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Attention: Elle Clementine

EPA Advice on Environmental Impact Statement

Dear Elle

Thank you for the request for advice from Public Authority Consultation (PAE-13093131), requesting the review by the NSW Environment Protection Authority (EPA) of the Environmental Impact Statement (EIS) for the proposed Cadia Mod-14 Increased Processing Rate (Application MP06_0295-Mod-14) at Cadia Road, Cadia, NSW, 2800.

The EPA has reviewed the following documents:

- Cadia Modification 14 Processing Rate Modification – Cadia Holdings Pty Ltd
- Attachment A
- Appendix A - Surface Water Assessment
- Appendix B – Groundwater Review
- Appendix C – Biodiversity Development Assessment Report
- Appendix D – Aboriginal Cultural Heritage Assessment
- Appendix E – Noise Assessment
- Appendix F – Air Quality and Greenhouse Gas Assessment
- Appendix G – Road Transport Assessment
- Appendix H – Economic Assessment
- Appendix I – Preliminary Hazard Analysis

The EPA understands the proposal is for:

- An increase in the approved pre-processing rate from 32Mtpa to 35 Mtpa
- Upgrades to Cadia East mining and ore processing infrastructure to provide capacity to accommodate a mining, materials handling and processing rate of 35Mtpa;
- Continued deposition of tailings into the Northern Tailings Storage Facility (NTSF), Southern Tailings Storage Facility (STSF) and the open Put Tailings Storage Facility (PTSF);

- Construction works on the NTSF and STSF, including;
    - Changes to wall construction designs of the NTSF and STSF embankments and associated disturbance
    - Implementation of NTSF repair works to restore the embankment by encapsulation of the slumped section
    - Construction of centreline lifts at the NTSF and STSF embankments in response to the findings of the Independent Technical Review Board's investigation into the NTSF slump
- Additional pre-conditioning of the overburden above the Cadia East orebody, to be achieved via direction drilling from the surface; and
- Construction and operation of a Sodium Hydrosulphide Solutioning Plant

Based on the information provided, the proposal is subject to an environment protection licence under sections 43, 47, and 55 of the *Protection of the Environment Operations Act 1997* (POEO Act). Cadia Valley Operations (CVO) currently hold an environment protection licence (EPL 5590) for crushing, grinding or separating, mineral processing and mining for minerals under Schedule 1 of the POEO Act. If the modification to the current consent is approved EPL 5590 would require variation under section 58 of the POEO Act.

The EPA has the following additional comments and recommendations:

1. Matters to be addressed prior to determination

a. H2S impacts are underpredicted

The modification proposes to construct and operate a Sodium Hydrosulphide Solutioning Plant (the NaHS Plant). The NaHS plant will produce a solution from a flake product which would be used in the Molybdenum plant. The solution of NaHS produces Hydrogen Sulphide gas (H_2S) as a by-product with less than 1% of the NaHS flake forming H_2S during the solutioning process.

Todoroski Air Sciences Pty Ltd (TAS) has estimated that approximately 75kg of H_2S would be emitted from the NaHS plant per day. This emission rate is based on a maximum demand for the NaHS Plant of 43t of 35% NaHS solution per day. This is equivalent to approximately 15t of NaHS which would generate 0.15t of H_2S gas. A control efficiency of 50% has been assumed due to the proposed installation of a NaOH scrubber.

TAS has adopted a H_2S emission rate of 0.0009g/s, as shown in Table 5-6 of the AQIA. However, the EPA has calculated the emissions rate to be 0.87 grams per second. Whereby;

75kg/day = 75,000g/day = 3125g/hr = 52.08g/min = 0.868g/sec.

The AQIA H2S emission rate calculated by TAS is 1000 times lower than the rate calculated by the EPA. As such the H_2S emissions modelled appear to be underestimated and will require revision.

Additionally, the AQIS provided contains insufficient detail about the process description of the NaHS plant and the chemical processes which take place in the formation of the NaHS. As such Cadia Holdings Pty Limited (CHPL) will be required to complete the following actions prior to the EPA providing its advice for the modification;

(1) The H2S emission rate calculations provided in the AQIA must be reviewed for accuracy. Should calculation errors be found, the assessment of H2S impacts must be revised.

(2) The AQIA must be revised to include a detailed description of the NaHS Plant processes and mechanisms by which H2S gas are formed.

(3) The AQIA must be revised to include information about the proposed H2S scrubber system including supporting documentation which confirms the expected control efficiency. Inclusion of a manufacturers emission performance guarantee is recommended. The scrubber must be shown to be fit for purpose for the given application.

b. Background Air Quality and Cumulative Impacts

The assessment considered a single scenario to represent the Modification which includes the increase in processing rate and the construction works on the NTSF and STSF.

The results presented by TAS for incremental 24-hour average PM2.5 and PM10 concentrations indicate no predicted exceedances of the impact assessment criteria at the privately-owned receptors. However, further information on the method used to account for background air quality and cumulative air impacts is required.

To account for the dust generating activities associated with the modification, TAS has advised that the AQIA used a similar approach to the one previously used in the Air Quality Impact Assessment: Cadia East Project (Holmes Air Sciences, 2009). This approach was selected to provide a direct comparison with the existing approved operations. The assessed Year 17 in the Cadia East Project assessment was considered to most closely represent the current operations.

The total TSP emissions predicted for the year 17 scenario were 3,062,453 kg/ annum (not provided in the current AQIA). The total TSP emissions predicted by TAS for the modification have increased to 5,887,941 kg/annum, representing a 152% increase in total emissions.

TAS has estimated non-mine contributions by calculating the difference between the modelled past mining activities during 2017 and the actual measured data during 2017 (Section 5.4.2). The average difference between the measured and predicted levels from each of the monitoring points was assumed to be the contribution from other, non-modelled dust sources and was added to the future predicted values to account for the background dust levels.

To determine the cumulative impacts from the proposed modification, TAS has modelled a mining scenario for 2017, based on the actual mining activities occurring at CVO in that year (the base year). The results of the modelling were used to determine the CVO's contribution to measured air quality for 2017. The results were applied in the cumulative assessment to minimise potential double counting of existing mine emissions. Thus, the reported increments are effectively the change in impacts from current operations.

Whilst the approach used by TAS is described and generally understood, data has not been provided to support the described methodology. For example, TAS has not included the emissions inventory used to model the existing activities occurring in 2017 or discussed the controls applied for each of the activities. Additionally, calculations have not been provided to show how the results of the base year 2017 modelling have been applied in the cumulative assessment scenario.

For transparency the EPA requires the following additional data to be provided to support the approach used by TAS, and to allow the EPA to verify the reported cumulative impacts reported:

1) A copy of the emissions inventory used to model the base year 2017 including discussion and justification for any controls applied

2) **Production records to support the activity rates adopted in the base year 2017 modelling scenario**
3) **Sample calculations showing how the cumulative impacts from the proposed modification have been determined**
4) **All PM10 monitoring data (24-hour averages) from each of the 4 mine-operated TEOM ambient air monitoring stations for the calendar year 2017.**

c. Referenced Report was not provided

Estimated emissions and source parameters for the Molybdenum Plant have been obtained from the Air Quality Assessment of the Proposed Cadia Copper Molybdenum Plant (Katestone Environmental, 2018). No discussion or justification for the adopted emission rates is provided. It has not been demonstrated that the emission rates adopted from the Katestone report are reflective of current and future operations of the Molybdenum plant.

Additionally, the Katestone report is no longer available via the DPE's Major Projects portal. The EPA require that, where data is relied upon from an external report, the referenced report be provided in full.

The EPA requests the following additional information:

1) **The AQIA be revised to include adequate justification for the assumed emission rates from the Molybdenum plant. It should be confirmed that the adopted emission rates are accurate and representative of the existing and future Molybdenum plant operations.**
2) **The proponent must provide a copy of the referenced Molybdenum assessment report: *Proposed Cadia Copper Molybdenum Plant (Katestone Environmental, 2018)***

d. Water Balance Model scenarios/ assumptions

Appropriate input data, including a long period of record of SILO data and appropriate scenarios, have been used in the modelling. The modelling has highlighted improvements to sizing existing storages that can be implemented as part of the modification and maintain a nil overflow scenario for TSFs and seepage ponds systems, however, the modification does not confirm the sizing for all storages.

Table 9 of Appendix A indicates that all existing water management storages (except for the Eastern Dyke Storage) may need to be enlarged prior to the construction of the proposed outer batter geometry of the TSFs in order to contain runoff from a 1 in 100 year, 72 hour rainfall event (1% Average Exceedance Probability (AEP), 72 hour duration rainfall event) (subject to confirmation of the final design criteria via a proposed risk assessment).

A limitation of the modelling and assessment, therefore, is that all storages have been modelled for a 1% AEP, 72 hour duration rainfall event, however, the Modification proposes that sizing for some storages would be reviewed via a post-consent risk assessment process linked to the existing Water Management Plan, e.g. run off risk from emplaced mine waste rock on the outside of new TSF batters verses risk of processed tailings/process water on the inside of the TSF (plus seepage of this wastewater to surface water storages below the TSFs).

A further risk factor is the permeability of the newly proposed TSF design and whether over time poorer water quality may result if seepage increases. This would need to be accounted for in any risk assessment.

While the Modification indicates that 1% AEP, 72-hour duration rainfall event storages could be implemented, the criteria and methods for the risk assessment are unclear, e.g. what risk factors or runoff quality would result in selection of reduced sizing and how would that

runoff quality/risk be determined. The licence currently provides for both 1 in 20-year rainfall event storages and 1 in 100-year rainfall event storages, however, the basis for the different storage sizing is not clearly set out in the Modification.

The EPA requests the following information be provided:

1) **A risk assessment that demonstrates that all pollution control storages are appropriately sized and potential changes in seepage can be appropriately managed on site.**

2) **The mitigation and maintenance measures that will be applied to retain operational capacity for pollution control storages and seepage management should also be detailed and included as part of the risk assessment.**

e. Tailings embankment modifications

Figure ES-1 provides the proposed modification area for the embankment of the Southern Tailings Storage Facility. The modification area appears to further encroach on the Rodds Creek and notes that approximately 25ha of the Cadiangullong Creek Catchment would be excised as part of the proposed modification.

Additionally, the proposed modification area is shown to utilise the entire southern extent of the mining lease boundary (ML1481) which runs parallel with Panuara Road. The EIS notes that existing drainage lines from the embankment toe of the STSF and NTSF would continue to be used for seepage collection with a sump proposed at each defined low point to collect, monitor and recover seepage. It is unclear as to how the expanded footprint will allow for the required room for a seepage collection point.

Surface water monitoring is also proposed to be relocated further downstream as construction of the embankment extends south however it is unclear if monitoring locations would be fully contained within the approved mining lease if the embankment is extended further south as proposed.

The EPA requires environmental monitoring to occur within the premises in order to determine if pollution is moving off-site.

The EPA requests the following information regarding the extension of the STSF and NTSF embankments be provided:

1) Further detail on the how infrastructure used for seepage collection and management will be located within the mining lease area, particularly at the edge of the STSF and still meet the requirements for seepage collection and monitoring;

2) Detail on the existing surface and groundwater monitoring points that are currently located within the area to be impacted by the proposed embankment modifications and demonstration of how they will be located so that they can continue their monitoring function within the mining lease boundary;

f. Power supply

The EIS states that there will be no change to power supply even though there will be an increase in peak demand. The EPA is aware there have been power supply failures at the premises that have frequently impacted environmental monitoring equipment. The EPA therefore requires:

1) **Detailed information on how the peak demand power requirements can be increased for the project without causing further power supply instability to environmental monitoring equipment.**

The EPA may provide recommended conditions of consent for the proposed modification once it is satisfied that all information regarding the environmental matters raised above has been provided.

If you have any questions about this request, please contact Lucy Apps on 6333 3800 or via email at central.west@epa.nsw.gov.au.

Yours sincerely

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Regulatory Operations Regional