

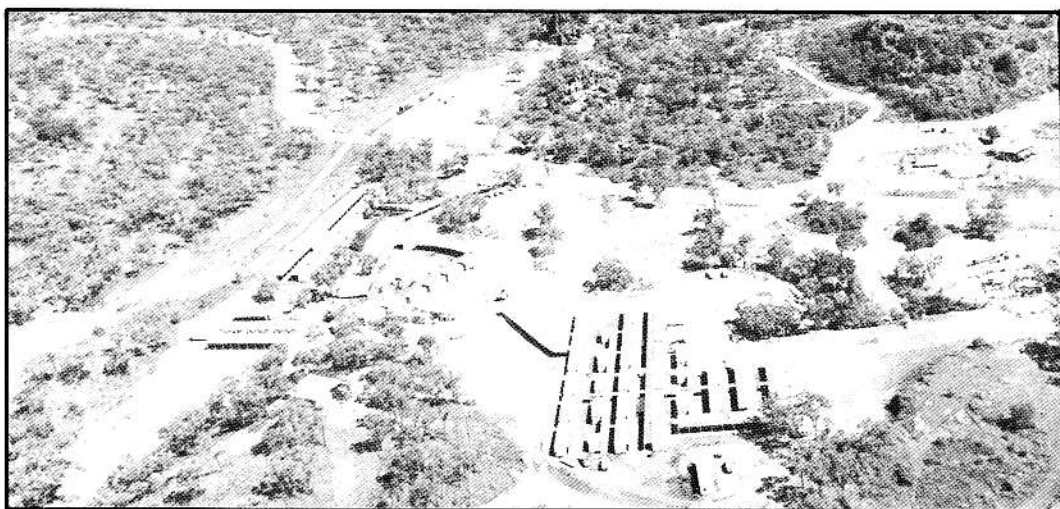
Red Dome Gold Mine

CHILLAGOE, NORTH QUEENSLAND, AUSTRALIA

NUGINI
MINING AUSTRALIA



Ed McCarthy & John Booth , Acacia holacrsig , Waste Dump Area



Administration and camp area

Introduction

The Red Dome Gold Mine is located approximately 15 kilometres west of the township of Chillagoe which itself is approximately 220 kilometres west of Cairns in Far North Queensland.

The Mine commenced operations in 1986 and was the first large scale gold project in Australia to be developed solely on the heap leach process.

The Mine operated successfully as a Heap Leach operation until 1989 when a new Grinding, Flotation and Carbon-In-Leach Plant was installed to process the non heap-leachable component of the ore body.

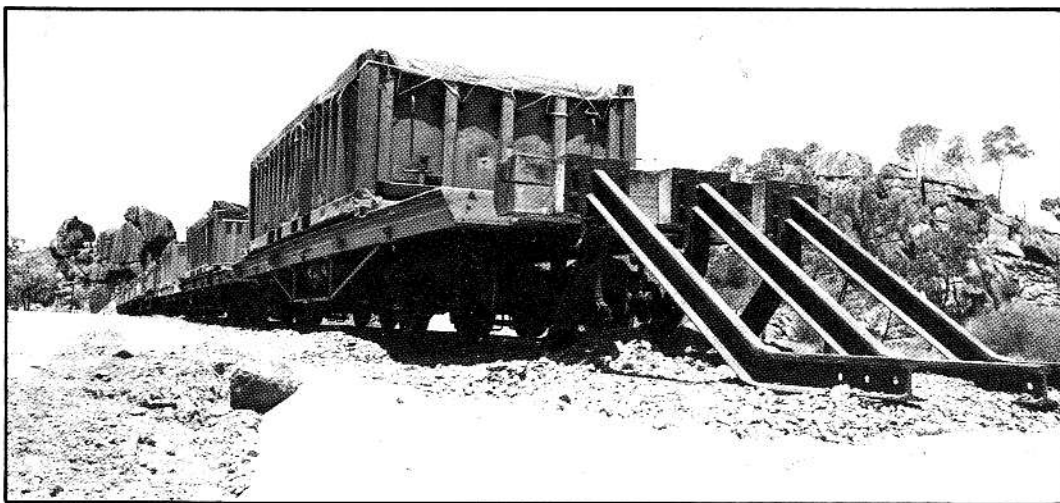
Upon commissioning of this new section of the plant, Red Dome started to produce copper concentrate as well as gold bullion. The copper concentrate is currently shipped via rail to Mt Isa for smelting and later refining in Townsville and overseas.

The mine is currently operating at an annual production rate of 90,000 ounces of gold, 90,000 ounces of silver and 4,000 tonnes of copper metal.

The current reserves provide another 3 years of processing, however there is considerable potential in the region for additional reserves and an extensive Exploration programme is currently being undertaken to identify and develop these potential new ore bodies.

The geological and hence metallurgical complexities at Red Dome make the operation a very challenging one which demands a high level of dedication and expertise by the workforce. In the past Red Dome has made some significant metallurgical breakthroughs and is currently operating in a mode which is unique at least to Australia and possibly the world.

It is our objective to meet the challenges presented by Red Dome in a way which is consistent with the needs of our various stakeholders which includes the community at large. Red Dome is fully aware of its environmental responsibilities and intends to be proactively involved in meeting these responsibilities.



Concentrate shipment

Geology

The Red Dome deposit occurs within the Chillagoe Formation, which is a carbonate rich part of the Hodgkinson Province. Sediments of the province were deposited in the Siluro-Devonian age, between 450 and 360 million years ago.

The Chillagoe Formation consists of chert, sandstone, siltstone, limestone (marble in places) and basaltic to andesitic volcanics. These sediments have been tilted to be nearly vertical by folding and faulting and are bounded to the southwest by the Palmerville Fault, an extremely large structure which can be traced over hundreds of kilometres. It separates the Chillagoe Formation sediments from the Dargalong Metamorphics of the Pre-Cambrian age (deposited over 1,000 million years ago).

At Red Dome, limestone has been intruded by quartz porphyry of Permo-Carboniferous age (360-290 million years ago), possibly along faults which are sub-parallel to the Palmerville Fault. Reactions between the hot porphyry intrusive and the limestone have formed a rim of skarn consisting mainly of wollastonite, garnet and hedenbergite. The gold and copper mineralisation was introduced with these reactions and was originally confined to the skarn and the outer rim of the porphyry.

Subsequently, ground water has dissolved the lime from the rocks, leading to the formation of a karst collapse breccia consisting of fragments of all the rock types set in a clay matrix. The breccia extends to over 150 metres below the surface and has been intensely oxidised. Both the brecciation and oxidation processes have caused redistribution of the gold and copper in the upper, oxidised zone. This zone has

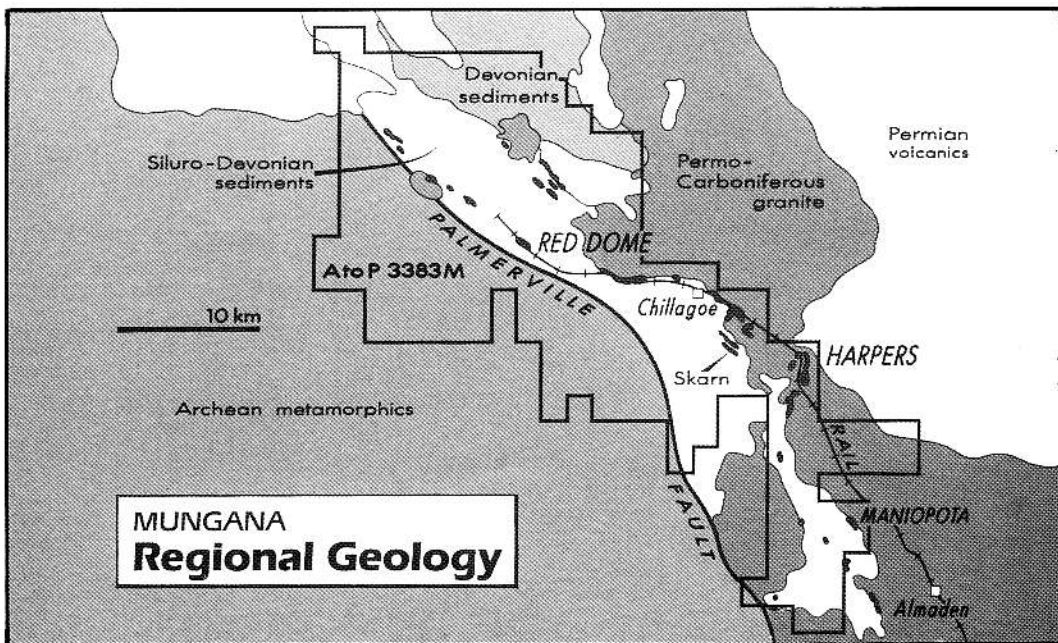
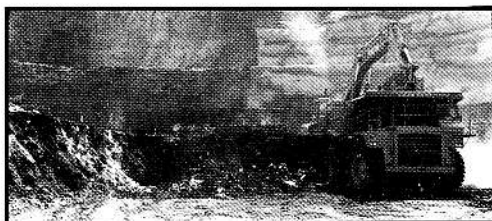
provided the majority of the ore mined and treated at Red Dome in the past.

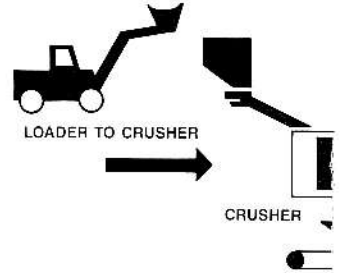
Future production will be from increasing amounts of fresh skarn and porphyry.

Copper mineralisation consists of native copper and secondary copper minerals such as malachyte and azurite in the oxidised zone. Copper also occurs in clay minerals and as chrysocolla in the oxide zone but cannot be extracted economically in these forms.

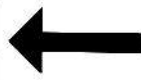
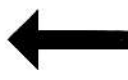
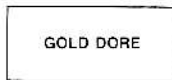
In the primary (fresh) ore, copper occurs in bornite, chalcopyrite and chalcocite. Minor zinc (sphalerite) and lead (galena) mineralisation is also present but these are not recovered.

Gold occurs as very fine (less than dust size) particles in both the oxide and primary mineralisation and silver is generally associated with the copper minerals.





Processing Flow Chart



Processing

Treatment of ore started as a Heap Leach operation in 1986. This consisted of pretreatment of clayey material with lime and cement, to aid percolation, and stacking on prepared pads. The heaps were then sprayed with cyanide bearing solutions to dissolve the gold. The solutions are collected in ponds, the gold recovered on to carbon, and the 'barren' solution recycled.

To recover gold associated with copper and to treat the deeper, harder ore, a Grinding, Flotation and Carbon-In-Leach Plant was constructed and commissioned in May 1989. Since this time, this has been the main treatment process. Some low grade ore is dump leached by spraying with cyanide solutions without pretreatment.

The milling operations consist of first crushing to produce a mill feed less than 200mm in size. This material is reclaimed and ground to fine sand size in rotating mills with the aid of steel balls to liberate the various minerals.

The copper minerals, and approximately two thirds of the gold, are recovered to a concentrate suitable for smelting, by the process of froth flotation. The valuable minerals attach to bubbles and are separated from the bulk of the material. The concentrate is filtered and stockpiled for railing. A trainload per week is transported.

The tailings from the Flotation Plant may still contain gold which is recovered by leaching with cyanide and

absorption on to activated carbon. The gold and silver are then recovered from the carbon and treated to produce dore' bars.

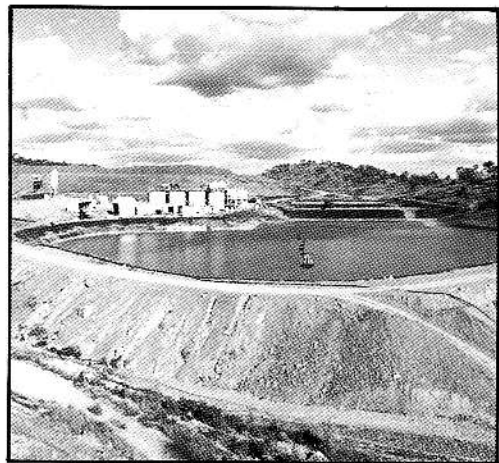
Typical daily Mill production rates are:

Tonnes Treated - 3,000 tpd

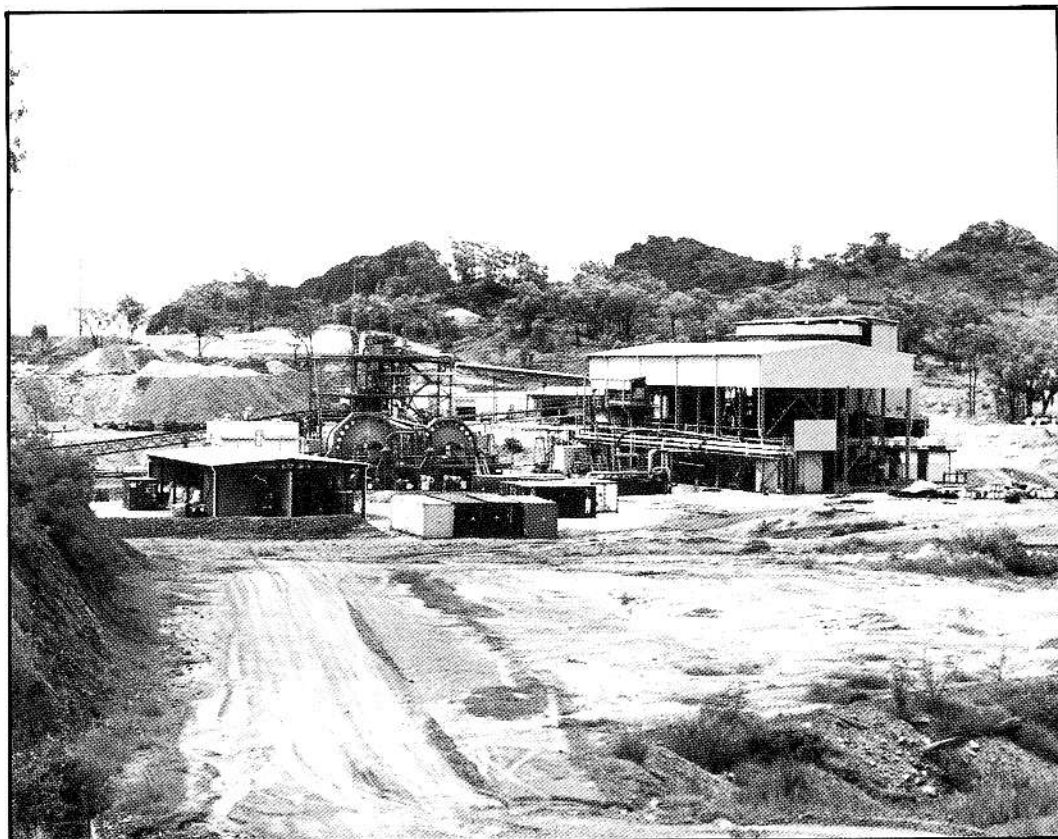
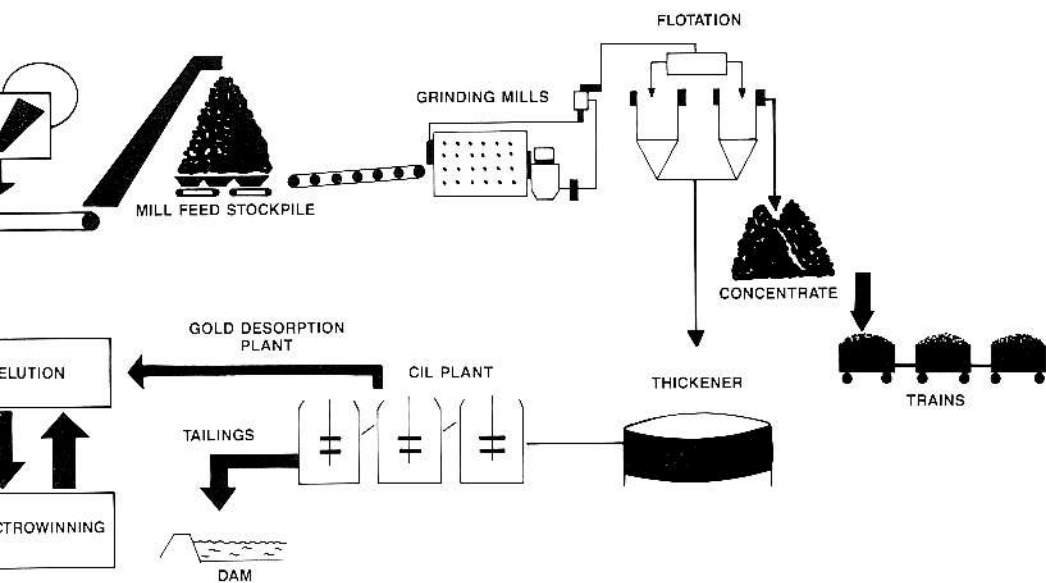
Copper in Concentrate - 11 tpd

Concentrates are currently railed to Mt Isa for smelting.

ROM heap leaching also contributes to gold and silver production.



CIL, Gold Plant and Pond System



Grinding and Flotation Plant

Red Dome and the community

Red Dome Pty Ltd plays an important role in the economy of Far North Queensland and especially the Cairns and the Atherton Tablelands region.

The company currently employs 124 permanent staff plus approximately 45 sub-contractors as well as a number of casual employees on a day by day basis. Based on a multiplier effect of 5:1, Red Dome supports directly and indirectly approximately 1,000 people in the Cairns, Tableland Region.

Another benefit to the local business community and to the areas economic wellbeing is the purchase of consumables, transport, accommodation and services required to maintain the mine and its workforce.

Some relevant economic facts are as follows:

Annual Personal Income	
Tax Generated	– \$2.0 million
Annual Payroll Tax Paid	– \$0.3 million
Annual Royalty	– \$1.1 million
Annual Power Bill	– \$3.5 million
Annual Concentrate Rail Bill	– \$1.1 million
Annual Accommodation & Transport Bill	– \$1.0 million

Red Dome Pty Ltd is also actively involved in many other projects which benefit the community, these include:

- (a) Money raising schemes, and substantial donations to the Royal Flying Doctor Service;

- (b) A commitment to the Mareeba Shire Council for the Bourke Developmental Road, ensuring an all weather access road from Mareeba to Chillagoe and the mine;
- (c) Work experience opportunities; and
- (d) Vocational employment.

Safety

Safety at Red Dome is of a high priority equal to morale, costs and production. A very efficient safety programme covering the entire site has been developed.

A modern well equipped First Aid Post and two mine rescue vehicles which are manned by highly qualified First Aid and Safety Officers, plus an emergency services organisation of 20 personnel who are responsible for mine rescue and fire fighting within the camp, give excellent coverage and also support the local community.

A safety incentive scheme where employees are rewarded for the length of time accident free has been implemented and the mine is currently enjoying an accident frequency rate well below the national average.

The small turnover in permanent staff is indicative of the company's efforts to provide a workplace that allows its employees to gain maximum job satisfaction through positive contribution to a vigorous, fast developing company with an eye to the future.

STATISTICS

MINING

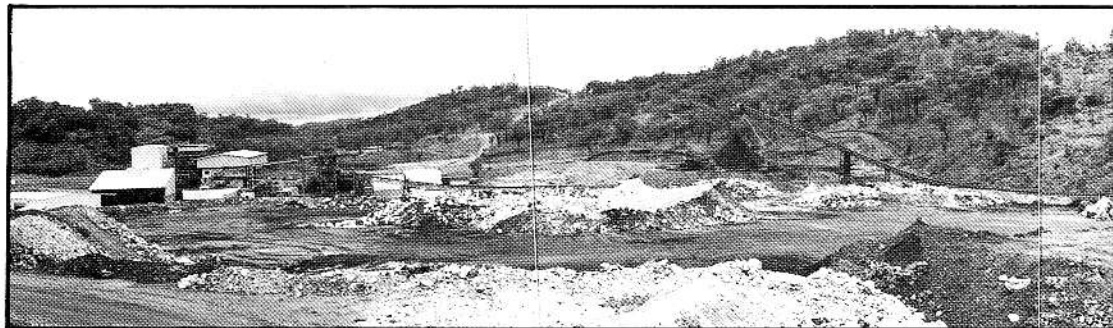
Annual Gold Production:	90,000oz
Annual Production Rate:	1.2 million tonnes
Waste/Ore Ratio Stage 11:	2:1
Planned Pit Dimensions Stage 11:	600 x 500 x 200
Open Cut Reserves Remaining:	1.9 million tonnes
Average Grade:	2.7 g/t Au, 0.45% Cu, 12 g/t Ag
Stockpile Reserves:	1.6 million tonnes at 1.50 g/t
Underground Resources:	1.9 million tonnes
Average Grade:	3.6 g/t Au Grade 0.6% Cu Grade

TOTAL EMPLOYEES:

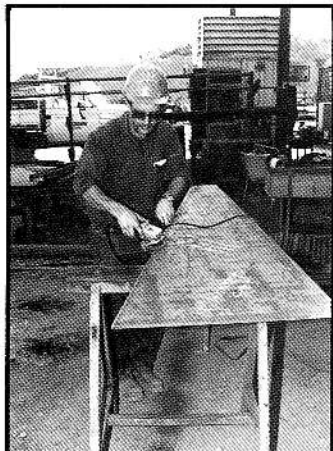
124 Permanent Employees
29 Contract Earthmovers

MINING EQUIPMENT:

Excavators : PC1000 x 1
: CAT 966 FEL
: CAT 980 FEL
Dump Trucks : CAT 777 x 5
Drills : DM 25
: Bohler DTC 122H
: Rockbolting Truck
: D8N Bulldozer



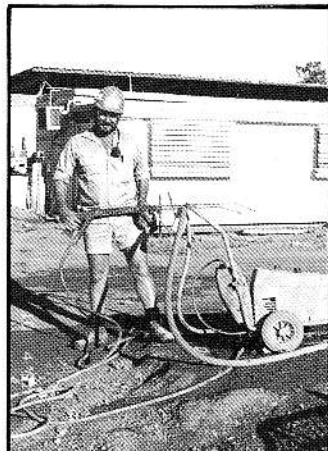
People



Rob Wilson



Sue Prior



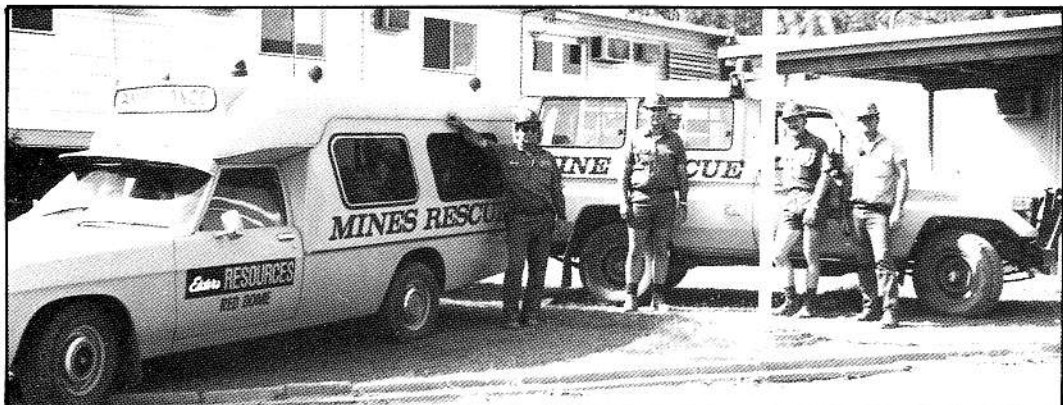
Tom Ross



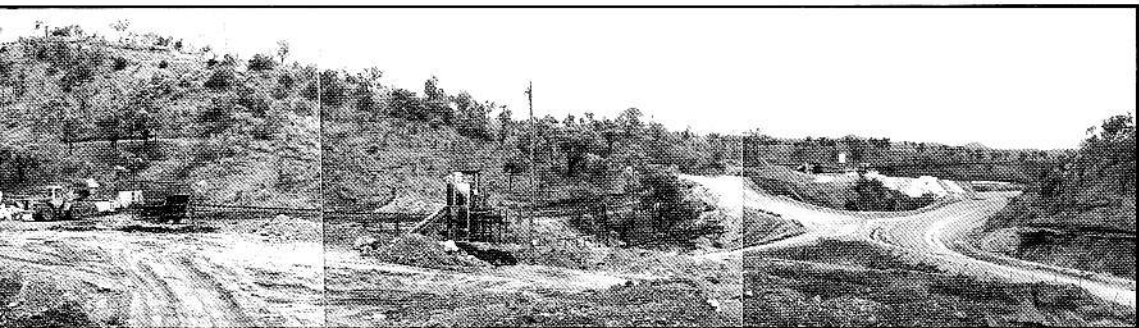
Ed Bartlett



Colleen Patten, Sharon Prior, Marie Agnew & Sandrah Santowski



Ron Pedrola, Nigal Brown, John Boot & Dave Scott



Environmental Rehabilitation

Most major human activities require the use of land and any major industry has some effect on the environment.

Red Dome is no exception being a moderately large scale producer of gold and copper contributing to Queensland's economy.

There is a growing awareness in our community of the importance of the requirement for environmental protection and conservation.

This awareness is shared by Red Dome, which is participating as part of the wider community in the development of a long term management strategy for the Mitchell River under the auspices of the Mitchell River Watershed Management Group.

Red Dome has developed its own Environmental 'Code of Practice'. A staged decommissioning document has been produced detailing post mining land forms, land uses and their cost estimates for each section of the mine. It is intended to invest some \$4 million over the next 3 to 4 years to rehabilitate disturbed areas to accomplish decommissioning.

While rehabilitation programs will vary from mine site to mine site, there are four common stages:

- (a) Determination of the future use of the disturbed area;
- (b) Earthworks to prevent erosion and measures to maximise surface suitability for plant growth;
- (c) Establishment of vegetation, for example by

direct planting, artificial seeding or techniques to conserve topsoil seed sources; and

- (d) Monitoring and research to ensure that the desired ecosystems are obtained and techniques determined to maximise their success.

Red Dome has installed its own nursery facility which produced and planted out some 3,500 native trees in 1990. The target for the 1991-1992 wet season is to produce some 10,000 seedlings.

Rehabilitation is very much site specific, hence the learning curve is steep and very much site specific also. However, much is being learnt from the ongoing trials and good results are becoming apparent on the waste dumps.

This year nursery practices will be included in our multi-skilling programme to enable all workers to gain experience in rehabilitation.

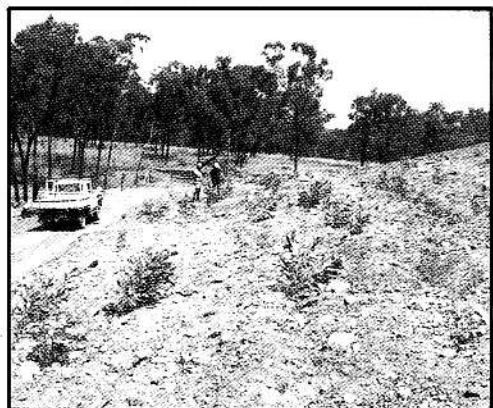
A modular 'Environmental Awareness' programme is being instigated to teach and encourage responsible environmental work practices.

The Environmental Department has a statutory responsibility to monitor surface and ground water quality on a regular basis for the presence of contaminants and take immediate remedial action if contamination occurs.

It is Red Dome's desire to be proactive, rather than reactive in environmental matters. Sound planning and detailed monitoring are key elements in managing Red Dome's Environmental Program.



Nursery



Rehab of Waste Dump Area