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SML 450

ANDAMOOKA

FINAL REPORT AT LICENCE SURRENDER FOR THE PERIOD 23/7/1970 TO 22/12/1970

Submitted by
Stockholm Mining Exploration NL
1970

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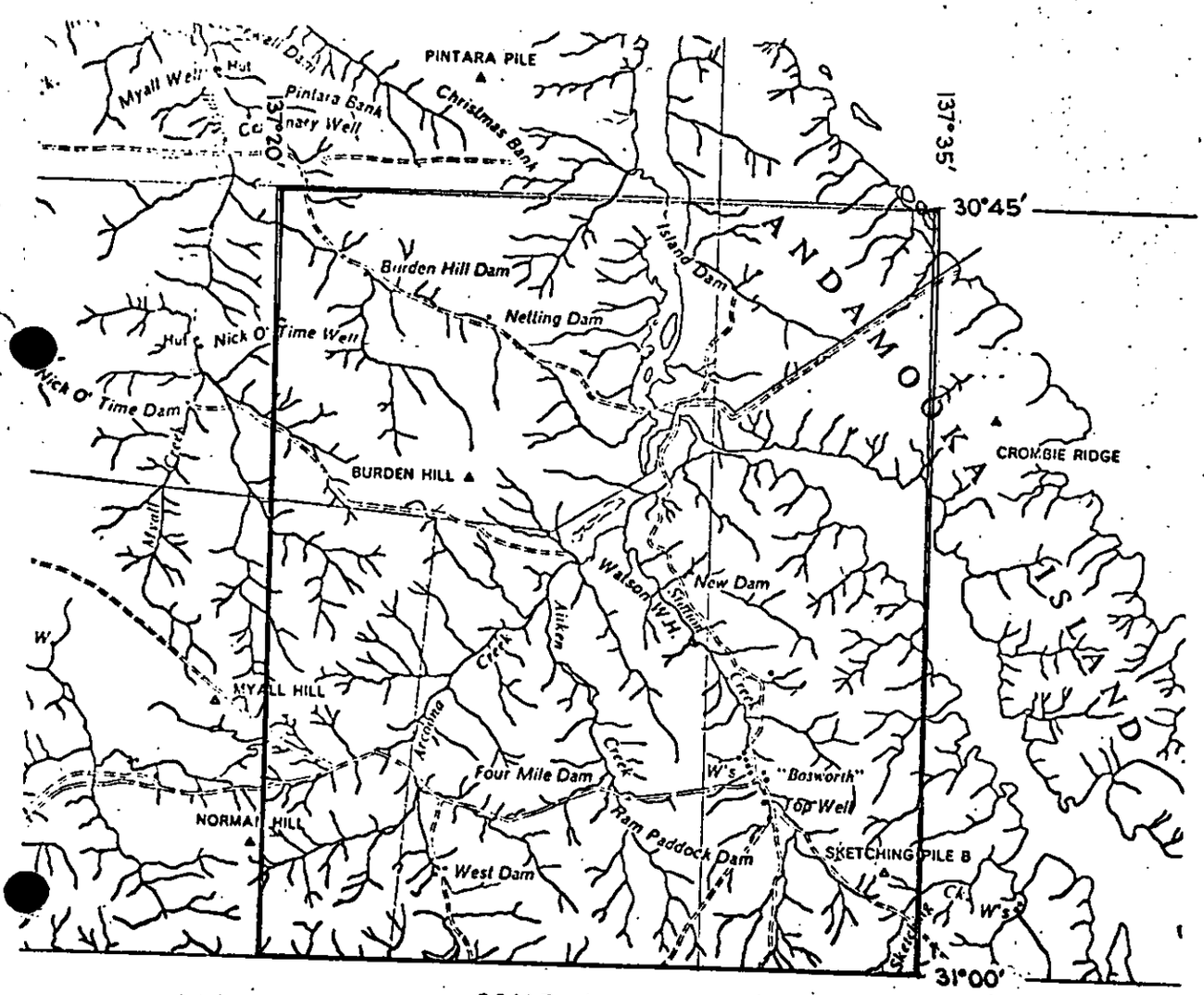
Government of South Australia
Primary Industries and Resources SA



SCALE 1:250000

STOCKHOLM MINING EXPLORATION N.L.

DOCKET D.M. 204/70 AREA 253 SQ MILES

1:250000 PLANS ANDAMOOKA

LOCALITY

S.M.L. No. 450 EXPIRY DATE 22.7.71

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TENEMENT HOLDER: Stockholm Mining Exploration N.L.

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STOCKHOLM MINING EXPLORATION N.L.

SPECIAL MINING LEASE 450

ANDAMOOKA AREA

SOUTH AUSTRALIA

COMPLETION REPORT

By

B.L. FARRELL B.Sc(hons)

Of

MINOIL SERVICES PTY. LTD.

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ABSTRACT

Ironstone outcrops associated with a fault system in quartzite were investigated for base metals. The ironstones were found to be mainly ferruginized cappings on the quartzite or as a cementing matrix for fault brecciated quartzite. Drill cuttings gave extremely low values for copper, lead, and zinc when analysed. No further work is recommended on the S.M.L.

INTRODUCTION

Special Mining Lease (S.M.L.) 450, a 280 square mile area, was taken out on 22/7/70 by Stockholm Mining Exploration N.L.. Possible base metal targets existed in numerous ironstone outcrops along a fault system, in a quartzite host rock. Some preliminary sampling located an anomalous zinc value in an ironstone vein in Arcoona Creek. A programme was undertaken to examine closely, the ironstone outcrops and zinc anomaly.

1. LOCATION

Special Mining Lease 450 is located on the Andamooka 1:250,000 Sheet and is bounded by latitudes, 30°45' and 31°00', and longitudes, 137°20' and 137°35', respectively. See plan SME 3. The lease is located on portions of Bosworth, Arcoona and Andamooka Stations. The nearest population centres are Andamooka (pop. 1,500), 30 miles to the north, and Woomera (pop. 5,000), 50 miles to the south-west.

2. ACCESS

The Transcontinental Railway Line (4'8½" gauge) linking Port Pirie to Perth passes some 50 miles to the south west of the S.M.L.. The Stuart Highway, the main road from Port Augusta to Alice Springs, roughly parallels the railway line in the region. Forty miles of gravel and dirt, second class road, connects Pimba, on the Stuart Highway, to the S.M.L. Access from the air is facilitated by a landing strip at Bosworth Station.

3. CLIMATE

The area has an arid climate. An average of 5 to 6 inches of rainfall, with no marked seasonal incidence, is received per annum. Temperatures are characterized by a large diurnal range. The mean annual temperature is 65°F. Evaporation is high being approximately 100 inches per annum.

4. RELIEF

Relief features are well defined and are related directly to the geology of the area. The lease can be divided into two physiographic divisions. These are:

(1) Arcoona Plateau

(2) Lake Torrens Sunklands

(1) Arcoona Plateau

This division occupies much of the S.M.L. area. It consists of a gently, rolling, high level peneplain flanking the western shores of Lake Torrens. In parts of the S.M.L., the peneplain is deeply dissected and reduced to remnants. The plateau, with its dissected remnants, is generally mantled by heavy red clay soils, with a gibber strewn surface almost devoid of vegetation. The gibbers which strew the plateau consist of flat quartzite slabs, derived from Pre-Cambrian quartzites, or rounded quartzite boulders and quartz gravels from Mesozoic and Cainozoic veneers.

(2) Lake Torrens Sunklands

A small portion of the Lake Torrens Sunklands is found on the eastern edge of the lease area. Here the western shore of Lake Torrens is flanked by rising ground and low cliffs. The shore of this dry to semi-dry salt lake is controlled by the Torrens Fault, a strong lineament. This lineament falls just outside the S.M.L. area, but probably gave rise to the irregular embayment containing portion of Andamooka Island.

5. DRAINAGE

A regional tilt to the north is reflected in the drainage. Drainage is internal and dendritic in nature and controlled by faulting and jointing. The major creek, the Arcoona, with its major tributaries, the Aiiken and Station Creek, are fault controlled. The Arcoona flows in a north eastern direction into Lake Torrens. This creek system drains most of the S.M.L. area. The north-west corner of the S.M.L. is drained by northward flowing tributaries of Myall Creek. Myall Creek flows off the lease area and eventually drains into Lake Torrens. Streams are wide, shallow, illdefined and ephemeral. After a rainfall, surface waters often collect in gilgai depressions or canegrass swamps. At lower levels stream erosion has reached baselevel and exposed basement rocks in low cliffs.

6. VEGETATION

The general area is almost devoid of trees and shrub growth. Some very low saltbush steppe occurs on the plateau while along shallow water courses a few myall and acacias grow.

7. PREVIOUS INVESTIGATIONS

The S.M.L. was probably prospected at the turn of the century for copper. Copper deposits were being exploited outside the S.M.L., at Mt. Gunson, 50 miles to the south-west. Small pittings on an iron stone outcrop, 0.7 miles north of Bosworth Homestead, are evidence of this prospecting activity.

Recent regional mapping work by the Department of Mines resulted in the publishing of the Andamooka 1:250,000 map in 1966.

8. REGIONAL GEOLOGICAL SETTING

Information on the regional geological setting of the area is contained in a report by R.K. Johns (Johns 1967). The lease is situated on the Stuart shelf, which is a stable platform marginal to the Adelaide Geosyncline. Sediments on the Stuart shelf are relatively undeformed, except locally, in areas of faulting. Conditions of sedimentation in this area were very different to those further east in the Adelaide Geosyncline, but some correlations can be made between sections in the two areas. See table 1.

The oldest sediments known are the Pernatty Grit and Woolcalla Dolomite. These are of Proterozoic age, and together are regarded to be equivalent to the Umberatana Group of the Adelaide Geosyncline. They have a total thickness of at least 1,500 feet in some places, and consist of grits, sandstones, quartzites and siltstones, overlain by dolomites.

Sediments of the Tent Hill Formation, which are equivalent to the Wilpena Group of the Adelaide Geosyncline, overlie the Woolcalla Dolomite. The basal member, known as the Woomera Shale, consists of up to 550 feet of purple, green, red and brown shales. This is overlain by an unnamed member consisting of 250 feet of sandstone, siltstones and quartzites. The

topmost member is the Arcoona Quartzite, which consists of fine to medium grained, light-coloured sandstones and quartzites. Throughout the Tent Hill Formation there are sedimentary structures indicative of shallow water deposition and strong current action during deposition.

The youngest sediments of Proterozoic age are associated with the Yarloo Shale. Outcrops of this formation are isolated, and coupled with local faulting, proper relationships to the Arcoona Quartzite Member are not observable.

Overlapping the Arcoona Quartzite and Yarloo Shale, disconformably, are limestones and shales of Cambrian Age. Younger sediments of Mesozoic, Tertiary and Quaternary age are also present in some places.

Folds on the Stuart Shelf are gentle and open, with low dips seldom exceeding 15°. The major faulting in the area is along the western edge of Lake Torrens. All other faulting is minor only, and is often accompanied by brecciation, local upturning of strata, and the introduction of iron oxides.

9. GEOLOGY OF THE S.M.L.

Unconsolidated younger deposits consisting of clay, soil, sand, gravel, and gibber deposits mask the greater part of outcrop. Outcrop is restricted to cliffs, escarpments on salt lake flanks and the sides of more deeply incised watercourses, viz Arcoona Aiiken and Station Creeks. The ground generally is strewn with boulders which are probably representative of the rock type a few feet below the surface. These boulders and outcrop show that the topmost member of the Tent Hill Formation, the Arcoona Quartzite, is present throughout the entire lease area.

The Arcoona Quartzite exposed in the lease area is a light coloured, even grained sandstone to quartzite of fine to medium grain size. Less commonly it is coarse grained and gritty, with well rounded clouded quartz grains. On exposed weathered surfaces silicification and hardening has led to the formation of a hard dense quartzite. In places the sandstone is friable and less strongly consolidated and carries kaolin.

The member is well bedded, with prominent flaggy outcrop and float. Other characteristic features are the presence of "clay gall" impressions, ripple marks and strong current bedding.

10. STRUCTURE

The S.M.L. occupies part of the stable Stuart Shelf which has a northward regional tilt of 1° to 5°. Faulting is well evidenced on the S.M.L. by truncation, local upturning of strata, brecciation and introduction of iron oxides.

11. PRESENT INVESTIGATION

The features of interest on the lease are numerous small ironstones, associated with extensive faulting in the Arcoona Quartzite. A previous sampling programme (see progress report 17/7/70) revealed one ironstone to be geochemically anomalous, having a zinc value of 0.3%.

The present programme was to investigate more closely;

(1) The siliceous ironstones.

(2) The zinc geochemical anomaly.

One hundred and fifty feet of rotary percussion drilling was done on two ironstone outcrops.

Good profiles of the ironstones have been revealed by stream incision along the fault zones. The ironstones are expressed as:-

(1) Iron oxide matrix to brecciated cemented quartzite.

(2) Surface cappings on the flatly dipping sandstone.

(3) Massive siliceous iron oxides.

(4) Joint infillings or veins in sandstone.

The above four cases can be seen in Station Creek, north of Bosworth Homestead. The most common ironstone expression are surface cappings in and on the flatly north west, dipping sandstone. The sandstone has been permeated and the pore space infilled with iron oxides, for 5 to 30 feet in depth. This usually occurs at the fault edges. Occasionally iron oxide cemented agglomerate overlies the ferruginized quartzites. The agglomerate ranges from six to twelve inches in thickness. See figure 1.

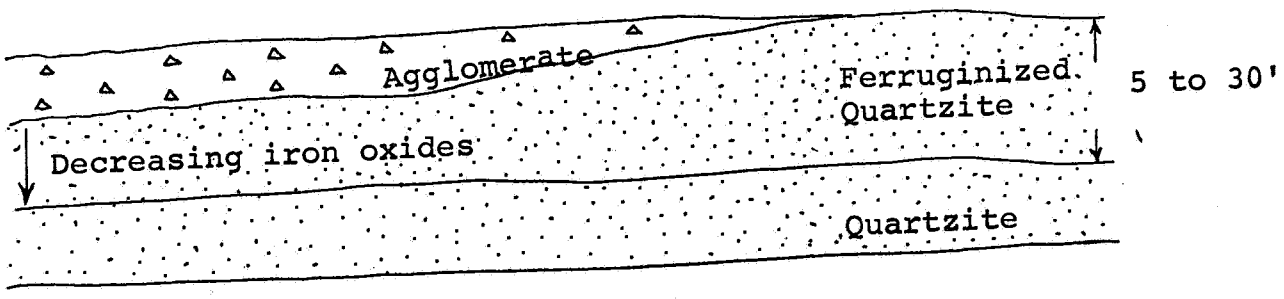

Fig. 1 Ferruginized capping profile - Station Creek.

Massive siliceous iron oxides were noted. In most cases these were flat dipping and capped the Arcoona Quartzite. These were probably formed by later remobilization and concentration of the iron oxides. Iron minerals noted were limonite, goethite and haematite. See Figure 2 for a typical profile noted in Station Creek.

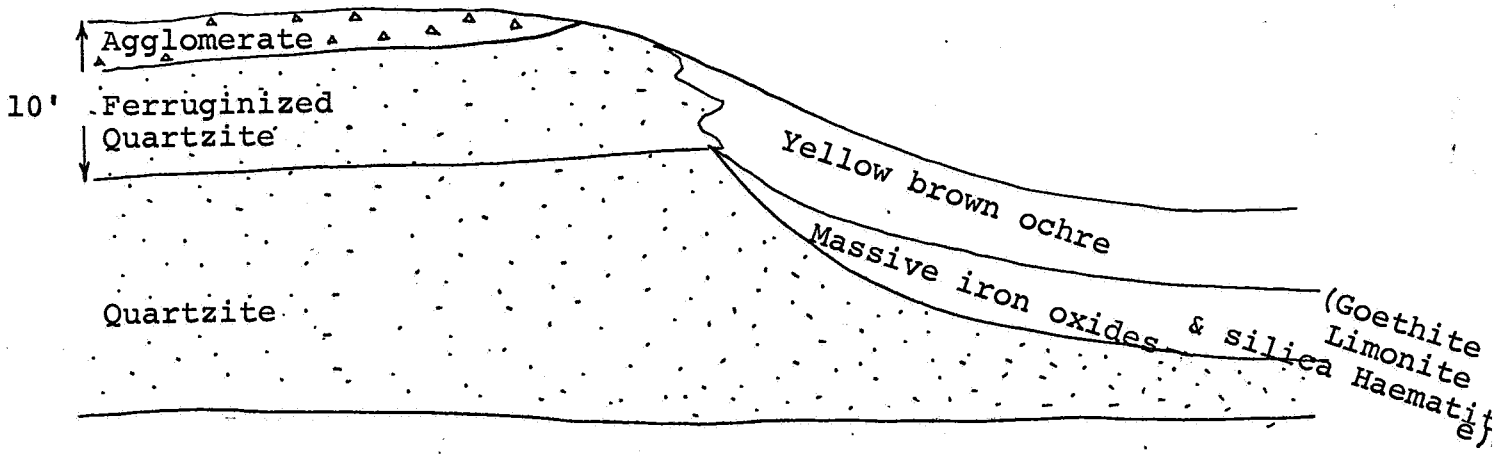

Fig. 2 Typical Profile of Massive Ironstones - Station Creek.

(1) Siliceous Ironstones

Two massive siliceous ironstones not exposed by stream incision were percussion drilled to see if they were capping remnants or highly leached gossans. These ironstones are situated 0.7 miles north of Bosworth Homestead. (See plates SME 4 and 5). In no case did the ironstones have the appearance of true gossans, nor were there any signs of sulphides or basic intrusions associated with the ironstones. An attempt to dig prospecting pits had been made on the largest outcrop. Drilling revealed that the ironstones were again cappings of ferruginized quartzite, 20-25 feet in thickness. Analysis of the cuttings gave expected low values for copper, lead and zinc. See appendix 1 and 2.

(2) The Zinc Geochemical Anomaly

The anomalous zinc value in Arcoona Creek was from a sample (D7). (See plate SME 4 for location). This sample was taken where ironstone occurs as 2 to 6 inches wide veins (?) along joints in the quartzite. The veining (?) was at the base of a ferruginized and manganese stained quartzite outcrop.

Sample No	Cu	Ag	Pb	Zn	Mn
D7	10	-	2	3000	1500

* Results in P.P.M.

Table 2 Geochemical results of Ironstone from Arcoona Creek.

The material in the creek bed did not appear to be primary in origin i.e. weathered sulphides in veins. The joints appear to have been chemically infilled by manganese and iron oxides derived from nearby ferruginized quartzites. The manganese content in the veins was sufficiently high to act as a collector of zinc, thereby giving rise to the anomalous zinc value. See Table 2.

SUMMARY

Ironstone outcrops associated with a fault system in the PreCambrian, Arcoona Quartzite were investigated for base metals. The ironstones were not gossans, but mainly ferruginized cappings on the quartzite. A zinc anomaly in Arcoona Creek appeared to be associated with iron and manganese oxides infilling joints in the quartzite. The manganese had acted as a collector of zinc. Further work is not recommended, and as no other targets to investigate exist, relinquishment of the lease is advised.

24/11/70

B. L. FARRELL B.Sc(hons)
Geologist
MINOIL SERVICES PTY. LTD.

GENERAL REGIONAL STRATIGRAPHY

TABLE 1

Cainozoic	Quaternary			
	Tertiary			
		u/c		
Mesozoic	Cretaceous			
		u/c		
Palaeozoic	Cambrian		Yarra-Wurta Shale	
			Andamooka Limestone	
		u/c		
Upper Proterozoic	Marinoan	Wilpena Group Equivalents	Yarloo Shale	
			Tent Hill Formation	Arcoona Quartzite
				Unnamed Member
				Woomera Shale
		Umberatana Group Equivalents	Woolcalla Dolomite	
	Sturtian		Pernatty Grit	

APPENDIX 1.

Rotary Percussion Chip Logs

Hole	:	AP - 1
Inclination	:	60°
Azimuth.	:	093°
Depth	:	70 feet
Position	:	.7 mile bearing 338° from Bosworth Homestead. 30 feet bearing 273° from small ironstone outcrop.
Log	:	
0' - 30'	:	Yellow brown to brown black iron oxide cemented sandstone and quartzite. Some massive siliceous limonite and/or goethite chips.
30' - 40'	:	Yellow white sandstone and quartzite, some grey white sandy clay lenses. Trace iron oxides quartz grains, subangular to rounded, fine, medium grain size, clouded.
40' - 70'	:	White sandstone and quartzite, fine medium grained, quartz grains well rounded and packed.
Hole	:	AP - 2
Inclination	:	Vertical
Depth	:	40 feet
Position	:	30 feet bearing 093° from AP - 1 on ironstone outcrop
Log	:	
0' - 25'	:	Yellow brown to brown black iron oxide cemented sandstone and quartzite. Some massive siliceous limonite and/or geothite chips.
25' - 35'	:	Yellow white sandstone and quartzite.

Appendix 1 continued

Hole	:	AP - 3
Inclination	:	Vertical
Depth	:	40 feet
Position	:	800 feet north of AP - 2 on top of ironstone covered hill.
Log	:	
0' - 25'	:	Yellow brown to brown black iron oxide cemented sandstone and quartzite. Some massive siliceous limonite and/or goethite chips.
25' - 35'	:	Yellow brown to yellow white sandstone and quartzite.
35' - 40'	:	White quartzite with some sandy clay lenses.

* All bearings true north.

APPENDIX 11

Percussion Hole Analyses

Hole	Footage	Cu	Pb	Zn	Mn
AP - 1	5-10		5	14	70
	10-15		10	5	150
	15-20		10	5	520
	20-25		10	5	540
	25-30	<5	10	5	180
	30-35		5	5	90
	45-50		5	10	85
	70-75		5	15	45
AP - 2	5-10		10	15	480
	10-15		10	10	440
	15-20	<5	10	10	580
	20-25		10	10	370
	35-40		10	5	190
AP - 3	0-5		20	15	650
	5-10		20	5	530
	10-15		15	10	470
	15-20	<5	5	15	2200
	20-25		5	10	3500
	35-40		10	15	1300

* All analyses parts per million

CONYNGHAM ST. FREWVILLE SOUTH AUSTRALIA 5063 TELEPHONE 79 1662 TELEGRAMS 'TELEX' AA82520

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THE AUSTRALIAN MINERAL DEVELOPMENT LABORATORIES

PLEASE ADDRESS ALL CORRESPONDENCE TO THE DIRECTOR.

OUR REFERENCE: AN3/320/0 2264/71
YOUR REFERENCE:

23 November 1970

The Geologist in Charge
Stockholm Mining Co
C/- Minoil Services Pty Limited
105 Gouger Street
ADELAIDE SA 5000

REPORT AN2264/71

YOUR REFERENCE:	Application dated 18/11/70
IDENTIFICATION:	AP series
DATE RECEIVED:	18/11/70

Enquiries quoting AN2264/71 to Officer in Charge please.

Analysis by: A.E. Francis

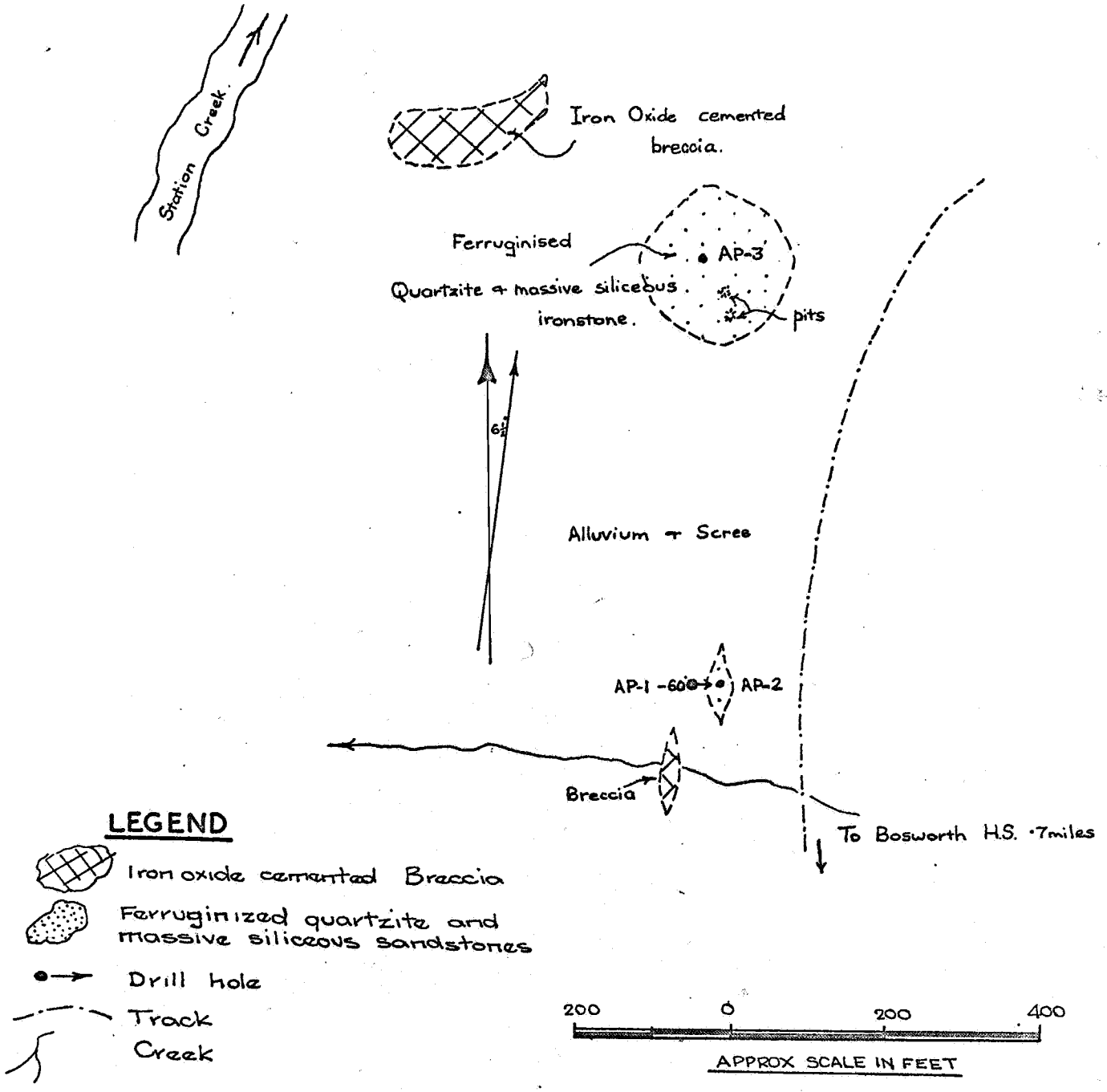
Officer in Charge, Analytical Section: A.B. Timms

for P. Dixon
Acting Director

plm

FORM 12 JOB 2264/71 AMDEL GEOCHEMICAL SERVICE BATCH NO. 1

TT	Sample No.		Cu	Pb	Zn	Cr	Mn		
1	AP1 - 2		<5	5	10	90	70		
2	- 3		<5	10	5	110	150		
3	- 4		<5	10	5	110	520		
4	- 5		<5	10	5	110	540		
5	- 6		<5	10	5	160	180		
6	- 7		<5	5	5	100	90		
7	- 10		<5	5	10	75	85		
8	STD 5/11								
9	AP1 - 14		<5	5	15	75	45		
10	AP2 - 2		<5	10	15	120	480		
11	- 3		<5	10	10	100	440		
12	- 4		<5	10	10	100	580		
13	- 5		<5	10	10	150	370		
14	- 8		<5	10	5	140	190		
15	AP3 - 1		<5	20	15	65	650		
16	- 2		<5	20	5	85	530		
17	- 3		<5	15	10	85	470		
18	- 4		<5	5	15	110	2200	[illegible]	
19	AP3 - 5		<5	5	10	110	3500	[illegible]	
20	AP3 - 8		<5	10	15	170	1300		
	No repeat								

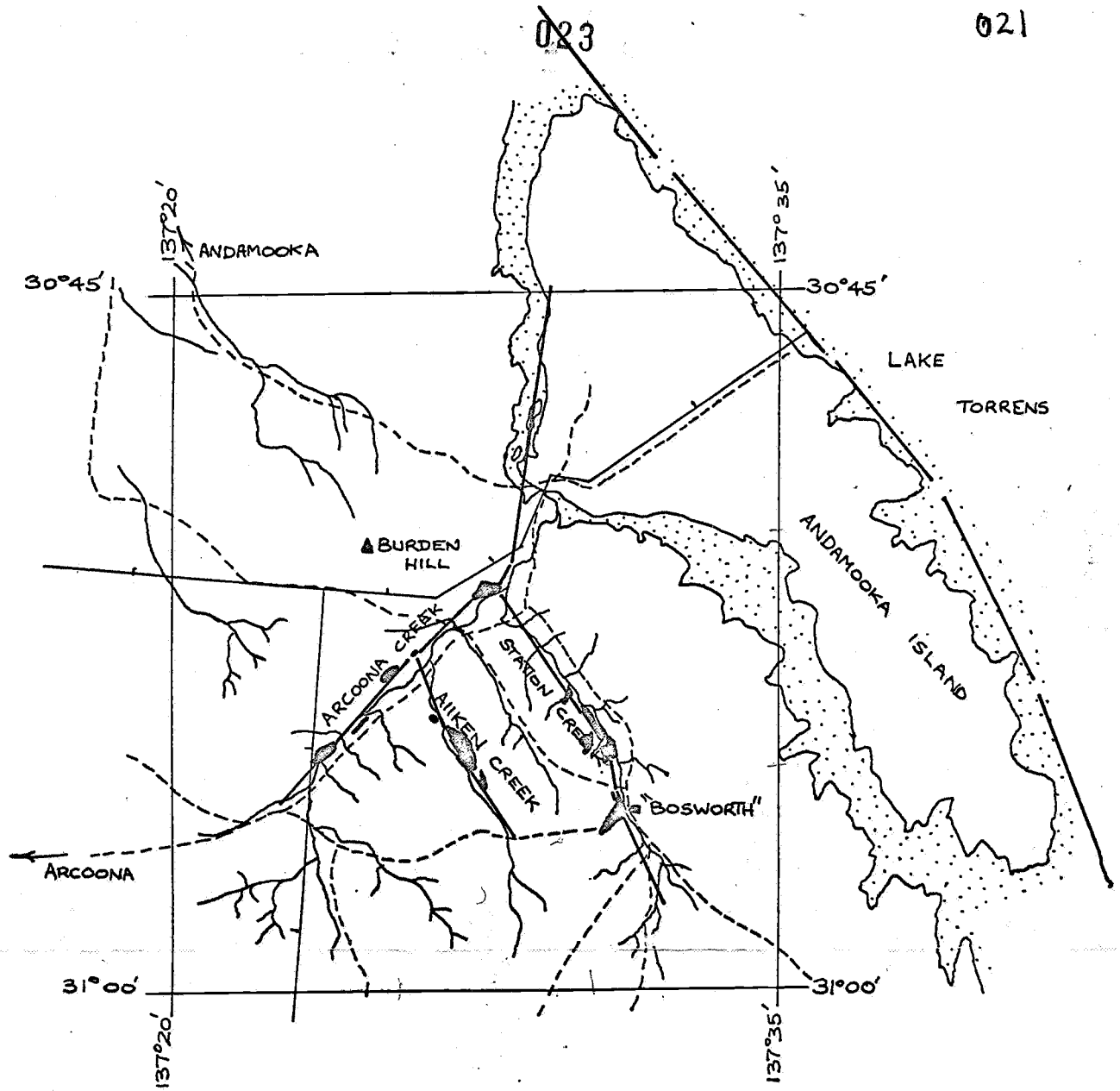


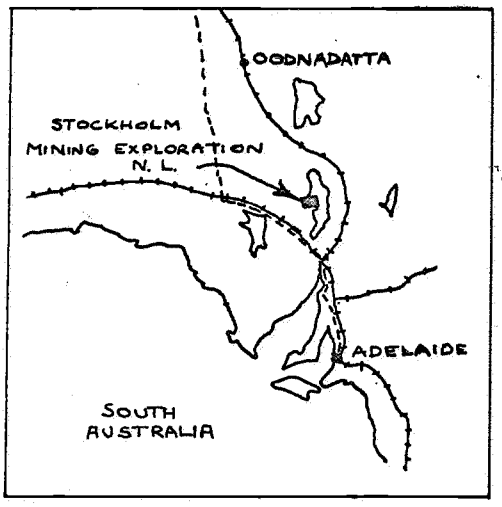
STOCKHOLM MINING EXPLORATION N.L.

SPECIAL MINING LEASE 450

SKETCH PLAN OF DRILL HOLE LOCATIONS

GEOLOGIST: B.FARRELL.	SOUTH AUSTRALIA	MINOIL SERVICES PTY LTD
NOVEMBER 1970		ADELAIDE S.A.





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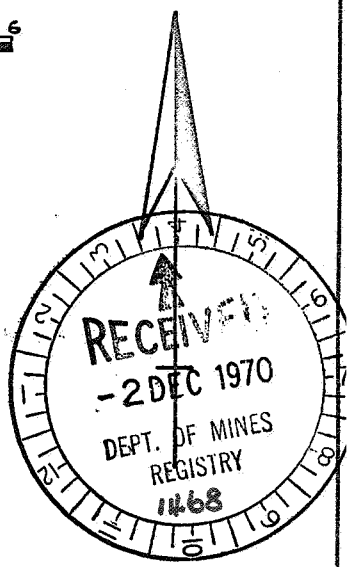
SCALE 1" = 4 Miles

LEGEND
- Faults
- Fence
- Track
- Salt Lake
- Ironstone



STOCKHOLM MINING EXPLORATION N L

SPECIAL MINING LEASE 450

LOCALITY PLAN.

GEOLOGIST B FARRELL DATE NOVEMBER 1970	SOUTH AUSTRALIA	MINOIL SERVICES PTY LTD ADELAIDE S.A.

SME 4

1468-1

LAKE TORRENS

SAMPLE D7

ANDAMOOKA

6½°

STATION CREEK

ARCOONA CREEK

AIKEN CREEK

LOCATION FIGURE 1 & 2

PLATE 3

"BOSWORTH"

Arcoona Quartzite (PreЄ)

scree and isolated outcrops

ARCOONA

LEGEND

- Inferred Fault
- Breccia
- Track
- Airstrip
- Stream
- Ironstone

SCALE 1:58000

Data from uncontrolled photographs.

STOCKHOLM MINING EXPLORATION N.L.

PART SPECIAL MINING LEASE 450

PLAN SHOWING IRONSTONE OUTCROPS

GEOLOGIST B FARRELL	SOUTH AUSTRALIA	MINOIL SERVICES PTY LTD
DATE NOVEMBER 1970		ADELAIDE S. A.