Annual Compliance Report Ichthys LNG Project (EPBC 2008/4208): 2019–2020

Report

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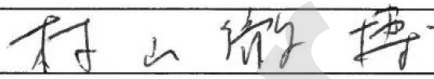
NOTICE

Declaration of accuracy

In making this declaration, I am aware that sections 490 and 491 of the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) make it an offence in certain circumstances to knowingly provide false or misleading information or documents. The offence is punishable on conviction by imprisonment or a fine, or both. I declare that all the information and documentation supporting this compliance report is true and correct in every particular. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this authorisation.

Signed	
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Abbreviation, term or acronym	Meaning
2018/2019 Compliance Report	Annual Compliance Report Ichthys LNG Project (EPBC 2008/4208): 2018-2019 (X060-AH-REP-60054)
AMOSC	Australian Marine Oil Spill Centre
AMSA	Australian Maritime Safety Authority
AOC	accidentally oil contaminated
BTEX	benzene, toluene, ethylbenzene and xylene
CEMP	Construction Environmental Management Plan
CMT	crisis management team
COS	Coastal Offset Strategy (X075-AH-STR-0001)
COVID-19	disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)
CPF	central processing facility
CCPP	combined cycle power plant
DAWE	Department of Agriculture, Water and the Environment (Commonwealth)
EIMP	environmental impact monitoring program
EPBC 2008/4208	the Ichthys LNG Project Commonwealth approval
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
EPL228 (as varied)	The Ichthys LNG environment protection licence issued by the NT EPA to operate the facility.
FPSO	floating production, storage and offloading (facility)
GEP	gas export pipeline
IMT	incident management team
INPEX	INPEX Operations Australia Pty Ltd
LDMP	Ichthys Onshore LNG Facilities: Liquid Discharge

Abbreviation, term or acronym	Meaning
	Management Plan: Operations (L060-AH-PLN-60050)
LNG	liquefied natural gas
LOR	limit of reporting
LPG	liquefied petroleum gas
Maintenance DSDMP	Maintenance Dredging and Spoil Disposal Management Plan (L060-AH-PLN-60010)
Nearshore OPEP	Nearshore Oil Pollution Emergency Plan (X060-AH-PLN-60003)
NATA	National Association of Testing Authorities, Australia
NT	Northern Territory
NT EPA	Northern Territory Environment Protection Authority
OEMP	Onshore Operations Environmental Management Plan (L060-AH-PLN-60005)
OSMP	Operational and Scientific Monitoring Program
QA/QC	Quality Assurance and Quality Control
SWL	standing water level
the Operator	INPEX group companies
the Project	Ichthys LNG Project
TN	total nitrogen
TNA	training needs analysis
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TRH	total recoverable hydrocarbons
UV	ultraviolet

1 INTRODUCTION

INPEX Operations Australia Pty Ltd (INPEX) as proponent for the Ichthys LNG Project, was issued with an approval under the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act; approval EPBC 2008/4208) on 27 June 2011. The EPBC 2008/4208 approval was subsequently amended by variations to conditions 1, 3, 4, 5, 7, 8, 9, 13, 15, 16 and 19 made pursuant to Section 143 of the EPBC Act.

Condition 13 of EPBC 2008/4208 requires INPEX to submit a Compliance Report to the Department of Agriculture, Water and the Environment (DAWE) within 15 months from commencement of operation[1], with each subsequent report submitted within 12 months from the date of the previous report. This is the second Compliance Report to be submitted following of commencement of operations on 27 July 2018.

Specific Project details are provided in Table 1-1, with an overview and status of activities described in Section 2.2.

Table 1-1: Ichthys LNG Project details

Item	Project details
EPBC number	EPBC 2008/4208
Project name	Ichthys LNG Project
Approval holder	INPEX Operations Australia Pty Ltd
Approval holder ABN	ABN 48 150 217 262
Approved Action	To develop the Ichthys Field in the Browse Basin to produce liquefied natural gas, liquefied petroleum gas and condensate and including the installation and operation of offshore extraction facilities in Ichthys Field, onshore processing facilities at Bladin Point and 850-935km pipeline from Ichthys Field to Bladin Point, Northern Territory, as described in the referral (EPBC 2008/4208) and the variation to the action dated 11 May 2011.

1.1 Purpose and scope

The purpose of this Compliance Report is to meet the requirements of EPBC 2008/4208 Condition 13 (as varied 27 May 2015), which states:

> *The person taking the action must submit a Compliance Report detailing compliance with any plan, report, strategy, or program (however described) referred to in relation to this approval. The date of the first Compliance Report must be submitted to the Minister within 15 months from the commencement of operation with each subsequent report submitted within 12 months from the date of the previous report. The Compliance Report must be made publicly available on the person taking the action's Australian website for the operational life of the action.*

[1] The Ichthys LNG Project approval (EPBC 2008/4208) defines operations as "*the commencement of gas extraction and transfer from subsea wells to the floating liquefied natural gas facility and liquefied natural gas facility and liquefied natural gas tankers*". The date reflected is the date the wells were first opened offshore. Onshore operations did not commence until 14 September 2018.

The Compliance Report is not required to include activities conducted within the Commonwealth Marine Area.

The person taking the action may cease complying with condition 13 if they have written agreement from the Minister.

DAWE representatives have advised[2] that the scope of the Compliance Report is limited to the demonstration of compliance with the following EPBC 2008/4208 conditions (as varied) and their associated plans, programs or strategies:

- Condition 1 - Oil Spill Contingency Plan (as varied on 03 February 2015)
- Condition 2 - Operational and Scientific Monitoring Program
- Condition 5 - Decommissioning Management Plan (as varied on 27 May 2015)
- Condition 8 - Liquid Discharge Management Plan (as varied on 03 February 2015)
- Condition 9 - Noise Management Plan (as varied on 06 March 2014)
- Condition 10 - Dredging and Spoil Disposal Management Plan (as varied on 05 April 2013)
- Condition 11 - Offsets (Coastal Offset Strategy).

This Compliance Report addresses compliance with above conditions and associated plans, programs or strategies during the 27 July 2019 to 26 July 2020 reporting period.

As per EPBC 2008/4208 Condition 13, this report does not address activities occurring in the Commonwealth Marine Area. These activities are regulated by the National Offshore Petroleum Safety and Environment Authority under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* and associated regulations.

1.1.1 DAWE approved plans or strategies

Table 1-2 provides an overview of relevant DAWE approved plans or strategies, which were in effect during the 27 July 2019 to 26 July 2020 reporting period.

Table 1-2: DAWE approved plans/strategies

Title	Description
Ichthys Onshore LNG Facilities Construction Environmental Management Plan (Rev 2, L092-AH-PLN-10001)	The Onshore Construction Liquid Discharge Management Plan (EPBC 2008/4208, Condition 8) is a sub-set of the Ichthys Onshore LNG Facilities Construction Environmental Management Plan (CEMP). The CEMP describes the measures in place to mitigate the potential environmental effect of liquid discharges associated with Ichthys LNG construction and commissioning activities. Construction and commissioning activities described under this plan ceased at the Ichthys LNG site on 11 October 2019.
Ichthys Onshore LNG Facilities: Liquid Discharge Management Plan: Operations (LDMP; L060-AH-PLN-60050)	The LDMP describes the measures in place to mitigate the potential environmental effect of liquid discharges associated with onshore Ichthys LNG operations activities. The LDMP was a sub-set of the Onshore Operations Environmental Management Plan (see below), until March 2020. The LDMP (Rev 0 and Rev 1) was updated in March 2020 and July

[2] Email correspondence received from the DAWE Compliance Monitoring Team on 30 July 2019.

Title	Description
	2020 to reflect amendments to the Ichthys LNG environmental protection licence (EPL228 as varied). On both occasions, amendments to the LDMP did not result in a new or increased risk, and as such it was submitted to DAWE for information only, in accordance with Condition 15.
Onshore Operations Environmental Management Plan (OEMP; L060-AH-PLN-60005)	The LDMP (EPBC 2008/4208, Condition 8) is a sub-set of the OEMP. The OEMP describes the measures in place to mitigate the potential environmental effect of liquid discharges associated with onshore Ichthys LNG operations activities. The OEMP (Revision 2) was submitted in accordance with EPBC 2008/4208 Condition 8 and was approved by DAWE on 29 May 2018. Subsequent to this, in March 2020 a standalone LDMP was prepared and submitted to DAWE for information (refer above). The standalone LDMP reflects the content presented in the OEMP.
Nearshore Oil Pollution Emergency Plan (Nearshore OPEP; X060-AH-PLN-60003)	The Nearshore OPEP describes the activities, arrangements, and framework for response to oil spills, which may occur within Northern Territory waters as a result of Ichthys LNG activities (EPBC 2008/4208, Condition 1) and the operational scientific monitoring program (EPBC 2008/4208, Condition 2), which would be implemented in the event of a spill. The Nearshore OPEP (Rev 1) was submitted in accordance with EPBC 2008/4208 Conditions 1 and 2 and was approved by DAWE on 23 February 2017. Subsequent to this, the Nearshore OPEP was updated in October 2018 (Rev 2) to incorporate administrative amendments. These amendments did not result in a new or increased risk, and as such was submitted to DAWE for information only in accordance with Condition 15. No updates to the Nearshore OPEP occurred during the 2019-2020 reporting period.
Maintenance Dredging and Spoil Disposal Management Plan (Maintenance DSDMP; L060-AH-PLN-60010)	The Maintenance DSDMP describes the measures in place to mitigate impacts associated with maintenance dredging. It allows for a maximum volume of 1.5 Mm^3 to be dredged within an approved 5-year period. The Maintenance DSDMP (Rev 1) was submitted in accordance with EPBC 2008/4208 Condition 10 and was approved by DAWE on 21 June 2018. No updates to the Maintenance DSDMP occurred during the 2019-2020 reporting period.
Coastal Offset Strategy (X075-AH-STR-0001)	The Coastal Offset Strategy provides high-level details of INPEX's environmental offset programs. The Coastal Offset Strategy (Rev 4) was submitted in accordance with EPBC 2008/4208 Condition 11 and was approved by DAWE on 13 April 2012.

2 DESCRIPTION OF ACTIVITIES

2.1 Ichthys Project overview

The Ichthys LNG Project (the Project) is a joint venture between INPEX group companies (the Operator), major partner Total, and the Australian subsidiaries of CPC Corporation Taiwan, Tokyo Gas, Osaka Gas, Kansai Electric Power, JERA and Toho Gas. Drawing on the hydrocarbon resources of the Ichthys gas and condensate field in the Browse Basin at the western edge of the Timor Sea offshore Western Australia, the Project is expected to produce 8.9 Mt of liquefied natural gas (LNG) and 1.6 Mt of liquefied petroleum gases (LPGs) per annum, along with approximately 100 000 barrels of condensate per day at peak.). The Project has an expected operational life of at least 40 years.

The Ichthys Field covers an area of around 800 km^2 and drilling studies suggest that its hydrocarbon resources are 12.8 trillion cubic feet of sales gas and around 527 million barrels of condensate.

The extraction of natural gas and condensate is carried out via a floating semisubmersible central processing facility (CPF) at the Ichthys Field. This removes water and most of the condensate from the reservoir fluids and the separated condensate is transferred to a floating production, storage and offloading (FPSO) facility moored approximately 3.5 km from the CPF. After further processing on the FPSO, the condensate is exported directly from the field at an average rate of up to 85 000 barrels per day.

The dehydrated gas and the remainder of the condensate is compressed and exported through an approximately 890 km long gas export pipeline (GEP) to the Project's onshore processing plant at Bladin Point in Darwin Harbour in the Northern Territory (NT; see Figure 2-1).

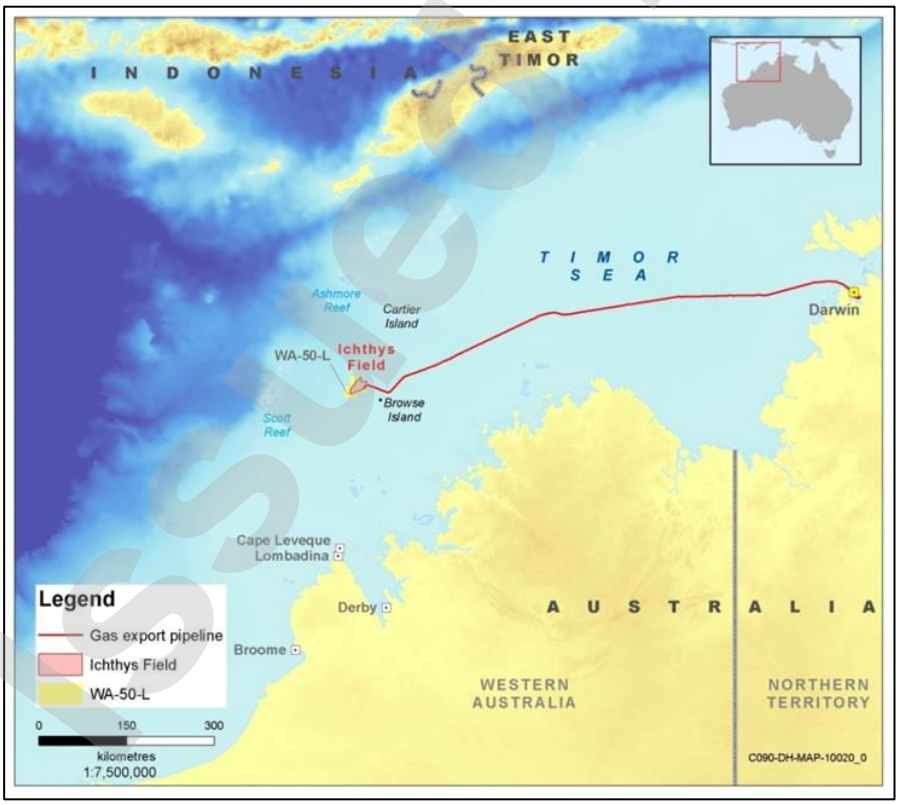

Figure 2-1: Location of the Ichthys Field and GEP route

2.2 Current status of activities

As noted in Section 1.1, this Compliance Report only applies to nearshore and onshore activities being undertaken in the Northern Territory and where an approved plan (as conditioned under EPBC 2008/4208) is required.

During the reporting period both onshore commissioning and operations activities were being undertaken simultaneously at Ichthys LNG, Bladin Point. Figure 2-2 depicts the Ichthys LNG layout. A summary of key activities undertaken during the reporting period is presented in the following sections.

2.2.1 Construction

As noted in the Annual Compliance Report Ichthys LNG Project (EPBC 2008/4208): 2018-2019 (2018/2019 Compliance Report; X060-AH-REP-60054), construction activities ceased at Ichthys LNG in April 2019. During this reporting period, activities being undertaken related to final commissioning and site demobilisation activities, which were completed on 11 October 2019. Key activities that were undertaken during the period 27 July 2019 to the 11 October 2019 were as follows:

- Commissioning activities associated with combined cycle power plant (CCPP)
- Site clean-up/rehabilitation and demobilisation including:
  - removal of any debris, litter and temporary stockpiles
  - removal of all equipment and temporary construction infrastructure
  - rehabilitation of disturbed areas not required for the operational phase of the Project
  - clean-up and remediation of any contaminated areas.

2.2.2 Operations

Key operations activities undertaken during the reporting period were as follows:

- activities associated with product (LNG, LPGs and Condensate) processing, storage, loading and offtake
- activities associated with routine and shutdown maintenance of the onshore facilities
- environmental monitoring activities.
- First start-up and steady-state of the CCPP in combined cycle.

The COVID-19 pandemic had a minor impact on operations and scheduled training activities and exercises. Impacts occurred from March 2020 till the end of the reporting period. Border travel restrictions and controls were imposed by the NT Government and INPEX's Pandemic Plan was activated, resulting in access restrictions for non-essential personnel working at Ichthys LNG.

Figure 2-2: Ichthys LNG site layout

3 COMPLIANCE WITH EPBC 2008/4208 APPROVAL CONDITIONS

As per the requirements of DoE (2014) the terms and definitions provided in Table 3-1 have been used to indicate the status of compliance with relevant EPBC 2008/4208 approval conditions.

A summary of the compliance status with relevant EPBC 2008/4208 approval conditions (refer Section 1.1), applicable timeframes and reference to evidence supporting the compliance status (as applicable) is provided in Table 3-3.

Table 3-1: Compliance status terms, acronyms and definitions

Term	Acronym	Definition
Compliant	C	"Compliance" is achieved when all the requirements of a condition have been met, including the implementation of management plans or other measures required by those conditions.
Non-compliant	NC	A designation of "non-compliance" should be given where the requirements of a condition or elements of a condition, including the implementation of management plans and other measures, have not been met.
Not applicable	NA	A designation of "not applicable" should be given where the requirements of a condition or elements of a condition fall outside of the scope of the current reporting period. For example, a condition which applies to activity that has not yet commenced.

3.1 Audit, reviews and exercises

As noted in Section 2.2.2, the COVID-19 pandemic had a minor impact on scheduled training activities and exercises. Impacts occurred from March 2020 till the end of the reporting period. Border travel restrictions and controls were imposed by the NT Government and INPEX's Pandemic Plan was activated, resulting in access restrictions for non-essential personnel working at Ichthys LNG.

The following training and exercises were originally scheduled to be undertaken between April and August 2020:

- Testing of Darwin Incident Management Team (IMT) and Perth Crisis Management Team (CMT) capability
- Testing of Ichthys LNG Emergency Response Team and Darwin IMT capability.
- First strike response training in Darwin Harbour (Bhagwan Marine (Oil Spill Equipment Contractor) and INPEX).

Testing of Darwin IMT, Perth CMT and Darwin ERT capability exercises have been rescheduled to be undertaken in Quarter 1/2 2021. The first strike response training in Darwin Harbour was undertaken 19 August—21 August 2020. Although outside of the reporting period, outcomes of first strike response training have been discussed in this Compliance Report.

It should be noted that in response to COVID-19 the INPEX Darwin IMT, Perth IMT and the Perth CMT were activated. This demonstrates capability and effectiveness of systems/processes to respond to a large scale event under real conditions (despite not being oil-spill related).

A summary of audits and reviews, as relevant to EPBC 2008/4208 conditions, undertaken during the reporting period is provided in Table 3-2. Outcomes of audits as applicable to EPBC 2008/4208 conditions are presented in Table 3-3.

Table 3-2: Summary of audits, reviews and exercises

Audit/review/exercise title	Scope	Date
Annual Operations Environmental Compliance Audit (External third-party audit – ERM on behalf of Northern Territory Environment Protection Authority (NT EPA))	The audit assessed compliance with the OEMP (inclusive of liquid discharge management) and NT EPA issued operations licence (EPL228).	07 October 2019 – 11 October 2019
Annual Operations Environmental Compliance Audit (Internal audit)	The audit assessed compliance with the LDMP, OEMP and the NT EPA issued operations licence (EPL228).	22 June 2020 – 07 July 2020
Annual review of Nearshore OPEP (internal)	Review to ensure the Nearshore OPEP remained current and suitable for Ichthys LNG activities occurring in Darwin Harbour.	17 December 2019
Spill Response COVID-19 Mitigations Workshop	The exercise considered the following scenario: a diesel and crude oil spill, from a coastal class tanker outside of Darwin Harbour. The purpose of the exercise was to examine the available field and IMT resources within the Northern Territory, and the additional National resources (Government and Industry) availability and capability. This included consideration of COVID-19 mitigations, to mobilise interstate people into NT, in response to a spill.	23 July 2020
First Strike Response Training – Darwin Harbour	Tested field deployment capabilities for oil spill equipment in Darwin Harbour.	19 August -21 August 2020

Table 3-3: EPBC 2008/4208 approval conditions compliance table

Condition no.	Condition	Timing	Status	Evidence/Comments
1	Oil Spill Contingency Plan The person taking the action must develop and submit to the Minister for approval, an Oil Spill Contingency Plan that demonstrates the response preparedness of the person taking the action for any hydrocarbon spills, including the capacity to respond to a spill and mitigate the environmental impacts on the Commonwealth marine area and listed species habitat within offshore areas and Darwin Harbour. The Plan must include, but is not limited to: a) Oil spill trajectory modelling for potential spills from the action. This should include consideration of a well blow out or uncontrolled release. The modelling should be specific to the characteristics of the hydrocarbons contained in the Ichthys gas field, the likely volumes released in a worst case scenario spill, and the potential time over which the oil may be released in a worst case scenario spill, including a scenario of a minimum eleven (11) week uncontained spill; b) A description of resources available for use in containing and minimising impacts in the event of a spill and arrangements for accessing them; c) A demonstrated capacity to respond to a spill at the site, including application of dispersants, if required and appropriate, and measures that can feasibly be applied within the first 12 hours of a spill occurring; d) Identification of sensitive areas that may be impacted by a potential spill, in particular, Browse Island, specific response measures for those areas and prioritisation of those areas during a response; e) Details of the insurance arrangements that have been made in respect of paying the costs associated with operational and scientific monitoring, as outlined in the Operational and Scientific Monitoring Program required under condition 2 and repairing any environmental damage arising from potential oil spills, as determined necessary from the results of the Operational and Scientific Monitoring Program; f) Training of staff in spill response measures and identifying roles and responsibilities of personnel during a spill response; and g) Procedures for reporting oil spill incidents to the Department. The person taking the action must not commence drilling activities until the Oil Spill Contingency Plan is approved. The approved Oil Spill Contingency Plan must be implemented.	Ongoing	Compliant	During the reporting period there were no spill events which required activation of the Nearshore OPEP. As noted in Section 3.1, a number of training exercises scheduled to be undertaken during 2020, to test response capabilities and processes outlined in the Nearshore OPEP, were rescheduled due to COVID-19 related business impacts. Whilst outside the reporting period the first strike response training originally scheduled for April 2020, was undertaken in August 2020. The summary of the training was as follows: • A field deployment exercise, which was externally facilitated by Response Resource Management. • Exercise participants included Bhagwan Marine and INPEX personnel. • The exercise validated INPEX's first strike capability for Darwin Harbour - deployment of zoom-boom equipment from the Bhagwan Marine boat-ramp. No non-conformances with the capabilities described in the Nearshore OPEP were identified during the post-exercise review. In addition to routine training and exercises, INPEX also led an extensive joint industry/government COVID-19 spill response exercise in June 2020. Participants included the Northern Territory Government, the Australian Marine Oil Spill Centre (AMOSC), the Australian Maritime Safety Authority (AMSA) and other industry members (i.e. Shell and Santos). The outcomes of this joint industry/government exercise during the 2020 COVID-19 crisis has significantly enhanced INPEX's understanding of spill response capabilities and arrangements within the Northern Territory, and how other capabilities could be mobilised into the Northern Territory and supported by both government and industry mutual aid capability. An annual review of the Nearshore OPEP was undertaken in late-2019. The review did not result in any changes or updates to the plan, and the content remains current. Separately from the Nearshore OPEP review, a review of the operational need for Darwin IMT support associated with a spill response in Darwin Harbour was undertaken during the reporting period, and outcomes have been incorporated into the 2020 revision of the training needs analysis (TNA). In light of the learnings of COVID-19 in regard to INPEX's enhanced 'remote' IMT capability, INPEX has identified that the INPEX Perth IMT can now provide much additional IMT support to the Darwin IMT, through the enhanced remote IMT capability. The 2020 revision of the TNA reflects these changes. Insurance arrangements were maintained in accordance with the Insurance Plan described in the Nearshore OPEP during the reporting period.
2.	Operational and Scientific Monitoring Program The person taking the action must develop and submit to the Minister for approval, an Operational and Scientific Monitoring Program that will be implemented in the event of an oil spill to determine the	Ongoing	Compliant	The Operational and Scientific Monitoring Program (OSMP) is incorporated into the Nearshore OPEP, which address the requirements

Condition no.	Condition	Timing	Status	Evidence/Comments
	potential extent and ecosystem consequences of such a spill, including, but not limited to: a) Triggers for the initiation and termination of the Operational and Scientific Monitoring Program, including, but not limited to, spill volume, composition, extent, duration and detection of impacts; b) A description of the studies that will be undertaken to determine the operational response, potential extent of impacts, ecosystem consequences and potential environmental reparations required as a result of the oil spill; c) Details of the insurance arrangements that have been made in respect of paying the costs associated with operational and scientific monitoring, as outlined in the Operational and Scientific Monitoring Program, and repairing any environmental damage arising from potential oil spills, as determined necessary from the results of the Operational and Scientific Monitoring Program; d) Inclusion of sufficient baseline information on the biota and the environment that may be impacted by a potential hydrocarbon spill, to enable an assessment of the impacts of such a spill; e) A strategy to implement the Operational and Scientific Monitoring Program, including timelines for delivery of results and mechanisms for the timely peer review of studies; f) In the event of an oil spill the person taking the action must pay all costs associated with all operational and scientific monitoring undertaken in response to the spill, as outlined in the approved Operational and Scientific Monitoring Program and any environmental remediation determined necessary by the results of the approved Operational and Scientific Monitoring Program; and g) Provision for periodic review of the program. The Operational and Scientific Monitoring Program must be submitted at least three months prior to the commencement of drilling activities. The person taking the action must not commence drilling activities until the Operational and Scientific Monitoring Program is approved. The approved Operational and Scientific Monitoring Program must be implemented.			of EPBC 2008/4208 Conditions 1 and 2 – refer above. During the reporting period there were no spill events which required activation of the OSMP. INPEX continues to maintain a contract with an external contractor to ensure OSMP readiness, in the event this is required to be implemented.
5	Decommissioning Management Plan The person taking the action must submit for the Minister's approval a Decommissioning Management Plan to mitigate the environmental effects of decommissioning the proposal within the Commonwealth marine area. The Decommissioning Management Plan must include a detailed risk assessment to justify leaving any infrastructure on the seafloor of the Commonwealth marine area and must be consistent with any published Commonwealth Government policy or legislation prevailing at the time. Decommissioning cannot commence until the plan is approved. The approved plan must be implemented.	Prior to decommissioning activities	Not applicable	This condition was not applicable during the reporting period.
8	Liquid Discharge Management Plan The person taking the action must submit for the Minister's approval a Liquid Discharge Management Plan or plans to mitigate the environmental effects of any liquid discharge from the proposal, including sewerage and surface water runoff. The Liquid Discharge Management Plan(s) must be for the protection of the Commonwealth marine area and habitat for listed species in Darwin Harbour and must: a) identify all sources of liquid discharge; b) describe any impacts associated with the discharge of liquids, including the cumulative impacts associated with the discharge of sewerage; c) clearly articulate the objectives of the plan and set measurable targets to demonstrate achievement of these; d) outline measures to avoid impacts; e) where impacts are unavoidable describe why they are unavoidable and measures to minimise impacts; f) demonstrate how any discharges into Darwin Harbour are consistent with the guidelines for	Prior to commencement of construction	Compliant	Construction As noted in the 2018/2019 Compliance Report, final construction activities, associated with the CCPP, were completed in April 2019. Subsequent commissioning activities for the CCPP and demobilisation activities were completed in October 2019. Following the cessation of construction activities, an environmental risk assessment to identify credible source-pathway-receptor linkages was undertaken by the construction environmental monitoring contractor. This included assessing the magnitude of the risk of an adverse effect. The outcome of the risk assessment was that environmental monitoring under the construction Environmental Impact Monitoring Program (EIMP) could cease as of 30 April 2019 (Greencap 2019) due to the cessation of construction activities and reduction in scale of activities (e.g. demobilisation). The assessment found that there was either no linkage between a source and receptor (i.e. no impact pathway) or the residual risk of remaining pathways was low due to

Condition no.	Condition	Timing	Status	Evidence/Comments
	discharges, and the water quality objectives for Darwin Harbour, developed under the National Water Quality Management Strategy; g) identify all regulatory requirements relating to the discharge of liquids and how these will be met; h) include a monitoring regime to determine achievement of objectives and success of measures used; i) outline reporting and auditing arrangements; and j) describe how the plan will apply the principles of adaptive management.			reduced likelihood and magnitude of risk source. During the reporting period, specifically from July to October 2019, operations monitoring described in the Operations LDMP was being undertaken. This considered risks associated with the commissioning of the CCPP (refer below and Appendix A). No events resulting in a significant impact to matters of national environmental significance or habitat for listed species in Darwin Harbour, occurred during the reporting period.
	The plan(s) must be submitted prior to the commencement of the relevant activity to which they apply. The relevant activity may not commence until the plan is approved. Separate Liquid Discharge Management plans can be submitted for the management of liquid discharges in the Commonwealth Marine Area and Darwin Harbour. The approved plan(s) must be implemented.	Ongoing	Compliant	Operations During the reporting period, the following compliance monitoring activities were undertaken: • monthly commingled treated effluent (in-pipe) monitoring (August 2019 to July 2020) • biannual groundwater quality monitoring (July 2019 and January 2020) • annual harbour sediment monitoring June 2020) • quarterly jetty outfall monitoring (October 2019, February 2020 April 2020 and July 2020). Results of monitoring programs demonstrate that liquid discharges associated with Ichthys LNG activities have not adversely affected the declared beneficial uses or objectives for Darwin Harbour. A description of the monitoring programs and locations is described in Section 7 of the LDMP, with a summary of the outcomes of each of these monitoring programs provided in Appendix A. As noted in the 2018/2019 Compliance Report, Ichthys LNG achieved steady state operations on 19 June 2019. Following this, the frequency of commingled treated effluent (in-pipe) monitoring reduced from weekly to monthly, in accordance with the approved LDMP and the Ichthys LNG Northern Territory environment protection licence (EPL228). Further, an annual review of the 2018/2019 groundwater monitoring data was undertaken to determine if there had been any changes to groundwater quality. The review found that no changes in groundwater quality attributable to Ichthys LNG had occurred. Given this, and as allowed for in the LDMP, the sampling of frequency of the groundwater monitoring sampling was reduced from quarterly to biannual following the July 2019 (compliance survey 4). To assess compliance with the LDMP both an external audit conducted by a third-party (ERM on behalf of the NT EPA) and an internal audit were undertaken during the reporting period (refer to Table 3-2). In both audits, a non-conformance was recorded where specified commingled treated effluent (in-pipe) discharge limits had been exceeded during the reporting period. Note, in all cases discharge limit exceedances were investigated and corrective actions implemented at the time of the event, in accordance with the LDMP. Further, all exceedances were minor in nature, and did not result in any environmental harm or impact. Appendix A provides a summary of these exceedances. During the reporting period, there were no events that resulted in any material non-compliance with the LDMP or a significant impact to matters of national environmental significance.

Condition no.	Condition	Timing	Status	Evidence/Comments
9	Noise Management Plan The person taking the action must submit for the Minister's approval a Noise Management Plan (or multiple plans) to avoid and mitigate the noise impacts on marine fauna associated with construction activities in Darwin Harbour or the Commonwealth marine area. The Noise Management Plan/s must be for the protection of listed species in Darwin Harbour or the Commonwealth marine area (whichever area the construction activities are to be undertaken) and must: a) identify all sources of noise that may adversely impact fauna in Darwin Harbour or the Commonwealth marine area; b) describe any impacts associated with noise generated by pile driving and blasting; c) provide a schedule of expected pile driving and blasting activities; d) clearly articulate the objectives of the plan and set measurable targets to demonstrate achievement of these; e) outline measures to avoid impacts; f) where impacts are unavoidable describe why they are unavoidable and measures to minimise impacts; g) include a monitoring regime to determine achievement of objectives and success of measures used; h) provide for the involvement of an expert panel in the development of the plan and monitoring program required to detect and manage impacts; i) outline reporting and auditing arrangements; and j) describe how the plan will apply the principles of adaptive management. In addition, the person taking the action is not permitted to undertake any blasting unless it can be demonstrated that all prudent and feasible alternatives have been ruled out and the Minister has given specific permission to allow blasting. If permission is granted the person taking the action must not undertake blasting activities for more than 28 days in total, without written approval from the Minister, and must not undertake blasting before sunrise or after sunset on any of these days. The plan/s must be submitted at least three months prior to the commencement of any pile driving or blasting activities to which the plan applies. Pile driving or blasting activities may not commence until the plan is approved. The approved plan must be implemented.	Construction phase	Not applicable	No construction activities requiring a noise management plan occurred during the reporting period.
10	Dredging and Spoil Disposal Management Plan The person taking the action must submit for the Minister's approval a Dredging and Spoil Disposal Management Plan (DSDMP) for the protection of inshore dolphins, marine turtles and Dugong occupying Darwin Harbour. The DSDMP must include, but is not limited to, the following: a) final methodologies for dredging including the method and timing of dredging activities; b) a schedule for dredging activities; c) a comparison of dredging methodologies proposed based on potential impacts on dolphins, turtles and Dugongs associated with individual methods, including noise and sediment plumes; d) justification of the dredging option/s chosen based on best practice at the time; e) mitigation measures, including measures for each type of dredge to avoid entrapment of marine turtles; f) methods to prevent, detect and respond to impacts on any number of marine turtles; g) measures that allow the alteration of dredging activities and/or implement mitigation methods in an adaptive management framework to ensure the protection of turtles, Dugongs and dolphins; h) the outcomes of hydrodynamic and sediment transport modelling required to predict impacts and finalise the design of the dredging campaign; i) contingencies to manage dredging if there is a significant departure from predicted impacts; j) an ecological monitoring program, which must exist either in full within the DSDMP, or as a standalone document (see Note 1 below) that is appropriately referenced in the DSDMP;	Ongoing	Compliant	The approved Maintenance DSDMP is not yet activated, as there has been no requirement for a maintenance dredging campaign since the approval of the plan.

Condition no.	Condition	Timing	Status	Evidence/Comments
	k) the involvement of an expert panel in the development of the plan and monitoring program required to detect and manage impacts; and l) reporting and auditing arrangements. The DSDMP must be submitted at least three months prior to the commencement of dredging. Dredging for which the DSDMP has been prepared must not commence until the DSDMP is approved. The approved DSDMP must be implemented. Note 1: Regarding condition 10(j); if the person taking the action wishes to prepare the ecological monitoring program as a standalone document, then the ecological monitoring program must be approved in writing by the Minister. The approved ecological program must be implemented.			

11	Offsets
	The person taking the action must submit for the Minister's approval a Coastal Offset Strategy for the protection of listed threatened species and listed migratory species impacted by the proposal in Darwin Harbour. The Coastal Offset Strategy must include:
	a) High level details on the implementation of the following offsets outlined in the Northern Territory's letter to the Acting Secretary of the Department of Sustainability, Environment, Water, Population and Communities dated 23 May 2011, including a commitment and indicative schedule for the development of detailed sub-plans for each offset program
	• Publication of data collected for the Browse Basin and Kimberley coastline;
	• an integrated monitoring and research program for Darwin Harbour;
	• habitat mapping for Darwin Harbour Region (including Bynoe Harbour):
	• funding of Australian Research Council Linkage projects;
	• conservation management of marine megafauna in the western Top End; and
	• research on the conservation status, distribution and habitat use of coastal dolphins.
	b) Provision for the permanent protection of approximately 2000 ha of terrestrial vegetation and mangroves, or of an area as otherwise agreed by the Minister and provision for the management of the protected area(s) for the life of the project;
	Note 1: permanent protection can include the acquisition and inclusion of an area in the conservation estate, covenanting arrangements on private land, other formal agreements with private landholders, or permanent changes to management regimes on Crown or Aboriginal land.
	Note 2: This condition does not limit the provision of these offsets in synergy with any conditions of any other approving party.
	c) Provision for the permanent protection of marine habitat for inshore dolphins. marine turtles and Dugong that is preferably, but not necessarily, adjacent to the protected mangrove vegetation and provision for the management of the protected area(s) for the life of the project.
	Note 1: permanent protection include the acquisition and inclusion of an area in the conservation estate, covenanting arrangements on private land, other formal agreements with private landholders, or permanent changes to management regimes on Crown or Aboriginal land.
	Note 2: This condition does not limit the provision of these offsets in synergy with any conditions of any other approving party
	The Coastal Offset Strategy must include commitments to timeframes and funding arrangements, and be made available on the proponent's website. The strategy must be submitted for approval at least three months before construction activities commence in Darwin Harbour. No construction activities may commence in Darwin Harbour until the Coastal Offset Strategy is approved.
		Ongoing	Compliant	The Coastal Offsets Strategy (Rev 4) was submitted in accordance with EPBC 2008/4208 Condition 11 and was approved by DAWE on 13 April 2012.
				Scientific reports, data and maps, which have been produced as result of execution of programs required under Condition 11, are available at https://www.inpex.com.au/projects/ichthys-lng/our-commitments/.
				Condition 11a
				Condition 11a offset programs which have been completed and were reported on in the 2018/2019 Compliance Report have been excluded from the current Compliance Report. The following Condition 11a programs remain ongoing or were completed during the 2019/2020 reporting period:
				• Darwin Harbour integrated marine monitoring and research program (ongoing)
				• Conservation management of marine megafauna in the western Top End (ongoing)
				• Long-Term Monitoring of Coastal Dolphins in Darwin Harbour and the Abundance and Distribution of Dugongs in the Northern Territory (completed)
				<u>Darwin Harbour integrated marine monitoring and research program</u>
				During the reporting period a number of field activities and reports were competed, including:
				• mangroves:
				  • remote sensing pilot project to assess spatial and temporal changes in distribution, including recommendations for the establishment of a long term monitoring program.
				  • ongoing mangrove sediment monitoring (i.e. soil surface elevation)
				• sediment:
				  • Darwin Harbour Outer and East Arm baseline sediment sampling and reporting
				• finalisation of the long term monitoring plan for anthropogenic pressures on Darwin Harbour
				<u>Conservation management of marine megafauna in the western Top End</u>
				Although outside of the reporting period, a variation to EPBC 2008/4208 Condition 11a (specific to this program) was approved by DAWE on 21 August 2020, as follows:
				Conservation management of dugongs, cetaceans and threatened marine matters of national environmental significance in the Top End.

Condition no.	Condition	Timing	Status	Evidence/Comments

				The varied program is expected to deliver greater conservation outcomes, while also delivering cultural and social benefits as a direct result of:
				• broadening the eligible species to include threatened marine species
				• broadening the geographical extent to include the entire Top End.
				The program is planned to commence in July 2021.
				<u>Long-Term Monitoring of Coastal Dolphins in Darwin Harbour and the Abundance and Distribution of Dugongs in the Northern Territory</u>
				During the reporting period a number of field activities and reports were competed, including:
				• dolphins
				  • final boat-based photo identification survey and report for coastal dolphins in Darwin Harbour and surrounding waters
				  • Darwin region coastal dolphin population variability analysis including future management scenarios and sensitivity analysis
				• dugongs
				  • Gulf of Carpentaria dugong aerial surveys (fixed-wing and imagery) to compare detection rates and relative abundance of dugongs as well as estimate dugong population size.
				The program was completed in its entirety in June 2020, and final reports are currently in preparation and will be listed on the INPEX website upon completion.
				Condition 11b and c
				INPEX has completed an assessment of the mechanisms and options available to fulfil Condition 11b and 11c requirements.
				INPEX is currently in discussions with DAWE to obtain in-principle support of preferred mechanisms for achieving permanent protection of appropriate areas of terrestrial and marine habitats.

4 REFERENCES

Department of the Environment. 2014. *Annual Compliance Report Guidelines*. Commonwealth of Australia, Canberra, ACT.

DOE—*see* Department of the Environment

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Padovan, A.V. 2003. *Darwin Harbour water and sediment quality*. Marine and Estuarine Environments of Darwin Harbour. Proceeding of the Darwin Harbour Public Presentations, February 2003.

Simpson S.L., Batley, G.B. and Chariton, A.A. 2013. *Revision of the ANZECC/ARMCANZ Sediment Quality Guidelines*. CSIRO Land and Water Science Report 08/07. CSIRO Land and Water.

APPENDIX A: SUMMARY OF OPERATIONS MONITORING PROGRAM RESULTS

A.1 Commingled treated effluent (in-pipe) monitoring

Commingled treated effluent (in-pipe) sampling was undertaken on a monthly basis throughout the reporting period. Where an exceedance was detected additional sampling was undertaken where this was determined to be required. In addition to routine monthly sampling, ad hoc sampling was undertaken on 23 June 2020 as part of the onsite laboratory National Association of Testing Authorities (NATA) Australia accreditation Quality Assurance and Quality Control (QA/QC) processes.

The results for in-pipe monitoring at sample location 750-SC-003 for the reporting period are presented in Table A-1. Results that exceeded discharge limits are shown in bold text.

During the reporting period, there were three occurrences where wastewater quality was above discharge limits, which are further discussed in Section A.1.1. Note, during the ad hoc sampling undertaken by the onsite laboratory on 23 June 2020, an exceedance was detected. As part of the ongoing investigation further sampling was undertaken. Any exceedances of the same parameter following this initial event are considered part of the original event and ongoing investigation.

Overall, there was generally little variability of the wastewater quality, with the majority of results below discharge limits described in the LDMP. This demonstrates the wastewater treatment systems were operating effectively.

Table A-1: Weekly/monthly sampling results for 750-SC-0003 (bolded values indicate an exceedance)

Date	pH	Electrical conductivity	Temperature	Turbidity	Dissolved oxygen	TPH as oil & grease	TRH (C10-C40)	TSS	BOD	COD	Free Chlorine	Ammonia	Total nitrogen	Total phosphorus	Filterable Reactive Phosphorus	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Silver	Zinc	Enterococci	E coli	Faecal coliforms	Anionic surfactants	aMDEA	Glycol (MEG)	Glycol (TEG)
Unit	**pH units**	**µS/cm**	**°C**	**NTU**	**%**	**mg/L**	**µg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**µg N/L**	**µg N/L**	**µg P/L**	**µg P/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**cfu/100mL**	**cfu/100mL**	**cfu/100mL**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
13-Aug-19	8.2	1111	26.3	<0.5	106	<1	<100	<5	<2	20	-	10	**14000**	1200	700	<0.1	<1	5	<1	<0.1	5	<1	13	4	<1	1	<0.1	<0.001	<2	<2
10-Sep-19	8.2	490	27.4	1.5	89	<1	<100	<5	3	16	-	180	2000	1200	700	<0.1	<1	5	5	<0.1	1	<1	90	64	**130**	130	<0.1	<0.001	<2	<2
1-Oct-19*	8.2	475	29.8	-	-	-	-	-	-	-	-	-	**10500**	450	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
09-Oct-19	8.2	277	30.5	1.5	93	<1	<100	<5	<2	11	-	60	<2000	500	300	0.1	<1	107	<1	<0.1	24	<1	78	18	1	<1	<0.1	<0.001	<2	<2
11-Nov-19	7.7	284	32	1	86	<1	<100	<5	<2	14	-	650	2000	400	<200	<0.1	<1	<1	<1	<0.1	3	<1	741	10	1	2	<0.1	<5	<5	<5
10-Dec-19	7.9	278	32.9	0.5	75	<1	<100	<5	6	14	-	810	3000	500	300	<0.1	<1	4	<1	<0.1	3	<1	374	17	<1	<1	0.1	<5	<5	<5
20-Jan-20	7.9	290	28.1	<0.5	96	<1	<100	<5	<2	11	-	<2000	6000	<500	<500	<0.1	<1	2	<1	<0.1	<1	<1	40	4	3	3	<0.1	<5	<5	<5
12-Feb-20	8.3	375	31.7	<0.5	86	<1	<100	<5	<2	8	-	7000	9000	<500	<500	<0.1	<1	6	<1	<0.1	<1	<1	9	21	<1	<1	<0.1	<5	<5	<5
10-Mar-20	8.0	286	27.8	1	84	<1	<100	<5	2	11	-	<2000	6000	<500	<500	<0.1	<1	5	<1	<0.1	<1	<1	102	58	12	12	<0.1	<5	<5	<5
15-Apr-20	8	263	30.9	1	87	<1	<100	<5	3	9	-	5000	5000	<500	<500	<0.1	<1	4	<1	<0.1	1	<1	236	17	10	10	<0.1	<5	<5	<5
12-May-20	8.9	346	28.3	0.5	84	<1	<100	<5	<2	14	< 0.02	10000	10000	<500	<500	<0.1	<1	14	<1	<0.1	3	<1	166	55	12	12	<0.1	<5	<5	<5
09-Jun-20	7.9	314	28.2	1	80	<1	<100	<5	9	11	< 0.02	2000	4000	<500	<500	<0.1	<1	3	<1	<0.1	1	<1	68	60	18	18	<0.1	<5	<5	<5
23-Jun-20	-	-	-	-	-	-	-	-	-	-	-	6000	**13000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Jun-20†	-	-	-	-	-	-	-	-	-	-	-	9000	10000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Jun-20†	-	-	-	-	-	-	-	-	-	-	-	9000	**14000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25-Jun-20†	-	-	-	-	-	-	-	-	-	-	-	36000	**35000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Jun-20†	-	-	-	-	-	-	-	-	-	-	-	2000	3000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Jun-20†	-	-	-	-	-	-	-	-	-	-	-	1400	**1500**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Date	pH	Electrical conductivity	Temperature	Turbidity	Dissolved oxygen	TPH as oil & grease	TRH (C10-C40)	TSS	BOD	COD	Free Chlorine	Ammonia	Total nitrogen	Total phosphorus	Filterable Reactive Phosphorus	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Silver	Zinc	Enterococci	E coli	Faecal coliforms	Anionic surfactants	aMDEA	Glycol (MEG)	Glycol (TEG)
Unit	**pH units**	**µS/cm**	**°C**	**NTU**	**%**	**mg/L**	**µg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**µg N/L**	**µg N/L**	**µg P/L**	**µg P/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**cfu/100mL**	**cfu/100mL**	**cfu/100mL**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
												0	**0**																	
29-Jun-20†	-	-	-	-	-	-	-	-	-	-	-	6000	7000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Jun-20†	-	-	-	-	-	-	-	-	-	-	-	7000	7000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
02-Jul-20†	-	-	-	-	-	-	-	-	-	-	-	3000	4000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05-Jul-20†	-	-	-	-	-	-	-	-	-	-	-	16000	**17000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
08-Jul-20†	-	-	-	-	-	-	-	-	-	-	-	4000	5000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Jul-20†	-	-	-	-	-	-	-	-	-	-	-	8000	9000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14-Jul-20	7.9	266	24.4	1.0	80	<1	<100	<5	<2	12	<0.02	<2000	<2000	<500	<500	<0.1	<1	7	<1	<0.1	4	<1	204	<1	<1	<1	<0.1	<5	<5	<5

* Indicates additional sampling undertaken following the exceedance event on 10 September 2020

† Indicates additional sampling undertaken following the exceedance event on 23 June 2020

A.1.1 Limit exceedance assessment outcomes

Throughout the reporting period there were four discharge limit exceedances. A summary table of all discharge limit exceedances including corrective actions is provided in Table A-2.

Table A-2: Summary of commingled treated effluent sample point exceedance events

Date sampled	Parameter	Result	Limit	Cause and/or contributing factors	Corrective actions
13 August 2019	Total Nitrogen	14 mg/L	10 mg/L	The investigation identified at the time of sampling the sewage treatment plant was the only source discharging into the combined jetty outfall line. The potential cause of the total nitrogen exceedance was due to the poor performance of the sewage treatment plant. The sewage plant was returning back into service following extensive maintenance activities in the week prior to the exceedance and not in a stable operating condition. Once stable operations for the plant were achieved the total nitrogen levels were below the discharge limit.	Following the identification that the source of the elevated total nitrogen was from the sewage treatment plant the following occurred: • The treated sewage effluent was prevented from discharging to the comingled jetty outfall line on the afternoon of 16 August 2019. The treated sewage was diverted into the accidentally oil contaminated (AOC) drainage network where this waste stream could comingle with additional wastewater. • Further sampling of the combined wastewater stream (AOC/treated sewage effluent) from the AOC holding basin on 19 August 2019 reported a total nitrogen concentration of 9.2 mg/L, while sampling of the individual stream from the sewage plant reported a total nitrogen concentration of 8.8 mg/L, while the AOC system reported a total nitrogen level of 2.2 mg/L. • Discharge of the comingled effluent from the AOC system re-commenced on 22 August 2019, following the issue of the interim laboratory report, as all the individual streams entering into the combined jetty outfall were below 10 mg/L. Due to all the individual streams being below 10 mg/L the treated sewage was lined back up to directly discharge into the combined jetty outfall, as it was considered the sewage treatment plant was in a stable operating mode. • Increased field testing for total nitrogen of

Date sampled	Parameter	Result	Limit	Cause and/or contributing factors	Corrective actions
					the treated effluent quality has occurred following the return to service of equipment post maintenance activities at the sewage treatment plant, to ensure the effluent quality is below LDMP discharge limits prior to discharge to the jetty outfall. • Treated effluent will be held up if over the discharge limit and sent for re-treatment.
10 September 2019	*Escherichia coli*	130 CFU/100 mL	100 CFU/100 mL	On investigation, it was determined that at the time of sampling (10 September 2019) there were two streams discharging into the jetty outfall line; the first stream was from the AOC treatment system (including the demineralisation plant reject brine) and the second was the stream from the sewage treatment system. The investigation found that the most probable cause of the elevated *E. coli* levels was due to a faulty ultraviolet (UV) sensor equipment which affected the sterilisation process in the sewage treatment plant. Following the identification of the *E. coli* contamination chlorine dosing was carried out in both the AOC and sewage treatment plant systems on 17 September 2019. Note at this time the treated sewage was diverted to the AOC holding basin and not discharging to the jetty outfall. On 18 September 2019 extensive sampling from various locations within both the sewage and AOC treatment plants occurred to determine the source of the *E. coli*. The treated sewage post UV sterilisation reported *E. coli* levels at 23 CFU/100 mL (noting this value is below the LDMP discharge	• Decontamination of the *E. coli* from within the sewage treatment plant, through chlorine dosing was implemented on 17 September 2019. • Replacement UV sensor parts were procured and the repair work of the system occurred. • In addition, a small floating chlorine dosing unit has been installed up-stream of the UV sterilisation system as a backup system to the UV system in the sewage treatment.

Date sampled	Parameter	Result	Limit	Cause and/or contributing factors	Corrective actions
				limit of 100 CFU/100 mL), this result indicated that system was only partially treating *E. coli*, while the AOC system testing reported *E. coli* levels of 6 and <1 CFU/100 mL. Replacement UV sterilisation parts were procured and the repair work occurred shortly after delivery of the parts. The source of the *E. coli* from the sewage treatment system is not able to be identified unequivocally, as it could have been from either animal waste or dead animals (e.g. cane toads) present in the AOC drainage system. Following the chlorine dosing, all resultant water was held in the observation basin to allow for the chlorine to degrade to non-detectable levels (<0.02 mg/L; consistent with the trigger value used for the receiving environment during the construction phase (refer CEMP) and the lowest level in situ equipment is able to read). Discharge to the jetty outfall recommenced on 19 September 2019 following the chlorine dosing of the water treatment systems. A further wastewater sample was collected from location 750-SC-003 on 1 October 2019, subsequently reported an *E. coli* level of 2 CFU/100 mL, with the same streams discharging into the outfall line at the time of sampling.	
1 October 2019	Total Nitrogen	10.5 mg N/L	10 mg N/L	The cause of the total nitrogen exceedance was the poor performance of the sewage treatment plant, due to the supply line of the sugar dosing system being left closed following the swap out of	• The treated sewage effluent was prevented from discharging to the comingled jetty outfall line on the afternoon of 7 October 2019.

Date sampled	Parameter	Result	Limit	Cause and/or contributing factors	Corrective actions
				the sugar bulk storage. This resulted in the sugar dosing system being offline for approximately three days, which then caused an imbalance in the sewage treatment plant resulting in high total nitrogen discharge levels. Following the identification that the sugar feed supply was not operational, the sugar supply line was re-opened.	• The treated sewage was diverted into the AOC drainage network where this waste stream could comingle with additional wastewater. • Further sampling of the combined wastewater stream (AOC/treated sewage effluent) from the AOC observation basin on 8 October 2019 reported a total nitrogen concentration of <2 mg/L, while sampling of the individual stream from the sewage plant reported a total nitrogen concentration of 4 mg/L on 9 October 2019. • Discharge of the comingled effluent from the AOC system re-commenced on 9 October 2019, as all the individual stream entering into the combine jetty outfall were below 10 mg/L. • Sampling form sample location 750-SC-003 on 9 October 2019 reported total nitrogen concentration of <2 mg/L. • INPEX revised the inspection checklist to ensure that a daily check is undertaken to ensure that the sugar dosing system is operational for the sewage treatment plant.
23 June 2020	Total Nitrogen	13.3 mg/L	10 mg/L	The investigation identified that the main cause of the total nitrogen exceedance was due to several sources of elevated ammonia in the CCPP steam system entering the steam blowdown treatment package which was unable to be treated, due to the elevated ammonia concentration being above the level the steam blowdown package is designed to treat.	INPEX identified that the main source of the elevated total nitrogen was from the steam system and the following actions have occurred: • A single service water hose was plumbed into the jetty outfall line to dilute the steam blowdown from the CCPP on 27 June 2020, while the engineering team was developing the logic changes required to address the issues

Date sampled	Parameter	Result	Limit	Cause and/or contributing factors	Corrective actions
					identified with the ammonia dosing pumps. • A second service water hose was subsequently added to the jetty outfall line on 28 June 2020, and third on 29 June 2020. • The logic settings on ammonia dosing pumps were changed on 1 July 2020. • An additional service water hose added to the jetty outfall to aid in dilution on 6 July 2020 • The line up to flash tank was corrected and verified as per design requirements on 7 July 2020 • Repair and maintenance of the level transmitters in the steam system flash tanks in July 2020 • Servicing of the sugar dosing pump occurred on 24 June 2020, with the dosing system returned to normal operations on this date. Following the implementation of the above actions, sampling at location 750-SC-003 was conducted on 11 and 14 July 2020, to verify the actions had reduced the total nitrogen concentration to below 10 mg/l in the CCPP steam blowdown. Note a full combined comingled jetty outfall sampling event occurred on 14 July 2020, which reported a total nitrogen concentration of <2 mg/L. Corrective actions that have or will be undertaken to ensure the non-compliance does not reoccur: • Through the incident investigation several additional actions were identified to prevent reoccurrence which require a longer lead time. These involve:

Date sampled	Parameter	Result	Limit	Cause and/or contributing factors	Corrective actions
					• Reducing the ammonia concentration of the fluid which is injected into the steams system from 19% to 10%. • Calibration of the ammonia dosing pumps. INPEX has placed in a maintenance service request for this works to occur, and it is scheduled to occur by the end of August 2020. • Undertake an engineering review of the ammonia injection dosing pump arrangements, with the intent to change out to an alternative Grundfos pump type, with a lower rate of injection, if viable. • Undertake an engineering review to investigate the redirection of the ammonia dosing injection location from directly into the header, to the induvial heat recovery steam generator (HRSG) drums.

A.2 Jetty outfall monitoring

Quarterly jetty outfall monitoring was undertaken during the reporting period as follows:

- compliance survey 2 – October 2019
- compliance survey 3 – February 2020
- compliance survey 4 – April 2020
- compliance survey 5 – July 2020.

Impact and reference site results for the four surveys undertaken in the reporting period are summarised in Table A-3. Generally results for all parameters in all four surveys show little variability between impact and reference sites, indicating the discharged commingled treated effluent had no discernible influence on samples collected at these locations. As such, discharges have not adversely affected the declared beneficial uses or water quality objectives for Darwin Harbour.

Table A-3: Median impact (Imp) and reference (Ref) site sample results for jetty outfall compliance surveys 2,3,4 and 5 (bold values indicate an exceedance)

Parameter	Unit	Compliance Survey 2		Compliance Survey 3		Compliance Survey 4		Compliance Survey 5	
		Imp	Ref	Imp	Ref	Imp	Ref	Imp	Ref
Free Chlorine	mg/L	n/a	n/a	n/a	n/a	n/a	n/a	0.02	0.02
pH	pH units	7.9	7.9	7.8	7.8	7.8	7.8	7.9	7.9
Electrical conductivity	µS/cm	54600	54600	48240	47955	56050	55875	54590	54325
Temperature	°C	29.6	29.5	31.3	31.1	33.2	33.1	25.6	25.6
Turbidity	NTU	1.9	2.0	1.3	1.2	5.4	5.6	1.0	1.0
Dissolved oxygen	%	97.1	97.2	101.8	102.3	90.3	89.8	97.5	96.9
Visual clarity and colour	n/a	No change	No change	No change	No change	No change	No change	No change	No change
Surface films	n/a	None	None	None	None	None	None	Yes	Yes
Silver	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	µg/L	0.3	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Copper	µg/L	0.4	0.5	0.6	0.6	0.4	0.6	0.4	0.4
Mercury	µg/L	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	µg/L	0.4	<0.3	<0.3	<0.3	0.4	0.3	0.4	0.3
Lead	µg/L	0.2	0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1
Zinc	µg/L	2.0	<1	2.0	2.0	1.0	<1	2.0	1.0
Ammonia	µg N/L	<3	<3	5.0	4.0	5.0	6.0	<3	<3

Parameter	Unit	Compliance Survey 2		Compliance Survey 3		Compliance Survey 4		Compliance Survey 5	
		Imp	Ref	Imp	Ref	Imp	Ref	Imp	Ref
FRP	µg P/L	6.0	6.0	3.0	2.0	8.0	8.5	7.0	6.5
Total phosphorus	µg P/L	18.0	19.5	13.0	12.0	22.0	21.5	17.0	22.0
Total nitrogen	µg N/L	120.0	135.0	130.0	130.0	150.0	155.0	110.0	150.0
TSS	mg/L	1.0	2.0	4.0	3.0	5.0	4.5	1.0	3.0
TPH as Oil and grease	n/a	None	None	None	None	None	None	None	None
	mg/L	<5	<5	<5	<5	<5	<5	<5	<5
TPH (C6 – C36)	µg/L	<50	<50	<50	<50	<50	<50	<50	<50
Enterococci	MPN/100mL	<10	<10	**83.0**	82.5	<10	<10	<10	<10

A.2.1 Trigger assessment outcomes

Compliance Survey 3 median Enterococci values at impact sites (83.0 MPN/100mL) exceeded both the reference site value (<10 MPN/100mL) and the trigger value (50 MPN/100mL), therefore a trigger investigation report was completed.

The resulting investigation determined that the elevated Enterococci results were not a result of the Ichthys LNG jetty outfall discharge, given in-line monitoring results and initial dilution. Elevated results may have been a result of initial flush of Darwin Harbour triggered by recent rainfall events.

A surface film noted at impact sites during Compliance Survey 5 was also noted at reference sites, therefore was not considered a trigger exceedance. It was determined that the film (which did not display any hydrocarbon properties such as rainbow colouring) originated form the ballast water discharge of a nearby moored LNG tanker.

A.3 Harbour sediment quality monitoring

An annual harbour sediment quality monitoring survey was undertaken in June 2020.

Metal and metalloid results for harbour sediment quality are presented in Table A-4. One arsenic trigger exceedance was recorded at control site C3. High levels of arsenic are known to naturally occur in Darwin Harbour and are considered a reflection of local geology rather than anthropogenic activities (Padovan 2003). Further, as the trigger exceedances were reported at control sites, elevated levels of arsenic were not attributed to Ichthys LNG operations.

All impact and control locations were below the laboratory limit of reporting (LOR) for benzene, toluene, ethylbenzene and xylene (BTEX) (Table A-5). All sampling locations had at least one result above the LOR for TPH, within the petroleum hydrocarbon fraction range of C15-C36. However, none of the results exceeded the guideline value of (280 mg/kg). The presence of TPH in all samples likely indicates the presence of non-petrogenic hydrocarbons of biological origin (e.g. vegetable/animal oils and greases, humic and fatty acids). Non-petrogenic hydrocarbons of biological origin are known to occur in Darwin Harbour with mangrove sediment samples analysed during the construction and operational phases returning positive results for TPH. Samples were reanalysed following silica gel clean-up, with the majority of samples subsequently returning a result below LOR, indicating the presence of non-petrogenic hydrocarbons.

Table A-6 and Figure A-1 provides a summary of the particle size distribution for impact and control sites. Impact sites contain a higher proportion of fines (i.e. silts and clays <63 µm) compared to control sites. It is important to consider this difference when comparing impact and control site data as fine particles such as clay and silt are more likely to absorb organic and heavy metal contaminants (Simpson et al. 2013). To address this difference, metals should be normalised to aluminium (Munksgaard 2013) and organics to total organic carbon (Simpson et al. 2013), as done for potential trigger exceedances in this survey.

Overall, there were no changes to harbour sediment quality associated with Ichthys LNG activities. As such, discharges have not adversely affected the declared beneficial uses or objective for Darwin Harbour.

Table A-4: Harbour sediment quality survey metal and metalloid results (bold values indicate an exceedance).

Site*	Aluminium	Antimony	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc	Mercury
Guideline values	n/a	2	20	1.5	80	65	50	21	200	0.15
Background level	n/a	n/a	16.0	0.071	17.5	4.7	8.8	8.7	21.4	n/a
I1	8180	<0.50	11.50	<0.1	23.7	5.8	8.6	7.5	23.0	<0.01
I2	8250	<0.50	9.47	<0.1	24.1	5.6	8.3	7.6	21.8	<0.01
I3	7850	<0.50	10.50	<0.1	23.0	5.2	7.9	7.5	20.7	<0.01
I4	7020	<0.50	8.79	<0.1	20.9	4.9	7.1	6.4	19.3	<0.01
I5	8360	<0.50	9.85	<0.1	23.7	5.7	8.5	7.3	21.5	<0.01
I6	8760	<0.50	10.10	<0.1	24.7	5.8	8.6	7.8	23.0	<0.01
I7	9430	<0.50	10.60	<0.1	26.3	6.8	9.3	8.4	23.8	<0.01
I8-1	7600	<0.50	9.37	<0.1	21.1	4.8	7.8	6.7	19.5	<0.01
I8-2	7810	<0.50	9.83	<0.1	21.8	5.0	8.1	6.9	20.0	<0.01
I8-3	8400	<0.50	9.69	<0.1	23.5	5.7	9.0	7.4	22.7	<0.01
I9	6390	<0.50	9.82	<0.1	19.0	4.2	7.3	5.8	16.8	<0.01
I10	7810	<0.50	11.80	<0.1	21.7	4.9	7.7	6.9	19.8	<0.01
I11	7570	<0.50	9.63	<0.1	21.5	5.2	8.2	6.9	19.7	<0.01
I12	7060	<0.50	10.20	<0.1	20.3	4.7	7.8	6.4	18.7	<0.01
I13-a	6240	<0.50	9.74	<0.1	18.9	6.5	7.2	6.1	17.8	<0.01
I13-b	6100	<0.50	9.19	<0.1	19.2	6.1	5.6	6.4	17.7	<0.01
I13-c	11000	0.3	12.00	0.05	28.0	10.0	8.9	12.0	30.0	0.01
I14	5970	<0.50	16.80	<0.1	39.1	4.2	10.8	5.1	17.6	<0.01
I15	7240	<0.50	10.90	<0.1	20.6	4.9	8.4	6.5	18.8	0.01
I16	1530	<0.50	9.00	<0.1	5.6	1.0	1.9	1.5	4.0	<0.01
C1-1	3400	<0.50	12.20	<0.1	13.2	2.8	4.5	3.2	9.5	<0.01
C1-2	2780	<0.50	11.30	<0.1	11.2	2.2	3.9	2.6	7.9	<0.01
C1-3	3290	<0.50	13.30	<0.1	13.8	2.6	4.4	3.1	8.9	<0.01
C2	6400	<0.50	9.72	<0.1	20.2	5.0	7.9	5.6	18.4	<0.01
C3	3310	<0.50	**22.90**	<0.1	22.0	1.4	5.6	2.8	6.7	<0.01
C4	3700	<0.50	15.70	<0.1	42.2	1.8	9.2	2.0	4.6	<0.01

* C = Control Site, I = Impact site.

Table A-5: Harbour sediment quality survey organic results

Site*	Total organic carbon (%)	TPH (mg/kg)	BTEX (mg/kg)
Guideline values	n/a	280	n/a
Background level	n/a	n/a	n/a
I1	1.28	53	<1.0
I2	1.13	34	<1.0
I3	0.94	24	<1.0
I4	0.86	24	<1.0
I5	1.17	37	<1.0
I6	0.96	44	<1.0
I7	1.09	38	<1.0
I8-1	1.01	35	<1.0
I8-2	1.01	18	<1.0
I8-3	1.10	19	<1.0
I9	0.91	38	<1.0
I10	1.14	40	<1.0
I11	0.96	27	<1.0
I12	0.97	20	<1.0
I13-a	0.78	26	<1.0
I13-b	0.85	23	<1.0
I13-c	0.90	<275	<1.0
I14	0.74	25	<1.0
I15	1.06	51	<1.0
I16	0.49	28	<1.0
C1-1	0.54	23	<1.0
C1-2	0.51	14	<1.0
C1-3	0.49	15	<1.0
C2	0.85	18	<1.0
C3	0.39	46	<1.0
C4	0.23	<14	<1.0

* C = Control Site, I = Impact site

Table A-6: Harbour sediment quality survey mean particle size composition (%)

Sites	Clay (<4 µm)	Silt (4-63 µm)	Sand (63-2,000 µm)	Gravel (>2,000 µm)
Impact	9.81	54.88	33.47	1.84
Control	5.33	32.82	50.12	11.73

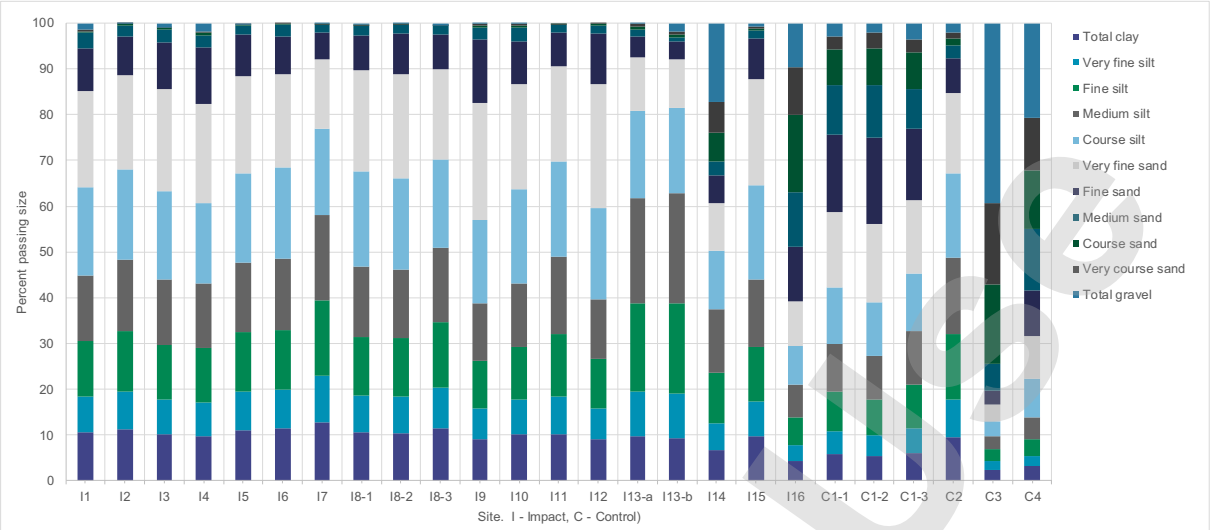

Figure A-1: Harbour sediment quality survey particle size distribution

A.3.1 Trigger assessment outcomes

No trigger exceedances were reported for this period. The arsenic exceedance was limited to one control site, therefore is not attributable to Project activities. In addition, high levels of arsenic are known to naturally occur in Darwin Harbour and are considered a reflection of local geology rather than anthropogenic activities (Padovan 2003). As such, no further investigation was undertaken.

A.4 Groundwater monitoring

Two groundwater surveys were completed in the reporting period in July 2019 and January 2020. A high-level summary of groundwater results and trends is provided below. Note presentation of groundwater data trends include data collected during the construction phase.

A.4.1 Physio-chemical

Physio-chemical monitoring results measured during the reporting period are consistent with those from the construction period and 2018/2019 LDMP. Ichthys LNG is located on low-lying peninsula connected to the mainland by a small isthmus. Most of the groundwater wells are located around the perimeter of Ichthys LNG and are saline with average electrical conductivity of 30,000 to 40,000 µS/cm (Figure A-2). Groundwater is also acidic to neutral with average pH typically between 5.2 and 5.8 (Figure A-3). Similar to previous surveys, groundwater elevation was higher (e.g. water table was shallower) following the wet season and decreased during the dry season (Figure A-4).

The standing water level (SWL) of groundwater at Ichthys LNG is influenced by rainfall, although some bores are located slightly below the highest astronomical tide line and are tidally influenced. As such, these wells have less variability in their SWL. Note the reduced SWL in the reporting period is likely to be associated with low rainfall over the 2018/2019 and 2019/2020 wet seasons. Further, peak SWL typically occurs in September/October, while SWL is lowest in February/March, while groundwater surveys for the reporting period were completed in July 2019 and January 2020. An assessment of groundwater fluctuations during the construction phase of Ichthys LNG (2013 to 2019) concluded that construction of Ichthys LNG had not adversely impacted groundwater levels (Greencap 2019).

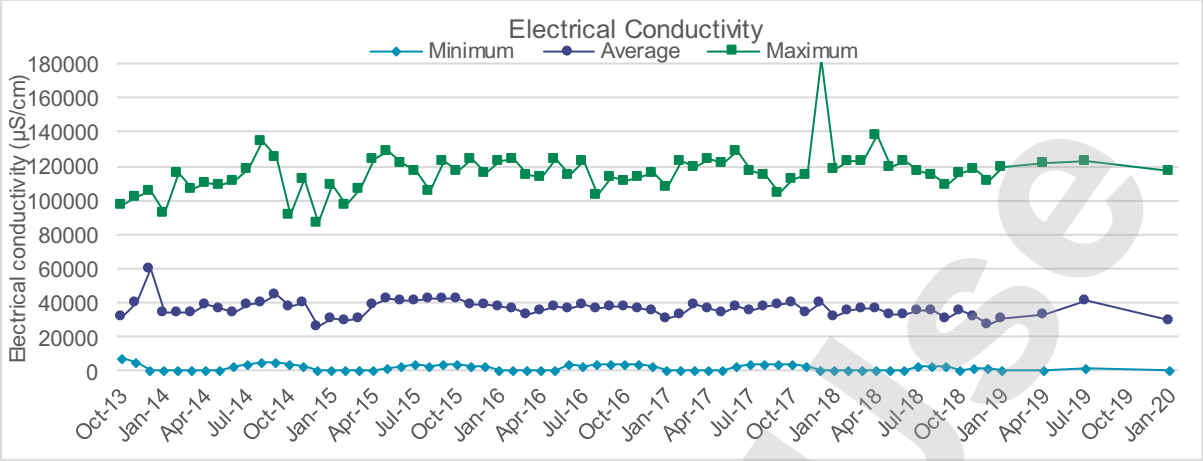

Figure A-2 Average, minimum and maximum electrical conductivity for Ichthys LNG groundwater wells

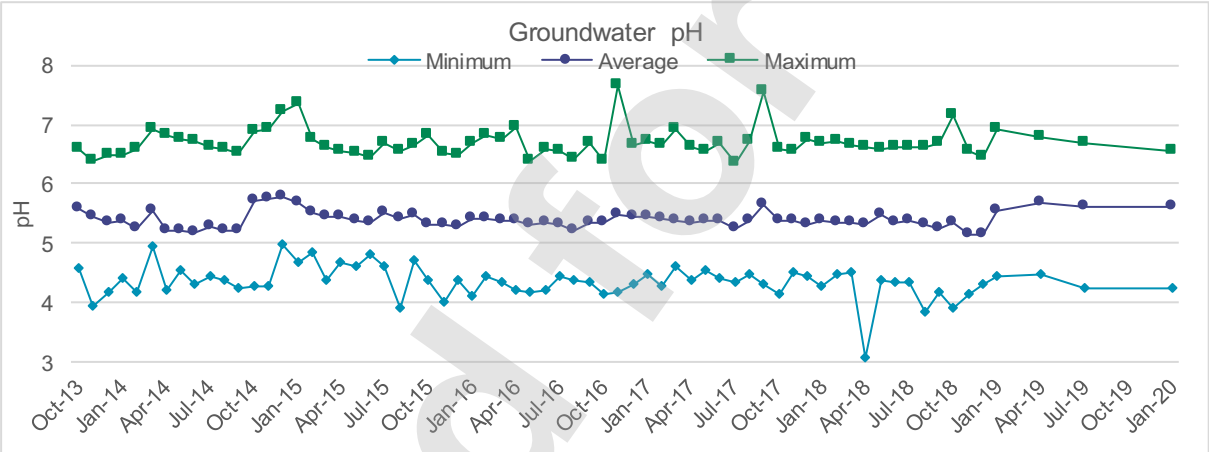

Figure A-3 Average, minimum and maximum pH for Ichthys LNG groundwater wells

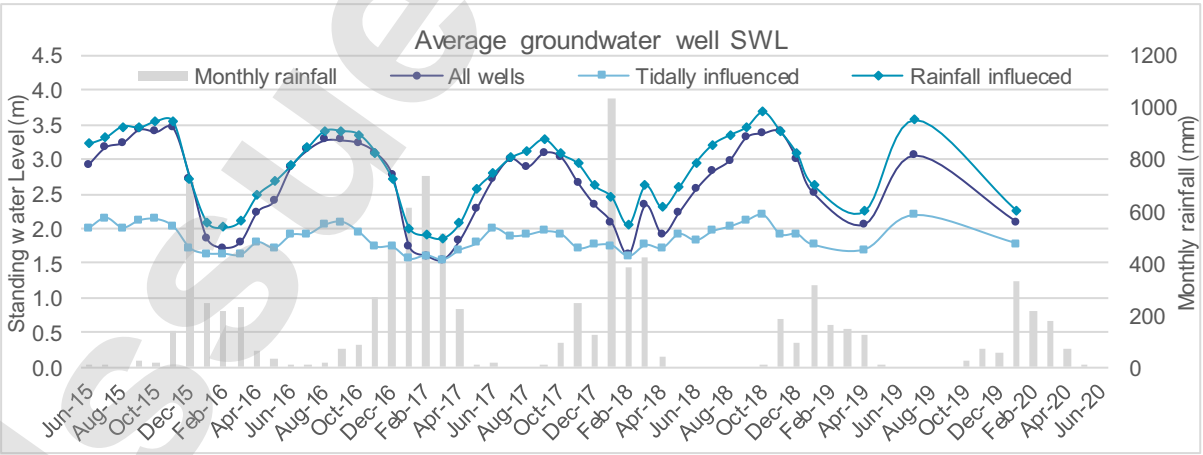

Figure A-4 Average SWL for Ichthys LNG groundwater wells

A.4.2 Nutrients

Nutrient monitoring results measured during the reporting period were generally consistent with those from the construction period and previous operations 2018/2019 Compliance Report. Nutrient concentrations are known to vary inter-annually and seasonally (Figure A-5 and Figure A-6). Nutrients can also be highly variable between groundwater wells (Figure A4-6).

During the reporting period, and similar to 2018/2019 Compliance Report, ammonia was the nutrient that had the greatest number of trigger exceedances (10 in Survey 4; July 2019 and five in Survey 5; January 2020). Ammonia also demonstrated a strong seasonal trend, with concentrations increasing during the dry season and decreasing in the wet season (Figure A-7). Interannual variability is likely to be associated with natural factors such as rainfall; both the total rainfall and timing of rain (e.g. early in the season or late in the season). The 2019/2020 wet season rainfall was well below average and the driest wet season since construction of Ichthys LNG began. This follows on from the previous wet season, which at that point in time was the driest wet season on record and well below average. The dry 2019/2020 wet season has likely contributed the concentrations and subsequently the number of ammonia exceedances recorded during the reporting period.

Overall the variations in nutrient concentrations measured are considered to be the result of natural variations and not attributable to Ichthys LNG activities.

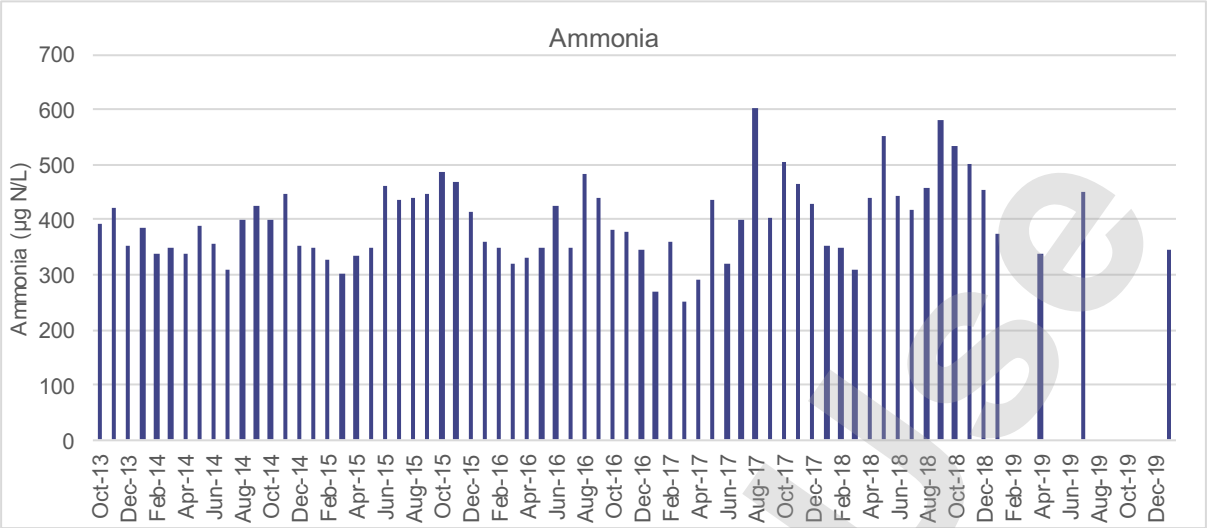

Figure A-5: Average ammonia concentrations for all groundwater wells

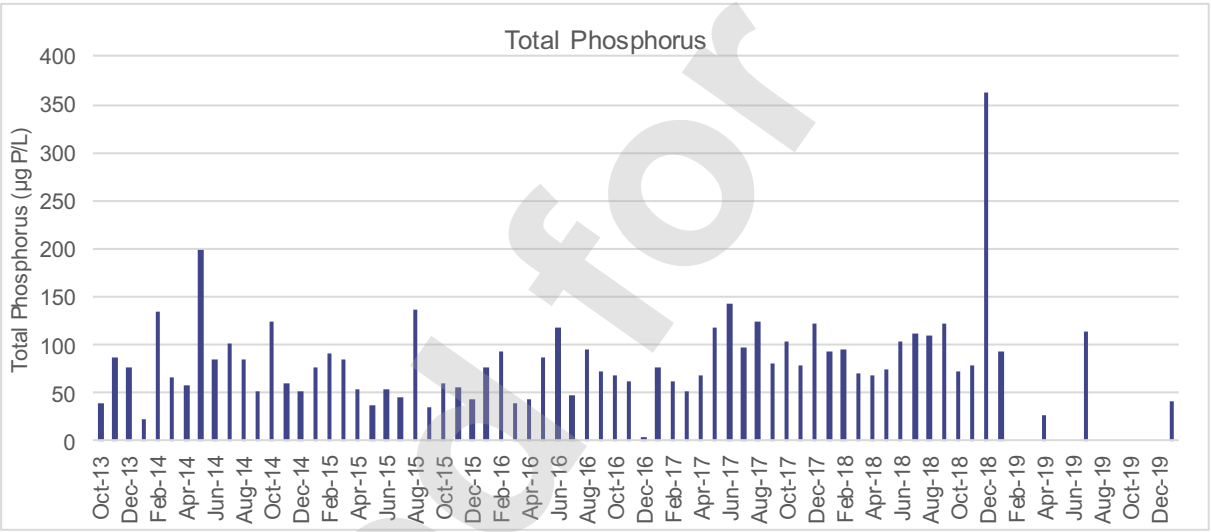

Figure A-6: Average total phosphorus concentrations for all groundwater wells

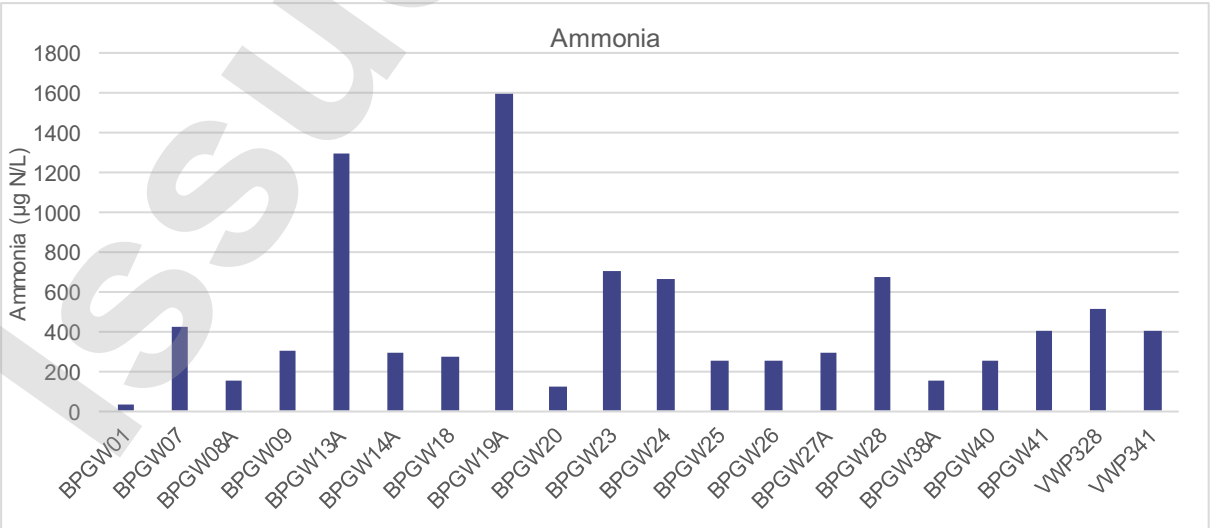

Figure A-7: Groundwater survey 4 ammonia concentrations

A.4.3 Metals and metalloids

Groundwater metal concentrations measured during the reporting period were generally consistent with those from the construction period and previous operations 2018/2019 Compliance Report. Similar to nutrients, metal concentrations are known to vary inter-annually and seasonally (see Figure A-8 for an example). Metals can also be highly variable between groundwater wells (see Figure A-9 for an example).

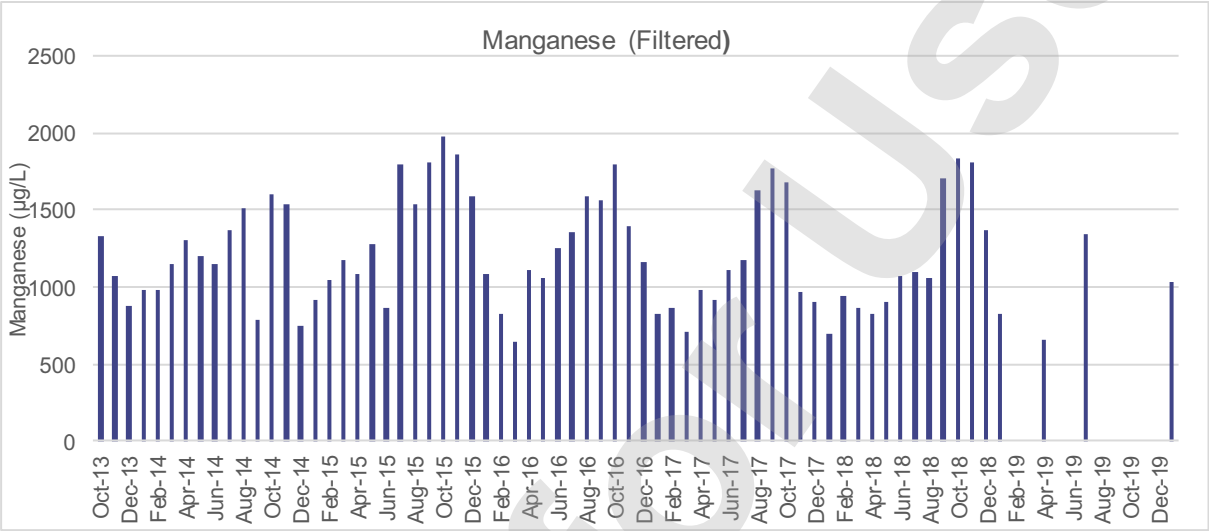

Figure A-8: Average manganese concentrations for all groundwater wells

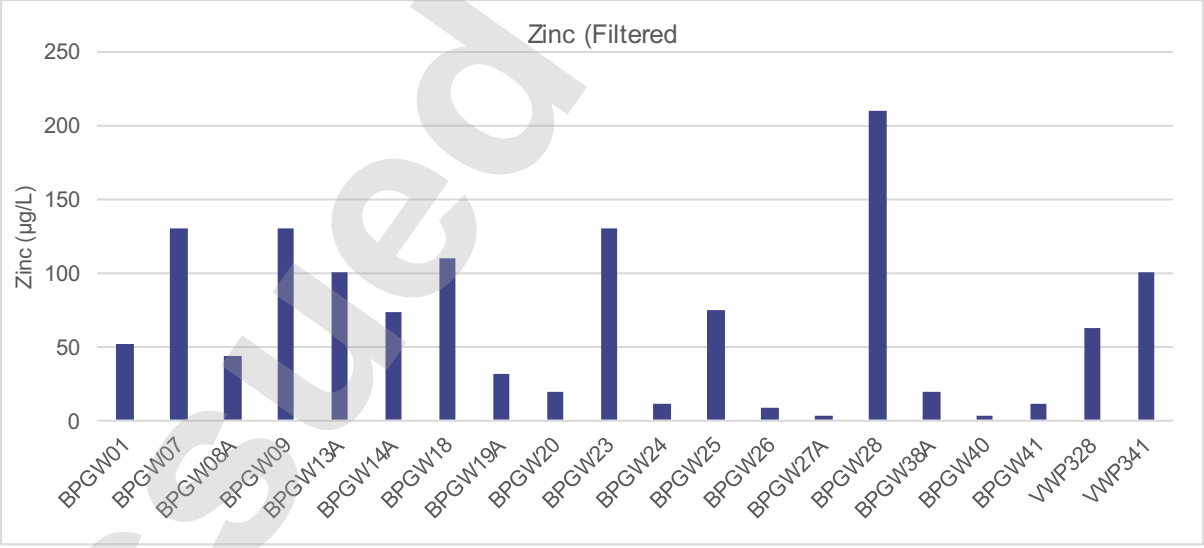

Figure A-9: Groundwater survey 4 zinc concentrations

During the reporting period and similar to 2018/2019 Compliance Report, zinc was the metal that had the greatest number of trigger exceedances (12 in July 2019 and four in January 2020) and showed a strong seasonal trend, whereby concentrations typically increase during the dry season and typically decrease in the wet season following the onset of wet season rainfalls (see Figure A-10 for example of seasonality at a well).

Interannual variability is likely to be associated with natural factors such as rainfall; both the total rainfall and timing of rain (e.g. early in the season or late in the season). The 2019/2020 wet season rainfall was well below average and the driest wet season since construction of Ichthys LNG began. This follows on from the previous wet season, which at that point in time was the driest wet season on record and well below average. The dry 2019/2020 wet season has likely contributed the concentrations and subsequently the number of zinc exceedances recorded during the reporting period.

Overall the variations in metal and metalloid concentrations measured are considered to be the result of natural variations and not attributable to Ichthys LNG activities.

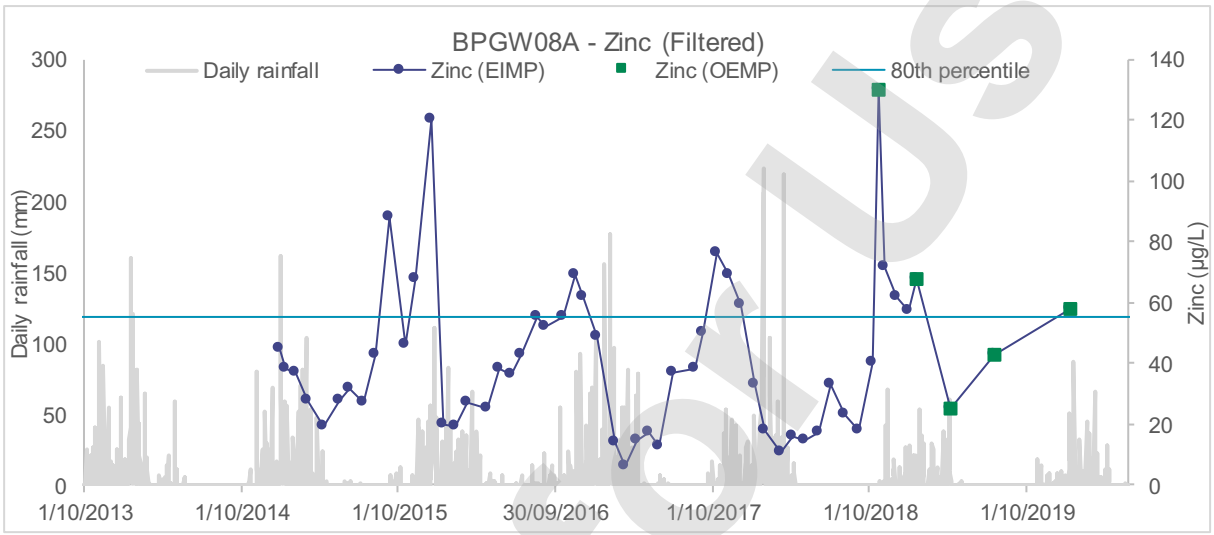

Figure A-10: Groundwater well BPGW08A zinc (filtered) concentrations with daily rainfall

A.4.4 Organics

No BTEX or phenols were reported in any of the samples from any of the wells during the reporting period, there was also no detection of light non-aqueous phase liquid at any well during the reporting period. A positive total recoverable hydrocarbon (TRH) result (200 µg/L) for well VWP328 was reported in July 2019, the only TRH result for the reporting period. The reported TRH concentration was not a trigger exceedance as it was below the TRH trigger value (600 µg/L). During the construction phase 31 positive TRH groundwater samples were reported. Twenty three of these were reanalysed following silica gel clean-up for TPH, all of which returned results below laboratory LOR indicating presence of non-petrogenic hydrocarbons (e.g. lipids, plant oils, tannins, animal fats, proteins, humic acids, fatty acids). Although silica gel clean-up wasn't undertaken for the positive result at VWP328 in July 2019, it is likely this was caused by non-petrogenic hydrocarbons similar to previous positive detections. It was also noted that the following January 2020 survey reported TRH below laboratory LOR. Note as per the LDMP, silica gel clean-up is only completed when TRH results exceed the trigger value.

A.4.5 Microbiological

Faecal coliforms (total) and *E. coli* were not detected at BPGW19A during the reporting period, while low concentrations were reported in January 2020 at BPGW27A (Table A-7

Table A-7: Microbiological results for the reporting period

Well	Date	*E. coli* (mpn/100 mL)	Faecal coliform (total) (mpn/100 mL)	Biological oxygen demand (mg/L)

BPGW19A	Survey 4	<1	<1	2
	Survey 5	<1*	<1*	34
BPGW27A	Survey 4	<1	<1	<1
	Survey 5	9*	9*	4.9

*cfu/100 mL, equivalent to mpn/100 mL

A.4.6 Trigger assessment outcomes

In accordance with the receiving environment adaptive management process outlined in the LDMP, groundwater trigger exceedances were investigated. A summary of the number of trigger exceedances by survey is provided in Table A-8

Investigation for all trigger exceedances using multiple lines of evidence concluded that the reported trigger exceedances were likely natural (e.g. represent seasonal trends and natural variability) and no further evaluation or management response was required.

Table A-8: Summary of groundwater trigger exceedances

Date	Month	Physio-chemical	Nutrients	Metals	Total
Survey 4	July	4	23	29	56
Survey 5	January	5	14	36*	55*

*Includes 11 technical trigger exceedances which occurred as a result of laboratory LOR being higher than the trigger value and benchmark level

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Revision	Date and Time	Issue Reason

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