



# Orica Groundwater Cleanup Project

## Background briefing paper on the Proposed Groundwater Treatment Plant

### **Why do we need a Groundwater Treatment Plant?**

The EPA, through its Notice of Clean Up Action (Cleanup Notice), which was issued to Orica on 26 September 2003, mandated the hydraulic containment and *ex situ* (above ground) treatment of contaminated groundwater from the Primary Containment Area (Block 2 of Orica Southlands). This is to contain the spread of the central plume, containing high concentrations of 1,2-dichloroethane (ethylene dichloride, EDC). It also mandates contaminant containment at the Secondary Containment Area (downgradient of the Primary Containment Area, at Botany Golf Course/Foreshore Road) and at source areas. Orica needs to develop a Groundwater Treatment Plant on the Botany Industrial Park (BIP) in order to achieve this.

### **What alternatives have been considered?**

A comprehensive list of options and alternatives are described in the Groundwater Cleanup Plan in Appendix C. In summary, options to treat the contaminated groundwater include on- and off-site treatment. Off-site treatment (e.g. disposal at Waste Service NSW's Lidcombe liquid waste treatment plant) is not practical due to the large volumes of contaminated water requiring treatment and the associated infrastructure and operational support (such as pumping and road transfers).

A range of on-site treatment technologies were evaluated at the time of developing the Groundwater Cleanup Plan. These included:

- Air stripping of volatile CHCs and thermal oxidation
- Chemical oxidation
- Steam stripping for recovery of chlorinated hydrocarbons (CHCs), followed by CHC destruction (which may occur off-site or on-site, probably using plasma arc technology)

Of these, air stripping with thermal oxidation emerged as the most acceptable because of its reliability and its capability to meet regulatory emission standards. It is also a proven, robust and effective technology that will achieve the required level of treatment in the best achievable timeframe.

### **How would this plant operate?**

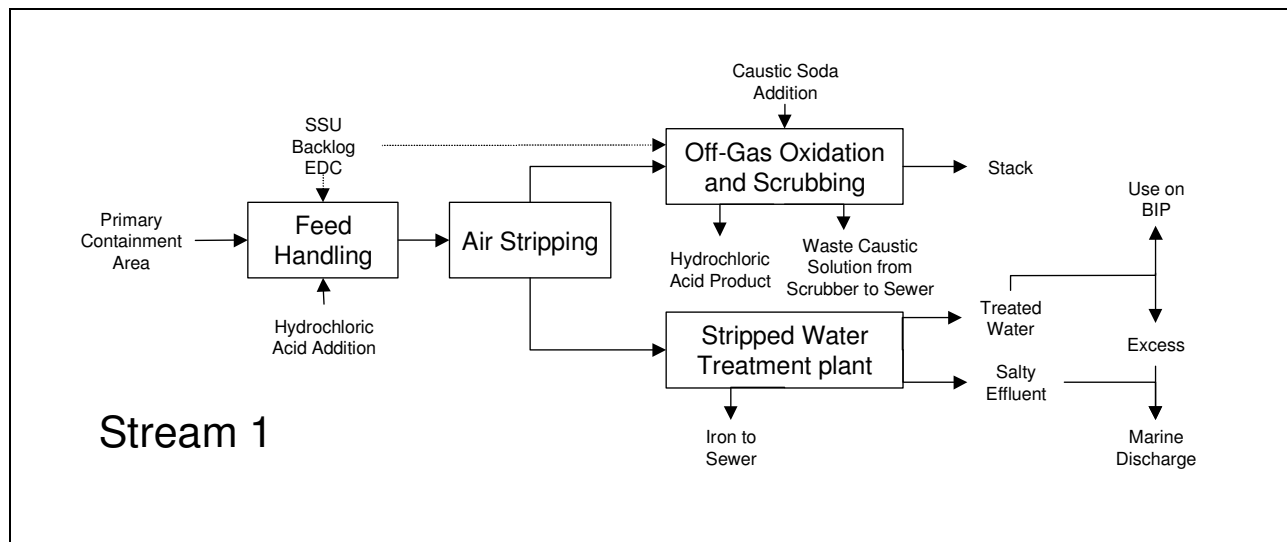
Groundwater is pumped from a line of extraction wells in the containment areas and piped into a groundwater feed tank. Hydrochloric acid is then dosed into the feed tank to acidify the groundwater and reduce the chance of fouling in the air strippers. The acidified water is then pumped to the air stripping section.

Air stripping is performed by blowing ambient temperature air up through a falling column of water, transferring the chlorinated hydrocarbons from the water to the air. The water and air are then treated separately.

Contaminated air from the air strippers passes through a thermal oxidation unit. The oxidation process generates hydrogen chloride gas as a by-product, which is recovered by absorption in water to form hydrochloric acid in the acid absorber. The air stream then continues to the caustic scrubber for further treatment to meet emission specifications agreed with the EPA. Air exits the plant via a proposed 10m high EPA-licensed stack.

---

Stripped water from the air strippers is treated with caustic soda to raise the pH to approximately 8. This causes dissolved iron to precipitate. Precipitated iron from the iron removal stage will be removed (probably using a sand filter) and sent to sewer as trade waste in agreement with Sydney Water. The high iron content of this effluent can be beneficial to the sewer system, as it acts as a scavenger for odour compounds in sewage and assists in sludge flocculation. The stripped water then passes through activated carbon to remove trace organics that were not air stripped. Finally, the dissolved solids (salt) will be removed, probably using a reverse osmosis filter unit.



**Figure 1 - Groundwater Treatment Process - Conceptual Schematic**

### What will Orica do with the treated water?

Treated water discharge from the Groundwater Treatment Plant will meet Australian Drinking Water Guidelines and ANZECC Guidelines for marine discharge. Most of the treated water will be reused by process operations around the Botany Industrial Park. Any excess clean water will be discharged through an existing pipeline to the existing Bunnerong saltwater channel that discharges into Botany Bay at Brotherson Dock. The salt removed in the Reverse Osmosis unit will also be discharged with the excess treated water into the Bunnerong saltwater channel and hence into Brotherson Dock.

### When is construction expected?

Orica will need to obtain planning approval for the plant and this will take some time. Assuming approval is obtained, Orica hopes to begin construction in February 2005. If that is the case, we would expect the plant to be operational by November 2005.

### How long will the plant be operational?

This will depend on the rate of cleanup of the contaminated groundwater and source areas. At this stage, the plant is expected to operate for up to 30 years. Once groundwater treatment is no longer required, the plant would be shut down and decommissioned.

# Development of the Environmental Impact Statement for the Proposed Groundwater Treatment Plant

## **Why is an Environmental Impact Statement (EIS) required?**

The Orica Groundwater Treatment Plant is the largest project module of the 28 modules proposed under the Orica Botany Groundwater Cleanup Plan. Environmental impacts for all of the project infrastructure components must be assessed as part of all development applications. Orica has sought advice from the Department of Infrastructure, Planning and Natural Resources (DIPNR) who have confirmed that an EIS is required for the Groundwater Treatment Plant. Orica has retained environmental and engineering consultants URS to prepare the EIS for the treatment plant.

## **What will the EIS determine?**

The overall objective of the EIS is to provide sufficient information on issues, impacts and management measures regarding the process and operation of the Groundwater Treatment Plant. The EIS will identify the project needs, describe the potential impacts and issues and assess mitigation measures to manage them.

## **What specific studies in the EIS will be undertaken?**

The studies planned include:

- A health risk assessment in relation to site personnel and neighbours
- A hazard assessment in relation to plant operation and Dangerous Goods
- Environmental studies of:
  - groundwater quality and flow once the plant is operational
  - the recovered water quality including treatment standards, water reuse, and water discharge
  - geotechnical issues relating to soil
  - air quality relating to emissions and standards
  - noise impact relating to construction and equipment operation
  - Waste management
  - Traffic issues
  - Visual assessment
  - Flora and fauna considerations
  - Heritage matters

## **What consultation will be undertaken?**

While the EIS is not expected to be lodged until the end of August, it is important for Orica to understand all community issues in relation to the construction and operation of the plant so that these may be considered during the development of the EIS. This process aims to create a more informed awareness of the plant technology and operation early in the EIS development process. By creating an awareness of the constraints around this cleanup project, Orica hopes that this will help to minimise time delays for the eventual recovery, treatment and reuse of the groundwater. A series of workshops have been scheduled to facilitate these discussions during the EIS development period. Below is an outline of the consultation and opportunities for third party input:

- Regulatory authorities – ongoing discussions as required
- EIS workshops with the community to establish issues – June 16
- EIS workshops with the community to provide feedback on specialist studies – July 20
- EIS workshops with the community to review submission – August 16

- EIS exhibition and formal response to authorities – late August
- Submissions from other stakeholders following exhibition period

### **When and where will the Environmental Impact Statement be exhibited?**

Orica intends to have the EIS prepared and submitted by the end of August 2004. DIPNR will then determine the exhibition dates. The dates and venues will be advertised through metropolitan and relevant suburban newspapers. Further information closer to lodgement date can be obtained via the Orica community feedback line (listed below) or via the information email address on the Orica Botany Groundwater Website ([www.oricabotanygroundwater.com](http://www.oricabotanygroundwater.com)).

Further information:

Botany Groundwater Project  
Community Relations  
Orica Australia Ltd  
16 – 20 Beauchamp Road  
MATRAVILLE  
Community Feedback Line: 1800 025 138