

RELINQUISHMENT REPORT  
EXPLORATION LICENCE 7614  
McCARTHY'S AREA, NT

21 FEBRUARY 1992 TO 20 FEBRUARY 1994

BY  
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FOR

AZTEC MINING COMPANY LIMITED



MOUNT EVELYN SD 53-5  
Ranford Hill 5370

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Darwin NT

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## SUMMARY

The geology of Exploration Licence 7614 comprises sediments of the Lower Proterozoic Pine Creek Geosyncline which have been intruded by granite belonging to the Cullen Batholith. The exposed metasediments within the licence area belong to the Mount Partridge, South Alligator and Finnis River Groups.

The McCarthys Pb-Ag mine with a total recorded production of 580t, is located approximately 7kms south south east of EL 7614. Literature research has revealed that the area has been explored since the 1960's for a number of commodities using different mineralisation models without any success. The historical work has shown however there were gossanous limonite horizons throughout the area with anomalous Pb and Zn which had not been systematically tested.

Work conducted by Aztec Mining within the relinquished area involved literature research and compilation of data from previous explorers.

## 1. INTRODUCTION

Exploration Licence 7614 is located 30 kms ENE of Pine Creek and is 9 kms south-west of the Moline Mine on the Ranford Hill 1:100,000 (5370) geological map sheet (Figure 1). Access is gained via the Kakadu Highway and then cleared tracks leading into the old McCarthys mine site.

The licence is held by Aztec Mining Company Ltd and was taken out in conjunction with adjacent licences (MCN 4419-26 and EL's 7054, 7615, 7979) to explore more fully the old McCarthys silver-lead mine and surrounding area for base metal and gold mineralisation. The area has been explored extensively since the 1960's for a number of commodities, however the potential for discordant polymetallic vein type base metal mineralisation had not been fully evaluated.

The aim of this report is to outline the work conducted during the period of tenure within the relinquished area of EL 7614.

## 2. TENURE

Exploration Licence 7614 was granted to Aztec Mining Company Ltd on 21 February 1992 for a period of six years.

Exploration Licence 7614 was reduced to five graticular blocks as required by the Mining Act at the completion of Year Two of tenure.

## 3. CONCLUSIONS

1. No follow up exploration is recommended for the relinquished area of EL 7614.

#### 4. PREVIOUS EXPLORATION

Exploration in the region of the licence area has been well documented since the mid 1960's.

Sturm (1966) undertook an investigation of the McCarthys lead prospect for United Uranium. He undertook geological mapping, soil sampling and wagon drilling and identified two separate lodes; A, to the south and B, to the north.

Channel sampling in the areas of one of the inclined shafts at 10 metres recorded 26.5% Pb over 1 metre and 19.5% Pb over 0.9 metres. Sturm indicated that there was no one distinctive lode, but that mineralisation occurred in siltstone bordering an aplite dyke. Unfortunately the 16 wagon drill holes did not test the ore at depth fully, due to ground water and loss of circulation.

Weber (1968) undertook geological mapping and rock chip sampling in the vicinity of the McCarthys mine for United Uranium. The only evidence of sulphide mineralisation he found in the region was pyrite, however he recorded high base metal values throughout his sampling grid. These could not be traced to actual base metal mineralisation, but he recommended that further sampling take place to determine whether non-outcropping sulphide-rich zones occurred in the region. Concurrent with this programme a reconnaissance steam sediment (-80 mesh) sampling programme was completed in the area and reported by T W Middleton (1968). The samples were analysed for Cu, Pb, Zn, Ni, Co and Bi. A number of drainages were geochemically anomalous in base metals.

CRA Exploration (Wills 1978) reported on exploration over the Moline region in EL 1091 which incorporated the area now covered by EL 7054. Soil sampling across the Golden Spider Anticline revealed elevated base metal results through the Wildman Siltstone and Zamu Dolerite rock types. Two soil anomalies were identified from the 1977 sampling (Anomalies 11.3 and 11.5) with assays up to 795 ppm Pb, 490 ppm Zn and 89 ppm Cu recorded.

The results from the second year of exploration (Wills, 1979) repeated Anomaly 11.3, with soil samples returning maximum assays of 751 ppm Pb, 296 ppm Zn and 75 ppm Cu. Rock chips returned a maximum lead assay of 1.28%, while maximum Zn, Cu and Ag were 691, 510 and 1 ppm respectively. These anomalous results were obtained from a line of ironstone breccias along a fault zone.

Follow-up work on Anomaly 11.5 recorded best soil results of 265 ppm Pb, 260 ppm Zn and 78 ppm Cu. These results were obtained from a zone of ironstone and haematitic shales adjacent to Zamu Dolerite. Maximum rock chip assays were 2040 ppm Pb, 1.31% Zn and 748 ppm Cu. Both anomalous zones lie north of EL 7615 parallel to the dominant north-west trending fold axis.

The Australian and New Zealand Exploration Company (Davies 1980) conducted a stream sediment sampling survey over areas underlain by Koolpin Formation. A statistical test on the results did not provide a meaningful interpretation however elevated Pb, Zn and Cu results were recorded at McCarthys, and to the west and north-west of McCarthys. Davies believed the elevated results were due to higher background content of some metals in the shale units and the higher metal content in the ironstone bodies.

Cyprus carried out a mapping and rock chip sampling survey (Miller 1988) over EL 3008 and recorded some anomalous Pb, Cu and Zn from rock chip samples in carbonaceous cherty shales of Koolpin Formation and Wildman Siltstone. Maximum results recorded were 930 ppm Cu, 1.14% Pb and 5060 ppm Zn.

Vann (1988) reported on exploration carried out in three exploration licences one of which was EL 5196 known at McCarthys East for Renison Goldfields.

Mapping by Vann revealed a complex fold structure in associated with the Golden Spider Anticline. He identified a zone of weakly anomalous gold in the Golden Spider anticlinal closure. The best result recorded was 0.394 g/t over 6 metres. Assay quality control was poor however, and repeat determinations were recommended.

Fitzgerald (1989) carried out follow-up sampling at the Golden Spider prospect in the nose of the anticline. Exploration was for gold and 13 samples were taken from quartz saddle reefs in the Koolpin Formation. Only one sample recorded greater than 0.1 g/t, viz 1.5 g/t.

Driffield Mining Pty Ltd (1989) carried out rock chip sampling on four traverses at 500 metre spacing north of the McCarthys mine within EL 5847. No significant gold or base metal anomalies were reported.

## 5. GEOLOGY AND MINERALISATION

The Exploration Licences are located near the centre of the Early Proterozoic Pine Creek Geosyncline and metasediments of the Mt Partridge, South Alligator and Finnis River Groups are exposed in the area.

The Cullen River Batholith intrudes the metasediments and outcrops to the south and east of the McCarthy's project area. It is comprised of a coarse grained porphyritic hornblende biotite rock. The granite is generally well exposed in the area and forms low undulating hills well incised by numerous perennial streams. The intrusive granite contact with the sedimentary rocks to the north is often marked by a zone of quartz, pegmatite and aplite veining, rafts of sedimentary rocks within the granite and slivers of granite within the sedimentary rock pile.

Directly north of the granite contact the Early Proterozoic sedimentary sequences of the Mt Partridge, South Alligator and Finnis River Groups have folded into an asymmetrical sequence along north-westerly trending axis. Two anticlines, called the McCarthy's and Spider Anticline, after Gold Field's Exploration Pty Ltd work in 1988, form the prominent features within this folded sequence. These anticlines expose Mundogie Sandstone in the core and Wildman Siltstone units of the Mt Partridge Group and the Koolpin Formation of the South Alligator Group within the centre of the lease. Further to the north the folded sequence exposes stratigraphically higher units of South Alligator and Finnis River Groups.

A description of each formation in ascending order is discussed below:-

### MUNDOGIE SANDSTONE

The Mundogie Sandstone is equated to Acacia Gap quartzite by Aztec Mining and consists of coarse grained feldspathic quartz sandstones and pebble conglomerate. It forms a prominent topographic high feature with rugged and deeply incised streams draining from it. On the contact with the Wildman Siltstone a strongly ferruginous, brecciated, gossanous and quartz veined horizon is occasionally developed. Secondary ferruginization is ubiquitous in these instances often forming the framework within the sandstones and breccias. This horizon is conformable and can be mapped over a considerable strike length. It is interpreted to be a décollement structure. A relic boxwork texture is observed at times and contributes to the strong ferruginous alteration. Quartz veining in this horizon is multiphased and stockworked in appearance and also often affected by later tectonic brecciation.

## WILDMAN SILTSTONE

This portion of the stratigraphy has been interpreted differently by Aztec Mining. Sediments below Mundogie Sandstone are assigned to Upper Whites Formation and sediments above are assigned to Lower Koolpin Formation.

Rocks mapped in this unit predominantly comprise siltstones and carbonaceous phyllite. A strong cleavage is developed in these rocks and exposed bedrock is typically stained by iron oxide. The McCarthy's Mine is hosted by the Wildman Siltstone. A distinctive haematite rich horizon can be traced within the unit over most of the licence area. It is interpreted to be a lateral equivalent of the iron ore deposits at Frances Creek and is locally termed, Frances Creek beds.

## KOOLPIN FORMATION

The Koolpin Formation forms the topographic high ridge lines. On the limbs of the Spider Anticline these ridges are flat topped and have cliff like drop offs along the edges. Silicification as a result of weathering phenomena has strongly altered these rocks although the original texture and nature can still be discerned. The Koolpin predominantly comprise carbonaceous mudstone but has chert, ironstone and phyllite interbeds. A commonly exposed ironstone interbed is characterised by the presence of sugary and nodular cherty bands which resemble the I5 ironstone horizon as known within the Middle Koolpin Formation in the Mt Bonnie and Burrundie Dome regions. The nodular chert ironstone horizon often forms the steep drops along the edges of the ridge. Strong secondary silicification in conjunction with ferruginization within this bed make it particularly resistant to erosion. Ferruginization within the Koolpin Formation is a common feature. Boxwork textures is disseminations and within fractures is often observed throughout but is particularly concentrated along cherty and ironstone horizons.

## GEROWIE TUFF

The Gerowie Tuff comprises light brown siliceous siltstones, argillites and albitic cherts. These rocks, along with the Mt Bonnie Formation, form a series of relatively low undulating hills that are well incised by a perennial drainage system. Very thin skeletal soils develop over the Gerowie Tuff and rock types are difficult to discern through the effects of weathering on similarly textured and coloured lithologies.

## MT BONNIE FORMATION

The Mt Bonnie Formation superficially, at least, resemble the Gerowie Tuff in it's occurrence and nature. Siliceous siltstones, slates, argillites, cherts, and greywackes are observed. Areas of well incised but low relief are formed and thin skeletal soils are commonly developed.



## BURRELL CREEK FORMATION

The Burrell Creek Formation is typified by felspathic greywacke, slates and siltstones.

## ZAMU DOLERITE

This dolerite occurs as a medium to coarse grained sill in the Koolpin Formation. It can occur as a distinctive series of resistant outcrop and rubble or become preferentially weathered and be obscured under soil and regolith cover. Distinctive dark red clay rich soils are developed over the dolerites in these instances.

The closest mineral deposit to the licence is the McCarthys lead and silver mine. The lode is 0.3 metres to 1.0 meters wide and was worked between 1912 and 1927 from several shafts. The lode occupies a shear zone dipping between 70° and 80° west and transgresses carbonaceous siltstone of the Wildman Siltstone. The ore comprises an oxidised zone with pyromorphite, cerussite, anglesite and galena. It is postulated that the ore formed due to metal precipitation by reduction during contact metamorphism within the hornblende-hornfels zone around the McCarthys Granite. Total recorded production is estimated at 580 t concentrate of silver and lead (Stuart-Smith et al, 1988).

Detailed exploration conducted by Aztec Mining Pty Ltd has located discordant lead and zinc mineralisation in northerly and west north west trending structures. The mineralisation commonly occurs as linear gossanous limonitic outcrops variably silicified with a trace of galena and pyrite. Within Zamu Dolerite the mineralisation occurs more as a stockwork of gossanous veinlets. The widest development occurs where the two structures intersect.

## 6. WORK CARRIED OUT

All of the open file literature related to the McCarthy's area was reviewed and data compiled. For details of this work see Section 4.

No field work was conducted within the relinquished area of EL 7614.

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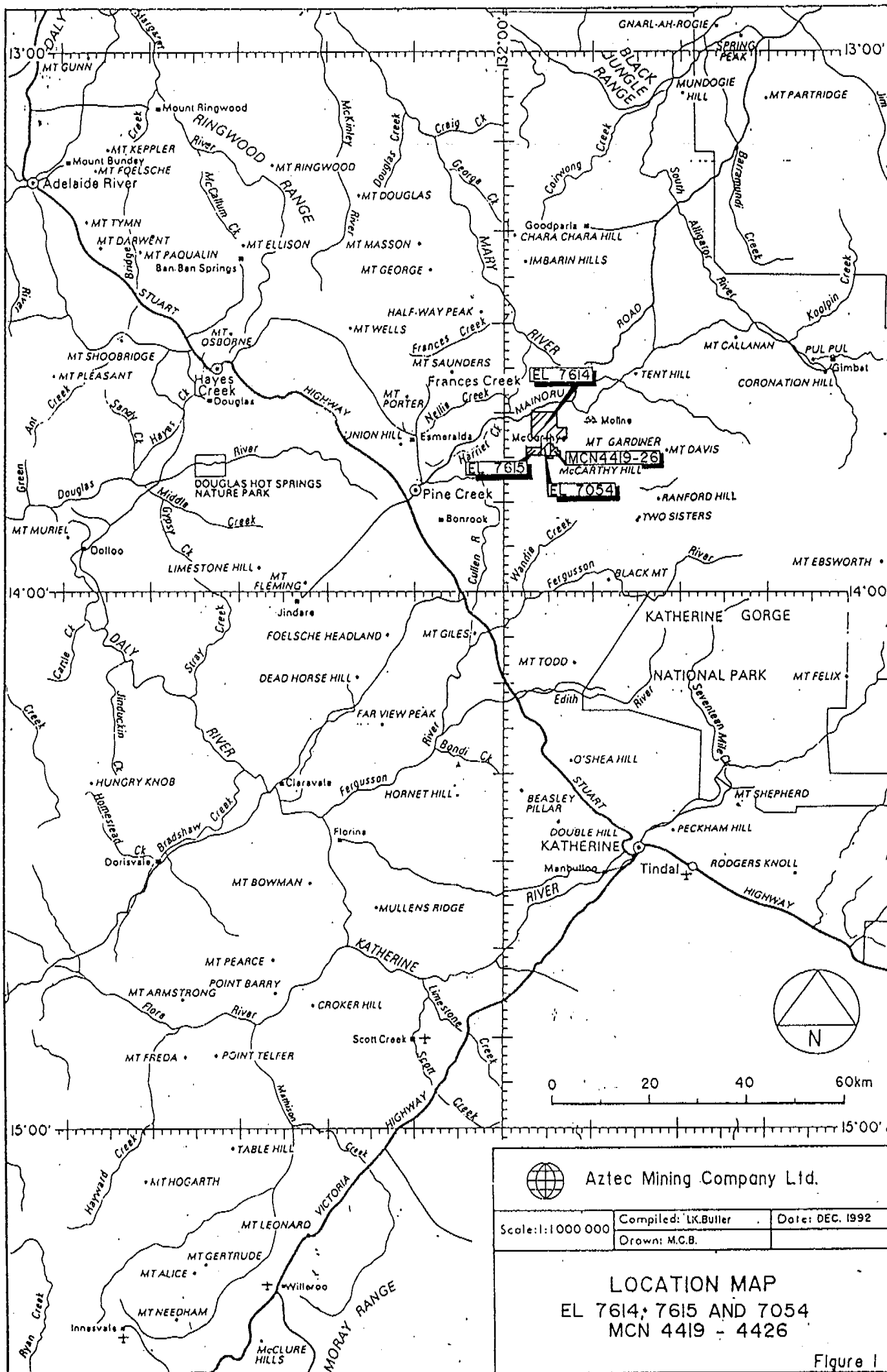
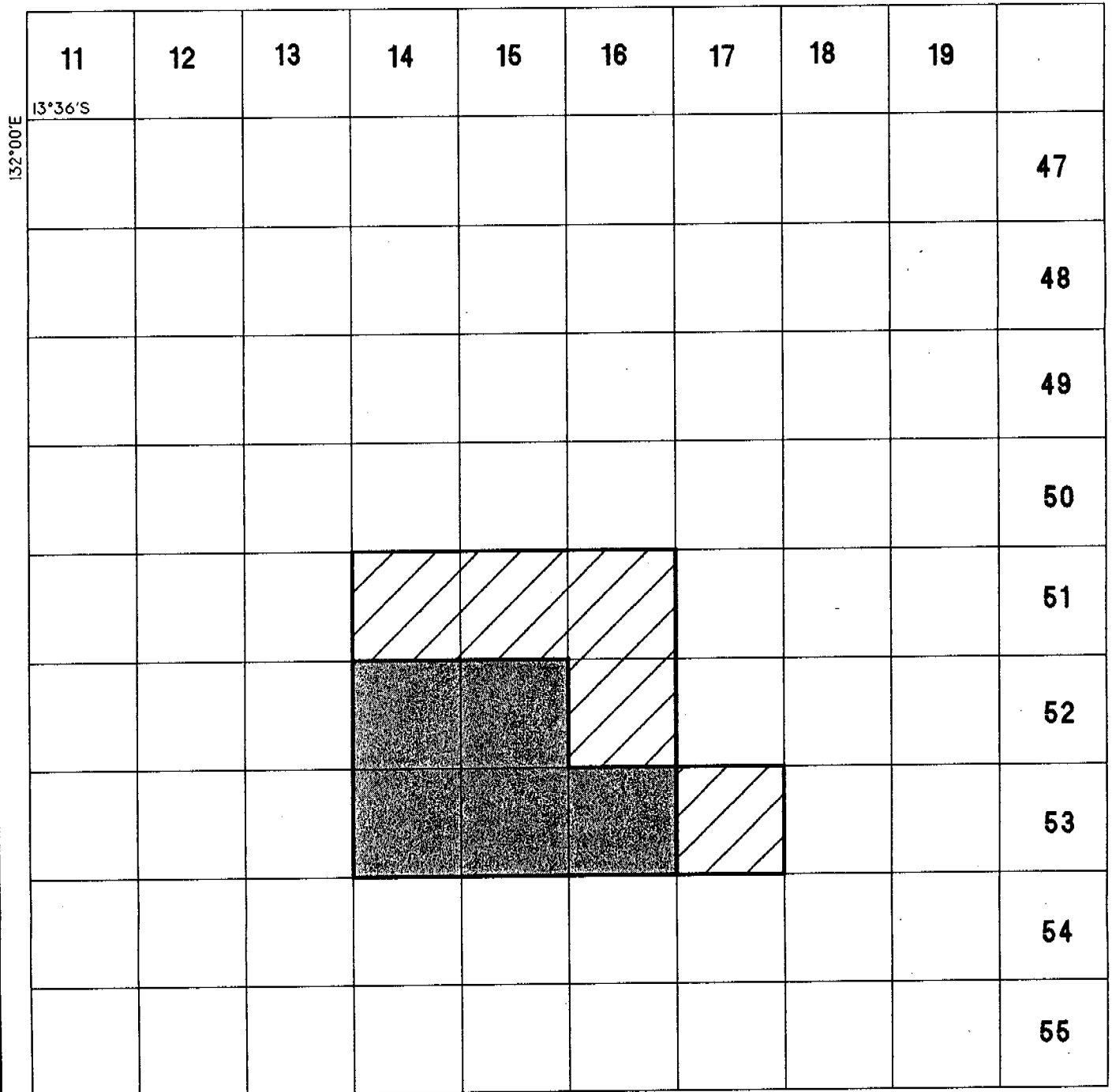


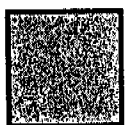
Figure 1

"A"

MOLINE 15/4-IV



LEGEND



Retained area



Surrendered area

FIGURE 2

Scale : 1:100 000

Date : 17 Dec. 1993

Author : R.L. Humberston

Drawn : R.A. Nicol

Plan No.:ntdrop\_13



**Aztec Mining Company Limited**

**EL 7614**

**RETAINED AND SURRENDERED AREAS**