DOC17/397227

Ms Kate Masters
Senior Planning Officer, Waste
Department of Planning & Environment
Via e-mail at: kate.masters@planning.nsw.gov.au

01 August 2017

Dear Ms Masters

Woodlawn Bioreactor Modifications (MP 10_0012 MOD2 and DA 31-02-99 MOD 3)

Thank you for your email dated 3 July 2017 inviting the Environment Protection Authority (EPA) to provide comment on Veolia Environmental Services (Australia) Pty Ltd's application to modify the Project Approvals for the Woodlawn Bioreactor.

The EPA understands that Veolia is seeking to modify the existing Project Approvals to permit the implementation of a new leachate management system, including the construction of a Membrane Bioreactor Treatment Plant and the discharge of treated leachate to Evaporation Dam 1.

This application follows a previous commitment made by Veolia to develop and commission a long-term leachate management solution for the Woodlawn Bioreactor. On 5 August 2016, the EPA received a document from Veolia titled *Long-term Leachate Treatment Solution Submission Report* with additional supporting information being provided on 1 September 2016. The report outlined Veolia's strategy for managing leachate at the Woodlawn Bioreactor over the long-term and was written in response to deficiencies with the existing leachate management system and EPA concerns that Veolia did not have a plan in place for managing leachate over the longer-term. The EPA assessed the report and subsequently advised Veolia that the strategy it outlined was generally acceptable, noting that detailed design of the system was still required, evaporation dam integrity issues would need to be rectified and planning consent would need to be sought and obtained. Implementation of the strategy was formalised via conditions of the Project Approvals and the environment protection licence which required its implementation by 31 December 2017.

The EPA has reviewed this application and the supporting documentation and has identified several issues and deficiencies that require investigation and/or resolution, as detailed at Attachment A.

If you have any questions about this matter, please contact me on 4224 4144.

Yours sincerely

NICK FENELEY
Acting Unit Head – Waste Compliance
Environment Protection Authority

PO Box 513 Wollongong NSW 2520
Level 3, 84 Crown Street, Wollongong NSW 2500
Tel: (02) 4224 4100 Fax: (02) 4224 4110
TTY (02) 9211 4723
ABN 43 692 285 758
www.epa.nsw.gov.au

ATTACHMENT A – DETAILED COMMENTS

1. **Leachate Treatment System**

It is a condition of the Woodlawn Bioreactor's environment protection licence (EPL 11436) that the Leachate Treatment Plant (LTP) be capable of continuously treating at least 4L/s of leachate.

The application states that the LTP will be capable of treating "up to" 4 L/s.

The EPA requests that the Proponent provides clarification as to what contingencies have been built into the design to ensure that the LTP is capable of continuously treating at least 4 L/s, including what measures will be employed to maintain treatment capacity during periods where maintenance and repairs are taking place.

2. **Leachate/Water Balance**

The application includes two water balances, both prepared by WSP | Parsons Brinckerhoff. The first is dated 22 July 2016 and was prepared for Veolia to determine whether ED1 and ED2 can provide adequate storage for Veolia's treated leachate and stormwater over the next 40 years of projected operation. The second water balance is dated 23 December 2016 and was prepared for Heron Resources for the purpose of developing a water management strategy for the proposed Woodlawn Mine. Both water balances acknowledge concurrent operation of the bioreactor and the mine.

The original water balance was previously submitted to the EPA by Veolia as part of its consultations on the Long-Term Leachate Management Strategy. It concluded that:

"…overflows from ED1 and ED2 can only be prevented if Heron Resources uses water from ED1 at 15 L/s without the use of mechanical evaporator, and 10 L/s with the mechanical evaporators during the worst case leachate production under the wet climate sequence similar to 1947 to 2015 with a pan factor of 0.6, when water is transferred from ED3 cells at 1 L/s. Even under the dry climate sequence similar to 1976 to 2015, Heron Resources might have to reuse the water from ED1 at a rate of 14 L/s without mechanical evaporator, and at 8.5 L/s with mechanical evaporators operating at ED1 and ED2."

Given the importance of the model's assumptions about Heron Resources water use, the EPA requested that Veolia provide confirmation, being a written commitment from Heron Resources, that it will use 15 L/s of treated water in its processing operations. This written confirmation was provided by Heron Resources on 1 September 2016 stating that *"the usage rate from the evaporation dam would be in excess of 15 to 20 litres per second"*. The EPA provided its in-principle support for the Long-Term Leachate Management Strategy based on this commitment.

The EPA is concerned to see that the second water balance provides a significantly reduced estimate of Heron Resources predicted water usage. It concludes that *"the net project demand is likely to vary between 7.2 L/s and 10.9 L/s."*

Despite this, the application asserts that *"The additional water balance confirmed that Evaporation Dams 1 and 2 have sufficient capacity under all climatic conditions (including a worst-case scenario) to accommodate the water related requirements of both projects without mechanical evaporators."*

It is unclear how this conclusion can be drawn when there does not appear to be an equal or compensatory reduction in the inputs into the dams. In this respect, the EPA is concerned that the second water balance may have underestimated inputs into ED1 and ED2. Specifically, it unclear whether the model accounts for:

a) Contributions from ED3 (Veolia must progressively dewater the ED3 dams at a continuous rate of 1 L/s); and

b) Higher rates of pumping that may be required at the start of the project to reduce leachate levels in the landfill void (i.e. leachate that has built up in the waste mass that must be removed to restore flow within the gas extraction network).

In order to allow a proper assessment, the Proponent should clarify these points and provide a copy of the model's raw input data.

The EPA also notes that the original water balance models dam levels from 2018 to 2058, whilst the second water balance only models dam levels to 2029 (the expected date that mining will cease).

The EPA requests that the Proponent provides additional information to demonstrate that the evaporation dams will not overflow in the period between 2030 and 2058.

Finally, the impact of constructing the new coffer dam (discussed further below) has not been considered in either of the two water balances submitted. The EPA considers this a critical issue, given that the coffer dam will sacrifice at least 140 ML of storage capacity within ED1 for at least 12 years (i.e. the time taken to dewater the new dam under a dry climate sequence scenario). The water balances should be update to reflect this.

3. **Integrity of Evaporation Dam 1 (ED1) and Evaporation Dam 2 (ED2)**

The application includes a seepage investigation report prepared by AECOM. Preparation of the report was a condition of EPL 11436. The report:

a) Assesses the geophysical conditions underlying and surrounding ED1 and ED2;

b) Assesses the integrity of the liner mechanism for ED1 and ED2;

c) Assesses the identified points of liner failure/faults;

d) Assesses the pathways for the migration of pollutants from ED1 and ED2 into the surrounding environment (including into Allianoyonyiga Creek and Crisps Creek);

e) Assesses the current nature and extent of groundwater and surface water pollution caused by ED1 and ED2; and

f) Recommends control and remediation measures to improve the integrity of ED1 and ED2, prevent the occurrence of seepage from ED1 and ED2, and repair or make good any groundwater or surface water pollution caused by ED1 and ED2.

The EPA has reviewed the AECOM report and the Peer Review prepared by Earth2Water Pty Ltd and is firmly of the view that both ED1 and ED2 should be lined with a high-density polyethylene (HDPE) liner, as per AECOM's recommendations. The EPA's reasons for this are as follows:

1. The existing dams were not constructed with an engineered liner of any type/method;

2. There is strong evidence that the dams are leaking and that the rate of seepage is likely to increase once the dams are filled and hydraulic head pressures increases;

3. The locations of the seepage points and preferential pathways are not well known and their comprehensive delineation is unlikely to be successful;

4. The claimed permeability of the dam floor materials cannot be relied upon given the permeability results are of re-moulded (mixed and compacted) samples and are not necessarily representative of in-situ conditions, where preferential pathways due to lenses or bands of more permeable, granular material may be present; and

5. Much of ED1 and parts of ED2 are known to be underlain by high permeability coarse grained sediments which are likely to be a significant preferential pathway for contaminant migration towards Crisps Creek.

The EPA does not support the further investigation as proposed by Earth2Water Pty Ltd.

The EPA is of the view that the ecological risk assessment proposed by the Proponent is an appropriate means of determining the remedial measures for seepage that has already left the dams, but is not relevant in the context of assuring against future seepage.

It is recommended that DPE seek a construction plan and program for lining ED1 and ED2, including details on how residual water that is currently stored in the dams will be managed.

The EPA will be writing to Veolia separately about its program for further investigating and completing remedial measures for seepage that has already left the dams.

4. **Transfer of Water Between ED1 and ED2**

The original Long-Term Leachate Management Strategy proposed to store stormwater and treated leachate separately. It was proposed that treated leachate be discharged to ED1 and stormwater to ED2. The EPA understands that it is now proposed to discharge both stormwater and treated leachate to ED1.

The rationale for this departure from the original strategy is unclear to the EPA and should be further justified by the Proponent.

Further, the new water balance prepared for Heron Resources shows that ED1 will overflow on multiple occasions unless water (i.e. treated leachate and bioreactor stormwater) is deliberately transferred from ED1 to ED2. In this regard, ED2 should be considered an integral part of the bioreactor's proposed leachate management system.

5. **Mechanical Evaporation**

The Proponent's intentions with respect to the use of mechanical evaporators are unclear. The application states that up to four mechanical evaporation units would be required for worst-case leachate production under the wet climate scenario, however it only commits to the use of *"a minimum of three evaporators or other equivalent evaporative devices will be utilized when the leachate treatment plant commences operations"*. This should be further explained in the context of the project water balances.

Veolia has previously advised the EPA that it would continuously operate three mechanical evaporators within the ED3 dam network providing an additional outflow of 1.1L/s, which would halve the timeframes indicated within the water balance to dewater those dams. It is the EPA's expectation that the three evaporators the Proponent has committed to using in this application will be additional to the three evaporators it had previously committed to using on ED3.

The EPA also notes that the water balance assumes that the mechanical evaporator units will evaporate a minimum of 28% of the treated leachate that is pumped through them and that some individual units will be operated continuously. Veolia has previously acknowledged that it is not yet achieving continuous operation of its existing evaporators (installed at ED3N), but stated that it is investigating new evaporation technologies and setups, including:

- Alternate spraying equipment, such as atomisers;

- Alternate setup to existing sprayer units to direct the spray onto exposed areas of the dam floor, to maximise operations and evaporation loss over the surface area of ED1;

- Establishment of multiple areas for spraying around and within ED1 footprint;

- Installation of additional mechanical evaporator capacity over and above the number modelled in the existing water balance; and

- Technologies to capture or control spray/mist to further enhance evaporation to enable continuous operation.

The EPA previously requested that any new operational proposals resulting from these investigations be included and justified in any modification application. This does not appear to have been done in the current application.

6. **Proposal to Construct Interim Leachate Storage Dam**

The application includes a proposal to construct a new 140ML coffer dam within ED1 to provide additional storage capacity for leachate discharged from the existing leachate treatment system. The Proponent claims that the additional storage is required because existing storage areas will reach capacity before the Long-Term Leachate Treatment System is operational.

The EPA does not support the construction of additional storage for leachate treated through the existing treatment system, except under extenuating circumstances where emergency containment is required to prevent overflow of existing storage areas. This is largely because of the environmental management legacy the storage dams create once full.

It is noted that Veolia obtained approval from DPE in 2016 to construct another additional storage dam (ED3S-S) for the same purpose. ED3S-S provided 111 ML of treated leachate storage capacity and Veolia anticipated it would last approximately 16 months (under a wet climate sequence scenario). In the event that the dam filled more quickly than anticipated, Veolia proposed the following contingencies:

1. Implementation of additional measures to increase evaporation rate, such as mechanical evaporation equipment and/or biological systems;

2. Investigate the use of heat from the onsite power station; and, if necessary; and

3. Create additional storage (i.e. another coffer dam) within ED3S.

The EPA requests that the Proponent explain what contingencies have been implemented to date and the reasons why ED3S-S has filled at a faster rate than anticipated, given the wet climate sequence scenario refenced has not eventuated in the eleven months since the dam was commissioned.

The EPA notes Veolia's intention to progressively remove and treat partially treated leachate from the dam, should it be approved, once the long-term treatment facility is operational. The EPA is concerned about the length of time it will take to completely dewater the dam, particularly under a wet climate sequence scenario. The EPA requests that Veolia provides details about options that may exist for increasing the rate at which the dam could be dewatered.

Finally, the impact of constructing the new coffer dam has not been considered in either of the two water balances submitted with the application. The EPA considers this a critical issue, given that the coffer dam will sacrifice at least 140 ML of storage capacity within ED1 for at least 12 years (i.e. the time taken to dewater the new dam under a dry climate sequence scenario). The water balance should be update to reflect this.

7. **Air Quality Impacts**

The Air Quality Impact Assessment (AQIA) submitted with the application does not consider odour impacts from treated leachate stored in ED2. This is because it was prepared in the context of ED2 only receiving stormwater. Given that the Proponent now proposes to store treated leachate in ED2 as well as ED1, the AQIA should be updated to consider odour emissions from ED2 as well.

Further, the AQIA prepared for the construction and operation of the coffer dam in ED1 assumes that the dam surface area is 15,000 m^2. Elsewhere in the application document it is stated that the proposed dam will have an area of 45,000 m^2. This should be clarified by the Proponent and, if necessary, the AQIA should be updated to reflect the correct dam surface area.

8. **Contingency measures in the event mining activities cease earlier than expected**

The water balances for the project rely heavily on Heron Resources using water from the evaporation dams in its mining operation.

It is recommended that the Proponent provides further details about what contingency measures could be employed in the event mining operations cease earlier than expected.

9. **Project Timeframes**

As noted above, it is a condition of EPL 11436 that the new leachate management system be operational by 31 December 2017. The EPA understands that this is also a condition of the Project Approvals (MP 10_0012 MOD1 and DA 31-02-99 MOD 2).

Veolia's commitment to the project and to this deadline was an important consideration in the EPA's regulation of odour impacts from the Woodlawn Bioreactor and its decision not to take further regulatory action in response to odour complaints received from the Tarago community during 2016. The EPA is extremely disappointed to see that the Proponent is now estimating that the new system is unlikely to be operational until then end of 2018 without an adequate justification being provided and will be writing to Veolia separately about this issue.