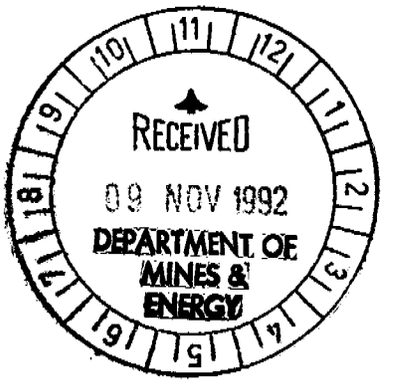


STOCKDALE PROSPECTING LIMITED

FINAL REPORT

EXPLORATION LICENCE 6810

BULLO RIVER AREA

A.K. BERRYMAN

OCTOBER, 1992

STOCKDALE
PROSPECTING
LIMITED
A.C.N. 004 912 172

131 Reichardt Road,
Winnellie NT
P.O. Box 3152
Darwin NT 0801
Australia
Telephone (089) 47 1333
Fax (089) 47 0932

Registered Office:
60 Wilson Street
South Yarra Victoria 3141
Australia

Project Name:	BULLO RIVER
Title:	Final Report, Exploration Licence 6810 Bullo River Area
Author:	A.K. Berryman
Edited/Approved:	J. Joyce
Date:	October, 1992
Place:	Darwin
1:250,000 Sheet Name & No:	Auvergne SD 52-15
Keywords:	Bullo River, Moonlight Valley Tillite, Stream Sediment Sampling, Soil Sampling, Diamonds, Garnet, Chromite

Abstract:

An initial four phase exploration programme conducted in the first year of tenure within EL 6810 yielded a number of chromites, probably sourced from the Moonlight Valley Tillite.

TM and airphoto work in the second year of tenure helped to confirm the tillite as the source of the chromites. The relinquished tenement as such, has little potential to host a diamondiferous intrusive.

Ref: EL 6810.FIN

Copy to: NTDME, Darwin, IC,

Circulate: RVD, JJ/TRF

SUMMARY

Exploration Licence:	6810
Dated Granted:	17th September, 1990
Area:	135 blocks (435 sq km approx)
Occupant:	Stockdale Prospecting Limited
Operator:	Stockdale Prospecting Limited
Commodities sought:	Diamonds
Exploration:	An initial four phase exploration programme conducted in the first year of tenure within EL 6810 yielded a number of chromites, probably sourced from the Moonlight Valley Tillite. TM and airphoto work in the second year of tenure helped to confirm the tillite as the source of the chromites. The relinquished tenement as such, has little potential to host a diamondiferous intrusive.

CONTENTS

TABLES

FIGURES

MAPS

STOCKDALE PROSPECTING LIMITED
EXPLORATION LICENCE 6810
FINAL REPORT

1. INTRODUCTION

Exploration Licence 6810 is located just to the east of the NT/WA border, and to the north of the Victoria River Highway. It lies wholly on the Auvergne SD 52-15 1:250,000 mapsheet.

Voluntary reduction of the area of EL 6810 from 500 blocks to 135 blocks was made after the first year of tenure. Extensive reconnaissance and then follow-up sampling was conducted over the current tenement area. Heavy mineral sampling produced a number of initially promising results, dominated by moderate interest chromites.

Extensive follow-up to initial results lead to the voluntary surrender of EL 6810 on the 13th of August 1992. This report summarises the exploration conducted over the remaining 135 blocks of EL 6810, and the reason for the relinquishment.

2. TENURE

Exploration Licence 6810 was granted on the 17th of September, 1990 for a period of six years.

Prior to the granting of this licence, Stockdale Prospecting Limited held a total of six exploration licence applications in the Bullo River area. They were then amalgamated for convenience into EL 6810, as outlined in Table 1.

TABLE 1: SPL ORIGINAL APPLICATIONS IN THE BULLO RIVER AREA

ELA	AREA
6666	24 blocks (77 sq km)
6667	368 blocks (1185 sq km)
6696	30 blocks (97sq km)
6697	20 blocks (64 sq km)
6809	28 blocks (90 sq km)
6810	30 blocks (97 sq km)
Total	500 blocks (1610 sq km)

For convenience, this 500 block area was combined to form the original area of EL 6810.

At the completion of the first year of tenure, a voluntary 73% reduction of EL 6810 was made. This took place on the 10th of September 1991, reducing the licence from 500 blocks to 135 blocks. The remaining portion of the licence was relinquished on the 13th of August 1992.

3. PHYSIOGRAPHY, VEGETATION AND CLIMATE

The tenement area lies entirely within the Victoria River Plateau physiographic subdivision. This unit has in turn been further subdivided into 5 subdivisions (Paterson, 1970).

Exploration Licence 6810 falls completely within the "Tablelands" subdivision of the Victoria

River Plateau. These tablelands consist of rugged dissected plateau, mesas and cuestas up to 150m high. Most of the area is underlain by sandstones which are well drained by deeply incised streams. As a result, stream sample quality during the four phases was generally rated as good to very good.

Vegetation consists of sparse, open woodland, which becomes considerably thicker near major drainages. Vegetation on the sandstone plateaus and over the Moonlight Valley Tillite is sparse, consisting of spinifex grass and the occasional stunted shrub.

Climate is typically monsoonal, with a short hot wet season between November and April, and a warm dry season for the remainder of the year. Rainfall ranges between 750 and 900mm, and falls mainly during the wet season.

4. LIAISON

4.1 Land Holders

Station managers were consulted prior to the commencement of each of the four phases of exploration. On each occasion where it was necessary, exploration programmes were altered to comply with the wishes of the station managers.

As a small part of EL 6810 falls within the Keep River National Park, the Ranger at the Park was consulted and kept informed of all movements.

4.2 Aboriginal

In 1989, a formal site clearance exercise was arranged through the Northern Land Council on behalf of Stockdale Prospecting and the Miriwoong people. A total of 6 exclusion zones were identified and these areas were excised from sampling programmes.

In addition, maps were updated with AAPA registered and recorded sites prior to each phase of sampling.

5. GEOLOGY

5.1 Geological History/Stratigraphy

The tenement area is made up of rocks from the Victoria Basin. This basin consists of thick sedimentary sequences, layed down on the relatively stable Sturt Block.

A short local geological summary is as follows:

ARCHAEAN/LOWER PROTEROZOIC

Basement in the region probably consists of the low to moderate grade metamorphics of the Halls Creek Group.

CARPENTARIAN/ARCHAEAN

The oldest sediments in the area make up the Fitzmaurice Group. These sediments crop out to the north of the tenement area, and to the north of the Victoria River Fault. They were formed in a relatively shallow water depositional environment. These sediments form what is known as the Fitzmaurice Mobile Zone.

ADELAIDEAN

Further shallow conditions laid down both the Bullita Group and the Auvergne Group. The Bullita group represents a period of calcareous precipitation. The Auvergne Group underlies all of the tenement area. It consists of massive quartz sandstones, dolomites and some siltstone. The Auvergne Group unconformably overlies the Bullita Group.

The sea later receded, leading to the deposition of the fluvial Bullo River Sandstone. This sandstone is a massive reddish brown quartz unit, and unconformably overlies the Auvergne Group, and is in turn unconformably overlain by the Duerdin Group.

Following a period of folding and faulting (probably centred at the Victoria River Fault), cooler temperatures led to the deposition of both the Moonlight Valley Tillite and the Fargoo Tillite. The Moonlight Valley Tillite overlies a large percentage of the Auvergne Group and the Bullo River Sandstone in the tenement area. Other sediments of the Duerdin Group, deposited after the tillites, are possibly lacustrine in origin.

LOWER CAMBRIAN

The Antrim Plateau Volcanics is a vesicular basalt with limited extent in the tenement area. When initially extruded, it was thought to have covered much of the Victoria River region.

PALAEOZOIC

Later marine and non marine sedimentation occurred regionally, along with upwarping, erosion and laterization, but this had little bearing on the tenement area.

5.2 Tectonic History/Structure

The Victoria River Basin (VRB) consists of a maximum thickness of 3.5km of relatively stable carbonate and ferruginous sequences, covering an area of some 160,000 sq km on the Sturt Block. Folds are generally broad, and faulting is rare. It is believed the VRB has been relatively undeformed since Carpentarian time. Deformation has been less severe with time.

The VRB is bounded to the north west by the Fitzmaurice Mobile Zone, to the south west by the Ord Basin, to the south by the Carpentarian Birrindudu Basin, to the south east by the Paleozoic Wiso Basin, to the north east by the Cambrian/Ordovician Daly River Basin, and to the north by the Pine Creek Geosyncline and Litchfield Block.

The tenement area is dominated by the Spencer Range Fault. This fault runs parallel with the nearby Victoria River Fault, which marks the boundary between the Victoria River Basin, and the Fitzmaurice Mobile Zone. These faults strike roughly northeast, and have many associated minor faults, often running either parallel or perpendicular to the large faults.

6. EXPLORATION

6.1 1st Year of Tenure

Four phases of exploration within EL 6810 were conducted during the first year of tenure. Early availability of results suggested the need for further work in each case.

The first phase of work involved the collection of relatively widespread heavy mineral stream and barrage samples. Samples varied in size, largely depending on drainage area, and were generally screened to either -1.0 + 0.4mm or -4.75mm.

36 samples were collected at this reconnaissance stage, giving an approximate density of 1:12 sq km. Sample numbers were:

V 7841 - 42	(2)
V 7846 - 49	(4)
V 7852 - 53	(2)
V 7860 - 62	(3)
V 7879 - 80	(2)
V 7882	(1)
V 7885 - 93	(9)
V 7896 - 7905	(10)
V 7912 - 13	(2)
V 7915	(1)
Total	36

Table 2 lists sample results from the first phase of work.

TABLE 2: FIRST PHASE RECONNAISSANCE RESULTS

SAMPLE	RESULT
V 7847	1 chromite
V 7852	1 chromite
V 7882	1 chromite
V 7912	1 Diamond, 0.002 cts

The diamond recovered was described as an irregular fragment of an octahedra, stained with intense green and brown spots. The chromites were generally anhedral, and of moderate interest.

The reconnaissance sampling was sufficiently significant to warrant further work. The diamond and singleton chromites all needed to be traced back to a source. The initial density was too low to delineate a likely source rock.

Prior to any further work, TM images and airphotos were investigated at this preliminary stage, in an attempt to isolate an indicator source. Three anomalies were chosen, and were sampled by BC 7101, 7103 and 7106 respectively. All three anomalies were low priority, and samples were negative.

40 infill and follow-up samples were collected during the second phase of sampling. Sample numbers are as follows:

BC 7021 - 27	(7)
BC 7032 - 39	(18)
BC 7051 - 53	(3)
BC 7055	(1)
BC 7057 - 58	(2)
BC 7060 - 62	(3)
BC 7088	(1)
BC 7091 - 92	(2)
BC 7094 - 95	(2)
BC 7104	(1)
Total	40

Sample results for the second phase follow-up sampling are listed in Table 3.

TABLE 3: SECOND PHASE SAMPLE RESULTS

SAMPLE NO.	RESULT
BC 7024	1 Garnet
BC 7025	1 Garnet, 1 Chromite
BC 7027	1 Garnet
BC 7035	1 Garnet
BC 7047	4 Garnets
BC 7051	25 Garnets, 1 Chromite
BC 7055	1 Garnet, 1 Chromite
BC 7057	1 Garnet
BC 7058	1 Chromite
BC 7061	1 Chromite

The samples from this work were treated at Stockdale's Darwin Treatment Plant directly after a batch of garnet rich drill samples from the Roper River area. Authigenic pyrite, common in the Velkerri Formation in the Roper Region, was found for the first time in concentrates from the Bullo River area. It was therefore believed that the majority of positive results from this phase of work could be disregarded. The probable contamination of these samples however was not taken for granted, and follow-up work involved resampling the "garnet" streams.

The third phase of sampling set out to confirm the validity of the garnet results. Further work also attempted to find the source of reconnaissance chromite results, and finally, the overall density of sampling was increased to approximately 1 sample every 5 sq kms.

Garnet follow-up sampling details can be found in Table 4.

TABLE 4: THIRD PHASE GARNET FOLLOW-UP

SAMPLE NO.	INITIAL RESULT	REPEAT SAMPLE	EXCAVATED VOLUME (L)	RESULT
BC 7024	1G	BD 2207	200	5 Chromites
BC 7025	1G, 1 Chr	BD 2206	200	Negative
BC 7027	1G	BD 2205	200	Negative
BC 7035	1G	BD 2202	200	Negative
BC 7047	4G	BD 2246	100	Negative
BC 7051	25G, 1 Chr	BD 2212	100	2 Chromites
BC 7055	1G, 1 Chr	BD 2210	200	8 Chromites
BC 7057	1G	BD 2213	200	4 Chromites
BC 7061	1G	BD 2214	100	Negative

While some samples did contain chromites, no further garnets were recovered, and it has been concluded that all of the garnets were as a result of contamination.

Two chromite results namely V 7847 and V 7852 were chosen for follow-up work. Table 5 lists sample details and results.

TARGET SAMPLE	INITIAL RESULT	SAMPLES COLLECTED	SAMPLE DENSITY	SAMPLES USED	RESULTS
V 7847	1 Chr	26	1:14sq km	BD2214-18 BD2245 BD2447-49 BD2252-55 BD2257 BD2260-69 BD2274	BD2245 = 8Chr BD2266 = 3Chr BD2249 = 1Chr BD2269 = 1Chr BD2252 = 2Chr BD2215 = 2Chr BD2255 = 2Chr BD2216 = 2Chr BD2263 = 6Chr BD2218 = 1Chr BD2265 = 2Chr
V 7852	1 Chr	7	1:14sq km	BD2310-11 BD2308 BD2313-16	BD2316 = 1Chr

Follow-up work proved, particularly in the case of sample V 7847, that the source was both local and rich in chromite. Interestingly both chromite follow-up areas were found to drain the Moonlight Valley Tillite.

A further 24 samples were collected over the tenement area to reduce the density of sample cover to approximately 1:4 sq km. These samples were collected away from the tillite, and all were negative with respect to indicators and diamonds with the exception of BD 2298 which contained a single chromite. Four of the samples however were found to contain particulate gold grains. These were:

BD 2207	4 Grains	(0.0057gms)
BD 2244	1 Grain	(0.0003gms)
BD 2252	1 Grain	(0.0002gms)
BD 2269	2 Grain	(0.0012gms)

Once again, these samples were found to be either draining, or found directly within the Moonlight Valley Tillite (MVT).

The final phase of sampling set out to confirm the source of both the chromites and the particulate gold. The chromites were followed up with a loam grid over an area of known tillite exposure. Particulate gold results were followed up with 5kg bulk cyanide leach stream samples.

The loam grid was placed over stream sample BD 2266, well within the MVT. The grid was 800m x 800m in size (Map 3), with a 100m line and sample spacing. 81 samples were collected. Sample numbers were:

BD 2539 - 2555	(17)
BD 2571 - 2600	(30)
BD 4601 - 4634	(34)
Total	81

The BD 2266 loam grid only produced two positive results, these being BD 4605 and BD 4617, each containing a single chromite.

A single individual chromite result, BD 2298 was also followed up with close interval (200 metres) upstream sampling. This sample was away from the mapped tillite and was therefore of interest. A total of 7 samples were collected, these being BD 5319 - 25. All follow-up samples were negative.

81 -2.0mm BCL gold samples were collected every 200 metres upstream from the original positive results. Sample details are as follows:

TABLE 6: GOLD FOLLOW-UP RESULTS

Sample No.	Au-80# (ppb)	Au BLEG (ppb)	Sample No.	Au-80# (ppb)	Au BLEG (ppb)
BD4635	1	0.2	BD5016	1	0.2
BD4636	1	0.2	BD5017	1	0.2
BD4637	1	0.2	BD5018	1	0.2
BD4638	1	0.2	BD5019	1	0.2
BD4639	1	0.2	BD5020	1	0.2
BD4640	1	0.2	BD5021	1	0.3
BD4641	1	0.2	BD5022	1	0.2
BD4642	1	0.2	BD5023	1	0.2
BD4643	1	0.2	BD5024	1	0.2
BD4644	2	0.2	BD5025	1	0.2
BD4645	1	0.2	BD5026	1	0.2
BD4646	3	0.2	BD5027	1	0.2
BD4647	2	0.2	BD5028	20	0.5
BD4648	1	0.2	BD5029	9	0.2
BD4649	1	0.2	BD5030	1	0.3
BD4650	1	0.2	BD5031	1	0.2
BD4651	1	0.5	BD5032	1	0.6
BD4652	1	2.4	BD5033	1	0.2
BD4653	1	0.2	BD5034	1	0.2
BD4654	1	0.2	BD5035	1	0.2
BD4655	1	0.2	BD5036	1	0.2
BD4656	1	0.2	BD5037	1	0.2
BD4657	1	0.2	BD5038	1	0.2
BD4658	1	0.2	BD5039	1	0.2
BD4659	1	0.2	BD5385	1	0.2
BD4660	1	0.2	BD5386	1	0.2
BD5001	1	0.2	BD5387	1	0.2
BD5002	1	0.2	BD5388	1	0.4
BD5003	1	0.2	BD5389	1	0.2
BD5004	1	0.2	BD5390	1	0.2
BD5005	1	0.2	BD5391	1	0.2
BD5006	1	0.2	BD5392	1	0.2
BD5007	1	0.2	BD5393	1	0.2
BD5008	1	0.2	BD5394	1	0.2
BD5009	1	0.2	BD5395	1	0.2
BD5010	1	0.2	BD5396	1	0.2
BD5011	1	0.2	BD5397	1	0.2
BD5012	1	0.2	BD5398	1	0.2
BD5013	1	0.2	BD5399	1	0.2
BD5014	1	0.2	BD5400	1	0.2
BD5015	1	0.2			

ORIGINAL RESULT	SAMPLES COLLECTED
BD 2207	BD 5001 - 14, BD 5385 - 91
BD 2244	BD 4635 - 47
BD 2252	BD 5392 - 97
BD 2269	BD 5015 - 39, BD 5398 - 5460, BD 4648 - 60

100 grams of material from each BCL sample was extracted for gold fire assay to test between the two sampling/laboratory techniques. Sample results can be found in Table 6. There appears to be no evidence for primary mineralisation in these results, thus it is reasonably clear that the tillite is randomly releasing both chromite and gold particulate. Work in the second year of tenure set out to confirm that this was the case, and to find the extent of the unit.

6.2 Second Year of Tenure

Work during the second year of tenure primarily set out to discover the true spatial extent of the MVT. The occasional scattered chromite (BD 2298) suggested that if the unit was indeed the cause of most, if not all the chromites, then it was considerably more widespread than is mapped.

Both TM imagery and airphotos were used to delineate the true extent of the MVT. The tillite varied widely in both spectral response and "texture", so that definitive characteristic features could not be confirmed. However, general characteristics were identified, and plotted against the mapped MVT boundary (Figure 1). The image shows the mapped boundary in yellow, and the possible tillite extension in red. It should be noted however that the Antrim Plateau Volcanic unit, located to the west of the tenement area, also had a similar spectral appearance, so some areas identified can be readily discounted when the image is compared with a geological map.

The image however is valuable in that it suggests the possibility that the MVT is indeed more widespread than is mapped, and that any unusual grains may be resulting from this spatial distribution.

From this work, it is safe to assume that the chromites are being released by the MVT, and that this unit is more widespread than is mapped. It is unlikely that the primary source of the chromites lies within the tenement area, and as such, EL 6810 is no longer of interest as the potential host of a primary diamondiferous source.

7. PERSONNEL

Field staff involved in the two years of exploration are as follows:

	1st Year	2nd Year
Geologists	3	4
Prospecting Hands	6	-
Mechanic	2	-
Helicopter Pilot	2	-
Helicopter Engineer	2	-
Total	15	4

8. **EXPENDITURE**

Expenditure on the relinquished tenement totals $177,152 as allocated in Table 7.

TABLE 7: PROJECT EXPENDITURE EL 6810

OPERATIONAL STAFF COSTS	49,974
GENERAL OPERATIONAL EXPENSES	3,256
TRANSPORT AND TRAVEL	37,399
TENEMENTS COSTS	2,171
SAMPLE ANALYSIS	423
CENTRAL TREATMENT PLANT	18,224
LAB TREATMENT	3,560
LAB EXAMINATION	9,015
GENERAL CONTRACTORS	1,435
REMOTE SENSING	8,298
GEOPHYSICS	202
DRAFTING	4,679
COMPUTER SERVICES	1,487
MINERALOGY	1,269
REGIONAL ADMINISTRATION	12,360
HEAD OFFICE ADMINISTRATION	16,260
CAPITAL EXPENSES	7,140
TOTAL	177,152

9. **SUMMARY**

An initial four phase exploration programme conducted in the first year of tenure within EL 6810 yielded a number of chromites, probably sourced from the Moonlight Valley Tillite.

TM and airphoto work in the second year of tenure helped to confirm the tillite as the source of the chromites. The relinquished tenement as such, has little potential to host a diamondiferous intrusive.

A.K. BERRYMAN
PROJECT GEOLOGIST
DARWIN, N.T.

COMPUTER EFFECTS AND IMAGES PTY LTD
STOCKDALE PROSPECTING LTD

PC1 ML MD class
Date 4/3/91 N.J.M

10'
20'
129°30'
40'
50'
15°30'
40'
50'
16°00'

SPIRIT HILLS STATION

BULLO RIVER STATION

EL 6810

NEWRY STATION

AUVERGNE STATION

Lloyds Ck.

RANGE

Bullo River

PINKERTON

Baines River

West

VICTORIA HWY.

Keep River

AUVERGNE D52-15

LOCATION MAP

5 0 10 KM

MAP 1

STOCKDALE PROSPECTING LIMITED
A.C.N. 004 912 172

NORTHERN TERRITORY
AUVERGNE D52-15

BULLO RIVER PROJECT

EL 6810

Compiled	
Drawn	K JW
Date	OCT., 1992
Scale	1:250,000
Revised	
	SEL N-82

CR92/612

129° 00'00" -15° 30'00"
129° 10'00"
129° 20'00"
129° 30'00" -15° 30'00"
-15° 40'00"
-15° 50'00"
-16° 00'00"
129° 00'00"
129° 10'00"
129° 20'00"
129° 30'00" -16° 00'00"

8280
8270
8260
8250
8240000mN
500000mE
520
530
540
550

EL6810

See SEL4111 for sampling in this area

BD5001-5014
BD5385-5391

0 1 2 3 4 5km

CARLTON	LEGUNE	VICTORIA RIVER
KUNUNURRA	KEEP	PINKERTON
ARGYLE DOWNS	NEWRY	KILDIRK

INDEX TO ADJOINING SHEETS

D:/MDF92/BULL02P.BAS
D:/MDF92/BULL02P.BND
D:/CUL/D5215DDP.CUL
D:/DRN/D5215DDP.DRN
D:/MDF92/BULL02P.SAM

MAP 2

STOCKDALE PROSPECTING LIMITED
A.C.N. 004 912 172

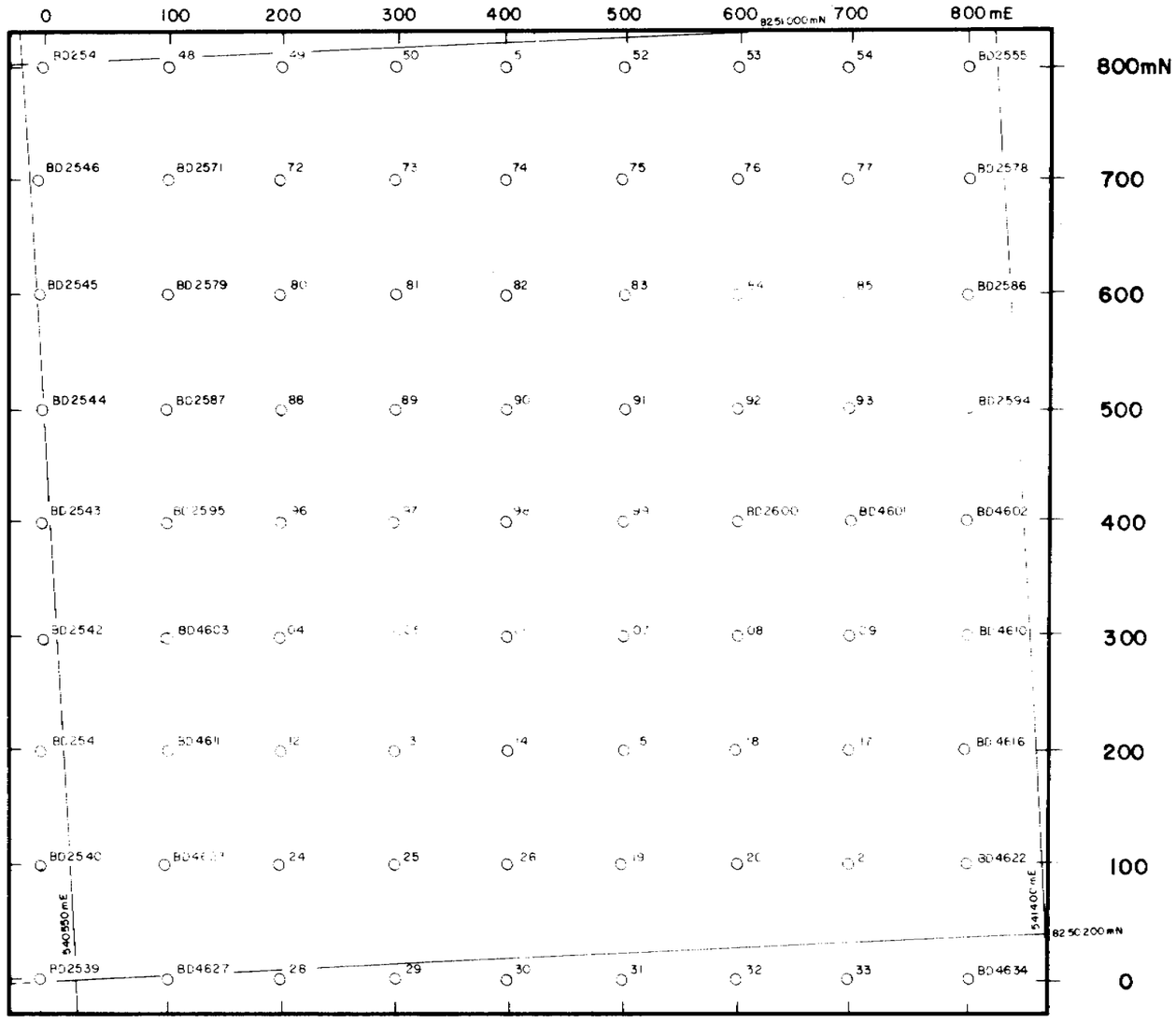
AUVERGNE D5415 / KEEP 1:100000
BULLO RIVER PROJECT

EL6810
CURRENT SAMPLING

CR92/612

Compiled	AKB
Drawn	HMR
Date	10/92
Scale	1:100000
Revised	
SEL	BULL02P

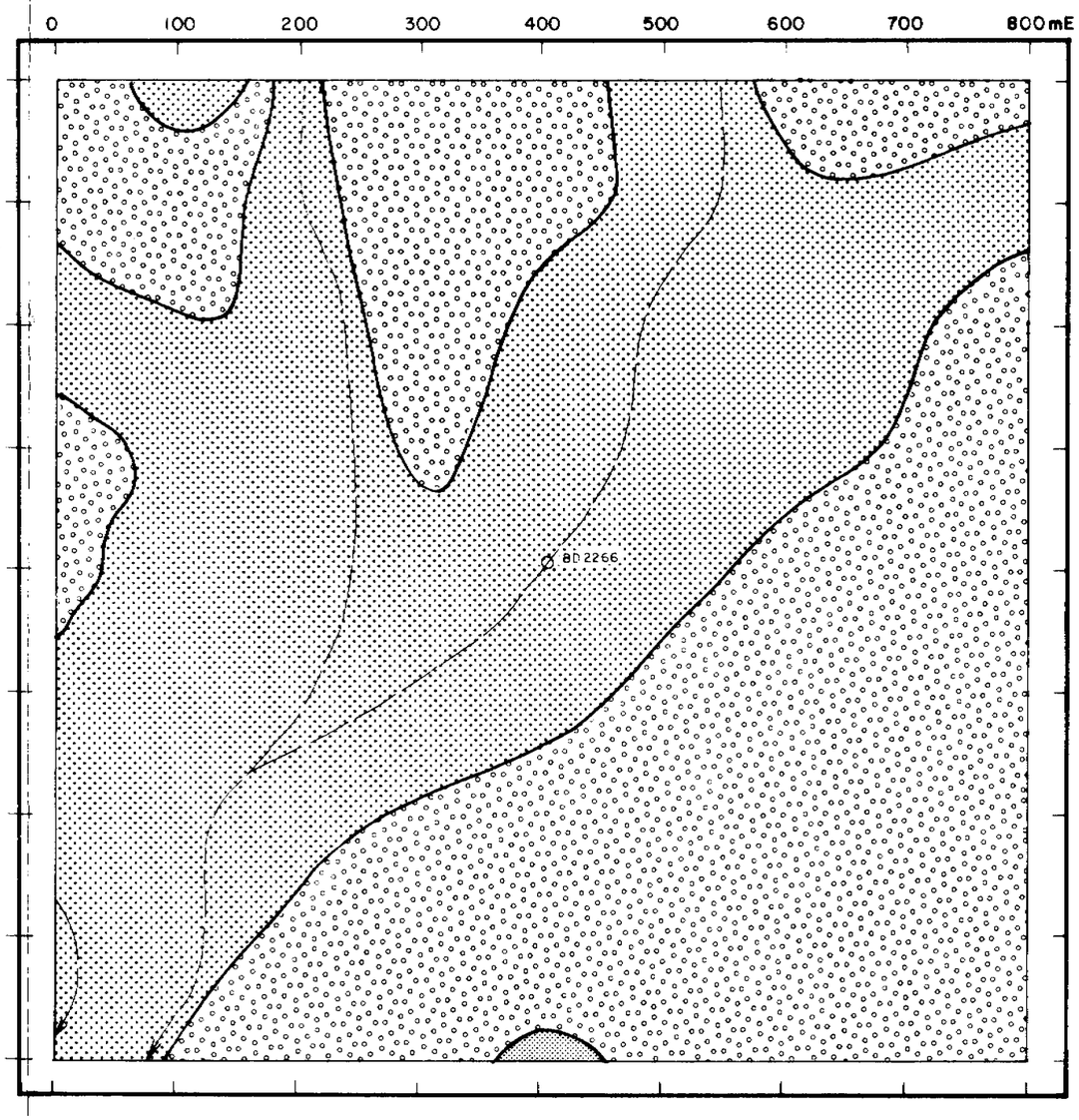
SAMPLING



APRIL '91 AKB/PH
BD2539 - 55
BD2571 - 2600
BD4601 - 34
(Total 81)

GEOLOGY

MN



LEGEND

- DRAINAGE
- TILLITE & SPINIFEX
- ALLUVIUM & CANE GRASS
- FELSPATHIC PEBBLY SANDSTONE/CANE GRASS

100m 0 100 200 300 m

MAP 3

STOCKDALE PROSPECTING LIMITED

NORTHERN TERRITORY
D52-15 KEEP 1:100 000
BULLO RIVER PROJECT

BD2266 FOLLOWUP LOAM GRID
MOONLIGHT VALLEY TILLITE

Compiled	AKB/PH
Drawn	BAN
Date	JUNE '91
Scale	1:5000
Revised	
	SEL 4111

EX921612