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PRELIMINARY ASSESSMENT OF THE KAISER - MHA

SILICA PROSPECT EL 43/70

TASMANIA

FOR

KAISER ALIUMINUM

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1. SUMMARY

Kaiser Aluminum and Chemical Corp. (Aust) Pty. Ltd. has an agreement with Mineral Holdings Australia Pty. Ltd. (MHA) to explore for high grade quartzite within the northern half of Exploration Licence 43/70 held by MHA in north western Tasmania.

This report is based on previous geological and other data from various sources, and observations from a recent field visit by a geologist from Kaiser and a geologist from Longworth & McKenzie, who have been retained to carry out the exploration programme.

The quartzite beds are located within an extensive area of Pre-Cambrian sediments, which has been simply folded with consistent strikes of about 45° and dips of 40-70°. Prospective quartzite beds crop out over an area of at least 50 square kilometres. Apparent stratigraphic thickness of some beds is up to 150 metres.

Several sites for investigation have been identified and a staged exploration programme has been established with a review at the conclusion of each stage.

Diamond drilling will be commenced if initial geological work, including costeaning, indicates suitable sites. Analytical work will commence as soon as samples become available so that results can provide feed back for the continuing field work.

Stages 1 and 2 of the programme, involving an estimated expenditure of \$40,000, is planned for completion by mid-April and Stage 3 with an estimated preliminary expenditure of the order of \$145,000 is planned for completion by mid-July depending on weather and drill rig availability.

Limited results of chemical analyses are available which indicate potential deposits of suitable quality. At this stage it is recommended that further exploration be carried out in the anticipation that a mineable quantity of suitable grade silica can be discovered.

2. INTRODUCTION

2.1 Agreement

Mineral Holdings Australia Pty. Ltd.(M.H.A.), hold Exploration Licence 43/70 over an area of 310 km² centred about 20 km south west of Wynyard in north-western Tasmania.

Under an agreement with M.H.A. Kaiser Aluminum and Chemical Corp (Aust) Pty. Ltd. have undertaken to explore for quartzite in an area of 145 km² in the northern half of E.L. 43/70. (See Plans 1 and 2).

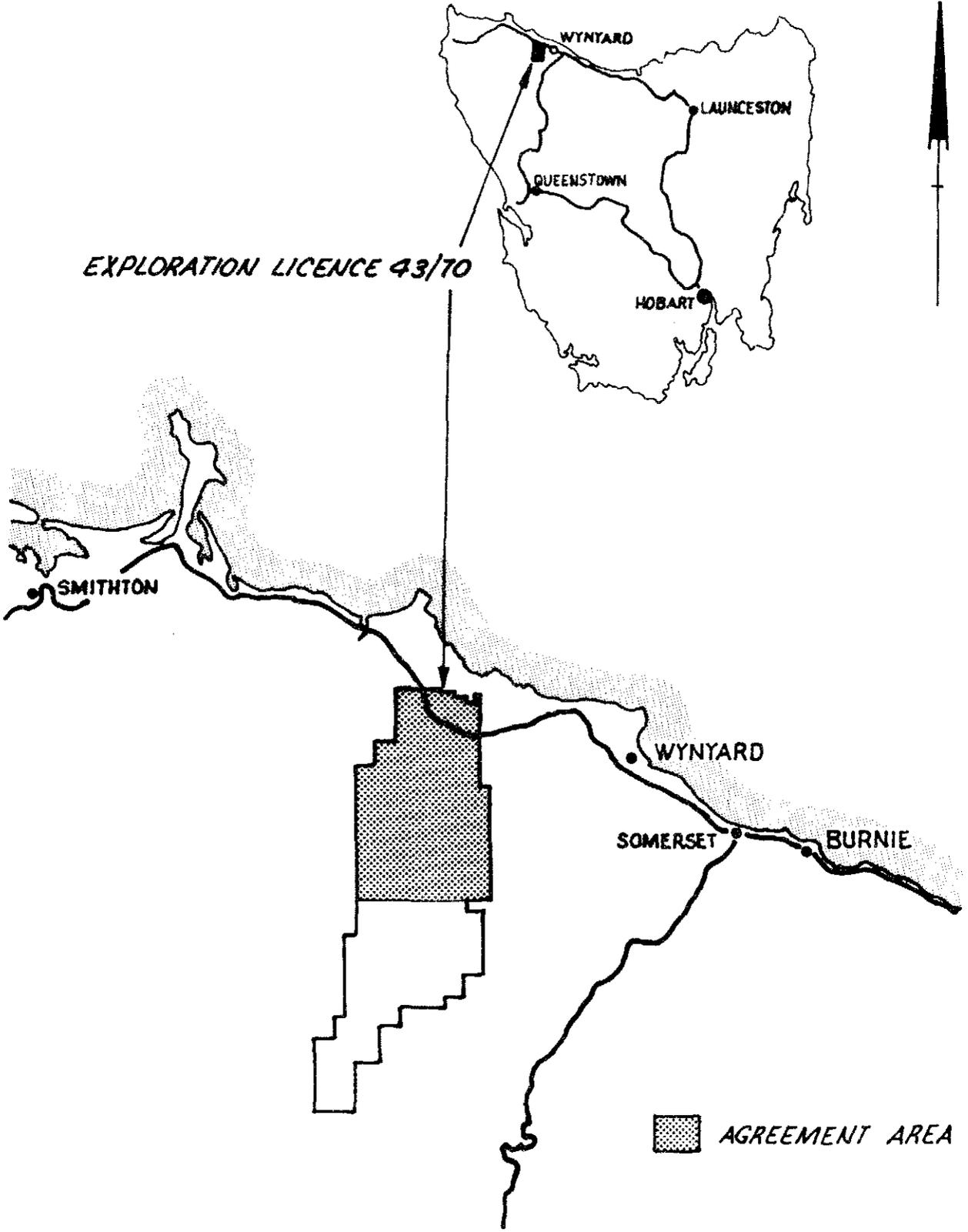
2.2 Quality and Quantity Specifications

Kaiser will be exploring the area preferably for a large deposit or other deposits of very high grade quartzite.

Chemical specification will be the subject of further advice resulting from laboratory trials but as an indication chemical grade requires a silica content of greater than 99%, with iron less than 0.1%, titanium oxides less than 0.03%, alumina less than 0.5% and Calcium less than 0.15%. For metallurgical grade similar requirements apply but with a maximum of 0.25% iron and Calcium less than 0.2%. For refractory grade the total of iron oxides, alumina and titania should not exceed 0.5%.

The physical requirements of a suitable quartzite include specifications for strength, crushed sizing, shape and thermal shock resistance. Crushed size specification is approximately 50 to 100 mm, shape is yet to be specified. Quartzite will have to have adequate thermal shock resistance to pass standard tests. A quantitative specification is yet to be indicated. An aggregate crushing value (Australian Standard AS 1141 - Sect 21 - 1974) suitable for ballast

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EXPLORATION LICENCE 43/70

SMITHTON

WYNTARD

LAUNCESTON

QUEENSTOWN

HOBART

WYNYARD

SOMERSET

BURNIE

AGREEMENT AREA

LOCATION OF EL. 43/70

PLAN 1



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material would probably be adequate. The quartzite should also comply with the specification for TEMCO (Tasmanian Electro-Metallurgical Company) quartzite.

The quantity required is subject to further advice from Kaiser, but an initial objective of 2 million tonnes of quartzite is sought. The quartzite should be distributed such that an annual production of 100,000 to 300,000 tonnes is feasible.

2.3 Exploration Organisation

The execution and management of the exploration programme will be carried out by Longworth & McKenzie Pty. Ltd. Engineering, Geotechnical and Geological consultants of Sydney. The programme is detailed under Section 7.

During all stages of the programme close liason will be maintained between Kaiser and Longworth & McKenzie.

2.4 Field Examination

Notes in this report on the various prospects result from brief field examinations by J.H. Callender of Kaiser and C.L. Adamson of Longworth & McKenzie on 20th to 23rd January, 1981. On 21st January Mr. K. Pinner, (M.H.A.) acted as guide to various locations and on this day T. Summons, geologist of the Tasmanian Geological Survey accompanied the party.

The purpose of this visit was to provide knowledge for the preparation of an exploration programme.

3. GENERAL GEOLOGY

The eastern half of the area has been mapped on a scale of 1:63,360. This mapping is published in the Table Cape and Burnie geological maps, both of which are covered by reports by R.D. Gee (1971 and 1977).

Apart from Quaternary alluvium and Tertiary basalt, silcrete and possible sub-basalt Tertiary sediments, the rocks of the agreement area are predominantly composed of relatively undeformed pre-Cambrian sediments containing the quartzites which are the targets of the exploration programme.

Gee (1971, pg 9) in his report on the Table Cape 1:63,360 geological map summarises the Proterozoic sequence as follows;

KEITH METAMORPHICS	Not relevant
ROCKY CAPE GROUP	
Jacob Quartzite	1130 m
Irby Siltstone	760 m
Detention Sub-group	
Cave Quartzite)	
Port Slate)	1400 m
Bluff Quartzite)	
Cowrie Siltstone	2400 + m

Initial prospecting has established that the rocks of interest are the Jacob Quartzite and the quartzite beds within the Detention Sub-group.

Within the agreement area the quartzites of the Detention Sub-group cover by far the larger area and form the more prominent out-crops. Gee (1971, pl0) states, of the Detention Sub-group, that it contains about 10% of siltstone, of which the Port Slate is

the thickest bed, but that siltstone lenses from a few metres to 80 metres thick occur irregularly. Most of Gee's observations were probably made along the coast but during the recent field inspection it appears that his general description would apply to the agreement area.

From the existing geological mapping, the field examination and a brief inspection of aerial photos, it seems that the geological structure is relatively simple with beds striking approximately 45° and dipping 40° to 70° both NW in the area examined.

4. EXISTING PROSPECTS

4.1 General Discussion

Some of the existing prospects are located within the Jacob Quartzite which, although covering a lesser area than the Detention Sub-group, is much more accessible. These prospects are all, either on roads, or within about 500 m of a road.

The quartzites of the Detention Sub-group crop out over considerable areas in the Dip Range which extends for 11 km within the agreement area. Of this extent, only about 1.5 km at the northern end and a much smaller area towards the southern end has been examined in superficial detail. Even in these areas there are other parallel quartzite beds which have not been examined.

In the Dip Range, the most promising quartzite beds are at least 1 km from a road.

Aerial photographs were not available during the field examination of the various prospects.

4.2 Jacob Quartzite Prospects

For locations see Plan 2.

4.2.1 Maynes Creek

This outcrop of quartzite extends for 4.8 km in a north easterly direction from a prominent bluff on Maynes Creek (Burnie 1:63,360 geological sheet). Over most of its length it has a width of 300-400 m with either vertical or steep dips. Basalt entirely surrounds the quartzite outcrop.

Access to this deposit is not difficult, and M.H.A. recently collected a bulk sample from the bluff near Maynes Creek. Map contours suggest easy physical access. This deposit is on private land.

Two BHP percussion drill holes within 20 m of each other and adjacent to the bulk sample sites were sampled with the following results.

BH		SiO ₂	Fe ₂ O ₃	Al ₂ O ₃
SC 11	0-6 m	98.9	0.45	0.10
	9-15 m	99.0	0.25	0.10
SC 12	0-6 m	98.7	0.30	0.05
	6-12 m	98.5	0.35	0.10

4.2.2 Meunna Trig (Myalla Road)

This exposure of quartzite occurs on a sharp bend in Myalla Road north of Meunna Trig (not shown on the

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standard 1:100,000 Arthur River map). The quartzite here is a thin bed several metres wide interbedded with siltstones.

4.2.3 Pokes Road

This prospect is a road material quarry on a ridge top, which results from the more resistant quartzite. The quartzite (fine grained) bed which strikes at 42° and dips NW at 50° has a thickness of approximately 5 m with siltstone on both sides.

No sample results are known from this prospect.

4.3 Quartzites of the Detention Sub-group

For locations see plan 2.

4.3.1 Dip Range No. 1

This locality refers to a prominent quartzite ridge about 1.5 km long extending from Hogarth Creek at the southern end to the Dip Range No. 1 North Prospect in the north. The quartzite beds of this prospect crop out strongly at isolated points along the ridge. At each end of the ridge the quartzite beds crop out more extensively than elsewhere.

At Dip Range No. 1 North, Kevin Pinner (M.H.A.) has measured a continuous quartzite outcrop across the strike of about 200 m, which could represent a stratigraphic thickness of about 150 m. This area may include both Crown and private land.

At Hogarth Creek a large outcrop of quartzite is exposed on both sides of the gully. This outcrop has

not been measured, but it is estimated that a stratigraphic thickness of at least 25 m is exposed. These outcrops were not observed in their entirety.

Hogarth Creek has cut a deep gully across the strike of the strata forming the Dip Range. Well developed joint faces on the exposures in Hogarth Creek suggest that the gully direction is controlled by a geological structure such as a fault, shear zone or dyke. A fault with a similar strike is shown on the Table Cape 1:63,360 geological map about 1.5 km north of Hogarth Creek.

In addition, an occurrence of very weathered iron stained igneous rock was observed in the Hogarth Creek gully immediately downstream of the main quartzite outcrops.

Both Hogarth Creek and Dip Range No. 1 North prospects are located about 1 km from Newhaven Road.

Access to the Hogarth Creek prospect would require development tracks across steep side slopes of up to about 25°. No heavy timber is present on the proposed access route.

Access to Hogarth Creek is steeper and better drained while the route to Dip Range No. 1 North traverses more low lying and swampy country.

4.3.2 Dip Range No. 2

This prospect is located high on a main ridge of the Dip Range about 3 km from the closest road and about 200 m in elevation, above it.

Scattered outcrops of quartz are present on the crest of the ridge and no clear indication of the width of the quartzite bed could be obtained.

Prominent quartzite outcrops about 1 km from the road and at a low elevation were observed on the valley side during the walk to the prospect. These outcrops were not inspected.

4.3.3 Milabena Prospects

These were not visited due to lack of time. They are located within the mapped area of the Detention Sub-group. Three analyses for quartzite quoted by M.H.A. indicate a suitable silica level.

5. EXPLORATION CONSIDERATIONS

As discussed in Section 4 the prospects may be divided broadly into two groups, the Jacob Quartzite and the Dip Range Quartzite (part of the Detention Sub-group). It should be noted that the Jacob Quartzite and the Dip Range Quartzite are separate geological members. As such the extrapolation of quartzite chemical and physical properties from one to the other (based on existing information) can only be regarded as tenuous.

Generally a limited number of surface samples have been taken across both groups. The Jacob Quartzite has also been subject to some subsurface sampling however no such exploration has been carried out on the Dip Range Quartzite. From the available information the Dip Range Quartzite appears in terms of possible quantity and quality to be the superior prospect and thus would be the first exploration area.

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During the initial field examination it was noted that extensive areas of vegetation were present where quartzite would have been expected to crop out along the prominent strike. At this stage it is not known whether these areas are due to lithological changes or due to the development of a soil profile.

The reasons for lack of outcrop can only be established by costeaning to identifiable bedrock.

Sporadic areas of surface silicification on the Dip Range prospect were noted. However as limited surface and no subsurface information is available on the Dip Range prospects the continuity of the chemical and physical silic properties, laterally and with depth will only be established by appropriate sampling during exploration.

With respect to the Jacob Quartzite, particularly the Maynes Creek deposit irregular surface silicification has been reported. Recent blasting of samples from Mayne Creek by B.H.P. has shown the deposit to be composed of a very glassy hard white surface with a friable sub-surface. Whether the friable subsurface is itself a weathering effect and of limited depth is not known at this stage.

Two processes may have been involved in surface silicification of the quartzite. Firstly Silcrete formation appears to have been involved in silification of some outcrops. This contention is supported by the presence of a silcrete cemented Tertiary gravel deposit forming a ridge capping adjacent to Dip Range No. 1 North Prospect.

Secondly leaching of contaminating minerals has also up-graded surface zones of the quartzite. Several surface samples from different localities exhibited voids from which minerals had been removed. Gee, 1971 notes leaching to 10 m depth of quartzite in the Sister's Hills.

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To date there has however been insufficient exploration to determine whether this silicification is wide spread enough and of sufficient depth to prove beneficial in terms of the overall silica quality available with respect to chemical or physical characteristics.

6. INITIAL RESOURCE ASSESSMENT

Silica bearing quartzite rocks occur commonly in the Proterozoic sequence within EL 43/70. Prospective beds occur over an area of more than 50 square kilometres within the agreement area. The Dip Range I prospect has a strike length of 1400 metres. Traverses normal to the strike of aggregate lengths of 530 metres indicated that an inferred stratigraphic thickness of 150 metres of quartzite could be confirmed by initial costeaning. At the Dip Range No. 1 prospect quartzite outcrop occurs at up to 160 metres above base drainage level.

The above is indicative of substantial quantities of quartzite. The suitability of these deposits will however be subject to sufficient mineable quantities having acceptable chemical composition and physical character. Environmental constraints and accessibility could restrict some areas available for development, but these problems are likely to be subordinate to the task of proving sufficient quantities of suitable silica. The possibility of several sites being needed to provide this is realised.

It is considered that despite the restrictive chemical and physical specifications required of the material sought, it is likely that an exploration programme as described below will be successful.

7. EXPLORATION AND DRILLING PROGRAMME - POSSIBLE REQUIREMENTS FOR
LARGE SCALE PROVING OF GEOLOGICAL RESERVES

7.1 General

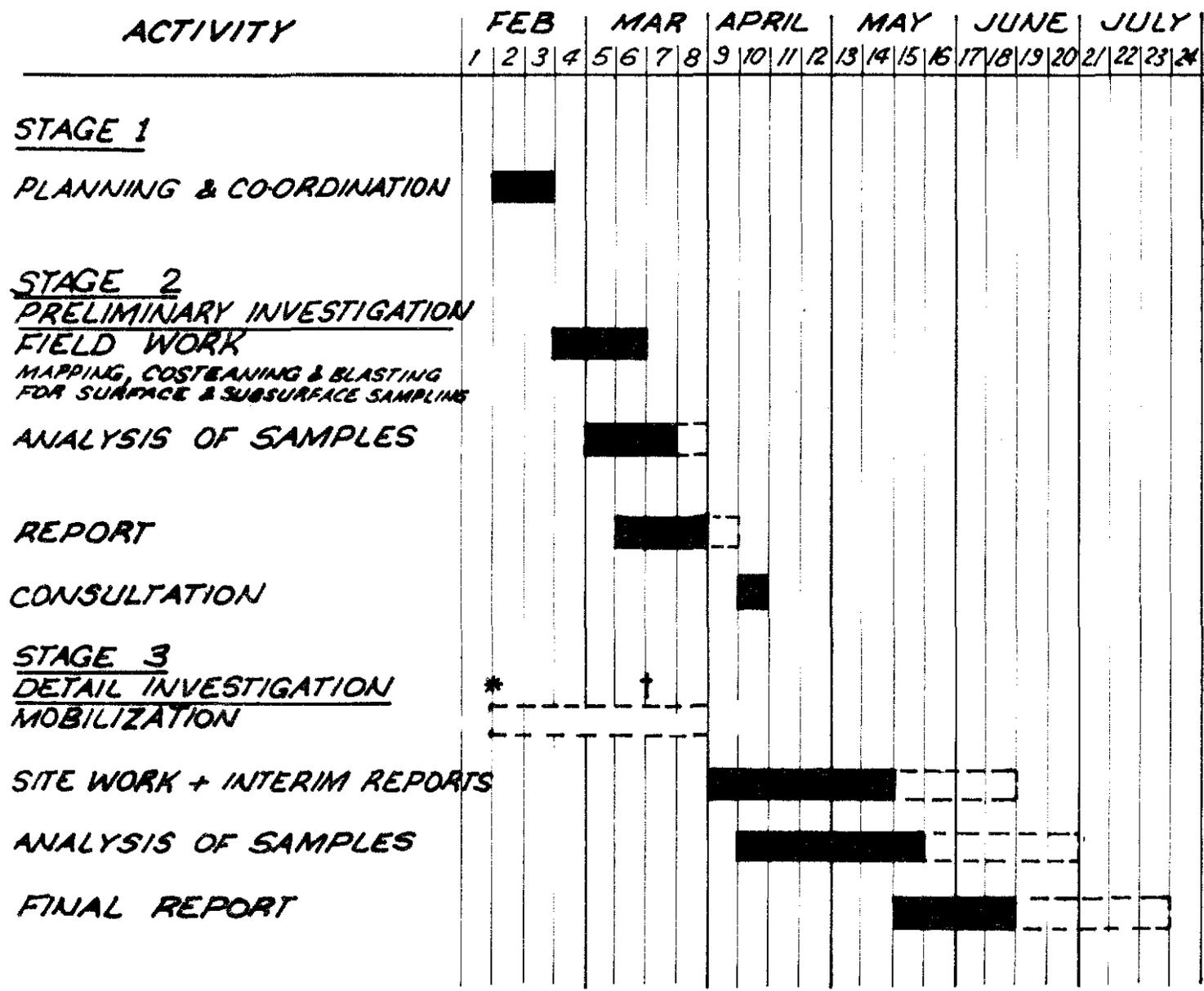
The field trip to E.L. 43/70 by Adamson and Callender together with a review of previous work in the lease area form the basis for this exploration programme. A multi-stage programme is envisaged; each stage becoming increasingly more detailed with the successful completion of the previous phase. A period of review would be associated with the completion of each of these stages. Estimates would be firmed up and planning reviewed with regard to the additional information gained from the previous stage.

The following programme outline is not intended as an exploration commitment either in terms of the number of stages, timing or anticipated expenditure levels as these may be altered as circumstance necessitate. Particularly, the programme maybe cut short if results are not promising.

7.2 Exploration Programme (See Figure 1)

A three stage exploration programme is proposed. The first stage would be essentially a formulation phase during which all available information is collected, base maps prepared, air photo interpretation carried out and co-ordination undertaken for the following stage. The second stage is envisaged as a preliminary investigation composed of field work (mapping, costeaning and sampling), laboratory analysis and a definitive report. The purpose of this work being firstly to gain an overall appreciation for the resources of the licence and secondly to identify a target area in terms of quality and quantity for proving up during the subsequent stage. The third stage would then consist of the detailed drilling and sampling of the prospect(s) at such intervals as

PROGRAMME



NOTE:
 * BOOK DRILL RIG
 † DRILL RIG CONFIRMED AFTER VERBAL REPORT AT COMPLETION OF FIELDWORK/SAMPLE ANALYSIS IN STAGE 2

FIG. 1



is required to prove the reserves. Upon the successful completion of field work and sampling programme a report containing, geological maps, sections, drill logs and locations, analytical data and reserve estimates based upon a preliminary mine plan could be produced, together with such other information gathered during the investigation likely to effect the mine development.

Stages 1 and 2 may be expected to be completed by mid April while should Stage 3 proceed, a completion date ranging from mid-June to mid-July is envisaged depending upon drill rig availability and weather.

It is estimated that stages 1 and 2 will incur an expenditure in the order of \$40,000 while the successful completion of the total project would have an expenditure level in the order of \$185,000.