GAS IMPORT JETTY AND PIPELINE PROJECT
ENVIRONMENT EFFECTS STATEMENT
INQUIRY AND ADVISORY COMMITTEE

TECHNICAL NOTE

TECHNICAL NOTE NUMBER:	TN 015
DATE:	07 October 2020
LOCATION:	Crib Point Jetty Works
EES/MAP BOOK REFERENCE:	Technical Report A
SUBJECT:	Response to RFI 007 – Section 2.3 Regasification when LNG tanker is present
SUMMARY	The information in this technical note explains the regasification process when a LNG Carrier is present.
REQUEST:	Explain the discharge and water quality implications of re-gasification operations (and the discharge ports) when an LNG tanker is moored beside the FSRU.

NOTE:

Introduction

1. This question is similar to a more pointed question asked on behalf of MPSC and addressed in TN 015, namely, whether the FSRU will operate while there is an adjacent LNG Carrier.

2. The basis of the question presumably arises from the conclusions of the hydrodynamic modelling summarised at Table 6-11 in EES Technical report A, Part 1, reproduced below.

Table 6-11. Summary of Results for Chlorine and Temperature Predictions

Production rate	Operating Mode	Vessels at Crib Point Jetty (Berth 2)	Chlorine above Guideline Value (6 µg/L)	Temperature above/below Guideline Value (0.5 °C)
Peak	Open loop	No LNG Carrier	Complies	0.7 ha
Average	Open loop	No LNG Carrier	Complies	0.5 ha
Peak	Open loop	With LNG Carrier	5 ha	20 ha
Average	Open loop	With LNG Carrier	2 ha	12 ha
One-third Peak	Open loop	With LNG Carrier	1 ha	6 ha
Peak	Closed loop	No LNG Carrier	0.2 ha	0.2 ha
Peak	Closed loop	With LNG Carrier	0.2 ha	0.3 ha

3. The table provides the results for chlorine and temperature predictions when the FSRU is operating while an adjacent LNG Carrier is moored. The critical point is the operation of the FSRU, rather than the presence of the adjacent LNG Carrier. While the FSRU is operating, the hydrodynamic model provides for seawater discharge from 6 ports facing east. The discharge flow is interrupted by the presence of an adjacent LNG Carrier. Where the FSRU is not in operation, there is no discharge from the east facing ports, so the presence of an adjacent LNG Carrier is immaterial.

4. Table 6-11 includes the results for open loop operation, which is the primary proposed mode of operation for the FSRU. The intake and discharge of seawater is similar for the operation of combined loop. For the purposes of this TN, operation in closed loop can be set aside.

5. Table 6-11 also assumes that the FSRU is operating at its peak rate (750 mmscf/d -3 trains operating including in closed loop), average rate (500 mmscf/d – 2 trains operating) or low rate (250 mmscf/d -1 train operating).

6. In the scenarios summarised in Table 6-11 the worst case is shown while there is an adjacent LNG Carrier and peak rate of operation in open loop. This scenario results in an area of impact of 5 ha where chlorine levels are above the guideline value of 6µg/L (0.006mg/L) and an area of 20 ha where the temperature differential is above/below the guideline value 0.5°C.

7. The best case in Table 6-11 is shown when there is no adjacent LNG Carrier while the FSRU is operating. As explained in the summary, the area of chlorine exceedance in this scenario is limited to the 40 metre discharge flow (albeit not at any point on the sea bed), and the area of temperature differential above/below the guideline value of 0.5°C is limited to an area around the vessel of 0.7 ha in peak operation (note this is predicted to be 0.5 ha in average operation).

Minimising the area of impact – Operations Environment Management Plan

8. As part of the EMP, the operation of the FSRU is proposed to be regulated by an approved Operations Environment Management Plan (**OEMP**) prepared in consultation with the EPA and approved by the Minister for Planning under Clause 4.3.4 of the Incorporated Document.

9. The EMP is also required to be generally consistent with any works approval granted by the EPA.

10. AGL has proceeded on the basis that:

    (a) The EES models scenarios to inform the assessment of environmental impacts.

    (b) The actual operation of the FSRU will be consistent with a minimised area of impact, regardless of the assessment of acceptability of impacts of a larger area of impact.

    (c) The OEMP would be prepared on the basis that the impacts of the FSRU must be contained within the minimised area of impact identified for the purpose of the OEMP or any Works Approval.

    (d) If the FSRU is operated while an adjacent LNG Carrier is moored it would be necessary to innovate the operations, or to design, to achieve this . For example, as shown in the witness statement of Dr Ian Wallis, the discharge ports could be reconfigured so as to allow the FSRU to continue to operate at the low rate while there is an adjacent LNG Carrier.

11. The effect is that the area of impact will be confined to the minimised area.

12. In his expert witness statement, Dr Wallis was instructed to assist to formulate a minimised area of impact which could be used as the basis for an appropriate Mitigation Measure (**MM**) / Environmental Performance Requirement (**EPR**) to be given effect in the OEMP.

13. A draft OEMP has not yet been prepared as it would follow the recommendations of the IAC, a final set of MMs/EPRs and consultation with the EPA. By way of background, an internal memorandum prepared by AGL's project director for the purposes of preparing a consultation draft of the OEMP is attached to this TN.

A Performance Based Approach

14. For the purposes of the assessment by the IAC, the response to item 7 is summarised as follows:

    (a) The area of impact for chlorine and temperature variation is demonstrated to be minimised when the FSRU is operated without an adjacent LNG Carrier;

    (b) The area of impact for chlorine and temperature variation should not exceed the minimised areas of impact that would result from the operation of the FSRU when no LNG Carrier is adjacent to the satisfaction of the EPA ;

    (c) This can be given effect by means of an appropriate MM /EPR and/or within the OEMP or any Works Approval;

    (d) Any requirement should be performance based to enable engineering, design, and operational innovation and to support continued operation of the FSRU if practical and to the satisfaction of the EPA.

15. The revised MM/EPR in the Day One EPRs includes the following:

    Except as approved or required by the EPA, the OEMP must include requirements that discharges from the FSRU must not exceed:
    a. a chlorine residual concentration of 0.1mg/L;
    b. a temperature variation of 7°C from ambient;
    c. a chlorine residual concentration of 0.006mg/L beyond a distance of 40 metres from the FSRU.

CORRESPONDENCE: N/A

ATTACHMENTS: 1 Attachment.

1. Memorandum, Gas Import Jetty Project – Marine Operational Parameters (21 September 2020).

Attachment 1

Memorandum

To:	Markus Brokhof – Chief Operating Officer, Integrated Energy
From	Lucy Martin – General Manager, Major Projects
Endorsed:	Doug Jackson - Executive General Manager, Group Operations, David Moretto - General Manager Integrated Portfolio Planning, Paul Meech, Program Director – Project Spirit, Major Projects, Ricky McNally - Project Director, Major Projects, Brian Kitney - Head of LNG Origination, Origination,
Subject:	**Gas Import Jetty Project – Marine Operational Parameters**

Dear Markus

This memorandum reflects the outcomes of the various review meetings held in recent months and informs the preparation of the Operations Environment Management Plan (OEMP) as it would affect core operational parameters which may impact on the intake and discharge of seawater at Crib Point. While it is too early to prepare a draft OEMP, it is appropriate to commit to some operational parameters to guide internal decision making, and to help to inform the assessment process by the project team, consideration by the IAC, and consultation with the EPA and other relevant stakeholders. It is assumed that the OEMP will need to be consistent with any operating licence issued by the EPA and that operational limits would be applied.

1. Incorporated Document

Under the Incorporated Document (Clause 4.3.2), prior to commencement of use and development, an Environmental Management Plan (EMP) must be prepared to the satisfaction of the Minister for Planning and in consultation with the Mornington Peninsula Shire Council.

Clause 4.3 requires that the EMP must set out the process and timing for development of an OEMP and other plans and procedures required by the mitigation measures including the process and timing for consultation with relevant stakeholders including DEWLP, Worksafe, the EPA and POHDA.

There will be an overlap between aspects of the OEMP and any relevant licence or requirement on operations imposed by the EPA. Further, aspects of the operations inform the potential for environmental impacts to occur, and may properly be reflected in mitigation or environment performance measures together with any refinements or improvements that may emerge from the assessment by the Inquiry and Advisory Committee.

2. Parameters EES

For the purpose of modelling potential environmental effects in the EES, various worst case scenarios were adopted, as well as some variations to these scenarios. For example, the hydrodynamic modelling includes scenarios depending on rate of flow and tidal conditions.

This is appropriate as the FSRU is designed to have an engineering capacity to meet future demand if required albeit it is anticipated that the intensity of operation will vary throughout the operating life of the facility and will not operate continuously at full engineering capacity in the initial phase. For example, while not proposed as a limit, the EES records that the FSRU would initially receive approximately 45 petajoules (PJ) of LNG per annum (approximately 12 LNG carriers) and that the amount of LNG could be increased to 160 PJ per annum (approximately 40 LNG carriers) depending on demand. Beyond the initial phase it is difficult to predict when demand in Victoria would require additional supplementary supply from Crib Point, either on an annual basis or short term for system

security, as this may be influenced by a range of factors. Accordingly, to ensure flexibility, the operational limits should be set on the basis that the marine impacts must not exceed the best case scenarios that can be achieved by design and operational decisions.

For the OEMP, and in consultation with the EPA, it will be necessary to state with sufficient clarity the proposed operations, including any operational limits, and the timing and processes for any change to those limits over time.

The OEMP is intended to be a document that can be reviewed from time to time in consultation with the EPA and with the approval of the Minister. This provides an opportunity for revisions or changes to operation over the 20 year life of the Project to be considered in consultation with the EPA and with the benefit of the results of monitoring programs.

3. Operational Parameters - Consultation Draft

This memorandum provides a framework for core operational parameters informing the Project premised on possible project limits. The core operational parameters are set out in Annexure A.

4. Monitoring

The consultation process should finalise monitoring programs to be undertaken throughout the life of the Project. It is envisaged that the OEMP would include a regular review procedure, eg, every 3 years, providing updates based on monitoring. This would include water quality and verification monitoring. There are precedents available to support this discussion.

5. Process and timing considerations

The preparation of an OEMP is required prior to the commencement of the development and use. The OEMP must cover a range of issues apart from marine issues of direct interest to the consultation phase with the EPA. The Project Team will observe the EES process and hearings and the IAC recommendations with a view to preparing a consultation draft for the OEMP as soon as possible.

It is noted that any OEMP will also have to consider the potential to deal with any unforeseen demand issues arising from any deficiencies of supply in the market or as a consequence of any energy crisis.

Kind regards,

Lucy Martin
General Manager, Major Projects

Annexure A – Core Operational Parameters

The core operational parameters are set out as follows:

Gas Import and Jetty Project - Marine Parameter	**Initial Phase (Years 1 and 2)**	**Operational Phase (From year 3)**
Permissible operating modes	'Open Loop' mode other than in circumstances where seawater temperature is close to or below 10° celsius 'Combined Loop' mode in circumstances where ambient seawater temperature is close to or below 10° celsius	'Open Loop' mode other than in circumstances where seawater temperature is close to or below 10° celsius 'Combined Loop' mode in circumstances where ambient seawater temperature is close to or below 10° celsius
Maximum daily gas production rate (mmscf/day*) without LNG carrier moored adjacent to the FSRU	Up to 500 mmscf/day	1 March – 31 August: Up to 750 mmscf/day 1 Sep – 28 Feb: Up to 500 mmscf/day
Maximum 14 day average (mean) daily seawater flow rates in open and combined loop regasification mode (m^3/day) without LNG carrier moored adjacent to the FSRU**	Up to 312,000 m^3/day	1 March – 31 August: –Up to 468,000 m^3/day 1 Sep – 28 Feb: Up to 312,000 m^3/day
Maximum daily gas production rate (mmscf/day*) with LNG carrier moored adjacent to the FSRU	Minimise the area of impact by establishing an area informed by the 'no adjacent vessel scenario' as a guide in the first instance and then design and operate to remain within this area of impact. To operate within the area of impact include	Minimise the area of impact by establishing an area informed by the 'no adjacent vessel scenario' as a guide in the first instance and then design and operate to remain within this area of impact. To operate within the area of impact include

	measures such as the following: • Zero transmission while adjacent vessel is present; or • Transmission rates as follows if the EPA is satisfied that the area of impact is not unreasonably changed or increased: ○ Rate equal to the regasification rate that can occur without any of the regasification trains operating; or ○ Up to 250,000 mmscf/d subject to discharge ports being situated to the west or to the south of the FSRU; or ○ Rate based on further or different design, operation or innovation that can be shown not to exceed or to reduce the area of impact.	measures such as the following: • Zero transmission while adjacent vessel is present; or • Transmission rates as follows if the EPA is satisfied that the area of impact is not unreasonably changed or increased: ○ Rate equal to the regasification rate that can occur without any of the regasification trains operating; or ○ Up to 250,000 mmscf/d subject to discharge ports being situated to the west or to the south of the FSRU; or ○ Rate based on further or different design, operation or innovation that can be shown not to exceed or to reduce the area of impact.
Maximum 14 day average (mean) daily seawater flow rates in open and combined loop regasification mode (m^3/day) with LNG carrier moored adjacent to the FSRU**	[To be determined to accord with regasification rate specified above].	[To be determined to accord with regasification rate specified above].

* Million standard cubic feet per day.

** Excluding cooling of freshwater generator and intermittent flows relating to ballast water, water curtain and fire testing.