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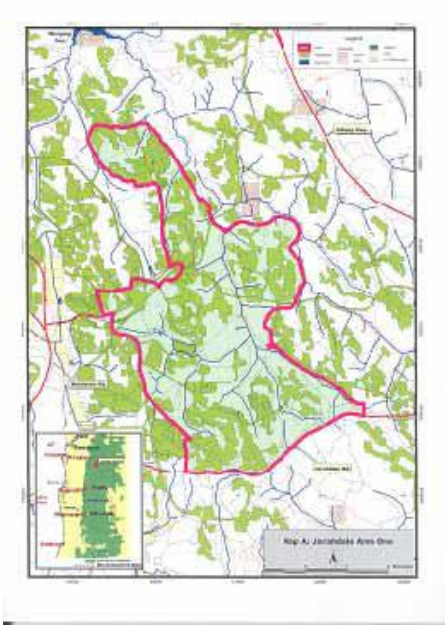
mining and rehabilitation

THE MINING PROCESS

Alcoa's bauxite mining operations in Western Australia occur in the Darling Ranges. The bauxite occurs as a result of a lateritic weathering process and is often found on the sides of the hills. To access the bauxite there are a number of steps involved in the mining process.

Pre-mining surveys

Pre-mining surveys are conducted in all new mining areas to provide information on fauna and vegetation; to map the extent of dieback disease; and to identify any significant Aboriginal or European heritage sites. If rare or protected species or significant sites are present, they are avoided or management plans are developed to minimise the impact of mining on them.



Exploration drilling

Exploration drilling is undertaken to identify the specific location of ore bodies within the mine lease that are suitable for mining. Drilling starts at wide spacing (120 m) and then focuses in on identified ore bodies (see grade control drilling).

Mine planning

Mine planning takes into account any significant vegetation, fauna or heritage sites identified during the pre-mining surveys as well as avoiding the spread of dieback disease. A number of mine plans are produced, including a conceptual 25 year mine plan, a ten year mine schedule and a detailed five year mine plan.

The Five Year Mine Plan and the Mining and Management Program (MMP) are submitted to the Mining and Management Program Liaison Group (MMPLG) each year for Ministerial approval. The MMP summarises the major environmental management programs that will be undertaken to minimise the impacts of mining, with emphasis on issues relevant to the next five years.

Developing infrastructure

Developing infrastructure is conducted when the mining activities move into a new area within the mineral lease, the crusher will be relocated closer to the new area to be mined to reduce the trucking distance. On average, the crusher will move approximately every 10-20 years. New roads are created each year to allow access to areas to be mined in the following few years.

Grade control drilling

Grade control drilling is undertaken to obtain detailed chemical composition information of the ore which is planned for mining. This information is used to plan when to mine which pits, as the mines must supply a constant grade of ore to the refineries by mixing ore of different grades from different pits together.

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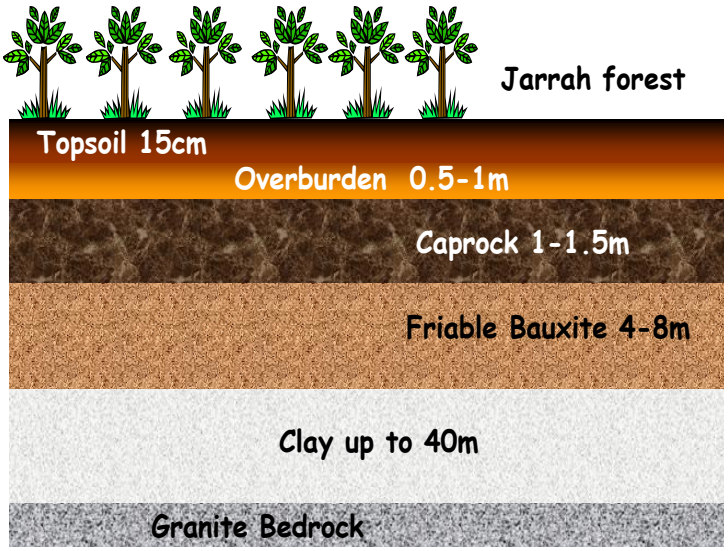
The Mining Process continued.

Timber

Any marketable timber within Alcoa's mine lease belongs to the State Government. Before clearing, the Forest Products Commission takes any marketable timber from areas where mining is planned each year.

Once all marketable timber has been taken by the Forest Products Commission, all remaining timber is cleared from the areas to be mined and positioned in rows. Historically wood waste was burnt, however to reduce burning the residue timber is utilised by external organisations for charcoal production, as wood chips for Alcoa sites and as fauna habitats in the rehabilitated mine areas. Alcoa is aiming to stop burning wood waste completely by identifying uses for all of the waste material.

Bauxite Profile Before Mining



Topsoil and overburden removal

The soil profile is made up of a number of layers, including the topsoil and overburden layers. The topsoil layer contains a large store of seed and nutrients that is vital to the success of the forest rehabilitation and is about 15 cm thick. The overburden layer is 20-80 cm of gravely sub-soil material sitting above a cemented laterite layer known as caprock. These layers are removed separately using scrapers prior to mining.

Secondary overburden removal

Due to the uneven nature of the caprock, the scrapers are unable to remove the entire overburden layer as some of this material will remain in the "potholes" in the caprock. A small excavator is used to remove any remaining overburden.

Breaking caprock

The caprock is a solid rock layer containing bauxite and rests above the friable bauxite layer in the soil profile. This caprock layer is broken by blasting.

Crushing and conveying to refineries

Once the caprock layer has been broken, the bauxite is ready to be mined. An excavator or loader is used to load the bauxite onto haul trucks for transport to the crusher. The crusher is used to break the ore down to a smaller size suitable for transport along the conveyor belt to the refineries. Several pits are usually mined simultaneously in order to supply the refinery with a constant grade of ore.

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