# Appendix A Issues raised in submissions

| *Submission* | *Primary issues raised in submission* |
|---|---|
| Private submitter | • The lower quality of the product proposed to be discharged to Bunnerong Canal and the Bay is difficult to justify.<br>• Contaminated groundwater should be treated in such a way as to restore its original quality.<br>• Project should produce an outcome that could reuse the treated groundwater. |
| Private submitter | • What evidence is there that subsidence will not occur and negatively impact surrounding properties?<br>• Will there be a Dilapidation Survey undertaken prior to extraction commencing?<br>• What guarantees, compensation or bonds are required to ensure any negative impacts are rectified?<br>• What will be the impact if the process fails to stop the toxic plume reaching the Bay?<br>• What safeguards are there for residents and users of the Bay?<br>• If Orica plans to sell treated greywater, it should offer it for free to residents who have lost the use of their bores. |
| Private submitter | • Siting a hazardous waste incinerator in Sydney is unacceptable.<br>• There is sufficient liquid storage that can be used until a dedicated Hazardous Waste Precinct is established for the management and destruction of toxic wastes for all of NSW.<br>• Australia's ratification of the Stockholm Convention requires minimisation and where possible elimination of dioxins, furans, and other hazardous by-product emissions.<br>• EIS has not fully considered alternatives.<br>• The proposed incinerator will emit many other pollutants to which vulnerable groups such as children will be exposed. |
| National NGO | • Incineration of chlorinated groundwater contaminants in an area surrounded by residences, schools, hospital is unacceptable and out of line with Australia's international obligations.<br>• Incineration particularly of chlorinated waste is acknowledged as a priority source of dioxins, furans and other toxics by US EPA and international community.<br>• It is inconsistent with Australia's obligations under the Stockholm Convention.<br>• Dioxins and furans bioaccumulate, are toxic to humans and wildlife and persist.<br>• Effects of dioxin include immune system, reproductive, development disorders and cancers.<br>• Do not accept "bushfire argument" in EIS that uncontrolled combustion is the largest source of dioxins.<br>• Other pollutants like VOCs, PAHs are also of major concern.<br>• EIS does little to mitigate opposition to siting an incinerator emitting persistent bioaccumulative toxins approximately 300 metres from residents.<br>• Orica has failed its obligations to the community and the EIS process to fully consider the alternatives to building a hazardous waste incinerator in Sydney, in particular Gas Phase Chemical Reduction (Ecologic).<br>• Reliance by Orica on using draft Best Available Techniques guidelines (Stockholm Convention) to support preferred option is unacceptable because they have not been finalised.<br>• The health risk assessment is meaningless because it does not include body burden testing, air monitoring data and examination of all exposures.<br>• There is capacity to store the waste for up to a decade and ample time to locate an appropriate waste management precinct and construct a non-incineration facility – this could be combined with an appropriate destruction site for Orica's existing HCB waste stockpile. |
| Private submitter | • Life cycle engineering should be achieved.<br>• All contaminated fill should be stored until an acceptable treatment technology is found.<br>• Sewer should not be used as a receptacle for waste.<br>• Needs a waste management plan.<br>• Need to monitor the plume to see if it is stable or receding.<br>• Who will decide on what ammonia treatment unit will be used? A technical committee should be developed and consulted here, including representatives from EPA, universities, local government and community etc. |

| Submission | Primary issues raised in submission |
|---|---|
| Local representative NGO | • Assessment of alternatives should have included Germany which is recognised as a leader in dealing with dioxins and furans emissions.<br>• Self monitoring by Orica should cease.<br>• Over a 30 year period how will consistency and accountability be maintained?<br>• EIS does not state what is the best available thermal oxidiser and who is the best vendor for it? USA and Japan thermal oxidiser plants may not be good enough.<br>• How would other chemicals discharged into Bunnerong Canal react with proposed discharges? How much monitoring and testing is undertaken?<br>• What control systems are in place? Is a daily diary kept by operators. Who will operators report to?<br>• Once the treatment of contaminated groundwater is complete the GTP must be decommissioned and removed.<br>• Public comment period was insufficient; there has been a lot of public consultation but due to technical complexities the public is disadvantaged – Orica should fund an independent expert chosen by the community to assist it in understanding technologies etc.<br>• Thorough review is required of the management plan and an update of the international and national chemical emission standards. Constant review of the procedures is required which could be antiquated in 10 years or less.<br>• The current hazard/risk analysis is inadequate and should be reviewed by an independent expert chosen by the community and funded by Orica.<br>• Where has the final selection been seen in operation? Has it operated for 30 years? Does it perform the same in the Australian climate?<br>• Periodic checks of the pipe conditions must be made for leaks etc.<br>• Recommendations made by Dr Peggy O'Donnell and Dr Marcus Lincolm Smith must be implemented in the estuary monitoring programs.<br>• Orica should place a security bond of $50m against satisfactory clean up (first payment to be in Public Trustees).<br>• An independent expert chosen by community members and funded by Orica must be appointed to assist community members of CLG as required.<br>• The standards for dioxin emissions as quoted in the EIS for USA and Japan may not be good enough. Standards for Germany must be investigated.<br>• All areas surrounding the clean up facility must be cleaned (inc Botany Industrial Park).<br>• There is to be no stockpile remaining of chemicals used or unused or wastes resulting from the clean up stockpiles.<br>• All compensations are to be finalised wherever necessary.<br>• Orica's Board of Directors is to be held accountable for all mishaps, non-compliance etc.<br>• Every section of the clean up plant is to be decommissioned, dismantled and removed from the regions of Botany Bay. |
| Local representative NGO | • Emissions of dioxins and furans within proximity of homes and schools are unacceptable<br>• Not demonstrated that the levels of salinity in discharges will not impact ecology of the immediate area and beyond, particularly seagrasses.<br>• EIS fails to examine impact on seagrass beds or salt marsh or study bird, mammal, reptile ingestion of toxins from drinking water near plume sites.<br>• Within Botany Bay there are recognised sites and issues under Australian Oceans Policy, Ramsar Convention, marine parks, aquatic reserves, intertidal protected areas – need to clearly demonstrate that discharges will not impact these areas.<br>• Timing of exhibition and period for comment unsatisfactory.<br>• EIS has very little information on impacts on ecology of the bay or health of community using estuary at the discharge interface: in event proposal fails, what back up? Precautionary Principle should be applied and both containment and destruction systems should have support systems in place prior to approval.<br>• Little or no investigation has been made of the long term issues for movement of contaminants in the aquifer beneath the Bay itself – test on fish caught in Botany Bay should be identified and NSW Fisheries should make results public. Most fish that visit Penrhyn Estuary also visit other extremes of the bay.<br>• Dredging 7.5m $m^3$ sand from immediately adjacent to Penrhyn Estuary will have some effect on toxic plumes.<br>• Orica is responding to DEC's demands as top priority but this doesn't excuse DEC delay in requiring clean up.<br>• Support the call for a $50m security bond and the holding of Orica management responsible for mishaps. |

| Submission | Primary issues raised in submission |
|---|---|
| Global NGO | • Decision to clean up groundwater supported but not the proposal that will result in generation and release to the environment of POPs.<br>• Other alternatives for containment and treatment need to be considered: it appears the least cost option has been chosen without due consideration of health and environmental impacts from incineration – EIS gives little consideration to VOCs and PAHs that can arise from incineration.<br>• Orica should be seeking to reduce emissions from site not increasing them.<br>• The proposal is inconsistent with Australia's obligations under the Stockholm Convention. |
| State government agency [DIPNR] | • The Preliminary Hazard Analysis is based on a number of assumed conditions due to limited design information – all these assumptions should be reviewed after finalisation of design and updated in the Final Hazard Analysis.<br>• Impact of toxic fumes is defined as local – reasons for this conclusion should be clarified.<br>• Statement in Consequence Analysis that groundwater is non-hazardous contradicts other information and should be clarified.<br>• Consideration should be given to the proximity of storage tanks to the thermal oxidiser in the event of explosion.<br>• Further information is required on the influent gas concentration to the thermal oxidiser.<br>• Clarification of the methods used to achieve stated concentrations for Arsenic and Chromium in the treated reuse water is required. |
| Global NGO | • Use of incineration technology to destroy groundwater contamination is opposed when viable closed loop non-incineration technologies are available.<br>• By own admission Orica has 10 years' storage capacity for contaminant using pumping and stream stripping – rejecting the incineration proposal will not threaten the Bay – current pumping allows time for a solution that does not negatively impact the local community.<br>• The proposal is inconsistent with the Stockholm Convention and Australia's obligations thereunder.<br>• The human health risk assessment is problematic re treatment of dioxins: firstly, there is no safe level for dioxins intake; secondly, ignores the fact that some segments of Australian population already receive far in excess of Australian standard tolerable daily intake.<br>• Accepting certain levels of dioxins intake as tolerable inconsistent with rationale of Stockholm Convention; lack of endpoint analysis for endocrine disruption renders value of risk calculations questionable |
| State government agency [NSW Health] | • Human health risk assessment in EIS broadly in accordance with nationally accepted framework and guidelines<br>• Estimated emissions of chemicals of potential concern under best/worst scenarios need to re-confirmed as accurate; operational status of emissions need continuous monitoring and reporting |
| State government agency [Sydney Water] | • Any proposals for adjustments to trade wastewater discharges from the Orica site will be assessed in terms of wastewater quality and quantity and impact on the limited capacity of the Malabar Sewage Treatment Facility |
| Local NGO | • The proposed treatment method will release dioxins and increase the VOCs emitted from Orica – any increase in emissions is of concern particularly with respect to the vulnerability of our children<br>• Because of the urgency of preventing contamination reaching the Bay, there should be an alternative plan if the proposal proves unacceptable which should be activated if contamination breaches the containment lines<br>• Not happy with current emissions from the site, much less future emissions.<br>• Supports proposals in other submissions for alternative technologies<br>• Resents being required to comment on the proposal in a situation of such urgency to act – the lateness of the compulsory clean up action places unconscionable pressure on the Government and community to accept whatever is proposed<br>• The DNAPL sites are on-going sources of contamination likely to impact our grandchildren when the liner fails – consideration should be given also to the clean up of these sites<br>• Effects of the plume on the Penrhyn Estuary not included in the EIS – these are of concern<br>• The effect of current levels of emissions on Banksmeadow school are unacceptable, and future emissions will be much less so: there should be ambient air quality and dust monitoring at the school<br>• Support calls for a $50m bond and moratorium on any sale of land by Orica |

| Submission | Primary issues raised in submission |
|---|---|
| Local government [Randwick City] | • Extraction and treatment of contaminated groundwater should be undertaken as soon as possible and hydraulic containment and groundwater treatment plant construction strongly supported, subject to concerns with thermal oxidation, emissions and the risk assessment process<br>• A rigorous independent assessment of alternative technologies should be conducted – mechanisms should be put in place that ensure best practice technologies are included at a later date when suitable new destruction technology that avoids incineration and release of dioxins is developed<br>• Purchase of GTP equipment by Orica pre-approval seems to pre-empt the consultation and EIS process outcome: it appears Orica proposal based on time and money rather than holistic environmental, social, economic assessment, especially when alternatives like biotreatment still under investigation<br>• Use of the GTP should be restricted to the current proposal.<br>• Contaminated water passed Foreshore Road containment is reaching Penrhyn Estuary but there doesn't appear to be a mechanism to address this: actions such as the fencing need to be clearly articulated; containment at Foreshore Road will result in salt water being drawn into the aquifer – potential ecological, environmental and infrastructural effects of this are unclear<br>• EIS fails to have regard to the sensitive salt marsh and sea grass habitat.<br>• Need for incineration as a treatment process is questioned, as there may still be better yet-to-be-investigated alternatives, which would be more in keeping with the Stockholm Convention<br>• Recommended that accurate background levels be obtained to information health risk assessment process especially regarding cumulative impacts.<br>• Recommended that an ongoing health risk assessment process be formalised with independent expert overview re bioaccumulation of contaminants in water, and re dioxins emission to air.<br>• There should be an independent review of alternative technologies over the 30 year period with a requirement for best practice to supersede the GTP once technologies are developed.<br>• There should be independent expert monitoring of the process at the cost of Orica. |
| Local government [City of Botany Bay] | • Not enough effort is being put into addressing and managing the DNAPL source areas.<br>• Use of the GTP beyond clean up of the contaminated groundwater should be subject to extensive discussion with the community and key stakeholders.<br>• Containment along Foreshore Road will impact the interface between freshwater and marine water – EIS does not propose any measures to continuously evaluate or mitigate.<br>• Plant should be run on a minimum of 10% green power to mitigate greenhouse emissions.<br>• EIS fails to recognise coastal saltmarsh communities as listed endangered ecological community under NSW Threatened Species Act – detailed monitoring regime should be implemented to ensure changes to this community are monitored, identified, reported and communicated.<br>• Ambient air quality monitoring in Randwick LGA provides less accurate representation than monitoring in Botany; buffer distance to residences not significant compared to other sites in Australia; dioxin emissions are a concern for the local community so monitoring and reporting needs to be accessible, easily read and understood by the community. |
| State government agency [Department of Primary Industries] | • Return the treated water through the estuary rather than discharge through Brotherson Dock – this appears to have been treated in a cursory fashion as being too hard or too expensive.<br>• Potential impacts on the benthic communities in Penrhyn Estuary due to changes in flow in Springvale and Floodvale Drains – reduction in freshwater inputs to the estuary has the potential to greatly influence the community structure of the aquatic community in the estuary and have a flow effect for wading bird populations.<br>• There is a lack of specific information on the toxicity or bioaccumulation potential of the chemicals in the groundwater in the benthic organisms, fish populations and wading birds that feed on them.<br>• There should be a monitoring program to determine the abundance and special distribution of benthos and sampling before, during and after groundwater interception.<br>• There should also be toxicological studies using a range of indicator species. |
| State government agency [NSW Maritime] | • There appears to be no specification given for the salinity level of discharge water.<br>• Water quality monitoring should be undertaken at the discharge point, namely the pipeline where it enters Bunnerong Canal in addition to at Brotherson Dock as proposed.<br>• There is minimal detail regarding the discharge point at Bunnerong Canal – the design of the diffuser should be provided and the nature of the works required to construct and install the diffuser should be provided. |

| Submission | Primary issues raised in submission |
|---|---|
| Local State MP | • Orica should conduct Dilapidation Surveys for residents concerned about potential structural damage to their properties.<br>• What consideration has been given to impacts if assumptions made in the EIS concerning the application of the Environmentally Hazardous Chemicals Act, Water Act, Road and Rail transport (Dangerous Goods) Act and Soil Conservation Act prove to be incorrect.<br>• It is unclear from the EIS how the Community Relations Activities and public input will be incorporated into the project.<br>• Orica should consider how it can alleviate the inconvenience to community and residents e.g. for those who have lost the use of bores, by meeting the cost of installation, operation and maintenance of rainwater tanks.<br>• Orica should enter a Community Contract that goes beyond DA conditions and includes a commitment to consultation, reporting a lodgement of a security bond.<br>• Conclusions drawn re HCB detected in oysters and fish seem inconsistent with the testing results and HCB in marine organisms is not mentioned in the Executive Summary.<br>• The most efficient destruction technology will mean higher greenhouse gas emissions – a GHG management/offset strategy will be required.<br>• The EIS does not mention the impact of emissions on ambient air temperature and impacts for local weather and bird flight paths. |
| Private Submitter | • Government and industry have a responsibility to ensure that risks are properly managed and that they are negligible compared to the risks faced during the course of everyday life.<br>• DEC's detailed EIS guidelines and Orica's fulfilment of them are commendable<br>• Orica has been accessible and generous with resource information.<br>• Ongoing consultation opportunities include monitoring methods, recording and reporting to community on air emissions, groundwater, transport of chemicals, storage of chemicals, bioremediation, community emergency alarm procedures, guidelines for local developments.<br>• There is a window of opportunity for positive proactive stakeholders to be part of a model consultative process.<br>• Success in avoiding contingent liabilities, in this case contaminating Botany Bay, will be achieved if the persons responsible possess both the ability and the will to build the groundwater treatment plant and continue research on clean up. |

# Appendix B Conditions of Approval

## *Introduction*

The Department of Environment and Conservation, NSW Maritime, Sydney Ports Corporation, Sydney Water Corporation and Department of Infrastructure, Planning and Natural Resources have each decided to approve the activity subject to the following conditions.

- General Conditions
- Conditions to vary Environment Protection Licence No. 2148
- Conditions under Part V (section 116) of the Water Act
- Conditions from DIPNR regarding land use safety planning
- Conditions for Part 3A permit under Rivers and Foreshore Act
- Conditions from Sydney Water
- Conditions from Sydney Ports Corporation for approval for discharge into Bunnerong Canal

The reasons for the conditions are to:

- ensure that adequate safeguards are in place to protect the environment and human health
- mitigate the potential environmental impacts of the activity
- ensure compliance with relevant statutes and statutory instruments
- restore the quality of groundwater in and around Botany Industrial Park.

## *General Conditions*

1. The proposed works must be carried out generally in accordance with:
   1.1. the procedures, safeguards and mitigation measures identified in the EIS
   1.2. an environmental protection licence under the *Protection of the Environment Operations Act 1996*
   1.3. a licence under the *Water Act 1912*
   1.4. an approval under the *Rivers and Foreshores Act 1994*
   1.5. an approval under the *Sydney Water Act 1994*
   1.6. any permission from Sydney Ports Corporation; and
   1.7. this determination report and conditions of this approval.

2. 2. All necessary approvals as stated in section 1 must be obtained by Orica.

3. As far as practicable, the Environmental Management Plan for the project should combine and cover the conditions of the relevant approvals required for the project including the conditions of this approval.

## *Conditions to vary Environment Protection Licence No. 2148*

Orica currently holds an EPA environment protection licence (no. 2148) under the *Protection of the Environment Operations Act 1997*. A copy of this licence can be accessed via the EPA Public Register at www.environment.nsw.gov.au.

This licence contains existing conditions including but not limited to:

- limits in regard to controlling air, noise, water pollution and waste

- requirements for maintaining plant and equipment in a proper manner and operating plant and equipment in a competent manner
- monitoring and reporting environmental performance
- submitting a statement of compliance with respect to licence conditions
- reporting incidents that may cause harm to DEC.

DEC has determined that it is able to vary the existing EPA licence held by Orica to incorporate the following new licence conditions for the proposed development.

## NEW CONDITIONS

# Discharges to air and water and applications to land

### P1 Location of monitoring/discharge points and areas

P1.1 The points referred to in the following table are identified in this licence for the purposes of monitoring and/or setting limits for the emission of pollutants to the air from the point.

*Air*

| EPA identification no. | Type of monitoring point | Type of discharge point | Description of location |
|---|---|---|---|
| 9 | Air emissions monitoring/ Discharge to air | Air emissions monitoring/ Discharge to air | Stack serving GTP labelled "Monitoring Point 9 (GTP stack)" on drawing number B94744 submitted to the EPA on 25 January 2005. |
| 10 | Parameter monitoring | | Thermal oxidation unit labelled "Monitoring Point 10 (Thermal Oxidation Unit)" on drawing number B94744 submitted to the EPA on 25 January 2005 |
| 12 | Weather monitoring | | Weather monitoring station labelled "Monitoring Point 12 (Weather Station)" on drawing number B94744 submitted to the EPA on 25 January 2005. |

P1.2 The points referred to in the following table are identified in this licence for the purposes of monitoring and/or setting limits for discharges of pollutants to water from the point.

P1.3 The utilisation areas referred to in the following table are identified in this licence for the purposes of monitoring and/or setting limits for any application of solids or liquids to the utilisation area.

*Water and land*

| EPA identification no. | Type of monitoring point | Type of discharge point | Description of location |
|---|---|---|---|
| 11 | Discharge to waters Effluent quality and volume monitoring | Discharge to waters Effluent quality and volume monitoring | Drain outlet serving the GTP labelled "Monitoring Point 11 (GTP discharge to waters)" on drawing number B94744 submitted to the EPA on 25 January 2005. |

# Limit conditions

## L3 Concentration limits

L3.1 For each monitoring/discharge point or utilisation area specified in the table(s) below (by point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.

L3.2 Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.

L3.3 To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the tables.

*Air*

**POINT 9**

| Pollutant | Unit of measure | 100th percentile concentration limit |
|---|---|---|
| 1,2-Dichloroethane | mg/m3 | 8 |
| Chlorine | mg/m3 | 30 |
| Nitrogen oxides | mg/m3 | 400 |
| Volatile organic compounds | mg/m3 | 10 |
| Hydrogen sulfide | mg/m3 | 2 |
| Dioxins and Furans [1] | ng/m3 | 0.1 |
| Hydrogen chloride | mg/m3 | 30 |
| Sulfur dioxide | mg/m3 | 100 |
| Vinyl chloride | Ppm | 10 |
| Solid particles | mg/m3 | 20 |
| Carbon monoxide | mg/m3 | 100 |

Note: The above limits apply to the stack emissions prior to the addition of any re-heat air.

1. Polychlorinated-dibenzo-p-dioxins (PCDD) and polychlorinated-dibenzofurans (PCDF) as 2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD) equivalent calculated in accordance with the procedures included in Part 9, Clause 19 of the Clean Air (Plant and Equipment) Regulation 1997.

**POINT 11**

| Pollutant | Unit of measure | 50th percentile concentration limit | 90th percentile concentration limit | 3DGM concentration limit | 100th percentile Concentration Limit |
|---|---|---|---|---|---|
| 1,2-Dichloroethane | mg/L | | | | 1.9 |
| Arsenic | mg/L | | | | 0.0023 |
| Cadmium | mg/L | | | | 0.0007 |
| Carbon tetrachloride | mg/L | | | | 0.24 |
| Copper | mg/L | | | | 0.0013 |
| Iron | mg/L | | | | 0.3 |
| Lead | mg/L | | | | 0.0044 |
| Manganese | mg/L | | | | 0.08 |
| Mercury | mg/L | | | | 0.0001 |
| Nickel | mg/L | | | | 0.007 |
| Oxidised nitrogen | mg/L | | | | 0.015 Note 1 |
| pH | pH | | | | 7-8.5 |
| Reactive phosphorus | mg/L | | | | 0.005 |
| Tetrachloroethene (tetrachloroethylene) | mg/L | | | | 0.07 |
| Nitrogen (total) | mg/L | | | | 0.1 Note 1 |
| Trichloroethene (trichloroethylene) | mg/L | | | | 0.33 |
| Turbidity | NTU | | | | 5 Note 1 |
| Zinc | mg/L | | | | 0.015 |
| Benzene | mg/L | | | | 0.95 |
| Toluene | mg/L | | | | 0.18 |
| Vinyl chloride | mg/L | | | | 0.1 |
| Biochemical oxygen demand | mg/L | | | | 10 |
| Total phosphorus | mg/L | | | | 0.01 Note 1 |
| Chromium (total) | mg/L | | | | 0.0044 |
| NH3-N | mg/L | | | | 0.015 Note 1 |
| Chloroform | mg/L | | | | 0.37 |
| Temperature | °C | | | | 15-25 |
| | | | | | |
| | | | | | |

For the purposes of the table above Note 1 means that concentration limits may be subject to review and change once the final details are received on the treatment technology and the design of the discharge structure.

## L3.4 Reference condition

For the concentration limits specified for Point 9 (above), the following reference conditions also apply:

| Pollutant | Unit of measure | 100th percentile concentration limit | Reference Conditions | Averaging Period |
|---|---|---|---|---|
| 1,2-Dichloroethane | mg/m3 | 8 | Dry, 273 K, 101.3 kPa, 11% $O_2$ | Rolling 1 hour average |
| Chlorine | mg/m3 | 30 | Dry, 273 K, 101.3 kPa, 11% $O_2$ | As per test method |
| Nitrogen oxides | mg/m3 | 400 | Dry, 273 K, 101.3 kPa, 11% $O_2$ | Rolling 1 hour average |
| Volatile organic compounds | mg/m3 | 10 | Dry, 273 K, 101.3 kPa, 11% $O_2$ | Rolling 1 hour average |
| Hydrogen sulfide | mg/m3 | 2 | Dry, 273 K, 101.3 kPa, 11% $O_2$ | As per test method |
| Dioxins and furans[1] | ng/m3 | 0.1 | I-TEQ, Dry, 273 K, 101.3 kPa, 11% $O_2$ | As per test method |
| Hydrogen chloride | mg/m3 | 30 | Dry, 273 K, 101.3 kPa, 11% $O_2$ | Rolling 1 hour average |
| Sulfur dioxide | mg/m3 | 100 | Dry, 273 K, 101.3 kPa, 11% $O_2$ | As per test method |
| Vinyl chloride | ppm | 10 | Dry, 273 K, 101.3 kPa, 11% $O_2$ | Rolling 3 hour average |
| Solid particles | mg/m3 | 20 | Dry, 273 K, 101.3 kPa, 11% $O_2$ | As per test method |
| Carbon monoxide | mg/m3 | 100 | Dry, 273 K, 101.3 kPa, 11% $O_2$ | Rolling 1 hour average |

Note
1. Polychlorinated-dibenzo-p-dioxins (PCDD) and polychlorinated-dibenzofurans (PCDF) as 2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD) equivalent calculated in accordance with the procedures included in Part 9, Clause 19 of the Clean Air (Plant and Equipment) Regulation 1997.

## L3.5 Thermal oxidation unit lower limits

For each monitoring/discharge point or utilisation area specified in the tables below (by point number), the parameter must be equal to or greater than the lower limits specified for that parameter in that table.

**Point 10**

| Parameter | Unit of measure | Lower Limit | Averaging period |
|---|---|---|---|
| Residence time | s | 2 | Instantaneous |
| Temperature | °C | 850 | Instantaneous |
| | | | |

L3.6 The air stripping and thermal oxidiser plant must shut down and cease all emissions as soon as safely possible, but in no case later than 10 minutes, if there is a combustion failure in the thermal oxidiser.

## L4 Volume and mass limits

L4.1 For each discharge point or utilisation area specified below (by point number), the volume/mass of:

(a) liquids discharged to water or

(b) solids or liquids applied to the area,

must not exceed the volume/mass limit specified for that discharge point or area.

| Point | Unit of measure | Volume/mass limit |
|---|---|---|
| 11 | kL/day | 12000 |

**Noise limits**

L6.4 Noise generated by activities associated with the Groundwater Cleanup Project, other than those accepted by DEC as being 'construction' at the premises, must not exceed the noise goal level presented in Table 6.4 below:

**Table 6.4 - Noise Design Goal Limits (dB(A))**

| Location | Day | Evening | Night |
|---|---|---|---|
| | $L_{Aeq(15\ minute)}$ | $L_{Aeq(15\ minute)}$ | $L_{Aeq(15\ minute)}$ |
| *Nearest affected receivers surrounding the Groundwater Cleanup Project* | *35 dB(A)* | *35 dB(A)* | *35 dB(A)* |

**L6.5** For the purpose of Condition(s) L6.1; L6.2 and L6.4:

- Day is defined as the period from 7 am to 6 pm Monday to Saturday and 8 am to 6 pm Sundays and public holidays.
- Evening is defined as the period from 6 pm to 10 pm.
- Night is defined as the period from 10 pm to 7 am Monday to Saturday and 10 pm to 8 am Sundays and public holidays.

L6.6 Noise from the premises is to be measured at the most affected point on or within the residential boundary to determine compliance with the LAeq(15 minute) noise limits in condition L6.4.

Where it can be demonstrated that direct measurement of noise from the premises is impractical, the EPA may accept alternative means of determining compliance. See Chapter 11 of the *NSW Industrial Noise Policy*.

The modification factors presented in section 4 of the *NSW Industrial Noise Policy* shall also be

applied to the measured noise level where applicable

L6.7 The noise emission limits identified in condition L6.4 apply under meteorological conditions of:

- wind speeds up to 3 m/s at 10 metres above ground level, or
- temperature inversion conditions of up to 3 $^{o}$C/100 m and wind speeds up to 2 m/s at 10 metres above ground level.

**Hours of operation – construction**

L6.8 All construction work at the premises must only be conducted between 7:00 am and 6:00 pm Monday to Friday, 8:00 am and 1:00 pm Saturdays, with no construction activities on Sundays or public holidays. Construction is permitted at any time if it is not audible at the nearest affected receivers. Audible means that it can be heard by a person at the nearest affected receivers.

L6.9 Activities at the premises, other than construction work, that meet the noise goal provided in L6.4 may be conducted on a continuous basis.

L6.10 The following activities may be carried out at the premises outside the hours specified in condition L6.8:

- the delivery of materials as requested by Police or other authorities for safety reasons
- emergency work to avoid the loss of lives, property and/or to prevent environmental harm.

# Monitoring conditions

## M2 Requirement to monitor concentration of pollutants discharged

M2.1 For each monitoring/discharge point or utilisation area specified below (by point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns.

**POINT 9**

| Pollutant | Unit of measure | Frequency | Sampling method |
|---|---|---|---|
| 1,2-Dichloroethane | mg/m3 | Continuous | CEM-8 |
| Carbon monoxide | mg/m3 | Continuous | CEM-4 |
| Chlorine | mg/m3 | Quarterly | TM-7 and 8 |
| Dioxins and furans | ng/m3 | Special frequency 2 | TM-18 |
| Dry gas density | kg/m3 | Quarterly | TM-23 |
| Hydrogen sulfide | mg/Nm3 | Quarterly | TM-5 |
| Hydrogen chloride | mg/m3 | Continuous | Method approved in writing by the EPA |
| Moisture content | % | Continuous | TM-22 |
| Molecular weight of stack gases | g/g-mole | Quarterly | TM-23 |
| Nitrogen oxides | mg/m3 | Quarterly | TM-11 |
| Oxygen (O2) | % | Continuous | CEM-3 |
| Solid particles | mg/m3 | Special frequency 3 | TM-15 |
| Sulfur dioxide | mg/m3 | Special frequency 3 | TM-4 |
| Temperature | K | Continuous | TM-2 |
| Velocity | m/s | Continuous | CEM-6 |
| Vinyl chloride | ppm | Continuous | CEM-8 |
| Volatile organic compounds | mg/m3 | Continuous | CEM-8 |
| Volumetric flowrate | m3/s | Continuous | CEM-6 |

M2.5 For the purposes of the table(s) above:

Special Frequency 2 is defined as monitoring monthly for the first 6 months and bimonthly thereafter. This monitoring frequency could be reviewed after 2 years.

Special Frequency 3 is defined as monitoring monthly for the first 6 months and quarterly thereafter. This monitoring frequency could be reviewed after 2 years.

**POINT 11**

| Pollutant | Unit of measure | Frequency | Sampling Method |
|---|---|---|---|
| 1,2-Dichloroethane | mg/L | weekly | Grab sample |
| Arsenic | mg/L | weekly | 24 hour composite |
| BOD | mg/L | weekly | 24 hour composite |
| Benzene | mg/L | weekly | grab sample |
| Cadmium | mg/L | weekly | 24 hour composite |
| Carbon tetrachloride | mg/L | weekly | Grab sample |
| Chromium (total) | mg/L | weekly | 24 hour composite |
| Copper | mg/L | weekly | 24 hour composite |
| Iron | mg/L | weekly | 24 hour composite |
| Lead | mg/L | weekly | 24 hour composite |
| Manganese | mg/L | weekly | 24 hour composite |
| Mercury | mg/L | weekly | 24 hour composite |
| Nickel | mg/L | weekly | 24 hour composite |
| Nitrate + Nitrite (oxidised nitrogen) | mg/L | weekly | 24 hour composite |
| Nitrogen (ammonia) | mg/L | weekly | 24 hour composite |
| Nitrogen (total) | mg/L | weekly | 24 hour composite |
| Phosphorus (total) | mg/L | weekly | 24 hour composite |
| Reactive Phosphorus | mg/L | weekly | 24 hour composite |
| Tetrachloroethene (tetrachloroethylene) | mg/L | weekly | Grab sample |
| Toluene | mg/L | weekly | Grab sample |
| Trichloroethene (Trichloroethylene) | mg/L | weekly | Grab sample |
| Turbidity | NTU | weekly | 24 hour composite |
| Vinyl chloride | mg/L | weekly | Grab sample |
| Zinc | mg/L | weekly | 24 hour composite |
| pH<br>conductivity<br>temperature | pH<br>uS/cm<br>C | weekly<br>continuous<br>continuous | 24 hour composite<br>in line instrumentation<br>in line instrumentation |

M2.5 In relation to monitoring requirements at point 9, a performance specification test must be conducted for all continuous emission monitoring systems at the time of installation, or soon after, and thereafter on a quarterly basis. The quarterly tests must be conducted at least two months apart for each continuous emission monitoring system and in accordance with the requirements of the applicable CEMS protocol. The results of all performance specification tests must be submitted to the EPA within one month of completion of the tests.

## M3 Testing methods - concentration limits

M3.2 Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication, unless another method has been approved by the EPA in writing before any tests are conducted.

## M6 Requirement to monitor volume or mass

M6.1 For each discharge point or utilisation area specified below, the licensee must monitor

(a) the volume of liquids discharged to water or applied to the area
(b) the mass of solids applied to the area
(c) the mass of pollutants emitted to the air.

at the frequency and using the method and units of measure specified below.

**POINT 11**

| Frequency | Unit Of Measure | Sampling Method |
|---|---|---|
| Daily during any discharge | kL/day | Method approved in writing by the EPA |

## M7 Requirement to monitor thermal oxidation unit parameters

M7.1 For each monitoring/discharge point or utilisation specified in the tables below (by point number), the licensee must monitor (by sampling and obtaining results by analysis) each parameter specified in column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns.

*Air*

**POINT 10**

| Parameter | Unit of measure | Frequency | Averaging period |
|---|---|---|---|
| Volumetric flow rate | $m^3/s$ | Continuous | CEM-6 |
| Temperature | °C | Continuous | TM-2 |
| | | | |

## M8 Weather monitoring

M8.1 For each monitoring point specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the parameter specified in column 1. The licensee must use the sampling method, units of measure, averaging period and sample at the frequency specified opposite in the other columns.

**POINT 12**

| Parameter | Unit of measure | Averaging period | Frequency | Sampling Method |
|---|---|---|---|---|
| Wind speed @ 10 m | m/s | 15 min | Continuously | AM-2 and AM-4 |
| Wind direction @ 10 m | ° | 15 min | Continuously | AM-2 and AM-4 |
| Sigma theta @ 10 m | ° | 15 min | Continuously | AM-2 and AM-4 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| Additional requirements | | | | |

| Parameter | Unit of measure | Averaging period | Frequency | Sampling Method |
|---|---|---|---|---|
| Siting | | | | AM-1 and AM-4 |
| Measurement | | | | AM-2 and AM-4 |

## General conditions

### Signage

G2.1 The location of EPA point number(s) 3,4,7,8,9,10,11 and 12 must be clearly marked by signs that indicate the point identification number used in this licence and be located as close as practical to the point.

## Special conditions

# E9 Audits and reviews

The objective of this condition is:

- to conduct a series of ongoing independent audits to validate the predictions included in the EIS and compliance with this licence, and to the extent required by any other approval, compliance with those approval conditions relating to the project
- to conduct environmental reviews with the aim of optimising performance
- to conduct engineering audits to ensure the performance of the plant will not deteriorate in the longer term
- to identify remedial measures that can be implemented in the event an audit shows a discrepancy between actual and predicted performance.

This condition comprises two parts:

- Part A – Validation audit and Environmental review
- Part B – Engineering audit

# PART A - VALIDATION AUDIT AND ENVIRONMENTAL REVIEW

## General

The licensee must undertake comprehensive validation audits and environmental reviews of the works undertaken in accordance with the EIS.

The auditor must prepare a written report on the validation audit and environmental review for submission to the DEC, DIPNR, Sydney Ports Corporation, Sydney Water Corporation, NSW Maritime, City of Botany Council and the Independent Monitoring Committee and make this report available for public inspection on request.

A single report must be submitted that includes all the validation audit and environmental review requirements of this licence and to the extent required by any other approval, compliance with those approval conditions relating to the project.

The report must be submitted with each Annual Return for the first two reporting periods during which the groundwater treatment plant has commenced operation. The ongoing necessity for this requirement will be reviewed in consultation with the Independent Monitoring Committee and taking into account the performance of the groundwater treatment plant.

The EPA may require the licensee to undertake works to address the findings or recommendations presented in the report as a requirement of this licence. Any such works must be completed within such time as agreed to by the EPA.

Each Validation audit and Environmental review must include the following components:

- Validation audit
- Environmental review

# E9.1 VALIDATION AUDIT

The licensee must engage (and bear the full cost of) an independent and suitably qualified auditor to undertake comprehensive validation audits of the project.

The auditor must:

- be a certified environmental auditor who has gained certification from a certification body (such as Registrar Accreditation Board and Quality Society of Australasia international (RABQSA) formerly known as (QSA) who have been accredited by the Joint Accreditation Services Australia and New Zealand (JAS/ANZ);
- have Lead Environmental Auditor certification; and
- have held lead environmental certification for at least 2 years.

The licensee must consult with the Independent Monitoring Committee in the selection of the auditor.

The validation audit must:

(a) be carried out in accordance with ISO 19011:2003: Guidelines for Quality and/or Environmental Management Systems Auditing

(b) take into account representative operating conditions, including worst-case scenarios, which relate to the groundwater treatment plant

(c) assess compliance with the requirements of this licence, and to the extent required by any other approval, compliance with those approval conditions relating to the project

(d) assess the project against the predictions made and conclusions drawn in the EIS and supporting documents prepared by the licensee

(e) include the following components
    - air emission validation program
    - water discharge validation program
    - noise validation program
    - thermal oxidation unit validation program

### E9.1.1 Air emission validation program

The licensee must conduct an air emissions validation program, which includes but is not be limited to the following:

(a) Ensures the range of all air pollutants monitored are continually reviewed and modified where necessary to ensure the licensee is capable of detecting the presence of all significant air pollutants not already specified in the licence.

(b) make recommendations about changes to existing monitoring, including substances monitored and

frequency of monitoring

(c) validate the conclusions of the human health risk assessment that was undertaken as part of the EIS using emissions monitoring data collected under this licence

(d) validate the conclusions of the air quality impact assessment undertaken as part of the EIS using emissions monitoring data collected under this licence

(e) prepare and implement of a comprehensive odour detection program. This must include but not be limited to:
- A leak detection and repair (LDAR) program to detect and minimise fugitive VOC emissions from the groundwater treatment plant and associated plant and equipment, in accordance with US EPA Method 21 – Determination of Volatile Organic Compound Leaks (40 CFR Part 60, Appendix A, Method 21) or such other method agreed in writing by the EPA
- An overall odour detection program, including representative off-site observations by independent and suitably qualified persons to identify and prevent unanticipated odour sources.

### E9.1.2 Water discharge validation program

The licensee must conduct a water discharge validation program, which must include but not be limited to the following:

(a) Ensures the range of all water pollutants monitored are continually reviewed and modified where necessary to ensure the licensee is capable of detecting the presence of all significant water pollutants not already specified in the licence, make recommendations about changes to existing monitoring, including substances monitored and frequency of monitoring.

### E9.1.3 Noise validation program

The licensee must conduct a noise validation program, which must include but not be limited to the following:

(a) identification and ranking by sound power level all significant noise sources on the premises (in 1/3 octave bands for any source with potentially undesirable noise character)

(b) identification of all noise sensitive receivers that may be affected by the operation of the groundwater treatment plant, and select an appropriate number of representative receiver locations to represent all sensitive receivers

(c) the results of all noise measurements undertaken to assess compliance with Condition L6.4 of the licence

(d) a statement of whether noise levels from all activities at the licensed premises comply with the specified noise limits at the representative receiver locations. The statement must take into account tonal, impulsive and short duration noises originating from the groundwater treatment plant

(e) where noise levels have been assessed as exceeding allowable licence limits, a statement explaining the reason why this has taken place

(f) a statement of what feasible and reasonable additional measures may be implemented to further reduce noise levels below those specified in the licence.

### E9.1.4 Thermal oxidation unit validation program

The licensee must conduct an thermal oxidation unit Validation program which includes but is not be limited to the following:

(a) Ensures that all parameters monitored comply with the Thermal Oxidation Unit lower limits specified in Condition L3.5 in the licence.

(b) Reports the fraction of time the lower temperature limit specified in Condition L3.5 is not achieved

within ±50°C.

(c) Correlates all dioxin air emissions data monitored at Point 9 in accordance with Condition M2.1 with temperature and flow rate data monitored at Point 10.

(d) Quantitatively assess dioxin air emissions at Point 9 with the thermal oxidiser operating at or near 850°C.

(e) Where there are increases in dioxin air emissions at the lower temperature limit set at Point 10 (as investigated in (d) above), make recommendations to change the lower temperature limit set at Point 10 and associated operational procedures to prevent dioxin concentration increases at the recommended lower temperature limit.

Note: Quantitative assessment of dioxin at Point 9 is to be undertaken in accordance with the *Approved Methods for the Sampling and analysis of Air Pollutants in NSW, 2000, unless otherwise agreed in writing by the EPA.*.

## E9.2 ENVIRONMENTAL REVIEW

The licensee must conduct an Environmental review, which must include but not be limited to the following:

(a) a review of complaints received and action taken by the licensee
(b) summary of environmental monitoring required under the licence and to the extent required by any other approval, compliance with those approval conditions relating to the project
(c) identification of trends in all monitoring data collected since the commencement of operation of the groundwater treatment plant
(d) a statement on the effectiveness of the overall environmental management and performance of the project
(e) the following programs:
- dioxin minimisation and management program
- groundwater treatment plant water
- reuse groundwater monitoring program
- ambient environmental monitoring program

### E9.2.1 Dioxin minimisation program

The licensee must conduct a program that includes, but is not limited to the following:

(a) an investigation into technical options and scientific developments that would allow continuous monitoring and or sampling of any possible dioxin emissions from the groundwater treatment plant
(b) an investigation of chemical and/or physical parameters that are likely to correlate with the actual or potential formation of dioxins and could be used as a surrogate indicator of dioxin formation in the groundwater treatment plant
(c) make recommendations about changes to existing monitoring, including substances monitored and frequency of monitoring.

### E9.2.2 Groundwater treatment plant (GTP) water reuse strategy

The Licensee must conduct a program that investigates opportunities to maximise the reuse of treated water from the groundwater treatment plant and reduce the amount of treated water discharged to waters provided the reuse or reduction can be achieved in a safe and practical manner and it will provides the best environmental outcome, in the circumstances.

The program must include but need not necessarily be limited to the following:

- characterisation of the treated water in terms of quality and quantity
- identification of potential sues for this treated water, taking into account relevant and recognised environmental and human health guidelines or standards to ensure it is appropriate for this use
- identification of options to beneficially reuse treated waters to minimise the amount of treated water being discharged
- assessment of the feasibility and cost of these options
- selection of options for implementation
- timetable for implementation of the selected options
- inclusion of any of potential uses of this treated water, taking into account relevant and recognised
- other relevant recommendations relating to treated water reuse.

The licensee must consult with the DEC, NSW Health Department, Sydney Water Corporation, Sydney Ports Corporation, Botany Bay Council, DIPNR and NSW Maritime on the development of the program.

### E9.2.3 Groundwater monitoring program

The licensee must conduct a Groundwater monitoring program which must include but not be limited to the following:

(a) monitor groundwater to assess whether the extraction of groundwater will result in any actual or potential impacts to surface waters or habitats in the locality
(b) review the conclusions of the groundwater assessments and modelling that was undertaken as part of the EIS, including using all monitoring data collected under this licence or other approvals for this project
(c) include a mechanism to regularly review the effectiveness of the monitoring program to ensure it is effective in detecting the presence of actual or potential impacts not already identified
(d) make recommendations about changes to existing monitoring and frequency of monitoring.

The program must be prepared and implemented in consultation with the DEC, DIPNR, DPI, Sydney Ports Corporation, Sydney Water Corporation, NSW Maritime and City of Botany Council.

### E9.2.4 Ambient environmental monitoring program

The licensee must conduct an Ambient environmental monitoring program which must include but not be limited to the following

(a) develop and implement a program to monitor ecological health of habitats in the locality and water quality in the receiving environment, including specification of sampling locations, sampling frequencies and parameters to be tested
(b) include quality control elements
(c) include monitoring sites at Penrhyn Estuary, Botany Bay and Bunnerong Canal as well as other relevant off-site locations
(d) assess whether the project will result in any actual or potential impacts to surface waters or habitats in the locality from the operation of the groundwater treatment plant and associated plant and equipment
(e) review the conclusions of the ecological and ambient water quality assessments that were undertaken as part of the EIS, including using monitoring data collected under this licence or other approvals for this project
(f) include a mechanism to regularly review the effectiveness of the monitoring program to ensure it is effective in detecting the presence of actual or potential impacts not already identified
(g) make recommendations about changes to existing monitoring, including substances monitored and

frequency of monitoring.

The program must be prepared and implemented in consultation with the DEC, DIPNR, DPI, Sydney Ports Corporation, Sydney Water Corporation, NSW Maritime and City of Botany Council.

## E9.3 PART B - ENGINEERING AUDIT

The licensee must make arrangements for, and bear the full cost of, an independent auditor to undertake engineering audits of the groundwater treatment plant and associated plant and equipment (including all control systems) to ensure it is maintained in a proper and efficient condition and operated in a proper and efficient manner with respect to its environmental and safety capability and performance.

Matters to be addressed in the audits must include but not be limited to

(a) review of the frequency of inspections and maintenance programs to ensure they are effective in detecting actual or potential changes in the environmental and safety performance
(b) review of procedures for detecting changes to the equipment that could impact on performance, including corrosion and wear
(c) review of results of internal inspections of all equipment, using video techniques where appropriate.

The licensee must consult with the Independent Monitoring Committee in the selection of the auditor.

The engineering audits must generate a report for submission to the EPA, DIPNR, Sydney Water Corporation, City of Botany Council, Community Liaison Group and available for public inspection on request.

The report must be submitted with each Annual Return

- at end of every 5$^{th}$ reporting period, for the first 15 years of operation of the groundwater treatment plant and then
- every 2$^{nd}$ reporting period in which the plant remains in operation.

The EPA may require the licensee to undertake works to address the findings or recommendations presented in the report as a requirement of this licence. Any such works shall be completed within such time as the EPA may agree.

# E10 Independent Monitoring Committee

E10.1 The licensee must establish and service an Independent Monitoring Committee with technical and community representatives. The licensee must provide monitoring information and reports and consult with this Committee as required by the relevant conditions of this licence.

*Note: The Independent Monitoring Committee may be formed by the licensee by expanding the existing Community Liaison Group currently established and serviced by the licensee.*

# E11 Financial Assurance

**Requirement for works**

The licensee must construct and operate the groundwater treatment plant referred to, and required by, the EPA Notice of Clean-up Action issued on 26 September 2003 as subsequently varied, and this licence.

**Purpose of financial assurance**

This licensee requires construction and operation of the groundwater treatment plant to complete the Botany groundwater clean-up project. The purpose of this project is to undertake remediation work to address groundwater contamination caused by historical manufacturing activities undertaken at the Botany Industrial Park (former ICI site). The objective of this condition is to secure or guarantee funding for or towards the ongoing operating costs of the project, following construction of the groundwater treatment plant.

**Due date for financial assurance**

The licensee must lodge a financial assurance in the form of a bank guarantee, a bond, or in another manner acceptable to the EPA by 30 November 2006.

The financial assurance must be maintained during the operation of the groundwater treatment plant and thereafter until such time as the EPA notifies the licensee in writing that it is satisfied that the contaminated groundwater has been appropriately remediated.

**Expert advice to be provided to the EPA**

The licensee must engage (and bear the full cost of) independent and suitably qualified experts to:

- Review and confirm the estimated annual and total remaining net operating and maintenance costs of the groundwater treatment plant and the associated monitoring and reporting costs over the life of the project; and
- Review and advise on the risks associated with the licensee's ability and commitment to meet those costs during the life of the project and the probabilities of those risks ; and
- Review and advise on the technical and environmental risks if the licensee is unable to meet the operating costs during the life of the project and the probability of those risks.

The licence must provide the expert reports to the EPA, together with any written comments from the licensee about the appropriate form or amount of the financial assurance, by 30 June 2006.

**Determination of financial assurance**

The form and amount of the financial assurance will be determined by the EPA (and imposed by a subsequent licence condition), following the EPA's consideration of the expert reports on costs and risks and probabilities, and the licensee's submission on the appropriate form and amount of the financial assurance.

The EPA may require the financial assurance to be adjusted so that it keeps pace with inflation for so long as the EPA requires the financial assurance to remain in place. The EPA may review the financial assurance from time to time in light of the remaining works required to complete the remediation.

## Conditions under Part V (Section 116) of the Water Act

Pursuant to Part V of the *Water Act 1912* the Department of Infrastructure, Planning and Natural Resources (DIPNR), having reviewed the documentation associated with the proposal as described in a report titled *Botany Groundwater Cleanup Project – Environmental Impact Statement* (EIS) dated November 2004 and submitted to the Department by Orica Australia Pty Ltd, proposes to grant a Licence subject to a formal application being received from the proponent for such.

In addition to the licence, DIPNR proposes general and specific conditions for management of groundwater resources and dependent ecosystems in the area of the proposed groundwater clean up development.

The general terms of approval are set out below.

**A. General conditions - Water Licence (Part V Water Act)**

1. Under the provisions of Part V (s116 ) of the Water Act, this licence shall be valid for the period of ten (10) years and may be renewed upon application.

2. The licensee shall allow the Department of Infrastructure, Planning and Natural Resources, or its authorised representatives, subject to appropriate occupational health and safety provisions, full and free access to the works (ie groundwater extraction bores and groundwater investigation/monitoring bores), during or after construction, for the purpose of undertaking inspection or test of works and its fittings, and shall carry out any work or alterations deemed necessary by DIPNR to ensure the protection and maintenance of the works, or the control of the water extracted and for the protection of the quality and the prevention from pollution/contamination of surface and subsurface water.

3. The licensee shall notify DIPNR if the works (ie groundwater extraction bores, investigation/monitoring bores) are to be abandoned and, contingent with safety requirements, seal off the works by:
   (a) backfilling the work to ground level with clay or cement, or
   (b) other methods agreed to or directed by DIPNR.

4. Prior to the construction of any bore for purposes of groundwater extraction, investigation and/or groundwater monitoring, a bore licence application shall be submitted and a licence obtained from DIPNR. Completion details (Form A - Particulars of completed bore) of all bores are required to be forwarded to DIPNR within three (3) months of completion of construction.

5. Any drilling contractor engaged to construct a groundwater extraction, investigation and/or monitoring bore must hold a current NSW Water Bore Drillers Licence, with appropriate endorsements for the proposed work, that has been issued under the Water Act by DIPNR.

6. All groundwater extraction, investigation and/or monitoring bores shall be constructed in accordance with bore construction requirement given in *Minimum Construction Requirements for Water Bores in Australia* – Land and Water Biodiversity Committee Edition No 2, September 2003.

7. Appropriate occupational health and safety provisions required by NSW WorkCover must be observed during the construction of all water bores for the project.

8. Any licence granted that authorises pumping from the specified extraction areas viz Primary Containment Area on Southlands, Secondary Containment Area along Foreshore Road and DNAPL Containment line on the Botany Industrial Park is to be used for containment of contamination and groundwater remediation purposes only.

9. All groundwater extracted for containment and remediation shall be transferred to the GPT via dedicated transfer pipelines, which should be monitored to ensure pipeline failure does not occur.

10. Works used for the purpose of conveying water taken by means of the licensed work shall not be constructed or installed so as to obstruct the reasonable passage of flood water flowing into or from a water course.

**Specific conditions – groundwater management**

1. The licensee shall maintain records of the gross and individual volume of groundwater extracted from all bores utilised for containment of contamination and groundwater remediation and provide this information to DIPNR on an annual basis or upon request from the Department.

2. The licensee shall install and maintain groundwater monitoring bores as part of the Environmental Monitoring Plan (EMP) and obtain the endorsement of DIPNR for the location, design and technical data to be obtained from the monitoring bore network

3. The licensee shall install automatic water-level recording devices with provision for downloading and archiving groundwater level data for the endorsed groundwater monitoring network.

4. DIPNR reserves the right to request an audit of the groundwater monitoring data and archiving quality assurance/quality control (QA/QC) procedures and request the licensee take corrective measures if found to be necessary as a consequence of the audit findings.

5. The licensee shall prepare interpreted reports on a schedule endorsed in the EMP that provides technical information about the groundwater level behaviour for the area impacted by the extraction borefields, with reference to previous groundwater simulation predictions cited in the EIS.

6. The licensee shall install and maintain a settlement monitoring network in accordance with the EMP endorsed by DIPNR.

7. The licensee shall obtain as part of the EMP groundwater quality data from both the production borefields and monitoring bore network and provide technical reports on this information, with reference to performance indicators for groundwater clean up, in accordance with the endorsed EMP.

**Groundwater monitoring program**

1. Orica must, as a component of the Environmental Monitoring Plan, prepare and implement a groundwater monitoring program by 30 June 2005 and prior to commencement of operation of the groundwater treatment plant.

   The objectives of this monitoring program are:

   (a) to detect groundwater flow and direction at depths relevant to the proposed extraction points
   (b) to document the effectiveness of the groundwater pumping containment activity
   (c) to assess the remediation of the sand beds aquifers groundwater system by reference to performance indicators.

   The groundwater monitoring program must be developed in consultation with DIPNR, DEC, the Department of Primary Industries and Sydney Ports Corporation.

   The groundwater monitoring program must include details on but need not necessarily be limited to the following:

   (a) location of monitoring bore holes - including the depth at which they are screened to enable access of groundwater
   (b) monitoring of the reduced level (m AHD)
   (c) monitoring the groundwater gradient and determination the direction of groundwater flow
   (d) monitoring methodologies and standards to be employed
   (e) reporting and assessment of results
   (f) opportunities to integrate the monitoring program with other monitoring requirements in the vicinity
   (g) monitoring frequency
   (h) representativeness of the sampling.

The applicant must submit a pre-extraction baseline groundwater monitoring report to DIPNR and any

other relevant government agencies by 30 September 2005 for the operation of the groundwater treatment plant.

## Conditions from DIPNR regarding land use safety planning

### Preconstruction

1. At least one month prior to the commencement of construction of the proposed activity (except for construction of those preliminary works that are outside the scope of the hazard studies), or within such further period as the Director General may agree, Orica shall prepare and submit for the approval of the Director General the studies set out under subsections (a) to (c) (the pre-construction studies). Construction, other than of preliminary works, must not commence until approval has been given by the Director General.

    (a) HAZARD AND OPERABILITY STUDY

    A Hazard and Operability Study for the proposed activity, chaired by an independent qualified person approved by the Director General prior to the commencement of the study. The study shall be carried out in accordance with the DIPNR's Hazardous Industry Planning Advisory Paper No. 8, *HAZOP Guidelines*. The study report must be accompanied by a program for the implementation of all recommendations made in the report. If the Applicant intends to defer the implementation of a recommendation, justification must be included.

    (b) FINAL HAZARD ANALYSIS

    A Final Hazard Analysis of the proposed activity prepared in accordance with DIPNR 's Hazardous Industry Planning Advisory Paper No. 6, *Guidelines for Hazard Analysis*.

    (c) CONSTRUCTION SAFETY STUDY

    A Construction Safety Study prepared in accordance with DIPNR's Hazardous Industry Planning Advisory Paper No. 7, *Construction Safety Study Guidelines*. If the construction period exceeds six (6) months, the commissioning portion of the Construction Safety Study may be submitted two months prior to the commencement of commissioning.

### Ongoing

2. INCIDENT REGISTER

    The Applicant shall maintain a register of accidents, incidents and potential incidents with actual or potential significant off-site impacts on people, property or the biophysical environment. The register shall be made available for inspection at any time by the independent Hazard Auditor and the Director General.

3. HAZARD AUDIT

    Twelve months after the commencement of operations of the proposed development, or within such further period as the Director General may agree, the applicant shall carry out a comprehensive Hazard Audit of the proposed development and within one month of the audit submit a report to the Director General. The hazard audit may be incorporated in the overall hazard audit for Orica.

The audit shall be carried out at the applicant's expense by a duly qualified independent person or team approved by the Director General prior to commencement of the audit. Further audits shall be carried out every three years or as determined by the Director General and a report of each audit shall within a month of the audit be submitted to the Director General. Hazard Audits shall be carried out in accordance with DIPNR's Hazardous Industry Planning Advisory Paper No. 5, *Hazard Audit Guidelines*.

The audit shall include a review of elements of the site Safety Management System and a review of all entries made in the incident register since the previous audit.

The audit report must be accompanied by a program for the implementation of all recommendations made in the audit report. If the applicant intends to defer the implementation of a recommendation, justification must be included.

4. The conditions of consent imposed on the BIP (DA No 30/98, approved on 16/1/1998) include the review and update, if necessary, of BIP and Orica Site Safety Management Systems, Site Fire Safety Study and Site Emergency Plan. Any revisions of the above studies should be submitted to the Director General for approval.

5. In these conditions "Director General" means Director General of the Department of Infrastructure Planning and Natural Resources or delegate.

## Conditions for Part 3A Permit under Rivers and Foreshore Act

1. Physical works at Bunnerong Canal are not to commence until such time as a Part 3A Permit under the *Rivers and Foreshores Improvement Act 1948* has been issued by NSW Maritime.

2. The permission of the relevant landowner on which the works will be undertaken is to be obtained prior to lodgement of any Part 3A Permit application with NSW Maritime.

3. Suitably dimensioned plans and elevations showing the pipeline and outlet to Bunnerong Canal in relation to Bunnerong Canal and surrounds are to be provided to NSW Maritime prior to issue of any Part 3A Permit for the works.

4. A suitable plan to manage any acid sulfate material that may be encountered during the works associated with the Bunnerong Canal discharge point is to be prepared and submitted to NSW Maritime prior to the issue of the Part 3A permit.

5. Water quality monitoring should be undertaken at the discharge point, being the pipeline where it enters Bunnerong Canal.

6. Within 2 months of achieving practical completion of the construction activities at Bunnerong Canal, the proponent must submit a report outlining its compliance with the conditions of the Part 3A Permit. The report must also outline details of environmental incidents, near incidents and remedial actions undertaken to repair any environmental damage.

7. Prior to lodgement of any Part 3A Permit application with NSW Maritime the proponent must submit in writing to Sydney Ports Corporation and NSW Maritime a Bunnerong Canal Discharge Optimisation Plan. The objective of this plan is to ensure that the discharge in Bunnerong Canal is optimised to minimise scouring of sediments and maximise the mixing of the discharge with the receiving waters. The plan must include but not be limited to:

   - a detailed design of the discharge structure demonstrating how the potential for scouring is minimised and how mixing with receiving waters is optimised.

- a description of how the operation of the discharge will be optimised (ie flow rate limitations and timing of discharge).

- protocols for handling emergency situations.

- a monitoring proposal, including initial base line measurements of the sediment levels and distribution within the canal and Orica's proposed ongoing sediment distribution monitoring program.

The plan must be developed in consultation with DEC, DIPNR, Sydney Ports Corporation and the NSW Maritime.

## Conditions from Sydney Water

1. Orica must comply with the requirements of the *Sydney Water Act 1994*. This includes obtaining a Section 73 Compliance Certificate. In seeking the Compliance Certificate, Orica must supply to Sydney Water all information necessary for Sydney Water to assess the impacts of the proposal on Sydney Water assets and operations. Orica must also comply with the requirements of Sydney Water issued as a Notice of Requirements, under Section 74 of the Act, prior to the Completion Certificate being issued. Such requirements will include adjustments to the trade waste agreement.

2. In relation to the discharge of excess treated water to Sydney Water's Bunnerong stormwater channel, Orica must conduct further technical investigations (eg potential impacts on flooding and the structural integrity of the channel) and obtain appropriate agreement with Sydney Water, prior to the commencement of any discharge.

## Conditions from Sydney Ports Corporation for approval to discharge into Bunnerong Canal

1. Subject to the finalisation of a formal instrument of agreement between Sydney Ports Corporation and Orica, approval shall be granted for the discharge of water into Bunnerong Canal (the Canal) at a rate not to exceed 12 ML per day, and at a flow rate not to exceed 0.14 cubic metres per second.

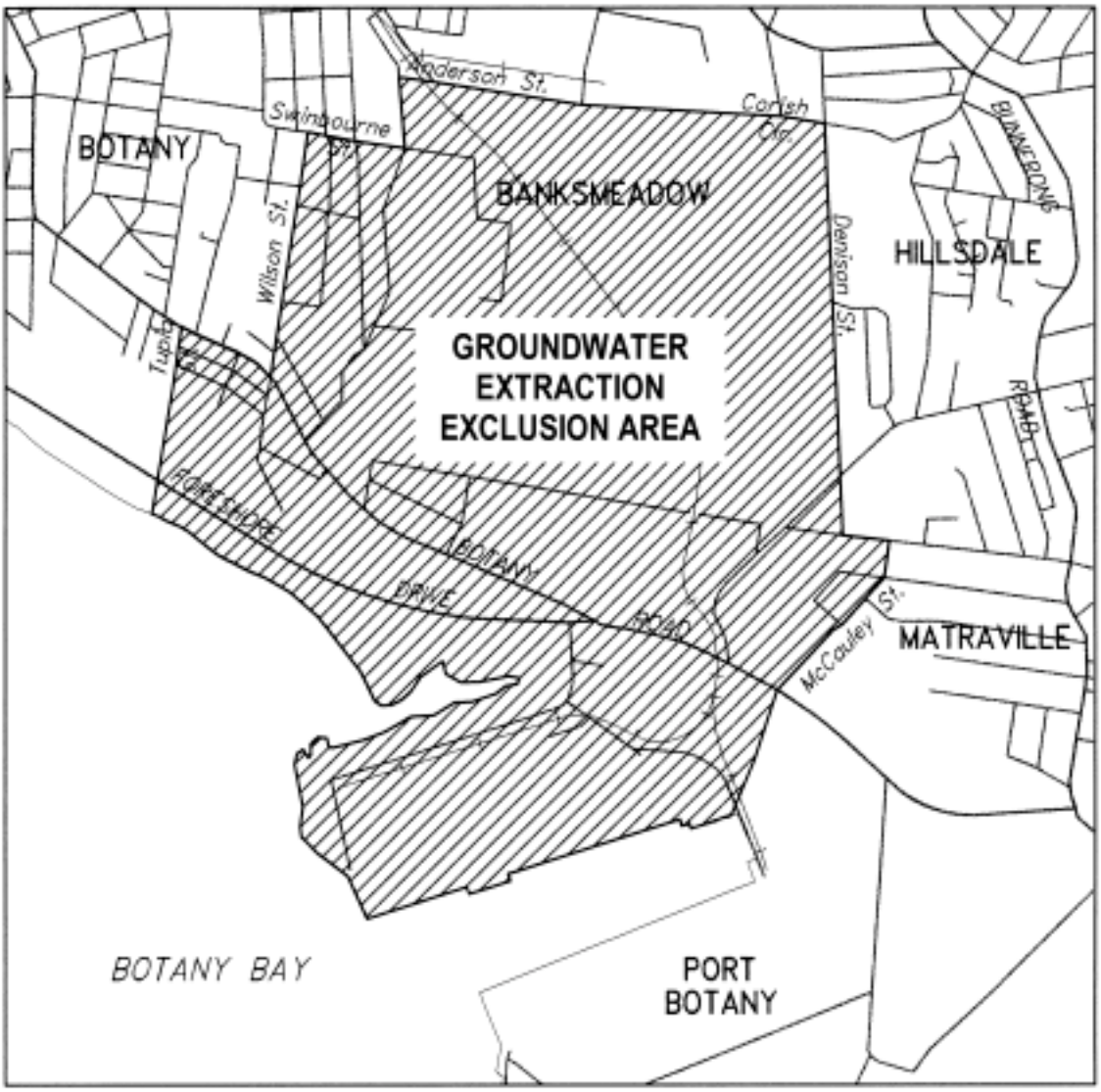
2. Prior to the commencement of any discharge into the canal, and the finalisation of the formal instrument of agreement, Orica shall submit – for Sydney Ports Corporation approval - a *Bunnerong Canal Discharge Optimisation Plan*. This plan shall contain (but is not limited to) details of the discharge structure to be installed, initial baseline measurements of the sediment levels and distribution within the Canal and Orica's proposed ongoing sediment distribution monitoring program.

3. Should monitoring indicate sediment movement to an extent that is unacceptable to Sydney Ports Corporation, Orica will be required to develop appropriate mitigation and/or management measures for Sydney Ports Corporation approval and implement these within an agreed timeframe.

4. Orica will be required to cease discharge in the canal as directed by Sydney Ports Corporation, if it is essential to conduct maintenance on the canal, maintain port operations, respond to emergencies or in the event of a pollution incident.

5. The quality of the water being discharged must meet all relevant requirements for discharge into stormwater systems. Orica is to monitor and document for Sydney Ports Corporation pollutant levels within the water to be discharged. In the event of discharge waters containing pollutant levels in excess of relevant requirements, Orica will:
   (a) immediately notify Sydney Ports Corporation
   (b) undertake appropriate action to cease the generation of the pollution and undertake appropriate clean up actions
   (c) at its expense, promptly comply with any notice, order, direction or requirement of Sydney Ports Corporation and/or of any other relevant Authority.

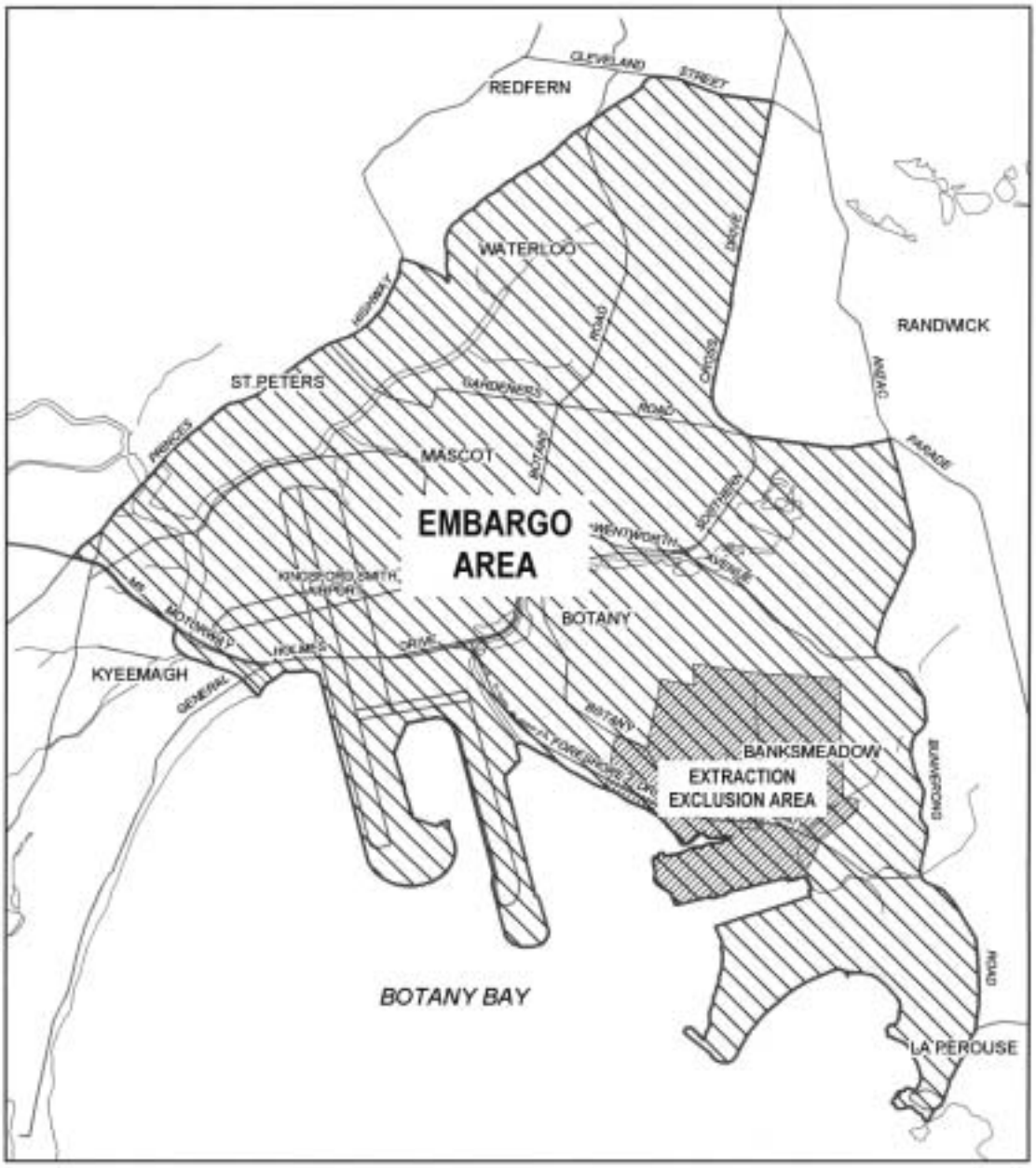
## **Appendix C** Botany Sand Beds Groundwater Extraction Exclusion Area




**The Groundwater Extraction Exclusion Area** (previously Groundwater Protection Zone 1) is an area around the known contamination plumes originating from historical activity at the former ICI Petrochemical Complex (now Orica). The exclusion area has been implemented in response to the detection of contaminants in groundwater downgradient of the Orica Complex.
This area occupies parts of East Botany and Banksmeadow, and is defined by cultural features as follows: Tupia Street, Botany Road, Wilson Street, Swinbourne Street, Stephen Road, Anderson Street, Corish Circle, Denison Street and McCauley Street.

In the Groundwater Extraction Exclusion Area, the Department of Infrastructure, Planning and Natural Resources has issued notices to licensees under the *Water Act 1912* not to extract groundwater. Unlicensed bore owners are advised not to extract groundwater within this area.

## **Appendix D** Botany Sand Beds Groundwater Embargo Area




**The Groundwater Embargo Area** This embargo area was gazetted to proactively manage sites with potential contamination by restricting new access to groundwater.

The area incorporates parts of the western half of the Botany Sand Beds Northern Zone, where it is known that historic industrial activity has occurred. The area is bounded by Anzac Parade, Bunnerong Road, Gardeners Road, Southern Cross Drive, South Dowling Street, Cleveland Street, Princes Highway and M5 tunnel alignment. The restriction placed on this area precludes any new bore licences for the extraction of groundwater from being issued with the exception of temporary dewatering, groundwater monitoring and remediation bores. The intent of the embargo is to not issue new licences until further assessment of the groundwater system occurs through the Botany Groundwater Strategy.