

	REPORT No: EN.1591.61.PR.028	Rev: 0
GROUNDWATER CLEANUP PLAN PROGRESS REPORT NO. 20		

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REVISION 0

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LIST OF ACRONYMS

ACRONYM	DEFINITION
ADWG	Australian Drinking Water Guidelines
AHD	Australian Height Datum
ANZECC	Australia and New Zealand Environment and Conservation Council
BEW	Botany Environment Watch
BEREPA	Botany and Eastern Region Environment Protection Agency
BGC Project	Botany Groundwater Cleanup Project (hydraulic containment and treatment project as described in the EIS)
BGL	Below ground level
BGP	Botany Groundwater Project (entire set of activities pertaining to Orica's contamination of the BIP and environs)
BIP	Botany Industrial Park
BP	Bundle piezometer
CFM	Chloroform (trichloromethane)
CHC	Chlorinated hydrocarbon
cis-1,2-DCE	cis-1,2-dichloroethene
CoBB	City of Botany Bay
COPC	Chemical of potential concern
CTC	Carbon tetrachloride (tetrachloromethane)
CLC	Community Liaison Committee
DEAC	Diethyl aluminum chloride
DEC	Department of Environment and Conservation, incorporates the EPA and is now DECC
DECC	Department of Environment and Climate Change, formerly DEC
DIPNR	Department of Infrastructure, Planning and Natural Resources (former NSW Government department, separated into DoP and DNR)
DNAPL	Dense non-aqueous phase liquid
DNR	Department of Natural Resources (formerly part of DIPNR, now part of DWE)
DWE	Department of Water and Energy
DoD	Department of Defence
DoP	Department of Planning (formerly part of DIPNR)
EDC	Ethylene dichloride (1,2-dichloroethane)
EIAD	Environmental Impact Assessment Document
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
EPL	Environmental Protection Licence
EP&A Act	Environment Planning and Assessment Act
GAC	Granular activated carbon
GCP	Groundwater Cleanup Plan
GEEA	Groundwater Extraction Exclusion Area
GTA	General Terms of Approval
GTP	Groundwater Treatment Plant
HCB	Hexachlorobenzene
HCBD	Hexachlorobutadiene
HHRA	Human Health Risk Assessment
IMC	Independent Monitoring Committee

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ACRONYM	DEFINITION
ISCO	In Situ Chemical Oxidation
JBS	JBS Environmental Pty Ltd, an environmental consultancy
KBR	Kellogg, Brown and Root Pty Ltd, Engineering Contractor for many sub-projects of the BGP
KMH	KMH Consulting Pty Ltd, independent compliance auditor for the BGP
MoU	Memorandum of Understanding
NCUA	Notice of Clean Up Action
NHMRC	National Health and Medical Research Council
NSW	New South Wales
OEMP	Operational Environmental Management Plan
PCA	Primary Containment Area
PCE	Perchloroethylene (tetrachloroethene)
PFM	Planning Focus Meeting
PHA	Preliminary Hazard Analysis
PVDF	Poly vinylidene fluoride
QRA	Qualitative Risk Assessment
RAP	Remedial Action Plan
REF	Review of Environmental Factors
RO	Reverse osmosis
RTA	Roads and Traffic Authority
RWG	Regulatory Working Group
SCA	Secondary Containment Area
SCW	Scheduled Chemical Waste
SEPP	State Environmental Planning Policy
SESPHU	South East Sydney Public Health Unit
SPC	Sydney Ports Corporation
SSU	Steam Stripping Unit
SWC	Sydney Water Corporation
TBA	To be advised
1,1,2,2-TeCA	1,1,2,2-Tetrachloroethane
1,1,2-TCA	1,1,2-Trichloroethane
1,2,4-TCB	1,2,4-Trichlorobenzene
1,2,4,5-TeCB	1,2,4,5-Tetrachlorobenzene
TCE	Trichloroethene
TO	Thermal Oxidiser
TWA TLV	Time Weighted Average Threshold Limit Value
TWSA	Trade Waste Service Agreement
URS	URS Australia Pty Ltd, Orica's principal environmental consultant on BGP
VC	Vinyl chloride (chloroethene)
VOC	Volatile organic compound
VSD	Variable speed drive

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EXECUTIVE SUMMARY

The NSW Environment Protection Authority (EPA), now part of the Department of Environment and Climate Change (DECC), issued Orica Australia Pty Ltd (Orica) with Notice of Clean Up Action (NCUA) No. 1030236 on 26 September 2003, under the Protection of the Environment Operations (POEO) Act 1997.

Orica engaged URS to complete a quarterly monitoring event in September 2008 in accordance with the agreed monitoring plan. Results and discussions were provided in the URS report *Groundwater Treatment Plant (GTP) Quarterly Groundwater and Surface Water Monitoring Report, September 2008*.

Hydraulic Containment

- The inferred contours and patterns of deep groundwater flow infer that hydraulic containment was achieved during the monitoring period. Some groundwater flow past the northern and southern ends of the BIP containment line was observed during the monitoring period. As the GTP capacity increases, the BIP line will operate more consistently and the groundwater in these areas will be more effectively captured. In the meantime, flow lines indicate that that groundwater is likely to be captured at the PCA.
- The inferred contours and patterns of deep groundwater flow at the PCA infer that hydraulic containment was achieved during the monitoring period; and
- While it is not currently possible to conclusively demonstrate hydraulic containment of shallow groundwater at PCA, it has been demonstrated for portions of the containment line. For the remaining areas the rate of migration of shallow groundwater has been significantly reduced.
- The inferred contours and patterns of shallow and deep groundwater flow at the SCA infer that hydraulic containment was achieved during the monitoring period; and
- Results of salinity monitoring downgradient of the SCA indicate similar levels to those observed during previous monitoring rounds.

Chemical Monitoring Results

- With the exception of EDC, the regional distribution of contaminants is consistent with that presented in September 2007. This observation reflects both the implementation of hydraulic containment (and associated development of large areas of very slow groundwater movement) and the inherently slow migration of groundwater contamination. Due to these factors it is unlikely that groundwater contaminant concentrations will significantly change in the short to medium term; and
- While the distribution of EDC is largely the same as previous monitoring reports, the leading edge of the Central Plume continues to migrate towards the SCA

containment line and minor decreases in concentrations are being observed at Southlands due to hydraulic containment.

- Vinyl chloride (VC) concentrations exceeded the ANZECC (2000) low reliability Trigger Value (0.1 mg/L) at BP43 (0.1 m) at both high and low tides. All other pore water samples reported concentrations below the trigger values. The VC concentrations and historic maximums at BP43 (low and high tide) are attributed to short term changes in groundwater flow that could be due to works for the Port Botany Expansion affecting the emergence and interaction of pore water in the intertidal zone at the estuary; and
- In general, volatile CHC concentrations in pore water within Penrhyn Estuary were similar to or lower than historical concentrations.
- Concentrations of EDC in Floodvale Drain (SW052 and SW053) are decreasing, with the concentration of EDC sampled in Floodvale Drain in September 2008 being below both short-term and long-term historical concentrations.
- Concentrations of EDC were less than the ANZECC (2000) low reliability Trigger Value (1.9 mg/L) in Floodvale Drain, Springvale Drain and Penrhyn Estuary surface waters samples collected in September 2008. With the exception of the concentrations of EDC at Springvale Drain Outlet (SW031, at low and high tide) the EDC concentrations of all the surface water samples collected at the Penrhyn Estuary are similar to the concentrations detected in previous rounds and in all cases are lower than the ANZECC (2000) low reliability Trigger Value (1.9 mg/L). EDC was not detected at the Floodvale Drain Outlet or either of the Boat Ramps at low and high tides.
- Concentrations of other volatile CHCs in surface water collected during September 2008 were mostly lower than long-term averages and in many cases less than the short-term (twelve month) averages, and were similar to the concentrations determined for the previous monitoring round in June 2008

Implications for Human Health Risk Assessment

- The exposure concentrations for contaminants of potential concern (COPC) considered in the HHRA within the inner estuary have changed slightly with the inclusion of the data collected in September 2008. In addition some additional COPC – namely cis-1,2-dichloroethene and 1,1- dichloroethene (degradation products of tetrachloroethene [PCE] and trichloroethene [TCE]), which reported concentrations in the September monitoring round in the inner estuary that exceeded the adopted screening level values used in the HHRA – have been identified within the surface water that require consideration within the assessment. On this basis, risks to recreational users in the inner estuary have been updated with the revised exposure concentrations and additional COPC.
- No changes have been made to previous calculations for the outer estuary, as the exposure concentrations are essentially equivalent.
- Overall, the conclusions presented within the HHRA associated with exposures within the estuary remain unchanged. That is, given the conservative nature of

the range of assumptions and the safety factors applied to toxicity values, the risks to human health for all exposure scenarios are considered to be low.

Springvale Drain Air Monitoring

- There is a strong correlation between groundwater levels and contaminant concentrations in the surface water and ambient air near Springvale Drain. Generally, higher groundwater levels correspond with higher surface water concentrations as groundwater levels above the elevation of the base of the Springvale Drain lead to contaminated groundwater discharging into Springvale Drain.
- Higher surface water concentrations are associated with higher ambient air concentrations.
- The operation of the GTP and associated groundwater extraction has effectively reduced CHC concentrations in air in the vicinity of Springvale Drain at Southlands, north of Southlands, MCS and Discovery Cove such that long-term exposures to these chemicals that could be derived from volatile emissions to air from Springvale Drain are considered low and acceptable.

DNAPL Source Area Depletion Projects

- Orica engaged several respected experts based in North America to attend a workshop in Botany in December 2007 to discuss Orica's remediation strategy and the applicability of various remedial technologies.
- Dr Michael Kavanaugh, one of the workshop attendees, was engaged by Orica to evaluate the costs and benefits of full-scale implementation of ISCO or thermal treatment, and to assist Orica to present the findings of the workshop to the DECC and CLC
- A presentation was made to DECC on 15 September 2008 and to the CLC the following day.
- The presentation outlined the outcomes of the Remediation Strategy Review. The primary outcome was that inclusion of DNAPL source removal projects as an immediate part of the remediation strategy is not appropriate based on a number of significant practicability and technical constraints and considerations
- Accordingly, the Strategy Review participants agreed to a course of proposed actions that broadly consisted of:
 - Ongoing management of groundwater contamination to ensure human health and environmental receptor risk is acceptable;
 - Continuing optimisation of the operation of hydraulic containment lines and GTP for protection of critical human health and environmental exposures; and
 - Ongoing review of remedial technology developments for DNAPL remediation.

- The CLC has requested that a detailed workshop be held to provide the opportunity for full information about the Strategy Review to be shared and discussed. This workshop will be scheduled in early 2009.

GTP Operation

- The co-current Biological Aerated Filters (BAFs) installed in the first half of 2008 continue to work well in reducing concentrations of organics in the stripped water, which can encourage biological fouling, thus resulting in a significant increase to the average daily volume of groundwater treated in this reporting period (3.65 to 4.82 ML/day).
- The annual GTP shutdown is scheduled for late November 2008 and was underway at the time of submission of this report. In this reporting period, extensive preparations and planning were performed.
- Pumping from the containment lines has been consistent and steady in the lead up to the shutdown, and a short-term shutdown such as this does not compromise the effectiveness of containment.

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1 INTRODUCTION

The NSW Environment Protection Authority (EPA), now part of the Department of Environment and Climate Change (DECC), issued Orica Australia Pty Ltd (Orica) with Notice of Clean Up Action (NCUA) No. 1030236 on 26 September 2003, under the Protection of the Environment Operations (POEO) Act 1997. Since then the DECC has issued three variation notices as follows:

Notice under Protection of the Environment Act 1997	Date Issued
Notice of Cleanup Action (NCUA) No. 1030236	26 September 2003
<i>Variation NCUA No. 1033107</i>	17 February 2004
<i>Variation NCUA No. 1042957</i>	7 December 2004
<i>Variation NCUA No. 1052882</i>	2 February 2006

Condition 3 of the NCUA requires Orica to submit a Groundwater Cleanup Plan (GCP) by 31 October 2004 for consideration by the EPA. Condition 3 defines the issues to be addressed in the GCP within timeframes defined in Condition 4. Condition 3(e) defines requirements for a comprehensive monitoring plan, the results of which were to be reported to the EPA (under Condition 4G) on a quarterly basis.

This document is the twentieth report submitted in accordance to NCUA Condition 4G. The reporting interval for this report is 1 July 2008 to 30 September 2008, however if more recent and relevant information is available it is also included.

Progress Report No	Date	Comment
1	Wednesday 25 February 2004	Submitted on schedule
2	Monday 17 May 2004	Submitted on schedule
3	Friday 20 August, 2004	Submitted on schedule
4	Thursday 18 November 2004	Submitted on schedule
5	Wednesday 16 February 2005	Submitted on schedule
6	Tuesday 17 May 2005	Submitted on schedule
7	Monday 15 August 2005	Submitted on schedule
8	Wednesday 30 November 2005	Submitted on schedule
9	Tuesday 28 February 2006	Submitted on schedule
10	Wednesday 31 May 2006	Submitted on schedule
11	Thursday 31 August 2006	Submitted on schedule
12	Thursday 30 November 2006	Submitted on schedule
13	Wednesday 28 February 2007	Submitted on schedule
14	Thursday 31 May 2007	Submitted on schedule
15	Friday 31 August 2007	Submitted on schedule
16	Friday 30 November 2007	Submitted on schedule
17	Friday 29 February 2008	Submitted on schedule
18	Friday 30 May 2008	Submitted on schedule
19	Friday 29 August 2008	Submitted on schedule
20	Friday 28 November 2008	Current Report

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Previous reports are available at the relevant section of the website oricabotanytransformation.com and a distribution list is provided at the beginning of this document.

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2 COMPLIANCE SUMMARY

2.1 Notice of Clean Up Action (NCUA)

A summary of the compliance status against current NCUA (including variation notices) condition requirements is provided below:

Cond.	Summary of Requirement	Status	Reference Documents / Comments
3A	Commence preparation of GCP by 30/09/2003	Achieved.	Commenced on 26/09/2003
3B	Prepare and submit GCP by 31/10/2003 covering matters listed	Achieved.	GCP submitted 31/10/2003. EPA authorisation of GCP on 17/02/2004 by Variation Notice No.1033107.
4A	Commence implementation of GCP by 16/03/2004	Achieved.	Work commenced immediately after submission of GCP, in anticipation of its approval.
4B	Commence containment works within primary containment area within 14 days of receipt of all approvals and complete such work within 90 days.	Achieved.	Extraction commenced 28/10/2004. Orica letter of 29/10/2004, DECC letter 10/11/2004.
4BA	At least once every 3 months during GCP implementation report on effectiveness of hydraulic containment works.	Ongoing compliance.	Most recent data provided in Section 3.1 of this report.
4C	Complete identification of the locations of the DNAPL sources by 31 May 2004.	Ongoing compliance.	Significant DNAPL investigations completed to date and discussed in previous GCP Progress reports. No further work in this reporting period.
4D	Complete containment of DNAPL sources by 30/11/2004.	Achieved	Orica submission regarding compliance submitted 30/11/2004. DEC letter of 06/01/2005 has stated in-principle acceptance and requested further information. Orica submitted requested information on 27/01/2005. DEC provided letter of compliance on 07/09/2005.
4D	Remove DNAPL sources to the maximum extent practicable by 31 October 2005.	Achieved	Progress included in Section 4.3 of this report.
4E	Reduce the concentrations within the primary containment area to the maximum extent practicable by 31/10/2005, with an 80% target on July 2002 levels.	Achieved	Letter of compliance (to maximum extent practicable requirements of the Condition) received on 1 February 2006.
4F	Establish a secondary containment area by 31/10/2004.	Achieved.	Commenced extraction 29/10/2004. Orica letter of 29/10/2004, DEC letter of 10/11/2004 (confirmed in DEC letter of 06/01/2005).
4G	Implement monitoring program and report at the end of February, May, August and November of each year.	Ongoing compliance.	Summary of monitoring program results for this reporting period provided in Section 3 of this report. Details are provided in Attachment A.
5	Remedial measures to ensure groundwater and surface water flows into Botany Bay and Penrhyn Estuary	Work in progress.	Discussion on latest findings provided in Section 3 and Attachment A of this report.

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Cond.	Summary of Requirement	Status	Reference Documents / Comments
	achieve ANZECC Guidelines for slightly to moderately disturbed ecosystems.		
6	Emission controls from works and measures required by the NCUA strictly controlled through adoption of best practice. Works and operations to be carried out in a controlled and competent manner.	Ongoing monitoring being performed.	A discussion on GTP emission compliance provided in Section 5 of this report.
7	Orica to make all reasonable attempts to obtain consent for work on premises not occupied by Orica and related companies. Notify EPA within 7 days if refusal to grant access.	Ongoing compliance.	Ongoing access to third party premises sought as required.
7A	Updating of GCP to take account of developments.	Ongoing compliance.	The GCP remains relevant in terms of the overall groundwater containment and remedial strategy. The strategy is currently under review (see Section 4.3). The Groundwater and Surface Water Monitoring Plan was agreed for 2006 and a revised Plan was submitted and agreed with former DEC (now DECC) for 2007. In June 2008 Orica, in conjunction with its consultants, submitted a proposal for monitoring from late 2008 to 2010. DECC has agreed to the revised program.
7B	Orica to monitor groundwater in any other area likely to have been, or to be, impacted by the contaminants.	Ongoing compliance.	The most recent residential bore monitoring round has taken place in early November 2008 and will be reported on in the first GCP Progress Report in 2009.
7C	7B monitoring is to: a) Determine the spatial distribution of the contaminants; and b) Monitor changes in the spatial contamination and distribution of the contaminants.	Ongoing compliance.	Refer to comments on 7B.
7D	Monitoring results to be provided to the EPA as soon as possible after results become available to Orica.	Ongoing compliance.	Important results are provided to DECC as soon as possible. The quarterly progress reports are the primary mode of reporting monitoring data.
7E	Orica must consider best practice technology in the remediation of DNAPL and groundwater containing dissolved phase contamination.	Ongoing compliance.	DNAPL overseas mission completed in April 2005. Orica representatives have attended Battelle conference on "Remediation of Chlorinated and Recalcitrant Compounds" in Monterey, California in May 2008. Orica held a workshop at Botany in December 2007 to discuss remediation strategy with a range of respected

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Cond.	Summary of Requirement	Status	Reference Documents / Comments
			overseas and local experts. A submission and presentation was made to the DECC in September 2008 (see Section 4.3).
7F	Orica must provide an annual written report to DECC on actions required by 7E. First report to be provided no later than 28 February 2006.	Ongoing compliance.	Annual detailed update provided in Attachment B of Progress Reports 13 and 17.
7G	Orica must review the need to revise the HHRA in light of relevant monitoring data.	Ongoing compliance.	See 7H
7H	All reports submitted to DECC must include an assessment of the potential risk to human health.	Ongoing compliance.	All reports now submitted to DECC include relevant appraisal of potential risk to human health and hence identify any requirement to update the Consolidated HHRA.
7I	By 30 April 2006, Orica must prepare and submit to DEC, a monitoring plan for all necessary input parameters to the HHRA.	Achieved.	Plan submitted on 30 April 2006.
7J	Orica must provide copies of reports issued under 7F and 7H to DWE, SESPHU, NSW Health, and CoBB within 7 days of submission to DECC.	Ongoing compliance.	Ongoing compliance
7K	Orica must inform the community of developments by: <ul style="list-style-type: none"> a) A community forum agreed to by the DECC. b) Provision of a quarterly newsletter to people residing within a 1 km radius of BIP. c) Maintenance of a website in which copies of relevant reports are posted. 	Ongoing compliance.	<ul style="list-style-type: none"> a) The Community Liaison Community (CLC) meets quarterly b) See Section 6.1. c) www.oricabotanytransformation.com
8	Works and measures under voluntary agreement must not compromise the efficacy of measures under the notice.	Ongoing compliance.	Orica has since discontinued bioremediation trials because sufficient data had been obtained to assess the efficacy of bioremediation, and the PCA interim hydraulic containment was interfering with the flow of groundwater through the trials area. Orica proposed and DECC agreed to defer installation of a zero valent iron permeable reactive barrier wall.
8A	Provide additional information as detailed to DEC by 16/03/2004.	Achieved.	Issued by Orica 16/03/2004, received by DEC 17/03/2004 due to courier error. Additional information on PCA extraction design progressively provided in accordance with Orica's response of 16/03/2004.

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2.2 Environmental Protection Licence No. 2148 (EPL2148)

Orica reports compliance against EPL2148 requirements via the submission of the annual return in September each year. The following matters in this reporting period are noted in relation to the licence conditions and GTP:

- Orica has kept the DECC updated regarding progress towards obtaining NATA accreditation for the GTP Laboratory.
- Orica raised a number of technical matters in relation to monitoring at the GTP stack (including the continuous VOC monitoring, continuous moisture monitoring, and the method used to monitor hydrogen chloride). A meeting with the DECC Chief Scientist was held to further discuss these matters.
- A licence variation was issued on 20 August 2008 to reflect information submitted for the ammonia concentration reduction pollution program.
- Orica submitted a licence variation request on 18 August 2008 to better manage the timing of preparation of the independent audit and remove completed conditions. A licence variation was issued on 12 September 2008 permitting submission of the 2008 audit report after submission of the Annual Return. This variation also included minor changes relating to the GTP start-up and shut-down conditions and the frequency of moisture content monitoring at the GTP stack.
- A scan of the GTP feedwater, discharge to Bunnerong canal and discharge to sewer for semi-volatile compounds was requested by the DECC following advice to the Community Liaison Committee (CLC) from Independent Monitoring Committee (IMC) member John McCracken.
- As required by licence conditions, Orica advised DECC in September 2008 that Selleys Pty Ltd would be removed from the Deed of Cross Guarantee ('Deed') as a result of the proposed de-merger of the Orica Consumer Products from Orica Limited. In November 2008 Orica advised DECC that the Board of Orica Limited had decided to defer indefinitely the proposed de-merger and that as a result Selleys Pty Ltd will remain a party to the Deed. This has no impact on Orica's responsibilities under the NCUA or the EPL.
- For the past three years, Orica has also been subject to an independent audit by KMH Consulting. The third environmental audit was completed in September 2008 and the report submitted to DECC in early November. The percentage compliance against auditable conditions was over 90% and the auditor determined that sufficient actions were in place to address the recorded non-compliances.

2.3 Other Licences and Statutory Approvals

A summary of compliance status against other approvals relevant to the project is provided in the table below.

Licence / Statutory Approval	Comments
Conditions under Part V of the Water Act	<ul style="list-style-type: none"> • Groundwater and surface water monitoring conducted during this reporting period was undertaken in accordance with the program developed in response to condition E12.2.3 of

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Licence / Statutory Approval	Comments
	EPL2148. A summary of the results is provided in Section 3 of this report.
Conditions from Department of Planning	<ul style="list-style-type: none"> • These conditions require that Orica maintain a register of accidents, incidents and potential incidents with actual or potential significant off-site impacts on people, property, or the biophysical environment. Orica maintains an incident register for the GTP in the internal Safety Health and Environment Incident Management database.
Conditions from Sydney Water Corporation	<ul style="list-style-type: none"> • Orica obtained the Subdivider/Developer Compliance Certificate under Division 9 Section 73 of the <i>Sydney Water Act 1994</i> for the BGC Project on 19 January 2006.
Conditions from Sydney Ports Corporation (SPC)	<ul style="list-style-type: none"> • The licence with SPC for the discharge of excess treated water to the Bunnerong Stormwater Channel was finalised in January 2006 and subsequently executed by Sydney Ports and provided to Orica on 25 August 2006. Ultimately this discharge will be a backup only as Orica intends to maximise the reuse of treated water.

3 QUARTERLY MONITORING EVENT

NCUA condition 3B(e) requires Orica to implement a comprehensive monitoring program within the defined area (formerly named as the Groundwater Protection Zone 1 by the then DIPNR (subsequently DNR and now part of DWE), and now referred to as the Groundwater Exclusion Extraction Area [GEEA]) to:

- monitor changes in concentrations of the substances in the contaminant plumes;
- monitor changes in the spatial distribution of contaminant plumes in the sub-surface;
- gauge groundwater levels to assess effectiveness of hydraulic containment; and
- monitor concentrations in groundwater and surface water discharges to Botany Bay and Penrhyn Estuary for comparison against the Australian and New Zealand Guidelines for Marine and Fresh Water (ANZECC, 2000) trigger values for protection of slightly to moderately disturbed ecosystems.

Orica and DEC (now DECC) subsequently agreed the content and scope of the *GTP Groundwater and Surface Water Monitoring Plan* (URS, 2005a). On an annual basis DECC and Orica meet to discuss the effectiveness of the monitoring program and revise monitoring requirements as appropriate.

Orica engaged URS to complete a quarterly monitoring event in September 2008 in accordance with the agreed monitoring plan. Results and discussions were provided in the URS report *Groundwater Treatment Plant (GTP) Quarterly Groundwater and Surface Water Monitoring Report, September 2008*. This report is bound separately as Attachment A. The remainder of this section has effectively been transcribed from the URS report.

3.1 Hydraulic Containment

General

- While target water levels derived from the numerical model (Laase, 2005) are presented on the hydrographs to aid interpretation, it is important to note that observed levels below/above these targets do not directly imply hydraulic containment is/is not achieved. indicated above. An assessment of hydraulic containment requires incorporation and analysis of a number of lines of evidence;
- Additionally the target levels derived from the numerical model (Laase, 2005) are subject to the assumptions and limitations of the model. Notably, the numerical model assumes steady state conditions with respect to recharge and extraction rates, and as a result the model-derived target levels should only be used as an aid to the overall interpretation of hydraulic containment;
- The slow migration of groundwater and the potential for increased pumping to recapture groundwater mean that hydraulic containment can still be maintained through extended periods of no, or low, groundwater extraction. An assessment of the maximum time periods that the SCA and PCA containment lines can be off-line before groundwater at the containment line cannot be recaptured was presented in previous GTP monitoring reports;

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- Implementation of hydraulic containment has altered the natural groundwater flow regime with flow now characterised by flow drawn towards the three containment lines;
- Large areas of very low hydraulic gradients have developed due to hydraulic containment. These areas represent zones of very slow groundwater flow and as a result contaminant concentrations in these areas are likely to remain relatively constant for the medium to long term;
- Water levels at regional monitoring wells show no discernible water level impact due to hydraulic containment thus indicating a limited potential to affect infrastructure and licensed groundwater users.

BIP Containment Line

- The primary purpose of the BIP containment line is to contain contaminated groundwater migrating from source areas located on BIP. If groundwater extraction is temporarily reduced due to periodic GTP capacity limitations, this reduction occurs at sections of the BIP containment line based on a predetermined order of priorities.
- The inferred contours and patterns of deep groundwater flow infer that hydraulic containment was achieved during the monitoring period. Some groundwater flow past the northern and southern ends of the BIP containment line was observed during the monitoring period. As the GTP capacity increases, the BIP line will operate more consistently and the groundwater in these areas will be more effectively captured. In the meantime, flow lines indicate that that groundwater is likely to be captured at the PCA.

PCA Containment Line

- The primary purposes of the PCA are mass removal of the central 1,2-dichloroethane (EDC) plume in the deep aquifer, and hydraulic containment on Block 2, Southlands.
- The inferred contours and patterns of deep groundwater flow at the PCA infer that hydraulic containment was achieved during the monitoring period; and
- While it is not currently possible to conclusively demonstrate hydraulic containment of shallow groundwater at PCA, it has been demonstrated for portions of the containment line. For the remaining areas the rate of migration of shallow groundwater has been significantly reduced.

SCA Containment Line

- The primary purpose of the SCA is to minimise migration of groundwater contamination to Botany Bay (recognising that there was already contamination in areas downgradient and to the east of the containment line before groundwater extraction commenced);
- The inferred contours and patterns of shallow and deep groundwater flow at the SCA infer that hydraulic containment was achieved during the monitoring period; and

- Results of salinity monitoring downgradient of the SCA indicate similar levels to those observed during previous monitoring rounds.

3.2 Chemical Monitoring Results

Onsite Monitoring Wells

- Concentrations reported for monitoring wells located on the BIP and at Southlands were similar to those previously reported. Where increases and decreases were identified using the parametric tests only samples at BP80 (BIP) and BP02, BP03, BP45 and BP46 (Southlands) were considered to represent significant trends. The observed changes in concentrations at BP80 are the result of its close upgradient proximity to the BIP containment line. The observed changes at Southlands monitoring wells are likely to be the result of movement of the Southern Plumes as groundwater flow patterns change due to hydraulic containment.

Offsite Monitoring Wells

- Concentrations reported for offsite monitoring wells were similar to those previously reported with the exception of wells located at the leading edge of the Central Plume, which is continuing to migrate towards the SCA. It is important to note that hydraulic containment was achieved at the SCA during the monitoring period and as ongoing containment at the SCA is required under the NCUA the leading edge of the Central Plume will be captured at the SCA and will not discharge into Penrhyn Estuary;
- The increases observed for EDC and trichloroethene (TCE) at BP01 (2 m) are considered significant. The increases are consistent with historical trends and concentrations at deeper BP01 ports (6 m) and are considered to be representative of groundwater that migrated downgradient of Foreshore Road prior to the commencement of hydraulic containment at the SCA; and
- The reported EDC concentration at BP72 (3 m) was 0.011 mg/L which, given its relatively low concentration, represents only a slight increase compared with the previous maximum of 0.007 mg/L. Based on the discussion presented in Section 7, the historical maximums reported for BP72 (and the Northern Plumes) do not alter the conclusions of the Consolidated Human Health Risk Assessment (HHRA) or Addendum.

Regional Contaminant Distribution

- With the exception of EDC, the regional distribution of contaminants is consistent with that presented in September 2007. This observation reflects both the implementation of hydraulic containment (and associated development of large areas of very slow groundwater movement) and the inherently slow migration of groundwater contamination. Due to these factors it is unlikely that groundwater contaminant concentrations will significantly change in the short to medium term; and

- While the distribution of EDC is largely the same as previous monitoring reports, the leading edge of the Central Plume continues to migrate towards the SCA containment line and minor decreases in concentrations are being observed at Southlands due to hydraulic containment.

PCA Total Chlorinated Hydrocarbon Concentration Estimate

- While total chlorinated hydrocarbon (CHC) concentrations were measured at a number of PCA monitoring wells, the distribution of data points was not suitable for use in re-contouring contaminant concentrations at Southlands.
- Significant contaminant mass continues to be removed from the subsurface at the PCA as evidenced by the achievement of hydraulic containment at the PCA during the monitoring period.
- Extensive sampling of PCA monitoring wells is planned for the biennial monitoring program (September 2009) and a detailed assessment of changes in contaminant concentrations at the PCA will then be made.

Penrhyn Estuary

- Vinyl chloride (VC) concentrations exceeded the ANZECC (2000) low reliability Trigger Value (0.1 mg/L) at BP43 (0.1 m) at both high and low tides. All other pore water samples reported concentrations below the trigger values. The VC concentrations and historic maximums at BP43 (low and high tide) are attributed to short term changes in groundwater flow that could be due to works for the Port Botany Expansion affecting the emergence and interaction of pore water in the intertidal zone at the estuary; and
- In general, volatile CHC concentrations in pore water within Penrhyn Estuary were similar to or lower than historical concentrations.

Surface Water

Concentrations of EDC in Floodvale Drain (SW052 and SW053) are decreasing, with the concentration of EDC sampled in Floodvale Drain in September 2008 being below both short-term and long-term historical concentrations. Concentrations of EDC in Springvale Drain at Southlands (SW049 and SW005) in September 2008 are substantially lower than the average of short-term and long-term historical concentrations.

- Concentrations of EDC were less than the ANZECC (2000) low reliability Trigger Value (1.9 mg/L) in Floodvale Drain, Springvale Drain and Penrhyn Estuary surface waters samples collected in September 2008. With the exception of the concentrations of EDC at Springvale Drain Outlet (SW031, at low and high tide) the EDC concentrations of all the surface water samples collected at the Penrhyn Estuary are similar to the concentrations detected in previous rounds and in all cases are lower than the ANZECC (2000) low reliability Trigger Value (1.9 mg/L). EDC was not detected at the Floodvale Drain Outlet or either of the Boat Ramps at low and high tides.
- Concentrations of other volatile CHCs in surface water collected during September 2008 were mostly lower than long-term averages and in many cases

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less than the short-term (twelve month) averages, and were similar to the concentrations determined for the previous monitoring round in June 2008

Implications for Human Health Risk Assessment

- The exposure concentrations for contaminants of potential concern (COPC) considered in the HHRA within the inner estuary have changed slightly with the inclusion of the data collected in September 2008. In addition some additional COPC – namely cis-1,2-dichloroethene and 1,1- dichloroethene (degradation products of tetrachloroethene [PCE] and trichloroethene [TCE]), which reported concentrations in the September monitoring round in the inner estuary that exceeded the adopted screening level values used in the HHRA – have been identified within the surface water that require consideration within the assessment. On this basis, risks to recreational users in the inner estuary have been updated with the revised exposure concentrations and additional COPC.
- No changes have been made to previous calculations for the outer estuary, as the exposure concentrations are essentially equivalent.
- Overall, the conclusions presented within the HHRA associated with exposures within the estuary remain unchanged. That is, given the conservative nature of the range of assumptions and the safety factors applied to toxicity values, the risks to human health for all exposure scenarios are considered to be low. However, the assessment has identified worst-case exposure scenarios (particularly within the inner estuary) where the calculated risks exceed the target values. However, it is again noted that the potential for exposure within the inner estuary is currently affected by access restrictions associated with the Port Botany expansion works, so these worst-case exposure scenarios might be no longer applicable. Nevertheless, they have been retained in the risk assessment for the time being. It is also worth noting that the risk values have not been recalculated using more recent surface water data (i.e., non-detection of a number of COPC in the inner estuary for several monitoring rounds – related to the reduced groundwater levels in the area due to the groundwater extraction resulting in significantly lower concentrations of most CHCs in Springvale and Floodvale Drains). This would otherwise be expected to significantly reduce the risk values for exposure activities such as swimming.

3.3 Recommendations

On the basis of the results of the September 2008 program, the following recommendations are made:

- Loggers and transducers identified in Section 4.3 of the URS report (Appendix A) require repair and/or replacement;
- Replacement of monitoring well MWB10S is essential to allow ongoing assessment of shallow containment at PCA. Installation of additional shallow groundwater monitoring wells downgradient of the PCA should also be considered to improve interpretation of shallow groundwater flow;

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- In view of the gradually increasing drawdown in the shallow aquifer at PCA as a result of increased pumping in the deep aquifer, the current pumping regime should be continued and enhanced (where possible); and
- As GTP capacity increases, additional pumping should be concentrated at the southern end of the BIP containment line to maximise contaminant mass removal and protection of Springvale Drain.

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4 OTHER ENVIRONMENTAL ACTIVITIES

Other groundwater and surface water monitoring and data acquisition activities that have been undertaken in this reporting period pursuant to, or that have relevance to, the agreed monitoring plan and conditions of the NCUA are detailed below.

4.1 Air Monitoring and Human Health Risk Assessment

It was reported in Progress Report No. 6 that the draft *Consolidated Human Health Risk Assessment 2005* (URS, 2005b) was prepared by URS and submitted to the DEC on 31 March 2005 with copies provided also to NSW Health and Prof. Brian Priestly (Monash University) from the Australian Centre for Human Health Risk Assessment for independent review. Following a request from the DEC, the draft report was released publicly.

Prof. Priestly completed the independent review and provided comments in a letter to the DEC on 11 May 2005. Generally the comments were overwhelmingly positive and strongly supported the findings of the risk assessment.

Regular air monitoring programs are scheduled, and the results are compared with the data assessed in the Consolidated Human Health Risk Assessment. A summary of the current air emission programs is provided below. Some of these are a requirement of the aforementioned monitoring plan, whilst others have been undertaken in response to recent groundwater and surface water analytical results.

15-Monthly Air Monitoring

Since 1995 air emission monitoring has conducted on a nominally 15-month cycle (targeting different seasons every year). Sampling locations are on and off the BIP and are usually adjacent to shallow groundwater-monitoring points. Some air monitoring locations – such as the Car Park Waste Encapsulation – are not directly relevant to the Botany Groundwater Project. Sampling was last performed in March 2008 and the next round is scheduled for January 2009.

Springvale Drain Air Monitoring

Previous GTP reports have detailed the monitoring of chlorinated solvent vapours in air close to Springvale Drain caused by the influx on contaminated groundwater into the drain. At the time of writing, a report detailing the results of 18 months of monitoring was almost complete. The findings are summarised below:

- There is a strong correlation between groundwater levels and contaminant concentrations in the surface water and ambient air near Springvale Drain. Generally, higher groundwater levels correspond with higher surface water concentrations as groundwater levels above the elevation of the base of the Springvale Drain lead to contaminated groundwater discharging into Springvale Drain. Accordingly it has been observed that reducing the groundwater level at Southlands (through pumping at the BIP and PCA containment lines) has decreased groundwater levels and hence decreased CHC concentrations in the surface water in Springvale Drain.
- Higher surface water concentrations are associated with higher ambient air concentrations. Therefore, it is considered that reducing the level of the

groundwater to below the elevation of the base of Springvale Drain is likely to reduce the total concentration of CHCs in the surface water of Springvale Drain and ambient air in the vicinity of Springvale Drain.

- The operation of the GTP and associated groundwater extraction has also effectively reduced CHC concentrations in air in the vicinity of Springvale Drain at Southlands, north of Southlands, MCS and Discovery Cove such that long-term exposures to these chemicals that could be derived from volatile emissions to air from Springvale Drain are considered low and acceptable. The highest measured concentrations of chlorinated solvents in ambient air are recorded in Southlands. The potential for peak exposures should be further managed should Southlands be permanently occupied at some point in the future.
- Sufficient data has been collected from areas adjacent to MCS and Discovery Cove to provide a meaningful assessment of long-term exposures. On this basis monitoring of these areas is recommended to be included in the 15 monthly air emissions sampling program only, with surface water concentrations monitoring at SW065 on a quarterly basis, and reviewed to determine if any increases in CHCs in surface water have occurred that would warrant additional sampling of exposure concentrations.

4.2 Residential Monitoring

The November 2008 residential bore sampling event had recently been completed at the time of writing. The results will be provided to the DECC and residents as soon as practicable, and a summary will be provided in the next GCP Progress Report.

4.3 DNAPL Source Area Depletion Projects

In accordance to Condition 7E of the EPL, Orica is required to stay abreast of relevant DNAPL remedial technologies and apply them as practicable.

Previous GCP Progress Reports have detailed the results of overseas fact-finding missions used to identify remedial technologies and techniques that might be practicably applied for the Botany Groundwater Project. The majority of the expertise in application of these remedial technologies is located in North America. To that end, Orica engaged several respected experts based in North America to attend a workshop in Botany in December 2007 to discuss Orica's remediation strategy and the applicability of various remedial technologies – including in situ chemical oxidation (ISCO) and thermal treatment, which had been selected by Orica for detailed evaluation – to Orica's groundwater plumes and plume source areas.

Dr Michael Kavanaugh, one of the workshop attendees, was engaged by Orica to evaluate the costs and benefits of full-scale implementation of ISCO or thermal treatment, and to assist Orica to present the findings of the workshop to the DECC and CLC. Dr Kavanaugh is Vice President and the National Science and Technology Leader for Malcolm Pirnie, Inc (USA). He is a chemical and environmental engineer with over 34 years of consulting experience on over 200 projects covering a broad range of environmental problems. Dr. Kavanaugh has prepared over 30 peer reviewed technical publications, two books, and has made

over 130 presentations to technical audiences as well as public groups including testimony before US Congressional and state legislative committees.

A presentation was made to DECC on 15 September 2008 and to the CLC the following day.

The presentation outlined the outcomes of the Remediation Strategy Review. The primary outcome was that inclusion of DNAPL source removal projects as an immediate part of the remediation strategy is not appropriate based on a number of significant practicability and technical constraints and considerations. These include the inability to access and treat all areas, lack of short to medium term benefits, as well as economic considerations.

Accordingly, the Strategy Review participants agreed to a course of proposed actions that broadly consisted of:

- Ongoing management of groundwater contamination to ensure human health and environmental receptor risk is acceptable. This will be achieved through extensive ongoing monitoring of the segments of the environment potentially impacted by contaminated groundwater;
- Continuing optimisation of the operation of hydraulic containment lines and GTP for protection of critical human health and environmental exposures and for gradual cleanup of contamination where containment lines are downgradient of source areas;
- Ongoing review of remedial technology developments for DNAPL, sorbed mass and dissolved phase treatment and their practical applicability to the Botany Groundwater Project.

Orica believes that the hydraulic containment system and GTP are having very beneficial effects, not just in significant dissolved phase mass removal from the aquifer, but more importantly in sustainable major improvements to surface water quality in Springvale Drain, Floodvale Drain and in Penrhyn Estuary. Orica proposes to further improve the situation with the installation of additional spear point extraction proximate to Springvale Drain.

Orica will continue to investigate and monitor inputs that drive assessment of human health and ecological risk, and will continue to review available technologies for application for DNAPL, sorbed and dissolved phase treatment. This remediation strategy review process has been beneficial, and should occur periodically.

DECC has reviewed Orica's submission and met with Orica on 6 November 2008. DECC acknowledged the comprehensiveness of Orica and Orica's consultants of the groundwater problem, which included an estimate of contaminant masses, modelling of future cleanup response under different remedial scenarios, and practicability assessments of full-scale application of likely cleanup technologies. DECC also requested that Orica's strategy be amended to expand the ongoing review of DNAPL source removal technologies to include development of a field trial of a selected technology.

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The CLC has requested that a detailed workshop be held to provide the opportunity for full information about the Strategy Review to be shared and discussed. This workshop will be scheduled in early 2009.

5 GROUNDWATER TREATMENT PLANT OPERATION

5.1 GTP Performance

A summary of the GTP operational performance for 1 July to 30 September 2008 is provided below:

Average volume of groundwater treated 1 July 2008 to 30 September 2008	4.82 ML/day
Total volume of groundwater treated since pump and treat activities commenced in 2005 (at 30 September 2008).	4.52 GL
Total volume of CHCs destroyed in the thermal oxidiser	621 tonnes

5.2 Air Strippers

Previous GCP Progress Reports indicated the air stripping system was suffering from biological fouling caused by the growth of a filamentous fungus within the stripping cabinets. Under the GTP's original operating regime, the groundwater entering the air strippers was acidified to prevent the build-up of inorganic precipitants such as aluminium and iron. However, it was found that these acidic conditions encouraged opportunistic growth of the filamentous fungus.

With regular cleaning the stripper units operate effectively. Orica continues to examine methods to improve performance and hence reduce the cleaning frequencies as resources allow.

In this reporting period, a trial was undertaken involving addition of chlorine dioxide, a disinfectant routinely used in water treatment. In the trial one air stripper pair was dosed into the feedwater at 3 mg/L (as Cl₂). After a period of one week the air stripper trays were examined and fungal biomass was absent. Design and procurement for a large-scale chlorine dioxide dosing system is progressing and will ramp up following the shutdown for annual maintenance. Installation and commissioning of a permanent system is planned for the second quarter of 2009.

5.3 Stripped Water Treatment Plant (SWTP)

The co-current Biological Aerated Filters (BAFs) installed in the first half of 2008 continue to work well in reducing concentrations of organics in the stripped water, which can encourage biological fouling, thus resulting in a significant increase to the average daily volume of groundwater treated in this reporting period (3.65 to 4.82 ML/day).

The lower concentrations of organic material have resulted in lower chloramine addition to control biological fouling. Reduced chloramine concentrations are beginning to lead to a noticeable reduction of the ammonia in the discharge water.

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Orica reports on the progress of the ammonia reduction in accordance with the Pollution reduction Program in place with the DECC. The next scheduled update report is due on 12 December 2008.

In addition a program to identify reverse osmosis (RO) membranes needing replacement (to reduce minor internal leakages caused by frequent cleaning) has complemented the reduced organic concentration in the RO feed (due to good BAF operation), leading to improved product water quality (lower organic concentration in product water).

5.4 Thermal Oxidiser and Dioxin Air Emissions

The Thermal Oxidiser (TO) has been successfully commissioned and is operating within licence specification for dioxin emissions from the TO (0.1 ng/m³). A routine quarterly sampling event took place on 18 September 2008. This did not include dioxins analysis, which occur every six months. All parameters were within specification.

5.5 GTP Scheduled Shutdown

The annual GTP shutdown is scheduled for late November 2008 and was underway at the time of submission of this report. In this reporting period, extensive preparations and planning were performed.

Pumping from the containment lines has been consistent and steady in the lead up to the shutdown, and a short-term shutdown such as this does not compromise the effectiveness of containment.

Further details of the shutdown will be provided in the next GCP Progress Report.

5.6 Destruction of DEAC Waste

Although not falling within this reporting period, a brief outline of the diethyl aluminum chloride (DEAC) waste destruction that occurred in early November is provided in this report.

Prior to the GTP shutdown, and after a detailed technical review and hazard study, four containers (approximately 3.1 tonnes) of DEAC contaminated waste were treated in the GTP. The waste contained an average of 7.5% DEAC in heptane (a solvent similar to petrol). The waste was a legacy from the former Propathene Plant, which produced polypropylene at the northern end of the BIP from 1979 to 1998, and had been stored at the BIP since 1996. Orica had been searching for a technically and environmentally sound and safe disposal method for the DEAC contaminated waste and the GTP presented a safe on-site solution for the one-off treatment of this waste. The destruction occurred over 13 days and has removed the risks associated with ongoing storage.

The decision to treat the waste was made in liaison with the DECC, and with the Department's conditional approval (which included notification of the CLC Chair). The timing of the waste treatment was driven by the GTP annual maintenance shutdown schedule. A major part of this year's shutdown includes the cleaning and

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repair of the thermal oxidiser. Any fouling or build-up in the thermal oxidiser created as a result of treating the DEAC contaminated waste will be readily removed during the shutdown.

Further information regarding results of monitoring performed during the waste destruction will be presented in the next GCP Progress report.

5.7 Beneficial Reuse of Treated Water

The GTP began supplying the Orica ChlorAlkali Plant with treated water in December 2006. Qenos is regularly receiving treated water for use in cooling towers. Solvay Interlox continues to receive and utilise treated water.

In this reporting period, modifications to the BAFs and maintenance of the RO membranes resulted in lower organic (carbon) content in the treated water making it suitable for use in demin plant use. Consequently, in this quarter, preparations were underway for the Orica ChlorAlkali Plant and Solvay Interlox to resume feeding their demin plants with treated water (in addition to other uses of the treated water). Their use of treated to these plants began in October 2008.

6 COMMUNITY CONSULTATION

This section provides a consolidated update in response to Condition 7K of the NCUA, which specifies how Orica must inform the community of developments in the remediation of groundwater, and provides information regarding the wider consultation activities that are undertaken by Orica to obtain community feedback regarding the BGC Project. Orica supports a two-way communication process with the local community and this section incorporates feedback received from the community during the reporting period.

6.1 Community Liaison Committee

The Community Liaison Committee (CLC) for the BGC Project was established in 1996 and meets the requirements for a community forum in accordance with Part a of Condition 7K of the NCUA. The CLC provides an opportunity for representatives of the local community to voice their concerns and questions, and provide feedback to Orica about the BGC Project.

CLC Meetings

A quarterly CLC meeting was held on 16 September 2008. Presentations were made by the DECC and Orica on progress of the Cleanup Project. The following table summarises key matters raised by members of the CLC at the September 2008 meeting, and actions taken or planned as a result (please note that this information has been summarised from draft minutes not yet endorsed by the CLC).

In response to CLC feedback on Orica's communication regarding the treatment of DEAC contaminated waste at the GTP, a short informal meeting of CLC members was held on 11 November. Key issues raised at this meeting are included in the table below.

Matter Raised by CLC	Action Taken or Planned
Reminding the community that bore water cannot be used for residential purposes.	Orica has informed the DWE that the CLC requested it undertake ongoing communication regarding the ban on bore water use by residents within the GEEA.
More information on surface water monitoring.	Orica to present an update on surface water monitoring results at December CLC meeting.
Results of 2008 Independent Audit.	Auditor Ken Holmes booked to present at the December CLC meeting.
Concern that Orica's rainwater tank rebate program has finished.	Orica to monitor community interest in the rainwater tank rebate program since its completion in June 08.
Remediation Strategy Review	DECC to provide feedback on Orica's Strategy Review at the December CLC meeting. Orica to arrange a community workshop on the outcomes of the Strategy Review and DNAPL technology investigations to be held in 2009.
Former ChlorAlkali Plant and the Human Health and Environmental Risk Assessment (HHERA).	Orica will provide an update on the former ChlorAlkali Plant mercury investigations at the December CLC meeting. DECC to provide feedback on the HHERA for the former ChlorAlkali Plant at the December CLC meeting.
The conceptual site model prepared for the BGC Project.	Orica has loaded a diagram from the conceptual site model as requested by the CLC onto the website. Orica plans to upload the full Conceptual Site Model report to the website

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Matter Raised by CLC	Action Taken or Planned
	as well.
Website Link requested to the 2003 USEPA Report on DNAPL Remediation	Orica has uploaded the 2003 USEPA Report on DNAPL Remediation on its website
No further IMC meetings requested in 2008	IMC members have been informed that no further IMC meetings are scheduled for 2008.
IMC Tasks in 2009	Prof Acworth to be invited to the DNAPL & Strategy Review workshop planned for the New Year.
Sydney Ports/Orica and CLC combined workshop.	Orica has distributed the minutes from the Ports/Orica/CLC workshop, as prepared by CoBB.
The remediation and development of Southlands	Orica to allocate ten minutes at future CLC meetings, to provide an update on the Southlands project.
DEAC contaminated waste treatment at the GTP – strong feedback received regarding the failure to notify the CLC in advance of the waste treatment	Orica to provide a detailed presentation on the DEAC contaminated waste, including monitoring results, and to respond to questions about the storage of legacy waste.
Communication processes with the CLC	Protocols for notification & communication with the CLC on matters of CLC interest between meetings to be discussed at the December CLC meeting.

CLC Newsletter

Orica produces a quarterly CLC Newsletter distributed by letterbox drop to approximately 5,500 homes and businesses within the Botany, Banksmeadow, Hillsdale, Matraville and Pagewood areas. This distribution area encompasses the 1 km radius from the Orica premises at Botany as required under Part b of Condition 7K of the NCUA.

CLC Newsletter No. 30 was distributed in September 2008 after being reviewed by the CLC. It included updates on groundwater treatment and containment, the June 2008 CLC meeting, soil washing trials at the former ChlorAlkali Plant, results from the May 2008 residential bore monitoring event and the community air monitoring program.

6.2 Independent Monitoring Committee

As detailed in previous reports, the IMC is a panel of experts, which has been established in consultation with the CLC to report to the CLC with appraisals of the operations of the GTP. At the September CLC meeting, members agreed that a second combined CLC/IMC meeting and a separate IMC meeting was not required this year. The table below lists recently completed and current IMC tasks.

Task #	IMC Task Description	Status
9	Prof Acworth to be asked to attend the Orica/Sydney Ports workshop	COMPLETED The workshop was held on 9 September 2008 and attended by Prof Acworth.

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Task #	IMC Task Description	Status
21	Orica to share the requirements of its Environment Protection Licence, Trade Waste Service Agreement and Ammonia Pollution Reduction Program for the GTP, along with recent results for each, with Dr John McCracken in order to better describe the inputs and outputs from the GTP treatment process. Dr John McCracken to provide feedback to the CLC following review of this information.	DECC sent a letter to Orica on 12/09/08 requesting sampling of feed and product water and scanning for semi-volatile compounds. Sampling and analysis are almost complete. Expect to report results in early 2009.
23	Prof Acworth to be invited to attend a community workshop on Orica's Strategy Review and DNAPL technology investigations.	Yet to be discussed with Prof Acworth. Workshop to be scheduled in the New Year.

6.3 Communication Tools

Community Workshops

A combined Sydney Ports Corporation and Orica workshop was held on 9 September 2009. This workshop was convened following requests from CLC members. Workshop minutes prepared by CoBB were distributed to the CLC.

Orica plans to hold further community workshops in 2009 on the Southlands remediation and development project, the BGC Remediation Strategy Review/DNAPL technology investigations, and Water Recycling initiatives.

BIP Site Tours

An Orica bus tour of BIP was held on 30 September 2008 and attended by 13 participants from DECC. The tour included the presentation of information about the BGC Project and Orica's other Botany Transformation Projects.

Newspaper Columns

Three newspaper columns were published in the *Southern Courier* since the last quarterly Progress Report. These columns incorporate information on a range of Orica projects. Reporting on the BGC Project was as follows:

- *Column 82: 30 September 2008:* Surface water quality at Penrhyn Estuary, combined Sydney Ports and Orica workshop, September 2008 CLC meeting and a reminder of the November residential bore monitoring event.
- *Column 83: 28 October 2008:* Groundwater treatment and containment and the mercury investigations at the former ChlorAlkali Plant.
- *Column 84: 25 November 2008:* Scheduled annual maintenance shutdown of the GTP and the treatment of DEAC contaminated waste at the GTP.

Website

The website is an important tool which provides immediate access to information about the BGC Project and supports Orica's commitment to open and transparent communication. Maintenance of the website is now a requirement under Part c of Condition 7K.

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The following material has been posted on the website during the reporting period:

- Groundwater Cleanup Plan Progress Report No.19;
- Recent newspaper columns;
- The September CLC newsletter;
- GTP Ecological Monitoring Program, No.3 (URS 2007a)
- The Briefing Paper, and all presentations to the CLC September 2008 meeting;
- A diagram from the Site Conceptual Model (URS 2007b) and
- 2003 USEPA Report on DNAPL Remediation (–USEPA 2003) (also available at <http://www.epa.gov/ada/download/reports/600R03143/600R03143.pdf>).

1800 Number

Orica continues to operate the free-call number – 1800 025 138. The majority of calls during this reporting period related to Orica’s November residential bore monitoring and some were received regarding the BIP site bus tour held on 30 September 2008. Other calls related to the BGC Project included a request for sponsorship, information about the groundwater contamination, the GTP, the rainwater tank rebate program and the treatment of DEAC contaminated waste at the GTP.

Enquiries placed through the 1800 line are generally responded to within 24 hours.

E-mail Feedback

Several e-mails were received in this reporting period from browsers of the Botany Transformation Projects website. Apart from marketing emails, matters raised related to the BIP site bus tour, sponsorship requests and requests for information about the GTP, the Southlands remediation and development project and groundwater treatment.

There were no emails received via the CLC feedback facility in this reporting period.

Provision of Reports (Part d of Condition 7K)

Part d of Condition 7K requires Orica to provide the community forum (i.e. the CLC) and the local libraries in the local government areas of Botany Bay and Randwick with copies of reports provided to the EPA under the NCUA. Quarterly reports are regularly provided to the CLC and these libraries.

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ATTACHMENT A – QUARTERLY MONITORING REPORT – SEPTEMBER 2008.

Groundwater Treatment Plant (GTP) Quarterly Groundwater and Surface Water Monitoring Report, September 2008, URS Australia Pty Ltd, 28 November 2008.
Separately bound report.