

Onshore Petroleum Activity – NT EPA Advice

IMPERIAL OIL & GAS PTY LTD IMP2-6.1 ENVIRONMENT MANAGEMENT PLAN (EMP) 2020-21 DRILLING PROGRAM REVISION EXPLORATION PERMIT (EP) 187

BACKGROUND

The Minister for Environment and Natural Resources has formally requested under section 29B of the *Northern Territory Environment Protection Authority Act 2012* (NT EPA Act) that the Northern Territory Environment Protection Authority (NT EPA) provide advice on all Environment Management Plans (EMPs) received under the Petroleum (Environment) Regulations 2016 (the Regulations).

That advice must include a recommendation on whether the EMP should be approved or not, supported by a detailed justification that considers:

- whether the EMP is appropriate for the nature and scale of the regulated activity to which the EMP relates (regulation 9(1)(b))
- the principles of ecologically sustainable development sustainable development set out in sections 18 to 24 of the *Environment Protection Act 2019*
- whether the EMP demonstrates that the activity will be carried out in a manner by which the environmental impacts and environmental risks of the activity will be reduced to a level that is as low as reasonably practicable and acceptable (regulation 9(1)(c)), and
- any relevant matters raised through the public submission process

In providing that advice, the NT EPA Act provides that the NT EPA may also have regard to any other matters it considers relevant.

Interest Holder	Imperial Oil & Gas Pty Ltd
Petroleum interest	Exploration Permit 187 (EP 187)
Environment Management Plan (EMP) title	2020-21 Drilling Program Revision EP 187 (IMP2-6.1)
EMP document reference	IMP2-6.1
Regulated activity	The activities under the revised EMP submitted under Regulation 17 ¹ cover the activities required to enable the interest holder to conduct drilling, well testing suspension and/or decommissioning of up to two exploratory petroleum wells extending into the wet season. It includes transport of waste to an authorised disposal facility and management of open drilling sumps during the wet season

¹ Reg. 17: Revision of an EMP is required if there has been a new environmental impact or environmental risk not provided for in the current plan for the activity; or an increase, not provided for in the current plan for the activity, in an existing environmental impact or environmental risk.

	<p>The previously approved EMP restricted activities to the 2020 dry season only.</p> <p>The revised regulated activities <u>do not include</u>:</p> <ul style="list-style-type: none"> • additional clearance of vegetation • increase in projected water use • increase in projected GHG emissions • hydraulic fracturing • production testing by flaring
Public consultation	<p>Public consultation on the revision to the EMP was required under 8A(1)(b) of the Petroleum (Environment) Regulations as the EMP proposes the drilling of a well. The EMP was made available for public comment for a period of 28 days from 3 July to 31 July 2020.</p>

NT EPA ADVICE

The 2020-21 Drilling Program Revision EP 187 (IMP2-6.1) Environment Management Plan (the EMP) proposes the drilling of two exploration wells on EP 187 on a later schedule that may extend into the wet season. It is a revision to an existing EMP (IMP2-4) for drilling in the dry season that was approved by the Minister for the Environment and Natural Resources on 2 March 2020.

The NT EPA provided advice on IMP2-4 to inform the Minister's approval decision. On 26 June 2020, the interest holder provided notice of a proposed modification to the regulated activity in accordance with regulation 22 of the Regulations. The notice met the requirement of a regulation 22 modification for the installation of two groundwater monitoring bores on the Carpentaria-1 well pad at SL4 well site (IMP2-4.1). These were constructed with an approved bore work permit under the *Water Act (1992)* and registered as licensed water bores under the Imperial Gum Ridge aquifer extraction licence (GRF10316).

The interest holder submitted a revised EMP on 30 June 2020 to replace IMP2-4.1 once approved by the Minister. The EMP was updated in response to government agency and public comments. The revised EMP proposed controls and measures in response to new and increased environmental impacts and risks associated with extending activities into the 2020-21 wet season. The NT EPA has focused on these new or increased environmental impacts or risks and the revisions to the EMP in its review.

The NT EPA's previous advice on IMP2-4 remains relevant where the environmental impacts and risks have not changed.

Activities have commenced under the existing EMP (IMP2-4.1) and are anticipated to occur over 80 days.

1. Is the EMP appropriate for the nature and scale of the regulated activity (regulation 9(1)(b))

The EMP clearly describes the scope of the activity and its duration. The previously approved Imperial Drilling Program (IMP2-4) EMP technical works program includes drilling one vertical petroleum exploration well at any two of the five well site locations during the 2020 dry season (May – September 2020). The approved scope (nature and scale) of the activity has not been altered from the previous EMP and includes:

- the Carpentaria-1 well site and Carpentaria-2 well sites at 1.44 hectares land disturbance each
- well site access tracks at total 3.5 hectares land disturbance
- forecast drilling duration for Carpentaria 1 – estimated 80 days including civil works

- 30 person accommodation camp
- approximately 240 m³ volume of waste including drill cuttings and drilling mud
- estimated water use approximately 5.0 ML
- Greenhouse gas emissions (GHG) for the approved activity estimated at less than 4,200 tCO₂-e
- the Certified Erosion and Sediment Control Plan which details stormwater and erosion design controls for sheet flow in high rainfall events for the access tracks and Carpentaria-1 and Carpentaria-2 well site design.

Under the Code of Practice: Onshore Petroleum Activities in the Northern Territory (the Code) the wet season is defined as October- April. A revision to the EMP was required due to a change in the previously approved drilling schedule because of COVID-19 restrictions and other scheduling changes. The revised EMP:

- proposes additional controls to extend the regulated activity into the wet season
- confirms the location of the two well sites – Carpentaria-1 and Carpentaria-2 with drilling of the Carpentaria-2 petroleum well at a later date in 2021, contingent on results from Carpentaria-1.

The revised EMP updates the risk assessment to identify the specific impacts, risks and mitigation measures for wet season operations and stakeholder engagement has been conducted to communicate these changes. The revised EMP clearly describes:

- measures for managing wastewater in a revised Wastewater Management Plan for wet season operations that includes maintaining a minimum freeboard of 1600 mm in the drilling sump until the demobilisation of the drilling operations, to conservatively accommodate a 1:1000 year wet season rain event;
- weekly well site inspections during site shut-in
- monitoring of freeboard on open drilling sumps
- the location of well sites to avoid areas of potential creeks or low lying areas in the wet season
- the management of traffic on unsealed tracks in wet conditions to mitigate vehicle damage to access tracks and management of spills
- the management of fauna entrapments in open drilling sumps
- provision of a helipad to enable rapid delivery of spares of other equipment and personnel in the event that access is blocked during the wet season.

The level of detail and quality of information provided in the EMP is sufficient to inform the evaluation and assessment of potential environmental impacts and risks, and meets the EMP approval criteria under Regulation 9(1)(b). As a further precautionary step, the NT EPA has provided advice relating to approval conditions for this EMP contained at the end of this document.

2. Principles of ecologically sustainable development

2.1 Decision-making principle (s18 *Environment Protection Act 2019*)

The revised EMP adequately assesses the environmental impacts and risks associated with the regulated activity and outlines appropriate avoidance and mitigation measures. The revision to the previously approved regulated activity for Carpentaria-1 drilling operations is low impact, small scale and of short duration. The activities proposed will inform longer-term decision making on development of a petroleum resource.

The risks and control measures associated with the approval for drilling the Carpentaria-1 petroleum well have been assessed and the NT EPA has previously provided advice to the Minister². The

² https://denr.nt.gov.au/_data/assets/pdf_file/0009/798849/ntepa-advice-to-minister-imperial-oil-gas-2020-drilling-program-ep187.pdf

revised drilling sump design is in compliance with the Code to conservatively accommodate a 1:1000 year rainfall occurrence during the wet season and the freeboard has been increased to minimum of 1600 mm during drilling operations.

The communications log has been updated to reflect stakeholder communications in respect to activities covered under this EMP, since the approved EMP IMP2-4 was lodged. The interest holder has demonstrated ongoing stakeholder engagement in the EMP as required by the Regulations with landholders and land managers, traditional owners, the Northern Land Council (NLC) and NT Government Agencies. The revised regulated activity was made available for public comments.

2.2 Precautionary principle (s19 *Environment Protection Act 2019*)

The NT EPA considers there is a low threat of serious or irreversible damage from the activities proposed in the EMP. The risks of drilling over the wet season are well understood and the EMP demonstrates adherence to the Code that establishes best practice management measures for operations, as set out in the risk assessment and revised Wastewater Management and Spill Management Plans. Measures for managing risks during wet season operations includes a revised design of the drilling sump to address the risk of drilling fluids/cuttings remaining on site over the wet season and overtopping.

The NT EPA is of the view the precautionary principle has been considered in assessing the revised regulated activity and has not been triggered due to the low threat of serious or irreversible damage existing and the presence of a satisfactory scientific basis to assess potential impacts and risks. In addition, the environmental and engineering monitoring commitments contained in the EMP comply with the Code and should provide suitable performance measures to ensure that the environmental objectives are met.

2.3 Principle of evidence-based decision-making (s20 *Environment Protection Act 2019*)

The EMP proposes to extend drilling operations into the wet season. The regional average daily rainfall records show that the rainfall for October to November is low. The daily averages are below 2mm per day and maximum of those averages is below 3mm per day. In October and November, rainfall is falling on dry ground with little runoff expected. The impact of drilling activities occurring over the wet season is temporary and affected stakeholders have been consulted. However there is higher rainfall later in the wet season, when the sumps will contain drilling waste.

A revised traffic management plan approved by the Department of Infrastructure, Planning and Logistics (DIPL) has been included in the EMP and the well site access track turnoff to the Carpentaria highway will be sealed to mitigate highway traffic risks.

A certified erosion and sediment control plan (CESCP) contains specific design and management controls for the well site access track and Carpentaria-1 and Carpentaria-2 well sites to mitigate potential erosion under sheet flow conditions. Detailed elevation plans and layout for the well sites are provided in the approved CESCP. The well sites will use coir-logs to divert stormwater flow around the well site. The well site sump will be bunded to prevent potential ingress of stormwater.

Geotechnical assessment of the soil at the well sites has been completed and assessed by DENR in compliance with Ministerial Approval Condition of the approved Drilling EMP. The geotechnical assessment provides load-bearing assessment of the well sites and recommends removal of <50mm of topsoil at the well site to be stockpiled on the well site under cover, for future use in rehabilitation of the well site. The subsurface is assessed as suitable for compaction rolling to provide a hard low permeability, low dust hardstand area for the drilling operations.

The NT EPA has previously assessed the potential chemicals of concern contained in the drilling fluid that remain unchanged in the revised EMP. The information provided in the EMP confirms that the most toxic chemicals (short-acting biocides) which are used to maintain sterility in the drilling fluid during drilling operations, are classified as “readily biodegradable” and have a half-life of less than five days.

A risk analysis of produced water sequestered from the same target shale formations at the nearby Santos Tanumbirini well site did not identify elevated concentrations of any analytes specified in the Code that may be of potential concern to fauna such as birds³.

The NT EPA is of the view that the evidence-based decision-making principle has been considered in assessing the regulated activity and that in the circumstances, decisions can be based on best available evidence that is relevant and reliable.

2.4 Principle of intergenerational and intra-generational equity (s21 *Environment Protection Act 2019*)

The potential environmental impacts and risks associated with the regulated activity can be adequately avoided or managed through the management measures and monitoring programs proposed in the EMP.

The final disposal of drill cuttings and drilling mud will be guided by the results of laboratory testing and either:

- transported to a licensed waste disposal centre in Queensland; or
- if seeking approval from DENR to dispose of residue from drilling fluids on-site, the approval request must include a certification from a suitably qualified third party that the material is of acceptable quality for disposal to land by the proposed method and that environmental harm will not result from the proposed disposal.

Maintaining a minimum freeboard of 1600 mm in the drilling sump until the demobilisation of the drilling operations, to conservatively accommodate a 1 in 1000 year wet season rain event. This freeboard is twice the annual total rainfall in the region and reduces the likelihood of a release of drilling wastewater from the drilling sump. Should the risk eventuate, the interest holder must notify DENR under the Regulations and has committed in the Spill Management Plan to remediating any spill area in accordance with the National Environment Protection Measure (NEPM) requirements. The previously approved Drilling EMP commits the interest holder to progressive rehabilitation throughout the life of the activity which, combined with the Code requirements, is considered to have reduced the risk of soil contamination to a level that is ALARP and acceptable

The regulated activity is subject to requirements of an AAPA Authority Certificate (C2020/012). Appropriate measures are proposed for the management of items of heritage value should they be discovered.

The NT EPA considers that environmental values will be protected in the short and long term from the activities outlined in the EMP and that the health, diversity and productivity of the environment will be maintained for the benefit of future generations.

2.5 Principle of sustainable use (s22 *Environment Protection Act 2019*)

The regulated activity forms one component of a broader exploration program to inform the potential for commercial petroleum production on EP 187. The total estimated greenhouse gas (GHG) emissions of approximately 4,200 tCO₂-e remain unchanged for the activity and will result in an overall increase in NT GHG emissions of approximately 0.03%. Total cumulative GHG emissions for the approved activities in the Imperial 2019-21 exploration program on EP 187 are estimated to be 9,900 tCO₂-e. The total estimated GHG emissions for the exploration program will likely result in an overall increase in NT GHG emissions of 0.06%. Under these circumstances of preliminary exploration activity, the NT EPA considers that cumulative emissions are not significant when considered in context of 2017 NT and Australian emissions, which were approximately 16.5 million tonnes and 535 million tonnes respectively⁴.

³ https://denr.nt.gov.au/_data/assets/pdf_file/0005/821912/ep161-santos-waste-water-risk-assessment-report.pdf.

⁴ NT and Australian GHG emissions in 2017 were approximately 16.5 million tonnes and 535 million tonnes, respectively, as reported in the DOEE (2019) State and Territory Greenhouse Gas Inventories 2017. <http://www.environment.gov.au/system/files/resources/917a98ab-85cd-45e4-ae7abcd1b914cfb2/files/state-territory-inventories-2017.pdf>

The NT EPA notes that the Government has committed to implementing all recommendations of the Hydraulic Fracturing Inquiry, including that the NT Government seeks to ensure there is no net increase in the lifecycle GHG emissions emitted in Australia from any onshore petroleum produced in the NT. The interest holder has been issued a water extraction licence (GRF10316) for up to 22 ML per year from the Gum Ridge aquifer.

Cumulative quantities of groundwater extraction and greenhouse gas emissions have been included in the EMP. The NT EPA has recommended the interest holder provide geospatial files of the land disturbance footprint(s) to DENR after completion of land clearing activities to ensure cumulative impacts of land clearing are addressed in subsequent stages of development.

The NT EPA is of the view that the sustainable use principle has been considered in assessing the regulated activity.

2.6 Principle of conservation of biological diversity and ecological integrity (s23 *Environment Protection Act 2019*)

No additional clearing is proposed in the revision to the approved EP187 Drilling EMP and the NT EPA has previously advised of its view that the conservation of biological diversity and ecological integrity would not be impacted by the activity.

The proposed activities do not pose a significant risk to threatened species at a population level, due to the low likelihood of threatened species inhabiting the area and the implementation of the proposed control measures to avoid impacts to fauna.

Fauna ingress and egress mitigation measures to the drilling sump have been provided in the EMP. This includes the sump fitted with mesh panel fencing no greater than 150mm x 150mm to prevent livestock and large fauna entry. Daily checks of pits during the drilling program and weekly site inspections will be undertaken during periods of site inactivity.

At this stage, the interest holder has not conducted drilling in the Beetaloo sub-basin and therefore there is no laboratory analysis of drilling wastewater. The NT EPA considers, however, that the interest holder should be required to provide to DENR, within 6 weeks of completion of drilling operations at the Carpentaria-1 well site, a laboratory analysis of drilling wastewater that may be contained in the drilling sump. The laboratory analysis must comply with Code.

2.7 Principle of improved valuation, pricing and incentive mechanisms (s24 *Environment Protection Act 2019*)

The interest holder will be required to prevent, manage, mitigate and make good any contamination or pollution arising from the regulated activity, including contamination of soils, groundwater and surface waters through accidental spills.

All stages of the regulated activity, including progressive rehabilitation of all disturbed areas to an acceptable standard, will be at the cost of the interest holder.

The interest holder is required to provide an adequate environmental rehabilitation security bond to indemnify the NT Government. This is based on an assessment by DENR of the estimated rehabilitation cost submitted by the interest holder. The rehabilitation costs for the regulated activity is supported by independent contractor quotes.

The NT EPA is of the view principle of improved valuation, pricing and incentive mechanisms has been considered in assessing the regulated activity and is based on the interest holder bearing any environmental costs for the activity.

3. Does the EMP demonstrate that the activity will be carried out in a manner by which the environmental impacts and environmental risks of the activity will be reduced to a level that is as low as reasonably practicable and acceptable (regulation 9(1)(c))

The key potential impacts and risks with the regulated activity during the wet season are:

- a reduction in surface and groundwater quality as a result of overflows from open drilling sumps and pits and spills including during transport of wastewater

- impacts on terrestrial environmental quality, resulting from localised contamination of soil due to spills, inappropriate wastewater management, erosion and localised flooding.

The EMP has considered the hierarchy of controls (elimination, substitution, engineering, administration) and provided demonstration of why the controls to be implemented are effective to achieve levels of impact and risk that are ALARP and acceptable. Controls include:

- locating the Carpentaria-1 well site in an elevated area that is not prone to flooding (the location remains unchanged from the site assessed in the existing EMP approved 2 March 2020). Access to the well site avoids depressions that may accumulate rainwater and traverses well drained lateritic rises that are prominent on EP817
- a site specific certified erosion and sediment control plan (CESCP) that specifies hydrological design controls for the well site during the wet season and is compliant with the Code
- a revised drilling sump design incorporating an impermeable HDPE lined and bunded pit to contain solid drill cuttings and potentially drilling fluid and a maintaining a minimum freeboard of 1600 mm until completion of drilling the Carpentaria-1 exploration well. Drilling sump levels will be monitored daily during operations to ensure levels are maintained below the minimum 1600 mm freeboard requirement.
- weekly well site inspection, when weather access permits, will be conducted during the wet season shut-in period
- removal from site of residual drilling mud in the drill cuttings sump that does not evaporate and fails to meet disposal requirements as outlined in the Code before the onset of monsoon rains, for disposal at a licensed facility in Queensland. This is following completion of drilling Carpentaria-1 well and site shut-in, for the months of highest regional average rainfall (January-March).
- geo-technical assessment of the site, indicating it as suitable for load bearing of drilling traffic, and the use of matting in some high traffic areas. No cut and fill is required for the well site reducing gravel pit requirements and impacts to flora and fauna. Coir logs will be used where required as bunding up-gradient at well site boundary to divert overland flow around the site as specified in the CESCP
- rig matting to support load bearing of drilling traffic and minimise the wellpad and access track construction requirements in the event of rainfall during drilling operations
- an approved Traffic Management Plan to manage the traffic risks at the access to the Carpentaria Highway.

An emergency response plan will be implemented, which includes event response and mitigation measures for significant rainfall events and loss of containment or other major spills, including during transport. The spill management plan considers immediate corrective actions for onsite spills during operations and the EMP commits to no wastewater storage tanks on site following completion of drilling and demobilisation from site.

The EMP demonstrates compliance with the Code for wet season operations and the potential impacts and risks have been reduced to a level that is ALARP and acceptable.

4. Relevant matters raised through public submissions

Public consultation on the revision to the EMP was required under the Petroleum (Environment) Regulations 2016, as the EMP proposes drilling activities. The EMP was made available for public comment for 28 days from 3 July to 31 July 2020.

A total of 284 separate email submissions were received.

- 97% of the public submissions originated from the advocacy website – Do Gooder.
- Approximately 68% of submissions came from outside the NT

- 87% of the submissions were a campaign form letter that canvassed a wide range of issues regarding petroleum production and the forecast effects of fossil fuel emissions on the world's climate
- Thirteen topics were identified in the public submissions. Wastewater (24%), Climate Change (21%), Water Resources (16%) and Heritage (8%) were the major issues raised.

The matters relevant to consideration of the revised EMP that were raised in the public submissions, related to wastewater and wet season operations are presented in Table 1.

Table 1: Issues raised in public submissions

Theme	Issues raised	Response
Water	overflow release from the drilling sump as a result of rainfall inundation during the wet season	<p>The Carpentaria-1 wellsite location is an elevated area that is not prone to flooding</p> <p>The site specific Certified Erosion and Sediment Control Plan (CESCP) specifies hydrological design controls for the well site during the wet season and is compliant with the Code.</p> <p>The risk of overflow is considered very low as the drilling sump incorporates the mandatory minimum freeboard to conservatively accommodate a 1 in 1000 year wet season rainfall event which is estimated to be equivalent to 1450mm over 90 days at MacArthur River mine site in the wetter gulf region to the east. The minimum 1600mm freeboard will be maintained throughout drilling operations and is twice the annual average total rainfall.</p>
Water	potential toxicity of the material contained in the drilling sump and potential impacts on fauna such as birds	<p>Risk of potential toxicity to fauna (e.g. birds) is considered low. Refer to section 2.3 of this advice and risk analysis of produced water that did not identify elevated concentrations of any analytes specified in the Code that may be of potential concern to fauna such as birds</p> <p>The NT EPA has recommended the interest holder provide to DENR a laboratory analysis of drilling</p>

Theme	Issues raised	Response
		wastewater that may be contained in the drilling sump.

5. Other relevant matters

Regulation 9 requires that an EMP provides a comprehensive description of the regulated activity, including provision of a detailed timetable for the activity. To meet this requirement, the NT EPA recommends the interest holder be required to submit a detailed timetable for the regulated activity to DENR.

CONCLUSION

The NT EPA has reviewed the public and NT Government agency submissions as part of its decision-making and when making recommendations to the Minister. This NT EPA advice to the Minister for Environment and Natural Resources considers and provides a response to any relevant matters raised in public submissions.

The NT EPA considers that, subject to the recommended EMP approval conditions, the EMP:

- is appropriate for the nature and scale of the regulated activity
- demonstrates that the regulated activity can be carried out in a manner that potential environmental impacts and environmental risks of the activity will be reduced to a level that is as low as reasonably practicable and acceptable.

In providing this advice the NT EPA has considered the principles of ecologically sustainable development.

RECOMMENDATION

In addition to the existing EMP approval conditions for the Imperial 2020 Drilling Program EMP (IMP2-4), the NT EPA recommends that should the revision to the EMP for Imperial Oil & Gas Pty Ltd be approved, the following conditions be considered:

Condition 1: The interest holder must submit to the DENR an updated timetable for the regulated activity prior to commencement of the activity and provide an updated timetable to the DENR each month.

Condition 2: The interest holder must provide to DENR within 6 weeks of completion of drilling operations at the Carpentaria-1 well site, a laboratory analysis of drilling wastewater that may be contained in the drilling sump. The laboratory analysis must comply with Code of Practice: Onshore Petroleum Activities in the Northern Territory Table C.8: Wastewater chemistry analytes.

Condition 3: In support of Schedule 1 cl. 11 of the Regulations and cl. A.3.5 of the Code of Practice: Onshore Petroleum Activities in the Northern Territory, the interest holder must provide geospatial files of the land disturbance footprint(s) to DENR within 2 months of completion of each land clearing activity or within 6 months of approval of this EMP, whichever occurs first.

Condition 4: The interest holder must provide an annual report to DENR on its environmental performance, in accordance with item 11(1)(b) in schedule 1 of the Petroleum (Environment) Regulations 2016 (NT). The first report must cover the 12 month period from the date of the approval, and be provided within 3 calendar months of the end of the reporting period. The annual

environmental performance report must align with the template prepared by DENR for this purpose and must include a signed declaration by the interest holder or operator.



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CHAIRPERSON

NORTHERN TERRITORY ENVIRONMENT PROTECTION AUTHORITY

9 SEPTEMBER 2020