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KIBUKA MINES PTY. LTD.

ANNUAL REPORT TO MINES DEPARTMENT
YEAR ENDING DECEMBER, 1972

by

McSWEENEY & PARTNERS PTY. LTD.

MANAGERS OF OPERATIONS

MICROFILMED

OPEN FILE

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Kibuka Mines took over from the Receiver of Naracoopa Rutile in August 1972 and a caretaker/manager was appointed whilst feasibility studies were conducted. McSweeney & Partners, Mining Consultants and specialists in alluvial and beach sand mining, were engaged to conduct this feasibility study. Subsequent to the presentation of the feasibility study to Buka Minerals - Kibuka Mines' parent company - McSweeney & Partners were appointed Managers of Operations.

Findings of Feasibility Study

From our information, records available at the Mine site, and general observations, the main problems with the previous operation could be summarised as follows :-

1. Inappropriate mining method;
2. Inadequate overall water supply;
3. Unreliable power supply;
4. The necessity for attritioning minerals before dry separation.
5. Supply of housing to ensure a suitable labour force.
6. The general lack of sufficient and well maintained equipment to conduct a normal operation.
7. Insufficient knowledge of deposit.

After consideration of cost to correct these factors, it was decided to proceed with a complete reconstruction program, estimated to cost a total of \$517,400.00. A detailed schedule of capital expenditure is appended. This program was embarked upon early in September, 1972 and completed mid-January, 1973. At the time of writing this report the Plant was in its final stages of commissioning.

It is intended in this report to take each one of these major problems and give a brief description of our findings and methods we have adopted.

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1. Inappropriate Mining Method.

The ore body at Naracoopa as exposed in Naracoopa Rutile's old mining pit revealed layers of limonised and laterised mineral bearing sands to a depth of approximately 7 to 10 metres. From the scant drilling information available in the previous owner's records, these limonised and laterised layers appeared to be fairly general throughout the ore body known as the Lanherne Beach deposit.

With regard to factors such as high water tables, the need for dozing to break out the material, and maintaining regular feed to plants, it was decided to instal a combined dry mining and dredging operation. The intention was to allow the dry mining unit, a dozer to win and break the material up and present it to a dredge which would deliver the material to the Primary Concentrating Plant.

Note: The word "dredge" is used loosely - in fact is is a pontoon-mounted gravel pump.

Immediately a decision for reconstruction was given we embarked on a control drilling program of approximately 4,000 metres of Gemco drilling to obtain information for mining and dredging control. In this type of mining method very precise information on basement contour is required. This was backed up by a small program of back-hoe costeaning to a depth of 6/7 metres which has revealed that the limonisation and laterisation appears to decrease as we proceed towards the northern areas of our ore reserves. A significant finding in our drilling was that the previously thought basement, a layer of washed cobble stones approximately 1/3 metre deep, at a depth of approximately 15 metres was in fact only a horizon and mineral bearing sands extended to a depth of up to 25 metres. The findings of this drilling will be referred to later in this report.

2. Inadequate Water Supply

Naracoopa Rutile Ltd. experienced considerable problems in ensuring an adequate clean supply of water which is extremely critical in the final dressing of heavy mineral concentrates. From information we could obtain from their records, they had found necessary to reduce

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their running time during the drier months in order to try to conserve water. After some investigation we located a dam site on a nearby farmer's property which we subsequently purchased and constructed a dam. This will give us an additional reserve of plus 20 million gallons of water over the previous supply of approximately 8 million gallons and should allow us to run up to three months during a period of no rainfall at all.

The existing water supply pump unit from the main supply dam was upgraded to ensure a surplus supply of water to the plant which previously suffered from a very critical water supply shortage.

3. Unreliable Power Supply

The power supply operated by the previous owners was a system of each plant having an individual power supply. This necessitated several power units at the various locations around the property and also had a detrimental effect on the operating time. As none of these units had back-up or alternative supplies, any electrical or power supply breakdown resulted in the closing down of a plant.

The rationalisation of this power supply involved the purchase of 4 x 225 K.V.A. Mirrlees Brush Alternator units and a complete switchboard control panel to enable one centralised power supply operated as a conventional powerhouse. This will give us a total capacity of 1.5 megawatts which is more than adequate for our present needs and should cover any expansion program in the future.

4. The necessity for attritioning minerals before dry separation.

Previously it had been impossible to obtain saleable grade Zircon from the Lanherne deposit and extremely difficult to maintain specification on Rutile product. This was mainly due to organic and inorganic stainings on the minerals. With this in mind, a program of attritioning tests were undertaken and from the information obtained two attritioning units were installed in the Secondary Concentrating circuit. The first

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unit being a revolving drum scrubber unit fed with 80% pulp density feed and using Caustic soda (NaOH) at the rate of 1 lb/Ton as the reagent. This is used principally to remove organic stainings.

The second unit, a conventional Wemco type 4-cell agitation attritioner again fed with 80% pulp density feed uses a combination of calcium hypochloride ($\text{Ca}(\text{OCl})_2$) and hydrochloric acid (HCl) as the cleansing reagent. This unit's principle purpose is to strip the inorganics from the mineral grains. The discharge from this attritioner is washed on tables to ensure no residual before proceeding into the final separation circuit.

5. Supply of housing to ensure a suitable labour force.

Kibuka Mines have purchased or leased an additional ten houses in order to attract a suitably trained labour force to the operation. Previously, the shortage of accommodation had reflected in the level and number of operators available.

6. The general lack of sufficient and well maintained equipment to conduct a normal operation.

It was apparent from the feasibility study that the facilities to carry out adequate maintenance did not exist, i.e., lathes, portable welders, cranes, etc., and hence these were purchased and installed. Also the number of tradesmen on the property was probably insufficient to ensure a program of preventative maintenance and this reflected heavily in their operating times.

7. Insufficient knowledge of Deposit.

From the scant drilling information available it was impossible to give an interpretation of the ore body. Little or nothing was known of the detailed nature of the ore, variations in grade, and general geomorphology of the area. The program of drilling previously mentioned was carried out in order to supply the required information as well as mining control. The program is still in progress at the time of writing this report. The findings to date would indicate a deposit considerably deeper than previously thought, the mineralogy considerably more complex, and that the grades of Rutile and Zircon,

previously thought to be 10% and 6% respectively, in the heavy mineral, vary eratically over the length of the deposit. As the results of this program are still coming forward for interpretation little more can be added at this point. No figure on the overall ore reserve has been calculated as the limits of the deposit have still to be defined.

GENERAL

Employment

The proposed level of manning for the operation is 48 to 50 which will allow us to maintain a continuous 7 day week operation on a 4 shift rotation basis. It has been our experience since commencement of commissioning that there is great difficulty in attracting suitable labour to King Island.

Rehabilitation

As this had not been carried out in any form by Naracoopa Rutile thus a "grass roots" research program was embarked upon. This is described in detail in the appended report.

SCHEDULE OF CAPITAL EXPENDITURE

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Mining Equipment	57,400
Primary Concentrating Plant	22,600
Secondary Concentrating Plant	58,300
Dry Separation Plant	54,500
Stores	14,700
Vehicles	24,200
Power Supply	83,000
Water Supply	11,700
Housing	67,200
Laboratory	5,500
Office & Amenities	8,500
Workshop and Store	11,900
Reconstructional Administration	94,000
Rehabilitation and Research	3,900
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<u>TOTAL:</u>	517,400
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REHABILITATION

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INTRODUCTION

Mining Operations at Naracoopa have been conducted since 1969.

Areas now requiring rehabilitation are 17.4 acres in total. These areas have been broken down into zones and are designated -

Southern Ocean Telecommunications		
	Area Inland	1.5 acres
Old Plant Site	Area Inland	9 "
Coastal Strip		6.9 "
		<u>17.4 acres</u>

Refer to map appended.

This low area damage relates to only acres per annum and would normally be rehabilitated but the Company which carried out the mining, Naracoopa Rutile, went into liquidation.

The present company, Kibuka Mines, has sufficient financial resources to make for profitable operations and to carry out rehabilitation. Kibuka Mines Pty. Ltd. undertake to rehabilitate all mined areas within their bases and regard the unrehabilitated areas as a liability to be faced.

Kibuka Mines Pty. Ltd. have employed acknowledged experts in the field of Beach Sand Mining in the form of McSweeney & Partners Pty. Ltd. In turn McSweeney & Partners Pty. Ltd. have employed agronomists and set out a restoration programme.

Kibuka Mines Pty. Ltd. have budgeted funds initially and progressively to what they recognise as a necessary and desirous activity within their general mining proposals.

Kibuka Mines Pty. Ltd. will make the Naracoopa area operations a showpiece which will evoke praise and not criticism from Government and citizens alike.

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REPORT

The philosophy of the approach to rehabilitation is that the area itself is amenable to good and comparatively easy regrowth. By comparison with East Coast of Australia conditions, we have at Naracoopa a far superior climate for growth generally.

The region may generally be described as :

Weather Patterns

- I. Rainfalls
- II. Prevailing Winds
- III. Soil Temperatures
- IV. Growing pattern

- I. The climate for the east coast of King Island where the Mine is situated would be classed as a predominately winter rainfall area with an average annual rainfall of 45 inches plus. Rainfall during 1972 has been well below average with only 29 inches falling which alone has caused establishment problems due to the drought conditions which have existed during late winter and spring.
- II. The prevailing winds in the Naracoopa area are predominately south westerlies with south easterlies expected between November and January. The area remains quite calm during the winter months allowing easy establishment of species, whereas, in the months when the prevailing south easterlies are present, problems of erosion and blasting of vegetation occur.
- III. Due to the sandy nature of the soil, high soil temperatures exist most of the year round.
- IV. The growing season takes place between early May and late October with the annual break being in April. It is therefore best to get establishment of species started in mid-to late May when soil temperature, calm wind conditions and rainfall characteristics are in favour.

Whilst it is recognised that growth in and on pure sand is difficult anywhere, this is overcome by top dressing with top soil saved from the surfaces initially.

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Tests to date substantiate the easy regrowth in fair soil. Test plots were laid down initially both in the frontal regions and in a protected inland "nursery" area.

Progress Reports on these areas are appended and it may be seen that many species of plants are suitable on this programme.

This process of determining the most suitable plants for particular duties is one thing - perhaps the simplest aspect of situation. What we wish to establish is that the growing period from May to October is generally most conducive to rapid propagation and establishment and so vital that if necessary supplementary irrigation should be used even for a short period in the first year.

Annual mining will call for only 20 acres and so irrigation to that extent would not be expensive. The Company has established fresh water dam supplies of 30 million gallons and has electrical driven pumping facilities installed.

Like farms, results cannot be apparent for two years. In the meantime authorities have only to study the approach and predict the outcome as we have done in the foregoing.

Our mining plan has been orientated to provide for ease of restoration and we would be pleased to provide this plant separately with notes on the alignment to rehabilitation efforts.

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SUMMARY

Acres requiring rehabilitation, Dec.1972	
Total	17.4
Acres exposed, 1973	20
Rehabilitation, 1973	<u>15</u>
Remaining Acres	<u>5</u>
Acres exposed, 1974	20
Rehabilitation, 1974	<u>20</u>
Remaining Acres	<u>5</u>

The situation is thereafter static until the final acreage is rehabilitated after operations are transferred to Cowper Point.

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TRIALS TO DATEGully Erosion on exposed dunes

A trial was run to test the feasibility of controlling gully erosion by the use of hay. Old hay was acquired from a local farmer and this was spread over the surface. The method used was to break the baled hay into 1" biscuits and these were laid side by side. The erosion stopped immediately and although some of the hay was covered to a depth of 1" with moving sand, growth was good, and a total coverage could be expected during the next growing season.

Grass & Fertiliser Trial (coastal plot)

This test aimed at showing the amount of growth that could be expected from the top soil that was left in heaps by the last company. The site that was picked was the most exposed point on the site. Good growth was shown initially, but due to the breakdown of the water supply, and excessive sand blasting, the plants were burnt off. However, the trial did show that although the top soil had been heaped for two years, good growth can still be obtained with the soil, but no regrowth could be expected. This trial is to be repeated in a less exposed position to establish the performance of individual species, and varying fertiliser rates.

Tree Trials

320 tube trees were purchased and this was made up of nine different varieties. These trees were selected because of their ability to grow under the conditions found at Naracoopa. Because of limited supplies of trees at the Nursery at the time of purchase, certain varieties were substituted. The final varieties to arrive were :-

Boobyalla, Coastal Ti-tree, Red-flowered yellow gum, Tasmanian cypress, Coastal wattle, Bracelet honey-myrtle, Hill Banksia, Kangaroo paperback and Pampass grass.

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Tree Trial - cont'd

Three trials were established, each trial having one tree of each variety.

- 1st trial - tree protected by super bags (plastic)
- 2nd trial - trees planted in protected area
- 3rd trial - trees planted on top of a moving sand dune

There was little difference shown between the growth in the first two trials and it was found that super bags were not necessary if the position was reasonably sheltered. The third trial on top of the moving sand dune was not expected to grow, however, two varieties did survive, boobyalla and pampass grass. All the trees in the other two trials survived and are growing well, despite the very sandy position. The balance of the trees were planted beside the Nursery and some varieties will be transferred later, but other, such as boobyalla, will be left as base stock for cuttings.

FUTURE TRIALS

1. Two more grass and fertiliser trials in January (watered)
2. Swamp trial
3. Native trees - Nursery
4. Control sand blow on sea front
5. Nine acres of tailings - May

Trial 1

Repeat of the grass and fertiliser trial done on the coastal strip. Same species and fertiliser rates to be used but put under more suitable conditions, in a position similar to what is expected experienced later. To be planted late-January, and watered so results are known in time for trials in May.

Trial 2

A trial to be carried out in a fresh water swamp environment close to the sea to select suitable varieties. The object is to see how to plant the swamp areas.

Trial 3

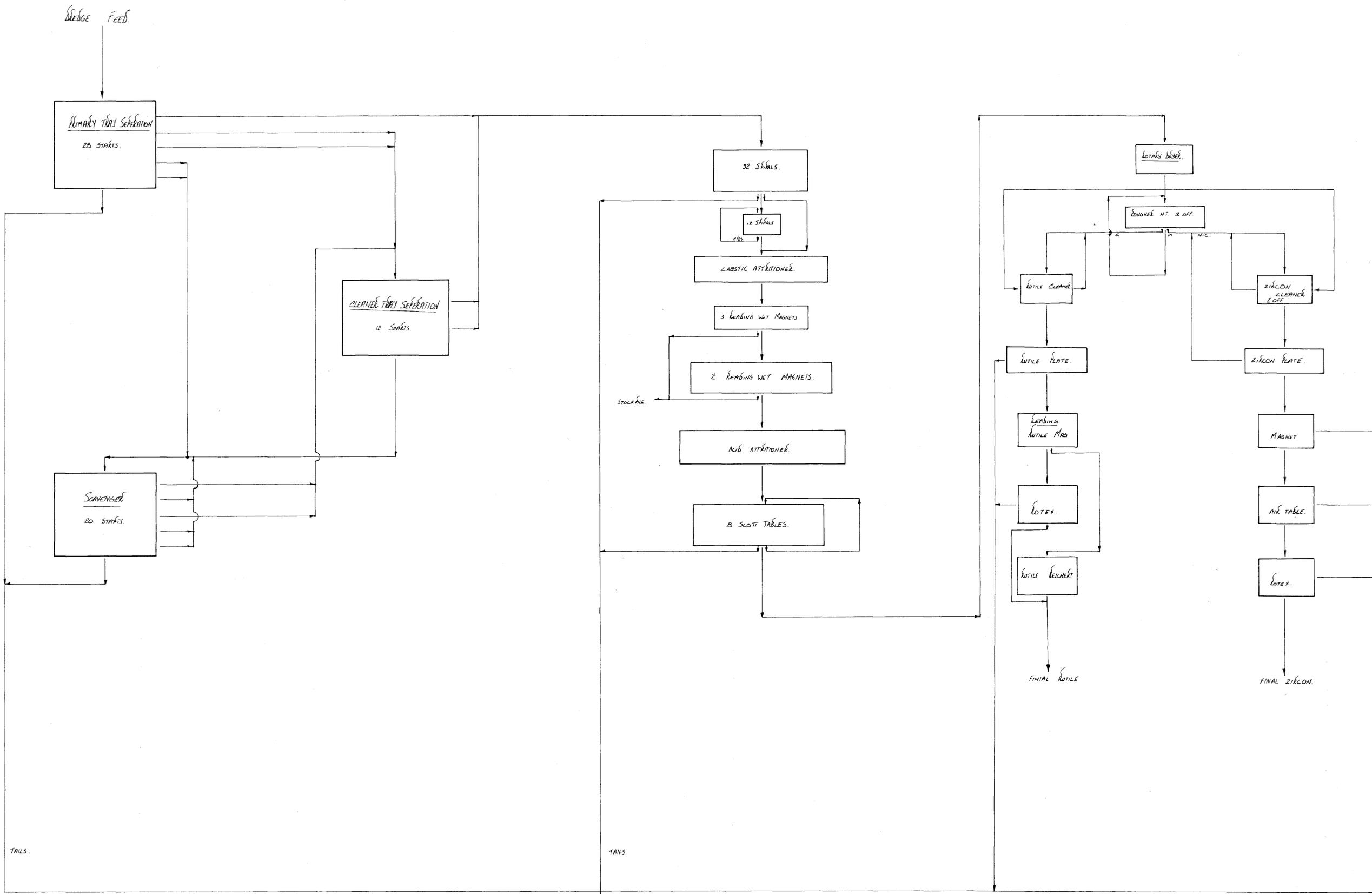
During January, to collect seed from native trees and plants around the immediate area, and grow and experiment with different varieties in the Nursery.

Trial 4

To devise a method to control the sand blow on the sea front. Brushing and spinnafex grass will be tried along with other methods.

Trial 5

In May to attempt the first full scale rehabilitation on nine acres of tailings left by the previous company.



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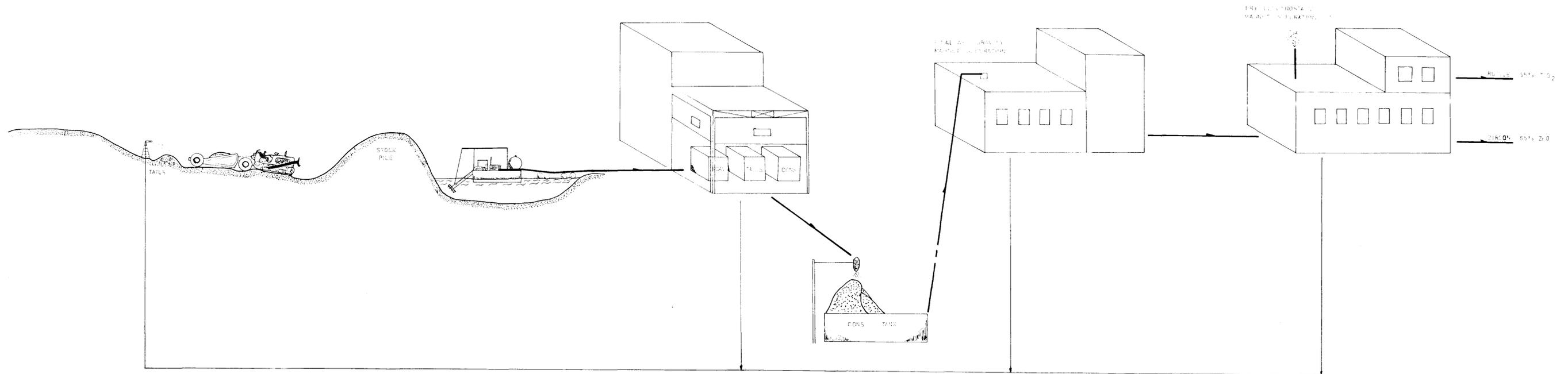
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COMPLETE FLOW SHEET.

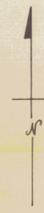
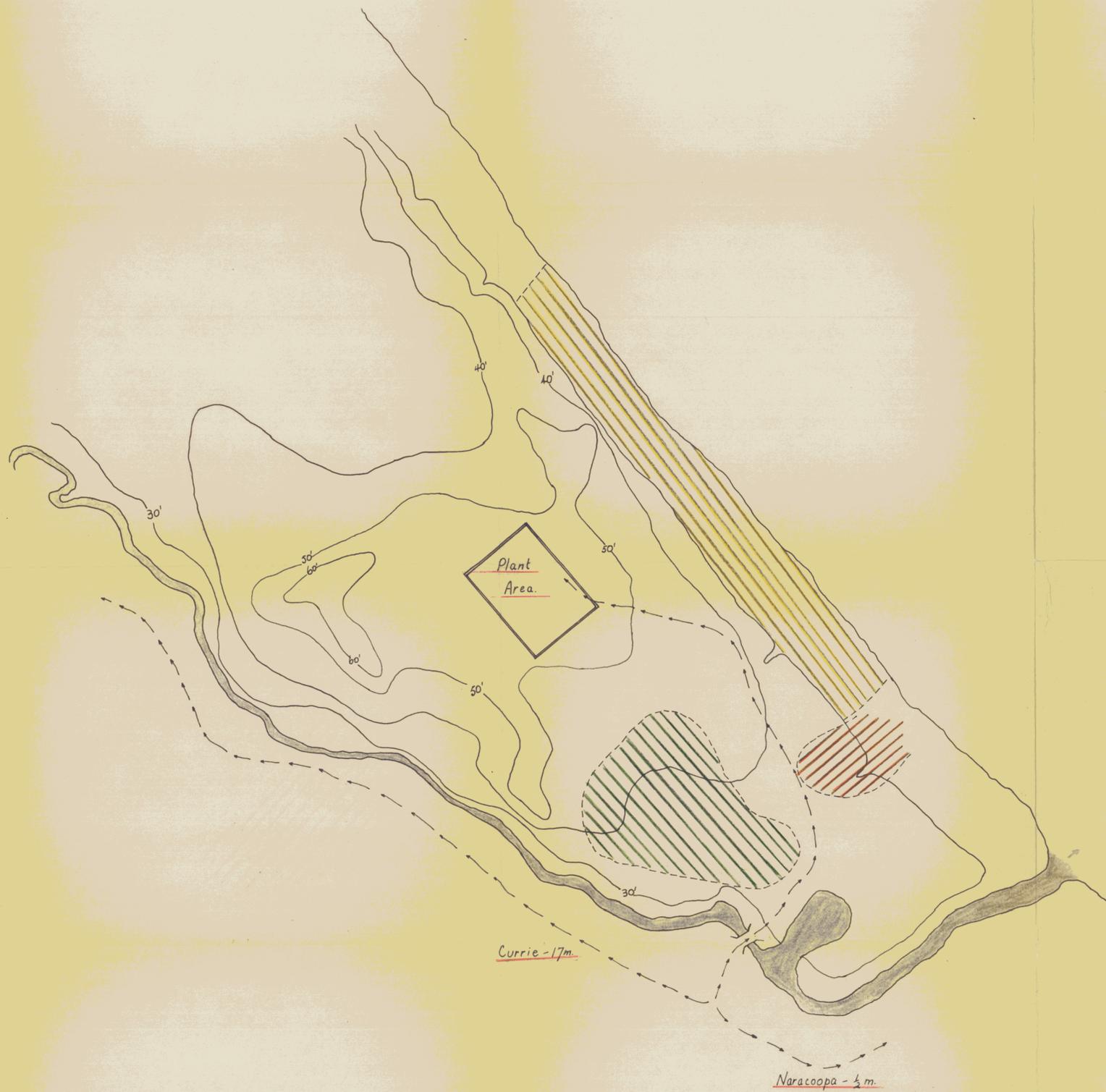
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FLOW SHEET, COMPLETE CIRCUIT OF MINERAL.



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Areas Requiring Rehabilitation

- Southern Ocean Telecommunications Area: approx 1 1/2 ac.
- Old Plant Site: approx 9.0 ac
- Coastal Strip: approx 6.9 ac

Scale 1" = 200'
3-1-73.



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