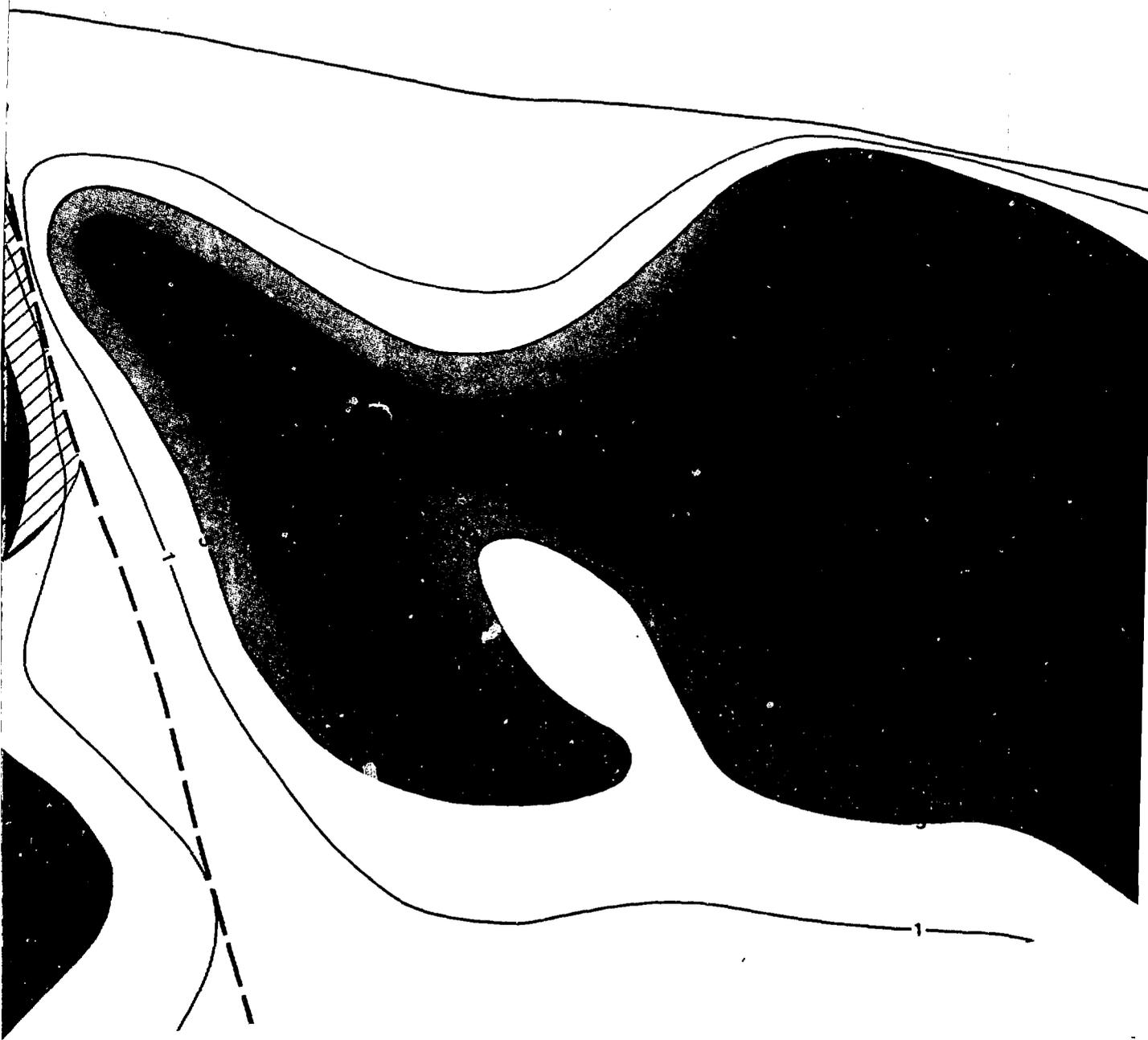


# JABILUKA GOLD – URANIUM PROJECT



**PANCONTINENTAL MINING LIMITED**

## JABILUKA

The Jabiluka gold-uranium deposit is located within Mineral Lease MLN1, 230km east of Darwin in the Alligator Rivers Region of the Northern Territory. The lease lies 11km west of the border of the Arnhem Land Aboriginal Reserve and 20km north of the Ranger Uranium Mine. Jabiluka, with reserves in excess of 200,000 tonnes of contained  $U_3O_8$ , is the world's largest high grade uranium deposit and also contains nearly 12 tonnes of gold.



Jabiluka was discovered by Pancontinental Mining Limited's geologists in 1971. Since then more than 250 holes totalling 51,000 metres have been drilled on a 30m x 30m grid to explore and define the orebody. In August 1982 Mineral Lease MLN1 was granted by the Northern Territory for a period of 42 years following the signing of an Agreement with the Northern Land Council representing the Traditional Aboriginal Owners and approval by the Commonwealth Minister for Aboriginal Affairs.

By the end of 1982 all necessary mining and environmental approvals had been obtained from the Commonwealth and Northern Territory Governments and Letters of Determination had been granted by the Commonwealth which allowed Pancontinental to seek sales contracts.

Significant marketing progress was made, a major sales contract was signed and letters of interest and other forms of commitment, representing at least 50% of anticipated production, were secured.

With the coming to power in 1983 of the Labor Government the Letters of Determination were withdrawn and the development of the deposit ceased. Jabiluka remains undeveloped awaiting a change of policy by the Australian Government.



## Environment

In 1979 the decision was taken to mine Jabiluka by underground techniques rather than by open cut. This decision will ensure that no mining operations will be close to the Magela Creek waterway and that there will be no risk of drainage from mining activities finding its way into the Magela.

Another benefit is that the area of surface disturbance will be reduced to less than 40% of that were it developed by open cut and will reduce the total amount of ore and waste to be mined, to less than 25% of an equivalent grade open cut.

## Water Management

As a result of the reduced area the amount of rainfall that must be captured and managed in the comprehensive water management system will be dramatically reduced. Waste water will be contained and controlled by a zero discharge system utilising evaporation or water treatment to remove all contaminants before irrigation application within the project area. No water will be released to the Magela Creek waterway or to the nearby Kakadu National Park.

## Kakadu National Park

Jabiluka, which was discovered prior to the establishment of Kakadu National Park, is not and never has been in the Park. The granting of Mineral Lease MLN1 pre-dates the proclamation of Stage 2 of Kakadu by 15 months.

## Rehabilitation

At the completion of operations the openings to the underground mine will be sealed. Surface facilities and the ore treatment plant will be removed and disturbed areas landscaped. The tailings storage facility will be covered with 1 metre of low permeability material and 2 metres of original overburden stockpiled during the construction phase. All disturbed areas will be re-vegetated with local plant species to the satisfaction of the relevant Northern Territory and Commonwealth Government Authorities and the Traditional Aboriginal Owners.

## Health and Safety

The mine design which incorporates

a mining method not requiring miners to work within the orebody for the most part and an efficient mine ventilation system will ensure that workers will be exposed to less than the maximum recognised acceptable levels of total radiation related to radon and to gamma.

The advanced mine ventilation system will also ensure that workers' exposure to airborne dust and diesel fumes will be kept to a practical minimum and well within acceptable limits.

In the ore handling and treatment stages the plant will be designed to ensure that radiation and dust is below internationally accepted permissible levels.

Health and safety management will be an integral part of the management policy and procedures under which the operation will be conducted.

## The Aboriginal People

Significant benefits will flow to the Aboriginal people in the form of financial payments, employment, training and business opportunities. Cash payments of \$1.8 million have already been made to the Northern Land Council on behalf of the Aboriginal Associations. Further payments will amount to \$8.2 million during the construction of the project plus royalty type payments based on 4.5% of net revenue for the first 10 years of production and 5% thereafter.

The agreement reached with the Northern Land Council on behalf of the Aboriginal people also requires that Pancontinental give a 5% preference to Aboriginal businesses for the supply of goods and services to the project.

There are no Aboriginal sacred sites within the Mining Lease MLN1 that will be disturbed or which lie close to the project area to be disturbed.

## The Uranium Market

During the period 1987-2000, the number of power-generating nuclear reactors in the world outside the centrally-planned economies is expected to increase from 335 to 415. The consumption of nuclear fuel will increase from the present level of 115 million pounds to 145 million pounds of  $U_3O_8$  per year. Existing uranium production capacity and planned expansions will not provide

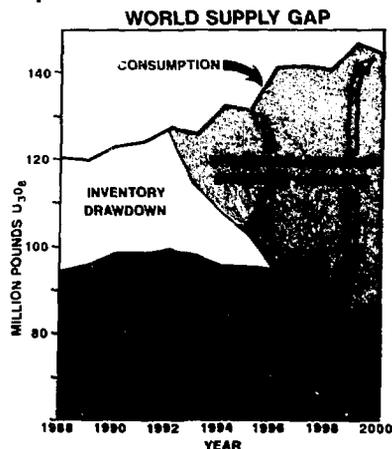
sufficient supply to meet that demand. New uranium projects must be developed. Current excess inventories are being progressively reduced so that by about 1992 stockpiles will be at levels consistent with the requirements of a prudent industry. Consumption continues to exceed actual production thus providing significant opportunities for low-cost producers to gain a large share of the market.

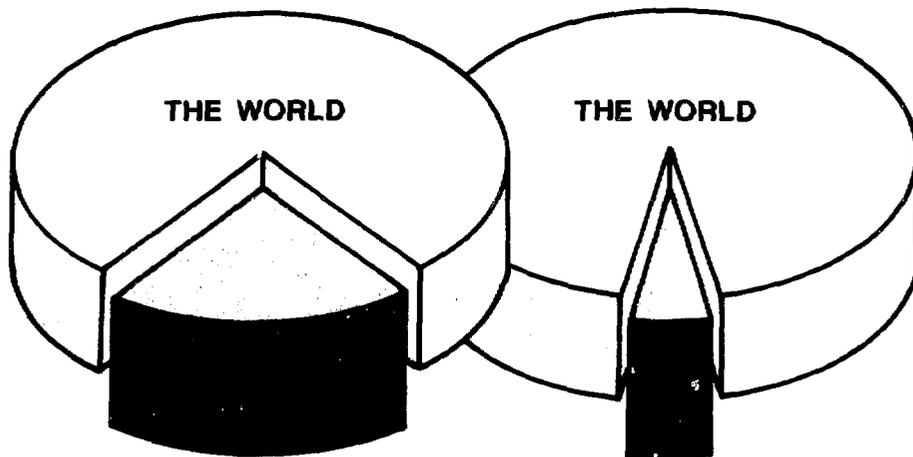
## Benefits to Australians

At a production rate of 1,500 tonnes (3.3 million pounds)  $U_3O_8$  per year, and a price of A\$30/lb, the uranium revenue from Jabiluka will be of the order of A\$100 million per year. Gold revenue will be of the order of \$12 million per year at current prices. Since the entire uranium production of the Jabiluka project is to be exported, the sales revenue will significantly increase Australia's export income and reduce the level of foreign debt.

Pancontinental will be subject to corporate income tax, royalties and other Government charges on earnings from the Jabiluka project. Additional Government revenues will flow from taxation of salaries and wages, shareholders' dividends, and profits earned by others on supplies of goods and services to the project. The benefits to the people of Australia will be substantial.

During the construction phase of a 1500 tonne  $U_3O_8$  per annum project direct employment at Jabiluka is expected to peak at approximately 500 persons while approximately 300 people will be employed during the operating phase of the project. The corresponding off site employment created by the project will be 2000-2500 jobs during construction and 500-600 during operations.





**AUSTRALIA'S URANIUM RESOURCES (1987)**

**AUSTRALIA'S URANIUM MARKET SHARE (1987)**

**URANIUM RESERVES**

|             | Tones      | Grade U <sub>3</sub> O <sub>8</sub> % | Contained U <sub>3</sub> O <sub>8</sub> (t) |
|-------------|------------|---------------------------------------|---|
| Jabiluka I  | 1,300,000  | 0.25                                  | 3,400                                       |
| Jabiluka II | 52,000,000 | 0.39                                  | 204,000                                     |
| Total:      | 53,300,000 | 0.39                                  | 207,400                                     |

**GOLD RESERVES**

|             | Tonnes    | Grade Au g/t | Contained Au (Kgs) |
|-------------|-----------|--------------|--------------------|
| Jabiluka II | 1,100,000 | 10.7         | 11,800             |

**Chronology**

- 1971 — The Jabiluka I uranium deposit was discovered by Pancontinental Mining Limited 230km east of Darwin.
  - A Joint Venture was formed between Getty Oil Development Company Limited (now owned by Texaco) and Pancontinental to develop the Project.
- 1979 — Jabiluka final Environmental Impact Statement was filed and approved by the Federal Government.
- 1982 — Agreement was reached with the Northern Land Council and the Aboriginal Traditional Land Owners.
  - Mining Lease was granted for a period of 42 years from August 1982.
  - Final approvals were given by the Commonwealth Government.
  - Letters of Determination were granted so that sales contracts could be sought. Firm commitments were secured for the supply of 35 million lbs U<sub>3</sub>O<sub>8</sub> over a 10 year period. Additional sales opportunities were at an advanced stage of negotiation.
- 1983 — Letters of Determination and the right to seek sales of product were withdrawn by the ALP Federal Government.
- 1987 — An option agreement was signed with Texaco giving Pancontinental the right to buy the 35% equity in the Project held by Texaco.

## Geology

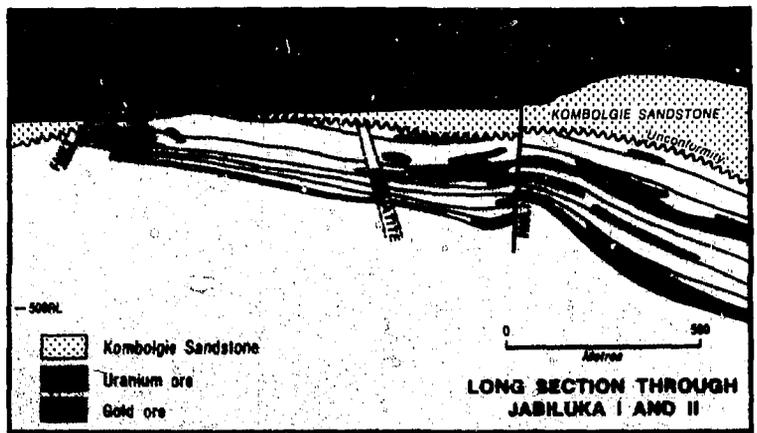
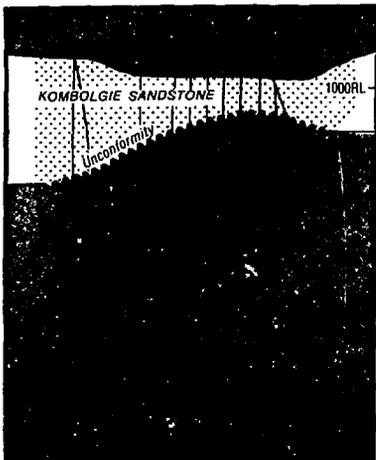
The Jabiluka mineralisation lies within the Lower Proterozoic Cahill Formation, a folded sequence of quartz-chlorite-sericite-graphite schists which are overlain by a flat-lying series of Middle Proterozoic Kombolgie Formation sandstones, grits and conglomerates.

Jabiluka comprises two deposits separated by 500 metres of barren carbonate sediments. Jabiluka I is relatively small, containing 1.3 million tonnes of ore and sub-outcrops to the west of the main sandstone escarpment. The major resource, Jabiluka II which lies 500 metres to the east contains 52 million tonnes of ore and is entirely covered by sandstone.

Uranium mineralisation occurs within four distinct ore horizons, separated by relatively barren schist sequences. The major host horizon is the Main Mine Series Schist containing more than 70% of the uranium reserves.

Uranium mineralisation is predominantly in the form of uraninite and is concentrated in brecciated zones within the schist horizons.

The major gold mineralisation is concentrated in the western part of Jabiluka II principally within the Main Mine Series Schist. The gold tends to be associated with uranium and occurs within uraninite grains and as cross-cutting veinlets.



## Mining

The Jabiluka II ore reserves will be mined exclusively by underground extraction methods. There is no plan to mine Jabiluka I.

The underground mine will be accessed by a decline from the surface. The decline will be collared in the valley to the south of Jabiluka and will be developed at a gradient of 1 in 8 to access the initial mining area at a depth of 200 metres. The decline will be developed within a barren quartz pegmatite which cross-cuts the sequence at the western end of the Jabiluka II orebody.

Main extraction levels will be developed eastwards off the decline in the footwall of the ore zone. Hanging wall development will be used for stope drilling and ventilation. The mine will be highly mechanised, utilising electric hydraulic drilling equipment, electric and diesel loaders and diesel powered ore haulage trucks. Ore will be trucked up the decline to the surface crushing, grinding and treatment plant. An efficient ventilation system will be installed to provide the required radiation protection and worker comfort in the tropical climate. Being an underground mine, land disturbance will be kept to a minimum; the only surface expression of the mine other than the decline portal will be the ventilation fans.

Initial production will be concentrated in uranium ore zones containing gold mineralisation. The main extraction method will be sub-level open stoping with some mechanised cut and fill stopes. Stopes will be backfilled using cemented de-slimed mill tailings, thus preventing any subsidence effects at the surface.

## Processing

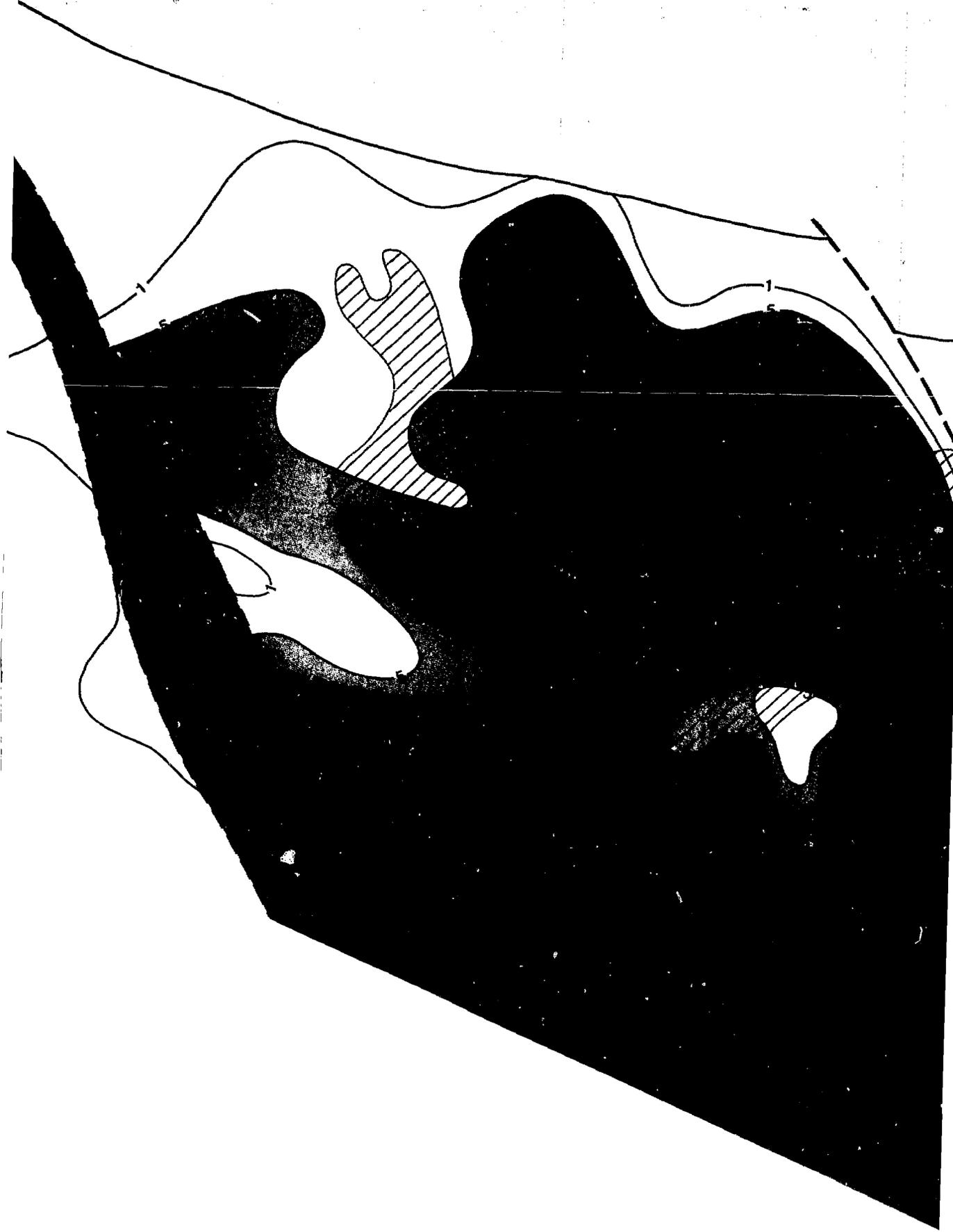
The planned ore treatment process will first reduce the lump-sized ore delivered from the mine to very fine pulp by crushing in a primary jaw crusher to about 150mm maximum then grinding in a semi-autogenous wet mill. The pulp will be leached with sulphuric acid and the solid particles separated from the aqueous liquor, which now contains the dissolved uranium, by settling and clarification processes. The washed particles will be neutralised with a lime solution and further treated to recover the gold content.

The clear uranium bearing solution will then be concentrated and purified using a solvent extraction process. The uranium will be precipitated from solution as a fine yellow powder, ammonium diuranate. The powder, yellowcake, will be thickened and recovered by filtration and the barren solution recycled within the process. The yellowcake will be dried and calcined to become uranium oxide before packaging in plastic lined sealed drums for shipment.

The gold will be recovered from the leached and neutralised tailings by the conventional cyanide leaching and carbon-in-pulp extraction process. The tailings from which the gold and uranium has now been removed will either be deposited in a tailing storage at the southern end of the lease area or will be used as mine backfill. About half of the tailings from the ore treatment process will be used in the progressive mine backfill operation.

## Production Rate

It is proposed to mine and process 275,000 tonnes of ore per year to produce 1,500 tonnes (3.3 million pounds) of  $U_3O_8$  and up to 30,000 oz of gold.



PLAN PROJECTION OF JABILUKA II SHOWING URANIUM CONTENT AND AREA OF GOLD MINERALISATION  
The numbers show the thickness of ore intersected by drilling (in metres) times the grade of ore intersected (in percent  $U_3O_8$ ).