

REPORT ON AUDIT FINDINGS

FOR THE

INFRASTRUCTURE OPERATING PLAN
GROUNDWATER TREATMENT PLANT
BOTANY INDUSTRIAL PARK

PREPARED FOR THE

INDEPENDENT PRICING AND REGULATORY TRIBUNAL

WASTEWATER FUTURES

UNIT 6 / 120 BLUESTONE CIRCUIT
SEVENTEEN MILE ROCKS QLD 4073
AUSTRALIA

DATE	REV	STATUS	PREPARED	VERIFIED	AUTHORISED
23/112012	1	Draft for comment	G Leslie	J Doyle	J Doyle
7/12/2012	2	Final	G Leslie	K Power/D Low	J Doyle

Audit Report Change Log

Author	Section	Comment	Action
IPART	General	A glossary / list of acronyms and abbreviations would be helpful	Included as requested
IPART	P3,	Amend terminology: <i>"IPART has issued Orica a 'Network operator Licence' and 'Retail Supplier Licence'"</i>	Amended as requested
IPART	P3, 4	Use correct Licence numbers: <i>'12_016' and '12_017R'</i>	Corrected as requested
Orica	P3	Amend Plant Capacity: <i>"The GTP is currently providing 4-4.8 MLD but is capable of providing greater volumes"</i>	Amended as requested
Orica	P4	Use correct EPL condition: <i>The requirement to maximise reuse of treated water is a requirement of EPL 2148 condition E3.2.</i>	Corrected as requested
Orica	P5	Amend information on business structure: <i>"The restructure involved integration of the GTP into Orica's Continuous Manufacturing Business in October 2012".</i>	Amended as requested
Orica	P6	Amend statement on Audit Process <i>"The audit was conducted on Orica with the cooperation of various staff and IPART observed"</i>	Amended as requested
Orica	P8	Use correct title for Orica Staff: <i>"Derek Low Orica Environmental Manager Management System Leader"</i>	Corrected as requested
Orica	P11	Update status of work cover regulations. <i>"Orica's operations on the Botany Site have been deemed to be a Major Hazard Facility (MHF) under the Work Health and Safety (General) Regulation 2011. In accordance with the Regulation, Orica has prepared and submitted the application for registration (February 2012). WorkCover is yet to make a determination on the application".</i>	Updated as requested
Orica	P11	Correct text on OEH regulations: <i>"The GTP is regulated by the OEH Contaminated Sites Section and the EPA's Sydney Industry Section (among others). Other facilities and groups in Orica have different regulatory regimes."</i>	Corrected as requested

Audit Report Change Log

Author	Section	Comment	Action
IPART	P15	Even if 'fully adequate' is awarded a summary of evidence sighted and reasoning for the grade is still appropriate.	Updated as requested
IPART	P16	Even if 'fully adequate' is awarded a summary of evidence sighted and reasoning for the grade is still appropriate.	Updated as requested
IPART	P17	Even if 'fully adequate' is awarded a summary of evidence sighted and reasoning for the grade is still appropriate.	Updated as requested
IPART	P20	Did the auditor sight evidence to demonstrate that the document is regularly updated or has a schedule for review?	Yes. There is evidence that the IOP is updated, however, the document control procedures for supporting documents need to be reviewed before next audit.
IPART	P21	IPART have previously advised that full lifecycle costs are not required, however as an opportunity for improvement we would look for some medium term forecasting of expenditure (3-5 years at least) to satisfy the intent of this clause.	Refer to revised text on findings for clause 6. (1) (b) in section 5 p 17
IPART	P22	What is the ongoing procedure to ensure the IOP is kept current (after 36 months)? Is this outlined in the EPMS? Can the auditor clarify?	See comment in executive summary & section 7

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1 GLOSSARY

BIP	Botany Industrial Park
CHC	Chlorinated Hydrocarbon
DNAPL	Dense non-aqueous phase liquid
DMS	Botany Legacy Operations Document Management System
EPA	Environment Protection Authority
EPL	Environment Protection Licence
EPMS	Environmental Performance Management System
GTP	Groundwater Treatment Plant
IOP	Infrastructure Operating Plan
IPART	Independent Pricing and Regulatory Tribunal
MHF	Major Hazard Facility
MOP	Maintenance Operating Procedure
NCUA	Notice of Clean Up Action
OEH	Office of Environment and Heritage
OGOP	Off-gas Oxidiser Package
PCA	Primary Containment Area
SCA	Secondary Containment Area
SH&E	Safety Health and Environment
SIS	Safety Instrumented System
SOC	Synthetic Organic Compound
SOP	Standard Operating Procedure
SWTP	Stripped Water Treatment Plant
VMP	Voluntary Management Proposal
VOC	Volatile organic compounds

2 EXECUTIVE SUMMARY

The Independent Pricing and Regulatory Tribunal (IPART) has issued a Network Operator Licence (No. 12_016) and a Retail Supplier Licence (No. 12-017R) to Orica Australia Pty Ltd (Orica) for the Groundwater Treatment Plant (GTP) located on the Botany Industrial Park (BIP) in Matraville, NSW.

The GTP infrastructure consists of a series of groundwater extraction wells, gas and liquid treatment facilities and treated water storage and distribution pipes. The GTP was built to contain and treat contaminated groundwater in the Botany Sands Aquifer. Water produced from the GTP is suitable for use in industrial processes and is supplied to three customers located on or in the vicinity of the BIP. The plant currently produces 4 to 4.8 million litres of treated water per day (MLD) but has capacity to produce more water if required.

GTP activities are regulated via permits or agreements with 6 NSW Government departments. Orica have provided unconditional and irrevocable bank guarantees for \$14.4M for the on-going operation costs of the GTP until such time as the EPA is satisfied that the premises are environmentally secure.

The first audit of the Infrastructure Operating Plan (IOP) and supporting documentation submitted by Orica, as required by Schedule 1 clause 6 (1) and/or clause 13 (1) of the *Water Industry Competition (WIC) Regulation 2008* found the documents to be *adequate* for the purposes of describing the systems and procedures necessary to execute activities and practices at the GTP.

Key audit findings

1. The IOP was “fully adequate” for documentation of the design, construction, operation and maintenance of the GTP infrastructure;
2. The IOP was “adequate” for documentation of systems and procedures for assessing system life span, redundancy and renewal of the GTP infrastructure;
3. The IOP was “fully adequate” for documentation of systems and procedures for ensuring safe and reliable performance of the GTP infrastructure;
4. The IOP was “fully adequate” for documentation of systems and procedures for ensuring continuity of water supply; and,
5. The IOP was “fully adequate” for documentation of systems and procedures for maintenance, monitoring and reporting standards of service.

Key Recommendations

That Orica applies consistent standards of document control to all documentation referenced in the IOP. In particular Orica need to develop a transparent system for tracking changes to spreadsheets used to register equipment. The document control must clearly identify status (revision number and date) and custody (author, review and approval) to ensure that subsequent audits can determine if the IOP is kept under regular review.

Section 7.3.1 of the IOP describes the arrangements for record keeping and refers a single person (document controller) with responsibility for management of records from the GTP. The audit recommends that the Document Controller is interviewed at the next IOP audit to ensure that uniform document control procedures have been applied to the items referenced in the IOP and that the IOP is current and kept up to date.

3 INTRODUCTION

Orica Australia Pty Ltd (Orica) operate a Groundwater Treatment Plant (GTP) on the Botany Industrial Park (BIP) site in Matraville, NSW. In accordance with Orica's Environmental Protection License No EPL 2148 the primary purpose of the GTP is to maintain hydraulic containment of contamination plumes in the groundwater of the Botany Sands Aquifer. Groundwater is extracted through wells located on the BIP and a tranche of primary and secondary containment wells located on property near Foreshore drive Botany. Extracted water is conveyed to the GTP for processing to remove volatile organic compounds (VOC's), soluble organic compounds (SOC's), Dense non-aqueous phase liquids (DNAPL's) and inorganic salts. The quality of the treated water is suitable for use in industrial applications as an alternative to drinking water supplied by Sydney Water. Condition E3.2 of EPL 2148 requires Orica to maximise the reuse of treated groundwater. Consequently, Orica have established commercial arrangements to supply treated water from the GTP to three industrial customers located on, and adjacent to, the BIP site.

On the 23rd of April Orica obtained a Network Operator Licence (No. 12_016) and a Retail Supplier Licence (No. 12_017R) from the Independent Pricing and Regulatory Tribunal (IPART). One obligation of all Network Operator and Retail Supplier Licensee's is to produce an Infrastructure Operating Plan in accordance with the requirements of Schedule 1 clause 6 (1) and/or clause 13 (1) of the *Water Industry Competition (WIC) Regulation 2008*.

On the 23rd of October 2012 Orica submitted an Infrastructure Operating Plan (IOP) for the GTP to IPART for review.

3.1 OBJECTIVE

The objective of this report is to present information on the audit process and preliminary findings of the first audit on the adequacy of the IOP for the GTP.

3.2 LICENSEE'S INFRASTRUCTURE, SYSTEMS AND PROCEDURES

Information on the Licensee's infrastructure, systems and procedures are contained in the Infrastructure Operating Plan (IOP). The IOP is a 29 page master document designed to address the requirements described in parts *a to e* of Schedule 1 clause 6 (1) and/or clause 13 (1) of the *Water Industry Competition (WIC) Regulation 2008*. The IOP is a summary document that makes extensive use of cross referencing to 81 supporting documents containing specific details on infrastructure, systems and procedures.

Infrastructure

The GTP infrastructure includes a network of groundwater extraction wells and transfer pipes, a treatment plant, treated water storage tank and product distribution network. Contaminants in the groundwater are separated into a gas phase containing the Volatile Organic Compounds (VOC's) and a liquid phase containing Soluble Organic Compounds (SOC's), Dense No Aqueous Phase Liquids (DNAPL) and dissolved inorganic salts. The VOC's are removed through an Off-gas Oxidation Package (OGOP) and the SOC's, DNAPL's and salts are removed through a Stripped Water Treatment Package (SWTP). The GTP is licensed to extract 15 Million Litres per Day (MLD) from the Botany Sands Aquifer, however, experience from the last 6 years of operation indicates that the contaminated plume can be contained by extracting 5 to 6 MLD. The SWTP operates at a process recovery of approximately 80% to produce 4 to 4.8 MLD of treated water suitable for reuse in industrial processes and 1 to 1.2 MLD of saline waste that is discharged to Sydney Water's sewer network.

Treated Water is distributed for use in cooling and demineralization systems at Orica’s ChlorAlkali plant, Qenos and Solvay Interox’s through a 1 km stainless steel pipe network consisting of 6 customer connection points and one point for discharge to a receiving environment. All the infrastructure, with the exception of some groundwater extraction wells and feed water pipelines and the treated water distribution pipeline to Solvay Interox is located on the BIP site.

Systems and Procedures

From 2005 to October 2012 the GTP operated under Orica’s Legacy Projects business unit. However, in October 2012 the GTP operations were integrated into Orica's Continuous Manufacturing Business (CMB). Some of the system and procedures used at the GTP were adopted from those in use in the manufacturing business or the wider BIP site, while others have been developed specifically for groundwater operation.

The systems and procedures applied to the GTP can be broadly divided into 4 categories covering, Operations, Maintenance, Safety Health and Environment (SH&E) and Business Management. There is extensive interconnection between each category to ensure that the GTP achieves its primary objective of meeting Orica’s ongoing obligations to contain groundwater contamination.

A list of the key Systems and Procedures from each category is presented in Table 1. A complete list is presented in the Glossary on page 3 of the IOP.

Table 1 GTP Systems and Procedures

Operations	Maintenance	SH&E	Business Management
Hydrology monitoring Performance monitoring Compliance monitoring Daily operation reports Alarms & Interlocks Standard Operating Procedures	Well maintenance Equipment monitoring Downtime analysis	Groundwater monitoring Incident registers EPMS	CapEx Proposals Customer service Reports Monthly financials

3.3 AUDIT METHOD

The audit of the IOP and supporting documentation was conducted with the cooperation of Orica GTP and CMB staff. The audit process was observed and monitored by IPART.

The audit process involved the review of the IOP and supporting documentation, inspection of the GTP site and treatment process and interviews with Orica staff.

The audit process commenced in October and is scheduled to conclude in December 2012 (Table 2).

The following section contains information on the scope and standards used in the audit, the steps involved in the audit process and finally the definitions developed for the audit grades used to determine the adequacy of the IOP and supporting documentation.

3.3.1 AUDIT SCOPE

The scope of the audit was based on the requirements identified in parts a, b, c, d and e of Schedule 1 clause 6 (1) and/or clause 13 (1) of the *Water Industry Competition (General) Regulation 2008*.

Evidence was examined to assess the adequacy of the IOP and supporting documents in providing information on the following;

1. The design, construction, operation and maintenance of the infrastructure (Requirement (a) of Schedule 1 Clause 6 (1) of WICR 2008)
2. The continued safe and reliable performance of the infrastructure (Requirement (b) of Schedule 1 Clause 6 (1) of WICR 2008)
3. The continuity of the water supply (Requirement (c) of Schedule 1 Clause 6 (1) of WICR 2008)
4. Alternative water supplies when the infrastructure is inoperable (Requirement (d) of Schedule 1 Clause 6 (1) of WICR 2008)
5. Arrangements for maintenance, monitoring and reporting standards of service (Requirement (e) of Schedule 1 Clause 6 (1) of WICR 2008)

In addition the scope included an assessment of the adequacy of the IOP and supporting documents to achieve the following;

- (i) Regular review and upkeep of the documents; and,
- (ii) the IOP is adequate to ensure that activities and practices at the GTP can be executed in accordance with the systems and procedures described IOP.

3.3.2 AUDIT STANDARD

The criteria used for the audit were set out in the IOP Audit Template contained in the Independent and Regulatory Pricing Tribunal (IPART) document: *Water Industry Competition Act 2006 Water – Audit Guidelines February 2012*.

The procedure for the audit was based on *Guidelines for Auditing Management Systems ISO 19011: 2011(E)*.

3.3.3 AUDIT STEPS

The IOP process consists of the three key steps based on the procedures defined in “Figure 6.1 Typical Audit Activities”, ISO 19011:2011 (E). The following timeline and description provides a summary of the steps involved in the first audit of the Infrastructure Operating Plan.

1. Initiating the audit

The initial conversations covering scope and timing of the audit were held with Orica and IPART in September and October 2012.

2. Preparing audit activities

An electronic copy of the Orica IOP was delivered via e-mail on October 23. A hard copy of the IOP and CD containing the 81 referenced in the IOP was received on October 25.

A draft audit plan based on the IPART audit guidelines was submitted to IPART for review on October 24, 2012. Comments on the IOP audit plan by IPART were incorporated and the revised plan was submitted on November 8, 2012.

3. Conducting the audit activities

A site inspection and audit meeting was held on Tuesday 13th of November 2012. The site inspection included a walk through of the Groundwater Treatment Plant at the Botany Industrial Park. The audit meeting was held at the offices of Orica Australia, 16 Beauchamp Rd Matraville NSW 2036.

The site visit and meeting commenced at 8.00 a.m. and concluded at 4.00 p.m. (Table 2). Staff from IPART and the Orica GTP participated and contributed to the audit meeting (Table 3).

The IPART IOP audit template was used as the basis for assessing the adequacy of the IOP (Table 5). The template was completed based on information presented in the IOP and supporting documents and interviews with Orica staff during the site visit.

The IOP and electronic copies of 73 of the 81 supporting documents were supplied as evidence for this audit.

Table 2 Timeline of activities for the IOP audit

Date	Task
Sept/Oct 2012	Initial activities
25/11/2012	Receipt of hard copy and CD archive of IOP documentation
8/11/2012	Submission of revised IOP Audit plant to IPART
13/11/2012	Site inspection and staff interviews
14 - 20/11/2012	Review of documentation and follow up with Orica
21/11/2012	Submit draft audit report to IPART for review
7/12/2012	Receive comments from IPART on draft report
10/12/2012	Submit final report

Table 3 Audit Process Participants

Name	Organisation	Role/Responsibilities in Audit Process
Derek Low	Orica	Environmental Management Systems Leader (Steps 1-3)
Michael Selleck	Orica	GTP Lead (Steps 1-3)
Gerry Fitzpatrick	Orica	Capital projects Lead (Step 3)
Damien Ivers	Orica	Operations Lead (Step 3)
Hartono Wijaya	Orica	Botany Site Manager (Step 3)
Jess Hanna	IPART	Technical Specialist (Step 3)
Kaye Power	IPART	Sr Technical Specialist (Step 1-3)
Greg Leslie	Auditor	
Shane Cox	Audit Minutes	

3.3.4 AUDIT TEAM

The IOP audit was conducted by Greg Leslie. Greg has experience in plant design and operation, asset management and water quality in recycled water systems. Prior auditing experience includes the Engineering Audit of the Orica GTP plant as required under Clause E3.4, part 5 of the Environment Planning and Assessment Act 1979. He has worked at the Orange County Water District, a groundwater management agency in Southern California (1993 to 2000) and was the Asia Pacific technology leader for water recycling at CH2MHill (2000 to 2004). He has served on the NHMRC Water Quality Advisory Committee during the revision of Australian Drinking Water Guidelines (2007-2010).

Table 4 IOP Workshop Agenda November 13, 2012

Works	Timing	
Document review including the IOP and the Audit Template	Prior site visit	
Site visit		
Day 1	Duration	Key Licensee Personnel
Inductions	08:00 – 08:15	M. Selleck
Meet and introductions	08:15 – 08:30	D. Low
Tour of infrastructure <ul style="list-style-type: none"> - Identification of key processes - Identification of key assets - Inspection of Supervisory Control and Data Acquisition 	8.30 – 11.00	M. Selleck
Review of management structure, regulatory frameworks and infrastructure (aerials)	11.00 – 11.15	D. Low
Interviews & Document Review <ul style="list-style-type: none"> - Part a: Design, construction, operation and maintenance of the infrastructure 	11:15 – 12:00	D. Low G. Fitzpatrick
Lunch	12:00 – 13:00	
Document Review & Interviews (Continued) <ul style="list-style-type: none"> - Part b: Continued safe and reliable performance of the infrastructure - Part c: Continuity of the water supply - Part d: Alternative water supplies when the infrastructure is inoperable - Part e: Arrangements for maintenance, monitoring and reporting standards of service 	13:00 – 16:00	D. Ivers M. Selleck

3.3.5 AUDIT GRADES

“Grades of Adequacy” were used when evaluation the evidence presented in the IOP and supporting documents.

The following definitions were used for each grade:



Fully Adequate

Sufficient evidence to confirm that the requirements have been fully met. Specifically,

1. The IOP addresses all the requirement (parts a to e)
2. The IOP contains references to external documents describing the procedures and systems used to operate the infrastructure
3. The external documents are complete and provide instruction, guidance or data indicating the document was, or has the potential to, meet the requirements
4. Document control procedures are in place, such that history of the IOP and supporting documents, including reviews and updates, can be tracked as evidence that the IOP is being implanted.



Adequate

Sufficient evidence to confirm that the requirements have generally been met apart from a minor shortcoming which does not compromise the ability of the utility to achieve defined objectives or assure controlled processes, products or outcomes. Specifically,

1. The IOP addresses all the requirement (parts a to e)
2. The IOP contains references to external documents describing the procedures and systems used to operate the infrastructure.
3. The external document are **mostly** complete so as to provide sufficient, instruction, guidance or data indicating the document was, or has the potential to, meet the requirements
4. **Some** document control procedures are in place, such that history of the IOP and supporting documents, including reviews and updates, can be tracked as evidence that the IOP is being implanted.



Inadequate

Sufficient evidence has not been provided to confirm that all major requirements are being met and the deficiency adversely impacts on the ability of the utility to achieve defined objectives or assure controlled processes, products or outcomes

1. The IOP **does not** addresses all the requirement (parts a to e)
2. The IOP **does not** contain all references to external documents describing the procedures and systems used to operate the infrastructure.
3. The external document are **do not contain** sufficient, instruction, guidance or data indicating the document was, or has the potential to, meet the requirements
4. No document control procedures are in place



No Requirement

The requirement to comply with the license condition does not occur within the audit period or there is no requirement for the licensee to meet this assessment criterion

3.4 REGULATORY REGIME

Orica are regulated by the following agencies for activities connected with the Groundwater Treatment Plant.

1. WorkCover NSW

Orica's operations on the Botany Site have been deemed to be a Major Hazard Facility (MHF) under the Work Health and Safety (General) Regulation 2011. In accordance with the Regulation, Orica has prepared and submitted an application for registration in February 2012. WorkCover is yet to make a determination on this application.

2. Office of Environment and Heritage (OEH).

The GTP is regulated by the OEH Contaminated Sites Section and the EPA's Sydney Industry Section (among others). Other facilities and groups in Orica have different regulatory regimes.

Orica's performance on the GTP is regulated by the Contaminated Sites Section via a Voluntary Management Proposal (VMP) under section 17 of the *Contaminated Land Management Act 1997*. The VMP includes ongoing groundwater extraction and treatment and investigations into possible DNAPL remediation technologies.

Air emissions and the discharge of excess treated water from the GTP is regulated by the Sydney Industry Section via an Environmental Protection License No. 2148 issued under the *Protection of the Environment Operations Act 1997*.

3. Sydney Water Corporation

Orica are required to monitor Trade Waste Discharge to Sewer from the GTP under Trade Waste Service Agreement No. 489 issued. The agreement is between Sydney Water and Botany Industrial Park and was issued under Sydney Water Act 1994.

4. Department of Primary Industries (Office of Water)

The Office of Water monitor and regulate the extraction of groundwater delivered to the GTP via Bore Licenses 10BL 16164879 for the primary containment area (PCA), 10BL 163917 for the secondary containment areas (SCA) and 10BL 164878 for the line on Botany Industrial Park (BIP). The licenses are issued under *Section 115 of the Water Act 1912*.

The Office of Water has also issued licenses for the installation of monitoring bores under the *Water Management Act (NSW) 2000*.

5. Department of Primary Industries (Fisheries)

Orica are regulated under a permit 05-030 issued by the Department of Primary Industries (Fisheries) under Part 7 of the Fisheries Management Act 1994 to extract groundwater at the Secondary Containment Area due to concerns on the potential impact of extraction and interception of flow to Penrhyn Eстуary on marine vegetation. On going monitoring has shown no significant impact on marine vegetation.

6. NSW Health

Orica are required to submit Human Health Risk Assessments to NSW Health for review and notify of any changes to the Consolidated Human Health Risk Assessment conducted in 2005 as a result of any changes identified in ongoing monitoring of the groundwater.

Orica also engaged NSW Health in the development of the Water Quality Management Plan conducted for reuse of treated water in industrial applications.

7. Independent Pricing and Regulatory Tribunal

IPART monitor Orica's performance via a Network Operator's Licence (No. 02_016) and a Retail Supplier's License (No. 02_017R) under the *Water Industry Competition Act 2006*.

8. Other Organisations

The alignment of groundwater extraction pipelines and treated water delivery pipelines required Orica to obtain a number of easements and licenses covering the installation of pipelines from the following organizations.

- Roads and Traffic Authority
- City of Botany Bay
- Department of Lands
- Energy Australia
- RailCorp
- Pacific National

4 DESIGN, CONSTRUCTION, OPERATION AND MAINTENANCE OF THE INFRASTRUCTURE

4.1 SUMMARY OF FINDINGS

Clause 6 (1) (a) – Fully Adequate

The IOP indicates the arrangements in relation to the design, construction, operation and maintenance of the GTP infrastructure, including particulars as to the life-span of the infrastructure, the system redundancy built into the infrastructure and the arrangements for renewal of the infrastructure.

4.2 REVIEW OF ACTIONS

1st audit of the IOP. No actions from previous audit

4.3 OPPORTUNITIES FOR IMPROVEMENT

The audit recommends that Orica develop procedures for document control to allow tracking of changes and revisions made to all supporting documents and files referenced in the IOP.

12 of the 23 supporting documents reviewed for adequacy against the requirements of Clause 6 (1) (a) contained incomplete or no document control details. See Table 6 for complete list.

It is recommended that Orica develop procedures for document control on the following items to ensure that the IOP is kept current.

- Item 5 Equipment register (XL spreadsheet)
- Item 6 Tag, Instrument & PLC register (XL spreadsheet)
- Item 7A Plant Structures register (XL spreadsheet)
- Item 15A Plant Shutdown review
- Item 25 Register of approved SOP's
- Item 29B GTP emergency response plan
- Item 40 Modification Assessments

5 THE CONTINUED SAFE AND RELIABLE PERFORMANCE OF THE INFRASTRUCTURE

5.1 SUMMARY OF FINDINGS

Clause 6 (1) (b) –Adequate

The IOP contained sufficient information describing the procedures linking operations and maintenance activities to future investments for renewal of GTP infrastructure. The IOP only contains details on 2013 Corporate and GTP capital budgets only. Similarly, it was not possible to identify specific O&M items and management and administration costs. In addition, the IOP and supporting documentation does not contain detail on whole of life costs or projected capital and O&M expenditure for the next 3 to 5 years. The absence of this information has resulted in a grading of adequate as this omission does not compromise the ability of the IOP to achieve the objectives of providing surety of the financial viability of the scheme. Orica have provided unconditional and irrevocable bank guarantees to the EPA for \$14.4M to cover on-going operation of the GTP.

5.2 REVIEW OF ACTIONS

1st audit of the IOP. No actions from previous audit

5.3 OPPORTUNITIES FOR IMPROVEMENT

The audit recommends inclusion of a section in the IOP that expands on the findings presented in the EPA Engineering Audit (Item 37). Specifically, “ that the condition of the GTP after 5 years of operation is sound, even though the maintenance requirements for this plant in the first years of operation were found to be significantly greater than originally envisaged” The EPA Engineering Audit continues to describe the procedures for tracking the maintenance, refurbishment and upgrade of assets in the OGTP and the SWTP. It is recommended that subsequent revisions of the IOP provide information on the projected maintenance, refurbishment and upgrades planned for the SWTP for the next 3-5 years to satisfy the intent of clause 6 (1) (b).

The audit recommends that Orica develop procedures for document control to allow tracking of changes and revisions made to all supporting documents and files referenced in the IOP.

11 of the 26 supporting documents reviewed for adequacy against the requirements of Clause 6 (1) (b) contained incomplete or no document control details. See Table 6 for complete list.

It is recommended that Orica develop procedures for document control on the following items to ensure that the IOP is kept current and is regularly reviewed.

- Item 18 Treated water supply interruption report (XL Spreadsheet)
- Item 40 Register of JSERA’s (XL Spreadsheet)
- Item 46 GTP Induction form
- Item 51 GTP Organisational chart

6 CONTINUITY OF THE WATER SUPPLY

6.1 Summary of Findings

Clause 6 (1) (c) – Fully Adequate

The IOP and supporting documentation contained sufficient information describing the Operational and maintenance procedures in place at the GTP to address both normal and abnormal (incident and emergency) conditions. The operation and maintenance procedures provide evidence that the likelihood and consequences of asset failure at the GTP can be predicted and managed.

6.2 Review of Actions

1st audit of the IOP. No actions from previous audit

6.3 Opportunities for Improvement

The audit recommends that Orica develop procedures for document control to allow tracking of changes and revisions made to all supporting documents and files referenced in the IOP.

6 of the 10 supporting documents reviewed for adequacy against the requirements of Clause 6 (1) (c) contained incomplete or no document control details.

It is recommended that Orica develop procedures for document control on the following critical items.

- Item 25A Register of approved SOP's
- Item 29 c Incident Scenarios
- Item 29B Emergency Response Plan
- Item 30 Legacy Projects Crisis Management Plan

7 ALTERNATIVE WATER SUPPLIES WHEN THE INFRASTRUCTURE IS INOPERABLE

7.1 SUMMARY OF FINDINGS

Clause 6 (1) (d) – Fully Adequate

The IOP and supporting documentation contained sufficient information describing the arrangement for providing an alternative water supply when the GTP infrastructure is inoperable.

It is important to note that Orica have not provided additional infrastructure to deliver an alternative source of water to customers in the event that the GTP is inoperable. However, the IOP indicates that the conditions of supply require customers to maintain a back up supply of water. The most important item referenced in the IOP is SOP 206 Communication Protocol for BIP Customers (53). The document is fully adequate for the purposes of describing the communications protocol and recording Orica staff that have been trained in the procedures. This document contains a document revision register and staff training register.

7.2 REVIEW OF ACTIONS

1st audit of the IOP. No actions from previous audit

7.3 OPPORTUNITIES FOR IMPROVEMENT

It is recommended that Orica develop procedures for document control for the 2 XL spreadsheets (Items 17 & 18) as these files contain detailed information on interruptions in supply and the number of users impacted.

8 ARRANGEMENTS FOR MAINTENANCE, MONITORING AND REPORTING STANDARDS OF SERVICE

8.1 SUMMARY OF FINDINGS

Clause 6 (1) (e) – Fully Adequate

The IOP contains information and references to supporting documentation describing the arrangements for maintenance, monitoring and reporting of standards of service. Systems and procedures are in place that informs the business on the performance of the infrastructure in terms of environmental performance, SH&E, capital improvement needs and staff development. The SOP's and operating protocols referred to in the IOP indicate a level of sophistication that is appropriate with the complexity of the assets.

The audit found that there are several arrangements and procedures for record keeping. In some cases, the document control procedures for ensuring the documents are kept up to date and are under regular review are fully adequate. For example, the procedure for periodic review of SOPs are fully adequate and the IOP contains sufficient information describing the procedures whereby staff can specify a review period for the documentation and arrangements for generating and distributing the SOP's once the document is updated.

Section 7.3.1 of the IOP indicates that critical documents are stored in a number of forms (hard copy and digital). In addition, the IOP identifies a single person (document controller) with responsibility for management of records from the GTP.

8.2 REVIEW OF ACTIONS

1st audit of the IOP. No actions from previous audit

8.3 OPPORTUNITIES FOR IMPROVEMENT

The audit recommends that the section in the IOP covering the Botany Legacy Operations Document Management System be expanded to provide a summary of procedures in place for document control for supporting documentation referenced in the IOP.

The audit recommends that the Document Controller is interviewed at the next IOP audit to ensure that uniform document control procedures have been applied to the items referenced in the IOP, and that the IOP is current and up to date.

Table 5 Infrastructure Operating Plan (IOP) Audit Table

Document reference	Requirement to be evaluated	Guidance	Evidence/Comments	Assessment Finding
WIC Reg Sched 1 cl.6(1)(a) and/or cl.13(1)(a)	The IOP indicates the arrangements in relation to the design, construction, operation and maintenance of the infrastructure, including particulars as to the life-span of the infrastructure, the system redundancy built into the infrastructure and the arrangements for renewal of the infrastructure.	<p>The IOP includes a detailed asset register. As a minimum the asset register will include:</p> <ol style="list-style-type: none"> 1. A list of all assets. 2. Basic physical data (material, size, age). 3. Relative locations of major infrastructure. 4. Capacities of infrastructure (eg, pumps, reservoirs, etc) – where applicable current and ultimate. 5. Location of secondary, alternative sources and/or infrastructure. 	<p>Complete asset register is available, regularly updated (v 6) and integral to maintenance and planning activities. The GTP project data book is up to date and contains information on basic physical data for the GTP. Including capacities of assets. Plant Structures Register is up to date and indicates material and age of assets. The plan plot plan clearly indicates the relative locations of the major infrastructure. Note the location (and requirement for) secondary or alternative sources and infrastructure is not applicable as the GTP is primarily a hydraulic containment plant. This does not deemed to rate a grade of inadequate as the agreements for the supply of treated water require customers to maintain infrastructure to ensure availability of towns water supply as a back up. In summary the IOP contains a comprehensive register of engineering information on the assets “as built” that is up to date and fully accessible to GTP staff.</p> <p>Evidence cited: Items 1, 2, 4, 5, 6, 7A, 7B, 8, 9</p>	<p>■ Fully Adequate</p>
		<p>The IOP includes an operational analysis of the assets to meet present and future needs. Outputs from the operational analysis include a schedule of required capital works for asset renewal, replacement and development.</p>	<p>Interview with Capital Project Lead Gerry Fitzpatrick. Regular assessment of the condition of the major plant items on the GTP are required under clause E3.4 of Environmental Protection Licence 2148. IOP and supporting documentation provide evidence on the process for identifying assets for renewal replacement. Plan for documenting renewal replacement needs clearly adequate.</p> <p>Evidence cited: Items 15, 37 & 40</p>	<p>■ Fully Adequate</p>

Table 5 Infrastructure Operating Plan (IOP) Audit Table

Document reference	Requirement to be evaluated	Guidance	Evidence/Comments	Assessment Finding
		<p>The IOP includes details of the:</p> <ol style="list-style-type: none"> 1. System operating rules to operate the infrastructure in the most effective manner during normal and breakdown conditions. 2. Performance requirements for assets. 	<p>The IOP clearly describes the systems used to guide infrastructure operations during routine operation and planned and un-planned shut down and emergency conditions. The operating rules and procedures provide clear and unambiguous guidance to operations staff. Standard Operating Procedures (SOP's) and Temporary Instructions (TI's) developed by Orica that have been adapted for use on the GTP. A full list of approved SOP's is contained in Appendix 25. The GTP is highly automated and the IOP clearly refers to generation of automated reports that complement scheduled analytical testing and routine plant checks. Operations activities are well documented and there exists a robust and rigorous system of internal reporting and review. The IOP clearly describes the process for assessing the performance of the assets in terms of hydrological containment, regulatory compliance and customer service.</p> <p>Evidence cited: Items 16, 21, 23, 24, 25, 26, 27, 28A, 28B, 29A, 29B</p>	<p>■ Fully Adequate</p>
WIC Reg Sched 1 cl.6(1)(b) and/or cl.13(1)(b)	The continued safe and reliable performance of the infrastructure	The IOP outlines the performance criteria and levels of service for the assets. These criteria are consistent with statutory obligations (if any) and there is a clearly defined process for documenting performance.	<p>Clearly described in Section 4 of the IOP. Detailed information in the Notice of Clean Up Action (A34) and the Voluntary Management Proposal (A35) clearly describe the performance criteria. Quarterly reports provide evidence that performance criteria are continually tracked and reported. Appendix 36 & 38 lists the internal Agreements to supply treated water specifying quantity and quality are measured and shown in A 16 and A 17. IOP also indicates allowances for monitoring interruptions to delivery (A18).</p> <p>Evidence cited: Items 3, 10, 16, 17, 18, 34, 35, 36</p>	<p>■ Fully Adequate</p>

Table 5 Infrastructure Operating Plan (IOP) Audit Table

Document reference	Requirement to be evaluated	Guidance	Evidence/Comments	Assessment Finding
		The IOP includes an asset condition and risk assessment which is regularly updated and includes:: 1. Asset condition. 2. Asset criticality. 3. Asset assessment.	Information relating to these criteria clearly outlined in Section 4.2 of the IOP with additional information in Appendix 5. IOP provides clear and unambiguous information on the assessment of assets based on a color rating (red/yellow/green) that provides current information on level of redundancy, condition and the frequency for repairs, refurbishment and renewal. Institutional knowledge is captured in post-shut down reviews (A15) Evidence cited: Items 5, 15 & overview of T32 maintenance software	■ Fully Adequate
		The IOP documents, or includes reference to documents, that outline the operation and maintenance policies, procedures and schedules for all key infrastructure.	Fully documented in section 4.3 (operations) and 4.4 (maintenance) of the IOP and reviewed in the EPA Engineering Audit. Documentation of maintenance policies, procedures and schedules rigorous and up to date. Evidence cited: Items 15, 37, 38, 39, 40, 41, 42, 43, 44 and 45	■ Fully Adequate
		The relevant operation and maintenance policies and procedures are available at all facilities, personnel are trained in the procedures and training is kept current where appropriate.	Fully documented in section 4.5 of the IOP. Orica maintains a comprehensive induction process for staff and contractors that includes mandatory 3 year renewal (A 46). Individual training requirements and needs are managed through the GTP training matrix (A 47) and the Training Management Database for Legacy projects. The training matrix is maintained and updated and based on a review of the needs for the operators and contractors. In addition SOP's and MOP's indicate if a specific training is required for specific activities Evidence cited: Items 46, 47	■ Fully Adequate
		The operation and maintenance procedures contain sufficient information to address the complexity, criticality, condition and age of the infrastructure.	Fully documented in section 4.5.2 of the IOP Appendix 5 and Appendix 15. DMS system provide operating and maintenance procedures, which also has a paper backup system, that addresses the complexity, condition and age of the infrastructure Evidence cited: Items 5, 15	■ Fully Adequate

Table 5 Infrastructure Operating Plan (IOP) Audit Table

Document reference	Requirement to be evaluated	Guidance	Evidence/Comments	Assessment Finding
		"The maintenance procedures are linked to asset life cycle optimisation, safe and reliable performance of the infrastructure, service criticality and business risk and outline appropriate blends of: 1. Reactive maintenance. 2. Preventive maintenance. 3. Predictive maintenance."	Fully Documented in section 4.4 of IOP and reviewed in the EPA Engineering Audit in July 2012. Maintenance procedures are well documented and describe programme of preventative maintenance (managed in T32), reactive maintenance (Mech and I&E log books), annual shutdowns and the use of vibrational analysis and other predictive tools. Specific procedures provided in supporting documentation. Evidence cited: Item 15, 37, 40, 41, 42, 43, 45	■ Fully Adequate
WIC Reg Sched 1 cl.6(1)(b) and/or cl.13(1)(b)		The infrastructure investment/capital works requirements identified in the IOP are based on sound strategic service planning including: 1. Required levels of service (including future growth in customer base and/or demand and documented performance targets). 2. Security of supply or service provisions (including inherent reliability, redundancy, alternative sources of supply or service, emergency management and business continuity). 3. Whole of life cycle cost evaluation.	It is important to note that there are no plans to expand the capacity of the GTP for the purposes of supplying customers. Orica have made significant improvements in reliability of plant and have decreased incidents of downtime from 30 events per year to 1 event per year. The IOP refers to documents covering emergency management and business continuity, in the context of groundwater clean up. The IOP makes clear that alternative sources of supply (existing potable water) are the responsibility of the customer. Information on procedures for whole of life evaluation are not included in the IOP Evidence cited: Item 19, 28A, 28B, 28C	■ Adequate
		The IOP specifies future (life-cycle) expenditures based on forecast expenditure for: 1. Capital (new and replacement). 2. Operations. 3. Maintenance. 4. Management and Administration.	Orica have provided unconditional and irrevocable bank guarantees to the EPA for \$14.4M to cover on-going operation of the GTP. The IOP contains details on 2013 Corporate and GTP capital budgets only. Similarly, not possible to identify specific O&M items and management and administration costs. This omission does not compromise the ability of the IOP to achieve the objectives of providing surety of the financial viability of the scheme Evidence cited: Item 48. 49. 50	■ Adequate

Table 5 Infrastructure Operating Plan (IOP) Audit Table

Document reference	Requirement to be evaluated	Guidance	Evidence/Comments	Assessment Finding
		The assignment of responsibility, to appropriate management and staff, is clearly articulated for the IOP implementation and on-going management, (including prioritising and programming).	The GTP organizational chart identifies individuals responsible for management of the GTP, however Evidence cited: Item, org chart is missing appropriate document control Evidence cited; Item 51	■ Fully Adequate
		A review process is in place to ensure that the IOP and associated procedures are kept current.	Fully documented in Section 4.9 of IOP. A copy of the WICR Infrastructure plan contained within the EPMS which will ensure that the IOP is maintained current. Evidence cited: Item 56	■ Fully Adequate
WIC Reg Sched 1 cl.6(1)(c) and/or cl.13(1)(c)	The continuity of the water supply	Operational and maintenance procedures address both normal and abnormal (incident and emergency) conditions. The likelihood and consequences of asset failure are predicted. Other requirements included in the guidance above.	Fully documented IOP refers to procedures for normal operation, incidence and emergencies. IOP also refers to a crisis management plan All reference documents are complete Evidence cited: Item 21, 25, 28A, 28B, 28C, 29A, 29B, 30, 53, 54	■ Fully Adequate
"WIC Reg Sched 1 cl.6(1)(d) and/or cl.13(1)(d)"	Alternative water supplies when the infrastructure is inoperable	Requirements included in the guidance above.	Evidence in the IOP of customer communication protocols and evidence of protocols in effect in monthly reports Note. No alternative supply available, however, conditions of supply require customers to maintain back up supply Evidence cited: Item 16, 17, 18, 53	■ Fully Adequate

Table 5 Infrastructure Operating Plan (IOP) Audit Table

Document reference	Requirement to be evaluated	Guidance	Evidence/Comments	Assessment Finding
"WIC Reg Sched 1 cl.6(1)(e) and/or cl.13(1)(e)"	The IOP indicates the arrangements in relation to the maintenance, monitoring and reporting of standards of service	<p>An appropriate quality/performance management system is outlined for monitoring and implementing the IOP, and the system is documented.</p> <p>The sophistication of the monitoring and control systems is proportional to the complexity of the scheme.</p> <p>The monitoring and control systems, where relevant, provide information on:</p> <ol style="list-style-type: none"> 1. Leakage assessment and reduction. 2. Energy management. 3. Security of facilities. 4. Overflow events. 5. Flows and/or demands. 6. Warning of potential problems. 7. Internal performance indicators. 8. Regulatory performance indicators. <p>The IOP documents the process for keeping records and reporting on operational and maintenance matters.</p>	<p>IOP clearly indicates that arrangements are in place at a business level to monitor environmental performance, SH&E, capital improvement needs and staff development.</p> <p>SOP's and operating protocols indicate a level of sophistication that is appropriate with the complexity of the asset. Case in point is the use of FTIR for on-line monitoring of furnace performance.</p> <p>Monitoring and control systems provide evidence of items 1, 3, 4, 5, 6, 7 and 8.</p> <p>The IOP indicates that critical documents are stored in a number of forms (hard copy and digital). Recommend that Orica commence an assessment of archive requirements for critical documents for subsequent audits.</p> <p>Evidence cited: Item12, 16, 17, 21, 23, 24, 36, 37, 53, 56, 57, 58, 59, 60A, 60B, 62, 63</p>	<p>■ Fully Adequate</p>

Table 6 Evaluation of supporting documentation

Item No.	Description	File Type	Original or Facsimile	Information Complete	Applies to requirements	Document Control
1	Process flow description and diagram	Text	Original	Complete	Yes	Absent
2	GTP intake pipe network	Drawing	Original	Complete	Yes	Complete
3	EPL 2148 – June 2012	Text	Original	Complete	Yes	Complete
4	GTP customer connections pipe network	Drawing	Original	Complete	Yes	Complete
5	GTP equipment register v6	Spreadsheet	Original	Complete	Yes	Incomplete
6	Tag, instrument and PLC IO register v1.6	Spreadsheet	Original	Complete	Yes	Absent
7A	Plant structures register Jan2011	Spreadsheet	Original	Complete	Yes	Absent
7B	Plant structures plot	Drawing	Facsimile	Complete	Yes	Complete
8	DG depots on site plan	Drawing	Original	Complete	Yes	Complete
9	Plot plan with area numbers	Drawing	Facsimile	Complete	Yes	Complete
10	Quarterly groundwater and surface water monitoring report	Text	Original	Complete	Yes	Complete
12	Daily meeting worksheet	Form	Original	Complete	Yes	Incomplete
14	Burner and blower trip log Oct11-Sep12	Table	Original	Complete	Yes	Incomplete
15	Post-shutdown review 2012	Table	Original	Complete	Yes	Absent
16	Diary report	Table	Facsimile	Complete	Yes	Absent
17	Treated water quality metrics	Spreadsheet	Original	Complete	Yes	Absent
18	Treated water supply interruptions report	Spreadsheet	Original	Complete	Yes	Absent
21	SOP 216 – GTP testing specifications	Text	Original	Complete	Yes	Complete

Item No.	Description	File Type	Original or Facsimile	Information Complete	Applies to requirements	Document Control
23	Routine plant checks	Table	Facsimile	Complete	Yes	Absent
24	Weekly operations program	Table	Original	Complete	Yes	Absent
25	Register of approved SOP	Table	Original	Complete	Yes	Absent
26	SOP-106 response to trip (2.2)	Text	Original	Complete	Yes	Incomplete
27	SOP-112 Plant startup with single blower (1.3)	Text	Original	Complete	Yes	Complete
28A	PIRMP – overview	Text	Facsimile	Complete	Yes	Complete
28B	GTP PRIMP Rev 1.1	Text	Original	Complete	Yes	Complete
28C	Incident Scenarios Rev 1.1	Text	Original	Complete	Yes	Incomplete
29A	ERP – Overview	Text	Facsimile	Complete	Yes	Complete
29B	GTP emergency response plan Rev 5	Text	Original	Complete	Yes	Incomplete
30	Legacy Projects Crisis Management Plan Rev 3.4a	Text	Original	Complete	Yes	Incomplete
34	Notice of clean up action	Text	Original	Complete	Yes	Incomplete
35	Voluntary management proposal	Text	Facsimile	Complete	Yes	Absent
36	SHERMIS overview	Text	Original	Complete	Yes	Absent
37	Engineering maintenance audit rev 3 July 2012	Text	Original	Complete	Yes	Incomplete
38	Orica SH&E Policy	Text	Original	Complete	Yes	Absent
39	Water quality policy	Text	Original	Complete	Yes	Absent
40	Modification assessments	Text	Facsimile	Complete	Yes	Absent
41	Register of Workshop JSERAs	Spreadsheet	Original	Complete	Yes	Incomplete
42	JSERA – Pedestal grinder	Table	Original	Complete	Yes	Complete
43	Persons authorized for pedestal grinder	Table	Facsimile	Complete	Yes	Absent
44	MOP 101 crane operation on Forshore Rd (1.0)	Text	Original	Complete	Yes	Complete

Table 6 Evaluation of supporting documentation

Item No.	Description	File Type	Original or Facsimile	Information Complete	Applies to requirements	Document Control
45	MOP 106 C%101ab sail erection and dismantle	Text	Original	Complete	Yes	Complete
46	GTP induction form	Form	Facsimile	Complete	Yes	Incomplete
47	Training matrix – 12-9-12	Spreadsheet	Original	Complete	Yes	Absent
48	Budget overview FY12-13	Table	Original	Complete	Yes	Incomplete
49	Corporate funded capital FY13	Table	Original	Complete	Yes	Incomplete
50	GTP funded projects FY12 - Sep 2012	Table	Original	Complete	Yes	Absent
51	Organisation Chart and accountabilities	Text	Original	Complete	Yes	Absent
52	SH&E plan 2012	Table	Original	Complete	Yes	Absent
53	SOP 206 - Communications Protocol for BIP customers (1.3)	Text	Original	Complete	Yes	Complete
54	Safety Report Feb 12	Text	Original	Complete	Yes	Complete
55A	Environmental Risk Assessments for medium impacts	Table	Original	Complete	Yes	Absent
55B	Environmental Risk Summary ERA GTP 2012 - 1	Text	Original	Complete	Yes	Absent
55C	Action Summary from ERAs	Spreadsheet	Original	Complete	Yes	Absent
56	EPMS overview	Text	Original	Complete	Yes	Absent
57	SWTP Sampling Schedule	Spreadsheet	Original	Complete	Yes	Absent
58	Limits specified by EPL 2148	Text	Original	Complete	Yes	Complete
59	Fortnightly report of pollution monitoring data	Spreadsheet	Original	Complete	Yes	Incomplete
60A	Critical control points Oct 2012	Text	Original	Complete	Yes	Incomplete
60B	Critical control points on PFD	Drawing	Original	Complete	Yes	Complete
62	Stripped Water Flow Controller	Drawing	Facsimile	Complete	Yes	Absent