Penrice Soda Holdings Limited

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Media Release

- ***Angaston mine post-closure would have "Little or no additional impact" on underground water levels.***
- ***Hydrology investigation results from Penrice mine reporting to Community Consultation Group***

The post-mining conditions at the Angaston mine in South Australia's Barossa Valley are predicted to have little or no additional impact on underground water levels, compared to the current operational conditions, an investigation by a leading international water and environment consultant has revealed.

Aquaterra Water & Environment – which recently investigated two prior reports on a private vineyard bore in 2003 and on the impact of the Angaston mine operations in 2008 - Aquaterra also reviewed a mine closure plan hydrogeological assessment from July 2009 produced by the mine owner, Penrice Soda Holdings.

Both the South Australian Department of Water, Land and Biodiversity Conservation (DWLBC) and the Department of Primary Industry Resources of SA (PIRSA) were consulted on and have reviewed this latest independent investigation.

Aquaterra Water & Environment's Adelaide based consultant, Mr Hugh Middlemis, presented the results of hydrology investigations at the Penrice Community Consultation Group (PCCG) meeting this month which was attended by members of the Barossa Grape & Wine Association and representative from DWLBC and PIRSA.

In his presentation to the meeting, Mr Middlemis outlined the structure and character of the three aquifers in the region: which are the upper and lower sedimentary aquifers in the Barossa Basin used by vineyard operators and the deep fractured rock aquifer in the pit of the Angaston mine.

The three aquifers are hydraulically connected, with recharge to the upper and lower sedimentary aquifers being predominantly by lateral flow from the fractured rock aquifer outcrop east of the basin below the mine, which is itself recharged by rainfall and runoff in the Mt Lofty Ranges. There is evidence for a mica-schist zone adjacent to the mine pit that may act as a partial and local barrier to "throughflow" to the west towards the Barossa Basin aquifers and this will be further investigated by Aquaterra.

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However, the mica-schist zone was ignored in the hydrogeological assessment, as a conservative assumption that would over-estimate the effects of the dewatering operation in terms of mine impact.

Mr Middlemis said that the mine pit water level is now at 100 metres below ground level (mbgl), compared to the pre-mining level of about 20 – 30 mbgl prior to mine operations commencing 60 years ago. While mine planning studies are being conducted at present, current plans could see the quarry extended to a depth of 140 mbgl, remaining within the fractured rock aquifer, which extends further to significant depths below this level.

The fractured rock aquifer salinity ranges from 1000 to 3000 milligrams per litre (mg/l) generally in the local area, with some pockets down to 500 mg/L, which makes it suitable quality mainly for irrigation uses, and in some zones for potable (drinking) water use.

Current Mine Operations

Mr Middlemis concluded that the effects due to current mine operations on regional ground water levels have an influence on surrounding bores, but only to several hundred metres, and possibly up to a maximum of one kilometre from the mine pit.

Mr Middlemis said the Penrice mine has two water licences, one for 102ML/yr from the pit fractured rock aquifer and one for 25.6ML/yr from the nearby Barossa Basin bore. The pit water is used for dust suppression and quarry product processing, while the bore is used for vineyard irrigation.

The pit is 1.5km in length compared with the 30km length of the Barossa Basin (i.e. less than 5% of the length). The licensed extraction for the quarry of 127.6 ML/yr is quite small (also less than 5%) in relation to the total extraction from the upper and lower aquifers of the Barossa Basin by local vineyard operators, which is in excess of 3000ML/yr.

Mr Middlemis explained that in terms of post mine impacts with a mine life of at least 20 years (but likely to be 30 – 50 years), a pit void will remain post-mining as there is insufficient overburden to backfill the pit and the cost of backfill would be prohibitive.

Lake Post Mine Closure

Post-mining, the ground water levels will rise, eventually forming a lake in the pit. The level of the lake will depend on the balance between inflows and evaporation, with the initial hydrogeological assessment (with conservative evaporation assumptions applied) indicating that the long term pit lake level could be around 80 to 100 metres below ground level (roughly equivalent to the current pit floor). This would mean that the pit lake would remain a ground water sink, and it would take about 60 years to achieve the new balance.

Mr Middlemis also indicated that this would also mean that the long term effects on the water table post-mining would be no worse than the current effects, as the current pit floor level is consistent with the lower end of the range of the predicted future pit lake levels, whether or not the pit floor is deepened further. There is monitoring evidence to indicate that the current drawdown effect on water table levels extends out from the pit for several hundred metres, and perhaps as much as 1 km.

Further hydrogeological investigations would involve the application of less conservative assumptions, such as lower evaporation rates for the pit lake, and taking account of the local water table gradient from east to west in the Penrice area. This more detailed work is expected to demonstrate that the pit lake level would be much higher, and may in fact become a through-flow system, with inflow on the east and outflow on the west. As the outflow would take with it much of the salt load increase due to evaporation, this would result in a much reduced long term pit lake salinity. More detailed studies will investigate this potential post-mining future, which was viewed positively by some attendees at the meeting.

However, the presentation focussed on the results of the initial assessment, which assumed that the pit lake remains a groundwater sink, and that there would be no outflow or extraction of water from the pit. Under these conservative assumptions, the pit lake salinity would increase over time due to evaporation. The initial hydrogeological assessment indicates that, over a 100 year period, the pit lake salinity would increase such that is would no longer be suitable for irrigation purposes.

In response to a question from the floor, Mr Middlemis agreed that the option of direct extraction from the pit lake would be beneficial, as the pumped volume would also take with it the salt that was building up due to evaporation and thus a much lower and more sustainable pit lake salinity would be achieved. Under this option, the water should remain suitable for irrigation purposes. This will also be investigated further in ongoing hydrogeological studies.

In conclusion, the conservative initial hydrogeological assessment predicted that, post-mining, there would be little or no change to current impacts in terms of regional groundwater levels, which extend several hundred metres to perhaps as much as 1km distance from the pit. While there would likely be some changes to groundwater salinity, it is expected that the water quality should remain suitable for irrigation purposes. As pit lake salinity predictions are highly dependent on assumptions about evaporation rates, a climate station installation in the existing pit is recommended to obtain site-specific data to constrain future predictions and assessments.

While there have been suggestions that Penrice was not regulated in its water usage and monitoring, Penrice representatives pointed out that this was not the case (and the DWLBC representative concurred), and Penrice committed to maintain its licence conditions while investigating ways to reduce its water usage through long term engineering solutions in its dust control program.

The Aquaterra presentation is available on the PIRSA web site.

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