

# Worsley Mine Development

## CONTINUING OPERATIONS

The **objective** for this component of the Environmental Review is to **reduce net greenhouse gas emissions** in order to minimise the risk of environmental harm associated with climate change.



## INTRODUCTION

South32 Worsley Alumina is an integrated bauxite mining and alumina refining operation in the South West of Western Australia with a proud track record spanning more than 35 years.

The Worsley Mine Development is the next phase of bauxite mining, providing access to future reserves and resources to sustain production at our Worsley Alumina refinery near Collie.

The project is a key enabler for Worsley Alumina to continue to deliver benefits to the Peel and South West regions, and Western Australia more broadly, for many years to come.

The project is currently subject to a State and Commonwealth environmental approvals process, with a comprehensive environmental review undertaken and an eight-week public review period.

## BACKGROUND

Australia currently contributes to approximately 1.27% of global GHG emissions (World Resources Institute, 2020). In September 2019, Australian GHG emissions were estimated to be 530.8 million tonnes (Mt) CO<sub>2</sub>-e, a 0.3% decrease in GHG emissions from the previous year (DISER, 2020).

Most recent domestic estimates for GHG emissions for the year to March 2021 were estimated to be 494.2 Mt CO<sub>2</sub>-e, reported to be 5.3% (27.8 Mt CO<sub>2</sub>-e) less than the previous year (DISER, 2021). The Kyoto Protocol (Doha Amendment 2012-2020) and the United Nations Framework Convention on Climate Change (UNFCCC) specify six categories of GHG's relevant to WA industries and guidelines. Under the UNFCCC Paris Agreement, Australia is currently committed to reducing GHG emissions by 26-28% below 2005 levels by 2030, which the Australian Government reaffirmed in the lead up to the 26th Conference of the Parties (COP26) in November 2021, along with committing Australia to net zero GHG emissions by 2050.

The largest source of operational GHG emissions at Worsley Alumina is associated with the Refinery operations due to the energy demand to generate steam for the Bayer alumina refining process. Process steam is currently generated from a mix of coal fired boilers and a multi-fuel co-generation steam and power generation plants (MFC's). Electricity is generated as a by-product using the existing onsite power stations, with electricity either consumed at the Boddington Bauxite Mine (BBM) and the Refinery or exported to the grid.

In FY21, Worsley Alumina's net operational GHG emissions totalled 3.74 Mt CO<sub>2</sub>-e, just under our existing MS719 authorised emissions limit of 3.75 Mt CO<sub>2</sub>-e. If Worsley Alumina were to continue to operate under the existing authorised limits, sustained its existing mining (i.e. through extraction with the approved extended mining areas) and refinery production rates and took no further action to reduce its GHG emissions, total Scope 1 and Scope 2 emissions would be in the order of 56.25 Mt CO<sub>2</sub>-e over the life of the Revised Proposal (i.e. 3.75 Mt CO<sub>2</sub>-e per year maximum authorised emission over the indicative 15 year period).

# POTENTIAL IMPACTS

**Worsley Alumina acknowledges that GHG emissions from the project contribute to cumulative global emissions.**

When considered in a regional context, the changing global climatic conditions are potentially driving both chronic and acute physical impacts in the south-west of Western Australia. Chronic impacts are those that incrementally develop over time, such as increasing air temperature or decreasing rainfall trends. Acute impacts are the sudden shock events, such as flooding, bushfire and cyclones.

Worsley Alumina is committed to reducing its carbon emissions but recognises that even with the project delivering a reduction in annual operational GHG emissions of 40% in 15 years, that cumulative GHG emissions outside of South32's operational control will continue to have a direct impact on global climatic conditions.

# PREDICTED OUTCOME

With the implementation of the GHGMP, and the proposed measures to reduce carbon emissions directly and mitigate indirect impacts on other Key Environmental Factors, Worsley Alumina considers that the GHG emissions associated with the Revised Proposal will meet the EPA's objectives for GHG emissions to "reduce net greenhouse gas emissions in order to minimise the risk of environmental harm associated with climate change" and support the Western Australian Government's and South32's goal of net zero emissions by 2050.

More detailed information is provided in Section 6.2 of the Environmental Review Document.

# MITIGATION

**In the short-term, Worsley Alumina is pursuing energy efficiency projects which are likely to represent the most material opportunities to contribute to achieving the first interim emissions reduction target.**

The most mature of Worsley Alumina's decarbonisation studies is mud washing, an energy efficiency project with an estimated abatement potential in the order of 280,000 tonnes of CO<sub>2</sub>-e per annum.

Switching Worsley Alumina's primary source of energy to lower carbon alternatives, in accordance with the State Governments Just Transition Plan (2020) for Collie, is a key strategy for reducing emissions. This fuel transition is also important to support the development of lower carbon energy markets in Western Australia and to improve our long-term energy security. Worsley Alumina are completing studies to detail the optimal approach to reduce the use of coal, with a pre-feasibility study for conversion of the existing coal-fired boilers to natural gas on-track for completion in FY22.

Worsley Alumina will continue to evaluate new and existing initiatives over the life of the Revised Proposal and beyond, against a number of criteria, including safety, technical performance, operability, emissions reduction, maturity, scale, economic return and time required to adapt to changes in process or energy efficiency technologies (including technology commercialisation). Over the longer-term, it is anticipated that future technology and renewables will play a role in the GHG emission reduction pathway in the medium to long term (potentially beyond the life of the Revised Proposal) as technology evolves, and commercialisation of renewable energy sources mature.

South32 are also engaging in innovative research and development forums to investigate future technologies, for example through participation in the ICMM 'Innovation for Cleaner, Safer Vehicles' (ICSV) initiative, and the Heavy Industry Low-carbon Transition Cooperative Research Centre. In FY21, South32 became a founding member of the Electric Mine Consortium to accelerate progress toward a fully electrified zero carbon and zero particulates mining operation. South32 are engaging with Government, industry and other partners, to support the development of low-carbon energy markets and policy that could underpin the decarbonisation of the and the emergence of a hydrogen economy.

The management and reduction of GHG emissions from the project is intended to be managed in accordance with the GHG Management Plan. Worsley Alumina has proposed specific interim emission reduction targets for its net operational emissions (Scope 1 and Scope 2), inclusive of both the BBM and Refinery. The proposed interim targets are intended to apply over five-yearly increments, using the existing MS719 authorised emissions limit as a baseline (3.75 MT CO<sub>2</sub>-e) and aligned with the 15-year indicative life of the Revised Proposal. In order to meet the interim targets, Worsley Alumina will seek to avoid and mitigate emissions from the project as a first priority. Where Worsley Alumina is unable to meet the proposed targets through the use of mitigation measures, it may seek to acquire and retire carbon offsets to address any remaining shortfall where practicable. The proposed Worsley Alumina interim GHG emissions targets:

- support South32's group-wide 2035 target and are aligned with the net zero by 2050 goal;
- are informed by key decarbonisation studies; and
- reflect what is reasonable and practicable at Worsley Alumina given the nature of the operation and the technological and energy market limitations.

Milestone	Interim Reduction target (Mt CO <sub>2</sub> -e)	% Reduction from Baseline
Baseline	3.75	-
5 Year Target	3.45	8%
10 Year Target	3.0	20%
15 Year Target	2.25	40%