



OUT19/12906

Philip Nevill
Planning and Assessment Group
NSW Department of Planning, Industry and Environment

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Dear Mr Neville

**Cadia Hill Tailings Completion - Modification 13 (06_0295)
EA Exhibition**

I refer to your email of 23 September 2019 to the Department of Planning, Industry and Environment (DPIE) – Water about the above matter. The following advice and recommendations are provided to you from DPIE –Water and the NSW Natural Resources Access Regulator.

Prior to Project Determination

Water Take and Licencing

Insufficient information has been provided to quantify the change in groundwater and surface water take during operations and post closure due to the altered final pit and Cadia East void design. This information is required to confirm the variation in water take from water sources due to the modification and the adequacy of existing entitlements or where exemptions may apply. Also, insufficient information has been provided to quantify water take during construction and operation of the new ventilation adit, and the adequacy of existing entitlements.

Therefore, it is recommended that the proponent should:

- Provide a detailed water balance of the pit and Cadia East void to quantify the change in the groundwater inflows and surface water inflows in the relevant water sources during operations and post closure, and demonstrate the ability to hold the necessary entitlements.
- Quantify the water take during construction and operation of the new ventilation adit, and demonstrate the ability to hold the necessary entitlement.

Climate and Water Modelling

The proponent should:

- Provide references for climate sequence generation method used, or adopt stochastic methods consistent with the climate literature. All models reliant on this sequence may require updating.
- Provide details on the 'water-use reduction' methods (as stated in the EIS), if water supply is threatened through drought. Additional comments are provided in **Attachment A** regarding this recommendation.
- Quantify dam spill predictions for wet, dry and median years.
- Remodel streamflow including the culverts, to address the risk of localised flooding near culverts and crossings.
- Revise the Groundwater Assessment Report to include the water quality results from MB 95 monitoring bore in order to establish baseline conditions or ascertain any movement of tailings water from the pit.*

Post Project Determination

Water Monitoring and Management

Should the project be approved, it is recommended that the proponent should:

- Update the Site Water Balance within the Water Management Plan to reflect the altered pit and void characteristics and associated water take.
- Recalibrate the water balance, final void and water management models after 3 years to confirm the parameters chosen are updated and relevant. The final void water level model should be updated every 3-5 years throughout the life of the project.
- Include a groundwater quality monitoring plan and reporting procedure for bore MB95 (or alternate bore(s)) in the broader Groundwater Monitoring Program required as a condition of project approval.*
- Progressively extend the bore casing of monitoring bore MB 95 above the tailings level to facilitate ongoing monitoring. If not feasible or practical, design an alternative proposal which allows groundwater quality monitoring to occur in locations at greatest risk to tailings water ingress. This could include at least one monitoring bore to a depth level with the bottom of the pit as part of the proposed additional groundwater monitoring bores between the south-west rim of Cadia Hill Pit and Cadiangullong Creek.*

* Additional comments are provided in **Attachment A** regarding these recommendations relevant to monitoring bore MB 95.

Any further referrals to DPIE – Lands, Water and DPI can be sent by email to:
landuse.enquiries@dpi.nsw.gov.au.

Yours sincerely



Simon Francis
Acting Manager, Assessments
DPIE Water – Strategic Relations
20 November 2019

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Comments in support of the recommendation relating to 'water-use reduction' methods

The water balance model has predicted shortfalls in raw water supply, with only 85% assured in some years (subject to climate modelling). In fact, rainfall is the highest inflow, which leaves the project exposed to climate risk. The proponent states "water use reduction measures" will be implemented if required (section 5.3), but this requires more detailed explanation. In section 2.0, water use is stated to vary with production, which implies the main (or only) "water-use reduction" method would be to reduce operations. The proponent should discuss the feasibility of unplanned reduced production, particularly in the context of drought and no General Security water allocations for several consecutive years. In any event, all water required for the project should be demonstrably secure before approval is granted.

Comments in support of the recommendations relating to monitoring bore MB95

An assessment against the Aquifer Interference Policy (AIP) is provided in AGE (2019)¹ that identifies mostly nil to slightly improved groundwater impact changes brought about by the modification. This is supported by the expert opinion provided in HydroAlgorithmics (2019). The Cadia Hill pit is a groundwater sink with the potential for temporary outward migration of tailings water in the south-west portion of the pit. Whilst DPIE - Water acknowledges the information and assessments provided in the reports, the following comments are provided to support recommendations made in relation to monitoring bore MB95:

- As per approval requirements of Modification 12, CVO has constructed monitoring bore series MB90 to MB95 to establish baseline groundwater conditions, and continually monitor the impacts of tailings deposition on surrounding groundwater system.
- The AGE report reports the monitored water levels of monitoring bore MB95, which is at the base of the pit, and compares that with the level of the deposited tailings. There is a clear correlation of water level increases in the aquifer beneath the pit with tailing deposition. This indicates that there is a hydraulic connection between the pit tailings and the aquifer adjacent to the pit, thus identifying a risk of groundwater contamination.

To fulfil the AIP requirement "Any change in the groundwater quality should not lower the beneficial use category of the groundwater source beyond 40 m from the activity", the baseline groundwater quality (metals and non-metals) at the bottom of the pit must be established and continually monitored against the water quality (metals and non-metals) of the tailings during and after the pit in-fill.

- The AGE report only provides water quality results of monitoring bores PZ 4 and PZ 5 which are shallow bores at the rim of the pit with screens almost 200 metres higher than the bottom of the pit. Therefore, the water quality results of these monitoring bores are currently not suitable to determine any water quality impact due to the placement of tailings in the pit. Water quality results must be obtained and reported from MB 95 monitoring bore.
- Monitoring bore MB95 is the deepest and most critical bore in the monitoring network. However, as this bore is constructed near the pit bottom, it will be inundated by the tailings placement and may become inoperative in future.
- CVO proposes to install additional groundwater monitoring bores outside the south-west rim of Cadia Hill Pit and along Cadiangullong Creek to measure groundwater levels and water quality.

¹ Australasian Groundwater and Environmental Consultants Pty Ltd (AGE), 2019, *Cadia Hill Tailings Completion – Groundwater Assessment*. Version 3.04, 21 March 2019, 37p.