RE HABILITATION OF BAUXITE MINING AREAS.

by J.A.W. Robley.

Western Aluminium N.L. (No liability) started mining bauxite in State Forest North of Jarrahdale in 1963 and to date have cleared an area in excess of 500 acres.

This figure does not include other areas cleared for two crushing plants (one under construction) and the attendant road and rail facilities.

Briefly, the company mines by an open cut method after clearing all vegetation from the area. Prior to clearing by the company, the Forests Department organises the removal of all merchantable timber, poles, piles etc. and also collects compensation at the rate of $2.00 per acre cleared.

The company is responsible for replacing over burden over the mined areas.

Prior to mining, the areas carried good quality Jarrah Forest ranging from P 30/60 JA to M 60 JA growing on sandy gravels overlying bauxite deposits. The P content of these soils is generally low ranging from < 2 to 101 p p m in the sites tested.

After mining the area resembles a moon landscape with a multitude of adjoining craters with near vertical walls rising 10' - 12'.

This is caused by the companies selective mining practice where by they cease to dig once the bauxite content has reached a certain commercial minimum.

The over burden is heaped on these remaining islands and is pushed down into the craters once mining operations have finished.

The over burden is then spread by bulldozer to form an even layer about 9" deep over the crater floor.

The actual crater floor is composed of "soft low grade bauxite"; the term "soft", however, is purely relative as even under ideal conditions it is impossible to dig it with a spade.

Surprisingly it is very porous and only in very low lying places does water collect; this is caused by fine material accumulating at the bottom of slopes and blocking the natural porosity of the surface.

Interest is being shown by the company in the re-habilitation of the mined areas being carried out by the Forests Department, and they were able to cite instances where a similar problem had been tackled in Arkansas

and success had been obtained with planting of Sweet Gum, (Liquidambar styraciflua)

In August 1966 the first planting of these crater areas was tried by the Forests Department over an area of about fourteen acres.

Pines and eucalypts were planted in craters where the over burden had been replaced and two control areas were set aside (each 1/10 acre) where plants were put into the crater floor with no overburden (the planting tool used being a cobra Jack hammer) and an area where the floor had been ripped to a depth of 9" with a D 7 Bulldozer still with no over burden replacement.

The following species were tried.

Pines	P. pinaster	
Eucalypts	E. cladocalyx E. maculata E. microcorys E. saligna.	E. globulus, E. bicostata } only planted in Control area.

The pines were planted 6' x 6' and the eucalypts 12' x 12'.

At the time of planting all eucalypts received 2 ozs. Blood and Bone 2 ozs. Potato Manure E mixed with the soil at the bottom of the planting hole.

The pines received 4 ozs. Superphosphate as a surface dressing in late September, 1966.

Following planting, several nights of severe frost were experienced at Jarrahdale and by virtue of the fact that planting was in the hollows many Eucalypts were burned by the frost.

Most plants recovered however and survival figures taken in March 1967 were as follows:-

E. cladocalyx	94%
E. microcorys	80%
E. maculata	65%
E. salinga	84%
P. pinaster	95%

Ten months after planting the height of the Eucalypts is between 2' 6" and 3' 0" and all plants appear to be vigorous and healthy.

The pines have not shown similar height growth but are on a par with other pinaster planted in Kelmscott Division and their condition is satisfactory.

In the control areas survival and growth has been generally poorer as could be expected.

The survival count taken in March, 1967 was as follows:-

Species	Ripped Only	Unripped
P. pinaster	50%	0
E. saligna	25%	70%
E. microcorys	100%	100%
E. maculata	35%	75%
E. globulus	45%	50%
E. cladocalyx	15%	60%
E. bicostata	not tried	90%

The Eucalypts have grown little since planting and are still dying so the survival is poorer now than at the March count.

The condition of the surviving pines is satisfactory.

It is interesting to note that survival of the plants in the unripped area is better than in the ripped area with the exception of P. pinaster.

A possible explanation could be that the capillarity properties of the porous bauxite was broken down by the ripping, thus denying plants soil moisture during the summer.

Planting of the mining areas will be continued in 1967 with a range of species being tried.

Although it is early yet to draw any conclusions, results so far are clearly encouraging.

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