



Orica Botany Groundwater Cleanup Project

Progress Update Presentation for Community Liaison Committee

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GTP Performance

Performance

- GTP treating on average >5 ML/day
- Continued fouling on Stripped Water Treatment Plant
 - Recent optimisation has significantly improved operation
- Consistently good dioxin results
 - Low temperature trials successfully conducted in August - aim to reduce greenhouse gases by burning less natural gas

Chloramine & ammonia

- Limit of 0.1 mg/L of Total Residual Chlorine since 2 July 2007
 - Sodium metabisulphite dosing system successfully commissioned, discharge to the environment complies with this new limit
 - However this leads to increased ammonia
- Pollution Reduction Program for ammonia reduction
 - Report submitted to DECC on 30 August 2007 outlining options for reducing ammonia

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GTP Performance

▶ **Groundwater Cleanup Progress**

Temporary Aquifer Storage & Recovery (TASR)

Groundwater Cleanup Progress

Operational performance

- As of end August 2007
 - 2,190 ML groundwater treated
 - 418 tonnes of CHCs recovered
 - Recovered CHC condensate from past SSU operation currently being destroyed at GTP

CHCs in surface water

- Penrhyn Estuary
 - Volatile CHC concentrations in intertidal shallow groundwater continue to decrease
- Floodvale & Springvale Drains
 - Lower CHC concentrations than historical averages
 - Ongoing surface water and vapour monitoring along Springvale Drain

DNAPL treatment investigations on-going

Groundwater Cleanup Progress

Hydraulic containment

- SCA
 - During pipe and pump repairs containment was not achieved in specific areas local to the work
 - During periods of heavy rainfall shallow containment was not achieved
 - Groundwater that had passed SCA in these periods is likely to have been drawn back
- PCA
 - Containment line operated well, but capacity constraints at the GTP limited containment about two weeks during mid-May
- BIP
 - Pumping priority is PCA and SCA, BIP is pumped as GTP capacity allows
 - Incomplete containment especially in May and June

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GTP Performance

Groundwater Cleanup Progress

▶ **Temporary Aquifer Storage & Recovery (TASR)**

Temporary Aquifer Storage & Recovery (TASR)

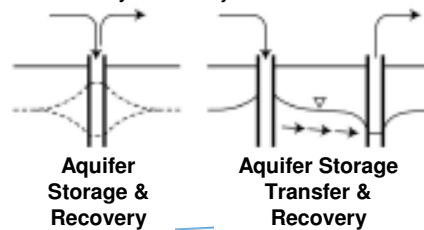
Background

- Steam Stripping Unit (SSU) proposed as backup to GTP in the BGC Project EIS
- SSU was not originally designed to treat groundwater
- SSU used as an interim solution while GTP was being built
- Interim groundwater treatment resulted in severe corrosion
- Capacity and reliability – barely adequate
 - Ongoing use of steam, nitrogen and resources required to minimise ongoing corrosion
 - Expensive to maintain
- Highly unlikely that an extended GTP shutdown is required
- Alternative backup containment options have been considered as a contingency only

TASR (cont.)

Aquifer storage and recovery

- Technique that allows water to be stored below ground for later extraction/reuse or to enhance environmental stream flows
- Represents a feasible alternative to maintain hydraulic containment at the SCA in the unlikely event of an extended GTP shutdown
- Traditional technique employs a single well for injection and later extraction
- In our case: injecting upgradient of the BIP extraction line ensures later recovery of the injected water



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TASR (cont.)

Trigger to commence TASR operation

- GTP shutdowns exceeding one month would not result in loss of hydraulic containment
- TASR operation would only commence if GTP was unlikely to be unavailable for a prolonged period
 - e.g. major equipment replacement/repair

Proposed location for TASR

- Upgradient of BIP Containment Line
 - Injected water quality (CHC concentration) comparable to the receiving groundwater
- Outside and upgradient of suspected DNAPL source area

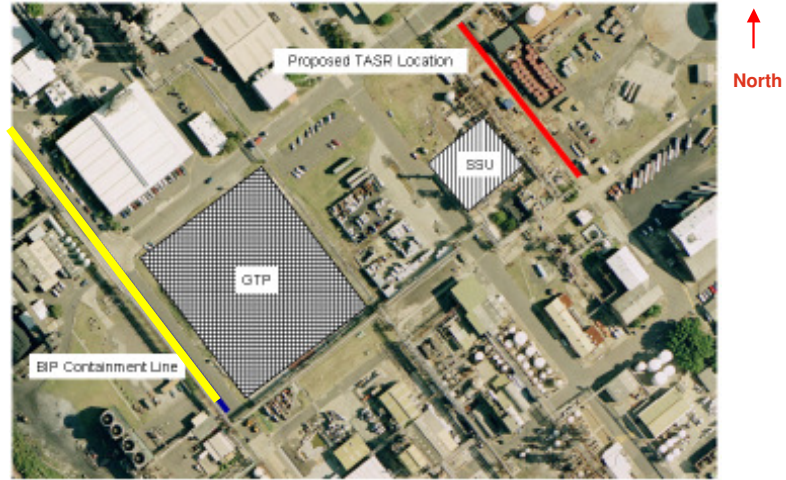
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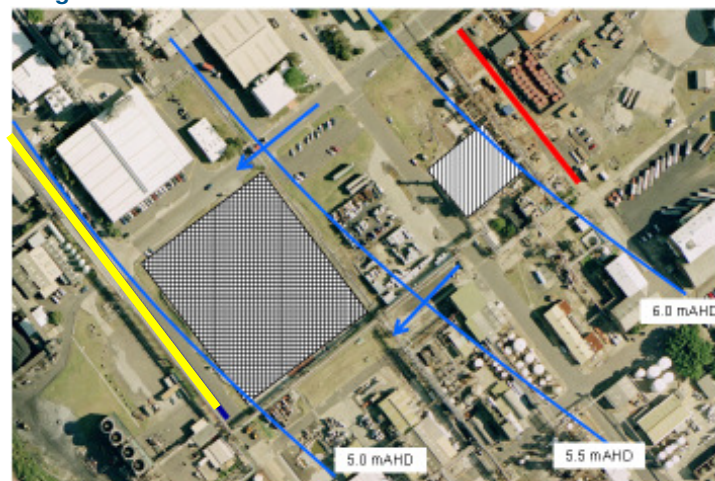
TASR (cont.)

Proposed location for TASR (cont.)



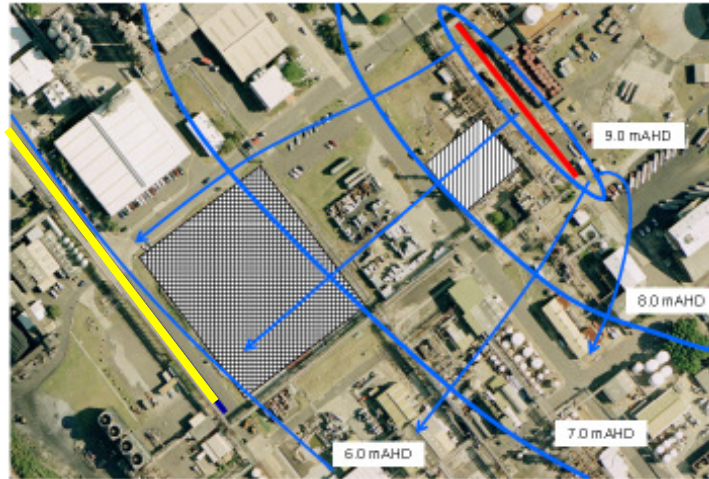
TASR (cont.)

Natural groundwater contours



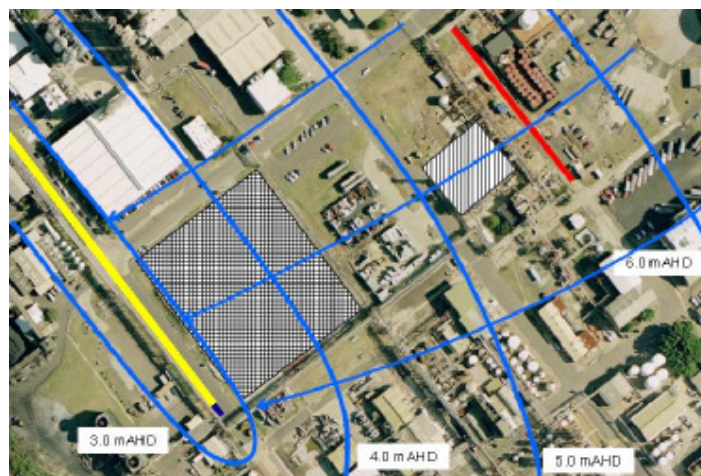
TASR (cont.)

Groundwater contours during injection



TASR (cont.)

Groundwater contours once hydraulic containment re-commences at the BIP



TASR (cont.)

Groundwater flow

Without TASR	During TASR
Velocity: 100 m/year	Velocity: 500 m/year
Travel time to BIP line: ~ 2 years	Travel time to BIP line: less than 6 months

TASR (cont.)

Considerations

- TASR is for SCA containment only
 - BIP and PCA lines extraction would not occur (same as in backup use of SSU)
- Maintenance requirements – may be significant but manageable
- Pre-treatment may be required to minimise well maintenance (e.g. filtration) and biological control
- Geochemical reactions between injected water and the aquifer may occur (e.g. precipitation)
- Contaminants other than CHCs may be present in injected water (e.g. nutrients, salt, etc)

TASR (cont.)

Benefits

- Ensures hydraulic containment can be maintained to protect Botany Bay
- Stored groundwater can be recovered, treated and recycled
 - Not discharged as per the SSU operation
- Minimises emissions of CHCs to the environment compared to SSU operation
- No nett environmental impact – water and contaminants will be recovered

- Initial feedback received from DECC and DWE
- **CLC feedback requested**

Next steps

- Modelling and design
- Formal proposal

