

Fact Sheet:

Anglesea Mine Filling Strategy & Groundwater Pumping Test

Introduction

[Alcoa's Anglesea power station and coal mine](#) operations were permanently ceased in August 2015. The progressive remediation and closure of the mine site, together with the decommissioning and remediation of the power station, is underway.

Alcoa has a regulatory obligation to develop the final Anglesea Mine Rehabilitation and Closure Plan to ensure a safe, stable and sustainable landform, with an expectation that the rehabilitation of the mine is completed in a timely manner.

A key aspect is an approved strategy to fill the mine void with water. Establishing a waterbody is also a key enabler for the [Eden Project Anglesea concept](#).

Alcoa is seeking an in-principle agreement on the fill strategy with the Victorian Government and continues to work to evaluate options.

The final Anglesea Mine Rehabilitation and Closure Plan must be approved by the Victorian Government's Earth Resources Regulation.

Key referring agencies are the Department of Environment Land Water and Planning, EPA Victoria, Southern Rural Water, Corangamite Catchment Management Authority, with Barwon Water also identified as a key stakeholder.

Water filling strategy

To fill the mine void with water approximately 18 gigalitres is needed in total. There is approximately 1.8 gigalitres of water in the void as at November 2020.

Alcoa's preferred option is for a "fast" fill strategy to fill the mine void over 5 to 10 years to support the current Eden Project Anglesea concept, early community access to the broader area and significant jobs and economic development in the region.

The alternative is a "slow" fill strategy, which may take more than 50 years and will not support the broader outcomes expected by the community and government in a timely manner.

Fill options

Alcoa has investigated and conducted technical analysis on a range of filling options including:

- restoration of Salt Creek into its original path to the mine void;
- use of groundwater from the Upper Eastern View Formation (UEVF) aquifer;
- use of groundwater from the Lower Eastern View (LEVF) aquifer;
- use of recycled water from Barwon Water's Black Rock water reclamation plant in Breamlea; and
- the natural fill option (groundwater infiltration and rain) which is estimated would take more than 50 years.

Of these, Alcoa's preference is to use a combination of surface water including peak flows from Salt Creek and groundwater. There is also longer-term potential to investigate recycled water.

Use of groundwater from Upper Eastern View Formation

The current focus is an option to use Alcoa's existing groundwater licence as a source of water to commence the filling process.

Alcoa has a licence to extract up to 4 gigalitres per year from the Upper Eastern View Formation. Approximately 3.5 gigalitres per year was previously extracted for use at the power station. The current licence expires in 2024.

Alcoa's proposal is to commence the filling process by extracting approximately 1.5 gigalitres per year to put into the mine void. 1.5 gigalitres represents less than half the historical extraction rate and is significantly less than the current licence limit of 4 gigalitres per year.

This proposal will allow other longer-term filling options to continue to be investigated in the interim.

It is the only option that will meet the timeline outlined by Eden Project International for the waterbody to be filled to at least 50% by about 2024 and will allow the project concept to progress with further design, planning and infrastructure studies.

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Approval process

To gain approval to use groundwater from the Upper Eastern View Formation, Alcoa must apply to Southern Rural Water to amend the existing Alcoa licence conditions, and also seek approval from the Victorian Government's Earth Resources Regulation as the mine regulator, to allow the water to be used in the mine void.

As such Alcoa first sought approval from Southern Rural Water to undertake a 12-month pumping test.

In May 2020 Alcoa applied to Southern Rural Water to amend its existing licence conditions to undertake the pumping test.

In late October 2020 Alcoa received an amended licence that permits the test.

12-month pumping test

Across 12 months the test will provide additional information to Alcoa, the regulators and the community to better inform decisions about the potential use of the groundwater in the mine void, and also determine if a longer-term sustainable extraction rate can be established.

The test will be undertaken in two parts:

- an initial six-month period to establish various aquifer parameters, update the groundwater model, and determine a sustainable extraction rate, which if successful would then support the full licence amendment process; and
- an additional six-month period to provide additional confidence to the community, and further validation of the updated groundwater model and input to the associated risk assessment.

The test will use an existing bore at the former power station with the extracted water to be pumped into the developing mine waterbody.

A limit of 1.5 gigalitres will be extracted.

The test will be undertaken with a specialist consultant and is anticipated to begin early 2021 following final approval from Earth Resources Regulation and the installation of necessary equipment.

Monitoring and triggers

To ensure the groundwater extraction is not threatening groundwater dependent ecosystems that may be in connection with the aquifer underlying and surrounding the mine, Alcoa is installing 16 additional groundwater observation bores and data loggers in these aquifers.

The network of groundwater monitoring bores and data loggers will monitor extraction rates, with conservative trigger levels set against these.

The monitoring will be undertaken by a specialist consultant and results will be independently reviewed.

Reporting

A monthly groundwater test report will be produced to enable stakeholders to track key indicators such as extraction rates, groundwater levels and a trigger update.

Community engagement

In April and May 2020 Alcoa sought feedback from the community on the proposed pumping test before applying to Southern Rural Water in May. As part of the approval process Southern Rural Water also publicly advertised the proposal to provide further opportunity for feedback. A report of the feedback Alcoa received follows.

Alcoa will continue to keep the community updated through monthly 'Community Updates' published in the Surf Coast Times and Armstrong Creek Times, distributed to more than 1,000 people on Alcoa's email database and posted on www.alcoa.com.au/anglesea.

The monthly groundwater test report will also be distributed to Alcoa's email database and posted on www.alcoa.com.au/anglesea. If you would like to be added to the database or provide any feedback please contact the Alcoa Anglesea team via:

EMAIL: angleseaps@alcoa.com.au

ONLINE FORM: [Click here to complete the form](#)

MAIL: Alcoa of Australia, Camp Road, Anglesea, VIC 3230

Community Engagement Report: Anglesea Mine Filling Strategy & Groundwater Pumping Test

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1. Executive Summary

Since 2015 Alcoa has been conducting broad engagement activities about the future of the Alcoa site to ensure community and key stakeholder feedback is well considered in Alcoa’s decision making. The water filling strategy for the mine has been a key topic in Alcoa’s community engagement activities and forums for several years.

Key activities include the regular Alcoa Community Consultation Network (CCN) meeting which was established in 2001, regular email updates to the large community database (1,000+ people) and full page advertorials (Alcoa Community Update) in the Surf Coast Times regularly cover the mine water filling strategy.

For specific projects, including the Mine Rehabilitation and Closure Plan and Eden Project Anglesea Concept, activities such as open houses, listening posts and onsite briefings and tours have also been conducted, allowing for even greater community engagement on the topic of the water filling strategy.

Most recently, the topic has focused on the potential use of groundwater from the Upper Eastern View Formation (UEVF) to commence the filling process. This potential option has been presented at the last five CCN meetings and covered in detail at the February 2020 CCN meeting and Eden Project update meeting.

To provide further information and opportunities for community feedback about the potential use of groundwater from the UEVF, including the proposed 12-month pumping test, Alcoa produced a range of materials in April 2020. In the absence of face to face engagement activities due to government restrictions to prevent the spread of coronavirus (COVID-19), the materials were distributed widely via Alcoa’s large community database and key information was also published in the local Surf Coast Times and Armstrong Creek Times newspapers.

Following this wide dissemination of materials, Alcoa received five items of feedback. Four out of five of the responses expressed support of the test. Three of the respondents asked Alcoa questions which were answered.

A key aspect of Alcoa’s community engagement strategy is to ensure that the community is kept regularly informed of the pumping test. This will be achieved through providing updates in the monthly Alcoa Community Update published in the Surf Coast Times and Armstrong Creek Times, emailed to 1,000 people on Alcoa’s database and posted on www.alcoa.com.au/anglesea. A monthly ‘technical’ report will also be produced to enable the community to track key indicators such as extraction rates, groundwater levels and a trigger update.

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2. Community engagement objectives

The community engagement strategy encompasses two objectives.

1. To inform the Anglesea community and key stakeholders about the pumping test and provide opportunities for feedback prior to the application to Southern Rural Water.
2. To provide ongoing information and feedback opportunities to the community when the test is underway.

3. Target Audience

A broad range of community and key stakeholders were targeted including Anglesea residents and homeowners, businesses, members of local community and interest groups and the general public.

4. Summary of recent community engagement activities

The activities outlined below specifically covered the topic of the potential use of groundwater from UEVF:

Date	Activity	Attendance / Circulation	Key topics
23 April 2020	Community Update	<ul style="list-style-type: none"> • 1,000+ database • Alcoa website • Surf Coast Times and Armstrong Creek Times 20,758 circulation 	<ul style="list-style-type: none"> • 12-month pumping test
23 April 2020	Fact Sheet	<ul style="list-style-type: none"> • 1,000+ database • Alcoa website 	<ul style="list-style-type: none"> • 12-month pumping test
24 February 2020	Eden Project Anglesea Concept Meeting & Alcoa CCN meeting	<ul style="list-style-type: none"> • Approx 100 attendees • 1,000+ database • Alcoa website 	<ul style="list-style-type: none"> • 2 water fill options • Details of UEVF presented
16 December 2019	Alcoa CCN meeting	<ul style="list-style-type: none"> • Approx 95 attendees • 1,000+ database • Alcoa website 	<ul style="list-style-type: none"> • 4 water fill options
11 November 2019	Alcoa CCN meeting	<ul style="list-style-type: none"> • Approx 120 attendees • 1,000+ database • Alcoa website 	<ul style="list-style-type: none"> • 4 water fill options • LEVF – off table
14 October 2019	Alcoa CCN meeting	<ul style="list-style-type: none"> • Approx 50 attendees • 1,000+ database • Alcoa website 	<ul style="list-style-type: none"> • 5 water fill options
12 August 2019	Alcoa CCN meeting	<ul style="list-style-type: none"> • Approx 110 attendees • 1,000+ database • Alcoa website 	<ul style="list-style-type: none"> • 5 water fill options

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5. Community Feedback Received to Date

Following the wide dissemination of information on 23 April 2020, a total of five items of feedback were received by Alcoa before 26 May 2020, all of which are outlined verbatim below:

Four out of five stated their support of the test. Three of the respondents asked Alcoa questions which were answered promptly.

Date	Content	Response from Alcoa
23/4/2020	This cautious approach seems to be a very sensible path to follow. Hopefully the trial can get the necessary approval and start as soon as possible. If the trial is proven successful, the Eden Project then could get underway and provide many opportunities for the area – much needed in these uncertain times.	<i>Thank you for your feedback.</i>
23/4/2020	Will you re-direct saltwater creek into the mine void at the same time as the pumping? Why has pumping been limited to 1.5 Gigalitres per annum? I am supportive of doing what we can to fill the void and encourage the Eden Project. Good work.	<i>Thanks for your response to the pumping test information we sent out, and for your ongoing interest in our activities!</i> <i>The proposed groundwater pumping from the Upper Eastern View Formation is proposed as approximately 1.5 gigalitres per annum to about half (a bit less than this actually) of our extraction rate when we were operating the PowerStation. We are choosing to be conservative really to ensure that we have minimal impact on the UEVF groundwater aquifer and so as not to interact with the developing water body in the mine. The pumping test and the associated monitoring will enable us to confirm this. The water extracted during the test will be placed into the mine.</i> <i>Regarding your question about the re-direction of Salt Creek, Alcoa's preference for filling the mine void is to use a combination of surface water including peak flows from Salt Creek and groundwater. There is also longer-term potential to investigate recycled water. However, at this point in time we do not have approval from the Victorian government to re-direct Salt Creek. Thanks again, hopefully this answers your questions and if you have any further comments, please don't hesitate to contact me.</i>
24/4/2020	Firstly may I say that I applaud the ongoing work at the Alcoa site and hopefully see the Eden Project get underway and then completed. Hopefully the mine pit will become full of water in time and the overflow will make its way into the river. My concern is the current state of the river: I am a swimmer who enjoys swimming in the river on a daily basis. I swim between 800 meters and 1.2km each day. My concerns are a two fold:	<i>Thanks for taking the time to write to us, we appreciate your feedback about the Alcoa site and I have shared it with the team.</i> <i>In relation to your concerns about the Anglesea River, a number of agencies and authorities are responsible for the river including DELWP, CCMA, Surf Coast Shire and Barwon Water.</i> <i>While Alcoa continues to support the State's current river management strategy by providing a water storage pond to Barwon Water (so that they can harvest water for release into the river over summer),</i>

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Date	Content	Response from Alcoa
	<ol style="list-style-type: none"> Is there a way that the PH can be controlled, (it is currently green in colour), with the quality restored to where it was once before, and The mosquito larvae is in epidemic proportions, as there is no fish in the river, the larvae are breeding without being checked. 	<p><i>Alcoa has no formal role in the actual management of the Anglesea River.</i></p> <p><i>Are you happy for me to pass your feedback onto the Surf Coast Shire in the first instance and also confirm who the best contact is in relation to river matters?</i></p>
26/4/2020	<p>We support the proposal with the following qualifiers:</p> <ol style="list-style-type: none"> The proposed monitoring bore sites are selected after guidance is sought from SRW and BW so that the monitoring site selection is co-ordinated with and complements other monitoring sites used to monitor all GW resources in the Anglesea Basin. The public is informed of all monitoring data on a regular basis. Similar reporting conditions be established as for BW use of the Lower Eastern View Formation GW reserve. Selection of locations for the infrastructure and drilling sites should minimize damage to the indigenous vegetation in the vicinity and avoid damage to areas of high conservation value flora. We note that the invasive weed <i>Disa Bracteata</i> was found adjacent to the Anglesea Bore No1 on Coalmine Road. Subsequently, and after a very intensive weed removal effort by BW employees and volunteers, BW reviewed their vehicle and machinery hygiene and undertook to monitor the site in the future. We request that Alcoa and their contractors require strict vehicle and machinery hygiene protocols be followed this time and that the sites are monitored for weed infestations regularly. Any infestations noted require timely control to avoid ongoing issues. 	<p><i>Thank you for providing your response to the proposed groundwater test. We appreciate and endorse your comments and confirm that both Southern Rural Water and Barwon Water are part of the stakeholder group we are closely consulting with regarding the monitoring sites. I can also confirm that our regular reporting will be in line with Barwon Water's data and conditions.</i></p> <p><i>In line with our overarching rehabilitation objectives to protect indigenous vegetation and areas of high conservation value where possible, we are very focused on avoiding damage as part of the bore drilling and have selected sites where the new bores can be installed without any damage to vegetation. We also continue to have in place appropriate hygiene practices for all new vehicles and machinery to site, in fact this is a condition of our commercial contracts with our suppliers.</i></p> <p><i>More broadly, as we reported briefly at the February CCN meeting, we've been undertaking an extensive weeding program in and around the mine rehab area, about 70 hectares in total so far. We have engaged locally experienced contractors Naturelinks and Envirotechniques (who have done work with Parks Vic and the Shire) and to date they have identified and removed a variety of species including Boneseed, Sallow Wattle, Pampas, etc but we have not identified any <i>Disa Bracteata</i> (but it's on the list to look out for). We will be happy to provide a more detailed summary of that work when completed and welcome your ongoing feedback.</i></p> <p><i>Thanks again and if you have any further comments, please don't hesitate to contact me or any of my team.</i></p>
20/5/2020	<p><i>I have some concerns regarding the use of UEV aquifer water or Salt Creek to fill the mine cavity.</i></p> <p><i>The Alluvium report of December 2014 suggested that the Fish Kills in the river since 2010 were a result of a drying of the soils in the catchment.</i></p>	<p><i>Thanks for your email and your feedback about the proposed groundwater pumping test.</i></p> <p><i>Firstly, let me assure you that Alcoa understands how important the Anglesea River is to the community and the environment and as such we would not propose to</i></p>

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Date	Content	Response from Alcoa
	<p><i>The Expert Panel was of the opinion that "the acid events in the Anglesea River system were largely natural. Participants heard that, in general, the acid events were associated with rainfall events (freshes) following periods of dry conditions. The dry conditions allow oxygen to enter the naturally occurring acid generating soils in the catchment. The rainfall events introduce water into the oxygenated, acid producing soils, releasing acid discharges to the stream systems." The cause of the drying of the soils was not specifically stated but understood to be due to a drying climate. I am concerned that that reduced rainfall is not the prime cause of the soils in the catchment drying out and that the root cause has not been identified. Among the possibilities are</i></p> <ol style="list-style-type: none"> <i>1) Escape of groundwater or perched aquifer into the mine cavity</i> <i>2) Leakage of perched aquifer into the significantly depleted UEV formation</i> <i>3) Changes to soil after Ash Wednesday fires</i> <i>4) Something else</i> <p><i>The rainfall for the river catchment is best indicated by the Wensleydale measurement station. Unfortunately this data started only in 1965 and is very incomplete. The best long term nearby rainfall data is from Cape Otway where there is an almost complete record from 1863 until the present day. Almost as good is the Winchelsea data set which is good from 1900 to 1998. It is patchy from 1998 to present but I have used SILO infill data to compare the two. Winchelsea is a long term data set much closer to Wensleydale. I have charted the raw annual rainfall and the previous 5 year accumulation for each year. The Millenium drought at Cape Otway or Winchelsea was not as bad as previous droughts around 1915-18 and 1944.</i></p> <p><i>There are also several other comparable dry periods of around the same order. Anglesea River has previously had a longstanding reputation as a reliable fishing spot despite these dry periods. What has changed now, that 10 years after the serious, but not unprecedented millenium drought we are still seeing catastrophically low pHs in the river?</i></p> <p><i>I suggest that no decision to utilise the UEV aquifer should be considered until we ensure that we are not jeopardising a recovery pathway for the river chemistry.</i></p>	<p><i>do anything that we believed could be detrimental to it in any way. We have gone to significant lengths to provide support to the state while they determine the future Anglesea River Strategy since the shutdown on the power station in 2015.</i></p> <p><i>Alcoa is aware that there have been numerous independent studies over many years that attribute the acid events in the Anglesea River System to the drying and wetting of the naturally occurring acid sulphate soils in the catchments; these have not linked Alcoa's historical use of UEVF water to this process. Alcoa is also aware that the Anglesea River is a highly modified system, inclusive of changes that were made following the 1983 Ash Wednesday fires, and various strategies regarding the river mouth opening over the years.</i></p> <p><i>There is no doubt when it comes to water that it is a complex system.</i></p> <p><i>It is for these reasons that we are proposing to undertake a 12-month test before any long term decisions are considered, and that this test be at a very conservative rate that is only about 50% of Alcoa's historical UEVF use.</i></p> <p><i>As outlined in the recent Community Update, the first six-month period of the test will establish various aquifer parameters, update the groundwater model, and determine a sustainable extraction rate. The second six-month period will provide additional confidence of the method, further validate the updated groundwater model and input to the associated risk assessment. In total, approximately 1.5 gigalitres would be extracted during the test.</i></p> <p><i>Also in addition to the more than 50 existing shallow observation bores located in and around the mine and former power station, Alcoa is installing an additional 16 groundwater monitoring bores around the mine providing even more information.</i></p> <p><i>This test will be closely monitored by the regulators, and all results will be reported monthly to the community. The test will be stopped in the event any issues are identified, which includes ongoing groundwater level monitoring in and around both the mine and the power station and adjacent to the Anglesea River.</i></p> <p><i>It is worth noting that as part of Alcoa's historical monitoring in the existing bores, during our use of UEVF we observed little or no change in these bores. Those bores monitoring the UEVF did show a local</i></p>

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Date	Content	Response from Alcoa
		<p><i>impact on UEVF groundwater levels around the mine. The reason why shallow impacts were not observed is due to the confining (low permeability) clay and coal layer that sits between the perched water table and the UEVF.</i></p> <p><i>Based on the various comments above we do not believe that undertaking the 12-month pump test will have an adverse impact on the Anglesea River and in the event the test identified any such impact we would stop the test. Our strategy is that the 12-month test will provide additional real information to Alcoa, the regulators and of course the community to then better inform us all regarding any longer term decisions before they are made.</i></p> <p><i>As always, I appreciate your feedback and the analysis you have undertaken and shared with Alcoa. We will include it (without names) in our application to Southern Rural Water so that they are also aware of your concerns.</i></p> <p><i>I'd also welcome the opportunity to discuss this further with you if you would like to do so and can be contacted directly or of course I'm happy to give you a call also.</i></p>

6. Ongoing community engagement activities

Alcoa is committed to keeping the community informed about the pumping test and providing ongoing opportunities for feedback. Should face to face engagement recommence in this period Alcoa will also provide updates at Alcoa CCN meetings (currently scheduled bi-monthly from June 2020).

Alcoa Community Updates

Alcoa Community Updates will continue to be published in the Surf Coast Times and Armstrong Creek Times, emailed to Alcoa's community database and published on the Alcoa website, for example:

- 28 May 2020 – An update on the 12-month pumping test application, including providing feedback on questions received to date; then
- Monthly from June 2020 – Updates on the application process, transitioning to reporting of monthly test details once the 12-month testing begins.

Briefing to Anglesea River Working Committee

Alcoa is scheduled to present a briefing about the pumping test to an upcoming Anglesea River Working Committee on 3 June 2020.

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Monthly reports

During the test, monthly groundwater reports will be produced inclusive of extraction rates (daily volume, daily limit, total volume year to date and yearly limit), groundwater levels and a trigger update (in line with the information provided in the Barwon Water monthly report.)

Collection of ongoing feedback

Ongoing feedback and questions will be invited and responded to by Alcoa in all communication materials via an [online feedback form](#) and emails to angleseaps@alcoa.com.