NOPSEMA
Australia's offshore energy regulator

KEY MATTERS REPORT

Nganhurra Operations Cessation

Document No: A757729

Date: 5 February 2021

Purpose of this report

NOPSEMA has accepted the Nganhurra Operations Cessation Environment Plan Revision 7 (the EP) submitted by Woodside Energy Ltd (the titleholder) for the decommissioning of the Nganhurra riser turret mooring (RTM), inspection, monitoring, maintenance and repair (IMMR) of Enfield subsea infrastructure, and well intervention activities in the Pilbara Region within the period 2020 to 2024.

The titleholder submitted the EP for assessment by NOPSEMA on 1 October 2020. It should be noted that an earlier version of the Nganhurra Operations Cessation Environment Plan (EP) was submitted on 20 December 2019 (Revision 3). Following further stakeholder consultation, Woodside elected to withdraw the earlier version of the EP under assessment (NOPSEMA reference: ID 5095) and submitted a new revision (Revision 6) on 1 October 2020. The revised EP included a more comprehensive evaluation of the impacts and risks associated with decommissioning the RTM via repurposing into an Integrated Artificial Reef (IAR), as well as further consideration of the practicability of onshore disposal.

In accepting the EP, NOPSEMA recognises that the primary environmental approval for the artificial reefing activity is an Artificial Reef Permit issued under the Environmental Protection (Sea Dumping) Act (1981) which is administered by the Department of Water Agriculture and the Environment (DAWE). The EP provides information on the end state when the RTM moves beyond the title boundary given these are impacts associated with the RTM decommissioning petroleum activity. The information in the EP is sufficient to assure NOPSEMA that the RTM will be decommissioned and environmental impacts and risks associated with being deployed as an artificial reef will be suitably managed under another credible regulatory regime (i.e. an artificial reef permit under the Environmental Protection (Sea Dumping) Act (1981)).

NOPSEMA has since completed its assessment of the EP against the requirements of the Environment Regulations and has accepted the EP subject to conditions on 5 February 2021.

This report explains how NOPSEMA took into account key matters that may be of interest to the public and accompanies the accepted Nganhurra Operations Cessation environment plan, revision 7 submitted by Woodside Energy Ltd, which is available on the NOPSEMA website and should be referred to for further information.

Further information

If you would like further information about the activity, please contact the titleholder's nominated liaison person specified in the EP and on NOPSEMA's webpage for the Nganhurra Operations Cessation activity.

If you would like to be notified of regulatory information on the activity, such as start and end dates and enforcement actions (if any), please subscribe to updates from the Underway Offshore page on NOPSEMA's website.

How NOPSEMA has taken into account key matters raised during the assessment and decision making process for the Nganhurra Operations Cessation EP

#	Matter	Titleholder response	NOPSEMA's assessment and decision
1	Concern regarding the disposal of the RTM in the offshore environment.	Woodside are seeking to deviate from the approved Nganhurra Operations Cessation Environment Plan (Revision 2) and dispose of the Nganhurra Riser Turret Mooring (RTM) offshore in the marine environment as part of an integrated artificial reef (IAR). The RTM removal methodology required for onshore disposal is no longer executable due to the failure and subsequent flooding of internal compartment 2 within the RTM. The compartment failure prevents the RTM being successfully deballasted, and the RTM being rotated to a horizontal position required for the towing of the RTM to Henderson for onshore disposal. Woodside has identified factors associated with the design and maintenance of the RTM that have led to this failure, including: • The Nganhurra RTM design concept was based on a similar Floating Production Storage Operation design from the early 1990s. • After installation, the base of the Nganhurra RTM (compartment 1) was, by design, filled offshore with 325 tonnes of iron ore slurry to provide ballast. Removing this ballast is not practicable.	NOPSEMA acknowledges that the design basis and initial RTM decommissioning as accepted in the Nganhurra Operations Cessation Environment Plan (Revision 2), was for onshore disposal at Henderson in Western Australia. As part of the EP assessment, NOPSEMA required Woodside to provide further information on the current integrity of the RTM and the engineering assessment of the activities required to decommission the RTM. These were requested to support Woodside's assessment of the probability of success and technical complexities associated with all onshore and offshore RTM decommissioning options (section 3.6 of the EP), and verify that onshore disposal is not practicable. NOPSEMA has also considered the information provided in Woodside's response to Improvement Notice 0775 (https://www.nopsema.gov.au/assets/Published-notices/A700032.pdf). As indicated in this notice, NOPSEMA required Woodside to make arrangements so that the RTM can be removed or disposed onshore as soon as reasonably practicable. NOPSEMA recognises that the disposal of the RTM in the offshore environment, was not originally planned or proposed by Woodside, and the subsequent deviation to the decommissioning of the RTM results in impacts and risks that would not be realised if the RTM was

		• The presence of this ballast combined with the compartment 2 failure makes horizontal rotation of the RTM, and therefore onshore disposal, not practicable. Woodside present and assess multiple options for both onshore and offshore disposal (section 3.6) within the revised environment plan, and conclude that offshore disposal is the only practicable option. In comparing offshore disposal options, Woodside have identified increased risks associated a deep water disposal location. For example a 370km tow (5-6 days) increases the potential for the vessels to lose control of the RTM, due to unforeseen adverse weather (including potential for cyclones). In addition, Woodside have concluded that deep water disposal options increase the risk that the outer shell of the RTM will rupture, resulting in foam being released to the environment.	disposed onshore. However, NOPSEMA has concluded, after taking into consideration the information provided, that there is a low probability that the RTM could be successfully removed from the marine environment and disposed of onshore. NOPSEMA has concluded that the only practicable alternative is to dispose of the RTM at an offshore location. There are increased risks associated with deep water disposal of the RTM and the proposed repurposing the RTM as part of an IAR is considered a practicable solution in the circumstances. NOPSEMA is considering a range of other enforcement and compliance options in relation to Woodside's inability to remove the RTM from the marine environment for onshore disposal.
2	Concern regarding the RTM disposal location and its proximity to a World Heritage Area (WHA).	Woodside's selection of the RTM disposal location and subsequent IAR was conducted in collaboration with Rechfishwest who are the applicant for an artificial reef permit under the *Environmental Protection (Sea Dumping) Act 1981.* The proposed reef location was selected following multiple rounds of consultation by Woodside and Rechfishwest with the recreational fishing community in Exmouth, and a constraints mapping process (section 3.7.4).	During the course of the assessment NOPSEMA required Woodside to present all environmental impacts and risks of the decommissioning activity, as well as indirect consequences arising from the placement of the RTM on the seabed, within the EP. NOPSEMA also required Woodside engage directly with, the Ningaloo Coast World Heritage Advisory Committee (NCWHAC) and the Director of National Parks (DNP) regarding the technical constraints that led to Woodside needing to dispose of the RTM offshore, and the proposed locations for the integrated artificial reef site. The initial location of the integrated artificial reef site identified in the EP was within 300m of the Ningaloo Marine Park (NMP) and NCWHA.

		Section 3.7.4 summarises the constraints for the selection of a suitable location for the IAR including: • Proximity to the mainland (e.g. boat ramps). • Outside State and Commonwealth marine parks. • Water depth - minimum 80 m & maximum 170 m water depths. • Outside existing petroleum titles. Woodside have identified an RTM disposal area located 1.7km to 4km from the WHA. The final location for the IAR within this area will be determined through approval of an artificial reef permit by the Department of Agriculture, Water and Environment under the *Environmental Protection (Sea Dumping) Act 1981*. Woodside have evaluated the impacts and risks associated with the disposal of the RTM against the values of the Ningaloo WHA (section 6.9 and 6.10), including the relevant key threats currently facing the WHA, and determined that: • The activity is not inconsistent with these values. • The activity will not significantly increase threats to the WHP. • The residual impacts and risks from the RTM offshore disposal are of an acceptable level.	In response to consultation with relevant persons, Woodside identified an alternative RTM disposal area located 1.7km to 4km from the NMP and NCWHA. In making a decision regarding this matter, NOPSEMA recognises that the primary environmental approval for the artificial reefing activity is an Artificial Reef Permit issued under the Environmental Protection (Sea Dumping) Act (1981) which is administered by the Department of Water Agriculture and the Environment (DAWE). The artificial reef permit evaluates the potential environmental impacts of a proposal to place an artificial reef at sea. Artificial reef activities cannot occur until they are approved through this regulatory process.
3	Concern that plastic and foam contaminants from	Woodside have provided information on the components and materials the RTM is comprised of, and assess the potential release of these residual materials and the	NOPSEMA acknowledges the importance of ensuring that the impacts and risk of from the decommissioning of the RTM are reduced to

	the RTM could adversely impact the marine environment.	subsequent impact they may have on the marine environment. Section 6.7.1.6 of the EP describes the plastics that are contained within the RTM that will remain when it is disposed onto the seabed. This includes: • 5.9 Tonnes of polyurethane foam in Compartment 13 of the RTM. • A small section of bend stiffener plastic at the end of each of the seven risers. • An estimated <10kg of residual plastics in components such as electrical cabling. • The plastics from one of the risers in the event this cannot be removed once the RTM is placed on the seabed in a horizontal position. The control measures being implemented to reduce impacts from plastics and foam contaminants include: • Remove residual topside plastics in the RTM (electrical cabling insulation, chemical lines). • Removal of risers and riser bend stiffeners. • Encapsulation of compressed foam in Compartment 13 with grout. • Encapsulation of any remaining bend stiffener that is unable to be cut with grout. • Development of a Marine Debris Monitoring and Management Program consistent with the objectives of the Marine Debris Threat Abatement Plan, which includes removing an equivalent amount of plastics	ALARP and acceptable levels. This includes ensuring that any indirect impacts from the RTM are managed appropriately. During the course of the assessment, NOPSEMA requested further information regarding: • The feasibility of removing plastics prior to the disposal of the RTM. • The potential impact of the residual plastics in the marine environment. NOPSEMA has concluded that the control measures included in the final EP reduce the impacts and risks to a level that is acceptable and as low as reasonably practicable. Any further control measures are not practicable and introduce unacceptable safety risks and increase other environmental impacts (e.g. chemically dissolve the foam). NOPSEMA's assessment also determined that given it was not practicable to remove the RTM for onshore disposal, water depths that allow Woodside to remove some of the plastics (e.g. 14.9 Tonnes from removing the majority of the risers) are preferable. Shallower water depths also provide the opportunity for grout to be used to encapsulate the foam in Compartment 13 and the bend stiffeners, which increases the likelihood that this material will not be released into the marine environment. NOPSEMA also acknowledges that Woodside have committed to develop and implement a Marine Debris Monitoring and Management Program. In making a decision regarding this matter, NOPSEMA recognises that the primary environmental approval for the artificial reefing activity

		material from the marine environment, and funding for research and education programs focussed on marine debris. Section 6.7.1.6 of the EP, also includes an evaluation of the impacts and risks associated with the residual plastics disposed with the RTM. The EP determines: • The release of plastics will not result in an impact greater than a slight, short-term impact on species, habitats (but not affecting ecosystem function), physical or biological attributes. • Impact will occur over extremely long timeframes (hundreds to thousands of years) and at a very slow rate • The quantity and contribution of microplastics from the degradation of the RTM and residual polymer components contained within it, is considered insignificant.	is an Artificial Reef Permit issued under the Environmental Protection (Sea Dumping) Act (1981) which is administered by the Department of Water Agriculture and the Environment (DAWE). As part of the artificial reef permit process, a long term monitoring plan for the artificial reef must be submitted and approved. The artificial reef permit also requires a demonstration that reef materials are suitable and prepared properly, and there are no significant adverse impacts on the marine environment. Artificial reef activities cannot occur until they are approved through this regulatory process.
4	Concern that while the RTM is on station, it is a navigation risk.	Woodside has included information in Section 6.6.1.1 of the EP regarding controls that will remain in place whilst the RTM remains on the petroleum title. Controls include: • An established 500m Petroleum Safety Zone. • inclusion of the RTM on current nautical charts. • The presence of warning lights on the RTM. • Installation of a passive radar reflector system.	NOPSEMA recognises that the RTM in its current location within the petroleum title area could create a marine navigation risk if additional compartments are flooded, with the RTM potentially submerging further or sinking. During the course of the assessment, NOPSEMA requested additional information on the integrity of the RTM and the control measures being implemented to reduce the risk that the RTM would sink further or lose station. NOPSEMA has also considered the information provided in Woodside's response to Improvement Notice 0775 (https://www.nopsema.gov.au/assets/Published-

			notices/A700032.pdf). As indicated in this notice, NOPSEMA required Woodside to implement systems to inspect, maintain and repair the RTM to ensure it does not sink unexpectedly and present a collision risk to other marine users. In response to NOPSEMAs assessment of the EP, Woodside have included: • Additional external visual inspections. • Installation of a navigation aid system that comprises of a solar-powered marine navigation lights, passive and active radar reflectors to enhance marine radar detectability. • Installation of a remote draft monitoring system which includes online monitoring capability as well as notification of discrepancies in the RTM position or draft. • Installation of a self-deploying navigation sentry buoy that would automatically deploy if the RTM was partially submerged. The buoy is equipped with passive reflectors and a racon unit so it will be visible on radar. • An additional assessment of the third party RTM engineering assessment if the RTM remains in station (on title) beyond April 2021. NOPSEMA has determined that Woodside have suitable control measures in place to detect any changes to the draft or position of the RTM.
5	The status and long term plans of all petroleum wells and	Woodside has detailed all remaining subsea infrastructure associated with the Nganhurra Offshore project. Details have been provided as an inventory in Section 3.3 of the EP	NOPSEMA recognises the importance of ensuring oil and gas operators meet their decommissioning obligations as required under

	infrastructure that remain on the seabed associated with the operations of the Nganhurra FPSO.	and includes the location, depth, dimensions and status of all subsea infrastructure. Section 3.9 of the EP describes potential well intervention activities, which would provide flexibility on the vessels and methodology for future campaigns to plug and abandon the wells. Section 3.4 of the EP also details the future decommissioning works that will be undertaken, but is not included in the scope of the EP. Permanent plugging and abandonment of the wells, is anticipated to commence in 2022 and an EP is planned for submission in 2021. Decommissioning of other subsea infrastructure is scheduled to occur in either 2023 or 2024, following an EP submission in 2022.	section 572 of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006 (OPGGS Act).* During the EP assessment, NOPSEMA required Woodside provide a detailed inventory of all property and equipment that remains on the seabed associated with the Nganhurra offshore project. Furthermore NOPSEMA required Woodside to provide details on the decommissioning project phases and justification for each phase of the decommissioning works. Separately and in addition to the EP assessment, as part of NOPSEMAs decommissioning compliance plan, Woodside have been issued with General Direction 812 under Section 574 of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006*. NOPSEMA issued the General Direction given that in NOPSEMA's opinion, the registered titleholders have not taken adequate action to remove property pertaining to Nganhurra offshore operations in production licence WA-28-L since production activities ceased from the fields associated with the Ngunhurra FPSO in 2018. The General Direction requires that the titleholders plug or close off the wells, remove all property, and undertake related remediation activities, to NOPSEMA's satisfaction. The General Direction reinforces legal requirements regarding the removal of property associated with offshore petroleum activities and carries significant penalties in the event of non-compliance.
6	Concern regarding potential impacts from light emissions	Woodside has evaluated the impact of light emissions from the activity in Section 6.6.1.5 (Operational Area 1) and Section 6.7.1.7 (Operational Area 2).	Operational Area 2 overlaps nesting habitat critical for survival for flatback, green, hawksbills and loggerhead turtles, and internesting biologically important areas (BIAs) for the same turtle species. There is uncertainty about the potential impact from light, and the

			Recovery plan for marine turtles in Australia requires that 'Artificial light within or adjacent to habitat critical to the survival of marine turtles will be managed such that marine turtles are not displaced from these habitats' To ensure there is no displacement of nesting turtles or hatchlings, NOPSEMA has accepted the EP subject to the following condition: *Condition 1: Develop and implement an artificial lighting management and mitigation plan that prevents marine turtles from being displaced from habitat critical to the survival of marine turtles. The plan must include monitoring and adaptive management in the event that marine turtles are attracted to artificial lighting*. In addition, artificial light from vessels may have an impact on wedge tailed shearwaters and the operational areas overlap with foraging and breeding BIAs for these birds. Muiron Islands are a significant breeding site and the peak period for fledging shearwaters to leave the nest is in March / April. The EP has been accepted subject to the following condition to ensure impacts and risks will be of an acceptable level: *Condition 2: Manage all offshore operational lighting to prevent attraction and the trapping of wedge tailed shearwaters in light pools on offshore vessels/MODU so that normal behaviours are able to continue.*
7	Concern regarding potential impacts to whale sharks	Woodside has evaluated the impact of acoustic emissions from the activity in Section 6.6.1.6 (Operational Area 1) and Section 6.7.1.8 (Operational Area 2) and the risk of vessel collision with marine fauna in Sections 6.6.2.8 (Operational Area 1) and 6.7.2.4 (Operational Area 2)	There are two identified foraging BIAs for whale sharks and Operational area 2 is located between them. It is likely that these BIAs are based on limited data points and the two areas are continuous.

			NOPSEMA recognises the Outstanding Universal Values as the basis for Ningaloo being prescribed protection as a World Heritage Property includes: The largest documentation of whale shark aggregations in the world (criterion vii). There is uncertainty about the potential impacts to whale sharks and disruption to their foraging. The Whale shark conservation advice includes the following requirement: 'Minimise offshore developments and transit time of large vessels in areas close to marine features likely to correlate with whale shark aggregations (Ningaloo Reef, Christmas Island and the Coral Sea) and along the northward migration route that follows the northern Western Australian coastline along the 200 m isobath (as set out in the Conservation Values Atlas, DotE, 2014).' The EP has been accepted subject to the following condition to ensure impacts and risks will be of an acceptable level: *Condition 3: Manage all impacts associated with towing, placing on the seabed, stabilising, modifying and augmenting the riser turret mooring (RTM), to prevent vessel strike and disruption to whale shark foraging*.