

## SULFUR DIOXIDE EMISSIONS FROM MCARTHUR RIVER MINE

On 8 April 2017 an article in *The Australian* made reference to raw air quality monitoring data from the McArthur River Mine (MRM) and alleged that there were at least 31 exceedances of the “national” air quality limits between September 2016 and March 2017.

The article contained a number of inaccuracies. This paper is a reply from the Northern Territory Environment Protection Authority (NT EPA) to that article. The NT EPA’s objectives in preparing this paper are to clarify:

- the role of the NT EPA and other agencies in the regulation of air quality at MRM
- the regulatory framework as it relates to air quality standards and monitoring
- the status of air quality, and its monitoring and management, at MRM.

### Why is sulfur dioxide being emitted from the McArthur River mine site?

Since early 2014 sections of the waste rock dump or Northern Overburden Emplacement Facility (NOEF) at MRM began self-heating and combusting due to the high levels of sulfidic material placed in the waste rock dump. The heating and combustion of the sulfidic material caused visible smoke plumes and emissions of sulfur dioxide ( $\text{SO}_2$ ). It also generated a number of complaints to the NT EPA’s Pollution Hotline.

### What is the role of the NT EPA at the McArthur River mine?

The NT EPA is responsible for providing advice on the environmental impacts of development proposals, policy advice and regulatory services to promote and enable ecologically sustainable development, effective waste management, pollution control and sustainable practices. This includes responsibility for responding to pollution incidents and complaints.

The NT EPA does not regulate activities on a mine site. The regulation and management of environmental impacts on a mine site is the responsibility of the Department of Primary Industry and Resources (DPIR), with the ultimate responsibility for environmental management on a mine site falling on the mine operator. Where an activity on a mine site has the potential to impact or has had an impact beyond the boundaries of a mine site the NT EPA can, and has, utilised its powers under the *Waste Management and Pollution Control Act* (the WMPC Act) to investigate and take compliance and enforcement action. The NT EPA is thus the main regulator for off mine site environmental impacts.

As the regulator of mining activities, at MRM, DPIR has been working with MRM to resolve the source of the  $\text{SO}_2$  emissions at the NOEF. NT Worksafe regulates workplace health and safety issues on mine leases.

## What is the National Environment Protection (Ambient Air Quality) Measure (Ambient Air Quality NEPM)?

The Ambient Air Quality NEPM is an instrument established in 1998 under the *National Environment Protection Council Act 1994* (NEPC Act) to provide a nationally consistent framework for monitoring and reporting on six common ambient air pollutants – carbon monoxide, lead, nitrogen dioxide, photochemical oxidants (ozone), sulfur dioxide and particulate matter (PM) as the larger size fraction of PM10. It was varied in 2003 to include smaller sized particles, PM2.5.

The Ambient Air Quality NEPM sets national air quality standards and goals for each of these pollutants, which jurisdictions including the Northern Territory monitor and report against. The NEPM aims to guide policy formulation that allows for the adequate protection of human health and wellbeing.

The Ambient Air Quality NEPM does not compel or direct pollution control measures, or set penalties for non-compliance.

Consistent with the Ambient Air Quality NEPM, the NT EPA monitors and reports on ambient air quality at three locations within the regional Darwin area: Stokes Hill, Palmerston and Winnellie. Further information is available on the NT EPA website at: <https://ntepa.nt.gov.au/waste-pollution/air>.

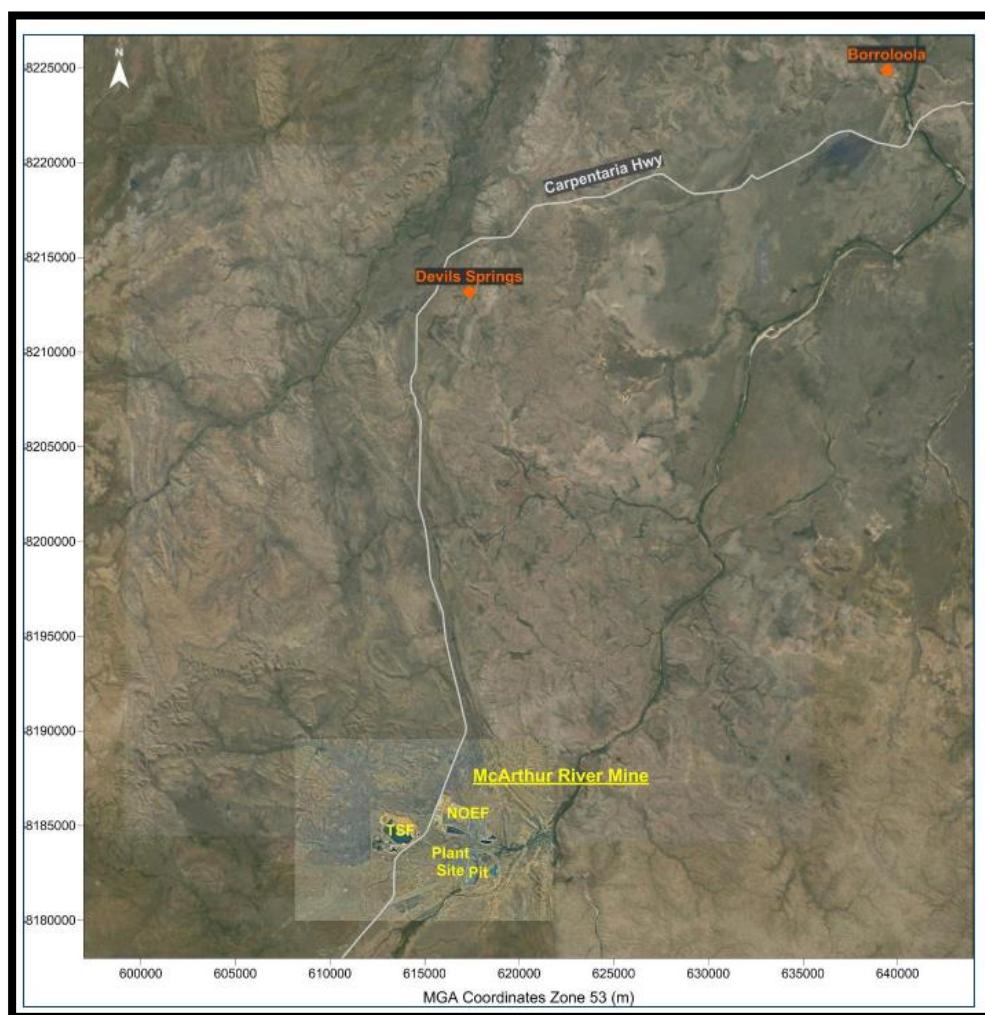
## Do the AAQ NEPM standards apply to the MRM site?

The Ambient Air Quality NEPM standards are based on health evidence of the impacts of air pollutants available at the time the standards are set. They are designed to provide protection to people from the pollutants' adverse human health effects. The standards are also designed to be realistically achievable in the different Australian jurisdictions with a focus on large urban areas, where the majority of Australia's population resides.

The Ambient Air Quality NEPM standards were established in relation to broad air quality within air sheds and are applicable at urban locations away from hot spots. The original intent of the Ambient Air Quality NEPM was to avoid monitoring near localised point sources of pollution and at peak sites, as these would not represent general population exposure.

The Ambient Air Quality NEPM standards are often used in a variety of locations and contexts, not representative of overall air quality in those areas and inconsistent with the intention of the Ambient Air Quality NEPM. As ambient standards; that is, pertaining to broad air quality within air sheds they are not generally aimed at assessing air quality at localised point sources, such as those from industrial plants and mine sites.

The monitoring of SO<sub>2</sub> at on the MRM site, and interpretation of associated air quality, needs to be considered in context with the original intent of the Ambient Air Quality NEPM. It is also important to acknowledge that the nearest population centres to MRM are the Devil Springs outstation (28km to the north) and the township of Borroloola (approximately 44km northeast of the mine) (Figure 1).



**Figure 1** Location of Devil Springs and Borroloola

### What actions has the NT EPA taken in relation to sulfur dioxide air quality matters at the MRM mine site?

In October 2014, the NT EPA required McArthur River Mining Pty Ltd to carry out an environmental audit to monitor and determine the impact of SO<sub>2</sub> emissions from the mine. This was in response to an NT EPA air pollution investigation into potential off-site environmental impacts related to fumes, odours and smoke emanating from the waste rock dump within the NOEF. The audit required MRM to install air quality monitoring stations (AQMS) at the nearest residential locations surrounding the mine in Borroloola and Devil Spring to monitor SO<sub>2</sub> emissions arising from the NOEF.

The monitoring program commenced 22 June 2015 and ran for 14 months over both Wet and Dry seasons, with a final report received from MRM in late 2016. MRM were required to make the air quality data publically available. MRM has completed all requirements of the audit.

### **What did the monitoring results tell us?**

The monitoring results over the 14 month period showed that there were no exceedances of the Ambient Air Quality NEPM SO<sub>2</sub> standards at the two off-site AQMS.

The monitoring results showed that the highest levels measured in any hour during the 14 months of monitoring were approximately ten times lower than the Ambient Air Quality NEPM criterion of 576µg/m<sup>3</sup> for the 1-hour average SO<sub>2</sub> standard at Devil Springs and approximately 100 times lower than the standard at Borroloola.

One objective of the environmental audit was to capture Wet season and Dry season data to account for meteorological changes between the seasons. Modelling undertaken by MRM using the air quality data obtained identified a contrast between the two seasons and a greater potential for 10-minute and 1-hour average SO<sub>2</sub> emissions to be above the Ambient Air Quality NEPM criteria along the Carpentaria Highway. Both Wet and Dry season modelling indicated that SO<sub>2</sub> emissions are unlikely to exceed the Ambient Air Quality NEPM criteria at the nearest residences of Devil Springs and Borroloola.

### **What prompted the establishment of the SO<sub>2</sub> monitoring station on the MRM mine site?**

At the conclusion of the audit it was determined jointly by the NT EPA and MRM that the continuation of the SO<sub>2</sub> monitoring at Borroloola and Devil Springs would add little additional value as the results showed that air quality at those locations was not being negatively impacted by SO<sub>2</sub> emissions from the mine.

The requirements of the audit were completed in September 2016. MRM voluntarily relocated the Borroloola AQMS to a location within the mine site near the NOEF (this site is now called Caravan NOEF - refer to Figure 2). The Devil Springs AQMS was decommissioned by MRM.

MRM has elected to publish data from the Caravan NOEF AQMS on its website. It is this data from the AQMS located within the mine site that informed the article in The Australian on 8 April 2017.

MRM is using data from the Caravan NOEF AQMS to inform its ongoing works to reduce self-heating at the NOEF, to provide information for on-site health and safety, and to fine tune its air quality modelling.



**Figure 1** Caravan NOEF SO<sub>2</sub> monitor location

### What has monitoring from the Caravan NOEF AQMS monitor told us?

Analysis of the data from the Caravan NOEF AQMS shows that there have been exceedances of the Ambient Air Quality NEPM standard for SO<sub>2</sub> recorded at the Caravan NOEF AQMS.

For example, in January 2017 there were four exceedances of the Ambient Air Quality NEPM 1 hour average air quality standard of 570 µg/m<sup>3</sup>.

While the raw air quality data from the MRM website shows some exceedances of the 1-hour SO<sub>2</sub> average Ambient Air Quality NEPM standard these are recorded on the mine site and immediately adjacent to the source of emissions at the NOEF.

Air dispersion modelling conducted by MRM and presented to the NT EPA has conducted and determined that the closest residential receptors at Devil Spring are not being impacted by these recent SO<sub>2</sub> emissions.

Based on this modelling, for the month of January 2017 the maximum SO<sub>2</sub> concentrations to impact Devil Springs and Borroloola are 64µg/m<sup>3</sup> and 13µg/m<sup>3</sup>, respectively which are well below the Ambient Air Quality NEPM standard.

**What is MRM doing to reduce emissions from the mine site?**

MRM has developed a comprehensive air quality management plan as part of its approval requirements which focuses on air quality monitoring and management to ensure that the mine site is not impacting the nearest off site population centres.

A key component of the McArthur River Mine Overburden Management Project, which is currently undergoing environmental impact assessment, addresses the future management of the NOEF to avoid the emission of SO<sub>2</sub>.