

## Alcoa of Australia Refining Operations

Alcoa operates a three-refinery system in WA – Kwinana, Pinjarra and Wagerup - between the capital city, Perth, and the port of Bunbury, 200 km to the south.

The Bayer refining process, used by alumina refineries worldwide, involves four steps to extract alumina (the feedstock for aluminium smelters) - digestion, clarification, precipitation and calcination.

Alumina is a white granular material, a little less coarse than table salt, and is technically called aluminium oxide.

Aluminium does not naturally occur as a metal, but must first be refined from bauxite in its oxide form.

### The Refining Process

#### Digestion



Finely ground bauxite (red in colour) is mixed with a hot caustic soda solution to dissolve the alumina from the bauxite. Every six tonnes of bauxite makes two tonnes of alumina.

#### Clarification



Insolubles, such as sand and mud, are settled and filtered out, leaving a solution of dissolved alumina hydrate

#### Precipitation



The liquid containing alumina hydrate is then cooled in large open tanks and seed crystals added, causing the alumina to crystallise out of solution

#### Calcination



The alumina hydrate is washed, then heated to remove water, leaving a pure dry alumina in the form of a fine white powder. This is cooled and stored, then shipped to smelters for processing.