

18 March 2022

Mr Stephen O'Donoghue
Director Resource Assessments
Department of Planning and Environment

By email c/o joe.fittell@planning.nsw.gov.au

RE: MOUNT PLEASANT OPERATION – REQUEST FOR INFORMATION (PAF MATERIALS)

Dear Steve,

Further to the New South Wales (NSW) Department of Planning, Infrastructure and Environment (DPIE) – Water letter of 29 September 2021 requesting further clarification of the Mount Pleasant Operation's management of potentially acid forming (PAF) material, please find MACH's supplementary responses below.

DPIE – Water's recommendations, as summarised in the letter were as follows:

That the proponent:

- *provide additional details regarding the procedures (e.g. process for identifying PAF material, testing methodologies, frequency, QA/QC) which would ensure the identification and appropriate handling of all PAF material mined under the approval being sought.*
- *provide additional details of monitoring and proposed responses to potential impacts to groundwater from handling and disposal of any PAF material in the out-of-pit emplacement area.*

We address these points in the subsections below.

Identification and Appropriate Handling of PAF Material

All mining operations during the Project are confined to the Wittingham Coal Measures. The prerequisite for PAF material occurring in these Measures is a high concentration of pyritic sulphur. The prevailing depositional environment during the formation of the Wittingham Coal Measures limited the occurrence of elevated pyritic sulphur and hence PAF materials to a discrete geological interval comprising the Archerfield Sandstone and Wynn Seam. This interval constitutes a small, well defined and manageable proportion of the total material mined. This is unlike some metalliferous mineral deposits, where igneous activity can be a key driver in the discontinuous occurrence of PAF materials.

The role of marine transgression and regression on the development of the Sydney Basin coal deposits, including the Wittingham Coal Measures, and the subsequent variance in geochemistry associated with marine or lacustrine depositional environments has been well documented in a range of geological references from the 1980s and 1990s (e.g. Diessel, 1992). In particular, the marine transgression associated with the deposition of the Archerfield Sandstone resulted in a significant increase in the occurrence of pyrite in this geological interval and the underlying Wynn Seam, due to the presence of seawater as the deposits were laid down. Subsequent deposits occurred in lacustrine or back-swamp environments that did not involve seawater, and hence generally NAF materials lie above the Archerfield Sandstone.

Consistent with the conceptual understanding of the Sydney Basin depositional mechanisms, the isolated occurrence of key PAF materials within the geological sequence has been confirmed by various geochemical studies at the Mount Pleasant Operation, Bengalla Mine and Mt Arthur (as documented in Attachment E of Appendix K of the EIS). These studies have confirmed that the Archerfield Sandstone and underlying Wynn seam are the PAF materials likely to be encountered at the Project. This geological sequence has geochemical characteristics that materially differ from the other geological sequences that were not deposited in a marine environment.

These intervals are already mined at the approved Mount Pleasant Operation. The geospatial occurrence of the various geological sequences and economic coal seams are well defined through the exploration programme and infill drilling conducted in advance of mining. The data collected through these investigations is the primary input to MACH's geological model that is used for detailed mine planning, including planning for the management of PAF and NAF waste rock material.

Therefore, the effective management of PAF material at the Mount Pleasant Operation is not reliant on the identification of PAF materials once material have been exposed, as the spatial distribution of PAF materials is well known in advance of mining. MACH will continue to undertake confirmatory geochemical test work over the life of the mine to support the detailed mapping of PAF material that is completed as part of MACH's exploration operations.

Scheduled PAF material extraction and dumping (including coal reject handling) is managed and monitored by the Open Cut Examiner. Key operational controls to manage PAF material include:

- all waste coal (e.g. oxidised coal) is treated as PAF, irrespective of seam source;
- all coal reject is treated as PAF and deposited in-pit, irrespective of seam source;
- fine coal reject is to be placed in fine coal reject cells/ or fines emplacement systems only; and
- Wynn Seam overburden and interburden (i.e. inclusive of the Archerfield Sandstone) is treated as PAF.
- The Wynn Seam itself is processed and blended as coal product.

Physical controls for PAF material include:

- the PAF line is pegged by surveyors prior to PAF material deposition on each bench;
- PAF load and dump locations are recorded, and haul trucks are GPS-tracked;
- in-pit cameras provide real-time monitoring of PAF mining and depositional activities; and
- a minimum cover of 10m is maintained between PAF materials and the final landform surface.

Monitoring and Response Measures

The proportion of PAF waste rock material is quite modest relative to the total volume of waste rock being managed on-site. Encapsulation of PAF material in engineered PAF cells is not required at the site because most overburden and interburden materials at the Mount Pleasant Operation are classified as NAF, have excess acid neutralising capacity, and have low oxidisable sulphur content (Appendix K of the EIS). Therefore, PAF material is separately scheduled, handled and then emplaced within PAF emplacement limits, to maintain sufficient NAF cover.

As described in MACH's previous response, PAF materials are already mined by the approved Mount Pleasant Operation and the potential for leachate drainage is effectively managed in accordance with the approved Mining Operations Plan, with surface water and groundwater monitoring undertaken in accordance with the approved Water Management Plan.

Monitoring potentially relating to PAF material management at the Mount Pleasant Operation includes:

- periodic confirmation assays of the acid forming potential of key materials;
- regular mine water quality monitoring (e.g. in-pit and Mine Water Dam);
- quarterly groundwater level monitoring;
- quarterly groundwater quality monitoring; and
- landform erosion monitoring, and rectification where required.

In the event that MACH's ongoing monitoring was to identify a need for additional PAF material management measures, appropriate additional measures to control acid formation would be developed and documented in the relevant Mining Operations Plan (prepared in accordance with the Mining Act, 1992) and the Water Management Plan (prepared in accordance with the requirements of any Project Development Consent). Such measures could potentially include:

- additional blending of PAF materials with NAF materials that have excess acid-neutralising capacity;
- additional traffic compaction to reduce oxygen ingress to PAF material to extend the lag period preceding acid generation, prior to covering with NAF material; and/or
- dosing PAF material with agricultural lime (fine limestone) to extend the lag period preceding acid generation, prior to covering with NAF material.

Please contact me if you would like to discuss this matter further.

Yours sincerely



Chris Lauritzen
General Manager Resources Development
Mount Pleasant Operation