Aquitaine Australia Minerals Pty.Ltd.

Progress Report of Exploration

on EL 246 to 21.5.73

[redacted]

Distribution:

Mines Department
Placer Prospecting
Conwest
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By: R. Ramdohr
May, 1973.

MG: 259

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1. SUMMARY

A.A.M. is operator on EL 246, held by Conwest (Australia) N.L. and their partner Placer Prospecting (Australia) Pty. Ltd.

Due to access difficulties only a limited amount of exploration work could be carried out in the reported period. Preliminary work, however, has revealed the presence of lead-zinc-mineralization in the faults and/or channel ways at Spirit Hill. Therefore a grid was pegged in the alluvial plains N and E of the hills. The grid is to serve as basis for shallow geochemical and also stratigraphical drilling. This work is now in progress.

It is recommended after renewal of the EL to continue mapping and shallow drilling, followed by IP in selected areas and - if warranted - diamond drilling.

2. INTRODUCTION

Exploration Licence 246 "Spirit Hill" is held by Conwest (Australia) N.L. (Fig. 1). An agreement was signed between Conwest (Australia) N.L., Placer Prospecting (Australia) Pty. Ltd. and A.A.M. which gives A.A.M. the option to earn a 33% interest in a joint venture to explore the E.L.

This E.L. expires on June 29th this year and this report is submitted at the end of May. (Only results obtained prior to May 21 have been included). Active field work, however, could only commence mid April due to weather depending access difficulties in the area. It became therefore necessary to concentrate on easily accessible and also obvious targets. By the end of 1973's field season we should have considerably more data and a summary report will be compiled.

The first few weeks of April were used to establish a base in Kununurra, setting up camp near the old Ochre Mine, on the same site as last year's camp, hire personnel and make all the necessary preparations for the actual field work.

Exploration work is hampered by the small percentage of rock outcrops. AAM/AAP previous work on the N.T. side of the Bonaparte Gulf Basin, however, proved invaluable and despite the very short period of active field work, some significant results were obtained.

3. GEOLOGY

During the past 20 years substantial contribution towards the understanding of the geology of the Bonaparte Gulf Basin had been made by geologists from the B.M.R. and companies like ARCO, Mines Administration and AAP/AAM. We thus have a reasonably clear picture of the sequence of geological events, stratigraphy and structure. The Bonaparte Gulf Basin, however, until quite recently used to be only interesting as potential reservoir for oil and gas. Only two years ago its potential for Pb - Zn - deposits was recognised and actively investigated.

3.1 Stratigraphy

S.E. of the basin margin and presumably underlying it as well is a mighty sequence of pre Cambrian ($p\in$) sediments and some volcanics. In direct contact with sediments of the basin are usually siltstones, mudstones and sandstones of Proterozoic age. These sediments are only at a few localities overlain by basaltic Antrim Plateau Volcanics ($\in$1a) of Lower Cambrian age. Usually Upper Devonian sediments of the Cockatoo Formation (Duc) lie directly, disconformably, on $p\in$.

The Duc is subdivided into a number of members, but we in fact encountered only two of them: Ragged Range Conglomerate (Dur) and Kellys Knob Sandstone (Duk).

Dur consists of fine to coarse sandstone and often very unsorted boulder conglomerates. The sequence is very ferrüginous. Dur is conformably (?) overlain by Duk, which comprises light grey, hard quartz sandstones and some pebble beds. Cross bedding is widespread. This member is commonly jointed.

Above the Cockatoo Formation occurs the Lower Carboniferous Burt Range Formation(Clb). This formation shows a sequence of facies changes laterally and vertically and appears quite different e.g. in the Burt Range as compared to the Ochre Mine Region. Only a doubtful stratigraphical column can be established so far, due to the limited outcrops. Along the N E. margin of the basin(Clb) comprises mauve and white, often brecciated sandstones at the base, followed by siltstones - mudstones with slide-slumpbedding. This sequence is overlain by arkosic sandy limestone - dolomite. A yellow, ferruginous sandstone follows which in places grades into a white, hard, quartz sandstone.

In the Spirit Hill, Clb consists of calcareous and dolomitic sandstone which is overlain by white, fine-grained quartz sandstone. West of Spirit Hill, Clb is unconformably overlain by Lower Carboniferous Milligans Beds (Clm) which comprise shales and (calcareous) sandstones followed by coarse sandstones and conglomerates of the Upper Carboniferous Border Creek Formation (Cub). On the NE platform the Burt Range Formation is conformably overlain by Point Spring Sandstone (Clp). This is a coarse grained, often friable grey brown, ferruginous, fossiliferous sandstone, which appears conformably overlain by Upper Carboniferous Border Creek Formation (Cub) which comprises conglomerates and sandstones. No younger rock formations is known in the area and most parts of the EL are covered by Cainozoic black soil, sand and silt.

3.2 Structure

The margin of the Bonaparte Gulf Basin is the dominant structural feature of the region. This hinge line has a NE trend, in the South it appears to coincide with the Cockatoo Fault System, NE of Spirit Hill it is a transgressional contact between Paleozoic and pre Cambrian sediments (excepting the Antrim Plateau Volcanics). The basin margin however, is not a straight hinge line, it consists rather of many ridges protruding basinwards and deep (submerged) valleys. This uneven pϵ surface plus intermittent Paleozoic uplifts and subsequent erosions are responsible for pinchouts and various transgressional contacts e.g. between Dur and pϵ, Duk and pϵ and even Clb and pϵ.

In the Sandy Creek - Alpha Hill region exists a N-S and NW-SE fault system, while the major Cockatoo Fault System SE of Spirit Hill strikes NE, parallel and partly coinciding with the basin margin.

The Burt Range Formation at Spirit Hill forms a NNE pitching anticline.

3.3 Lead - Zinc - Mineralization

The occurence of galena and cerussite at Spirit Hill was known for a number of years (ALLEN, 1956). Recently secondary zinc minerals, like smithsonite and hemimorphite were discovered there as well.

The mineralization occurs in a calcareous sandstone or as crust on it. The sandstone fills channels and faults within a sandy dolomite. The channels could have formed above water level during short periods of uplift after sedimentation of the dolomite, or they could be under water scourings. These channels become later filled with upper Clb sandstone.

Metal bearing brines which during compaction of sediments in the deeper parts of the basin, were squeezed out and migrated upwards to the basin margin, may have precipitated some of their metal content in such a favourable environment. Erosion seems to have removed most of the channel fill within the outcropping area. During weathering the primary sulphides were oxidized, perhaps transported and occassionally concentrated. Some galena, however, occurs in fractures and faults near these channel trends.

Secondary Zn - minerals were also encountered at the contact between sandy dolomite and overlying sandstone. This is consistent with findings at other localities along the basin margin.

4. WORK CARRIED OUT

In recent years it became obvious that sediments of the Bonaparte Gulf Basin would have a good potential for base metal deposits and also uranium mineralization.

4.1 Photomosaics made of the SE basin margin

To support exploration work photomosaics have been made of the SE basin margin. These mosaics at a scale 1:10,000 were compiled from Southbank Aviation black and white photos flown 1970/71. These mosaics serve several purposes, mainly as basis for the geological mapping, but also for the pegging of survey grids in selected areas, aircraft navigation during airborne geophysical surveys etc.

4.2 Grid Pegging

One grid was surveyed on the EL. 43 kilometres were pegged in the N and E of Spirit Hill in the alluvial plains (Fig. 2). This grid serves several purposes, particularly for accurate positioning of geophysical surveys and drill holes.

4.3 Rotary-Percussion Drilling

Drilling in the plains surrounding Spirit Hill was scheduled immediately after drilling on EL 247, but unexpected heavy rain made access impossible. Drilling is in progress at the time of preparation of this report. Drilling Contractor is Austral United Geophysics who use a Mayhew 1000 drill rig.

4.4 Airborne Radiometric Survey

In order to assess the potential of the Upper Devonian - Lower Carboniferous sediments in the Bonaparte Gulf Basin for possible uranium mineralization a radiometric survey was flown in the region. This survey covered part of EL 246. A helicopter (Hughes 500) chartered from Vowell Helicopters flew systematic lines at 800 m spacing at approximately 45 m mean height above ground. A SPAT instrument was used.

No significant radiometric anomaly was discovered.

5. CONCLUSIONS AND RECOMMENDATIONS

The limited exploration so far carried out on the EL certainly does not permit the drawing of final conclusions. But the potential of this part of the Bonaparte Gulf Basin for sedimentary Pb - Zn - deposits has been confirmed. We can expect possible mineralization within the Burt Range Formation where reducing conditions combined with stratigraphically and structurally favourable conditions have created traps for metal bearing brines. There is further a certain potential for supergene enriched deposits at the contact between dolomite and sandstone within the Burt Range Formation.

To outline areas of interest and generally to limit exploration activity to same, it is therefore recommended to map the margin of the Bonaparte Gulf Basin at a scale of 1:10,000. This work should be supported by shallow rotary-percussion drilling, particularly where there are few outcrops.

Once the Burt Range Formation has been outlined, drilling for geochemical anomalies, IP work and finally diamond drilling is recommended.

R. RAMDOHR

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FIG. 1

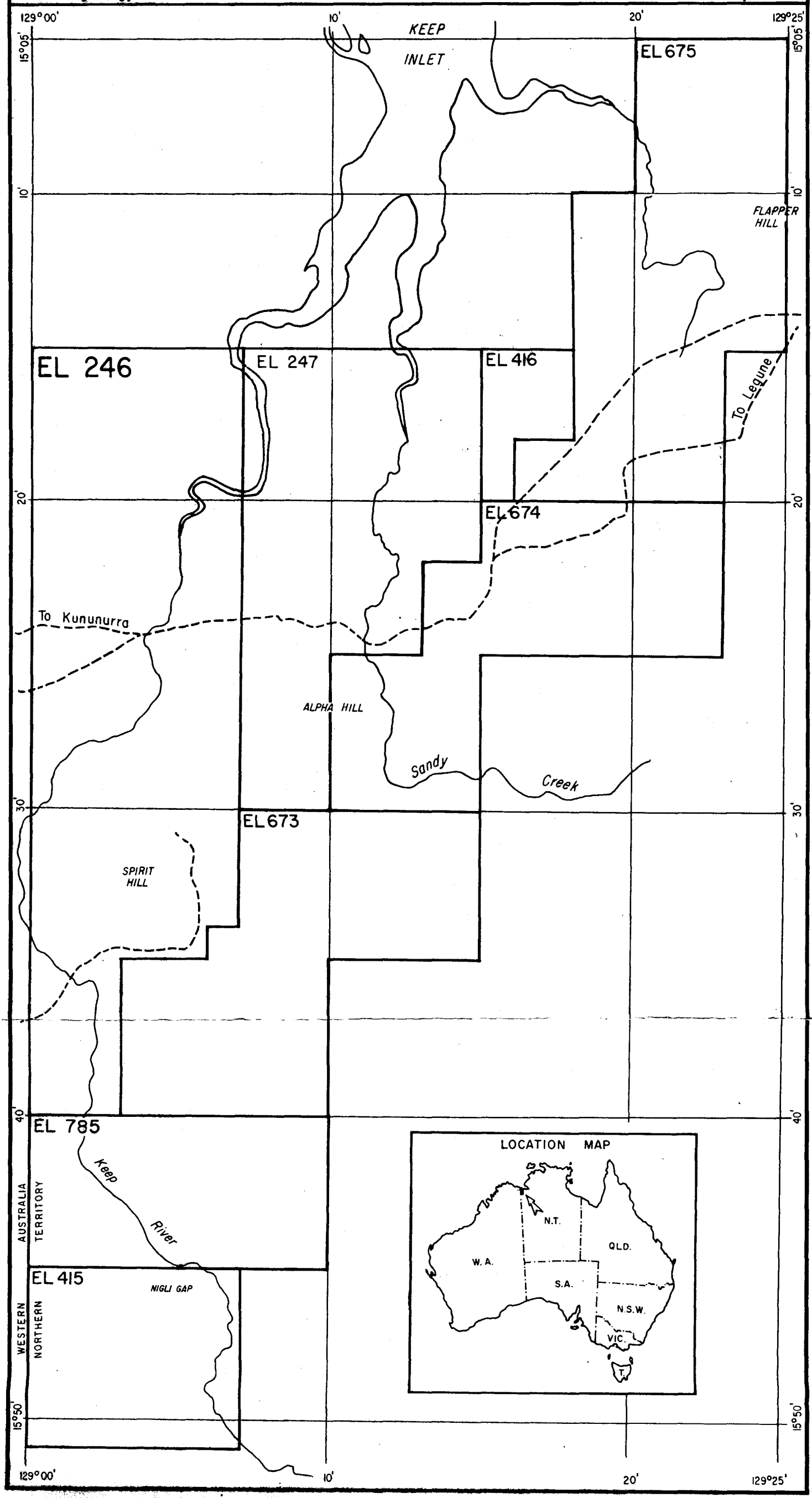
Scale 1 / 250,000

5 0 5 10 MILES

5 0 5 10 15 KILOMETRES

Mineral geology

May 1973



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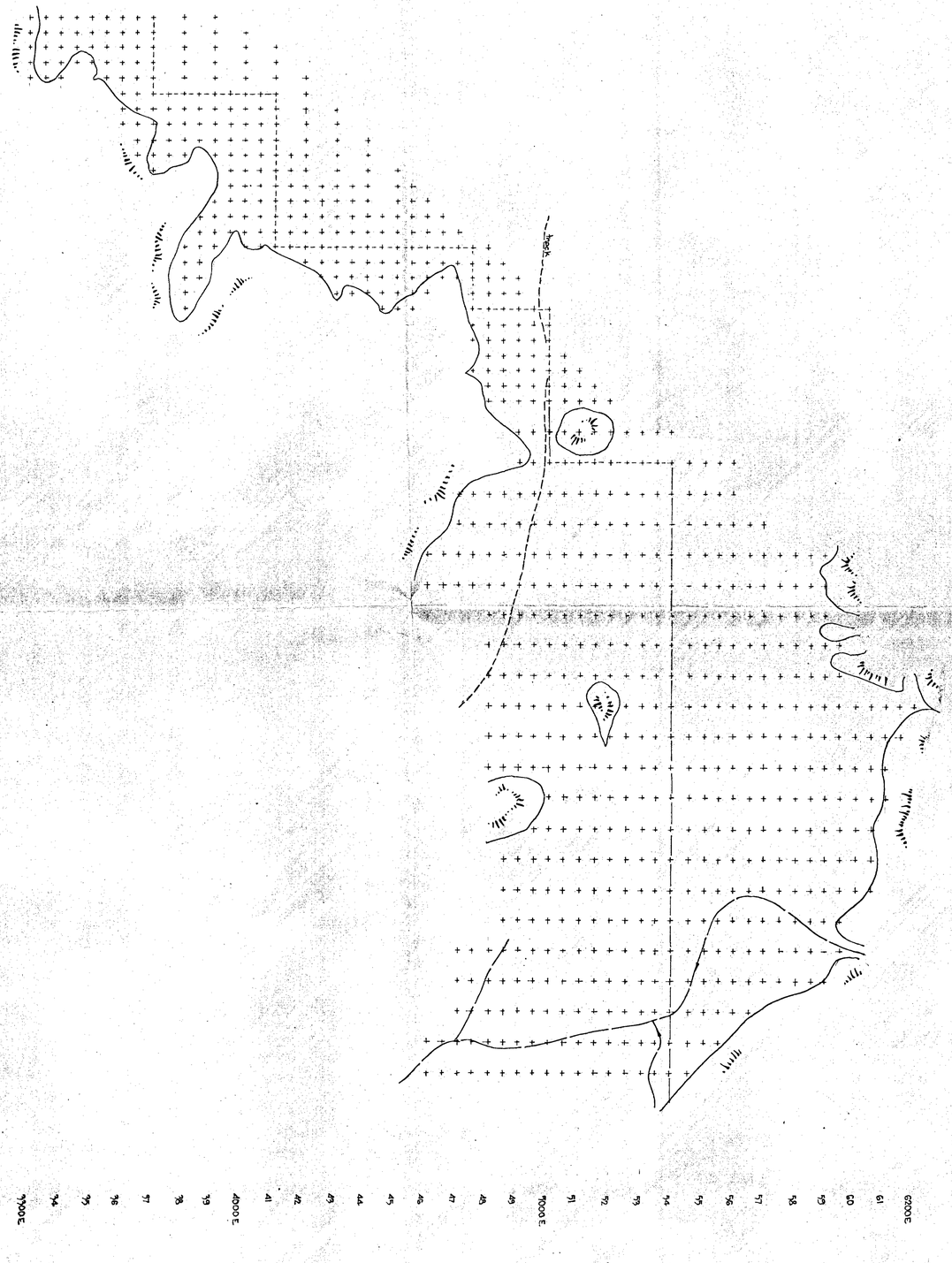

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AQUITAINE AUSTRALIA MINERALS PTY LTD
SPIRIT HILLS GRID
TO 21/5/73

Fig.2

Scale: 1:10,000	Drawn: J.W.	Job No: 327/73
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