Our reference : EF13/2738; DOC19/826564-8
Contact : Mr David Joseph, (02) 6333 3800

Philip Nevill
NSW Department of Planning, Industry and Environment
GPO Box 39
SYDNEY NSW 2001

2nd October 2019

Dear Mr Nevill

EPA Assessment - Mod 13 - Cadia Hill Tailings Completion (MP06_0295) Application
Cadia Valley Operations

I refer to your request via the major projects portal for the Environmental Protection Authority (EPA) to provide comment on the Cadia Valley Operations (CVO) Modification 13 Cadia Hill Tailings Completion MP06_0295 (the Proposal).

As requested, the EPA has considered the Proposal in terms of the potential impact to air quality, noise emissions, ground and surface water quality and waste management. The EPA's response is contained in Attachment A.

The EPA recommends the Department of Planning, Industry and Environment (DPIE) seek further information and clarification in respect of the matters raised in in Attachment A prior to finalising its assessment of the potential impacts of the Proposal.

Should you have any enquiries in relation to this matter please contact David Joseph at the Central West (Bathurst) Office of the EPA by telephoning (02) 6333 3800 or at central.west@epa.nsw.gov.au.

Yours sincerely

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EPA Assessment - MOD 13 - Cadia Hill Tailings Completion (MP06_0295) Application
Cadia Valley Operations

The EPA understands that the modification proposes:

- an increase to the in-pit disposal of tailings to a pre consolidation level of 713 mAHD from the currently approved 560 mAHD.
- the decommissioning and closure and inundation with tailings of ventilation adit VR101 located in Cadia Hill Pit
- installation of a new ventilation adit outside of the Cadia Hill Pit but within the existing approved mine disturbance footprint
- construction of additional buttressing on the Southern Tailings Settlement Facility embankment
- establishment of a pit lake or 'wet cover' as the final landform for the Cadia Hill Pit

The following summarises the EPA's assessment of the modification and provides comments for incorporation into the DPIE assessment of the Proposal.

Air Quality Impacts

Background

No assessment has been provided by the proponent regarding potential air quality in relation to the Proposal. The Proponent states in section 1 of the summary document that no impacts to air quality will occur. The environmental impact statement (EIS) does not consider scenario's where exposed tailings may generate dust under high winds, as has been experienced at the existing tailings storage facilities at CVO.

EPA Comments

Given the significant recent dust events at the Northern Tailings Storage Facility (NTSF) as a result of high winds on uncovered tailings material, the EPA considers that insufficient information has been provided regarding the management of potential dust from surface of the tailings at the raised AHD level.

Requested Information/Actions

The EPA requests DPIE seek the following:

- Details regarding how potential tailings dust will be managed having regard to the site air quality monitoring and management system and the dust suppression program which is currently being developed.

Groundwater Impacts

Background

The current understanding of the Cadia Hill Pit geology is that it has low permeability making it suitable for tailings deposition. CVO has established a network of ground water monitoring bores in accordance with Modification 11 which permitted the commencement of deposition of tailings into the pit. The groundwater monitoring network monitors groundwater flow gradient into the pit. The EIS includes the establishment of additional monitoring bores near the south west corner of the Cadia Hill Pit under this Proposal.

EPA Assessment

In assessing the groundwater impacts of the Proposal, the EPA reviewed the following documents:

Document	Author/Publisher	Published Date
Main Report: Cadia Hill Tailings Completion Modification 13	Cadia Holdings	9 September 2019
Appendix A: Cadia MOD13 Cadia Hill Tailing Completion Groundwater Assessment	Australasian Groundwater and Environmental Consultants	August 2019
Appendix C: Groundwater Assessment Peer Review	Hydroalgorithmics – Dr Noel Merrick	15 April 2019

Reliance on Modelling – subsidence and tailings settlement

Historical conservative modelling approaches have informed decision making at CVO over its operating life. As real-world subsidence has indicated an unlikelihood of connectivity between the open pit and underground east subsidence zone. The modelling and monitoring observed to date has indicated the level of connectivity ensures containment within the subsurface mine influence. Peer review also identifies the evidence for the consolidation and compaction of tailings as compelling.

While the tailings are initially deposited to 713mAHD, within six to seven years it will drop to 700mAHD, causing a lake to form in the void. The pit lake has the desired hydrogeological influence as regional groundwater 'sink' and suitable final landform. The centre of the tailings is expected to settle to 562mAHD 100 years post closure.

The use of temporary contingency measures is dependent on a short-term reversal of the hydraulic gradient towards the Cadiangullong Creek prior to tailing settlement. An effective grouting job of secondary fractures reducing permeability would prevent ingress to the formation in this period prior to the settlement of tailings.

Groundwater Monitoring

The extensive groundwater conceptualising and monitoring that occurs at CVO is in agreement with the Proposal. The very steep cone of depression from the low permeability host rock towards the pit would see an observable hydraulic gradient shift very gradually should the described interception measures be required.

The additional groundwater bores monitored would be designed and constructed for the specialised objective of demonstrating the effectiveness of the sealing and grouting of secondary fractures in the low permeability wall rock, while also complementing the existing regionally extensive network.

EPA Comments

The mitigation and management measures for the in-pit disposal of tailings to a pre consolidation level of 713 mAHD is supported in conjunction with the management and mitigation measures described in the modification, namely:

- The sealing and grouting of secondary fractures in the low permeability wall rock between 694 mAHD and 713 mAHD.

Requested Information/Actions

The EPA requests DPIE seek the following:

- The location/s of the proposed additional monitoring bores between Cadiangullong Creek and the south western boundary of the Cadia Hill Pit wall.
- The trigger standing water levels that indicate a reversal of the hydraulic gradient between the Cadia Hill pit wall and Cadiangullong Creek, and

The EPA also recommends that DPIE require an update of the CVO water management plan to include the new monitoring points and the described interception measures should the trigger levels be exceeded prior to tailings settlement or pit lake equilibrium post closure.

Surface Water Impacts

Background

CVO currently manages surface water via in interconnected series of water storage and tailings settlement facilities. The Proposal considers the capacity of each of these to manage site surface water under the increased Cadia Hit Pit tailings level.

EPA Assessment

In assessing the Proposal, the EPA reviewed the following documents:

Document	Author/Publisher	Published Date
Main Report: Cadia Hill Tailings Completion Modification 13	Cadia Holdings	9 September 2019
Appendix B – Surface Water Assessment Cadia Hill Tailings Completion Modification 13	Hyrdo Engineering and Consulting	31 July 2019

<u>Leachate dam overflows</u>

The modelling predicts no spills from any of the TSFs however, spills were simulated by the model from the following storages:

- Site Runoff Pond
- Southern Leachate Dam; and
- Southern Tailings Storage Facility (STSF) Seepage Reclaim Pond.

The EIS proposes that in order to avoid these predicted spills, CVO plans to review the catchment, capacity and pumping capacity of the above storages in order to ensure consistency with the hydrologic design criteria given in CHPL (2009) and the requirements of EPL 5590. The EPA notes that EPL 5590 allows for spills from these storages under high rainfall conditions.

The EIS does not state the predicted frequency of the spills in comparison to current conditions or to the existing licence requirements and it is not clear if the proposed changes can result in completely avoiding any spills.

Final equilibrium water level - Cadia Hill Pit tailings storage facility

Based on the previous modifications, the predicted final equilibrium water level in the Cadia Hill open pit (approximately 665 mAHD) would be some 56 mAHD below the spill level. The revised modelling for the current modification predicts that the final void water levels would take more than 150 years to reach equilibrium and, in the long term, the water level is not predicted to rise to closer than within 21 m of the 721 mAHD spill level. No spills are forecast to occur from the pit.

EPA Comments

The EPA does not consider that sufficient information has been provided to allow full assessment of the surface water impacts of the modification.

Requested Information/Actions

The EPA requests DPIE seek the following:

- additional information and details that address the predicted frequency of spills in comparison to the current conditions and whether and how the complete avoidance of spills can be achieved under the proposed changes.

- options to monitor the model predictions during operation (water level monitoring already proposed) in the proposal and as a basis for considering long term monitoring as part of a closure plan.

- action-based triggers and contingencies to mitigate against any unforeseen impacts to surface waters in the proposal.

Noise Emission Impacts

Background

The Proposal includes the construction of a new ventilation adit and buttressing of the Sothern Tailings Storage Facility (STSF) which will result in increased noise emissions.

EPA Assessment

In assessing the Proposal, the EPA reviewed the following documents:

Document	Author/Publisher	Published Date
Main Report: Cadia Hill Tailings Completion Modification 13	Cadia Holdings	9 September 2019
Appendix D – Noise Assessment Cadia Hill Tailings Completion Modification 13	Wilkinson Murray	30 June 2019

The assessment of noise from the construction of the new ventilation adit has been carried out in accordance with:

- NSW Industrial Noise Policy (INP) (Environment Protection Authority [EPA], 2000).
- Voluntary Land Acquisition and Mitigation Policy (NSW Government, 2018).

The model does not predict noise from the construction of the ventilation adit to exceed the previously approved noise levels.

The model does not assess construction noise from buttressing works at sensitive receivers in the vicinity of the STSF.

EPA Comments

The EPA does not consider that sufficient detail has been provided in the Noise Assessment to allow for complete assessment of the impacts on noise emissions of the modification proposal.

Requested Information/Actions

The EPA requests DPIE seek the following:

- additional detail and modelling of construction noise emissions for the buttressing works at the STSF.