	30	9.7	24.7	59.4	1.0	2.2	3.2	0.06

P E R C U S S I O N D R I L L I N G

PROJECT 1680-3
 Property Moonlight Prospect Hidden Valley N. T.
 Company Tin Creek Mining Corp. Ltd.
 Hole location 1040.5N/962E

HOLE No. PDH10
 Hole size 6"
 R.L. of collar -
 Dip at collar Vertical
 Depth 19'

Date started 24. 2. 71
 Date completed 24. 2. 71
 Logged by M. Garman

From	To	Description	From	To	Assay Results						
					LOI	Al ₂ O ₃	SiO ₂	TiO ₂	Fe	Fe ₂ O ₃	V ₂ O ₅
0	2	Dark red purple hematitic ironstone some rather earthy.	0	2	11.3	23.5	38.7	1.1	17.6	25.2	0.06
2	6	Dark red purple hematitic ironstone some rather earthy and some showing remains of light purple grey silty claystone.	2	4	11.2	22.4	38.9	1.1	18.1	25.9	0.13
			4	6	10.3	20.6	42.2	1.0	17.8	25.5	0.08
6	16	Cream silty-claystone with some dark red-purple ironstone and some light purple grey silty claystone with iron oxides on fine joints. Iron oxide decreases after 14'.	6	8	8.4	17.5	49.7	0.9	16.1	23.0	0.04
			8	10	8.3	18.7	56.0	0.9	10.9	15.6	0.03
			10	12	8.9	20.7	54.1	0.8	10.1	14.5	0.07
			12	14	9.4	23.3	58.6	0.9	4.8	6.9	0.03
			14	16	8.5	21.5	63.0	0.9	2.9	4.2	0.03
16	19	White and pale purple grey silty claystone.	16	19	8.0	19.3	63.4	1.0	5.0	7.2	0.03

P E R C U S S I O N D R I L L I N G

PROJECT 1680-3
 Property Moonlight Prospect Hidden Valley N. T.
 Company Tin Creek Mining Corp. Ltd.
 Hole location 1040N/970E

HOLE No. PDH11
 Hole size 6"
 R.L. of collar -
 Dip at collar Vertical
 Depth 35'

Date started 24.2.71
 Date completed 24.2.71
 Logged by M. Garman

From	To	Description	From	To	Assay Results						
					L.O.I.	Al ₂ O ₃	SiO ₂	TiO ₂	Fe	Fe ₂ O ₃	V ₂ O ₅
0	10	Dark brown silty soil and light purple-grey silty claystone with some dark red-purple ironstone.	0	2	8.0	13.9	47.3	0.9	20.6	29.5	0.13
			2	4	8.4	15.4	44.5	1.0	21.2	30.3	0.15
			4	6	8.4	17.0	38.9	1.0	24.2	34.6	0.14
			6	8	8.2	16.2	38.2	1.0	25.2	36.0	0.13
			8	10	8.1	15.1	38.7	1.0	25.7	36.8	0.14
10	25	Dark grey-purple silty claystone and some dark red purple ironstone with about 30% white silty claystone.	10	12	8.0	16.8	47.8	0.9	18.4	26.3	0.08
			12	14	8.7	18.7	48.6	0.8	16.0	22.9	0.08
			14	16	8.8	18.8	47.3	0.8	16.5	23.6	0.10
			16	18	8.5	19.3	53.2	0.9	11.7	16.7	0.04
			18	20	8.2	18.9	54.3	0.9	11.9	17.0	0.11
			20	25	8.2	17.9	49.3	0.9	16.1	23.0	0.11
25	35	White and light purple-grey silty-claystone	25	30	8.2	19.4	57.5	1.0	8.6	12.3	0.04
			30	35	8.0	19.7	61.0	1.0	6.2	8.9	0.10

P E R C U S S I O N D R I L L I N G

PROJECT 1680-3
 Property Moonlight Prospect Hidden Valley N. T.
 Company Tin Creek Mining Corp. Ltd.
 Hole location 1040N/980E

HOLE No. PDH12
 Hole size 6"
 R.L. of collar -
 Dip at collar Vertical
 Depth 20'

Date started 24. 2. 71.
 Date completed 24. 2. 71
 Logged by M. Garman

From	To	Description	From	To	Assay Results						
					L.O.I.	Al ₂ O ₃	SiO ₂	TiO ₂	Fe	Fe ₂ O ₃	V ₂ O ₅
0	2	Fine brown silty soil with white silty claystone and some hematitic ironstone.	0	2	10.4	19.2	48.4	0.9	14.7	21.0	0.08
2	20	White and light purple grey silty claystone some hard hematitic ironstone throughout.	2	4	9.6	22.7	60.3	0.9	4.1	5.9	0.03
			4	6	9.5	20.8	56.3	1.0	7.9	11.3	0.04
			6	8	8.6	20.1	58.2	0.9	7.5	10.7	0.07
			8	10	8.7	19.8	56.6	1.0	3.6	12.3	0.08
			10	12	8.6	19.9	57.0	1.0	8.4	12.0	0.10
			12	14	8.4	19.8	61.6	1.1	5.1	11.3	0.03
			14	16	8.1	18.4	55.6	1.0	10.4	14.9	0.07
			16	18	8.1	18.5	58.2	0.9	9.1	13.0	0.07
	18	20	7.6	17.7	57.6	0.9	10.3	14.7	0.06		

P E R C U S S I O N D R I L L I N G

PROJECT 1680-3
 Property Moonlight Prospect Hidden Valley, N. T.
 Company Tin Creek Mining Corp. Ltd.,
 Hole location 1040N/990E

HOLE No. PDH13
 Hole size 6"
 R.L. of collar
 Dip at collar Vertical
 Depth 55'

Date started 24. 2. 71
 Date completed 24. 2. 71
 Logged by M. Garman

From	To	Description	From	To	Assay Results						
					LOI	Al ₂ O ₃	SiO ₂	TiO ₂	Fe	Fe ₂ O ₃	V ₂ O ₅
0	12	Earthy reddish brown laterite with some cream clay. Increase in cream clay and some dark red-purple ironstone present between 6' and 12'.	0	2	13.1	28.5	46.6	1.5	6.9	9.9	0.06
			2	4	13.1	29.4	46.1	1.6	6.6	9.4	0.06
			4	6	13.5	28.4	43.3	1.5	9.1	13.0	0.06
			6	8	13.0	29.8	46.4	1.7	6.3	9.0	0.07
			8	10	12.8	29.4	45.8	1.7	6.8	9.7	0.04
			10	12	12.8	30.6	47.9	1.9	4.1	5.9	0.06
12	20	Red earthy ironstone with some cream clay.	12	14	12.7	30.7	49.0	1.8	3.2	4.6	0.06
			14	16	12.8	30.8	48.0	1.7	3.8	5.4	0.04
			16	18	12.8	31.3	47.9	1.8	3.8	5.4	0.06
			18	20	13.2	31.4	47.6	1.8	3.3	4.7	0.04
20	25	Some red earthy ironstone with harder red-purple ironstone and some white silty claystone.	20	25	12.4	29.4	46.2	1.7	6.6	9.4	0.06
25	30	Cream silty claystone with about 15% purple red ironstone.	25	30	9.5	22.2	58.0	1.3	5.3	7.6	0.06
30	35	Cream silty claystone with about 40% purple red ironstone.	30	35	9.3	19.7	48.1	1.1	14.8	21.2	0.13
35	40	Cream ironstained claystone some brown-yellow ironstone and some dark red purple ironstone. Remains of light purple grey silty claystone in some chips.	35	40	9.4	19.2	48.3	1.1	14.9	21.3	0.08
40	45	Mostly dark purple red ironstone some with remains of light purple grey silty claystone.	40	45	8.5	17.1	43.8	0.9	20.5	29.3	0.06
45	50	About 50-50 white silty claystone and dark purple red ironstone.	45	50	8.1	17.9	53.7	1.0	12.8	18.3	0.07
50	55	About 30% dark red-purple ironstone and remainder light purple grey silty claystone and some white silty claystone.	50	55	7.7	15.8	51.8	0.8	16.2	23.2	0.06

P E R C U S S I O N D R I L L I N G

PROJECT 1080-3
 Property Moonlight Prospect Hidden Valley, N. T.
 Company Tin Creek Mining Corp. Ltd.
 Hole location 1040N/1000E

HOLE No. PDH14
 Hole size 6"
 R.L. of collar -
 Dip at collar Vertical
 Depth 20'

Date started 24. 2. 71
 Date completed 24. 2. 71
 Logged by M. Garman

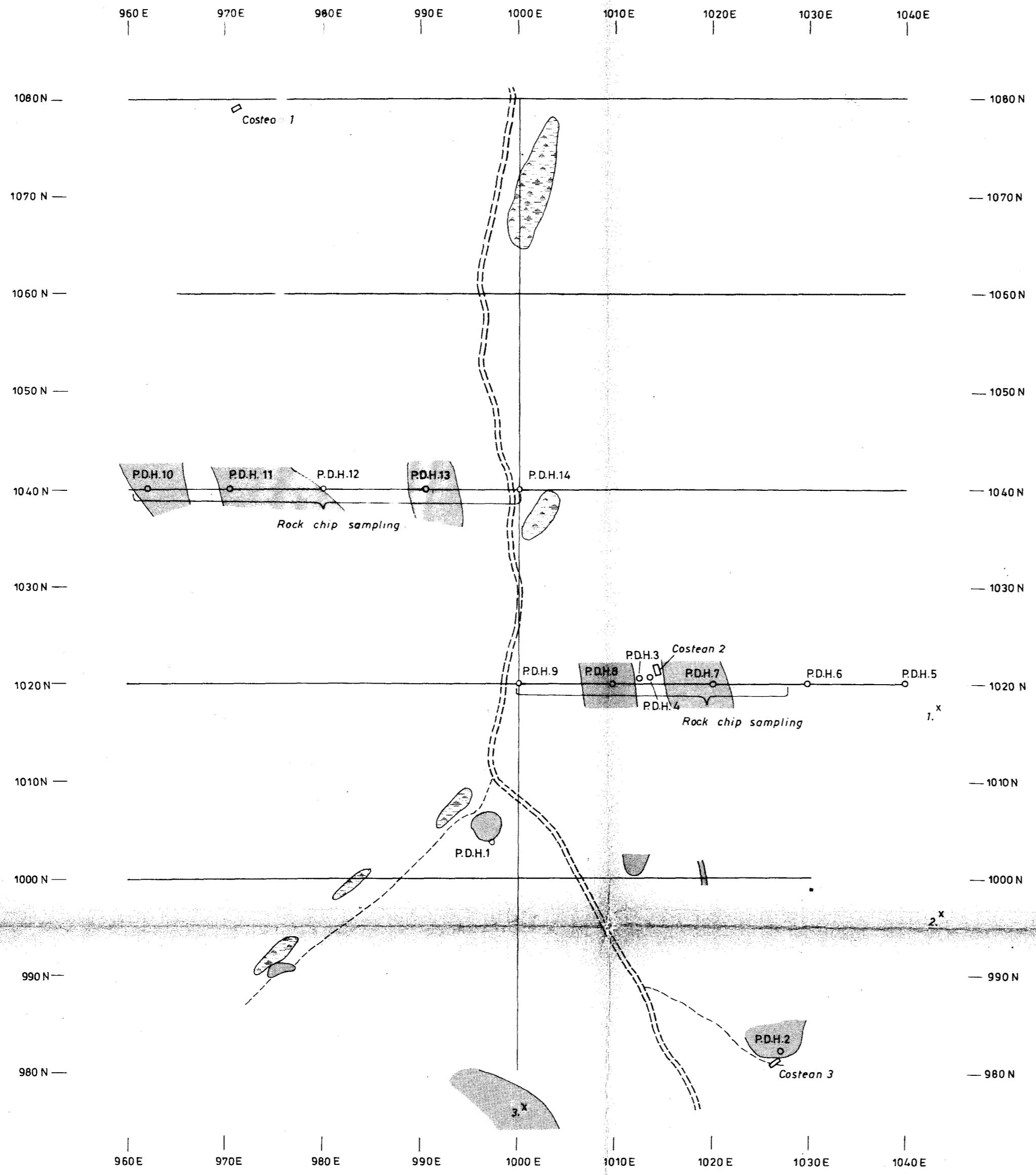
From	To	Description	From	To	Assay Results						
					LOI	Al ₂ O ₃	SiO ₂	TiO ₂	Fe	Fe ₂ O ₃	V ₂ O ₅
0	5	Earthy yellow brown clay with about 15% dark red-purple ironstone.	0	5	10.1	19.4	58.6	1.1	6.6	9.4	0.04
5	20	Cream to light brownish grey claystone.	5	10	10.5	20.5	57.8	1.0	5.2	7.4	0.03
			10	15	10.6	22.5	55.2	0.9	6.5	9.3	0.03
			15	20	10.8	22.5	55.4	0.9	5.8	8.3	0.01

Project MOONLIGHT PROSPECT HIDDEN VALLEY N. T.

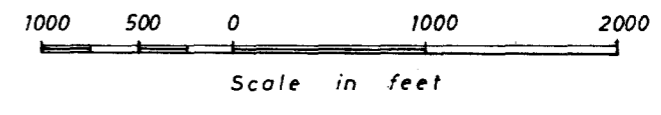
Sample No.	Type	Location	Length	Assov Result							Comment
				L. O.	Al ₂ O ₃	SiO ₂	TiO ₂	Fe.	Fe ₂ O ₃	V ₂ O ₅	
17	Rock Chip	Costean 2		10.2	19.0	34.2	0.9	24.5	35.0	0.14	laterite
18	"	x 1		7.0	11.9	26.3	0.7	37.4	53.5	0.36	ironstone
19	"	x 2		6.6	13.8	30.8	0.9	33.4	47.8	0.25	"
20	"	x 3		6.4	8.9	27.5	0.7	39.1	55.2	0.45	"
21	"	Costean 3		12.3	26.0	43.7	1.2	11.3	16.2	0.08	laterite
22	"	Costean 1		11.1	18.7	30.4	0.8	27.3	39.0	0.18	laterite
23	"	Costean 1		9.0	14.4	22.7	0.6	37.0	52.9	0.24	ironstone
100	"	1020N/ 1005E		6.3	11.2	31.3	0.7	35.1	50.2	0.27	"
101	"	1020N/ 1006E		5.4	9.6	22.6	0.7	43.0	61.5	0.25	ironstone
102	"	1020N/ 1007E		6.3	10.9	26.6	0.7	38.4	54.9	0.35	"
103	"	1020N/ 1008E		5.9	9.9	25.9	0.6	39.8	56.9	0.32	"
104	"	1020N/ 1009E		4.6	8.2	20.9	0.4	45.4	64.9	0.29	"
105	"	1020N/ 1010E		6.2	10.1	24.4	0.6	41.0	58.6	0.18	"
106	"	1020N/ 1011E		6.1	11.9	25.8	0.8	38.5	55.1	0.25	"
107	"	1020N/ 1012E		6.6	10.4	23.4	0.6	40.8	58.4	0.18	"
108	"	1020N/ 1013E		6.6	13.1	24.4	0.7	38.1	54.5	0.21	"
109	"	1020N/ 1014E		6.0	10.9	20.2	0.7	43.0	61.5	0.28	"
110	"	1020N/ 1015E		6.1	11.4	20.5	0.8	42.5	60.8	0.22	"
111	"	1020N/ 1016E		5.7	11.7	34.2	0.8	32.8	46.9	0.24	"
112	"	1020N/ 1017E		6.0	9.2	19.0	0.5	45.0	64.4	0.13	"
113	"	1020N/ 1018E		6.8	12.9	29.7	0.8	34.4	49.2	0.20	"
114	"	1020N/ 1019E		6.3	12.6	33.7	0.9	32.2	46.1	0.17	"
115	"	1020N/ 1020E		5.4	8.9	24.6	0.5	41.9	59.9	0.15	"
116	"	1020N/ 1021E		5.4	9.2	23.0	0.5	42.6	60.9	0.13	"
117	"	1020N/ 1022E		7.3	12.1	27.4	0.8	36.2	51.8	0.50	"
118	"	1020N/ 1023E		5.5	8.8	18.8	0.5	45.7	65.4	0.29	"
119	"	1040N/ 994E		8.1	11.4	20.2	0.6	41.1	58.8	0.21	"
120	"	1040N/ 993E		6.8	14.4	33.1	0.8	31.3	44.8	0.34	"
121	"	1040N/ 992E		7.2	12.6	36.8	0.8	29.5	42.2	0.29	"
122	"	1040N/ 991E		7.3	13.8	38.9	0.8	26.7	38.2	0.17	"
123	"	1040N/ 990E		7.8	14.4	36.7	0.8	27.9	39.9	0.18	"
124	"	1040N/ 989E		7.7	13.7	36.4	0.8	28.8	41.2	0.20	"
125	"	1040N/ 988E		6.5	11.5	30.8	0.7	35.1	50.2	0.14	"
126	"	1040N/ 987E		7.6	13.1	29.3	0.7	34.2	48.9	0.28	"
127	"	1040N/ 986E		6.2	12.2	24.6	0.7	39.3	56.2	0.18	"

Project MOONLIGHT PROSPECT HIDDEN VALLEY N. T.

Sample No.	Type	Location	Length	Assay Result						Comment	
				L. O.	Al ₂ O ₃	SiO ₂	TiO ₂	Fe.	Fe ₂ O ₃		V ₂ O ₅
123	Rock Chip	1040N/ 985E		6.4	10.4	24.2	0.6	40.5	57.9	0.18	ironstone
129	"	1040N/ 981E		6.3	11.6	29.5	0.6	35.9	51.3	0.10	"
130	"	1040N/ 983E		6.6	12.9	32.9	0.7	32.7	46.8	0.17	"
131	"	1040N/ 982E		6.5	10.3	30.7	0.7	36.2	51.	0.17	"
132	"	1040N/ 981E		5.9	12.3	33.4	0.7	32.7	46.	0.24	"
133	"	1040N/ 980E		6.6	12.3	35.5	0.3	30.5	43.6	0.13	"
134	"	1040N/ 979E		6.4	13.1	38.6	1.0	28.6	40.9	0.25	"
135	"	1040N/ 978E		7.1	12.6	34.4	1.0	31.3	44.3	0.21	"
136	"	1040N/ 977E		6.3	11.3	27.9	0.6	36.3	52.6	0.14	"
137	"	1040N/ 976E		6.7	13.2	30.8	0.3	33.9	43.5	0.15	"
138	"	1040N/ 975E		8.7	16.2	26.3	1.0	32.7	46.3	0.31	"
139	"	1040N/ 974E		8.1	14.1	26.2	0.9	35.3	50.5	0.25	"
140	"	1040N/ 973E		8.6	15.9	23.4	0.9	32.2	46.1	0.27	"
141	"	1040N/ 972E		8.2	15.3	25.3	1.0	34.2	43.9	0.36	"
142	"	1040N/ 971E		6.3	9.0	17.6	0.6	45.7	65.4	0.17	"
143	"	1040N/ 970E		7.3	13.7	29.2	0.9	33.3	43.3	0.15	"
144	"	1040N/ 969E		7.2	13.0	24.2	0.3	37.7	53.9	0.17	"
145	"	1040N/ 968E		6.5	12.1	20.6	0.7	41.5	59.4	0.15	"
146	"	1040N/ 964E		3.5	14.4	22.4	0.8	37.4	53.5	0.33	"
147	"	1040N/ 963E		3.5	14.7	24.3	0.3	35.3	51.3	0.38	"
148	"	1040N/ 962E		9.6	15.4	24.7	1.0	33.6	43.1	0.20	"
149	"	1040N/ 961E		6.9	12.3	36.3	0.9	29.3	41.9	0.10	"
150	"	1040N/ 960E		3.6	15.4	30.5	1.0	31.0	44.3	0.46	"
151	"	1040N/ 959E		8.7	15.3	25.1	1.0	34.1	43.3	0.57	"



Sample	Type	Fe%	V ₂ O ₅ %
1	Rockchips	37.4	0.36
2	Rockchips	33.4	0.25
3	Rockchips	39.1	0.45
Cos.1	Laterite	27.3	0.18
Cos.1	Rockchips	37.0	0.24
Cos.2	Laterite	24.5	0.14
Cos.3	Laterite	11.3	0.08



- LEGEND:—
- Ironstone occurrences.
 - Billabong.
 - P.D.H.1 Percussion drill hole location.
 - x
 Chip sample location.
 - Track.
 - Bulldozed lines.

WATTS, GRIFFIS AND McOUAT (AUSTRALIA) PTY. LIMITED
 CONSULTING GEOLOGISTS & ENGINEERS
 1ST FLOOR—56 PITT STREET, SYDNEY

TIN CREEK MINING CORP. LTD.

— Moonlight Area - Hidden Valley N.T. —

Sketch showing bulldozed lines
 sampling and drilling.

CR 71/64

SCALE: As shown	DATE: March '71	DRAWING No.:
DRAWN: J.M.C.	APPROVED:	1680-3/2

960 E 965 E 970 E 975 E 980 E 985 E 990 E 995 E 1000 E 1005 E 1010 E 1015 E 1020 E 1025 E 1030 E 1035 E 1040 E

1040 N
 sample numbers 151 150 149 148 147 146 145 144 143 142 141 140 139 138 137 136 135 134 133 132 131 130 129 128 127 126 125 124 123 122 121 120 119
 V₂ O₅ % 0.57 0.46 0.10 0.20 0.36 0.35 0.15 0.17 0.15 0.17 0.36 0.27 0.25 0.31 0.15 0.14 0.21 0.25 0.18 0.24 0.17 0.17 0.10 0.18 0.18 0.28 0.14 0.20 0.18 0.17 0.29 0.34 0.21
 Fe % 34.1 31.0 29.3 33.6 35.8 37.4 41.5 37.7 33.8 45.7 34.2 32.2 35.3 32.7 33.9 36.8 31.3 28.6 30.5 32.7 36.2 32.7 35.9 40.5 39.3 34.2 35.1 28.8 27.9 26.7 29.5 31.3 41.1



1020 N
 sample numbers 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118
 V₂ O₅ % 0.27 0.25 0.35 0.32 0.29 0.18 0.25 0.18 0.21 0.28 0.22 0.24 0.13 0.20 0.17 0.15 0.13 0.50 0.29
 Fe % 35.1 43.0 38.4 39.8 45.4 44.0 38.5 40.8 38.1 43.0 42.5 32.8 45.0 34.4 32.2 41.9 42.6 36.2 45.7

960 E 965 E 970 E 975 E 980 E 985 E 990 E 995 E 1000 E 1005 E 1010 E 1015 E 1020 E 1025 E 1030 E 1035 E 1040 E

WATTS, GRIFFIS AND McQUAT (AUSTRALIA) PTY. LIMITED CONSULTING GEOLOGISTS & ENGINEERS 1ST FLOOR - 56 PITT STREET, SYDNEY		
TIN CREEK MINING CORP. LTD. MOONLIGHT AREA - HIDDEN VALLEY N.T.		
Rock chip sampling.		
SCALE: 1" = 500' 0"	DATE: March '71.	DRAWING No.:
DRAWN: J B	APPROVED: M G	1680-3/ 3

997 E

1027 E

1012+50 E

1014 E

Line 1004 N PDH 1

0.18	25.9
0.06	6.8
0.03	15.6
0.03	3.7
0.03	3.9
0.04	10.9
0.04	4.7
0.03	3.3
0.03	6.3
0.06	4.6
0.07	11.3
0.03	4.0
0.03	2.8
0.04	1.5
$V_2O_5\%$	Fe%

982 N PDH 2

0.61	20.6
0.06	7.2
0.18	15.1
0.08	11.7
0.06	6.6
0.06	7.2
0.03	3.2
0.03	2.8
$V_2O_5\%$	Fe%


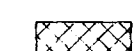
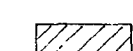

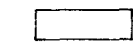
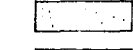
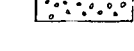
1021 N PDH 3

0.27	27.3
0.24	28.0
0.17	16.2
0.25	29.3
0.22	35.2
0.21	32.7
0.14	32.6
0.08	24.7
0.08	21.1
0.07	20.7
0.06	25.0
0.07	24.4
0.08	18.1
0.06	10.3
0.06	9.8
0.06	4.3
0.06	15.5
0.04	4.4
0.06	2.7
0.06	3.1
0.03	2.1
$V_2O_5\%$	Fe%

1021 N PDH 4

0.03	26.3
0.03	12.6
0.06	7.9
0.01	4.0
0.04	6.3
0.03	2.4
0.03	1.8
0.03	2.3
0.06	4.4
0.04	4.2
0.13	16.9
0.13	25.5
0.11	22.9
0.08	14.7
0.03	7.8
0.04	9.9
$V_2O_5\%$	Fe%

LEGEND:

-  Ironstone red-purple.
-  Ironstone with relict light purple silty claystone.
-  Light grey purple silty claystone
-  Light grey brown claystone
-  White silty claystone
-  Yellow limonitic dust
-  Lateritic ironstone

What's the
slaty depth?

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TIN CREEK MINING CORP. LTD.
MOONLIGHT AREA - HIDDEN VALLEY N.T.
Percussion drill hole sections

SCALE: Vert. 1"=10' DATE: March 71. DRAWING No.:
DRAWN: J.B. APPROVED: M.G. 1680-3/4

9 62 E

9 70 E

9 80 E

9 90 E

10 00 E

Line 10 40N

PDH 10

0-06	17.6
0-13	18.1
0-08	17.8
0-04	16.1
0-03	10.9
0-07	10.1
0-03	4.8
0-03	2.9
0-03	5.0
$V_2O_5\%$	$Fe\%$

PDH 11

0-13	20.6
0-15	21.2
0-14	24.2
0-13	25.2
0-14	25.7
0-08	18.4
0-08	16.0
0-10	16.5
0-04	11.7
0-11	11.9
0-11	16.1
0-04	8.6
0-10	6.2
$V_2O_5\%$	$Fe\%$

PDH 12


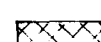
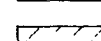
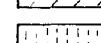
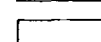
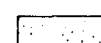

0-08	14.7
0-03	4.1
0-04	7.9
0-07	7.5
0-08	8.6
0-10	8.4
0-06	5.1
0-07	10.4
0-07	9.1
0-06	10.3
$V_2O_5\%$	$Fe\%$

PDH 13

0-06	6.9
0-06	6.6
0-06	9.1
0-07	6.3
0-04	6.8
0-06	4.1
0-06	3.2
0-04	3.8
0-06	3.8
0-04	3.3
0-06	6.6
0-06	5.3
0-13	14.8
0-08	14.9
0-06	20.5
0-07	12.8
0-06	16.2
$V_2O_5\%$	$Fe\%$

PDH 14

0-04	6.6
0-03	5.2
0-03	6.5
0-01	5.8
$V_2O_5\%$	$Fe\%$

- LEGEND :**
-  Ironstone red-purple.
 -  Ironstone with relict light purple silty claystone.
 -  Light grey purple silty claystone.
 -  Light grey brown claystone.
 -  White silty claystone.
 -  Yellow limonitic dust.
 -  Lateritic ironstone

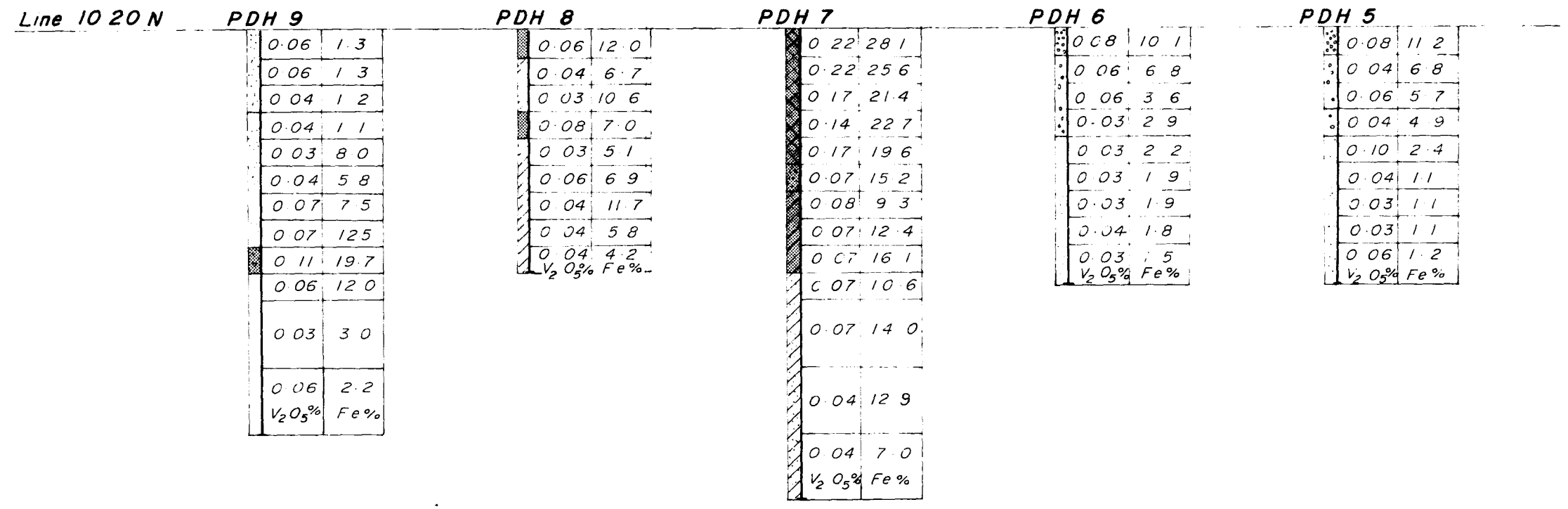
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MOONLIGHT AREA - HIDDEN VALLEY N.T.

Percussion drill holes on Section 1040N

SCALE: Horiz: 1" = 500'	DATE: March 71	DRAWING No.:
DRAWN: J.B.	APPROVED: M.G.	1680-3 / 6

10 00 E 10 10 E 10 20 E 10 30 E 10 40 E



- LEGEND:**
- Ironstone red purple
 - Ironstone with relict light purple silty claystone
 - Light grey purple silty claystone
 - Light grey brown claystone
 - White silty claystone
 - Yellow limonitic dust
 - Lateritic ironstone

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TIN CREEK MINING CORP. LTD.
 MOONLIGHT AREA - HIDDEN VALLEY N.T.
 Percussion drill holes on Section 1020 N

SCALE: Horiz. 1" = 500'	DATE: March 71	DRAWING No.:
DRAWN: J.B.	APPROVED: M.G.	1680-3/5