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CRA EXPLORATION PTY. LIMITED  
ACN 000 057 125



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EL 10/93 Razorback

Final Report

EL10/93  
10 DEC 1996  
See folio 55

Author: T. von Strokirch

Date: December 1996

Licence Holder: CRA Exploration Pty. Limited

Submitted to: Chief Geologist, South East District

Copies to: Mineral Resources Tasmania  
CRAE - South East District  
CRAE - ET & I

Submitted by:

Accepted by:

96-3946

FINAL REPORT - EL 10/93  
RAZORBACK, CRA EXPL.  
T. VONSTROKIRCH

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CRAE Report No. 22651

### Abstract

The Razorback tin mine is situated near the old township of Dundas, 7km ENE of Zeehan in Western Tasmania.

The mine was operated from 1975 to 1978 by Minops Pty Ltd.

CRAE entered into a joint venture with Minops in 1979 and conducted exploration over the prospect through the 1980's.

A detailed program of rehabilitation of the old mine site was put together in 1991.

In 1993 the licences were reissued to CRAE in order for rehabilitation work to be completed.

The rehabilitation work was completed to the satisfaction of the Department of mines Inspector. Following a review of the project, CRAE concluded that no further exploration be conducted on the licence.

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327004

<b>Plan No.</b>	<b>Title</b>	<b>Scale</b>
Tv 1167	EL 10/93 Razorback Location Plan	1:25 000

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Appendix 1	Oonah and Razorback Mining Leases Rehabilitation Plan.
Appendix 2	Summary of completed rehabilitation work.

## **1. Conclusions and Recommendations**

That no further exploration be conducted on the licence by CRAE. If the rehabilitation work is satisfactory the licence should be relinquished.

## **2. Introduction**

The Razorback tine mine is situated near the old township of Dundas, 7km ENE of Zeehan in Western Tasmania.

The mine was operated from 1975 to 1978 by Minops Pty Ltd.

CRAE entered into a joint venture with Minops in 1979 and conducted exploration over the prospect through the 1980's.

In 1993 the licence was reissued to CRAE in order for rehabilitation work to be completed.

This report covers work completed on the licence from 1993 to relinquishment.

## **3. Review of Previous Work**

### **3.1 Prior to Current Tenement**

Previous workers on the EL's include Placer Prospecting Pty. Ltd. (1964-66) and Minops (mid 70's).

Minops mined 180,000 tonnes of ore grading 0.6% Sn in a small open cut operation from 1975-78.

CRAE entered into a joint venture with Minops in the late seventies and continued its tin search until the mid 80's.

Exploration by CRAE pre-1993 consisted of :-

- Airborne EM (44 line km)
- Pulse EM ground follow up
- IP
- Diamond Drilling

In addition work by previous operators included diamond drilling and various ground geophysical methods. At Razorback up to 23 diamond drill holes were completed.

A small tin resource has been outlined :-

Razorback : 0.6Mt @ 0.85% Sn

At Razorback mineralisation consists of pyrrhotite-dominant massive sulphide pods with minor pyrite, chalcopyrite, cassiterite, galena and sphalerite. The mineral is hosted within a carbonate altered basic tuff proximal to a NNW-striking ductile structure.

The best CRAE drilling result was DD80RC1 with 0.9m @ 0.83% Sn.

A series of follow up drill holes was recommended but was not completed as the prospect was deemed unlikely to contain an ore body suitable for CRA.

Details of previous work are covered in the report by Purvis (1980).

The licence was re-issued to CRAE in 1993 in order for rehabilitation work to be completed.

### **3.2 During Current Tenement**

A review of existing data over the project area concluded that there was little potential for the Razorback area to host an ore body likely to be of interest to the RTZ-CRA group.

#### **4. Rehabilitation**

The licence was granted in order to allow certain rehabilitation works to be carried out. These are covered in detail in Appendix 1 (Oonah and Razorback Mining Leases Rehabilitation Plan). This work was completed to the satisfaction of government inspectors (appendix 2).

#### **5. Expenditure**

Total expenditure during the period of the licence has been A\$51 411

## 6. References

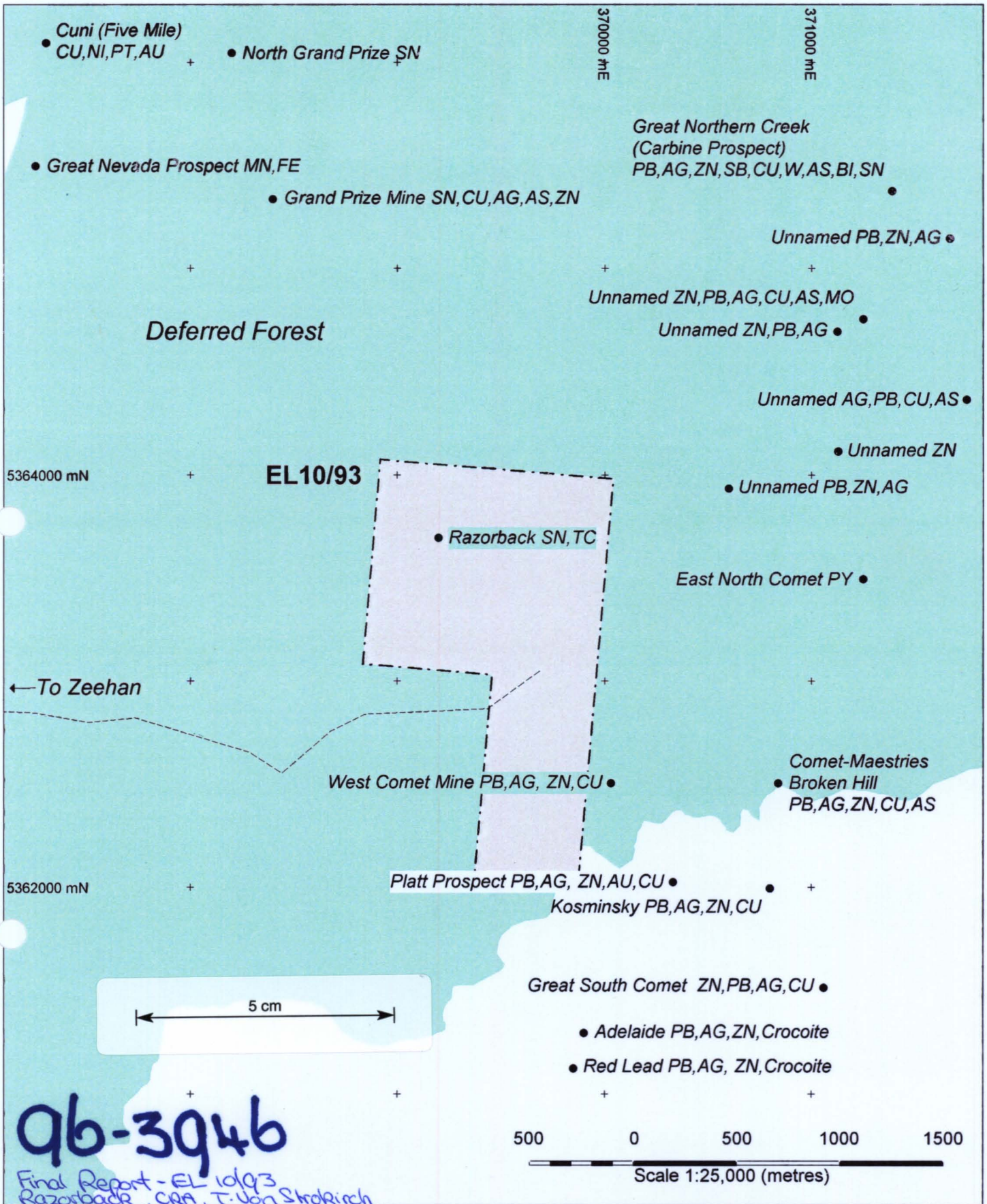
- Purvis J.G. 1980 Exploration at the Razorback Tine Mine, Western Tasmania; March 1979 to September 1980.

## 7. Location

Queenstown SK 55-5 1:250,000

## 8. Keywords

Tin, silver, dolomite, conglomerate, ultrabasic, carbonate hosted type, drill-diamond.



<b>Burnie SK5503</b>		
Sandy Cape 7815	Arthur River 7915	Hellyer 8015
Conical Rocks 7814	Piemans 7914	Sophia 8014
	Cape Sorell 7913	Franklin 8013
<b>Queenstown SK5505</b>		

<b>CRA EXPLORATION PTY. LIMITED</b>	
<b>EL10/93 Razorback</b>	
<b>Location Plan</b>	
<b>327009</b>	
Author: Torbjorn von Strokirch	Reference: Queenstown SK55-05
Drawn: Tony Sargeant	File Name: Tv1167.wor
Date: December 1996	Report No: 22651
Scale: 1:25,000	Plan No: Tv1167

**Appendix 1**

**Oonah and Razorback Mining Leases Rehabilitation Plan**



**Land Management and  
Rehabilitation Services Pty Ltd**

41b Tasma Street North Hobart Tasmania  
GPO Box 6596 HOBART TAS 7001  
Phone (002) 31 1509 Fax (002) 31 1548

A.C.N. 056 572 779

Directors:  
Tim Duckett and John Miedecke

**FACSIMILE**

5<sup>th</sup> of December 1996

To : T. von Strokirch  
CRA Exploration

Pages : 1

No: 03 92301166

From : Tim Duckett

**RE : Oonah and Razorback Mining Leases**

In August 1991 a Rehabilitation Plan was prepared for the Oonah and Razorback mining Leases by John Miedecke and Partners and Land Management and Rehabilitation Services (LMRS) formally Land Rehabilitation Services. The plan was implemented over a three year period by LMRS.

The plan was implemented as specified in the plan with two exceptions at the Razorback Lease and they are as follows.


Lime applications (as Limil) were used to neutralise the sulphide dumps at the Mill Site

The weed control programme for gorse has been extended over a period of 5 years and will continue on a maintenance basis.

The site was inspected by Bill Bourke (DELM) and Tony Christianson (Mines Inspectorate) in June 1993 and again by Mr Halfacre (Mines Inspectorate) and Shelly Inness (DELM) in 1995.

A photographic folio is currently being prepared for the Razorback site and will be available within the next 6 months.

Yours Sincerely



(Tim Duckett)

Environmental Management  
and Engineering Consultants

PO Box 128  
Beaconsfield Tasmania 7270  
Telephone: (003)947392  
Facsimile: (003)947382

Other Office:  
20 Rowntree Street  
Balmain New South Wales 2041  
Telephone: (02)8108100  
Facsimile: (02)8105542

327012

Principal Office ; GPO Box 659G,  
Hobart, Tasmania 7001  
41 Tasma Street  
North Hobart, Tasmania 7000,  
Telephone 002 311509,  
Facsimile 002 311548

JOHN MIEDECKE  
AND  
PARTNERS PTY LTD



CRA EXPLORATION  
OONAH AND RAZORBACK MINING  
LEASES  
REHABILITATION PLAN

August 1991

Land Rehabilitation Services

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PHOTOGRAPHS	rear of report

## 1.0 INTRODUCTION

CRA Exploration, holds two mining leases on the West Coast of Tasmania near Zeehan. ML 35M/72 (Oonah) covers an area of approximately 40 ha north-west of Zeehan, and ML 6M/77 (Razorback) an area of 85ha near Mount Razorback. The location of these leases is shown in Figure 1.

CRA procured these leases from Minops Pty Ltd. who formerly operated a tin exploration program at Oonah Hill and a mine at Razorback. CRA has carried out exploration programs beneath and around the old workings.

Both areas contain old mine workings, which date back to the early 1900's. The leases are described in more detail in the following sections.

This Rehabilitation Plan has been prepared on behalf of CRA for submission to the Department of Resources and Energy. It presents a rehabilitation plan for the Lease areas and proposes a rehabilitation programme which will be implemented over the next three years which is intended to satisfy the conditions on the leases.

## 2.0 REHABILITATION REQUIREMENTS

The principal acts with relevance to the rehabilitation at the leases are;

Mining Act, 1929  
Mines Inspection Act, 1968

The Mining Act and conditions of the lease require the company to "To rehabilitate the surface of the demised land to a condition satisfactory to the Director".

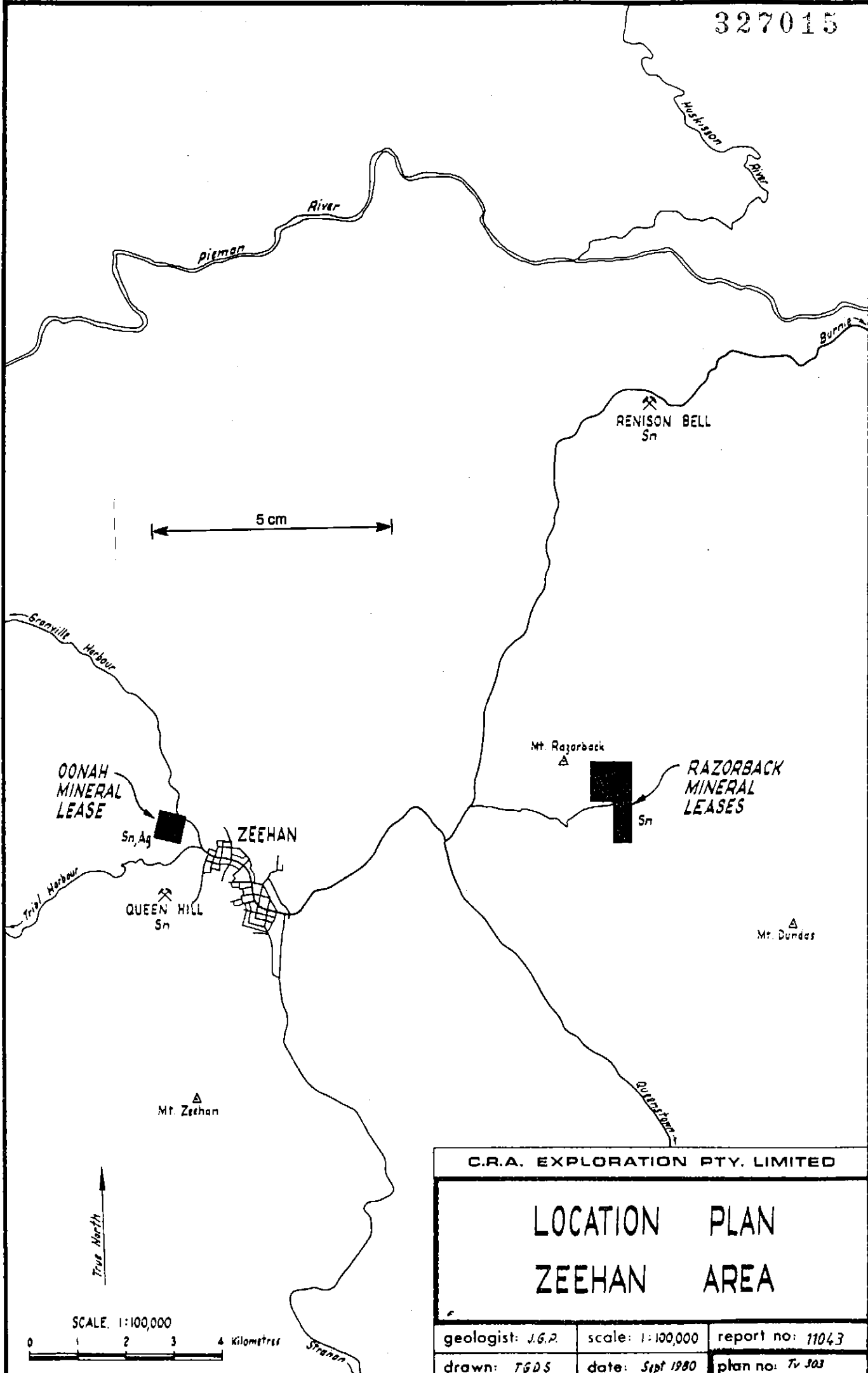
The Mines Inspection Act has provisions for the decommissioning of the mineral lease to a permanently safe condition.

## 3.0 REHABILITATION PLAN OBJECTIVES

The broad long term rehabilitation objective is, after stabilizing disturbed areas, to provide an environment which allows ecological succession and stability.

The specific objectives are to leave disturbed areas at the completion of rehabilitation in a condition which achieves the following;

- The area is stable and not eroding or degrading
- Disturbed areas are revegetated to the satisfaction of the the Director of Mines.
- The visual impact of disturbed areas is minimised from major vantage points.
- The areas are safe for anticipated after uses of these areas.
- The disturbed areas are returned to a compatible land use.
- Historic values are retained



C.R.A. EXPLORATION PTY. LIMITED

**LOCATION PLAN  
ZEEHAN AREA**

geologist: J.G.P.	scale: 1:100,000	report no: 11043
drawn: T.G.D.S.	date: Sept 1980	plan no: Tv 303

The mineral lease areas are Crown Land which will eventually return to public use and control under the Department of Parks Wildlife and Heritage. Therefore, future uses are expected to be restricted to public recreation .

The only practical land use is therefore considered to be a return to native vegetation cover. The lease areas also contains features and technical and historical interest to the general public. At Oonah these include the old mill area, adits, and shafts, as well as old tailings deposits, all of these are only a short distance from Zeehan. At Razorback, the open cut, waste dumps as well as exposed old underground drives, and to a lesser extent the mill area foundations and tailings dams are all of some historic interest.

The Rehabilitation Plan seeks to recognise these values.

#### **4.0 REHABILITATION PRINCIPLES AND PROCEDURES**

##### **4.1 REHABILITATION PRINCIPLES**

The general principles and criteria for establishing the need and priority for rehabilitation are described in this section. They were developed from current Government policy, industry practice and the experience of the consultants.

In Section 3.0, the objectives of the plan were identified as achieving environmental stability, minimizing visual impact, maintaining public safety and providing a compatible land use.

A priority rating has been placed on areas which are unsafe, visible, and/or unstable and not revegetating naturally. The more recent disturbances associated with CRA's exploration - tracks and drill pads, have also received priority and the main resources focussed on these areas.

Areas of historic (and therefore visitor interest) have been identified and preserved while taking into account public safety and rehabilitation goals.

Site Rehabilitation Plans (Section 5.0) have been developed from this information. The priority of rehabilitation considers all the factors.

##### **4.2 REHABILITATION PROCEDURES**

Rehabilitation consists not only of the act of revegetation, but also includes all the activities required to provide an environment suitable for the establishment of a vegetation cover, or if this is not feasible, some other method of stabilising the site.

For vegetation to establish successfully on any disturbed site, the environment must satisfy four simple requirements which are common to all plants;

- the plant roots must be able to penetrate the ground surface
- there must be an adequate but not excessive supply of moisture
- there must be an adequate supply of nutrients
- there must be limited toxicity.

In normal soils these are all satisfied, but in mine areas and mine waste materials they are frequently not. The art of successful rehabilitation depends on understanding which requirements are not being met, and taking remedial measures to alter conditions so that they are, where technically and economically feasible. In some circumstances, alternatives to revegetation may have to be considered.

The basic strategic rehabilitation procedures which will be adopted for rehabilitation are outlined below by individual topics. They are not site or area specific but are broad guidelines. Detailed specifications will be used in the site rehabilitation.

#### 4.2.1 SITE PREPARATION

The initial preparation of the site will aim to provide a rooting medium for successful vegetation establishment, and provide a stable surface.

- **Demolition and Cleanup**

As some of the areas, particularly at Razorback, contain redundant buildings, machinery and refuse, the first step will be the demolition and cleanup of the site. These materials will be salvaged if economic, otherwise material will be collected and buried on site.

- **Earthworks**

Earthworks include all the physical earthwork activities required to prepare the site for revegetation.

Earthworks will include;

##### *Profiling and Reshaping*

Overburden and other mine or construction waste dumps (but not stable waste dumps), road embankments and excavation slopes will be contoured and profiled as required to minimise steep slopes, control erosion, maintain slope stability and improve aesthetics. This will be achieved by the judicious use of a small bulldozer and/or excavator. It is not envisaged that this will require major earthworks, except in areas identified in the Site Plans.

##### *Concrete Treatment*

Some areas at Razorback contain old concrete structural foundations - such as the mill foundations. This concrete requires treatment to prepare the site for further earthworks and revegetation. Where feasible holes will be punched through the slabs and flat sites will be covered with overburden. Protruding steel will be removed and buried.

##### *Tailings Treatment*

Extensive areas of tailings occur on the sites. At Oona, these are coarse sand and stable, while at Razorback there are dams containing fine tailings and slimes. Tailings are to be left insitu and basically undisturbed. The Razorback dams will be flooded. This will prevent any ongoing oxidation and stabilise the materials.

### ***Batter Treatment***

Batters vary in size and also in materials. Treatment specifications have been developed according to their stability and revegetation potential. Treatment varies from none required, to benching and covering with soil.

### ***Ripping***

Extensive areas of compaction exist in the area. Ripping is required for revegetation to be effective and also to assist drainage and erosion control .

### ***Soil/Overburden Placement***

Concrete foundations which do not provide a suitable substrate for plant development, will be covered with unconsolidated materials, as will sulphide materials.

### ***Miscellaneous Treatment***

Other treatments are included in this category. They include road gripping (treatment to control drainage), diversion banks, drainage works, benching, and wetland establishment (as a means of rehabilitation).

## **4.2.2 REVEGETATION**

Revegetation will involve the re-establishment of local provenance native species in areas surrounded by existing natural plant communities.

- **Seed**

One seed treatment has been specified for the areas . The appropriate mix is listed in Appendix 1.

- **Seedlings**

The planting of seedlings is an expensive labour intensive method of revegetation, and is only proposed in specific areas (visible/unstable) where immediate establishment is required, or where adverse germination conditions exist. These areas are specified in the Site Rehabilitation plans (next Section).

- **Fertiliser**

The disturbed sites are nutrient deficient. Sources of plant nutrients are soil minerals and decaying organic matter. Once the topsoil had been removed or disrupted the major source of nutrients available to the plants is lost. This condition applies for virtually all the lease areas. Plants will not readily establish without a supply of nutrients.

Therefore, if areas deficient in topsoil are to be revegetated adequately, nutrients will have to be supplied in the form of fertiliser. An on-going application of fertiliser is also required until a self sustaining vegetation cover and nutrient reservoir is established.

The fertiliser mixes is specified in Appendix 2.

An initial application will be applied with maintenance fertiliser treatments as required.

• **Seed and Fertiliser Application Methods**

The options available for seed and fertiliser application are;

- hand broadcasting
- mechanical hydro-seeding/mulching.

Hand application will be required in most areas because of the small size and difficult access. Hydroseeding (seed + fertilizer + water) may be applied to the larger areas, principally at Razorback.

• **Planting/Application Time**

Native seed, seedling plantings and fertiliser will only be applied in late Autumn to early Spring to ensure ready moisture availability.

## 5.0 REHABILITATION SITE PLANS

Each Lease area has been divided into discrete sites, and rehabilitation priorities, objectives and rehabilitation prescriptions are given for each site. These sites were identified using the rehabilitation priority procedures developed in Section 4.1.

Table 1 illustrates the Plan and the identified sites are shown on the aerial photographs of the area which are at the rear of this report. Table 1 also sets out the detailed revegetation specifications for each site.

General rehabilitation guidelines for each of the Lease areas are summarized below in terms of the individual elements of the Leases. This includes a general description of the areas listed in Table 1 and shown in the aerial photographs. Selected site photographs are included at the rear of the report.

### 5.1 OONAH HILL SITE DESCRIPTION AND REHABILITATION PRESCRIPTIONS

#### 5.1.1 TRACKS AND ASSOCIATED DISTURBANCES

##### 5.1.1.1 Description

A large number of tracks intersect the area, some are historical and were used for access tracks and railways for past mining activities, and many of these are now overgrown and are stable and revegetating naturally. However, a large number have been constructed for exploration access, together with drill pads and associated areas. These tracks are evident on the aerial photograph. The tracks at the top of the photo are on quartzite, and in areas exposed to public views.

While many of these tracks and disturbed areas are revegetating naturally, many are not, and are actively eroding. These are mainly on the steeper slopes and in particular, the road past the old mill site and Minop Shaft. This road provides access to the fire trails further over Oona Hill and is used by both 4 Wheel drive vehicles and trail bikes.

The local bike club uses this route, and local tracks are formally used only once per year. A local representative has indicated that they could readily use other tracks in the area.

TABLE 2; OONAH HILL REHABILITATION PLAN

SITE	TREAT. AREA ha	TREATMENT Site Preparation	Revegetation
TRACKS	2.2	Rip, grip, drain and soil	Seed, fertilise, Tea Tree slash
PLANT SITE	1.5	Profile, rip select areas, cleanup , drain	Contour pin tea tree seed and fertilise.
DUMPS Dumps 1&3	1	Cleanup area, minor drainage control, profile where possible	Contour pin tea tree seed and fertilise.
Dump 2	0.1	Bench , recover and spread soil.	Seed and fertilise.
SHAFTS			
Oonah	0.01	Excavator fill and profile	none
	0.01	Fence	none
Adit		Pipe and block with fill	none
Shaft 2	0.01	Excavator fill and profile, or fence	none
Shaft 3	0.001	Fill with large rock	none
Minops	0.001	Concrete cap	
MISCELL			
Weed Control		Spray noxious weeds	
Signs		Erect signs	
Tree planting		Plant seedlings near access	

TABLE 2; RAZORBACK REHABILITATION PLAN

SITE	TREAT. Area ha	TREATMENT Site Preparation	Revegetation
NORTH DUMP	1.6	0.8 ha to be contour ripped, profiled and drainage control	Seed and fertilise
EASTERN SECTION of Open Cut	0.6	0.4 ha to be ripped, profiled, drainage provided and soil recovered.	Seed and fertilise
OPEN CUT		Block drives	
MILL SITE	1	Bury waste, bench face, profile, contour rip	Seed and fertilise
SULPHIDE DUMP	0.3	Bury sulphides, profile, rip	Seed and fertilise
TAILS DAM 1	0.7	Remove decants, divert creek, flood, construct spillway, rip compacted sites, profile.	Seed and fertilise Transplant Juncus and Restio sp
TAILS DAM BORR. PIT	0.5	Profile, contour rip, soil.	Seed and fertilise Tea tree brush
TAILS DAM 2	0.3	Remove decants, profile, rip, construct spillway.	Seed and fertilise
TRACKS/OTHER DIST. AREAS	3	Rip, grip, profile, drainage control, soil. Close access except to open pit, mill.	Tea tree slash additional fertiliser for poor areas
MISCELL Construct Pedestrian Bridge		Use power poles to construct access	
Signs			
Tree planting			
Weed Control		Noxious weed spraying	

### 5.1.1.2 Rehabilitation Treatment

The total length of tracks is approximately 5 km of which approximately 3 km require treatment. Some of these only require drainage works, while others also require revegetation. The area for treatment has been estimated on the observed site requirements. All roads not required for long term access, will be closed. This includes access to the fire trail which is used by trail bikes and 4 wheel drives.

Access tracks will remain to the mill site and Minops Shaft area. Where the existing access road meets the Trial Harbour Road will be cleaned up and ripped and revegetated.

#### Site Preparation (Area = 1.8 ha)

All compacted surfaces will be ripped where possible. Tracks on slopes will be "gripped" and drainage provided to undisturbed areas.

Available soil from the track sides will be recovered and spread over the track.

Entrances to the tracks will be blocked by earthworks and fallen trees.

#### Revegetation (Area = 1.8 ha)

Native seed and fertilizer will be applied by hand as the tracks are being restored by machinery. This eliminates future access difficulties. A total of 3.6 kg of seed and 630kg of fertiliser will be applied. The final treatment will involve cutting or pulling trackside seed bearing tea tree scrub over the track.

## 5.1.2 OLD MILL SITE AND ADIT AREA

### 5.1.2.1 Description

Much of this site has some historical significance and as the disturbance is historic, proposed that the area not be disturbed except for some site preparation in recently disturbed areas, safety measures and removal of rubbish. The Council and locals are using some of the dump materials for a source of fill and road building materials. Some contouring of these disturbed dumps is proposed, plus limited revegetation of some areas.

Tea tree brush will be pinned along the contours of the dumps as a revegetation treatment, with the supplementary application of other species.

### 5.1.2.2 Rehabilitation Treatment

#### Site Preparation (Area = 1.5 ha)

All site rubbish will be collected for for burial or removal to the Municipal dump

Major structures and mounds of tailings of historic interest will remain intact and undisturbed.

The adit will be blocked with fill, with a pipe left for drainage.

Area disturbed for fill will be profiled, as will other unnatural landforms. Site drainage from the adit and general area will be improved. Compacted surfaces will be contour ripped and prepared for revegetation.

### **Revegetation**

Revegetation treatment to speed-up natural revegetation processes is to pin seed bearing tea tree on the contour at 4m intervals on sloping exposed faces. These areas would be treated with native seed and fertilizer, applied by hand. A total of 5.2 kg of seed and 455kg of fertiliser would be applied.

### **5.1.3 OTHER DUMPS, TAILINGS DEPOSITS**

#### **5.1.3.1 Description**

A number of other dumps and tailings deposits are scattered over the area. These are all old dumps which are undisturbed and are stable, being composed of coarse sand size particles. One dump (Dump No 2) is exposed to public view.

#### **5.3.1.4 Rehabilitation Treatment**

Only the visible dump will be treated with earthworks. Rehabilitation treatment involves the speeding up of natural revegetation on the dumps.

#### **Site Preparation (Area = 0.1 ha)**

Dump No 2 will have benches cut into the face, be ripped and have soil recovered from the edges as much as possible. Site preparation in other areas will only be associated with drainage and track treatment.

Revegetation treatment to speed-up natural revegetation processes will be to pin seed bearing tea tree on the contour at 4m intervals on sloping exposed faces. These areas will be treated with native seed and fertilizer, applied by hand. A total of 4.0 kg of seed and 350kg of fertiliser will be applied.

### **5.1.4 SHAFTS AND ADITS**

#### **5.1.4.1 Description**

A total of four open shafts are located in the Lease area. These are the Oonah Main Shaft, near the old mill area, an unnamed shaft approximately 75 m to the north (Shaft 2), another approximately 50m north (Shaft 3), the Minops Shaft further north and the Adit near the Oonah Shaft. Only the Minops Shaft is open to any depth, with the remnants of a wooden headframe and with a concrete collar in good condition .

#### **5.1.4.2 Rehabilitation Treatment**

All the Shafts and Adits will be made safe. Shafts which are already blocked can either be fenced, or filled in with an excavator. This includes the Oonah Shaft and Shaft No. 2.

Shaft 3 acts as a drainage route for waters from the north east. This will have to remain open, otherwise a dam will be formed in this location which will spill over the fill batter to the Adit creek (the fill has blocked the natural drainage). This shaft will be filled with rock

fill to act as a filter, yet prevent access. Water will therefore continue to flow down the shaft where it will discharge from the Adit.

Access to the adit will be blocked with fill, while still allowing drainage to continue.

The Minops Shaft can be either left intact and capped with a concrete slab, or filled in and the concrete collar collapsed in.

## **5.1.5 DAMS**

### **5.1.5.1 Description**

Only one constructed dam remains on the Lease. This is to the north of the Mill area near Shaft 3. It contains the small catchment further up the hill and was presumably developed for a water supply. The dam spills to Shaft 3, and some erosion of the roadway has occurred in this area. The dam embankment is formed by fill and is approximately 30 metres wide at the top. There are therefore no stability concerns.

### **5.1.5.2 Rehabilitation Treatment**

The spillway erosion to the shaft will be repaired and rip-rapped. The Dam will otherwise be left intact.

## **5.2 RAZORBACK SITE DESCRIPTION AND REHABILITATION PRESCRIPTIONS**

The Razorback Lease area contains the old workings of initially underground tin mining operations which date back to the early 1900's, and the more recent open cut and processing carried out by Minops in the early 1970's. CRA took over the lease from Minops and carried an exploration program .

The mine area is evident on the aerial photograph, which was taken in 1988. Disturbances include the open cut, overburden dump areas to the north and south, access roads, the mill area, water storage and tailings dams. Natural revegetation processes are well underway in many areas, and in most cases disturbance which are evident on the photograph are now not as evident on the ground.

By far the majority of the disturbance is associated with the past mining activity, and only minor disturbance with the exploration activities. Gravel extraction is current within the Lease area at the south side of the Dundas Road, presumably by the Council. This area has not been considered in the plan.

### **5.2.1 NORTH DUMP**

#### **5.2.1.1 Description**

This dump contains the overburden stripped from the open cut. Overburden has been end-tipped over the hillside and has now to a large degree stabilised itself. Gully erosion is evident where uncontrolled runoff has discharged over steep areas. Revegetation is progressing slowly, due to exposure and nutrient deficiency.

### 5.2.1.1 Rehabilitation Treatment

#### Site Preparation (Area = 0.8 ha)

Areas which are accessible will be contour ripped, and drainage formed to the north and east into natural vegetation. Drainage lines will be rip rapped where feasible. Mounds of overburden will be profiled.

#### Revegetation (Area = 1.6 ha)

The general area will be seeded and fertilized, by hand or possibly by hydroseeding. A total of 6.4 kg of seed and 560kg of fertiliser would be applied.

### 5.2.2 OPEN CUT AND WESTERN SIDE

#### 5.2.2.1 Description

The open cut which was constructed in the early 1970's has steep slopes and high bench heights, with most of the western side now inaccessible. However, except for some local failures it is stable and the western side is revegetating naturally and successfully. This includes the the southern overburden dump. Numerous drives of the old underground workings are exposed in the open cut faces and the site itself provides diverse examples of mining history and is of some historical value.

#### 5.2.2.2 Rehabilitation Treatment

No rehabilitation work is proposed on the open cut itself and the western side, other than some earthworks for public safety, as these areas are stable and revegetating quite successfully.

Open drives will be closed by drilling and blasting the roofs, or caving with an excavator. Inaccessible entrances will be left open for public viewing.

### 5.2.3 EASTERN SIDE OF OPEN CUT AND ASSOCIATED ROADS

#### 5.2.3.1 Description

This area consists of benches and overburden formed and dumped in the open cut mining. The area is accessible and consists of a series of flat areas with steep batters and slopes. Revegetation has been poor due to exposure, aspect and the poor nutrient status of the material. Some areas are eroding, and the area is visible from the South.

#### 5.2.3.2 Rehabilitation Treatment

##### Site Preparation (Area = 0.4 ha)

Accessible benches and flat areas will be ripped and tracks ripped and gripped, with site drainage controlled and improved.

Mounds of overburden and bench edges will be profiled. Any stockpiles of topsoil beside roads will recovered and spread where applicable

**Revegetation (Area = 0.6 ha)**

The general area will be seeded and fertilized, by hand or possibly by hydroseeding. A total of 24 kg of seed and 210kg of fertiliser will be applied.

Trackside seed bearing tea tree scrub will be pulled over tracks.

**5.2.4 MILL SITE****5.2.4.1 Description**

The mill site contains the concrete foundations for the mill buildings, plus associated stockpiles and overburden benches. Uncontrolled drainage from the adit also flows over the site and old steel work and general refuse also remains.

**5.2.4.2 Rehabilitation Treatment****Site Preparation (Area = 1.0 ha)**

The flat exposed foundations will be covered with the fill material which exists in the batter above. This fill batter will also be benched. The inclined foundations will be broken up in selected locations if possible, and fill placed in these areas.

All refuse will be buried under the fill batter.

Mounds of overburden and ore will be profiled and the site ripped on the contour where possible. The adit drainage will be redirected into the creek channel, and the access roads at this higher level closed.

**Revegetation (Area = 1.0 ha)**

The general area will be seeded and fertilized, by hand or possibly by hydroseeding. A total of 4 kg of seed and 350kg of fertiliser will be applied.

**5.2.5 SULPHIDE DUMP****5.2.5.1 Description**

This dump contains the sulphide ore which has been stockpiled on the site. These materials are oxidising and will continue to do so unless covered.

**5.2.5.2 Rehabilitation Treatment****Site Preparation (Area = 0.3 ha)**

The sulphide will be buried and/or covered with other material won from the area. Mounds will be profiled and the site ripped on the contour where possible.

**Revegetation (Area = 0.3 ha)**

The general area will be seeded and fertilized, by hand or possibly by hydroseeding. A total of 1.2 kg of seed and 105kg of fertiliser will be applied.

## 5.2.6 TAILINGS DAMS AND WATER STORAGES.

### 5.2.6.1 Description

The tailings dams are located downslope of the mill area and adjoin an unnamed tributary of the Dundas River. Two smaller water storages were also developed for water supply purposes. None of the dam embankments are greater than 5 metres high and are therefore less than the referable dam height. The embankments appear to have been well constructed and stable. All dams would also be given a low hazard rating in accordance with the guidelines of ANCOLD and the Tasmanian Dams Safety Committee, because of the location and the tailings materials. The tailings have naturally segregated with the coarser materials in the No 1 (Upper Dam) and the finer material in the lower. The latter also receives drainage from the mill area and the adit.

### 5.2.6.2 Rehabilitation Treatment

There are several options which were considered for the abandonment. These are, breach the embankments and drain the storages, or leave the storages basically intact with additional spillway protection. The latter is the preferred option. The breaching of the embankments would result in additional site disturbance and could expose materials which could erode with possible downstream effects.

#### Site Preparation

##### Tailings Dam 1 (Area = 0.7 ha)

The two steel decant structures and pipework will be removed and blocked. The storage will then be able to flood and rise approximately one metre to the level of a new spillway constructed on the eastern abutment. This spillway would be a minimum of 5m wide and capable of taking any flood in the Creek. The existing diversion would be removed and the creek course diverted into the storage.

The embankment surface will be ripped and prepared for revegetation. Mounds of material at the SE abutment will be profiled and compacted areas ripped.

##### Tailings Dam 1 Borrow Area (Area = 0.5 ha)

All mounds and cuts will be profiled and the area contour ripped.

##### Tailings Dam 2 (Area = 0.3 ha)

The two steel decant structures and pipework will be removed and blocked. A spillway will be constructed on the western abutment to restrict the level to the existing level.

The embankment surface will be ripped and prepared for revegetation.

#### Revegetation

##### Tailings Dam 1 (Area = 0.7 ha)

The seed and fertilizer will only be applied to the area surrounding the dam that have been prepared mechanically.

Rooted Juncus and Restio cuttings will be transferred from Tailings Dam No.2 to the tailings of Tailings Dam No.1 and hand planted. This will provide the seed source for the ongoing wetland marsh development in the storage.

The general area will be seeded and fertilized, by hand or possibly by hydroseeding. A total of 2.1 kg of seed and 245kg of fertiliser will be applied.

#### **Tailings Dam 1 Borrow Area (Area = 0.5 ha)**

The general area will be seeded and fertilized, by hand or possibly by hydroseeding. A total of 2.0 kg of seed and 175kg of fertiliser will be applied.

#### **Tailings Dam 2 (Area = 0.3 ha)**

The seed and fertilizer will only be applied to the area surrounding the dam that have been prepared mechanically.

The general area will be seeded and fertilized, by hand or possibly by hydroseeding. A total of 1.2 kg of seed and 105kg of fertiliser will be applied.

Seed bearing tea tree scrub will also be spread over the area.

### **5.2.7 TRACKS AND OTHER DISTURBANCES**

#### **5.2.7.1 Description**

A number of tracks and other disturbances exist throughout the Lease area. These include the access road over the Dundas River, and other access roads and tracks. It also includes the power line, and all areas not covered previously. The calculated areas are ; Western Tracks 1.2 ha, North-Eastern 0.2ha, Eastern 0.1ha and South-Western 1.4 ha. Some of these areas are stable and revegetating quite successfully, other areas require earthworks to stabilise the area. The Access Road bridge has collapsed and access is now via a ford over the river.

#### **5.2.7.2 Rehabilitation Treatment**

It is proposed that the main access road to the mill site (lower road), and the open cut will remain open. All other tracks will be closed. Pedestrian access will be provided over a bridge to be installed at the current bridge site.

#### **Site Preparation (Area = 2.9 ha)**

All refuse will be collected for burial, or salvage. This includes the power line.

All compacted surfaces which are not revegetating satisfactorily will be ripped where possible. Sloping tracks sections will be gripped and suitable drainage provided for catchment discharge.

Available soil from the track sides will be recovered and spread over the tracks.

#### **Revegetation (Area = 2.9 ha)**

Areas which are revegetating naturally and successfully will not be treated, or if necessary will only be fertilised.

The seed and fertilizer will be applied by hand as the areas are being restored by machinery. This eliminates future access difficulties.

A total of 5.8 kg of seed and 1015kg of fertilizer will be applied. Trackside seed bearing tea tree scrub will be pulled over the track.

## **6.0 PLAN IMPLEMENTATION, MONITORING AND MAINTENANCE**

### **6.1 PROGRAM**

The proposed implementation program is shown in Table 3. The rehabilitation work has been programmed to commence in March 1992 for Oonah and be completed in June 1994. Maintenance will follow if applicable.

### **6.2 MONITORING**

The staged work programme will allow annual monitoring to establish the success of the rehabilitation work. This will determine any follow up maintenance required, and finally to determine whether the rehabilitation is satisfactory for the purposes of satisfying the lease conditions.

### **6.3 MAINTENANCE**

The task of stabilising and then establishing a permanent self sustaining vegetation cover will be followed by a maintenance period.

The maintenance programme will take into account the following:

- Replanting / reseeded - areas which have failed to revegetate may require a follow up treatment
- Fertiliser application - a single application is unlikely to be sufficient to maintain the plant nutritional needs in some areas.
- Erosion control and stability - affected areas impacting on water quality may need remedial works

### **6.4 WEED CONTROL**

The declared weeds Gorse, Broom and Pampas Grass are present on the Leases. Their control will be achieved by the spray application of the herbicide Roundup and Pulse.

The herbicide will be applied in the first year of the rehabilitation works and a follow-up treatment in the third year.

TABLE 3; OONAH AND RAZORBACK WORK PROGRAM

SITE	1992	1993	1994	1995	1996
	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND
<b>OONAH</b>					
Tracks	P - - - - R		- - M		
Mill Site	- - - -		- - - -		
Dumps	- - - -		- - - -		
Shafts	- - - -		- - - -		
Weed Control	- -		- -		- -
<b>RAZORBACK</b>					
North Dump		P - - - - R		- - M	
East Sect. O/Cut		- - - -		- - - -	
Mill Site		- - - -		- - - -	
Sulphide dump		- - - -		- - - -	
Tails. Dam 1			P - - - - R		- - M
Tails . Borr. Area			- - - -	- - - -	- - - -
Tails Dam 2			- - - -		- - - -
Tracks and other	P - - - - R		- - - -		- - - -
Weed Control	- -		- -		- -
Bridge		- -			
P Site preparation					
R Revegetation					
M Maintenance					

## APPENDIX 1: NATIVE SEED APPLICATION

The native seed mix for Oonah Hill and the Razorback is specified in the following table. The recommended rate of application is 4 kg/ha for open sites and 2kg/ha for tracks.

Species	Oonah Seed Mix kg	Razorback Seed Mix kg
Acacia dealbata	1.0	2.0
Acacia melanoxylon	0.5	1.0
Acacia mucronata	3.0	5.0
Acacia verticillata	2.0	5.0
Eucalyptus nitida	1.5	3.0
Eucalyptus brookerana	1.0	1.0
Hakea eppiglotis	IF AVAILABLE	
Hakea lissosperma		1.0
Leptospermum glaucescens	1.0	1.0
Leptospermum lanigerum	0.5	2.0
Leptospermum nitidum	1.2	0.8
Leptospermum scoparium	2.5	3.0
Melaleuca squamea	0.5	
Melaleuca squarrosa	0.5	1.0
	15.2	25.8

## APPENDIX 2 : FERTILIZER APPLICATION

The most cost effective fertilizer to apply is an EZ mix of 8:4:10 at 350 kg/ha.

The total fertilizer requirement for Oonah Hill is 1435 kg .

In addition to the fertilizer quantity specified for Razorback, extra fertiliser is required for areas of disturbance that have revegetated naturally, but the trees and shrubs are stunted. An additional 7 bags of fertilizer are required.

The total fertilizer required for Razorback is 3115 kg.

## APPENDIX 3 : MAINTENANCE FERTILIZER APPLICATION

### 1. Oonah Hill

An additional fertilizer application will be required in Year 3. Approximately 500 kg of 8:4:10 fertilizer will be required at 250 kg/ha.

### 2. Razorback

The maintenance work at the Razorback will involve fertilizer applications in years 4 and 5 following site preparation and revegetation in years 2 and 3 respectively. An estimate of the total area requiring maintenance fertilizer application is 5 ha.

Approximately 1250 kg of 8:4:10 fertilizer will be required at 250 kg/ha over 2 years.

CRA EXPLORATION  
ML 35M-72  
**OONAH HILL  
REHABILITATION PLAN**  
John Miedecke & Partners P/L August 1991

NORTH

TRACKS

MINOR SHAFT

TRACKS

ZEEHAN - PIEMAN

DUMP 3

TRACK TO BE CLOSED FROM THIS POINT

SHAFT 3

TRACKS

SHAFT 2

DAM

OONAH SHAFT

ADIT

TRACKS

TRACKS

MILL SITE

ACCESS TO REMAIN

TRACKS

DUMP 2

DRAINAGE SOURCE TO BE STOPPED IF POSSIBLE

APPROXIMATE POSITION OF ML 35M-72 BOUNDARY

DUMP 1

TRACKS

ML 35M-72

ACCESS

ROAD

ROAD

5 cm

0 20 40 60 80 100 120 140 160  
METRES

TRIAL

HARBOUR

327032

NORTH

Diversion of creek to Tailings Dam

TAILINGS DAM 1

Spillway

Decants

TAILINGS DAM 2

Decants

Spillway

EASTERN TRACKS

TAILINGS DAM BORROW PIT

Existing bridge  
Pedestrian access

ROAD

ML 6M-77

SULPHIDE DUMP

MILL SITE

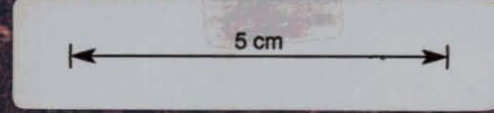
SOUTH-WESTERN TRACKS

RIVER

BOUNDARY

WESTERN TRACKS

EASTERN SECTION OF OPEN CUT

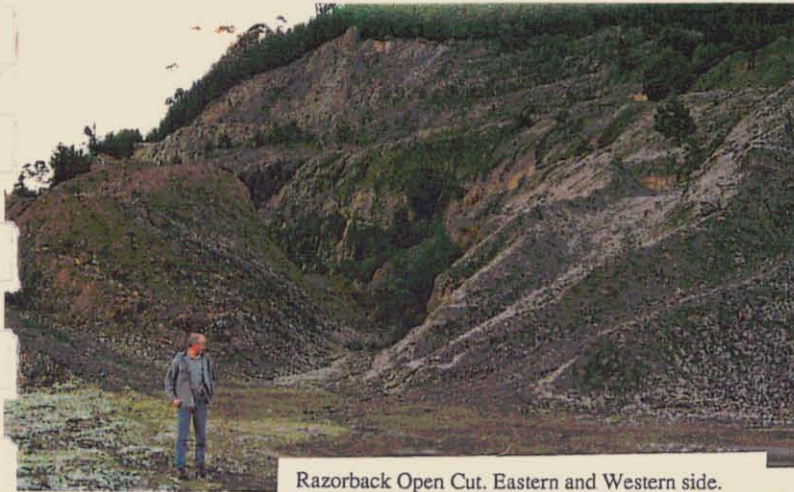


NORTH DUMP

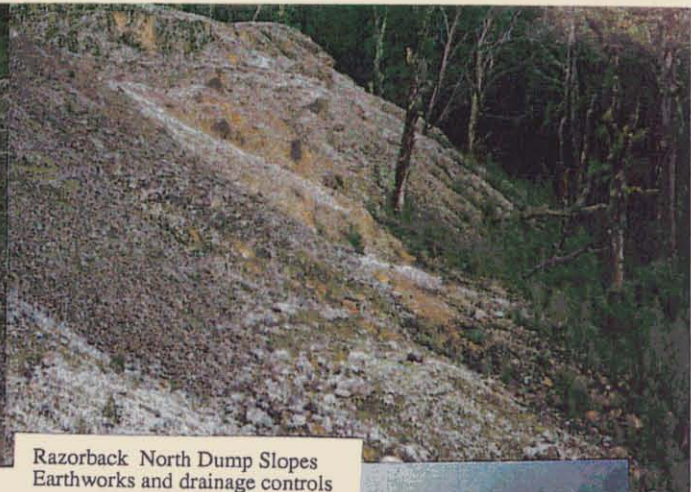
WESTERN SECTION OF OPEN CUT

NO REHABILITATION TREATMENT IN THIS AREA

CRA EXPLORATION  
ML 6M-77  
**RAZORBACK  
REHABILITATION PLAN**  
John Miedecke & Partners P/L August 1991



Razorback Open Cut. Eastern and Western side.  
Eastern side to be rehabilitated



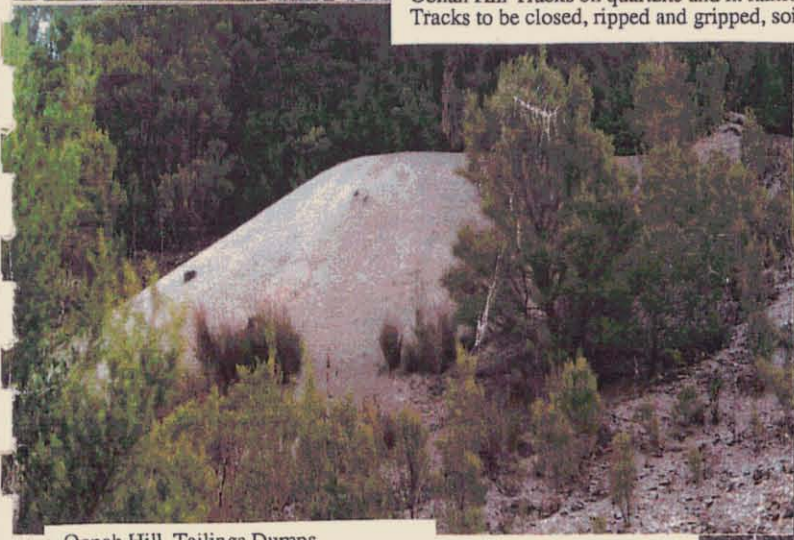
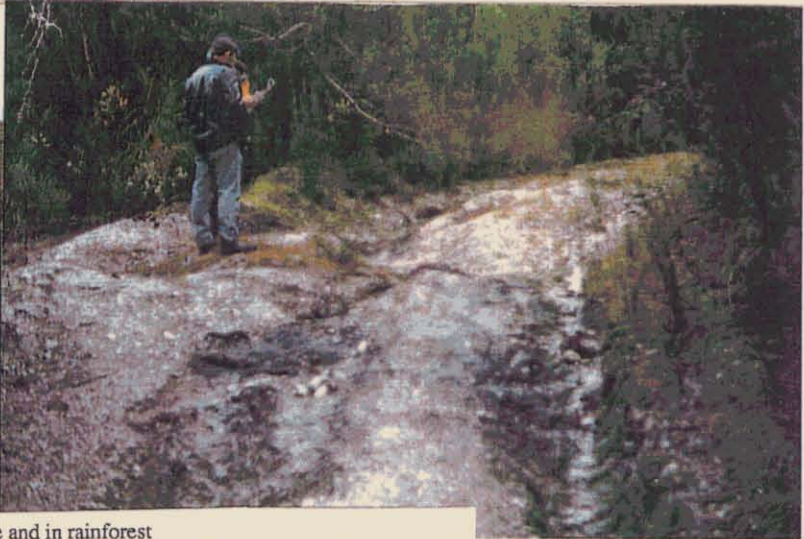
Razorback North Dump Slopes  
Earthworks and drainage controls



Razorback Mill Site.  
Concrete slabs to be covered with fill from dump on right hand side.



Oonah Hill Tracks on quartzite and in rainforest  
Tracks to be closed, ripped and gripped, soil returned from edges and revegetated.



Oonah Hill Tailings Dumps.  
Revegetation with pinned Tea Tree brush



Minops Shaft  
To be capped

**Appendix 2**

**Summary of Completed Rehabilitation Work**