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Ranger Exploration NL : environmental impact statement for the
Cobar tailings project



RANGER EXPLORATION NL
ENVIRONMENTAL IMPACT STATEMENT
FOR THE COBAR TAILINGS PROJECT

PREPARED JOINTLY BY:

LYCOPodium PTY LTD
Engineering and Mining Consultants
1050 Hay Street
WEST PERTH WA 6005
Telephone: (09) 481 0166

ON BEHALF OF:

RANGER EXPLORATION NL
PO Box 169
APPLECROSS WA 6153
Telephone (09) 364 8556

AND

R W CORKERY AND CO PTY LTD
Geological and Environmental Consultants
PO Box 27
ORANGE NSW 2800
Telephone: (063) 62 5411
(01) 689 3993



AUGUST 1986

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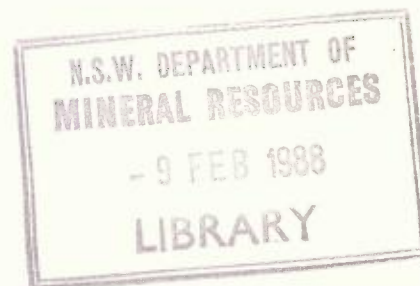
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(02) 689 3993



No. 403

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PLANNING - NEW SOUTH WALES

FORM 4

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979 SECTION 77 (3)(d)
ENVIRONMENTAL IMPACT STATEMENT

This statement has been prepared on behalf of Ranger Exploration N.L. being the applicant making the development application referred to below.

The statement accompanies the development application made in respect of the development described as follows:-

The re-treatment of gold bearing tailings.

The development application relates to the land described as follows:-

Part W.L.L. 2291 & Reserve 66143 for Commonage and Vacant Crown Land.

Parish: Cobar
County: Robinson

The contents of this statement, as required by Clause 34 of the Environmental Planning and Assessment Regulation, 1980, are set forth in the accompanying pages.

Name, Qualifications and Address of person who prepared Environmental Impact Statement	R.W. Corkery, B.Sc., M. Appl. Sc., P.O. Box 80, ORANGE NSW 2800
--	---

Certificate

I, Robert William Corkery of P.O. Box 80, Orange, NSW, hereby certify that I have prepared the contents of this Statement in accordance with clauses 34 and 35 of the Environmental Planning and Assessment Regulation, 1980.

Robert W. Corkery
.....

Signature

1st August, 1986
.....

Date

SUMMARY

THE PROJECT SITE

The project site is located in western New South Wales, approximately 4.5 km south-east of the town of Cobar and lies within the untenanted New Occidental mine site which was active in the period from 1935 to 1952.

The site has established road access from Cobar via the Hillston Road and is close to power and water from an existing underground pipeline. It covers a 79 ha area within existing mining leases owned by Cobar South Pty Ltd and Cobar Mines Pty Ltd.

TAILINGS RESERVES

Under the terms of an agreement with Cobar South Pty Ltd and Cobar Mines Pty Ltd, Ranger Exploration NL acquired the right to retreat the New Occidental tailings for the recovery of gold. The principal tailings resource of 2.7 million tonnes is represented by eight distinct dumps, some adjoining but of differing heights.

OUTLINE OF THE PROJECT

The Cobar tailings project will involve the construction of a carbon-in-pulp tailings retreatment plant to recover the low levels of gold remaining in the tailings. The treatment plant will produce gold in bullion form.

The tailings will be retrieved by either loader and dump trucks or scrapers, which will deliver the tailings to a dump hopper which has been designed to accept either type of feed. A stockpile of tailings will be constructed adjacent to the plant during the dayshift to provide adequate feed for the night shift.

Since all of the tailings have been finely ground by previous treatment there will be no crushing or grinding circuits. There will be a scrubber/trommel which is designed to act as an autogenous mill, with any lump tailings and any unground lump material retained to act as a grinding media and assist in the reslurrying of the tailings. The remaining circuit will be a normal carbon-in-pulp process.

After gold removal the pulp will be pumped to one of two new tailings dams which will be more stable than the existing dumps, and consequently their potential to have a negative impact on the environment will be greatly reduced.

Due to the very low levels of extractable gold remaining in the tailings (average 0.95 grams/tonne), the project is only viable at high throughput levels on a continuous basis. Accordingly, the operation will run 24 hours per day, 7 days per week. The earthmoving operations will be carried out during dayshift only.

The project will provide employment for approximately twelve persons, approximately one-half of which will be employed from the local area. Further indirect employment of up to three persons would be expected in the Cobar district.

ENVIRONMENTAL CONSTRAINTS

The principal environmental constraints identified are:

- (1) There are eight residences approximately 300 - 400 metres east and south east of the plant, these being the remnants of the housing servicing the New Occidental mine prior to closure in 1952. They are owned by the Principal leaseholder and the residents are employees of that Company.

- (2) The Cobar climate is harsh in summer with high temperatures and unpredictable rainfall, whereas winters are cool to cold with more reliable rains. Winds are variable but generally blow from the west and south-west in winter/spring and generally from the east in summer/autumn. An understanding of climate is important in planning rehabilitation, drainage controls, and aspects of the project affected by wind.
- (3) The soil reserves are extremely limited on the project site. Where present, the soil has low fertility however the knowledge obtained from the local Soils Conservation Service will be valuable in planning rehabilitation of the area to minimise erosion.
- (4) Noise levels at nearby residences are typical of a rural area with very low levels and clear still nights and high levels during windy periods.
- (5) The site drains both to the north and south locally since the tailings dumps are situated on a local watershed. A perimeter bund wall currently contains all runoff from the existing dumps.

IMPACT OF THE PROJECT

- (i) The local topography will differ at the completion of the project. There will be two dumps, larger and lower in height than the existing eight dumps.
- (ii) Air quality will not be affected because of extensive dust control measures.
- (iii) The local noise climate will change. The background level will rise as a result of the 24 hour per day operation. The noise levels at all times of the day will be within limits specified by the State Pollution Control Commission at residences distant from the site. The impact of noise levels at the locally situated Company housing will be acceptable provided a range of operational safeguards are adopted.
- (iv) The project will have significant economic impact on the town of Cobar. Weekly wages of approximately \$16,000 and Company spending both during construction and operation will generate indirect employment and further growth in Cobar.
- (v) The project's location will reduce the visual impact of the dumps and improve the general tidyness of the site.

CONCLUSION

The Cobar Tailings Project will result in a number of changes to the local environment many of which will be positive. The Company will adopt a wide range of design and operational safeguards to ensure the changes are within accepted limits. The project will become a minor component in the local economy for the next three and a half years and once again place Cobar as a centre of gold production in New South Wales.

SECTION ONE

INTRODUCTION

S E C T I O N O N EINTRODUCTION1.1 SCOPE

This Environmental Impact Statement has been prepared jointly by Lycopodium Pty Ltd and R W Corkery and Co Pty Ltd to support a Development Application by Ranger Exploration NL to Cobar Shire Council.

The proponent, hereafter referred to as "the Company", proposes to retrieve, transport and treat gold bearing tailings at a site 4.5 km south-east of Cobar, New South Wales.

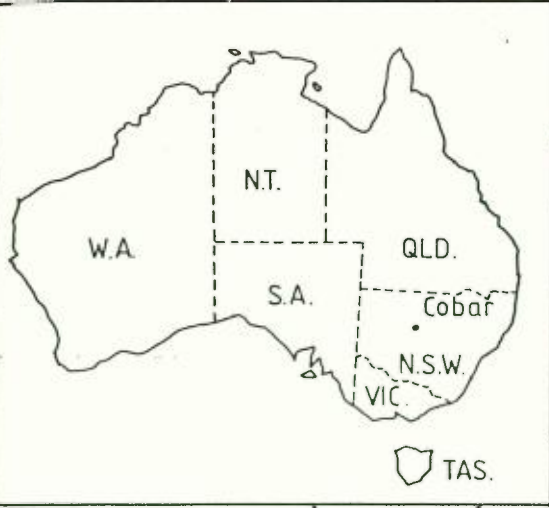
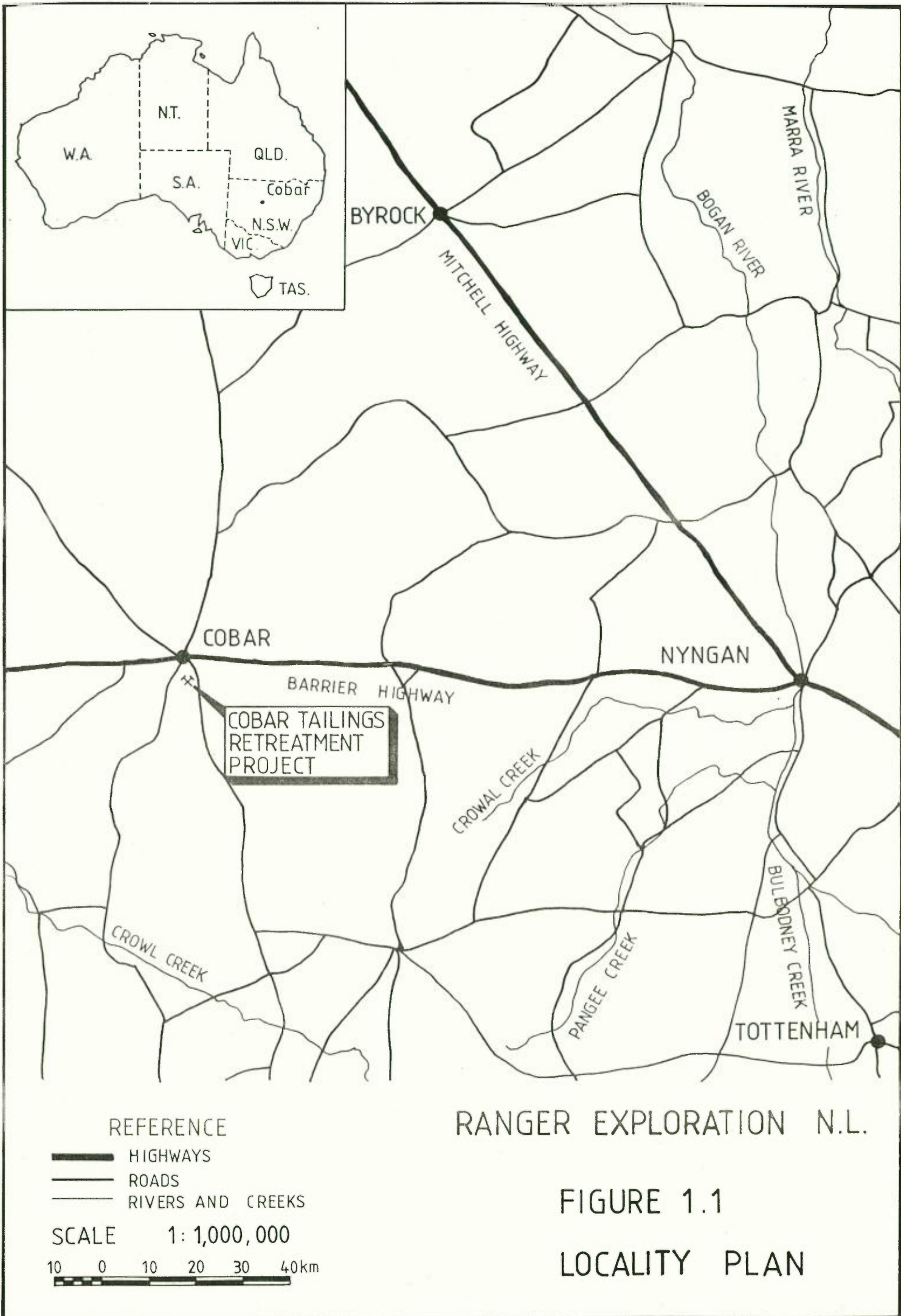
Figure 1.1 shows the Cobar Tailings Project site is located near the township of Cobar within the Parish of Cobar in the County of Robinson.

1.2 FORMAT OF THE IMPACT STATEMENT

This Environmental Impact Statement has been written in five sections. The requirements of Clause 34 of the Environmental Planning and Assessment Regulation, 1980 and the Director's letter (Appendix 1) have been incorporated into the most appropriate sections of the Statement. The format is as follows:

- Section 1 Introduces the proposal and the proponent, outlines the history of goldmining in the Cobar District, and the background to the Company's proposal.
- Section 2 Outlines the Company's objectives and their proposed plans for retrieval and treatment of the gold bearing tailings and the plans for rehabilitation.
- Section 3 Describes the existing environment around the Project Site. Potential constraints imposed by the existing environment are identified.

- Section 4 Presents the safeguards which have been incorporated in the site plan and the design of the treatment plant to protect the environment in the vicinity of Cobar.
- Section 5 Analyses the impact the safeguarded project will have on the environment surrounding the site.
- Appendices Correspondence from the Cobar Wrightville Common Committee and the Department of Environment and Planning.



BYROCK

MITCHELL HIGHWAY

MARRA RIVER

BOGAN RIVER

COBAR

NYNGAN

BARRIER HIGHWAY

COBAR TAILINGS
RETREATMENT
PROJECT

CROWAL CREEK

CROWL CREEK

PANGEE CREEK

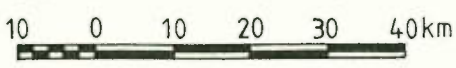
BULBODNEY CREEK

TOTTENHAM

REFERENCE

- HIGHWAYS
- ROADS
- RIVERS AND CREEKS

SCALE 1:1,000,000



RANGER EXPLORATION N.L.

FIGURE 1.1

LOCALITY PLAN



0 100 200
METRES

NEW OCCIDENTAL DUMPS

1.3 BACKGROUND

Ranger Exploration NL first established its interest in the New Occidental tailings dumps in April 1985, when negotiations were begun with Cobar Mines Pty Ltd. During a scout sampling programme in May 1985, 40 samples were collected by hand auger and these indicated the viability of a retreatment project to win the remaining cyanide-extractable gold.

In December 1985, Ranger Exploration NL secured an exclusive option for a complete resource and metallurgical evaluation of the dumps.

The tailings dumps were thoroughly sampled with a 293 hole drilling programme in January - February, 1986. This drilling was completed on a 30 by 30 metre grid, yielding 654 samples from 1,788 metres of drilling. Each sample, averaging 4 kg in weight, was despatched to the laboratory.

Following systematic metallurgical testing the viability of retreating the 2.66 million tonnes of tailings was established. Engineering and further metallurgical studies provided the capital and operating requirements of the project.

In April 1986, a joint venture to conduct the project was established consisting of Ranger Exploration NL (60 percent), Mincoa NL (25 percent) and Goldfields Metallurgical Services (15 percent).

1.4 THE PROPONENTS

Ranger Exploration NL is a public but, as yet, unlisted minerals Company which has developed substantial gold property interests during the last 18 months. Ranger Exploration NL has an issued capital of \$3,250,000, with the major holders (52 percent) being the executive directors of the Company. There are no vendor shares or options on issue.

Mincoa NL is a publicly owned mining and exploration Company that was listed on Australian Stock Exchanges on 9th January 1986. Mincoa has substantial gold mining interests in Western Australia, particularly at Edwards Find where pre-stripping preparatory to open-cut mining is underway. Mincoa has an issued capital of \$16.2 million, with the major holders being Wesfarmers Limited (20 percent) and Australian Diversified Resources Limited (13 percent).

Goldfields Metallurgical Services (GMS) is the trading name of the Goldmet Unit Trust of which Cheam Nominees Pty Ltd is the trustee. The unit holders in the trust are the directors and metallurgists who operate GMS as a Company specialising in metallurgical consulting, plant design, leaching, analytical and metallurgical testwork. The Company runs its own fully equipped laboratory in Kalgoorlie, and specialises in the design, commissioning and operation of carbon-in-pulp and carbon-in-leach cyanidation plants.

1.5 HISTORY OF MINING AT NEW OCCIDENTAL, COBAR

The mine was discovered in 1871, but gold production was only intermittent until 1899. From 1899 until 1921 production was continuous. The mine was reopened in 1935 and mining continued until 1952.

The latest figures published by the New South Wales Mines Department state that the mine at New Occidental produced a total of 1,440,923 tonnes of ore at an average grade of 10 grammes/tonne of gold. The remainder of the tailings on the site were derived from ore trucked to Occidental for treatment from other gold mines nearby.

The proposed tailings retreatment project will be fully within the area of the previous mining operation.

1.6 MANAGEMENT OF INVESTIGATIONS

The investigations into the project were undertaken jointly by Lycopodium Pty Ltd and R W Corkery and Co Pty Ltd. Project supervision and editing was undertaken by Robert W Corkery, B.Sc, M.Appl.Sc., principal of R W Corkery and Co Pty Ltd. The bulk of the report writing and plan preparation was undertaken by Robert J Osmetti, B.Eng, M.I.E. (Aust) of Lycopodium Pty Ltd.

Discussions were held regularly with the Company and their consultants throughout the preparation of the Statement. Assistance with the Statement's preparation and supporting studies was obtained from:

Lycopodium Pty Ltd for aspects relating to project planning and design.

Goldfields Metallurgical Services for metallurgical testwork.

Aurex Pty Ltd for aspects relating to mining, prospecting and exploration titles.

Eden Dynamics Pty Ltd for assistance in the assessment of the acoustical impact on the project.

The following authorities were consulted by Lycopodium Pty Ltd and R W Corkery and Co Pty Ltd, the Company, and their subconsultants during the preparation of the Environmental Impact Statement.

Department of Environment and Planning (Sydney)

Cobar Shire Council

Soil Conservation Service (Cobar)

Department of Mineral Resources (Orange)

Department of Industrial Relations (Cobar)

Department of Agriculture (Cobar)

National Parks and Wildlife Service (Cobar)

State Pollution Control Commission (Bathurst)

Telecom (Cobar)

Macquarie County Council (Dubbo)

Water Resources Commission (Sydney)

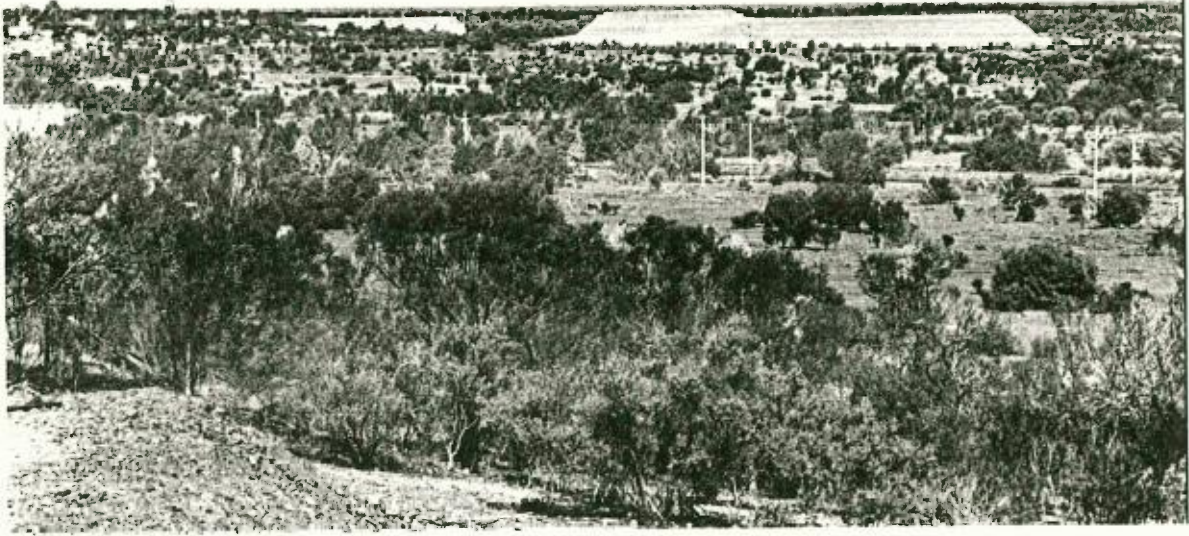


PLATE 2

View To The South From The Filtration Plant
Of The New Occidental Dumps.



PLATE 3

Aerial View Showing Proposed Plant Site.

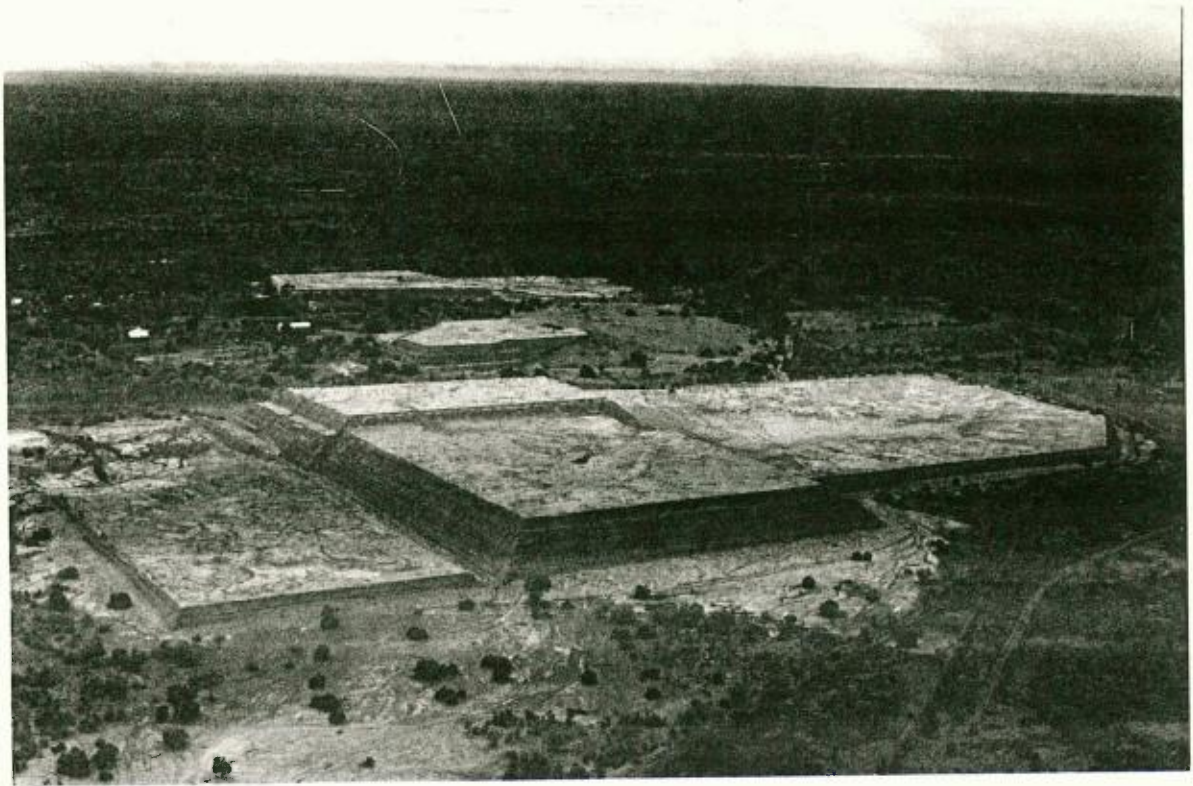


PLATE 4

Aerial View Looking South - East Of The New Occidental Tailings Dumps.

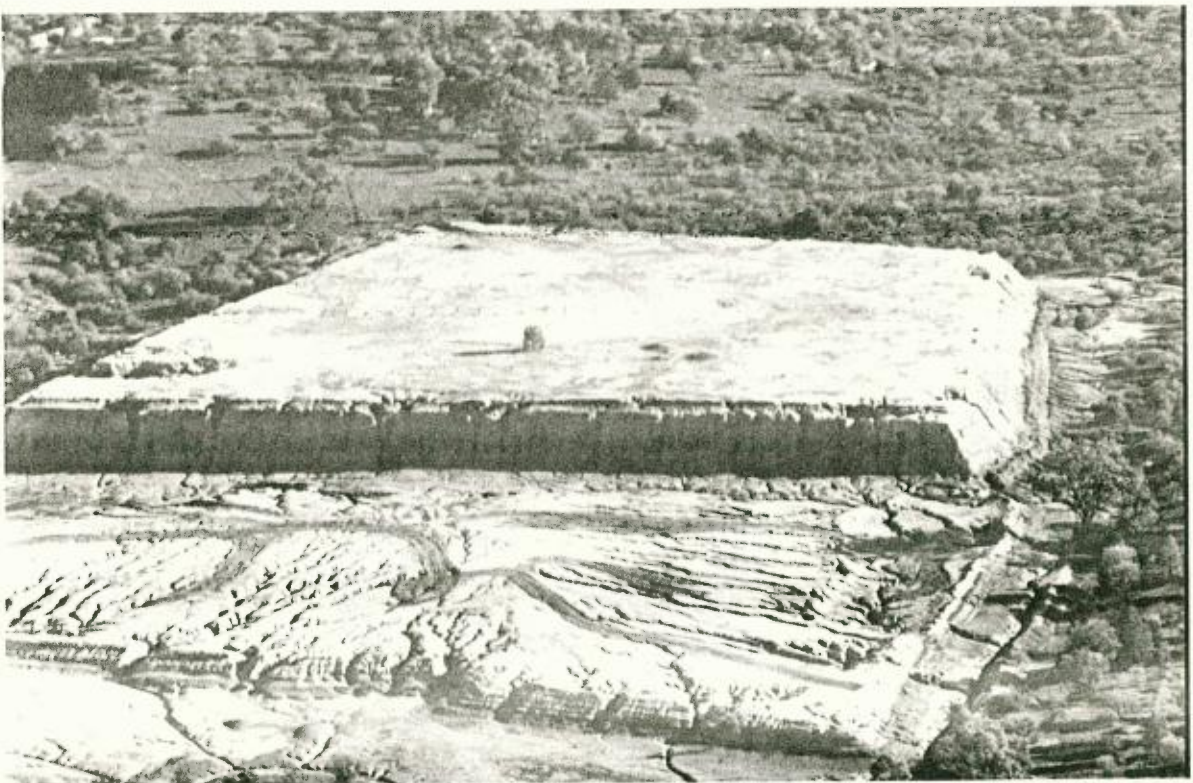


PLATE 5

Aerial View Of The Tailings Dumps Showing Effects Of Water Erosion.

SECTION TWO

DESCRIPTION OF THE PROJECT

SECTION TWODESCRIPTION OF THE PROJECT2.1 OUTLINE OF PROPOSAL

The Cobar Tailings Project is located on the southern side of the Cobar - Hillston road and at the end of the former New Occidental rail spur approximately 4.5 km south-east of the Cobar townsite. The site lies within a previous mine site in a sparsely settled rural and mining area close to power and an underground water pipeline.

The Cobar Tailings Project will involve the retreatment of the existing New Occidental tailings to recover gold bullion.

Figure 2.2 presents the proposed project site layout. Under the terms of an agreement with Cobar South Pty Ltd and Cobar Mines Pty Ltd, Ranger Exploration NL acquired the right to retreat the New Occidental tailings for the recovery of gold.

2.2 MINING TENEMENTS

The mining tenements comprise six gold leases with a total area of 33.7 hectares and four Mining Purposes Leases with a total area of 45.7 hectares. The leases are all held in the name of Cobar South Proprietary Limited (Cobar).

The numbers of the tenements, the area and expiry dates are as follows:

<u>Registered</u> #	<u>Portion</u> #	<u>Area</u> (ha)	<u>Original</u> <u>Lease Date</u>	<u>Expiry</u> <u>Date</u>
GL 24	GL 1	4.047	24/11/1888	26/12/2002
GL 77	GL 5	8.094	08/10/1892	08/10/2002
GL 242	GL 130	6.070	07/04/1897	31/12/2002
GL 291	GL 136	1.394	01/12/1897	26/12/2002
GL 429	GL's 103/104	8.094	23/10/1901	23/10/2002
GL 2363	MT 2	6.070	21/03/1919	26/12/2002
MPL 853	ML 182	7.310	07/10/1936	07/10/1997
MPL 869	GL 239	8.340	16/03/1937	16/03/1998
MPL 995	GL 257	16.220	10/12/1940	10/12/2001
MPL 1163	ML 94	13.438	15/04/1953	15/04/1993

The purposes of the Mining Purposes Leases are:

MPL 853

Erecting buildings and machinery to be used for any process whatsoever in connection with the extraction of gold or minerals; dumping mine residues and tailings and erecting dwellings for the use of persons on or about a mine, or a lease for mining purposes.

MPL 869

Erecting buildings and machinery, and electric motive power or lighting machinery, and maintaining and using same for purposes in connection with mining for gold or any mineral, or treating earth, ore or tailings; and dumping mine residues and tailings.

MPL 995

Dumping mine residues and tailings.

MPL 1163

Dumping mine residues and tailings.

Additional Purposes applied for:MPL 995

Removal and treatment of tailings and the laying of pipelines.

MPL 1163

Removal and treatment of tailings and the laying of pipelines.

2.3 THE RESERVES

The New Occidental tailings consist of 2.70 million tonnes in 8 distinct dumps near the abandoned New Occidental minesite 4.5 km south-east of Cobar townsite. The tailings resulted from the treatment of ore from the New Occidental mine and several other mines in the Cobar district active in the period 1935 - 52.

The tailings dumps are contained in an area of approximately 1,000 m x 800 m and occupy existing mining leases owned by Cobar South Pty Ltd and Cobar Mines Pty Ltd.

2.4 RETRIEVAL OF TAILINGS

The Company will use conventional earthmoving methods to retrieve the tailings. The tailings will be removed by either a loader and dump trucks or scrapers and hauled to the treatment plant.

No blasting will be required to loosen the tailings. Drilling has been completed for assay purposes.

As the gold bearing material is an existing tailings dump, no clearing of vegetation or removal of topsoil is necessary since the dumps are devoid of vegetation.

Retrieval of the tailings will be carried out to suit economic and environmental conditions and in general follow the order A, G, B, C, F, E, H and D. The dumps will be reduced back to former natural ground levels.

A stockpile beside the hopper will be created during the dayshift so that night shift operation will be confined to a front end loader feeding the hopper from the stockpile.

The Company expects the mining contractor will utilize equipment of a similar size to the following:

- Front-end loaders (988 or 992)
- Scraper excavators (636 or 639)
- 35 tonne dump trucks
- Light utility vehicles

2.5 TREATMENT PLANT

2.5.1 The treatment plant site shown on Figure 2.2 has been chosen for the following reasons:

- (i) The site is within an existing mine site, hence presents minimal impact on the natural environment.
- (ii) The site is close to existing tailings dumps which minimises the transport distance to site.
- (iii) The site provides a satisfactory fall for natural drainage and containment.

2.5.2 Plant Layout

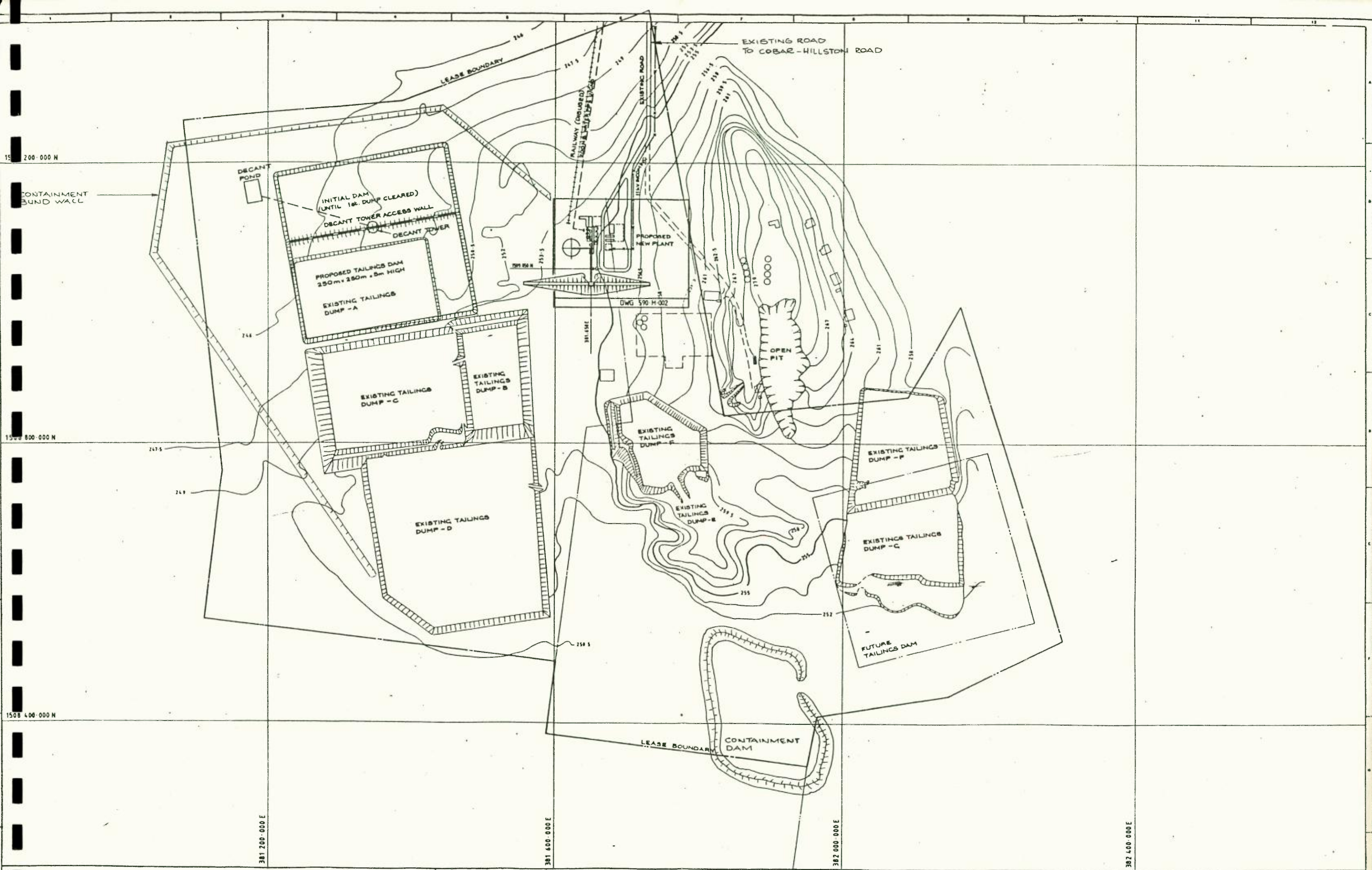
Figure 2.3 shows a preliminary layout of the treatment plant. All buildings will be enclosed within a security fence.

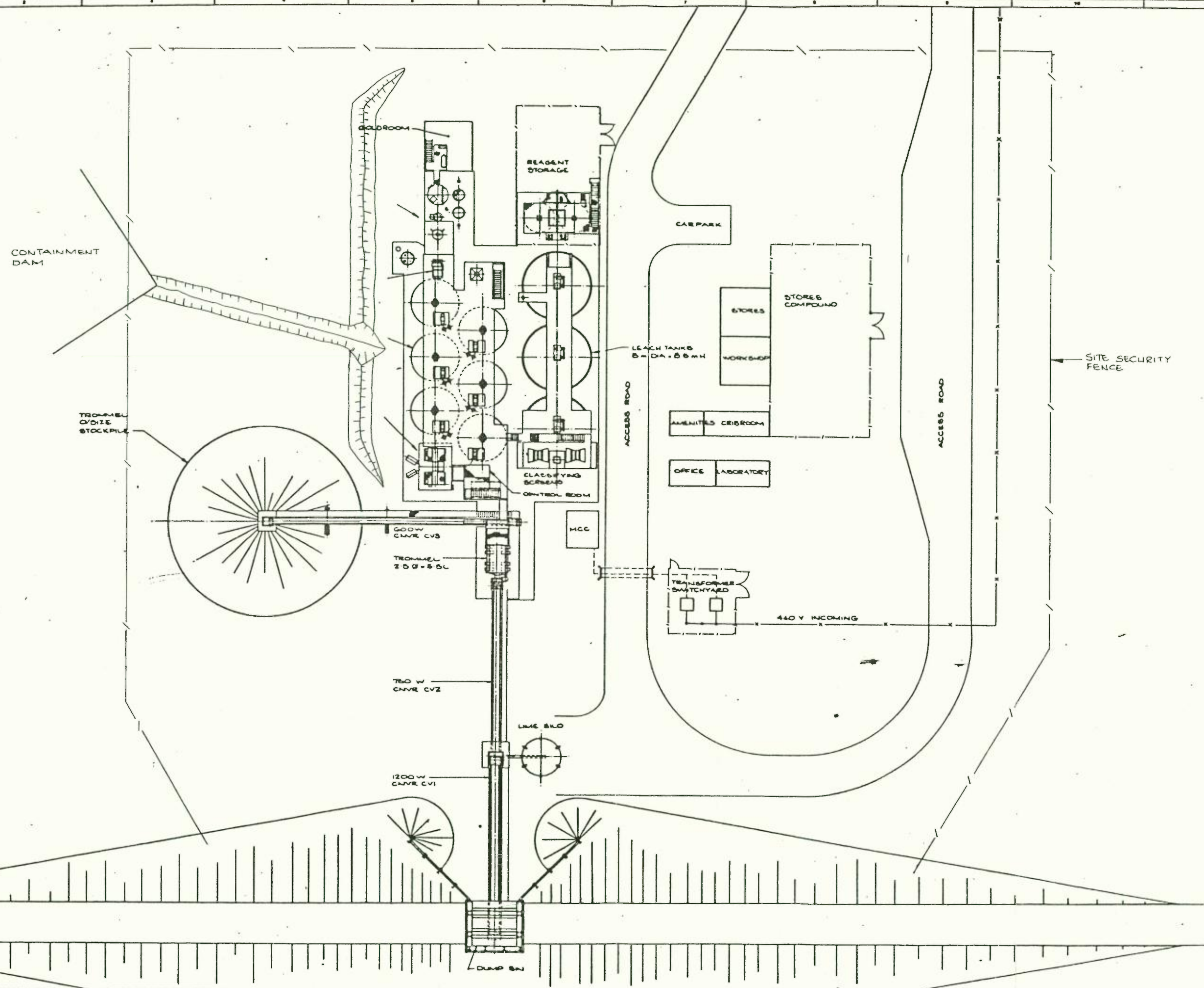
2.5.3 Outline of Process

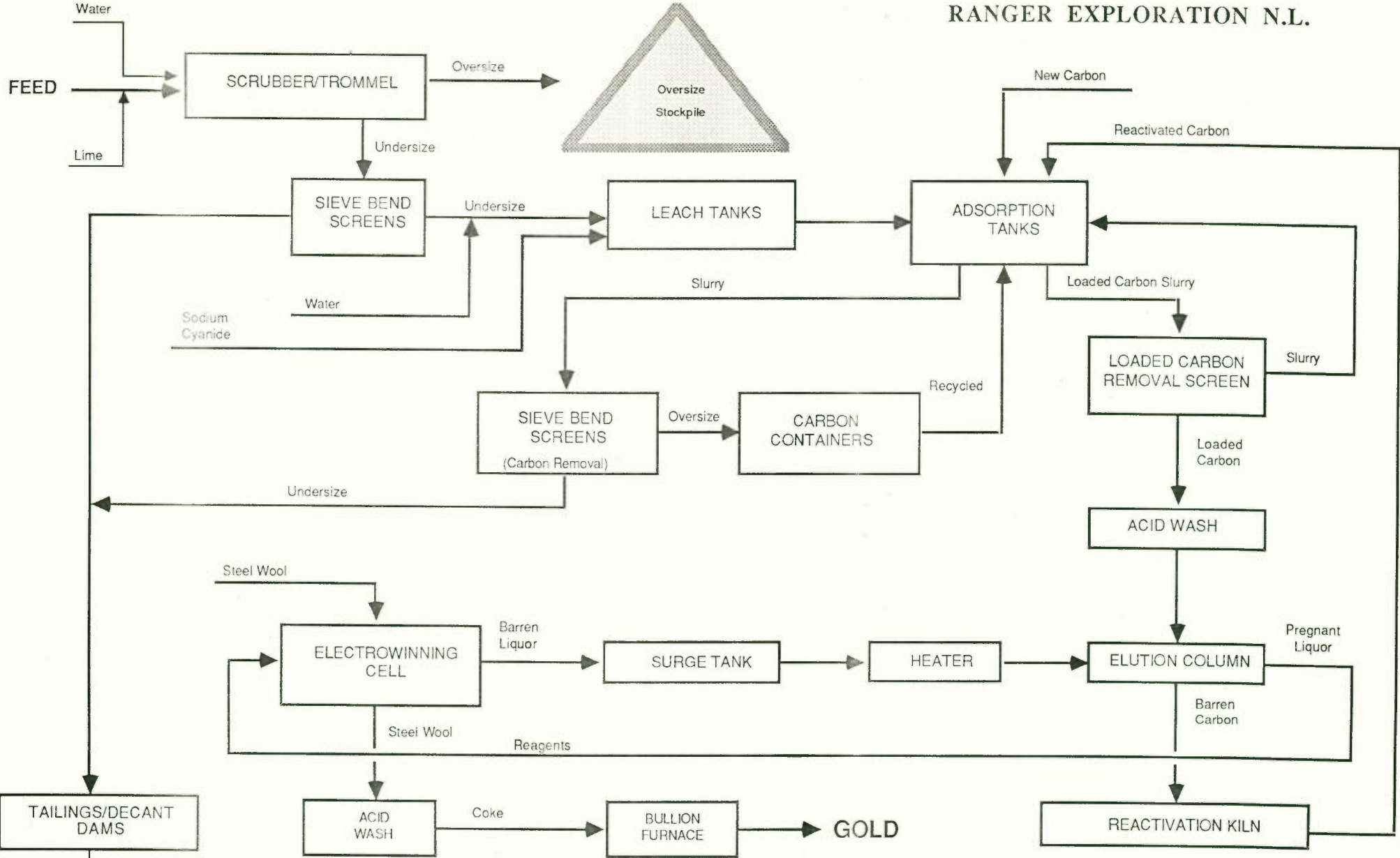
Figure 2.4 illustrates a simplified flowsheet for the treatment of the tailings after they are excavated from the dumps. Essentially, the tailings are slurried to allow the dissolution of the gold present and its collection of carbon particles.

Subject to final design, the treatment plant will comprise the following typical components:

- (i) An earthen ramp to a dump hopper into which the tailings are loaded from dump truck or scraper.
- (ii) A lime silo, from which lime is fed onto the conveyor feeding tailings to the scrubber via a screw conveyor.
- (iii) A scrubber/trommel into which the tailings are fed to be mixed with water and slurried. Hard materials such as stones, unable to be slurried, will remain in the scrubber for some time to act as grinding media to assist in repulping. The trommel acts as a screen to separate and remove these materials from the slurry. The slurry is collected in a hopper and pumped to the leach tanks.
- (iv) A set of mechanically agitated leach and adsorption tanks. Carbon is circulated counter current to the flow of the slurry via air lifts. Carbon "loaded" with gold is recovered and washed on a vibrating screen.
- (v) A gold room incorporating an acid wash vessel, an elution system, a carbon regenerating kiln (gas fired) and a gold smelting furnace.







LYCOPODIUM PTY. LTD.

COBAR TAILINGS RETREATMENT PLANT
PROCESS FLOWSHEET
FIGURE 2.4

2.6 TAILINGS DISPOSAL

2.6.1 Tailings Dam Construction

Two new dams proposed will store the 2.8 million tonnes of existing tailings scheduled for retreatment. A site for the first dam has been selected adjacent to existing dump A, and this will be expanded to final dimensions of 250 x 250 x 15 metres high when dump A has been removed (scheduled for the first two months of production). The site of the second dump is proposed to be located as per Plate 1 and will be used in rotation to expedite drying and wall construction.

Initial tailings embankments will be constructed to a height of 4 - 5 metres with soil and loose rock from within the storage basin. This material is expected to be at a suitable moisture content to permit adequate compaction by placing the fill in 300 mm layers and compacting with the earthmoving machinery.

The initial embankments will be used to retain beached tailings. Free water will not be permitted to lie against the embankments at anytime, and therefore they are not designed as hydraulic structures. A small amount of water from within the beached tailings may be absorbed into the face of the earthfill embankments, but this will rapidly be dispersed by capillary action and largely lost by evaporation.

Before the level of tailings reaches the top of the earthfill walls it will be necessary to progressively raise the peripheral embankments. This will be accomplished by excavating by backhoe and placing the material into a low bund 1 - 1.5 metres high.

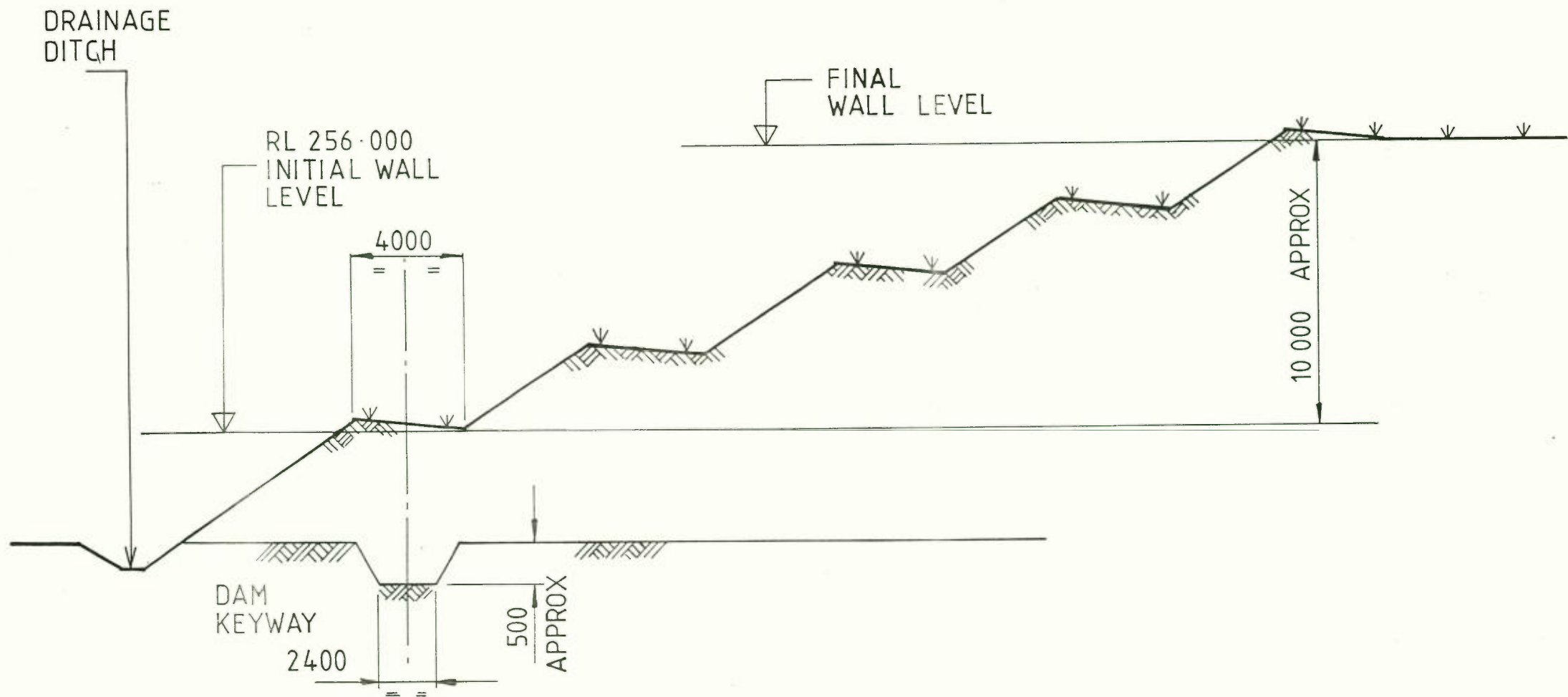
The method is well proven and essentially problem free. The moisture content of the tailings at the time of construction is important in that it largely determines the strength of the foundation tailings, and the density of the tailings in the bund. The tailings beach will be sufficiently dry to enable the weight of construction machinery to be supported.

Experience has confirmed that if this minimum criteria is satisfied, a series of competent well compacted bunds can be constructed resulting in a very stable outer face to the tailings storage.

The embankment constructed using the above techniques will have a terrace formed every 2.5 metres with an outside batter of 1:1.5 (v:h). The terrace will be wide enough for access by rippers or scarifiers (ie 4.5 metres) and each terrace will be graded back toward the inside of the dam with the overall RL carefully controlled to eliminate excessive gradients around the perimeter. Grasses will be established on each terrace as well as a strip around the perimeter of the final dam level.

The generous area available over which to deposit the tailings slurry will ensure that at no time will water pond adjacent to the embankments, and that the deposited tailings near the embankments will develop high shear strengths. Accompanying figure 2.5 shows the anticipated final appearance in cross-section.

Tailings will be discharged into the storage via a ring main system with riser pipes which will be extended as the crest height of the embankment increases. The discharge points will be regularly checked to allow an even build up of tailings over the surface of the storage.



RANGER EXPLORATION N.L.
 COBAR TAILINGS PROJECT
 CROSS SECTION OF PROPOSED
 NEW DUMP

FIGURE 2.5

Slurried retreated tailings issuing from the plant to the tailings dams are anticipated to have the following specifications:

- Discharge Volume: 145 kl/hour @ 40 - 50% solids
- Particle Size: 90% - 75 um
- Bulk Density: 1.31
- pH: 9.5 - 10
- Residual Cyanide Concentration 0.015 - 0.020%

The main elements in the waste material will be iron and copper cyanide salts, and calcium sulphate. None of these salts are considered harmful contaminants. The process will deposit tailings of a much higher "waste quality" than has been on the site over the last 40 years as many of the elements in the dump are cyanide soluble and will be absorbed onto the carbon.

As cyanide is a very expensive commodity its concentration will be monitored very closely. The concentration of cyanide in the waste are very low and will rapidly breakdown over a period of several days.

2.6.2 Control of Free Water

During the build up of the tailings dams, storage material will be selectively excavated to provide a trench leading towards the central decant.

This will allow water released from the tailings to pond around the decant well away from the embankments.

The decant will be of rock mound type. A central vertical riser pipe will be surrounded by a slotted outer casing which in turn will be surrounded by a mound of selected clean waste rock. Access to the decant will be via a rock fill causeway. Rock fill for the decant mound and the causeway will be mine site waste rock and selected gravel and screened material. The decant will be connected to an outfill sump by a 160 mm diameter polyethylene pipe. Valves will be provided to control the volume of water drawn from the storage. The decant water will pass into a fenced plastic lined holding sump from where it will be pumped back into the plant for reuse.

An important part of the design of the storage is consideration of the rate of evaporation losses over the tailings beaches. These losses together with losses from the free water pond must be sufficient to permit control of the size of the pond under the influence of demands for recycled water.

Up to 50% of all water pumped to the storage with the tailings can be returned to the plant under this system although with high evaporation rates expected at Cobar in summer months the recovery will probably fall to about 30%.

A protective levee will be built around the perimeter of the dam as a further safeguard.

2.7 CONSTRUCTION AND MINING RATES AND WORKING HOURS

2.7.1 Introduction

The Company proposes to commence the construction of the treatment plant as soon as the development application is approved. Excavation of barren tailings will commence during the construction to provide fill for the dump hopper ramp.

2.7.2 Construction Rate

The Company envisages that once underway, the treatment plant will be constructed in approximately three months.

2.7.3 Processing Rates

Approximately 2,500 tonnes of material will be retreated daily.

TABLE 2.1
WORKING HOURS - COBAR TAILINGS PROJECT

ACTIVITY	PROPOSED WORKING HOURS SEVEN DAYS/WEEK
CONSTRUCTION	6 am - 6 pm
TAILINGS RETRIEVAL AND TRANSPORTATION	6 am - 6 pm
TREATMENT PLANT	
- Trommel	24 hours
- Leaching Circuit	24 hours
- Tailings Disposal	24 hours

2.7.4 Working Hours

Table 2.1 lists the proposed activities on the project site and the proposed hours of operation of each activity. It is proposed to operate the project seven days per week.

2.7.5 Life of Plant

The Company predicts that the mine will have a life of approximately three and a half years, although the treatment plant may remain operative beyond that time to enable it to treat other tailings dumps in the Cobar area. This will naturally be subject to prevailing economic conditions.

2.8 SERVICES2.8.1 Power

The Macquarie County Council has advised the Company that they can provide an electrical supply for an approximate load of 1,000 kW. This would be achieved by extending a 22,000 volt spur line to the site from the existing New Occidental mine spur. The spur line crosses mining lease land belonging to Cobar Mines Pty Ltd.

A sub-station will be provided with a 22,000/415 volt transformer. The substation would be provided with a 415 volt outgoing circuit to the treatment plant.

The Company estimates it will utilise approximately 5 kilowatt hours of power for each tonne of tailings treated. This amounts to an annual usage of approximately 4,600 megawatt hours.

2.8.2 Water

Table 2.2 lists the estimated water requirements for the project.

TABLE 2.2
ESTIMATED WATER REQUIREMENTS FOR THE COBAR TAILINGS PROJECT

PROPOSED USE	REQUIRED QUALITY	REQUIRED VOLUME KL/DAY
Treatment Plant	Process water	1,400 days
Stripping Plant	Potable water	30
Ablutions	Potable water	10
Road Watering	Process water	50
Miscellaneous	Potable water	10
Total	Process water	1,450
Total	Potable water	50

The Company proposes to obtain its water supplies from two sources:

1 Potable Pipeline

Potable water will be provided from an existing Cobar Shire line to the Cobar Mines houses approximately 300 m from the site.

2 Process Water

Process water will come from the raw water pipeline from the Macquarie river. This pipeline supplies the Cobar water treatment plant and the Cobar Mines and Elura plants. Connection will be made to an existing unused metering point and a 200 mm dia polyethylene pipe provided to deliver water approximately 2.5 km to the site. The metering point is above plant site level and no pumping stations will be required. A pressurising pump will be required at the plant.

2.8.3 Telephone

The Company will require only one or two telephone lines for their communications to and from the site. Telecom have advised the Company that sufficient lines exist on the local exchange to satisfy their requirements and consequently there will be no requirements for radio transmitting equipment on this project.

2.8.4 Sewerage

The sewage and other effluent from the sanitary facilities and change houses on the project site will be collected in underground pipework and directed to an appropriate size septic tank(s) with associated transpiration beds (if necessary). Septic tank effluent cannot be placed into the tailings dam circuit since the presence of organic compounds would have an adverse effect on the carbon-in-pulp process.

2.9 SAFETY

The following safety issues have been addressed in the Company's planning:

Cyanide

The Company will adopt strict safety standards to ensure that the health of all employees is not endangered through the use of cyanide. The Company will satisfy all requirements of the Department of Industrial Relations in relation to the use of cyanide in the treatment.

These requirements cover such aspects as:

- (i) Protective measures to avoid ingestion or inhalation of cyanide, eg ventilation, protective clothing;
- (ii) Proper instructions for use of cyanide;
- (iii) Good personal hygiene;
- (iv) The local hospital will be advised that cyanide is being used at the mine;
- (v) Any spillages/leaks will be immediately cleaned up;
- (vi) Provision of first-aid kits and development of emergency procedures;
- (vii) Storage and security of cyanide.
- (viii) Danger signs will be erected within and around the site.

Public Safety

Signs will be erected on the boundaries of the Mining Lease advising the public that they should keep out as the site is dangerous.

Employee Safety

The Company will ensure its workforce is adequately trained to avoid accidents. Such training will be undertaken primarily with the assistance of the Department of Industrial Relations.

The Project Site will be regularly inspected by inspectors from the Department of Industrial Relations, who will ensure the above issues are all adequately taken care of.

2.10 TRANSPORTATION

2.10.1 Access Road

The Company proposes to use the Cobar - Hillston Road (trunk road 61) as the access road to the site. The plant is located approximately 700 m from this road.

2.10.2 Proposed Traffic

Construction Period

There will be a wide range of vehicles travelling to and from the site during the construction period. In the early stages, there will be numerous semi-trailers, low loaders and trucks delivering plant components to the site. Supply vehicles for fuel, concrete and parts will be regularly travelling to the site.

The Company estimates that a maximum of five large trucks/semi-trailers could be expected on any one day during construction. Employees' and contractors' vehicles could approach a maximum of 15 at the height of construction, however, for most of the time, less than 10 cars are expected daily.

The bulk of the larger vehicles will arrive during daylight hours subject to further restrictions by the Department of Main Roads for extra width vehicles. Most cars will arrive at the site by 7.00 am and leave during the late afternoon.

Operational Period

The traffic pattern during the operational life of the project will become quite regular as employees travel to and from work at regular times. Service vehicles will invariably travel to the site on a regular basis also.

2.11 EMPLOYMENT AND HOUSING

2.11.1 Construction Period

The Company expects the workforce during the construction period to increase at a regular rate for the initial four to six weeks to approximately 25 persons. The workforce should stabilise at 25 persons for approximately one month before it reduces as the completion of the project approaches.

The Company envisages that up to 30 persons, predominantly single men, will require accommodation during the construction period. Some contractors and labourers employed will reside locally. The Company's investigations have shown that sufficient accommodation will be available in local hotels and caravan parks.

2.11.2 Operational Period

The Company estimates that approximately twelve persons will be engaged directly by the Company and the earthmoving contractor they engage to mine the tailings. The Company estimates that approximately one half of those required will need to be imported into the district since the Company will require those persons to have had direct experience with gold projects. The remaining persons would be engaged locally.

The Company's local enquiries have indicated that there is sufficient rental housing and properties for sale in Cobar and the surrounding area to provide a good standard of living for their employees.

2.12 REHABILITATION

The Company proposes to incorporate rehabilitation procedures in all aspects of the development. The emphasis throughout the Company's planning is to ensure that rehabilitation is progressive and provides a long term low maintenance site.

On completion of the project (estimated summer 1989/90) the nett effect will be an improvement of the environment in that:

- visual impact will be enhanced from the current scene of eight scattered dumps of irregular size to two large dumps with more gentle contours;
- stability of dumps will be greatly improved. The slow erosion and dispersion of the tailings now taking place will be largely eliminated;
- any items of plant not removed will be enclosed in the safety fence area. Any unused or stored chemicals (eg carbon) will be removed from the site.
- the existing ash dumps lying north west of the plant site will be spread onto the sides of the tailings dumps to encourage grass growth. The ash dumps are well covered with native grasses as present indicating the suitability for use as cover material.
- after the removal of the existing dumps to the natural ground level the Company proposes to scarify the soil to aerate the soil and would seek the advice of the Local Soils Conservation Service to develop a programme for rehabilitation.

SECTION THREE

DESCRIPTION OF THE EXISTING
ENVIRONMENT

SECTION THREE

DESCRIPTION OF THE EXISTING ENVIRONMENT

3.1 TOPOGRAPHY

The proposed project site lies on a broad east-west trending ridge of average elevation 240 metres AHD. A smaller more pronounced north-south trending ridge immediate abutts the site to the north-east and rises to 270 metres ADH. The general surrounding topography is subdued and consists of almost flat countryside.

Natural surfaces slope at 1° to 2°, but the existing 8 tailings dumps form steep-sided tabular heaps up to 26 metres high covering some 35 per cent of the area of the site.

The natural surface is further already modified by tailings washed down from the dumps by erosion, and by discarded remnants of the old treatment plant.

3.2 DRAINAGE

The project site lies on the watershed, between the north-flowing tributaries of Yanda Creek and south-flowing tributaries of Crowl Creek. Both creeks lie within the Darling River basin, and are non-perennial because of limited catchment and low rainfall.

The drainage lines are shallow and consist of alluvial flats choked with sand, silt and clay.

Most of the site drains towards the north-west but there is some drainage southwards. The northerly drainage line is up to 150 metres wide, being clearly outlined by pale-coloured tailings washed from the existing dumps during the previous period of operation. Control of this drainage has been achieved by the construction of a bank, north west of dump A. The bank near dump A forms part of a drainage control network around all the tailings heaps (see figure 2.2).

3.3 GEOLOGY

3.3.1 Regional Geology

Devonian rocks of the Cobar Supergroup were deposited in the Darling Basin in both shallow and deepwater facies. Most major mineral deposits in the Cobar region occur in deep water sedimentary rocks near major faults.

3.3.2 Local Geology

The New Occidental Mine, adjacent to the site, is in the cleaved and folded slates and wackes (Great Cobar Slate), just west of the north-northwest trending Great Chesney Fault and south of a north-west trending cross fault.

The gold mineralisation occurred as disseminations with sulphide minerals in silicified slate and in quartz-gold-sulphide veins. Six steeply north-plunging lodes and numerous veins were mined.

The site itself is underlain by the Great Cobar Slate but this is largely concealed by the existing dumps and soils.

3.3.3 Mineralogy of the Tailings

The material is very fine, with more than 90% passing 75 microns, gold is evenly distributed throughout the size fraction. Gold recovery is higher near the surface of all dumps which is due to the oxidation of the sulphides near the surface and consequent release of otherwise refractory gold.

X-ray diffraction scan of a composite sample indicates that quartz and chlorite are the major minerals present, with traces of sulphide, magnetite and minor clay.

Microscopic examination of a grain amount shows chalcopyrite to be the dominant copper mineral, with several grains of pyrite and pyrrhotite also present.

3.4 SOILS

The site contains few areas of undisturbed soils or areas not covered by tailing dumps or their outwash. Those soils present are essentially shallow red earths of light texture.

3.5 METEOROLOGY

3.5.1 Source of Data

All temperature, rainfall, evaporation, fog and wind readings are drawn from records kept at the Department of Meteorology at Cobar.

3.5.2 Temperature

Table 3.1 lists the average daily maximum temperature at Cobar. January and February are the warmest months with average daily maximum temperatures of 33.2°C. Approximately 14% of daily maximum temperatures during these months exceed 38.3°C. June is the coldest month with an average daily maximum and minimum temperature of 16.5°C and 6.0°C, respectively. Frosts occur throughout the winter months.

TABLE 3.1

MEAN DAILY TEMPERATURES - COBAR STATION - °C

Month	J	F	M	A	M	J	J	A	S	O	N	D
Maximum	33.4	33.1	30.0	25.3	19.6	16.5	15.8	17.6	21.2	25.6	29.3	32.4
Minimum	20.1	20.0	17.2	12.8	8.8	6.0	6.9	6.2	8.9	12.6	15.5	18.6

3.5.3 Rainfall

Table 3.2 lists the average monthly rainfall and number of raindays per month. The total average yearly rainfall is 404 mm although during drought years total annual rainfall has been as low as 101 mm (1982). The wettest year on record was 1973 when 684 mm was recorded.

The records over many years tend to show that rainfall is distributed relatively evenly throughout the year. However, the rainfall pattern around Cobar is somewhat variable with no regular seasonal variation in rainfall. This is typical of a sub-arid, continental climate.

TABLE 3.2

MEAN MONTHLY RAINFALL - COBAR STATION (mm)

Month	J	F	M	A	M	J	J	A	S	O	N	D	YEAR
Mean	57.8	34.6	38.0	24.3	36.7	24.6	27.2	31.8	24.8	36.2	34.1	35.7	406
No of Raindays average	7	5	6	4	7	6	6	7	6	7	5	5	71

3.5.4 Evaporation

Table 3.3 lists the average monthly evaporation for a 17 year period at Cobar. Greatest evaporation occurs during January and least during June. Evaporation averages 2,100 mm per annum, thus any surface water is lost rapidly except in the coolest months or after very heavy rainfall.

TABLE 3.3

AVERAGE MONTHLY EVAPORATION - COBAR STATION (mm)

Month	J	F	M	A	M	J	J	A	S	O	N	D
Max.	416	322	270	172	111	74	89	126	192	270	321	379
Min.	186	141	163	79	59	40	52	67	103	116	170	240
Average	297	242	211	137	86	57	644	91	129	186	244	310

3.5.5 Temperature Inversions

Radiation inversions are the main type of temperature inversions likely to cause any noise to be enhanced. An indications of the frequency of radiation inversions when water vapour is present. Table 3.4 presents the recorded fog frequencies for the nearby Research Station. The maximum recorded fogs in any one month was nine in June, 1980. On average only seven fogs are recorded annually at Cobar.

TABLE 3.4

FOG FREQUENCIES - COBAR STATION

Month	J	F	M	A	M	J	J	A	S	O	N	D
Av. No/Month	0	0	0	0	1	3	2	1	0	0	0	0
Max. No. Recorded/Month	1	1	2	3	5	9	7	3	2	2	2	1

3.5.6 Wind

Records kept at the Cobar Research Station show that during summer and autumn, morning winds tend to predominate from the northwest and east. During winter, winds are variable both in direction and strength. A greater proportion of winds blow from the southwest quadrant than at other times during the year. Afternoon winds based on records from Cobar show a dominance in winds from the southwest and west throughout the year.

3.6 WATER RESOURCES

Any surface water present is confined to non-perennial streams and a single dam south of the eastern tailings dumps. This dam is fed by a gully flowing westwards. Erosion of the two eastern most dumps (G and H) has contributed to the setting up of this dam.

3.7 FLORA

The flora present on the project site generally reflects the extent of disturbance and regeneration capacity of the local species.

In areas severely disturbed by previous mining activities, the principal flora present are Australian Boxthorn and Pepper trees. Also present but in reduced abundance are a range of tree/shrubs such as Wilga Bush, Puntty Bush, Budda Bush, Hop Bush, Turpentine and Warrior Bush.

On the margins of the project site where the site is only partly disturbed, a range of trees such as White Cyprus, Poplar Box, Wild Orange and Mulga are found.

Native grasses (eg Spear grass) are sparse due to the dry climate, poor soil nutrition and regular grazing.

3.8 FAUNA

The principal fauna observed on and in the vicinity of the project site are Western Grey Kangaroos, emus, wild pigs, foxes, rabbits and wild dogs.

3.9 BACKGROUND NOISE

3.9.1 Monitoring Procedures

Background noise levels were monitored at three locations over a 24 hour period on the 25th and 26th July, 1986.

The measurement at these sites was considered to adequately describe the existing acoustic environment around the project site. Noise levels were monitored in accordance with Australian Standard AS1055.1-1984 on five occasions throughout the 24 hour period.

Noise levels were monitored using a Bruel and Kjaer integrating peak sound level meter type 2225. The meter was calibrated regularly using a Bruel and Kjaer sound level calibrator type 4320. A series of readings were taken at approximately 2 second intervals for a period of 5 minutes using the fast response mode of the meter. All readings are "A" scale readings.

3.9.2 Statistical Analysis

The data from the monitoring programme was statistically analysed into L_{90} , L_{eq} and L_{10} classes. L_{90} is the sound level exceeded 90 per cent of the sampling time, L_{eq} is the sound level of continuous noise which emits the same energy as the fluctuating sound over a fixed period and L_{10} is the sound level exceeded 10 per cent of the sampling time. L_{90} is considered to be representative of background noise levels.

3.9.3 Results

The background noise monitoring programme confirmed that the project site lies in a typical rural area where existing noise levels are low.

Noise levels in the vicinity of the project site (Site 1) and the Martin residence (Site 3) were similar. During the windy afternoon (speeds of up to 18 km/hr), L90 levels varied from 42 to 46 dB(A) principally to wind in the nearby trees.

As the wind dropped, noise levels also dropped to the 20 dB(A) limit of detection of the noise meter. These low levels continued through the night-time until 6.30 - 7.00 am when birds caused local noise levels to rise. Traffic on Trunk Road 61 was periodically audible at both sites.

The noise levels at the residence adjacent to the Chesney Mine (Site 2) were controlled also by wind speeds but also by noise emitted by an electrical transformer located near the house. Similar noise levels to Sites 1 and 3 were measured during windy periods, however, during still periods, background noise levels attributable to the transformer varied from 25 to 29 dB(A). Noise levels from cars passing this residence were also noted.

3.10 AIR QUALITY

The site is within a low density pastoral grazing area where the most common contaminant is dust from unsealed tracks, with the addition of seeds, pollen, insects and fire debris.

3.11 LAND OWNERSHIP AND LAND USE

The site is not currently in use except for minor light grazing in the extreme southwest.

There are thirteen residences owned by Cobar Mines Pty Ltd immediately northeast of the site. Only a few are occupied. One rural residence exists 900 m north-northwest of the project site. Refer to Figure 3.1 for land ownership details.

3.12 SOCIO-ECONOMIC FACTORS

The site is 4.5 km southeast of Cobar a modern town with a population of some 5,300, situated on the Barrier Highway which connects the town with Sydney, 706 km to the east and Broken Hill 451 km to the west.

The first mining leases were granted in 1870 and these covered the Great Cobar ore-bodies situated on the eastern edge of town. More deposits, mainly of copper, were found south from here for some 10 km, and by 1911 the town had 7000 inhabitants. The town became more oriented towards the then booming wool industry.

Mining again came to the fore in the economy of the town in 1965 when the CSA mine, 11 km northwest of town, was reopened. The prosperity of the town remains dependant to a large extent on this mine and the recently opened Elura mine further north. Elura, for example, employs some 250 people, most of whom live in Cobar.

Today, both mining and the wool industry contribute to Cobar's prosperity. The town has a wide range of shopping and sporting facilities.

3.13 VISUAL ASPECTS

Though partially shielded by the small, abrupt ridge immediately northeast of the site, the eight existing dumps are prominent and easily visible from the nearby Cobar - Hillston road. The highest existing dump stands 23 to 26 metres above the natural surface and is therefore particularly prominent.

The proposed retreatment project will result in two new dumps replacing the existing eight and occupying less than half the area. The new dumps will only reach a maximum height of 15 metres. The site will therefore be less visually prominent than it is now.

3.14 TRANSPORTATION NETWORK

Some 400 metres to the east of the site is the Cobar - Hillston all-weather road, designated Trunk Road number 61. A spur from this road extends 800 metres to the site, this road is also bitumen, but is in poor condition. This trunk road no 61 carries an average of 145 vehicles per day.

Cobar itself is served by the Barrier Highway, linking Nyngan and Broken Hill, and by the state Railway Authority which maintains a line from Nyngan, principally to serve the CSA copper mine.

3.15 SERVICES

Cobar is served by a 375 mm pipeline from Nyngan. the main filtration plant is 2.5 km north of the site on the summit of a prominent hill.

The Chesney mine, situated 1,750 metres north of this plant, is connected to the main supply.

The project proposal is to draw water from a metered take-off near the Chesney minesite, and pump the supply through a buried line.

The Macquarie County Council is responsible for the reticulation of electrical power in the district. A power line service the houses owned by Cobar Mines Pty Ltd immediately north-east of the site.

SECTION FOUR

**DESIGN AND OPERATIONAL
SAFEGUARDS**

SECTION FOURDESIGN AND OPERATIONAL SAFEGUARDS4.1 AIR POLLUTION CONTROLS4.1.1 Nature of Contaminants

The principal potential air contaminant that could be generated by the project will be dust arising from construction activities, vehicle movements, excavation and the tailings dams.

Other potential sources of air pollution would be:

- (i) small quantities of chemical emissions;
- (ii) exhaust emissions from diesel and petrol driven equipment and motors;

4.1.2 Dust Control MeasuresConstruction Activities

The excavation to create areas for plant construction will generate limited dust. Areas affected will be small, however, if considered necessary, areas will be watered before the activity commences.

Excavation

The tailings will be retrieved by either front end loader and dump trucks or scraper excavators transported to the feed hopper.

The surface 2 m of the tailings is quite dry so dust will be generated when it is handled. It is planned to control this by comprehensive watering of the haul roads and on the tailings dumps themselves by a water tanker operating throughout the day shift.

Dust suppression will be less of a problem as the project progresses because the moisture content towards the centre and the bottom of the dumps increase up to 20%.

Vehicle Movement

Dust generated by vehicle movements on the site will be controlled principally by the regular maintenance of the road surface.

On-site haul roads will be regularly watered to ensure dust levels are minimised. Areas such as the pad approaching the dump hopper will receive particular attention.

Exhaust Emissions

The earthmoving equipment and on-site vehicles will be fitted with appropriate exhaust controls. The Company will ensure that equipment used on site by itself and by its contractors will be properly maintained to ensure that no unacceptable exhaust emissions are emitted.

All earthmoving vehicles exhausts will be directed upwards or sideways so as not to impinge on the ground.

4.1.3 Control Measures for other Potential Air Contaminants

Sodium Cyanide

The process has a cyanide consumption of 1.5 kgm/tonne and thus a total of 1,290 tonnes of sodium cyanide will be consumed annually.

The sodium cyanide will be delivered in pelletised 800 kgm boxed bulker bags. The boxes will be stored undercover on pallets and enclosed in a designated cyanide area protected with a 3 metre high cyclone wire fence with two outward inclined strands of barbed wire. Standard warning signs and padlocks will be installed. It is proposed that three months' supply of cyanide (350 tonnes) will be stored on site to cater for any short fall in supply.

*production
not cyanide!*

Sodium cyanide doesn't have an odour, however, when it comes into contact with water, (eg rainfall/high humidity), hydrogen cyanide (HCN) is formed which does have an odour that resembles "bitter almonds". The principal safeguard proposed by the Company to eliminate this odour is to ensure that stores of sodium cyanide are kept dry and away from the atmosphere in secured premises.

The boxes will be transferred to a reagent mixing area by forklift as required and lifted by monorail to a bag splitter above a sealed mixing tank.

Cyanide concentration reaches 20% in this tank but protective alkalinity is maintained with a pH over 10. When this concentrated solution is injected into the first leach tank typical cyanide concentrations drop to 0.05%, decreasing through the system to 0.02% in the last tank.

Protective clothing, gloves, goggles and dust respirators will be worn during the handling of cyanide.

Any emission of hydrogen cyanide gas is almost completely pH dependant. For the Cobar ore, tests have concluded that cyanide consumption can be reduced in the process by maintaining pH levels above 10. As such very little emission of HCN gas can be expected, and experience has shown that the minor amount produced at tank level in the first leach tank (less than 5 ppm concentration) is quickly dispersed.

All cyanide areas will be clearly marked and appropriate safety precautions taken, eg plant spillage will be drained into a concrete sump to be pumped back into the plant or to tailings. Quantities of sodium hypochlorite will be available for spillage neutralisation.

Lime

The process has a lime consumption of 4 kg (60% available CaO)/tonne which is an annual requirement of 3,440 tonnes. Up to one month's supply will be stored on site as a back up procedure. In general lime will arrive in bulk tankers which will pneumatically transfer lime into a 70 tonne silo. Protective clothing, gloves and face mask will be worn when working in the lime storage area. The lime silo will have a dust collector installed at the top of the silo.

Fuels

The plant will be electrically powered off the state grid.

The only petroleum products used on the site will be diesel and petrol for earthmoving and plant vehicles. Diesel fuel will be stored in a 10,000 litre above-ground tank near the earthmoving maintenance operations and petrol will be brought from local outlets.

LPG

The stripping plant, boiler, the reactivation kiln and the smelting furnace will be fired by LPG which will be stored in a 6,300 litre (approximately) tank on the site. Specifications are as follows:

LPG Composition:	Propane/Propylene
Stored Temp:	42°C
Ambient Temp:	15°C
Supply Pressure:	140 kpa

Gas Consumption

Stripping Plant:	43.1 litres/hr
Reactivation Kiln:	31.3 litres/hr
Furnace:	8.62 litres/hr

Supply will be furnished by standard road tanker and stored in standard approved supplier owned pressure vessels. Vessels are fitted with water sprays for cooling in the event of hot weather or fires. Vessels are regularly inspected by supplier and government bodies.

Activated Carbon

The process uses 20 tonnes of activated carbon in circuit (-3.35 mm x 1.4 mm in size).

Generally most of this will be in the adsorption tanks with two tonnes being stripped in the stripping plant and up to a tonne being reactivated at any one time. The carbon is recirculated through the process and may last up to a year before having to be replaced. Old carbon would be stored in drums on the site.

Stripping Plant

Inherent in the stripping process is acid washing of the carbon. This involved flushing the carbon with a dilute 5 - 10% solution of hydrochloric acid to rid it of carbonates. Approximately 200 litres of 32% w/w hydrochloric acid will be consumed per week. Waste hydrochloric acid solution will be pumped to the tailings pond.

The acid is introduced into the bottom of the stripping column in a dilute solution. The principal gas emission is carbon dioxide from the acid reacting with calcium and magnesium carbonates. Small amounts of hydrogen cyanide gas can be generated and these will be vented from the sealed vessel well clear of operator platforms in a manner which ensures that no significant concentration is possible.

During the gold stripping operation, minute quantities of ammonia are evolved which will be dissipated by installation of an exhaust fan above the electrolytic cell.

During carbon reactivation the carbon is heated to approximately 700°C in a steam atmosphere. The fuel used is LPG and the only discharge is a small amount of steam from the carbon and the normal products of combustion.

Smelting

Smelting operations will be carried out once or twice per week, each occupying above one hour.

4.2 WATER POLLUTION CONTROLS

4.2.1 Potential Sources of Water Pollution

The principal potential water pollution controls are:

- (i) Site runoff;
- (ii) Surface runoff from the tailings dam;
- (iii) Spillage of chemicals and fuel from the plant;
- (iv) Subsurface seepage from the tailings dam.

4.2.2 Water Pollution Control Measures

The philosophy used in designing the plant and its associated earthworks will be to separate storm runoff into clean and possibly contaminated liquors. Clean runoff will be channelled away from the site in a manner which will prevent erosion of the existing surface. Proposed diversion banks are shown on Figure 2.3.

Any reagent contaminated run-off will be diverted into the decant pond and be subsequently returned to the process circuit.

In the unlikely event of a discharge resulting from the failure of the sodium cyanide reagent tanks or their discharge valves this will be contained within the concrete bunds surrounding the tanks. A sump pump located within the bund will pump all spillage to the tailings pump hopper and then to the tailings dam. The concrete bunds will contain all spills expected during normal operation and maintenance of the plant.

"Abnormal" spills such as failure of a slurry storage tank will be partially contained by the concrete bund. Should any overflow from the concrete bund occur this will be contained by earth Vee drains and berms and directed to an adequately sized settling dam where portable pumps will be used to return the spillage to the process circuit or alternately pump the spillage to the tailings dam (see figure 2.2).

This settling dam will be maintained in an operable condition to prevent any possible discharge from the site in the event of a catastrophic failure. It is not expected to be used for any normal function of the plant. As the slurry storage tanks operate in an overflow arrangement the capacity of the settling dam will be determined to contain the maximum possible loss from the system resulting from failure of any tank.

Containment system capacity will allow for the effect of a 1 in 20 year storm on the banded areas.

For the tailings dam a minimum free board of 500 mm will be maintained as security against rain storms and any abnormal occurrence. Two tailings dams will be used to allow adequate drying of the tailings prior to increasing the height of the walls. The second dam will provide additional surge capacity. No special safeguards are required beneath the tailings dam since the subsurface seepage of fluids will be essentially contained by the clay base. Impact on groundwater would not be expected due to the nature of the bedrock and absence of a shallow water table.

4.3 NOISE CONTROLS

4.3.1 Site Preparation and Plant Construction

Site preparation will involve the limited use of earthmoving equipment and a range of vehicles such as cranes, low loaders and concrete trucks. All these vehicles will be fitted with standard exhaust mufflers.

Few controls are possible in plant construction, however, since most construction will be restricted to daylight hours the need for controls is not considered appropriate.

4.3.2 Treatment Plant

The following controls will be adopted in the design and operation of the treatment plant:

- (i) All electric motors will be designed acoustically to reduce generation of noise levels.
- (ii) All earthmoving equipment transporting tailings to the treatment plant will be fitted with conventional exhaust mufflers.
- (iii) The stockpile adjacent to the feed hopper will be placed in such a manner to shield the night-time operation of the front-end loader as much as possible.
- (iv) The reversing "beep" on the front-end loader will be replaced with a flashing light for night-time use.

4.4 VISUAL CONTROLS

Few operational controls are possible to reduce visual impact since a number of the dumps are visible from nearby Trunk Road 61.

The long term reduction in the height of the dumps will contribute to a reduction of visual impact.

SECTION FIVE

THE PROJECT'S IMPACT
ON THE ENVIRONMENT

SECTION FIVE

THE PROJECT'S IMPACT ON THE ENVIRONMENT

5.1 TOPOGRAPHY

The main changes to the existing topography that will remain after the completion of the Cobar Tailings Project will be:

- (i) The removal of up to 8 to 10 unsightly and eroding tailings dumps in the New Occidental Minesite and nearby areas and these areas replanted with native grasses to complement the surrounding natural environment.
- (ii) The construction of two dumps for the retreated tailings. Their occurrence will be a noticeable change in the local topography. They will be, however, purposely contoured and stabilised with natural vegetation.
- (iii) Local conditions around the site of the treatment plant site would remain. The impact to these conditions would be minor.

5.2 DRAINAGE

The impacts of the project on the local drainage system will be minimal. The existing bund walls around the dump at present are adequate control against runoff and these will be maintained by the Company.

5.3 WATER RESOURCES

5.3.1 Surface Water

The project will only have a minor impact on the supply of surface water as outlined in Section 5.2. As a result of the water pollution control measures retaining water on site, lower stream flows immediately adjacent to the site could be expected, however, as the project is in a semi arid region the reduction of surface runoff would be insignificant.

5.3.2 Subsurface Water

All water requirements for the project will be supplied by mains from within the vicinity. Therefore, there will be no recourse to draw water from subterranean sources. There are no bores in the immediate area.

5.4 SOILS

The location of the treatment plant is in an existing abandoned minesite, in which no significant topsoil exists. The project will have negligible, if any, impact on the soil resources. Wherever possible topsoil will be retained in lowlying bunds to be reused as required.

5.5 AIR QUALITY

The safeguards outlined in Section 4.1 will ensure the dust levels in the vicinity will not increase significantly beyond the levels discussed in Section 3.10. Local minor increases in the immediate vicinity could be expected on extremely hot summer days.

The measures also outlined in Section 4.1 for the control of potential air pollutants other than dust should ensure the impact from these sources is negligible.

5.6 FLORA

The removal of vegetation on the site for the construction of the treatment plant will generate minor impact since most of the vegetation is Australian Boxthorn. The few native trees removed will also have minor impact since the vegetation around Cobar is generally widespread.

The long term grassing of the two remaining tailings dumps will be beneficial to the local flora, because material from the dumps will not be washed or blown onto nearby vegetation.

5.7 FAUNA

The project site occupies approximately 79 ha. The rehabilitation of the tailings dumps is considered to be beneficial in the long term by removing inhospitable barren tailings and returning the land to a more stable landform. The construction and operation of the treatment plant will result in the removal and/or relocation of some of the fauna noted in Section 3.8. This will have a negligible impact on the fauna concerned.

5.8 NOISE LEVELS

5.8.1 Introduction

The impact of the noise levels generated throughout the tailings retreatment project have been assessed in conjunction with Eden Dynamics Pty Ltd Acoustical Consultants of Sydney.

5.8.2 Planning Criteria for Assessment

The State Pollution Control Commission set the noise level not to be exceeded at the nearest non-project related residence. Table 5.1 lists these criteria in relation to the hours of operation.

TABLE 5.1
CRITERIA USED TO ASSESS NOISE IMPACT

Period	Maximum Sound Pressure Level Measured at Residence* dB(A) Maximum	Noise Source
Daytime (7.00am-10.00pm Monday - Friday) (7.00am-6.00pm on Saturdays)	45	Average noise of whole operation over a long period.
Night-time (10.00pm-7.00am Monday - Friday)	35	All noise sources.
Other times (6.00pm Saturday to 7.00am Monday)		

*That is, a residence not related to the project.

Source: S.P.C.C. Noise Control Manual.

Where the background noise level is below the planning criteria by more than 6 dB(A), the maximum planning level or criterion is recommended by the S.P.C.C. to be 5 dB(A) above the background level. When the existing background level is below 30 dB(A), the S.P.C.C. recommend the figure of 30 dB(A) should be assumed to be the background level. Hence, when little or no wind is present, the criterion for both daytime and night-time is 35 dB(A) at residences not related to the project.

5.8.3 Predicted Noise Levels

The predicted noise levels have been prepared on information available from manufacturers of equipment to be used on the project site. Table 5.2 lists the predicted noise levels at a range of distances from the site and previously of the surrounding residences.

It should be noted that the levels set in Table 5.1 are for persons outside their residence. Accordingly, if persons are inside their residence with windows open for ventilation, noise levels could be expected to be reduced by 8 to 13 dB(A). A reduction of 20 to 25 dB(A) could be expected if all windows and doors are closed. In this case, air conditioners can be used for ventilation purposes.

Noise from the project will be audible from time to time at Site 2 and 3 and will under normal atmospheric conditions be less than 35 dB(A) during the day and night. The predicted levels set out in table 5.2 could be increased by a local temperature inversion or a slight wind blowing towards the residences.

Even under atmospheric temperature inversions, the noise enhancement at the close non-mine related residence would have to exceed 10 dB(A) for plant night-time noise to exceed the 35 dB(A) acoustic criterion.

Noise levels in the vicinity of the Company housing adjacent to the site will exceed the levels set out in Table 5.1. However, since greatest impact could be expected at night, employees will be encouraged to sleep with windows closed and obtain ventilation through the use of air conditioners. The impact of noise generated at night on these residences would consequently be minor since the noise levels generated by the air conditioner inside of 45 dB(A) or more should mask the noise generated by the plant which is reduced by closed windows.

TABLE 5.2
PREDICTED NOISE LEVEL AROUND THE
COBAR TAILINGS RETREATMENT SITE*

<u>Distance</u> <u>(m)</u>	<u>Residence</u>	<u>Day-time</u> <u>Noise Level</u> <u>dB(A)</u>	<u>Night-time</u> <u>Noise Level</u> <u>dB(A)</u>
100	-	73	67
200	Closest Company Residence (Site 1)	63	57
300	Further Company Residence	57	51
500	-	50	44
800	-	44	38
1,000		40	34
1,600	Chesney Mine (Site 2)	31	25
1,850	K Martin (Site 3)	27	21

*Predicted noise levels and calculated by Eden Dynamics Pty Ltd.

5.9 SOCIO-ECONOMIC FACTORS

The provision of up to 30 jobs during the construction period will have an immediate impact on local employment. Where possible, the Company will engage local contractors and labourers. Other employment generated locally during the construction period will be for local utilities such as water supply and Telecom.

Once the project site is developed and production is underway, the regular employment of up to six people will assist the local employment level. Apart from the direct employment outlined, a small number of additional persons are likely to be indirectly employed as a result of the Company's project.

5.10 TRANSPORTATION NETWORK

The Company's project will result in increases in traffic on the Cobar - Hillston road. During the construction period there will be a greater proportion of heavy vehicles delivering equipment and plant to the site. Employees cars and heavy vehicles will generate an increase of approximately 60 vehicle movements per day or approximately 40 percent on the Cobar - Hillston road during the construction period. This will be reduced to approximately 30 vehicle movements or 20 percent of the current measured daily traffic levels once the plant is operational.

5.11 SERVICES5.11.1 Power

The Macquarie County Council will be able to supply the Company's power requirements without detriment to other consumers.

5.11.2 Water

The supply of water to the treatment plant will cause no impact on other users as the project replaces defunct consumers.

5.11.3 Telephone

Telecom advises that they will be able to supply the Company with the required number of lines. There will be no impact on local telephone services.

5.12 VISUAL ASPECTS

The Company's project will result in the visibility of the tailings dumps from the nearby Cobar - Hillston road being decreased principally because of the reduction in height and reduction of the number of dumps. Whilst the dumps will remain visible, their grassed surface will provide a slightly more aesthetic appearance than at present.

The project will result in the tidying up of the site and consequently improve local views, especially those from the Company owned houses.

5.13 CONSEQUENCES OF NOT PROCEEDING WITH THE PROJECT

- 1 An economic deposit of gold bearing tailings would not be re-processed.
- 2 The economic and social benefits outlined in Section 5 would not result.
- 3 The Company's shareholders would not benefit from a profitable tailings retreatment venture.
- 4 The reduction in visible impact would not result.
- 5 The improved long term management and appearance of the site would not occur.

ENERGY STATEMENT

The format of this Energy Statement follows the Guidelines set out by the Energy Authority of NSW.

1 BACKGROUND INFORMATION

The Company proposes to develop a tailings retreatment plant to process approximately 2.7 million tonnes of tailings containing gold. The tailings will be treated in a carbon-in-pulp treatment plant. The annual throughput of tailings will be approximately 860,000 tonnes. All processed material will be placed into two tailings dams.

2 OPERATIONAL ENERGY REQUIREMENTS2.1 Construction Period

During the construction of the treatment plant, the Company will utilise mobile generators and fuel driven vehicles.

The power requirement for welding, erection, etc during this period is estimated at 10 kW.

The following fuel driven vehicles will be used on site:

- Cranes
- Bulldozer
- Scraper
- Concrete Mixer
- Front-end Loader
- Small Trucks

The Company expects that the above vehicles will use approximately 20,000 litres of fuel during the three month construction period.

2.2 Tailings Retrieval and Transportation

The Company estimates that the fuel usage to operate the equipment involved in the loading and transportation of the tailings will amount to approximately 400,000 litres annually.

2.3 Treatment Plant

The treatment plant will be operated primarily by electrical power with a consumption of 5 kwh per tonne. Therefore, the annual electrical power usage will be approximately 4,600 megawatt hours.

The only other energy source is LPG which is required to operate equipment in the gold room.

2.4 Total Fuel Usage

The annual liquid fuel usage for the project will be approximately 400,000 litres.

3 JUSTIFICATION OF LIQUID FUEL USAGE

3.1 Tailings Mining

There is no alternative economic method to move the tailings.

3.2 Treatment Plant

The Company is maximising its use of electrical power.

APPENDICES

APPENDIX ONE

TELEPHONE: COBAR (06B) 36 2005
TELEX: AA69B35
ALL COMMUNICATIONS TO BE ADDRESSED
TO THE SHIRE CLERK
P.O. BOX 223

CORRESPONDENTS ARE REQUESTED
NOT TO INCLUDE MORE THAN ONE
MATTER IN ONE COMMUNICATION



SHIRE CHAMBERS
LINSLEY STREET,
COBAR, 2835
N.S.W.

THE REGULAR MONTHLY MEETING
OF THE COUNCIL IS HELD ON THE
FOURTH THURSDAY OF EACH MONTH

IN YOUR REPLY
PLEASE QUOTE

11th July 1986

PH:PM C5-2

COBAR WRIGHTVILLE COMMON COMMITTEE

Ranger Exploration NL,
P.O. Box 169,
APPLECROSS W.A.6153

Dear Sir,

RE: TREATMENT OF NEW OCCIDENTAL TAILINGS.

Reference is made to your letter of 12th February 1986, in relation to the above project, and I wish to advise that at a meeting held on 8th July 1986, the Common Committee resolved to offer no objections to the removal certain tailings from Gold Leases within the Wrightville Common.

The Committee is however concerned with future runoff from the retreated tailings dumped, and would request that your Company make every effort to contain runoff within the boundaries of the mining leases.

The Committee will be making this point known to Council for consideration when the development application comes before it.

Yours faithfully,


P. Henry
ACTING SHIRE CLERK.

APPENDIX TWO



Department of Environment and Planning



Ranger Exploration N.L.,
P.O. Box 169,
APPLECROSS. W.A. 6153

Remington Centre
175 Liverpool Street, Sydney 2000
Box 3927 G.P.O. Sydney 2001
DX. 15 Sydney

Telephone: (02) 266-7111 Ext. 7235

Contact: **Mr. V. Thomson**

Our reference: 86/1559

Your reference: GAT: R11:395

Dear Sir,

PROPOSED TAILINGS RETREATMENT PLANT,
NEW OCCIDENTAL MINE, ML 303 GL 24, 77, 242,
291, 429, 23 63 LOTS 102, 103, 104, PARISH COBAR

Thank you for your letter of 18th June, 1986 indicating that you are consulting with the Director with regard to the preparation of an environmental impact statement (EIS) for the above development.

2. As development consent is required for the proposal and it is a designated development within the meaning of Schedule 3 of the Environmental Planning and Assessment Regulation, 1980, as amended, an EIS must accompany the development application to the Cobar Shire Council. The EIS shall be prepared in accordance with clause 34 of the Regulation and shall bear a certificate required by clause 26(1)(b) of the Regulation (see Attachment No.1).

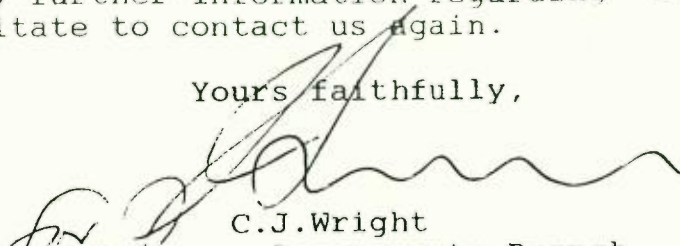
3. The Director has no specific requirements pursuant to clause 35 of the Regulation in regard to the form or content of the EIS.

4. Attachment No.2 is a guide to the type of information most likely to be relevant to the development you propose; not all of the matters raised therein may be appropriate for consideration in the EIS for your proposal; equally, the guide is not exhaustive.

5. In preparing your EIS you should approach Cobar Shire Council and take into account any comments Council considers may apply to its determination of the proposal.

6. Should you require any further information regarding this matter please do not hesitate to contact us again.

Yours faithfully,


C.J. Wright
Manager, Assessments Branch
Delegate for the Director

2/7/86

DEPARTMENT OF ENVIRONMENT AND PLANNING
ATTACHMENT No.1

STATUTORY REQUIREMENTS FOR ENVIRONMENTAL IMPACT STATEMENTS.

In accordance with Part IV of the Environmental Planning and Assessment Act, 1979, an environmental impact statement (EIS) must meet the following requirements:

Pursuant to clause 34 of the Environmental Planning and Assessment Regulation, 1980, as amended, the contents of an EIS shall include the following matters:

- (a) full description of the designated development proposed by the development application;
- (b) a statement of the objectives of the proposed designated development;
- (c) a full description of the existing environment likely to be affected by the proposed designated development, if carried out;
- (d) identification and analysis of the likely environmental interactions between the proposed designated development and the environment;
- (e) analysis of the likely environmental impacts or consequences of carrying out the proposed designated development (including implications for use and conservation of energy);
- (f) justification of the proposed designated development in terms of environmental, economic and social considerations,
- (g) measures to be taken in conjunction with the proposed designated development to protect the environment and an assessment of the likely effectiveness of those measures;
- (g1) details of energy requirements of the proposed development and measures to be taken to conserve energy;
- (h) any feasible alternatives to the carrying out of the proposed designated development and reasons for choosing the latter; and
- (i) consequences of not carrying out the proposed development.

The EIS must also take into account any matters required by the Director of Environment and Planning pursuant to clause 35 of the Regulation, which may be included in the attached letter.

The EIS must bear a certificate as required by clause 26(1)(b) of the Regulation.

DEPARTMENT OF ENVIRONMENT AND PLANNING
ATTACHMENT No.2

ADVICE ON THE PREPARATION OF AN ENVIRONMENTAL IMPACT
STATEMENT (EIS) FOR A MINING AND PROCESSING OPERATION

The purpose of this paper is to outline various issues relevant to the preparation and consideration of an EIS for a mining and processing operation. It is intended to assist preparation of the EIS. However, it is the applicant's responsibility to identify and address as fully as possible the matters relevant to the specific development proposal in complying with the requirements for EIS preparation (see Attachment No.1).

The matters nominated in this paper are not intended as a comprehensive identification of all issues which may arise in respect of a mining and processing operation. Some of the issues nominated may not be relevant to a specific proposal. On the other hand, there may be other issues, not included, that are appropriate for consideration in the EIS.

Information provided should be clear, succinct and objective and where appropriate be supported by maps, plans, diagrams or other descriptive detail. The purpose of the EIS is to enable members of the public, the consent authority (usually the Council) and the Department of Environment and Planning to properly understand the environmental consequences of the proposed development.

1. Description of the proposal.

The description of the proposal should provide general background information on the location and extent of the works proposed, an indication of adjacent developments, and details of the site, land tenure, zonings and relevant forward planning proposals and any other land use constraints.

This section should provide specific information on the nature, intent and form of the development. It should, as far as possible, include such details as the processes involved highlighting any proposed crushing or blasting, water management and treatment, chemical processing disposal of wastes, landscaping and rehabilitation. A description should also be provided of associated operations such as the transport of materials.

Particular details that may be relevant include:

- . Characteristics and economic significance of the resource
- . Quantity of materials to be mined.
- . Methods of extraction / plans of operations.
- . Details of treatment process.
- . Type of machinery and equipment to be used.
- . Expected life of the operation
- . Number of persons to be employed.
- . Hours of operation.
- . Details of necessary stockpiling.

- . Quantities and source of power required.
- . Site drainage and erosion controls.
- . Proposals for rehabilitation and landscaping.
- . Quantities and source of water required for the proposal.
- . Recycling of waste water.
- . Disposal of tailings and hazardous waste materials.
- . Transport storage and handling of chemicals and associated safety measures.
- . Proposals for rehabilitation, and assurances or effective completion.

2. Description of the Environment.

This should provide details of the environment in the vicinity of the development site and also of aspects of the environment likely to be affected by any facet of the proposal. In this regard, physical, natural, social, archaeological and economic aspects of the environment should be described to the extent necessary for assessment of the environmental impact of the proposed development.

3. Analysis of Environmental Impacts.

Environmental impacts usually associated with the mining processing operation are listed below. Where relevant to the specific proposal, these should be addressed in the EIS, taking into account the adequacy of safeguards proposed to minimise them.

- . Any possible siltation, sedimentation or downstream effects of the operation.
- . Any likely cumulative effects of the proposed operation when considered together with other operations in the vicinity.
- . Effects on flora and fauna.
- . The effects on the agricultural viability of the adjoining land holdings.
- . Likely noise/vibration disturbance caused by the operations, including transport operations, on nearby residences and highway.
- . Other impacts of trucking movements, including access over railways and onto highways.
- . Dust nuisance likely to be caused.
- . Water treatment and other pollution control measures.
- . Effects on water quality of nearby watercourses.
- . Disposal of waste material including tailings
- . Effects on the visual environment.
- . Any likely affectation of sites of Aboriginal archaeological or European heritage value (including Industrial Heritage) if located in vicinity of operations.
- . The proposed end use of the site and likely effectiveness of rehabilitation.
- . Effects on the nearest community facilities and services.

In addition, any potential for hazard or risks to public safety and any proposals to monitor and reduce environmental impacts should be included.

4. Contact with relevant Government Authorities.

In preparing the EIS, it is suggested that authorities, such as those listed below, should be consulted and their comments taken into account in the EIS.

- . The State Pollution Control Commission in regard to air, water and noise impacts and relevant pollution control legislation requirements;
- . The Department of Mineral Resources in regard to requirements under the Coal Mining Act.
- . The Soil Conservation Service regarding appropriate erosion control and rehabilitation procedures;
- . The Department of Agriculture if prime agricultural land may be affected by the proposal; and
- . The Heritage Council of NSW if the proposal is likely to affect any place or building having heritage significance if aboriginal places or relics are likely to be affected.

It is the responsibility of the person preparing the EIS to determine those Departments relevant to the proposed development.