

NOPSEMA Inspection - Okha Operations

Inspection details

| Duty holder(s) inspected | | |
|--|---|------------------------|
| Titleholder | Woodside Energy Ltd | |
| Entities inspected | | NOPSEMA Inspection No. |
| Petroleum Activity | Okha Operations | 3612 |
| Permissioning documents | | |
| Environment Plan | Okha Floating Production Storage and Offtake Facility Operations Environment Plan (Rev 7) | |
| Inspection dates | | |
| Onshore | 12-13 July 2022 Woodside offices | |
| Inspection team | | |
| Lead NOPSEMA Inspector | [REDACTED] | |
| Inspection Team | [REDACTED] | |
| Duty holder contacts | | |
| Nominated titleholder's representative (environment) | [REDACTED] | |

Report distribution

| Position | Company |
|---|----------|
| Records management | NOPSEMA |
| Offshore Environment Advisor - Production | Woodside |

Revision status

| Rev | Date | Description | Prepared by | Approved by |
|-----|-----------|--|-------------|-------------|
| A | 22-JUL-22 | Internal draft | [REDACTED] | [REDACTED] |
| B | 26-JUL-22 | Draft for discussion with duty holders | [REDACTED] | [REDACTED] |
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1. Inspection legislative framework and methodology

1.1. Legislative framework

NOPSEMA conducts inspections as part of its legislated function to implement an effective compliance monitoring strategy to ensure compliance with NOPSEMA listed laws¹. Inspections are undertaken by NOPSEMA inspectors appointed by NOPSEMA under Section 602 of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGSA).

This report has been prepared as required by the OPGGSA² and includes the Inspectors' conclusions from the inspection and the reasons for those conclusions. Where those conclusions indicate that there is non-compliance with the requirements of the OPGGSA, and/or commitments in permissioning document(s), resulting in a risk or potential risk to environmental management, the Inspectors have provided advice regarding the action(s) or outcomes recommended to address these conclusions.

A list of acronyms and abbreviations used in this report are provided in Appendix A.

1.2. Inspection objective and scope

The objectives of this inspection are to ascertain, for the scopes stipulated below, whether risks or impacts to the environment are being managed by the duty holder(s) as required by their duties under the OPGGSA and in accordance with accepted permissioning document(s); and that the controls described in those documents are effective in reducing these risks to ALARP and to an acceptable level.

The planned scope of this inspection was:

- Environment-critical equipment maintenance and management - ECE maintenance tracking and TI status; ECE assurance.
- Environmental management systems - Compliance and performance monitoring; and assurance activities.
- Verification of progress on actions resulting from incident (NTF10833) notified to NOPSEMA – gas leak from W2M manifold.

1.3. Preparation and conduct of the inspection

The inspection team prepared a planned inspection brief, including a list of documentation required prior to the inspection and proposed inspection itinerary and scope, and issued it to Woodside Energy Ltd (Woodside) on 17 May 2022. The documentation requested was received on 9 June 2022 and reviewed by the inspection team prior to arriving at the duty holder's premises. The inspection was amended on 10 July from a planned offshore inspection to an onshore inspection due to COVID cases at the facility, and the inspection brief was reissued 11 July to reflect this change.

On arrival at the premises, an entry meeting was held to communicate the purpose of NOPSEMA's inspection, the powers of the Inspectors under the OPGGSA and to provide an opportunity to discuss and clarify the inspection brief (including the scope of the inspection and proposed itinerary). A list of persons present at this meeting is included in Appendix B:.

¹ NOPSEMA listed laws are defined in Section 601 of the OPGGSA.

² Under Part 2, Division 3 of Schedule 2A

NOPSEMA Inspectors sighted and collected documents and systems, and interviewed titleholder representatives in order to aid in their consideration of the topics and to obtain supporting information for their findings and conclusions.

As per NOPSEMA's inspection policy, a sampled approach was taken to assess the inspection scope and to arrive at the conclusions in this report. The findings and observations in this report provide the basis for the conclusions and compliance advice (where applicable) but are neither exhaustive nor definitive.

Before leaving the premises, the inspection team prepared an Inspection Exit Brief, which was provided to and discussed with key personnel (and offshore personnel by teleconference) during an exit meeting. A list of persons present at this meeting is included in Appendix B:. The draft report was provided to Woodside for clarifications and correction of any errors – as a result, minor changes were made to the report before finalisation.

2. Inspection results

The following sections contain the detailed observations, findings and conclusions for the topics covered in this inspection. To ensure compliance with their duties under the OPGGSA and/or the requirements of relevant permissioning document(s), NOPSEMA expects the duty holder to consider the conclusions, and the reasons for those conclusions, and undertake sufficient investigation/action to both fully understand the conclusions presented and to take action to:

- Reduce the risks and impacts to ALARP and acceptable levels
- Ensure compliance with their duties under the OPGGSA and/or the commitments made in relevant permissioning document(s).

Compliance advice, in the form of recommendations, has been provided to assist the duty holder in their consideration of the conclusions and the actions they may need to take to address those conclusions. This advice indicates the actions, outcomes or considerations that should be taken into account when determining how Woodside will address any identified risk gaps and return to compliance. The considerations may indicate better practice actions or outcomes that should be reviewed for implementation and/or provide a warning regarding potential future non-compliance. The management of risk will however always remain the responsibility of the duty holder.

2.1. Operational context

The facility was undertaking normal operations (and no flaring) at the time of the inspection. Heightened controls for COVID-19 management were in place.

2.2. Topic 1 – Environment critical equipment maintenance and management

2.2.1. Objective and summary of requirements

The objective of this scope was to evaluate systems and processes in use to maintain and provide assurance of environment critical equipment (ECE) integrity and availability. In particular, the inspection focused on:

- Systems, processes and tools used to track ECE item maintenance (s2.7.5, s7.1.5.2).
- ECE management improvement work as described in the EP (s7.1.5.2).
- Specific equipment functionality/availability (flash gas compressor [FGC]).
- The use of technical performance standards for maintenance and assurance (s7.1.1.2).
- Competency elements related to equipment maintenance (s7.4.2).

2.2.2. Observations and findings

Systems, processes and tools for ECE tracking

The inspectors requested evidence of systems, processes and tools in place to track technical integrity (TI) and ECE item maintenance. Evidence provided included weekly TI/SCE 'deep dives' conducted, the Safeguard dashboards and reports, and monthly and annual SCE reviews. Inspectors noted that the systems maintain visibility of maintenance and assurance deferrals and corrective actions; including at a leadership level. It was also noted that deviations from ECE compliance dates would require a signoff process. It was also noted that for the sampled time periods, TI compliance (for ECE items) on Okha was recorded at 100%. Inspectors concluded that systems in place for TI/SCE oversight appear to be comprehensive and appropriate; and that the SCE review mechanisms provide a good snapshot of performance for SCEs and demonstrate active management of bad actors/common failures across multiple facilities.

ECE improvement work

The EP describes 'improvement work' to *"optimise management of equipment required for regulatory compliance..."* and that *"this parallel process will facilitate similar management as currently in place for P31..."* (referencing the OKHA FPSO Operations Performance Standard Environmental Emissions Monitoring & Controls [P31]). The inspectors queried the scope and timeline of the 'improvement work', and reviewed a copy of the draft Okha Regulatory Requirements standard. Inspectors noted that the standard covers the same elements as the P31 standard. No implementation date has yet been set, as the P31 standard is considered to be functioning adequately by Woodside.

FGC functionality

The FGC was out of service in 2021 and additional flaring was being recorded by the facility. The overhaul and reinstallation was planned for April 2022. The inspectors viewed records and sought clarification confirming the return to service, sighting the completed FGC Startup Checklist (dated 16/05/2022), associated FGC Reinstallation Procedure (PRT 2100330287), and two MOCs required to facilitate successful restart. Inspectors noted that the FGC availability enabled GHG emissions to return to baseline levels for the facility.

Technical performance standards

The EP contains multiple control measures that are managed through the use of the technical performance standards F22 – Open Hazardous and Non-Hazardous Drains, and P31 - Environmental Emissions Monitoring & Controls (EPS 5.4a, 6.4, 7.3, 8.6, 14.3, 16.3 and s7.1.1.2). A sampled approach was taken to validate the

maintenance and assurance status of ECEs contained in the F22 and P31 performance standards, with the assistance of Woodside personnel using the SAP system. Of the items sampled:

- F22 Performance Standard:
 - Assurance tasks for inspection and fitness for service assessment of open hazardous drain tanks were inspected (ref. AU053073). This work is described as 'periodic' in the performance standard (requirement F22.1), with no frequency specified for this item. The relevant work order in SAP identified a 4-yearly task, with the last PRT conducted in April 2021. The PRT work record was only partially completed, and signed off as 'tested ok' when not all components were tested. The work order frequency was then extended to 10Y, with supporting justification for this change unable to be located during the inspection.
 - The performance standard includes (requirement F22.1) a 2-yearly inspection of the open hazardous drains collection system and grid mesh (ref. AU052389). The most recent work order had been completed in May 2021. This work order recommended an additional action (coating refurbishment on a flange) which did not appear to be linked to any further notifications/actions.
 - The performance standard includes (requirement F22.2) a yearly inspection of oily water collection facilities (ref. AU052390). Annual inspections of oily water collection facilities were recorded for 2020-2022, and planned for 2023. The 2021 PRT recommended valve replacements to be undertaken on slops strainers. Evidence was sighted to show that this work is planned for the June 2023 shutdown. Inspectors queried whether the work required a shutdown to complete; as the engineer's comments in the work order indicate it doesn't need to wait for shutdown. It is not clear from the information sighted whether this work could/should be done earlier.
- P31 Performance Standard:
 - Produced water flow meter maintenance and calibration was inspected (requirement P31.1), with the performance standard indicating that the produced water flow meter (Tag No. 05FT450001) would be inspected as per the frequency in the Master Metering Register (DRIMS#10806492). The Master Metering Register indicates that there are two maintenance plans for this item – one 2-yearly task and one 4-yearly task. The frequency of work orders in SAP appears to reflect this.
 - The flare ignition system function testing (requirement P31.7, ref. AU052262) was inspected, with the performance standard indicating an adaptive frequency for function testing depending on performance as described in Table 1 of the PS. Flare ignition system function testing is currently being conducted at a 6-monthly interval, with 6 tests at a 3-monthly frequency completed before moving to 6-monthly, and an 'Enhance' system decision record of the shift in frequency per the PS. The most recent test was underway at the time of the inspection. The maintenance records support the current frequency as aligned with the adaptive approach contained within the PS.

Competency

The EP states that specific key roles (licence to operate [LTO] roles), including equipment maintenance, are actively tracked for compliance with LTO role requirements (s7.4.2). Inspectors confirmed this arrangement via the LTO Roles Report dashboard; and noted that at the time of inspection, the facility recorded 100% compliance with LTO role requirements.

2.2.3. Conclusion and advice

Conclusion [3612-1]

The inspectors conclude that based on the information provided during the inspection, appropriate oversight and maintenance of environment critical equipment is being undertaken at the Okha FPSO. The inspectors also conclude that the implementation of F22 performance standard assurance tasks held room for improvement, as it was not always clear whether tasks were being undertaken effectively.

The inspectors provide the following advice to assist Woodside in determining what actions to take to address the above conclusion. The inspectors recommend that Woodside consider:

- Revising the F22 performance standard to remove ambiguous language such as 'periodic', setting clear expectations for maintenance and assurance tasks.
- Utilising performance standard review processes to identify and rectify any discrepancies in maintenance tasks for the F22 performance standard.

2.3. Topic 2 – Environmental compliance monitoring

2.3.1. Objective and summary of requirements

The objective of this scope was to verify whether Woodside are undertaking sufficient compliance and performance monitoring, and assurance activities as specified in Section 7 of the EP. In particular, the inspection focussed on:

- Ongoing environmental monitoring of emissions and discharges (s7.5.1)
- Internal auditing and assurance activities to ensure environmental impacts and risks are continually being managed in accordance with EPOs and EPSs (s7.5.2)
- Environmental performance reporting (s7.7.3).

2.3.2. Observations and findings

Monitoring of emissions and discharges

The EP states that a range of systems and tools are in place to support the ongoing monitoring of environmental emissions and discharges from the Okha FPSO (s7.5.1). The inspection team sighted the Production Allocation System (also known as P2), the OMDAMP, Monthly HSE Performance monitoring reports, Performance One and the Production Function scorecards that demonstrated Woodside have appropriate visibility and management oversight for the ongoing monitoring of emissions and discharges from the activity.

Of the emissions and discharges being monitored the inspection team sampled a number of parameters during the inspection (e.g. monitoring of OIW, subsea chemicals and cooling water discharges). Inspectors verified that adequate monitoring of OIW discharge and cooling water volumes were undertaken during 2021. As an example, a review of the data contained in P2 and OMDAMP confirmed that there were no daily (averaged over 24hrs) OIW discharges above 30mg/L throughout 2021, consistent with the external reporting of compliance to NOPSEMA in the 2021 Annual Environmental Performance Report (ENVPROD-1907123793-9277).

The inspection team selected an IMR activity (i.e. Campaign 22/3) from the SSPL SCIMR Environment Project Register to verify the monitoring of subsea chemical discharges. While inspectors verified that Woodside have appropriate systems and tools in place to monitor subsea discharges (e.g. IMR Environment Questionnaire, SSPL – Assurance Evidence Sheet, End of Activity Reports) it was found that some of the required processes were not completed (i.e. SSPL – Assurance Evidence Sheet) and discharge volumes exceeded original estimates provided to the Production Environment Team (End of Activity - 2022 CWLH CK4 EHFL Replacement Site Report). Despite the inspection team sighting an email from the Production Environment Team requesting updates from the IMR Team of any expected change to discharge volume during the IMR activity, there was no evidence of any follow-up during the activity or review of the *End of Activity Report* to verify actual volumes discharged to the environment. In this regard, Woodside may wish to consider how current processes and tools can be further enhanced to ensure there is appropriate oversight and close-out of reporting when monitoring chemical discharges from IMR activities.

Internal auditing and assurance activities

The EP states that Woodside will conduct internal audits to review environmental performance against selected EPOs and EPSs (s7.5.2). The inspection team sighted the Production Offshore Environment EP Combined Inspection Schedule that highlights which EPO/EPS will be reviewed over a three-year rolling period. Inspectors noted that the scopes selected for the internal audits of 2020 (DRIMS #1400526153) and 2021 (DRIMS #1401698085) were consistent with the outputs of the scheduling tool and appeared appropriate for the impacts and risks evaluated in the EP.

The inspection team confirmed that systems and tools (e.g. ECAR, P2) appeared to have been appropriately used to support the 2020 and 2021 internal audit process. The tracking of evidence (as referenced in the 2021 ECAR) to confirm compliance against one of the audit scopes was verified by the inspection team (i.e. EPO5 – Produced Water). Inspectors also verified that actions raised in the 2021 internal audit (section 5.2) were tracked in the JIRA system, appropriately assigned to relevant personnel, and satisfactorily completed.

Environmental performance reporting

The Environment Regulations [Regulation 14(2)] requires Woodside to report on environmental performance to NOPSEMA on an annual basis. A review of the 2020 (DRIMS #1401713860) and 2021 (ENVPROD-1907123793-9277) Annual Environmental Performance Reports (EPRs) demonstrated reporting was undertaken in accordance with the timeframes specified in the EP (s7.7.3). The EPRs included reporting against environmental and Major Environmental Event (MEE) performance outcomes and standards, key environmental emissions and discharge data (e.g. flaring emissions, energy use and PFW discharge), and summaries of findings/actions from internal and external audits undertaken during the reporting period.

The information provided in the 2020 and 2021 EPRs appeared consistent with the outputs sampled from internal compliance monitoring tools (e.g. ECAR, P2) and internal and external audit finding, however the inspection team observed a minor discrepancy in the reporting of recordable incidents in the 2021 EPR. Specifically, section 3.2 of the 2021 EPR states there was one recordable event (e.g. breach of an EPO or EPS), however the Environment Breaches Database highlighted five breaches of EPOs or EPSs for 2021. It was unclear whether this was a typographical error or a classification/description difference. The inspection team also observed that the 2021 EPR report did not provide any information on the recordable event, despite section 3.2 of the EPR stating that this would be provided in section 6 of the report. From the observations made during the inspection, inspectors are of the view that the inconsistency found is most likely administrative in nature and not due to any deficiency at a system level.

2.3.3. Conclusion and advice

Conclusion [3612-2]

The inspectors conclude that at the time of the inspection Woodside are maintaining appropriate systems and tools to support ongoing compliance and performance monitoring, and assurance activities.

2.4. Follow up of previous incidents

2.4.1. Okha subsea manifold gas leaks

This incident was notified to NOPSEMA on 26 September 2021 (NOPSEMA reference NTF10766). The incident involved a gas leak being observed on the Wanaea 2-manifold (W2M). Follow-up information established that two separate leak locations were active; one being from a location where a flange clamp had been installed to control a previous leak, and a smaller weep at the WA9 PXOV location. At NOPSEMA's request, Woodside has been providing quarterly updates on the progress to remediate the leaks.

During this inspection the Inspectors received a verbal briefing (followed up by a written progress update [A857676]) on the progress to date. The inspectors observed that significant progress has been made towards installing a new clamp on the W2M leak; and this may be installed ahead of the committed Q2 2023 date, reducing the cumulative leak volume. The inspectors also noted that extensive evaluation of possible remediation options for the WA9 PXOV weep has been undertaken. The evaluation concluded that the current leak rate and inspection strategy are ALARP compared to other options, with an expected total leak of ~0.75 tonnes of methane before the end-of-field-life in 2031.

As a result of these observations and findings, the NOPSEMA Inspectors make the following conclusion

Conclusion [3612-C3]

The inspectors conclude that rectification works for subsea leaks identified at Okha are progressing appropriately.

Appendix A: Acronyms and abbreviations used in this report

| Acronym or abbreviation | Definition |
|-------------------------|---|
| ALARP | As Low As Reasonably Practicable |
| ECAR | EP Compliance Action Register |
| ECE | Environment critical equipment |
| EP | Environment Plan |
| EPO | Environmental Performance Outcomes |
| EPS | Environmental Performance Standards |
| EML | Environmental Management Law |
| FGC | Flash gas compressor |
| FPSO | Floating production storage and offtake facility |
| IMR | Inspection, Maintenance and Repair |
| LTO | Licence to operate (roles) |
| MEE | Major Environmental Event |
| MOC | Management of change |
| NOPSEMA | National Offshore Petroleum Safety and Environmental Management Authority |
| OPGGSA | Offshore Petroleum and Greenhouse Gas Storage Act 2006 |
| OMDAMP | Offshore Marine Discharges Adaptive Management Plan |
| SCE | Safety critical equipment |
| SCIMR | Subsea construction and inspection, maintenance and repair |
| SSPL | Subsea and Pipelines |
| TI | Technical integrity |
| W2M | Wanaea 2 manifold |
| WA9 PXOV | Wanaea 9 production crossover valve |
| Woodside | Woodside Energy Ltd |

Appendix B: Summary of meeting attendance

B.1: Entry and exit meetings

The Entry Meeting provided an opportunity for NOPSEMA to provide an overview of the planned inspection programme and confirm the itinerary. The Exit Meeting provided an opportunity for NOPSEMA to present the interim observations and conclusions from the planned inspection and for the facility's workforce to give their views. A list of personnel at the entry and exit meetings is included below:

| Name | Position | Organisation | Entry Mtg | Exit Mtg |
|------------|------------|--------------|-----------|----------|
| [REDACTED] | [REDACTED] | NOPSEMA | Y | Y |
| [REDACTED] | [REDACTED] | NOPSEMA | Y | Y |
| [REDACTED] | [REDACTED] | Woodside | Y | Y |
| [REDACTED] | [REDACTED] | Woodside | Y | Y |
| [REDACTED] | [REDACTED] | Woodside | Y | N |
| [REDACTED] | [REDACTED] | Woodside | Y | Y |
| [REDACTED] | [REDACTED] | Woodside | Y | N |
| [REDACTED] | [REDACTED] | Woodside | Y | Y |
| [REDACTED] | [REDACTED] | Woodside | N | Y |
| [REDACTED] | [REDACTED] | Woodside | N | Y |
| [REDACTED] | [REDACTED] | Woodside | N | Y |
| [REDACTED] | [REDACTED] | Woodside | N | Y |
| [REDACTED] | [REDACTED] | Woodside | Y | Y |
| [REDACTED] | [REDACTED] | Woodside | Y | Y |
| [REDACTED] | [REDACTED] | Woodside | Y | Y |
| [REDACTED] | [REDACTED] | Woodside | Y | Y |
| [REDACTED] | [REDACTED] | Woodside | Y | Y |

Appendix C: Summary of conclusions from this inspection

Conclusion [3612-1]

The inspectors conclude that based on the information provided during the inspection, appropriate oversight and maintenance of environment critical equipment is being undertaken at the Okha FPSO. The inspectors also conclude that the implementation of F22 performance standard assurance tasks held room for improvement, as it was not always clear whether tasks were being undertaken effectively.

Conclusion [3612-2]

The inspectors conclude that at the time of the inspection Woodside are maintaining appropriate systems and tools to support ongoing compliance and performance monitoring, and assurance activities.

Conclusion [3612-C3]

The inspectors conclude that rectification works for subsea leaks identified at Okha are progressing appropriately.