Matt Parmeter

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To the Planning Assessment Commission

Dubbo Zirconia Project

I oppose the mine for a few different reasons, but principally because I believe it will be eventually used to produce uranium ore.

Regards

Matt Parmeter

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Regardless of my personal opinion on uranium mining, I would ask that the following memo be considered.

ASSESSMENT OF POTENTIAL IMPACTS AND REMEDIAL MEASURES ON DUBBO's TOWN WATER SUPPLY

This memo looks at the possible (potential) effects of the DZP mine on the Dubbo town water supply.

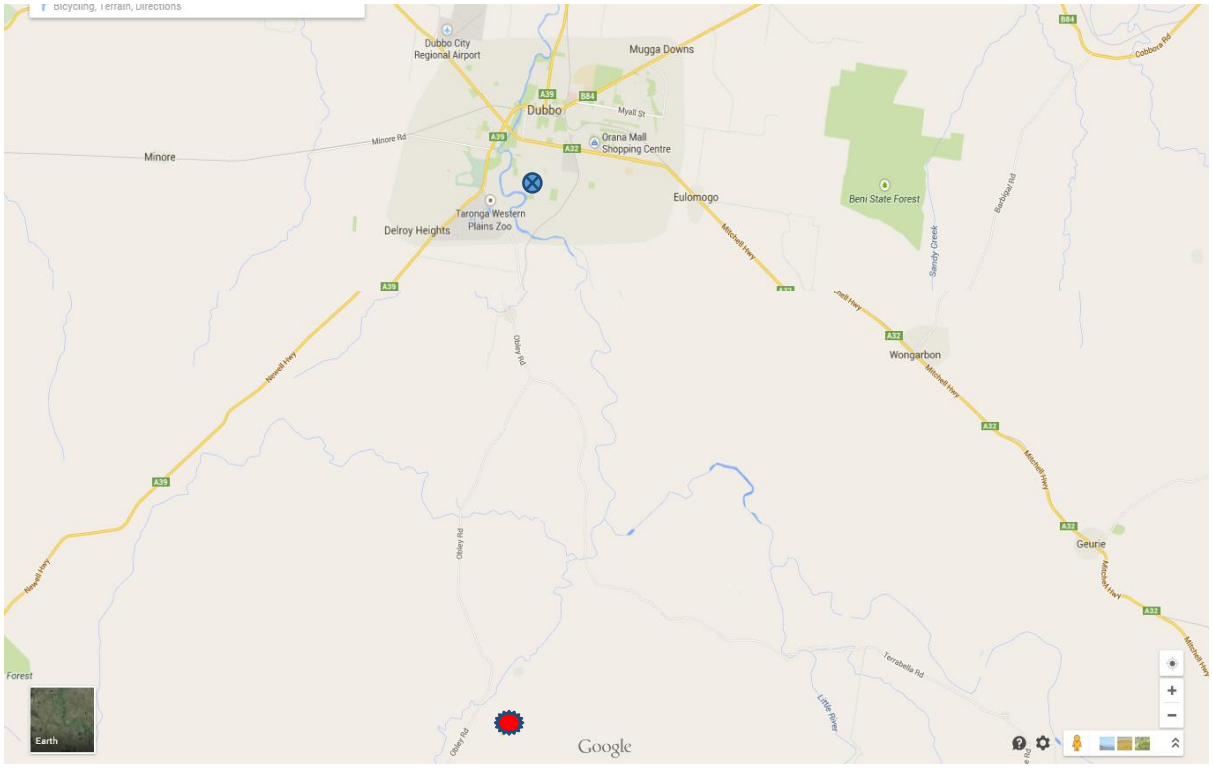
The consequences of a major incident on the towns water supply would be severe.

Before any mine was approved, I believe a detailed assessment of the potential long term impacts of the mine on Dubbos town water supply should be undertaken. The assessment should consider risks and potential consequences.

The issue is identified in page 3-33 and 3-34, but not undertaken in detail. In Section 4.5.5.6 the Applicant concludes that the Proposal would not result in adverse effects on downstream water users (page 4-114).
Page 4-118 says the Applicant would implement a detailed response plan (if chemicals in surface water in watercourses near the mine site exceeded given values).

If a mine was to be approved, I believe appropriate measures in the design should be undertaken to try to lessen the chances of a significant incident.

Map :



The red star indicates the mine site and liquid waste storage site. The blue circle indicates the intake of the Dubbo water treatment plant.

Location

The mine site is approximately 7.6 km (straight line distance) along the Wambangalang Creek to the Macquarie River junction.

The junction is approximately 13.4 km (straight line distance) upstream of the Dubbo town water supply intake in the Macquarie River. (distances from SIX maps website)

Dubbo Economy:

The gross regional product of the Dubbo economy is typically said to be worth about $2 B per year.

Dubbo town water supply

(Please contact Dubbo City Council to obtain accurate figures for this section)

Usage: Dubbo uses between 6000 and 10,000 ML of water per year. Water use in a typical year is often about 8,000 ML; with more being used in hot dry years.

Population: Dubbo has about 13,000 houses. The town water supply provides treated water to approximately 35,000 people.

Demand: Peak summer day demand is about 60 ML/day. The water treatment plant is capable of supplying up to 80 ML/day. Typical winter day demand is about 15 ML/day.

Sources: The town water supply is drawn from 2 sources – groundwater and surface water.

<u>Groundwater:</u>

Groundwater is a very useful supplementary supply to Dubbo. Its presence provides much security to the town water supply system.

It is supplementary, rather than the main supply.

The groundwater supply for Dubbo has its own issues.

The LWU licence for groundwater is 3850 ML. Because of pressures on local over extraction of the aquifer, the town typically takes up to approximately 2000 ML/annum of groundwater. Thus groundwater may provide about 25% (2000/8000) of Dubbo's typical demand.

Existing contamination of the groundwater aquifer: As a result of Dubbo being there, the groundwater aquifer under the town is threatened with contamination.

Parts of the aquifer have already been contaminated. An industrial incident has occurred in recent decades, and there is now a large plume of hydrocarbon contaminated water in the aquifer. Reports are available on this.

Borefields: Dubbo town water supply has two borefields. There are seven bores. The borefields provide a useful, though supplementary, water supply for the city of Dubbo.

The existing borefields could not be expected to supply Dubbo with its normal water supply (8000 ML/year) for any extended period of time (eg a year). They could not provide Dubbo with a water supply under moderate restrictions for an extended period of time (eg a year). ["moderate" obviously has to be defined; but in a normal year usage may reduce to the 6000 ML of a cool wet year]

Were the existing borefields to be excessively used, the existing groundwater contamination plume in the aquifer could be expected to spread further; and the aquifer may be at risk of permanent damage due to lowered water levels.

New borefields could be established some distance from Dubbo in the Macquarie alluvium to strengthen the Dubbo town water supply, that would alleviate some of these issues. This would likely take a number of years to put in place (say 2 to 5 years); and likely cost in the order of $10M or so (depending on the scale that was installed – it could be up to twice this).

<u>Surface Water:</u>

Most of Dubbo town water supply comes from the Macquarie River. The town water licence is for 8000 ML/year. (Town use is normally between 6000 and 10,000).

The water treatment plant draws its water out of the South Dubbo weirpool, on the Macquarie River.

If water was not able to be drawn from the Macquarie River weirpool, the town water supply would be immediately affected.

Risk Assessment

I was not able to find a specific detailed risk assessment for contamination of the Dubbo town surface water supply from the proposed mine in the EIS or associated documents. (Other than the information stated on the first page of this memo).

It may be that it has been carried out, and I have missed it in the EIS documents. What follows assumes that I have not missed it -

I would ask that a specific, detailed risk assessment, if it has not already been carried out, should be done.

Time view of risk assessment: Given that the mine is proposed for 20 years, with a possible life of up to 80 years; and that the mined site will exist in the town water supply catchment for as long as there is a town, I would ask that the risk assessment at least consider a few multiples of these timeframes. That is, consider the town water supply situation over the next few centuries - both during the mine life and after the mine life.

Generic town water supply management measures

In town water supply terms, going from easiest to hardest, the generic measures considered when there is a supply threat to a town water supply typically are

- minimise demand
- find alternate supplies
- cart water
- evacuation

Demand Management

Demand management measures (restrictions etc) can be applied during an emergency. Town water use is highest in summer, and lowest in mid winter. Even with severe water restrictions in place, it is unlikely that Dubbo's town water supply demand would drop much below 13 ML/day.

Emergency restrictions can reduce demand in the short term. They are typically not used as long term measures. Their use does cause economic damage.

(It may not sound significant, but gardens, lawns and trees have a psychological, societial, and hence an economic value. A reasonable amount of money has been spent on all the gardens in Dubbo).

Emergency restrictions can be brought in for a short term during a real or a potential emergencies. They will reduce water demand, and allow water treatment plant to be turned off; with the town

using already treated water in the reservoirs. Reservoirs in most towns are sized to store about one days peak supply. This can be stretched to 2 to 3 days with emergency water restrictions; provided that the reservoirs are mostly full when the incident occurs.

Frequent use of emergency measures, for safety precaution purposes, presents its own problems; and undermines the public's confidence in a town water supply.

Alternate Supplies

Two main alternate supplies – surface water and ground water.

Alternate groundwater for Dubbo would be developing additional borefields in the Macquarie alluvium. As previously stated, these may cost in the order of $10M or so, and take a number of years (say 2 – 5 years) to implement.

Alternate surface water sources for Dubbo would be piping water from Burrendong Dam to Dubbo. As a preliminary estimate only, a 600 mm gravity flow pipe for 85 km may cost up to $1M/km (Perhaps $60M - $80M or so). It would transport 10 to 15 ML/day under gravity, and 2-3 times this volume if pumped.
Such a pipeline would probably take more than 3 years (eg 3 to 7 years) to plan, gain approvals for, and construct, before it was operational.

Water Carting

Water carting is difficult to a couple of thousand people; and logistically almost impossible to a few tens of thousands of people.

It is not practical to cart water to Dubbo.

A preliminary report into carting emergency water to Dubbo was carried out during the last drought. The hypothetical exercises indicate capital costs in the order of $20M; very long lead times (up to 12 months) to establish systems to manage the water carting and obtain enough trucks and potable water tankers to cart the water.

Potential Consequences of an Incident

Incidents occur.

Much earth is proposed to be moved around. Chemicals and petrols would be transported. Accidents happen.

The hypothetical consequences of contamination should be discussed.

<u>Hypothetical consequences of a minor sediment spill / minor chemical spill into watercourses</u>

A minor sediment spill could be quite small; but will cause operational headaches.

If there was a minor spill of mined sediment (ie heavy metals) into Wambangalang Creek, Dubbo City Council should be immediately notified.

One of the first actions Council may take is to turn the water treatment plant off. Until they can get enough information to make an assessment of what happened. Alternately, they could turn the Macquarie River pumps off, and continue to process bore water.

The water reservoirs can hold 2 to 3 days supply. They are normally sized on one peak days supply.

In order to make an assessment, Council may inspect the site of the incident.

The public wants confidence in their tap water. It may be necessary to test the water in Wambangalang Creek and the Macquarie River to be able to satisfy public confidence that heavy metal contamination of the river water has not occurred to any real extent. This would happen at a NATA registered laboratory.

NSW Health Departments laboratory is in Sydney. To take a number of water samples, transport them to Sydney, have them tested, with the results emailed back is likely to take more than 24 hours.

A very minor sediment spill could conceivably result in Dubbo going on water restrictions for a couple of days, before an all clear could be given.

Similar incidents could occur with a traffic accident involving trucks with chemicals near Wambangalang Creek.

<u>Hypothetical consequences of a medium spill / serious (water soluble) chemical spill</u>

Sediment: This would be where a reasonable quantity of mined sediment did get into Wambangalang Creek.

Much of the sediment would be removed during a clean up operation.

The remaining sediment would spread out along the bottom of the creek bed. Heavy particles would likely stick to the bottom. This may mean they were not detected in a normal water sample, but were able to be detected with the sediments were all stirred up during big storms.

This may lead to an ongoing situation (for some years) where the water treatment plant was shut down for a few days every time there was a big run in Wambangalang Creek. And a lot of raw water testing was done in Sydney to prove that the raw water was safe to source.

Chemical: A water soluble chemical spill means that the chemical could disperse over time. This means we could measure when the chemical contamination level dispersed sufficiently to have an acceptable level of concentration. If this was a relatively shorter period of time (days to weeks), the existing borefield may be able to carry the town through on severe restrictions.

<u>Hypothetical consequences of a major sediment spill / major spill of a chemical that partially binds to sediments</u>

This would be the worst case scenario.

It is obviously very unlikely to happen.

The WTP is not specifically designed to remove every individual chemical species. Sedimentation and filtration can partially reduce the concentration of some metals in drinking water.

The exact nature of how the town water system would perform would depend on what sort of incident occurred.

Dubbo town water supply system would find it very difficult to supply a normal quantity of drinking water to residents if its Macquarie River source was removed for a significant length of time.

Social and Risk Factors

Angst

Incidents, whether real or imagined, have effects. Here are two examples of angst.

The Sydney Water crisis during 1998 is an example. A huge amount of angst was caused in the community. No deaths or injuries are attributed directly to the event. But the economic and other consequences were severe.

Dubbo town water supply had an incident about a decade ago. One reservoir had microbial contamination due to bird entry. A portion (not the whole) of the towns water supply had a boil water alert. I know of someone, on hearing the boil water alert announcement, who pretty soon started to feel sick. And their maladies of the previous days made sense; and they then felt worse. It later transpired that their tap water did not come from the affected part of the system. And then they got better again.

In one sense, the effects of real and imagined can be similar. If investors lose confidence in the share market, the prices will collapse. Public confidence is very important for town water supplies.

Giving the All Clear:

When a town water supply incident occurs, and an assessment is made and remedial measures are put in place; after they have worked, an assessment is made and if things have returned to acceptable, the all clear (situation for the public is back to normal) is issued.

Giving the all clear is not a simple matter. It is much more complicated in chemical pollution incidents than it is in microbial incidents.

In some cases infrastructure can be taken offline for years (ie effectively be rendered useless) due to an incident and perceived risk it created.

Hypothetically only, suppose an accident occurred, and some material entered Wambangalang Creek. A potential incident was declared. Water tests were undertaken in the weirpool of the Macquarie River.

What is the acceptable level in drinking water of

- Uranium
- Hafnium
- Yttrium
- Niobium
- Tantalum
- Zirconium

To determine if the water is safe to drink, we consult the Australian Drinking Water Guidelines. https://www.nhmrc.gov.au/guidelines/publications/eh52

For uranium, we know the answer. Levels of uranium below 0.017 mg/L are considered safe. (see page 1108).

For the other metals, I do not know the answer. The ADWG does not set a guideline value.

How does someone give the all clear, telling the public that the town water supply is safe to drink, when the guidelines do not tell us what safe means ? Is any amount at all acceptable ? Is any amount above zero unacceptable ? I do not know.

Giving the all clear, even for a minor incident, is not straight forward or simple. It can take quite a long time; and be subject to differing professional opinion about what level of risk is acceptable.

Possible Preventative Measures

Batter Slopes on the Liquid Residue storage facilities

I discussed slope stability of the liquid residue storage facilities in my previous submission on the EIS.

A response to the submission was provided. (5.9.1.1 page 114 of submissions)

I believe that widening the base of the tailings dams will provide additional structural stability. And will help minimise the continuing risk that the Proposal puts on the Dubbo town water supply.

The cumulative risk of all possible causes (suppose there was a small amount of poor construction, weak material, testing that missed the weakness, earthquake, etc) is greater than just the flooding risk of overtopping.

Slopes are designed at 1.5:1 to minimise earthworks volumes; and thus cost. This is standard engineering practice.

However, the tailings dams have very long walls. And will be there for a long time. The Dubbo City town water supply needs absolutely minimal risk. So the design philosophy should be, were practical, about minimising risk rather than minimising cost. Increasing the slope of the tailings dam storages to 3:1 batters may help somewhat to minimise the risk of a major incident for the town water supply.