Imperial Oil & Gas

EP 187

Appendix 10

Stakeholder Engagement and Consultation Plan

IMP 5-3

Document Control

Date	Rev	Description	Author(s)	Reviewed	Approved
05/02/24	1	Issued as an Appendix of EMP IMP 5-1	Sonia H.	Jon B., Vicky C.	Robin P.
25/07/24	2	Issued as an Appendix of EMP IMP 5-2	Imperial Oil & Gas	inGauge Energy	Imperial Oil & Gas
12/11/24	3	Approved for use as an Appendix of EMP IMP 5-3	-	-	-

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1 Overview

This appendix contains an engagement report and a log of communications with Stakeholders, in relation to EP 187.

Table 1—1 provides an overview of the stakeholders as per Schedule 1 clg(1)(a) of the *Petroleum (Environment) Regulations, 2016 (NT)*.

Table 1—1 Stakeholder Contact Details

Stakeholder	Contact Details
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

2 Stakeholder Engagement Report

2.1 Executive Summary

Imperial's Carpentaria Pilot Project (CPP) relates to the appraisal of a part of EP 187, located approximately 135 kilometres southwest of Borroloola within the Beetaloo and greater McArthur Basin. Imperial proposes a multi-year appraisal program in the western flank of EP 187, commencing in 2024, building on the fieldwork carried out under the previous 2019 to 2023 work programs.

The Stakeholder Engagement Report (SER) provides an overview of the activities implemented under the Stakeholder Engagement and Consultation Plan (Plan). Throughout this engagement process, and in line with the recommended approach for stakeholder consultation, Imperial has shared information about the Activity with a diverse range of stakeholders and the wider community, offering opportunities for them to provide feedback, communicate their aspirations and participate in informing activity development decisions throughout the process of preparing environmental assessment plans for this EMP.

Communication and engagement for the Activity have included a suite of significant engagement methodologies, including:

- Provision of information to, and engagement with, the Northern Land Council (NLC) as the relevant Land Council under the *Aboriginal Land Rights (Northern Territory) Act, 1976 (Cth) (ALRA)*, who acts as the agent and representative of Traditional Owners and affected Aboriginal people.
- Continued meetings with Traditional Owners directly and as facilitated by the NLC.
- Establishing a dedicated online consultation portal with current Activity information and company contact details.
- Designing a comprehensive Activity brochure that provides a summary of important aspects of the Activity and communicating Imperial's aspirations.
- Field visits inviting stakeholders to have an opportunity to see various parts of the Activity in operation.
- Targeted one-on-one meetings with key stakeholders and as requested by other identified stakeholders and community members.
- General community information displays and drop-in sessions across regional areas and in Darwin.
- Building on local business engagement mechanisms including establishing an online CPP Gateway page with Industry Capability Network NT (ICN NT).

The SER has been prepared to demonstrate how Imperial has delivered its consultation commitments as communicated in the Plan.

2.2 Stakeholder Classification

The stakeholder mapping and analysis process, as described in the Plan, is an ongoing exercise to ensure stakeholders and the community are engaged in an appropriate manner with the required level of information. Imperial has referred to the *PER* and supporting guidelines for industry to assign stakeholder and community, cluster groups.

Imperial is committed to consultation with stakeholders in alignment with the Plan and the IAP2 Spectrum levels. The levels of engagement have been defined by Imperial as:

- Collaborate: Imperial will work with stakeholders for advice and ideas and incorporate alternative solutions into CPP planning and decisions as much as possible.
- Involve: Imperial will work with stakeholders to ensure concerns and aspirations are reflected in Activity planning and decisions as much as possible and provide information on how feedback was incorporated.
- Consult: Imperial will keep stakeholders informed, listen to concerns and aspirations and provide information on how feedback was input was considered.
- Inform: Imperial will aim to keep stakeholders informed.

For the purpose of implementation of the Plan, Imperial has considered relevant stakeholder cluster groups and their level of interest.

Table 2—1 Stakeholder Cluster Groups

Stakeholder Tier	Stakeholder Cluster Group	IAP2 Ranking
Tier 1	Traditional Owners and the Northern Land Council	Collaborate
	Pastoralists (directly affected)	Collaborate
	Tenure neighbours (directly affected)	Collaborate
Tier 2	Government Agencies, Departments and Representatives (non-regulator or approval agencies)	Involve
Tier 3	Community and Local Residents	Consult
	Indigenous Organisations	Consult

Stakeholder Tier	Stakeholder Cluster Group	IAP2 Ranking
	Local Businesses	Consult
	Industry Representation Groups	Consult
	Community Organisations	Consult
Tier 4	Pastoralists (indirectly affected)	Inform
	Tenure neighbours (indirectly affected)	Inform
	Environmental Interest Groups	Inform

2.3 Engagement Methodologies Applied

The engagement methodologies described and applied for the implementation of the Plan include:

- **Traditional Owner Meetings:** Provision of Activity and EMP information to the NLC for NLC review, consideration, and response and for use in Traditional Owner meetings facilitated by the NLC.
- **Targeted group presentations:** Imperial has initiated and responded to targeted group meeting requests to provide a detailed presentation of proposed works for the CPP.
- **One-on-one meetings:** Imperial has initiated and responded to one-on-one meeting requests to provide a detailed presentation of proposed works for the CPP.
- **Community drop-in sessions:** Imperial has scheduled open community drop-in sessions to provide an opportunity for informal conversations about proposed works for the CPP.
- **Online consultation portal and contact mechanism:** Imperial has launched a dedicated online consultation portal to provide information to stakeholders and the community about proposed activities for the CPP and provided direct contact details as a mechanism to collate and respond to information requests and feedback.
- **Project overview document and email briefings:** Imperial has prepared comprehensive CPP overview documents with information about proposed works for the Activity and made this information available through a direct email campaign to stakeholders and the community, published on the online consultation portal and presented at various other forums throughout implantation of the Plan.
- **Field visits:** Imperial has initiated invitations to stakeholders to visit the site during periods of relevant activity.

- **Regional conferences and business network events:** Imperial has participated in conferences and networking events to provide information to stakeholders and the community at organised forums across the Northern Territory.
- **Regional community events and shows days:** Imperial has participated in regional community events and show days to provide information to stakeholders and the community at organised forums across the Northern Territory.
- **Local business engagement and supply chain briefings:** Imperial has launched a dedicated CPP Gateway page to provide information about the Activity directly to local businesses and has participated in supply chain briefings to provide information on upcoming works to assist businesses in considering supply chain opportunities.
- **Advertising and media:** Imperial has undertaken direct advertisement of CPP information and consultation portal access through printed media and radio announcements.

Further information about the implementation of these methodologies is detailed in the Key Consultation Activity Summary (**Section 2.4.6**) and the Communications Log (**Section 3**).

2.4 Consultation Activity

Imperial has committed significant effort to undertaking a broad consultation plan prior to the submission of the EMP. This has included directly affected stakeholders as defined by the *PER* and expanded to include the wider community.

2.4.1 Traditional Owners and the Northern Land Council

In 2013, Imperial lodged an application for the grant of a petroleum Exploration Permit (EP) over NT Portion 5706 which is Aboriginal Land under ALRA vested in the Mambaliya Rrumburriya Wuyaliya Aboriginal Land Trust. Pursuant to Section 41 of ALRA, Imperial applied to the NLC for consent to the grant of petroleum Exploration Permit (EP) 187.

An Exploration Deed was subsequently executed between the NLC, on behalf of Traditional Owners, and Imperial on 5 February 2014. Under the Exploration Deed for EP 187 with the NLC, Imperial has a confidentiality requirement, which must be adhered to; any information exchanged between Imperial and NLC covered by this requirement is not reported in this document.

During the preparation of this EMP, Imperial has carried out engagement with the NLC as the representative of the Traditional Aboriginal Owners and other Aboriginal People interested in

the Activities. Imperial works with the NLC to facilitate stakeholder engagement with the Traditional Owners of EP 187.

Imperial believes that the Activity satisfies the requirements of Section 57AAA to recover petroleum on an appraisal basis and is progressing with the requirement of Section 57AAA (5)(d) to obtain approval, consent, or agreement with the NLC and Traditional Owners for the sale or other beneficial use of petroleum recovered on an appraisal basis.

In August 2023, the NLC facilitated group meetings that included Traditional Owners for EP 187 and other Aboriginal people interested in the Activity. Four separate meetings were held across various regional locations as detailed in the Key Consultation Activity Summary **Section 2.4.6**.

Content provided to stakeholders at these meetings included an overview of the Activities, with the exception of the requirement of Section 57AAA (5)(d) to obtain approval, consent, or agreement with the NLC and Traditional Owners for the sale or other beneficial use of petroleum recovered on an appraisal basis. Meetings required to be facilitated by the NLC with Traditional Owners for EP 187 for the purpose of approval, consent or agreement are still in progress.

Imperial submitted its Annual Work Program (AWP) to the NLC to support consultation requirements on 10 October 2023. The AWP provides a comprehensive overview of proposed activities and work methods.

The NLC had meetings originally scheduled to be held with Traditional Owners in November 2023; however, these meetings were postponed by the NLC, requesting further time to review the information that was provided by Imperial. These meetings were subsequently rescheduled for December 2023. Unfortunately, unforeseen circumstances of cultural significance outside of the NLC and Imperial's control caused these planned meetings to be postponed again.

The NLC has made efforts to reschedule required meetings with Traditional Owners for EP 187 multiple times in both April and May of 2024. Unforeseen circumstances outside of the NLC and Imperial's control have again caused a delay in the facilitation of these meetings including:

- April 2024: Cyclone Megan's impacts on the local community postponed this round of scheduled meetings.
- May 2024: A significant death in the community of a senior Traditional Owners for EP 187 postponed this round of scheduled meetings.

Imperial is continuing to work with the NLC to prioritise the rescheduling of meetings required for the purpose of consultation related to this EMP as soon as practicable. Imperial has made its best endeavours to engage with the stakeholders and will continue this engagement effort. Imperial understands its stakeholder requirements and takes this responsibility very seriously. No activity relating to the EMP will be undertaken until consultation has been completed.

2.4.2 Directly Affected Pastoralists

Imperial liaises regularly with directly affected pastoralists to ensure they are aware of current and proposed activities. Throughout the implementation of the Plan, Imperial has undertaken various methodologies to ensure that directly affected pastoralists have been provided information about the proposed works for the Activity. Imperial has a track record of positive engagement with pastoralists and will continue to build on these relationships.

Where pastoralists have been available, one-on-one consultation has been carried out to discuss the details of the information provided and to document any issues raised by these stakeholders.

Further information regarding targeted meetings with directly affected pastoralists has been tabled in the Communication Log (**Section 3**).

2.4.3 Directly Affected Tenure Neighbours

Imperial has liaised with directly affected tenure neighbours relevant to ensure they are aware of the current and proposed activities within the Activity area.

2.4.3.1 Power and Water Corporation (PWC)

Power and Water Corporation (PWC) own and operate the McArthur River Gas Pipeline (MRGP) that transects the CPP Area from east to west along the Carpentaria Highway. Imperial have engaged directly with PWC regarding the Activity covered in the EMP through various meetings that have included discussions of a commercial nature including a connection to the MRGP. For this reason, the engagements have not been included in the Communication Log.

PWC has also received the general CPP engagement documents via email and did not provide any response. This is communication is detailed in the Communications Log (**Section 3**).

2.4.3.2 Department of Infrastructure, Planning and Logistics (DIPL)

Department of Infrastructure, Planning and Logistics (DIPL) are currently undertaking significant upgrades to the Carpentaria Highway which will be used as an access route for the Activity. Imperial has engaged directly with representatives from DIPL to discuss the status of the upgrades and how impacts from vehicle movements of the Activity may need to be considered.

DIPL has also received the general CPP engagement documents via email and did not provide any response. These communications are detailed in the Communications Log (**Section 3**).

2.4.4 Local Businesses and Supply Chain

Imperial has invested in building and maintaining an ongoing relationship with local businesses. Local businesses have been identified as a Tier 3 stakeholder for the purpose of implementing the Plan – see **Table 2—1**.

Local supply chain opportunities will be provided to businesses through existing direct relationships and the ICN NT Gateway page that has been established to promote participation. Throughout consultation, local businesses have indicated their interest in supply chain opportunities for upcoming works. Consultation and engagement with local businesses has been facilitated through local supply chain briefings, regional conferences, and business networking events – see **Section 2.4.6**.

Imperial will continue to utilise these existing methodologies to build on further engagement. Imperial will consider tender opportunities for participation from local businesses where they can demonstrate they meet capability requirements and provide economic competitiveness and availability. Work scopes may include, but are not limited to:

- Civil construction
- Transport and logistics
- Machinery and equipment hire
- Weed management
- Water Bore Drilling
- Supply, installation and maintenance of water bore pumps
- Water bore monitoring
- Well pad monitoring during non-operation periods
- Fencing construction and maintenance
- Accommodation and catering
- Camp services
- Electrical and communications
- Waste management
- Traffic control.

2.4.5 Other Stakeholders and the Wider Community

Other stakeholders and the broader community have been incorporated into Imperial's Plan as a proactive approach to ensuring Activity information is available as widely as possible. It is also important to Imperial that the community have a mechanism to provide feedback if they want to share their feedback or raise any specific concerns.

Imperial has undertaken a number of broad community engagement initiatives and will continue to review the effectiveness of these methodologies and forums to meet community expectations. This includes:

- Community drop-in sessions.
- Participation in community events and show days.
- Direct email campaigns.
- Online portals for sharing information and collating feedback.

Further information regarding general community engagement is detailed in the following sections and the Communications Log (**Section 3**).

2.4.6 2022-2023 Key Consultation Activity Summary and Ongoing Commitments

Consultation Methodology	Description	Engagement Reach	Ongoing Commitments
Targeted Group Presentations	20 August 2023 Meeting undertaken in Katherine attendance from some Traditional Owners and interested community relevant to EP 187 - Facilitated by NLC. Content included general overview of Activities with the exception of the requirement of Section 57AAA (5)(d) to obtain approval, consent, or agreement with the NLC and Traditional Owners for the sale or other beneficial use of petroleum recovered on an appraisal basis.	24 x Traditional Owners and community members in attendance.	Targeted group presentations will remain a core methodology to continue stakeholder engagement where stakeholders have requested, or Imperial believes it would be beneficial.
	21 August 2023 Meeting undertaken in Katherine attendance from some Traditional Owners and interested community relevant to EP 187 - Facilitated by NLC. Content included general overview of Activities with the exception of the requirement of Section 57AAA (5)(d) to obtain approval, consent, or agreement with the NLC and Traditional Owners for the sale or other beneficial use of petroleum recovered on an appraisal basis.	35 x Traditional Owners and community members in attendance.	
	22 August 2023 Meeting undertaken in Elliot with attendance from some Traditional Owners and interested community relevant to EP 187 - Facilitated by NLC. Content included general overview of Activities with the exception of the requirement of Section 57AAA (5)(d) to obtain approval, consent, or agreement with the NLC and Traditional Owners for the sale or other beneficial use of petroleum recovered on an appraisal basis.	10 x Traditional Owners and community members in attendance.	
	25 August 2023 Meeting undertaken in Borroloola with attendance from some Traditional Owners and interested community relevant to EP 187 - Facilitated by NLC. Content included general overview of Activities with the exception of the requirement of Section 57AAA (5)(d) to obtain approval, consent, or agreement with the NLC and Traditional Owners for the sale or other beneficial use of petroleum recovered on an appraisal basis.	21 x Traditional Owners and community members in attendance.	
	29 November 2023 Meeting undertaken with Daly Waters Progress Association (DWPA) members.	7 x Community Organisation members in attendance.	
Community Drop-in Sessions	21 November 2023 – Robinson River Community session; advertised on local notice boards and Mungoorbada Aboriginal Corporation Facebook page.	13 x community members in attendance.	Community drop-in sessions are to be scheduled annually to continue to build on transparent sharing of Activity information and activity updates.
	30 November 2023 – Borroloola Community session; advertised on local notice boards across the township and on the MAWA Aboriginal Corporation's Facebook page.	20 x community members in attendance.	

Consultation Methodology	Description	Engagement Reach	Ongoing Commitments
	1 December 2023 – Daly Waters (Hiway Inn) Community session; advertised on local notice boards.	7 x community members in attendance.	
	2 December 2023 – Elliott Community session; advertised on local notice boards.	7 x community members in attendance.	
	8 December 2023 – Darwin Community session; advertised through NT News printed media and Mix 104.9 local radio station.	10 x community members in attendance.	
Online Consultation Portal and Contact Mechanism	22 November 2023 Online consultation portal launched and available to the public.	N/A	Online consultation portal to be updated with relevant information and CPP updates.
Fact Sheets and Email Briefings	From 21 November 2023 Direct email campaign to identified stakeholders and community members.	62 x stakeholders and community representatives were directly provided with information.	Revise relevant stakeholder matrix to continue to provide relevant CPP information and updates.
Field Visits	18-20 December 2022 Traditional owners and local aboriginal community members were invited to participate in field visits while Imperial was undertaking various activities, including: • Drilling Carpentaria-4V • Fracking Carpentaria-3H • Other civil operations to support project activities • Monitoring of existing infrastructure	25 x Traditional Owners and community members attended across 3 days of scheduled site visits.	Facilitation of site visits will remain an ongoing core methodology to continue providing opportunities for further stakeholder engagement for directly and indirectly affected stakeholders, when appropriate. Any requests from directly affected stakeholders to undertake field visits will be considered as a priority.
Regional Conferences and Business Network Events	13 September 2023 NT Resources Week Annual Conference. CEO presentation to provide attendees with an update on Imperial's activities and outlook for future proposed activities.	Unmeasured	Participation will remain ongoing to continue stakeholder engagement and consider other forums for participation.
Regional Community Events and Shows Days	7-8 June 2023 - Alice Springs Regional Show Provision of information on activities to date and CPP aspirations with Imperial representatives available to engage directly with community members to answer questions.	Unmeasured	Participation will remain ongoing to continue stakeholder engagement and consider other community events relevant to stakeholder engagement.
	14 June 2023 - Tennant Creek Regional Show Provision of information on activities to date and CPP aspirations with Imperial representatives available to engage directly with community members to answer questions.	Unmeasured	
	21 June 2023 - Katherine Regional Show Provision of information on activities to date and CPP aspirations with Imperial representatives available to engage directly with community members to answer questions.	Unmeasured	
	27-29 June 2023 - Darwin Regional Show	Unmeasured	

Consultation Methodology	Description	Engagement Reach	Ongoing Commitments
	Provision of information on activities to date and CPP aspirations with Imperial representatives available to engage directly with community members to answer questions.		
Local Business Supply Chain Briefings	6 December 2023 - Katherine Supply Chain Briefing facilitated by ICN NT.	17 x Local Business representatives in attendance	Participation will remain ongoing to continue stakeholder engagement.
	8 December 2023 - Darwin Supply Chain Briefing facilitated by ICN NT.	97 x Local Business representatives in attendance	
Advertising and Media	22 November 2023 Printed NT News advertisement for general public awareness of Activity information and online consultation portal.	Unmeasured	Public advertising and media are to be considered where relevant to provide the general public with CPP information and updates.
	1 December 2023 Printed NT News advertisement for general public awareness of scheduled Darwin community drop-in session (8 December 2023).	Unmeasured	
	4-8 December Consistent radio advertisement slots to advertise for general public awareness of scheduled Darwin community drop-in session (8 December 2023).	Unmeasured	
One-on-one Meetings	Various one-on-one engagement meetings with stakeholders and community members were undertaken throughout 2023 as detailed in the Communications Log (**Section 3**).	N/A	One-on-one meetings will remain a core methodology to continue stakeholder engagement where stakeholders have requested, or Imperial believes it would be beneficial,

2.5 Key Themes and Issues

Imperial has maintained a log of key issues raised throughout implementation of the Plan and will consider appropriate channels to report back to stakeholders how these issues have been addressed in the EMP.

Throughout consultation, stakeholders were satisfied with the information presented through various methods, including prepared materials and in-person explanations and engagement.

Imperial will continue to review its engagement materials to address frequently raised issues and areas of concern and engage with stakeholders to provide them with relevant information to satisfy their requests wherever possible.

Imperial notes that no alternative solutions to information were presented throughout the consultation process, but there is an obligation to ensure information is regularly updated and shared through various ongoing engagement forums to continue to build confidence in the company's standard operational activities.

Table 2—2 Summary of Key Themes and Issues

Key Themes	Description of Issues Raised	Information Provided by Imperial	Identified Actions for Imperial	Changes Required to EMP	Reference to Information in EMP
Aquifer Protection and Well Integrity	Questions and concerns about Imperial's practices to ensure aquifers are protected from potential water contamination while undertaking Activity and over the lifetime of the well. No alternatives were raised for consideration in drafting the EMP.	Imperial provided information to stakeholders through prepared materials, presentations, and conversations to confirm these requirements. Imperial made stakeholders aware of the public reporting obligations and how information on well barrier verification and aquifer water quality monitoring can be accessed by the public. Significant attention has been paid to the provision of information to stakeholders to provide detailed information on this topic.	Continue to ensure this key issue is a priority in further information forums and methodologies to build on stakeholder and community understanding.	No change is required to EMP.	**EMP - Section 6** (Environmental Risk and Mitigation Measures) **EMP – Section 3.5.4** (Aquifer Protection)
Location of Activities	All stakeholders showed interest in understanding the location of the CPP activities. The relevance of the location for each stakeholder further determined how much information they wanted to receive and their ongoing requirements for consultation.	Maps defining the current CPP Area are provided in Project presentations and materials detailing the location of the Activity. The location is explained during presentations and discussed during small group meetings.	Continue to undertake stakeholder mapping analysis to ensure stakeholders who wish to remain informed and updated have access to ongoing engagement to meet their expectations.	No change is required to EMP.	**EMP - Section 6** (Environmental Risk and Mitigation Measures) **EMP – Section 3.2 & 3.3** (Site Selection and Planning, Site Location Optimisation)
Drilling and Fracking Activities	Questions were raised to understand in further detail how Imperial undertakes these standard operational activities. No alternatives were raised for consideration in drafting the EMP.	Stakeholders were informed of industry standards and Imperial's approach to this activity to build on their own knowledge for consideration using prepared materials and in-person interaction to further address questions. Significant attention has been paid to the provision of information to stakeholders to provide detailed information on this topic.	Continue to consider how ongoing industry education of practices can be communicated to build on stakeholder and community understanding.	No change is required to EMP.	**EMP – Section 3.5 & 3.6** (Drilling and Completions, Well Operations)
Business Contracting Opportunities	A majority of the engagement initiatives received interest from stakeholders to understand what local business contracting opportunities may become	Imperial has collaborated with ICN NT to establish an online CPP Gateway page for businesses to register their interest and stay	Continue to provide information through the dedicated online CPP Gateway page to keep businesses informed.	No change is required to EMP.	**EMP – Table 2.1—1** (Summary of Legislation Requirements)

Key Themes	Description of Issues Raised	Information Provided by Imperial	Identified Actions for Imperial	Changes Required to EMP	Reference to Information in EMP
	available as the CPP develops and how they can remain informed.	up to date with potential contracting opportunities. Where appropriate, direct contact is provided with key local contractors to ensure they are engaged in opportunities as they develop.	Work with top-tier contractors to encourage their engagement with local businesses.		
Water Supply	Stakeholders were keen to understand the projected water usage for the CPP and how it may affect their local water supplies. Pastoralists consistently enquired about separate metered access to Imperial drilled water bores.	Imperial confirmed that it must have a Water Extraction Licence issued by the NT Government, which determines the volume of water it is allowed to take for the Activity. The licence is issued in consideration of the local water allocation plan.	Continue to liaise with pastoralists directly about any potential bore access allowed under regulations.	No change is required to EMP.	**EMP – Section 3.9.2** (Groundwater) **EMP – Section 6.2.1** (Risk Assessment Table)
Approvals Required for Project Development	Stakeholders were interested in understanding the various approvals required to undertake CPP activities and the expected timeframe for Imperial to receive approvals to commence the next phase of CPP development.	Imperial provided information to stakeholders through prepared materials and conversations to confirm these requirements.	Consider how stakeholders should be updated as relevant throughout the various approvals processes.	No change is required to EMP.	**EMP – Table 2.1—1** (Summary of Legislation Requirements)
Rehabilitation	Questions were raised regarding the proposed plans for rehabilitation throughout various phases of the CPP. Pastoralists consistently raised the opportunity to explore not rehabilitating infrastructure such as access tracks, seismic lines, water bore, etc., where there may be an opportunity for final land use that is beneficial to them during and beyond the period that Imperial will utilise the infrastructure.	Imperial provided information to stakeholders through prepared materials and conversations to confirm the requirements of rehabilitation under current legislation. Imperial is committed to continuing to work with pastoralists and regulators to consider infrastructure-shared benefits, including beyond the term that Imperial will be utilising the constructed infrastructure where allowed by the regulations.	Consider ongoing consultation as appropriate to meet regulator and stakeholder expectations.	Consider drafting EMP for the potential to provide infrastructure handover if/when allowed by regulations.	**Appendix 03** (Rehabilitation Management Plan)
Employment Opportunities	Some engagement initiatives received interest from stakeholders to understand what employment opportunities may become available as the project develops and how they can remain informed.	Imperial provided information to stakeholders through prepared materials and conversations to confirm projected workforce development indications and the types of employment opportunities that may become available.	Consider further information to share with the community about workforce development and employment opportunities as appropriate to development activities. Work with all contractors to encourage their engagement with the local workforce where practical.	No change is required to EMP.	**EMP – Section 1.6** (Timing and Phasing of the Activity)

Key Themes	Description of Issues Raised	Information Provided by Imperial	Identified Actions for Imperial	Changes Required to EMP	Reference to Information in EMP
Water and Wastewater Management	Questions were raised to understand in further detail how Imperial undertakes these standard operational activities. No alternatives were raised for consideration in drafting the EMP.	Imperial provided information to stakeholders through prepared materials and conversations to confirm the current legislative and operational requirements and how improvements to processes may be envisaged over time. This includes centralised facilities and will result in more efficient use and process of water sources.	Continue to ensure this issue is discussed in further information forums and methodologies to build on stakeholder and community understanding.	No change is required to EMP.	**Appendix 06** (Waste and Wastewater Management Plan)
Environmental Monitoring	Questions were raised to understand in further detail how Imperial undertakes these standard operational activities and the requirements of the regulations. No alternatives were raised for consideration in drafting the EMP.	Imperial provided information to stakeholders through prepared materials and conversations to confirm these requirements. Imperial made stakeholders aware of the public reporting obligations and how information can be accessed by the public.	Continue to ensure this issue is discussed in further information forums and methodologies to build on stakeholder and community understanding.	No change is required to EMP.	**EMP – Section 7** (Management Plans) **EMP – Section 8** (Implementation Strategy)
Surface Impact and Land Clearing	Questions were raised to understand in further detail how Imperial undertakes these standard operational activities and how much land clearing and surface impact is envisaged throughout the lifecycle of the CPP.	Imperial provided information to stakeholders through prepared materials and conversations to confirm these requirements. This includes how ongoing activity is designed to limit surface impact where possible through developed industry technology to our best advantage.	Continue to ensure this issue is discussed in further information forums and methodologies to build on stakeholder and community understanding.	No change is required to EMP.	**EMP – Section 3** (Description of the Activity)
Access	Questions from directly affected stakeholders and other pastoralists about how access to property is undertaken and if this will affect stakeholders' own activities.	Imperial confirmed that its approach to access will remain respectful, and stakeholders will be aware of current and future project activities with time for consideration. While the CPP doesn’t envisage limiting stakeholders' rightful access, there will be designated areas of activity that will have restricted access to ensure that safety is maintained.	Continue to discuss access requirements directly with affected stakeholders.	No change is required to EMP.	**EMP – Table 2.1—1** (Summary of Legislation Requirements)

3 Communications Log

Table 3—1 Stakeholder Communications Log

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
2022/08/08	NLC	Senior Petroleum Project Officer	Email	• Notification of unexpected archaeological find outside proposed work area.	-	N	-	No change required	**Section 4.1.1**
2022/12/18	Katherine TO Group and community	Various representatives	Face to face meeting and site visit Carpentaria operations	• Stakeholders in TO group and community invited to visit Carpentaria operations including C1, C2, C3H frack spread and C4V drilling. • EEG company representatives escorted TO's and visitors on site tour and to answer any questions raised. • EEG provided transport and catering for day site visit.	Questions about water use, aquifer protection, details of drilling and hydraulic fracturing, details of flowback tank liners and leak detection, details on water re-use for HF, questions regarding training and employment opportunities, comments that the disturbance area was smaller than envisaged.	N	Discussion addressing all questions raised by attendees to provide further information on these specific topics.	No change required	N/A
2022/12/19	Mataranka TO Group and community	Various representatives	Face to face meeting and site visit Carpentaria operations	• Stakeholders in TO group and community invited to visit Carpentaria operations including C1, C2, C3H frack spread and C4V drilling. • EEG company representatives escorted TO's and visitors on site tour and to answer any questions raised. • EEG provided transport and catering for day site visit.	Questions about water use, aquifer protection, details of drilling and hydraulic fracturing, details of flowback tank liners and leak detection, details on water re-use for HF, questions regarding training and employment opportunities, comments that the disturbance area was smaller than envisaged.	N	Discussion addressing all questions raised by attendees to provide further information on these specific topics.	No change required	N/A
2022/12/20	Borroloola TO Group and community	Various representatives	Face to face meeting and site visit Carpentaria operations	• Stakeholders in TO group and community invited to visit Carpentaria operations including C1, C2, C3H frack spread and C4V drilling. • EEG company representatives escorted TO's and visitors on site tour and to answer any questions raised. • EEG provided transport and catering for day site visit.	Questions about water use, aquifer protection, details of drilling and hydraulic fracturing, details of flowback tank liners and leak detection, details on water re-use for HF, questions regarding training and employment opportunities, comments that the disturbance area was smaller than envisaged.	N	Discussion addressing all questions raised by attendees to provide further information on these specific topics.	No change required	N/A

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
2023/01/16	NLC	CEO Principal Legal Officer Branch Manager Energy and Resources	Face to face meeting	Discussion: • Prioritising the rescheduling of meetings postponed in 2023. • Information shared regarding proposed appraisal gas consent and process for negotiations with relevant stakeholders via NLC planned for 2024. • Other permit areas that may require consultation in 2024.	CEO requested summary email of conversations to be provided for continued prioritisation from NLC to work towards meeting facilitation and rescheduling as soon as possible.	N	Email provided documenting conversation for continued collaboration as required.	No change required	N/A
2023/06/7-8	General community	N/A	Face to face meeting	• Alice Springs Regional Show. • General company engagement and updates.	General themes and questions about water usage, aquifer protection, industry processes, project timeline, business, and employment opportunities.	N	Company representatives available to answer questions within forum and contacts provided for any future queries. General activity information provided on story board in display area.	No change required	**Section 4.3.1**
2023/06/14	General community	N/A	Face to face meeting	• Tennant Creek Regional Show. • General company engagement and updates.	General themes and questions about water usage, aquifer protection, industry processes, project timeline, business, and employment opportunities.	N	Company representatives available to answer questions within forum and contacts provided for any future queries. General activity information provided on story board in display area.	No change required	**Section 4.3.1**
2023/06/20-21	General community	N/A	Face to face meeting	• Katherine Regional Show. • General company engagement and updates.	General themes and questions about water usage, aquifer protection, industry processes, project timeline, business, and employment opportunities.	N	Company representatives available to answer questions within forum and contacts provided for any future queries. General activity information provided on story board in display area.	No change required	**Section 4.3.1**
2023/06/27-29	General community	N/A	Face to face meeting	• Darwin Regional Show. • General company engagement and updates.	General themes and questions about water usage, aquifer protection, industry processes, project timeline, business, and employment opportunities.	N	• Company representatives available to answer questions within forum and contacts provided for any future queries. • General activity information provided on story board in display area.	No change required	**Section 4.3.1**
2023/07/15	Eleanor Pools Station	Pastoralist	Phone call to arrange general catch up	• Advice regarding works upcoming on C2.	Advised are in the middle of Mustering but our activities will not affect them.	N	Will delay face to face until after muster and will both communicate if anything changes to avoid LH impacts.	No change required	N/A
2023/07/15	Eleanor Pools Station	Pastoralist	Face to face meeting	• General catch up and discussion on current/upcoming site activity.	Discussion regarding Imperial potential providing lighting tower for Borroloola rodeo as per 2021.	N	IMP to action support for community event.	No change required	N/A
2023/08/20	TO Group, Katherine	TO's and Community	Face to face meeting	• NLC facilitation of TO and community mtg following NLC private consultation (funded by IMP)	Key topics discussed: • Protecting aquifers and well integrity • Flooding mitigation	N	Discussion addressing all questions raised by attendees to provide further information on these specific topics.	No change required	**Section 4.1.2** **Section 4.1.3**

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
				to gauge interest in potential upcoming activities. • Presentation from IMP regarding activities undertaken to date and potential future activities on EP 187 for pilot project.	• Wastewater management, storage, and water use • Chemicals used in fracking • Rehabilitation and abandonment • Life expectancy of the project • Future employment and job opportunities				
2023/08/21	Katherine TO Group and community	TO's and Community	Face to face meeting	• NLC facilitation of TO and community mtg following NLC private consultation (funded by IMP) to gauge interest in potential upcoming activities. • Presentation from IMP regarding activities undertaken to date and potential future activities on EP 187 for pilot project.	Key topics discussed: • Protecting aquifers and well integrity • Environmental protection • Flooding mitigation • Wastewater management, storage, and water use • Earthquakes and well integrity • Chemicals used in fracking • Rehabilitation and abandonment • Finding independent trustworthy information • Life expectancy of the project • Maps and area of current wells and future development • Future employment and job opportunities	N	Discussion addressing all questions raised by attendees to provide further information on these specific topics.	No change required	**Section 4.1.2** **Section 4.1.3**
2023/08/22	Elliot TO Group and community	TO's and Community	Face to face meeting	• NLC facilitation of TO and community mtg following NLC private consultation (funded by IMP) to gauge interest in potential upcoming activities. • Presentation from IMP regarding activities undertaken to date and potential future activities on EP 187 for pilot project.	Key topics discussed: • Flooding mitigation • Wastewater management, storage, and water use. • Chemicals used in fracking • Wet season work and monitoring • Future employment and job opportunities • Life expectancy of the project • Economic benefit for TO's • Rehabilitation and abandonment	N	Discussion addressing all questions raised by attendees to provide further information on these specific topics.	No change required	**Section 4.1.2** **Section 4.1.3**
2023/08/25	Borroloola TO Group and community	TO's and Community	Face to face meeting	• NLC facilitation of TO and community mtg following NLC private consultation (funded by IMP) to gauge interest in potential upcoming activities. • Presentation from IMP regarding activities undertaken to date and	Key topics discussed: • Protecting aquifers and well integrity • Environmental protection and surface impact • Wastewater management, storage, and water use • Earthquakes and well integrity	N	Discussion addressing all questions raised by attendees to provide further information on these specific topics.	No change required	**Section 4.1.2** **Section 4.1.3**

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
				potential future activities on EP 187 for pilot project.	• Fracking process and perforating formations • Rehabilitation and abandonment • Life expectancy of the project and full production. • Maps and area of current wells and future development. • Future employment and job opportunities. • Agreement negotiation steps and process.				
2023/09/13	NT Industry and local businesses	N/A	Presentation	• CEO presentation company update at NT Resources Week Conference. • General company presentation including potential local business opportunities and work program update.	N/A	N	N/A	No change required	N/A
2023/09/14	Nurrdalinji Aboriginal Corporation	Deputy Chair	Email	Received from NAC: • Advise of Chairmans passing. • Request for information and update provided to TO's at previous meetings on Carpentaria activities.	N/A	N	2023/09/20 Response providing publicly available information regarding EP 187 meetings and details of activities.	No change required	**Section 4.1.4**
2023/09/21	Nurrdalinji Aboriginal Corporation	Deputy Chair	Email	Request received from NAC: • Invitation for IMP to attend information session to share information on industry activities.	N/A	N	2023/09/25 IMP response confirming company representative will be available to attend session as requested and coordinate details.	No change required	**Section 4.1.5**
2023/09/28	Confidential Aboriginal Community Member EP 187 TO Group	Community stakeholder	Face to face meeting	• Discussion about local employment opportunities and ongoing work including Cultural Heritage Monitors on EP 187 Carpentaria sites.	Continue to work together to consider further employment opportunities for locals.	N	Ongoing conversations to continue to work together.	No change required	N/A
2023/10/2	NLC	Senior Project Officer	Email	• NLC request for updated Annual Work Program to be submitted by 13/10/23 and content inclusions as per Exploration Deed to continue planning for 2023 meeting dates.	N/A	N	Confirmed AWP will be submitted by 13/10 as requested and intention to support planning for 2023 meetings.	No change required	N/A

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
2023/10/5	NLC	Senior Project Officer	Video conference call	• Discussed planning for next EP 187 On Country meeting and scheduling (Nov 23). • AWP to be provided by IMP to NLC by 13 Oct. • Discussed pending approval for CHM activities on EP 187. • Discussed ongoing planning for Production Agreement negotiations as required under ALRA.	• NLC planning for OCM ongoing. • Other activity discussions to continue.	N	11/10 CHM Cost Estimate approval provided to NLC to proceed.	No change required	N/A
2023/10/7	Nurrdalinji Aboriginal Corporation	Community stakeholder	Video conference call	IMP responded to request for consultation and information regarding: • Scale envisage for ongoing work. • Timeframes for operations. • Sacred site protection, water extraction and pipeline arrangements. • Ongoing consultation with Traditional Owners.	• Invitation for respectful conversation and invitation to meet on country in future. • Concern for country and ongoing activities. • Would like further discussion and information on employment opportunities and economic benefits for TO's. • EPT testing activity currently includes flaring gas - has this been consulted on? • Other environmental concerns not related to IMP projects or operations. • May have further questions.	N	• Have prepared information to address meeting brief (see presentation). • Will continue to meet with TO's as we have on EP 187 for many years and undertake requirements to consult with TO's on the directly affected area and under ALRA legislation. • Undertaking broader community consultation as required. • Will continue to use Cultural Heritage monitors and consider how ongoing employment opportunities may develop in future. • Have discussed EPT testing and flaring and current/future activities at previous On Country Meetings. • Will continue to monitor consultation requests and address as appropriate.	No change required	N/A
2023/10/8	OT Downs	Pastoralist	Face to face meeting	• Presented and discussed GWEL area, buffers, and existing landholder bores with station manager on site.	Station manager to review and provide information requested for landholder bores and advised to send the information directly to owners also.	N	Forward GWEL information directly to landowner.	No change required	N/A
2023/10/9	Eleanor Pools	Pastoralist	Email	• GWEL Consultation Introduction including hydrocenus sheet and consultation map. • Further follow up action will be undertaken to collect further feedback.	N/A	N	N/A	No change required	**Section 4.4.1**

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
2023/10/9	West Balbarini	Pastoralist	Email	• GWEL Consultation Introduction including hydrocenus sheet and consultation map. • Further follow up action will be undertaken to collect further feedback.	N/A	N	N/A	No change required	**Section 4.4.2**
2023/10/9	Relief Creek	Pastoralist	Email	• GWEL Consultation Introduction including hydrocenus sheet and consultation map. • Further follow up action will be undertaken to collect further feedback.	N/A	N	N/A	No change required	**Section 4.4.3**
2023/10/9	Eleanor Pools	Pastoralist	Face to face meeting	• Presented and discussed GWEL area, buffers, and existing landholder bores with manager on site.	• Manager to review and provide information requested for landholder bores. • Discussion of managing impact on other bores. • Request to consider beneficial use to draw from new water bores installed.	N	Continue consultation and consider pastoralists request where viable under existing regulations.	No change required	N/A
2023/10/10	OT Downs	Pastoralist	Email	• GWEL Consultation Introduction including hydrocenus sheet and consultation map. • Further follow up action will be undertaken to collect further feedback.	N/A	N	N/A	No change required	**Section 4.4.4**
2023/10/13	NLC	Senior Project Officer	Email	• EP 187 Annual Work Program 2024 and onwards to 2029 submitted to inform and progress planning for annual On Country Meeting scheduled for end NOV.	NLC SPO confirmed receipt of document.	N	N/A	No change required	**Section 4.2.1** **Section 4.2.3**
2023/10/14	Confidential Aboriginal Community Member EP 187 TO Group	Traditional Owner	Phone call	• Received advice from operations team that TO and community member had enquired to make contact. • Phone call to TO directly from IMP Management. • TO looking for information regarding activity undertaken to date, update, and timing of next scheduled On Country Meeting.	Acknowledged call back and questions answered.	N	N/A	No change required	N/A

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
				• Discussed appropriate details and answered questions.					
2023/10/25	NLC	Lawyer	Email	• Received from NLC requesting further information regarding draft EMP and proposed appraisal gas activities.	N/A	N	Response and information provided as requested 1/11/2023.	No change required	**Section 4.1.6**
2023/10/26	NLC	Lawyer x 2 Senior Project Officer	Face to face meeting	Discussion regarding: • Annual Work Program inclusion of appraisal gas and requirement for TO consent. • Planning to progress required consultation plan for the AWP activities.	NLC to review AWP and consider internally requirements for facilitating consultation.	N	N/A	No change required	N/A
2023/10/27	NLC	Senior Project Officer	Phone call	• Query received from NLC regarding Work Program area to progress meeting facilitation and requirement for relevant TO groups for new activity.	Provision of updated shapefiles to include only new activity areas for consultation as requested.	N	N/A	No change required	N/A
2023/11/1	Roper Gulf Regional Council	Mayor Governance Officer	Email	• IMP request to attend LGA meetings scheduled for 21 Nov. • Robinson River and Borroloola to present to attendees proposed plans for CPP.	2023/11/2 - Confirmed request and approval for agenda position. IMP to confirm attendance in person of VC.	N	2023/11/2 - Confirmed attendance in person.	No change required	N/A
2023/11/1	NLC	Lawyer Senior Project Officer	Email	IMP response to NLC with further information including: • Updated shapefiles of activity area. • Additional information for AWP - Work Methods. • Environmental updates.	Confirmed receipt.	N	N/A	No change required	**Section 4.2.2** **Section 4.2.3**
2023/11/2	NLC	Senior Project Officer	Phone call	• NLC phone call advising scheduled meetings for November cancelled with NLC requesting further time to review documentation provided.	N/A	N	Request meeting to discuss information queries and meeting reschedule.	No change required	N/A
2023/11/7	West Balbarini	Pastoralist	Face to face meeting	• Presented and discussed GWEL area, buffers, and existing landholder bores with manager on site.	• Manager to review and provide information requested for landholder bores.	N	Continue consultation and consider pastoralists request where viable under existing regulations.	No change required	N/A

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
					• Discussion of managing impact on other bores and additional potential bore in buffer area. • Request to consider beneficial use to draw from new water bores installed. • Will consider and respond via email if other questions.				
2023/11/8	NLC	Branch Manager Resources & Energy Lawyer x 2 Senior Project Officer	Face to face meeting	Discussion regarding: • Cancellation of planned consultation for November and rescheduling of meetings. • Working collaboratively towards rescheduling of meetings and information requests between NLC and IMP. • IMP will be undertaking wider community consultation as part of EMP requirements which will include sharing project information publicly to stakeholders outside of TO's within work program area.	• NLC request for further provision of information from IMP to NLC including draft EMP to be considered with previously submitted AWP. • NLC agree to explore rescheduling opportunity of meetings for 2023.	N	Confirm draft EMP information to be provided to NLC as soon as practical.	No change required	N/A
2023/11/10	Relief Creek	Pastoralist	Face to face meeting	• Presented and discussed GWEL area, buffers, and existing landholder bores with manager on site.	• Manager to review and provide information requested for landholder bores. • Discussion of managing impact on other bores and total volumes of water noting future pastoral bores may be installed within buffer area. • Request to consider beneficial use to draw from new water bores installed. • Will consider and respond via email if other questions.	N	Continue consultation and consider pastoralists request where viable under existing regulations.	No change required	N/A
2023/11/16	Roper Gulf Regional Council	Governance Officer	Phone call	RGC call to inform LGA meetings postponed and will be in contact for rescheduling and IMP presentation.	N/A	N	N/A	No change required	N/A
2023/11/17	NLC	Senior Project Officer	Email	• NLC confirmed meeting dates reschedule for December 2023.	N/A	N	IMP confirmed availability for rescheduled meetings.	No change required	N/A
2023/11/20	Lelia Creek	Pastoralists and local business owner	Face to face meeting	• Information provided to pastoralists on neighbouring property regarding the Carpentaria Pilot Project and general consultation program	• Interested to review information and stay informed with communications. • No issues raised regarding current and proposed activities.	N	N/A	No change required	N/A

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
				launched to get feedback from stakeholders and community while drafting EMP. • Advise consultation portal online also provides links to materials that can be downloaded. • Contact IMP directly with any further questions or requests for information.	• Interested in future local business opportunities.				
2023/11/20	NLC	Senior Project Officer	Email	• IMP provisions of slides and presentation drafted for On Country Meetings postponed until December.	NLC confirmed receipt of presentation material.	N	N/A	No change required	**Section 4.1.6**
2023/11/21	Robinson River Community	General community	Community Drop-In engagement	• Facilitated at Mungoorbada Aboriginal Corporation as central point in community. • Information provided to community members regarding the Carpentaria Pilot Project and general consultation program launched to get feedback from stakeholders while drafting EMP. • Advise consultation portal online also provides links to materials that can be downloaded. • Visitors encouraged to contact IMP if they had any further questions or requests for further information.	• Land clearing • Aquifer protection • Drilling activity • Fracking activity • Groundwater • Location of activities • Environmental monitoring • Rehabilitation • Surface impact • Water Supply • Water/wastewater management • Water contamination and management practices • Agreements (existing and new) • Community investment • Continued communications and information sharing.	N	IMP representatives answered questions from the attendees and plans for further stakeholder consultation with wider community.	No change required	**Section 4.3.2**
2023/11/21	Stakeholders as listed in **Section 4.3.3.2**	**Section 4.3.3**	Email campaign	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	N/A	**Section 4.3.3**

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
2023/11/21	Mungoorbada Aboriginal Corporation	CEO	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	• Met in person at Robinson River community drop-in day. • CEO to include information in communications to the Board.	N	Keep informed and with developments as project progresses.	No change required	**Section 4.3.3.4**
2023/11/21	NLC	Senior Project Officer	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Mabunji Aboriginal Resource Indigneous Corporation	Chairperson and CEO	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Mawurli and Wirrywangkuma Aboriginal Corporation (MAWA)	Community Coordinator	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	• Met in person at Borroloola drop-in day. • Interested in business opportunities and community investment. • Interested in understanding industry practises and operations.	N	Keep informed and with developments as project progresses.	No change required	**Section 4.3.3.4**
2023/11/21	Eleanor Pools	Pastoralist	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and	Confirmed received.	N	In person meeting arranged to consult directly.	No change required	**Section 4.3.3.4**

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
				stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.					
2023/11/21	West Balbarini	Pastoralist	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview. • In person meeting arranged with station managers to consult directly.	Confirmed received.	N	In person meeting arranged to consult directly.	No change required	**Section 4.3.3.4**
2023/11/21	Relief Creek	Pastoralist	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Sunday Creek Station	Pastoralist	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	Confirmed received.	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Middle Creek Station	Pastoralist	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
2023/11/21	Cow Creek Station	Pastoralist	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Tarlee Station	Pastoralist	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Birdum Creek Station	Pastoralist	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	Confirmed no issues to discuss with proposed activities.	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Cairns Industries	Local business owner	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Heartbreak Hotel	Local business owner	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and	N/A	N	N/A	No change required	**Section 4.3.3.4**

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				stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.					
2023/11/21	Hi-way Inn	Local business owner	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	Keep updated and in communications for local business opportunities.	N	Keep informed and with developments as project progresses.	No change required	**Section 4.3.3.4**
2023/11/21	Energy Club NT	Chairman and CEO	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	Confirmed received and stay updated on project activities.	N	Keep informed and with developments as project progresses.	No change required	**Section 4.3.3.4**
2023/11/21	NT Cattleman's Association	CEO	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	NT Indigenous Business Network	CEO and Hubs Operations Manager	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	Keep updated on project activities and opportunities to consider collaboration.	N	Keep informed and with developments as project progresses.	No change required	**Section 4.3.3.4**

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
2023/11/21	NT Business Council	Chairperson	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Extractive Industry Association NT	CEO	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	NT Farmers	CEO	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Civil Contractors Federation NT	CEO	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Industry Skills Advisory council NT	CEO	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and	N/A	N	N/A	No change required	**Section 4.3.3.4**

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
				stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.					
2023/11/21	Chamber of Commerce NT	CEO and Chief Policy Officer	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	Confirmed received and arrange meeting to consult directly.	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Industry Capability Network NT	CEO and Commercial Manager	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	Confirmed received and ongoing engagement directly.	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Glencore - McArthur River Mine	General Manager and Communities and Social Performance Superintendent	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Daly Waters Progress Association	Chairperson	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	Confirmed received and meeting date arranged for interested members who are available.	N	Coordinate meeting time as agreed.	No change required	**Section 4.3.3.4**

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
2023/11/21	Australian Energy Producers	NT Director	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	King Ash Bay Fishing Club	President	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Department of Industry, Tourism and Trade	Minister Chief of Staff CEO	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	Confirmed received and aware of project activities.	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Department of Environment, Parks and Water Security	Minister Chief of Staff CEO	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	Confirmed received.	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Department of Infrastructure, Planning and Logistics	Minister Chief of Staff CEO	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and	Confirmed received.	N	N/A	No change required	**Section 4.3.3.4**

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
				stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.					
2023/11/21	Department of Chief Minister	Minister Chief of Staff CEO	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	Confirmed received.	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Gas Taskforce	Chairman	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	Confirmed received.	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Investment Territory	Major Projects Commissioner	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	Confirmed received.	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Member for Barkly	MLA	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	Confirmed received.	N	N/A	No change required	**Section 4.3.3.4**

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
2023/11/21	Member for Katherine	MLA	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	Confirmed received.	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Leader of Opposition	MLA	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	Confirmed received.	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Roper Gulf Council	Mayor	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	East Arm Civil	Neighbouring Tenure Holder	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	• Confirmed received. • No concerns or issues to raise.	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	St Johns NT	Area Manager	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and	N/A	N	N/A	No change required	**Section 4.3.3.4**

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
				stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.					
2023/11/21	Nurrdalinji Aboriginal Corporation	Contact Officer	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	Confirmed received.	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Environment Centre NT	CEO (via admin address)	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3** **Section 4.3.3.4**
2023/11/21	OT Downs / Beetaloo Station	Pastoralist	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Leila Creek Station	Pastoralist	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	• Confirmed received and aware of project activities. • Interested to be aware of future local business opportunities.	N	Keep informed and with developments as project progresses.	No change required	**Section 4.3.3.4**

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
2023/11/21	Tanumbirini Station	Pastoralist	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Kalala Station	Pastoralist	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Confidential Aboriginal Community Member EP 187 TO Group	Traditional Owner	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/21	Confidential Aboriginal Community Member EP 187 TO Group	Traditional Owner	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/22	Amungee Mungee	Pastoralist	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and	N/A	N	N/A	No change required	**Section 4.3.3.4**

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
				stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.					
2023/11/22	Katherine Town Council	CEO	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/22	Confidential Aboriginal Community Member EP 187 TO Group	Traditional Owner	Face to face meeting	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	• Good understanding of activities undertaken to date and ongoing planned activities. • Continued information sharing with relevant TO's and the wider community is a good initiative to help people build their understanding. • Reducing requirement to flare gas through beneficial use is a good environmental outcome. • Interested in working collaboratively for positive outcomes. • Caring for Country important for TO's. • Interested in potential employment opportunities as project progresses.	N	Continue to maintain direct contact and open lines of communication.	No change required	N/A
2023/11/22	Darwin Community	General community	NT News advertisement	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.6**
2023/11/22	General Community	General community	NT News advertisement	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls	N/A	N	N/A	No change required	**Section 4.3.5**

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
				and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.					
2023/11/27	Hayfield Shenandoah Station	Pastoralist	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/27	Tamboran	COO	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/27	Daly Waters Energy	Head of Australian Operations	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	• Confirmed received and aware of project activities. • No issues or concerns raised.	N	N/A	No change required	**Section 4.3.3.4**
2023/11/27	Santos	Lead - Shale Plays Senior Advisor Government Affairs	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	• Confirmed received and aware of project activities. • No issues or concerns raised.	N	N/A	No change required	**Section 4.3.3.4**

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
2023/11/27	Power Water Corporation	Executive General Manager and Senior Manager Corporate Affairs	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/27	Hancock Prospecting / Jacaranda Minerals	Chief Geologist	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/11/27	NLC	Senior Lawyer	Email	NLC request for clarifications and additional information regarding AWP, EMP, and environmental information.	N/A	N	Confirm receipt of request for clarification/information to follow.	No change required	**Section 4.1.9**
2023/11/29	NLC	Senior Lawyer Senior Project Officer Branch Manager Energy and Resources	Email	IMP provision of information request including: • Draft EMP • Additional environmental information requested. • Target timelines and other approvals.	Confirm receipt of documents and information for review.	N	N/A	No change required	**Section 4.1.10**
2023/11/29	Daly Waters Progress Association	Members	Face to face meeting	• Information provided to DWPA and members regarding the Carpentaria Pilot Project and general consultation program launched to get feedback from stakeholders while drafting EMP. • Advise consultation portal online also provides links to materials that can be downloaded. • DWPA encouraged to contact IMP directly with any further questions or requests for information.	• Land clearing • Traffic volume • Working hours • Employment opportunities • Business contracting opportunities • Aquifer protection • Chemical use • Drilling activity • Fracking activity • Groundwater • Livestock operations • Location of activities	N	• IMP representatives answered questions from the attendees and plans for further stakeholder consultation with wider community. • Imperial is committed to continuing to work with pastoralists and regulators to consider infrastructure-shared benefits, including beyond the term that Imperial will be utilising the constructed infrastructure where allowed by the regulations.	EMP drafted for the potential to provide infrastructure handover if/when allowed by regulations. See EMP **Appendix 03** Rehabilitation Management Plan	N/A

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
					• Environmental monitoring • Rehabilitation and shared infrastructure • Surface impact • Water supply • Water/wastewater management • Weeds • Well integrity • Approvals • Water contamination and management practices • Property access • Managing damage to stakeholder infrastructure • Continued communications and information sharing. • Questions were raised regarding the proposed plans for rehabilitation throughout various phases of the CPP. • Pastoralists consistently raised the opportunity to explore not rehabilitating infrastructure such as access tracks, seismic lines, water bore, etc., where there may be an opportunity for final land use that is beneficial to them during and beyond the period that Imperial will utilise the infrastructure.				
2023/11/29	Confidential Aboriginal Community Member EP 187 TO Group	Traditional Owner	Face to face meeting	• Provision of information that is being shared publicly with the general community on proposed CPP activities, environmental controls and mechanisms for community and stakeholders to provide feedback while EMP is being prepared. • Discussed wider community engagement program being undertaken in addition to direct meetings with TO's through facilitated NLC meetings. • Appraisal gas phase as a step between exploration and production and why further activity is being	• Process of engagement and availability to attend meetings facilitated by NLC. • IMP commitment to continued engagement and information sharing with relevant TO's and the wider community is positive. • Interested in working collaboratively and maintaining direct contact for positive outcomes. • Caring for Country important for TO's.	N	Continue to maintain direct contact and open lines of communication.	No change required	N/A

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
				undertaken to continue to test viability. • Consent will be required and discussed with relevant TO groups through NLC.					
2023/11/30	Borroloola Community	General community	Community Drop-In engagement	• Facilitated at MAWA office as central point in community. • Information provided to community members regarding the Carpentaria Pilot Project and general consultation program launched to get feedback from stakeholders while drafting EMP. • Advise consultation portal online also provides links to materials that can be downloaded. • Visitors encouraged to contact IMP if they had any further questions or requests for further information.	• Employment opportunities • Business contracting opportunities • Aquifer protection • Drilling activity • Fracking activity • Groundwater • Land clearing • Location of activities • Regional planning • Royalties • Community investment and sponsorships	N	IMP representatives answered questions from the attendees and plans for further stakeholder consultation with wider community.	No change required	N/A
2023/12/1	Daly Waters Community	General community	Community Drop-In engagement	• Facilitated at Hi-Way Inn as central point in community. • Information provided to community members regarding the Carpentaria Pilot Project and general consultation program launched to get feedback from stakeholders while drafting EMP. • Advise consultation portal online also provides links to materials that can be downloaded. • Visitors encouraged to contact IMP if they had any further questions or requests for further information.	• Location of activities • Approvals • Community engagement initiatives and feedback process	N	IMP representatives answered questions from the attendees and plans for further stakeholder consultation with wider community.	No change required	N/A
2023/12/1	Eleanor Pools	Pastoralist	Face to face meeting	• Provision of information that is being shared publicly with the general community on proposed CPP activities, environmental controls and mechanisms for community and	• Shared infrastructure and ability to transfer any mutually beneficial infrastructure is important and would be positive to ensure we can works towards sensible outcomes. • Business and contracting opportunities.	N	• Continue to maintain direct contact and open lines of communication. • Imperial is committed to continuing to work with pastoralists and regulators to consider infrastructure-shared benefits, including beyond the	EMP drafted for the potential to provide infrastructure handover if/when allowed	N/A

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
				stakeholders to provide feedback while EMP is being prepared. • Discussed wider community engagement program being undertaken in addition to direct meetings with stakeholders. • Appraisal gas phase as a step between exploration and production and why further activity is being undertaken to continue to test viability. • Ongoing direct contact with pastoralists will be important to continue.	• Groundwater • Location of activities • Rehabilitation and transfer of infrastructure • Surface impact • Water supply • Approvals • Access • Management of potential damage to stakeholder infrastructure. • Questions were raised regarding the proposed plans for rehabilitation throughout various phases of the CPP. • Pastoralists consistently raised the opportunity to explore not rehabilitating infrastructure such as access tracks, seismic lines, water bore, etc., where there may be an opportunity for final land use that is beneficial to them during and beyond the period that Imperial will utilise the infrastructure.		term that Imperial will be utilising the constructed infrastructure where allowed by the regulations.	by regulations. See EMP **Appendix 03** Rehabilitation Management Plan	
2023/12/1	West Balbarini	Pastoralist	Face to face meeting	• Provision of information that is being shared publicly with the general community on proposed CPP activities, environmental controls and mechanisms for community and stakeholders to provide feedback while EMP is being prepared. • Discussed wider community engagement program being undertaken in addition to direct meetings with stakeholders. • Appraisal gas phase as a step between exploration and production and why further activity is being undertaken to continue to test viability. • Ongoing direct contact with pastoralists will be important to continue.	• Shared infrastructure and ability to transfer any mutually beneficial infrastructure is important and would be positive to ensure we can works towards sensible outcomes. • Business and contracting opportunities • Employment opportunities • Groundwater • Location of activities • Rehabilitation and transfer of infrastructure • Surface impact • Water supply • Approvals • Access • Management of potential damage to stakeholder infrastructure.	N	• Continue to maintain direct contact and open lines of communication. • Imperial is committed to continuing to work with pastoralists and regulators to consider infrastructure-shared benefits, including beyond the term that Imperial will be utilising the constructed infrastructure where allowed by the regulations.	EMP drafted for the potential to provide infrastructure handover if/when allowed by regulations. See EMP **Appendix 03** Rehabilitation Management Plan	N/A

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
					• Questions were raised regarding the proposed plans for rehabilitation throughout various phases of the CPP. • Pastoralists consistently raised the opportunity to explore not rehabilitating infrastructure such as access tracks, seismic lines, water bore, etc., where there may be an opportunity for final land use that is beneficial to them during and beyond the period that Imperial will utilise the infrastructure.				
2023/12/1	Darwin Community	General community	NT News advertisement	• Advertisement in NT News with information regarding Darwin Community Drop-In Session to be held Friday 8 December 2023.	N/A	N	N/A	No change required	N/A
2023/12/1	NLC	Senior Project Officer	Phone call and email	• NLC advice to IMP December meetings must be postponed due to death in community.	N/A	N	Acknowledgement and agree to consider rescheduling as soon as practicable in 2024.	No change required	N/A
2023/12/2	Elliott Community	General community	Community Drop-In engagement	• Facilitated at local park near Elliot Store as central point in community. • Information provided to community members regarding the Carpentaria Pilot Project and general consultation program launched to get feedback from stakeholders while drafting EMP. • Advise consultation portal online also provides links to materials that can be downloaded. • Visitors encouraged to contact IMP if they had any further questions or requests for further information.	• Employment opportunities • Business contracting opportunities • Aquifer protection • Land clearing • Location of activities • Waste management • Weed management • Approvals • Community investment • Community engagement initiatives and feedback process	N	IMP representatives answered questions from the attendees and plans for further stakeholder consultation with wider community.	No change required	N/A

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
2023/12/2	Local Indigenous Business Owner - Elliott	Business Owner	Face to face meeting	• Information provided to business regarding the Carpentaria Pilot Project and potential contracting opportunities. • Discussion regarding local business capability and capacity to consider project opportunities. • Introduction to ICN Gateway to stay up to date and direct contacts for further conversations.	Capability overview provided to continue further conversations as opportunity scopes are developed.	N	Continue to maintain direct contact and open lines of communication.	No change required	N/A
2023/12/2	Relief Creek	Pastoralist	Phone call	• Discussion regarding provision of information for proposed activities of CPP. • Consider scheduled time for face to face meeting if required to discuss and answer any questions.	• Information received. • Potential opportunity for catch up within following days - to reconfirm if available	N	Follow up call and message to check if meeting required in person and availability.	No change required	N/A
2023/12/4-8	Darwin Community	General community	Mix 104.9 radio advertisement	• Advertisement on radio 3 x per day Mon 4 Dec to Fri 8 Dec with information regarding Darwin Community Drop-In Session to be held Friday 8 December 2023.	N/A	N	N/A	No change required	N/A
2023/12/5	McArthur River Station	Pastoralist	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/12/5	Green Critical Minerals		Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	Confirm receipt and introduction to company representatives.	N	Follow up consultation meeting scheduled with available representative for further discussion.	No change required	**Section 4.3.3.4**

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
2023/12/6	Katherine Businesses	Various local businesses and community	Industry Briefing	• Launch ICN NT Gateway as point of contact for businesses to register interest to follow project developments and stay updated. • Discussion about CPP planned activities and location of activities.	• Questions regarding timing of development and specific local business opportunities. • Request to ensure local businesses stay informed and understand how ICN facilitates engagement. • Questions regarding activity already completed and provision of information from completed activity announcements.	N	Information provided directly to community member regarding previous announcements and completed activity.	No change required	**Section 4.3.7**
2023/12/6	Nutwood Downs	Pastoralist	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/12/6	Mallapunyah Station	Pastoralist	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	N/A	N	N/A	No change required	**Section 4.3.3.4**
2023/12/7-14	NLC	Senior Project Officer	Email	• Request for cultural monitor facilitation as part of an upcoming on-ground site re-assessment. • Provision of shape files, confirmation of accommodation, and inspection logistics.	• Confirms cultural monitor availability and attendance. • Offers logistical assistance if required.	N	Imperial to facilitate transport for cultural monitors.	No change required	**Section 4.1.11**
2023/12/7	Chamber of Commerce NT	Chief Policy Advisor	Face to face meeting	• Discussion including information and stakeholder and community engagement for CPP. • Proposed activities and timeline.	• CCNT capacity throughout NT including regional office to support business activity. • Supportive of projects with opportunity to grow NT economy and positive community impacts.	N	Keep informed and with developments as project progresses.	No change required	N/A

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
2023/12/7	Local Business	Managing Director	Face to face meeting	• Response to meeting request and interest in business opportunities for proposed CPP.	Business keen to work with industry through private investment for future options regarding local waste handling and facilities.	N	Keep informed and with developments as project progresses.	No change required	N/A
2023/12/7	Local Business	Managing Director	Face to face meeting	• Response to meeting request and interest in business opportunities for proposed CPP.	Business keen to understand potential work scope opportunities and capacity required to service requirements.	N	Keep informed and with developments as project progresses.	No change required	N/A
2023/12/7	Green Critical Minerals	Company representative	Video conference call	• Discussion including information on proposed activities of CPP. • Overlay or EP and EL areas.	• Aware of project activities to date and proposed plans. • No issues or concern with activities.	N	N/A	No change required	N/A
2023/12/8	Darwin Community	General community	Community Drop-In engagement	• Facilitated at Hilton Garden Inn as central point in Darwin community. • Information provided to community members regarding the Carpentaria Pilot Project and general consultation program launched to get feedback from stakeholders while drafting EMP. • Advise consultation portal online also provides links to materials that can be downloaded. • Visitors encouraged to contact IMP if they had any further questions or requests for further information.	• Business contracting opportunities • Aquifer protection • Cumulative impacts • Drilling activity • Emissions and climate change • Fracking activity • Ground water • Location of activities • Rehabilitation • Water Supply • Water/wastewater management • Approvals • Access • Continued communications and information sharing.	N	IMP representatives answered questions from the attendees and plans for further stakeholder consultation with wider community.	No change required	N/A
2023/12/8	Darwin Businesses	Various local businesses and community	Industry Briefing	• Launch ICN NT Gateway as point of contact for businesses to register interest to follow project developments and stay updated. • Discussion about CPP planned activities and location of activities.	N/A	N	N/A	No change required	**Section 4.3.7**
2024/01/15	NLC	Senior Project Officer Resources and Energy Branch Manager	Email	• Updated draft of EMP provided for continued review.	Confirmed receipt of documents.	N	N/A	No change required	**Section 4.1.11**

Date	Stakeholder	Position (if Applicable)	Contact Type	Summary of Information Provided	Response Received/Concerns Raised	Merit Review Trigger	Imperial Response	Change to EMP	Evidence
2024/02/1	Steam Resources	Managing Director	Email	• Notification shared directly regarding EEG online consultation portal launch with links to information on proposed CPP activities, environmental controls and mechanism for community and stakeholders to provide feedback while EMP is being prepared. • Attachment included CPP overview.	Confirmed receipt of information and introduction.	N	N/A	No change required	**Section 4.3.3.4**
2024/02/8	Eleanor Pools	Pastoralist	Email	• Hydrocencus sheet and bore information completed by pastoralist for GWEL consultation and document received.	N/A	N	N/A	No change required	**Section 4.4.5**
2024/02/9	Relief Creek	Pastoralist	Email	• Hydrocencus sheet and bore information completed by pastoralist for GWEL consultation and document received.	N/A	N	N/A	No change required	**Section 4.4.6**
2024/02/9	OT Downs	Pastoralist	Email	• Hydrocencus sheet and bore information completed by pastoralist for GWEL consultation and document received.	N/A	N	N/A	No change required	**Section 4.4.7**
2024/02/9	West Balbarini	Pastoralist	Email	• Hydrocencus sheet and bore information completed by pastoralist for GWEL consultation and document received.	N/A	N	N/A	No change required	**Section 4.4.8**

4 Appendices

4.1 Traditional Owners (and NLC)

4.1.1 2022.08.08 | Notification of Archaeological Find

From: [redacted]
Sent: Monday, 8 August 2022 12:06 PM
To: [redacted]
Cc: [redacted]
Subject: Fwd: Carpentaria 4 - CH find mitigation
Attachments: IMG_0440.jpg; IMG_0441.jpg; TH000192.JPG; TH000193.JPG; TH000194.JPG; TH000195.JPG; TH000196.JPG; TH000197.JPG; IMG_0448.jpg; IMG_0449.jpg; C4 CH Find.kmz

[redacted]

Please find information below regarding items found by TO representatives on site.

The items are outside of our proposed work area.

Thanks
[redacted]

Begin forwarded message:

From: [redacted]
Date: 5 August 2022 at 11:42:39 am AEST
To: [redacted]
Subject: FW: Carpentaria 4 - CH find mitigation

[redacted]

During CH monitoring yesterday a few CH items of interests were found [redacted] in the [redacted] We have photographed and GPS logged each location as per attached and below.
Please fwd accordingly and request NLC provide advice to the CH monitors on mitigation procedures for these items in this instance (eg: document and leave in place/mitigate items to secure location within the area and GPS logged/documented ect) ??
Regards,
Cheers

[redacted]
QLD Site contact [redacted]
NT Site contact [redacted]
SAT:

4.1.2 2023.08.20 – 25 | OCM Presentation Slide Pack

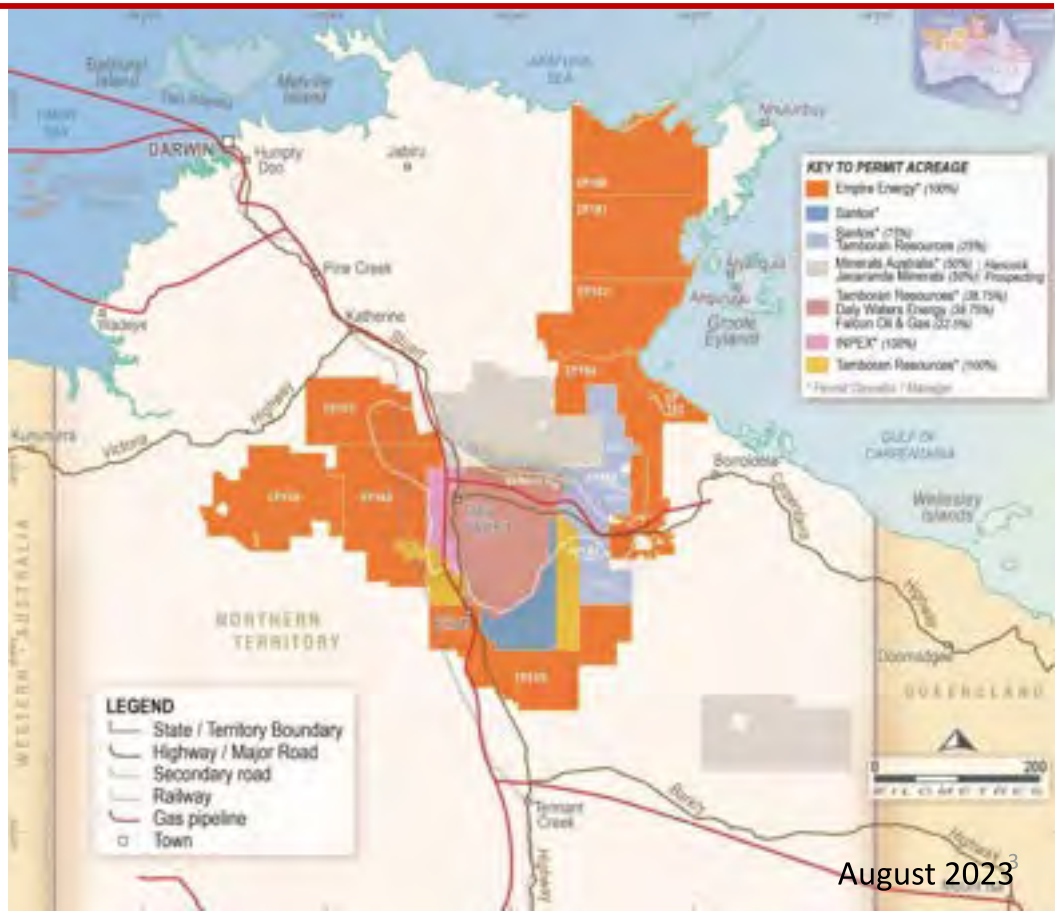
EMPIRE Energy

Imperial Oil & Gas –EP187

EP187 Exploration and Production Activities – August 2023

Who is Imperial Oil and Gas

- Imperial Oil and Gas, and Imperial Oil and Gas A are wholly owned by Empire Energy Group Limited
- Imperial has been working in the N.T. for over 10 years, holding Exploration Permits (EPs) 184, 187 and applications for EPs 180, 181, 182, 183, 188
- In 2021, Imperial Oil & Gas A Pty Limited acquired 100% of Pangaea (NT) Pty Ltd and EMG Northern Territory Holdings Pty Ltd interest in EPs 167, 168, 169, 198
- Empire Energy has worked hard to build a positive and long-lasting understanding with the local communities



On-ground activities so far in EP187

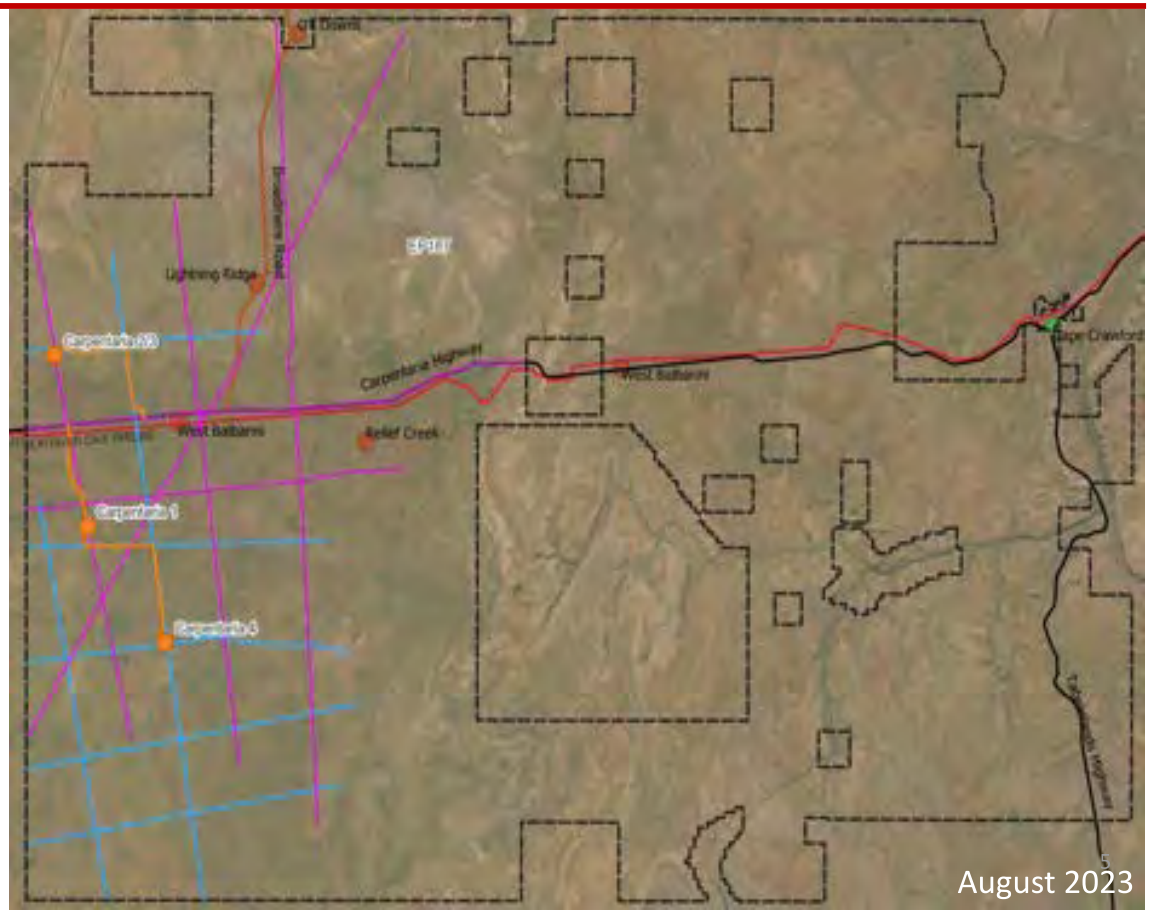
2019
- 231km 2D seismic (pink)

2020
- Drilled Carpentaria 1 well

2021
- 165km 2D seismic (blue)
- Hydraulic Fracture (HF) of Carpentaria 1
- Prod Test of Carpentaria 1
- Drilled Carpentaria 2V/2H

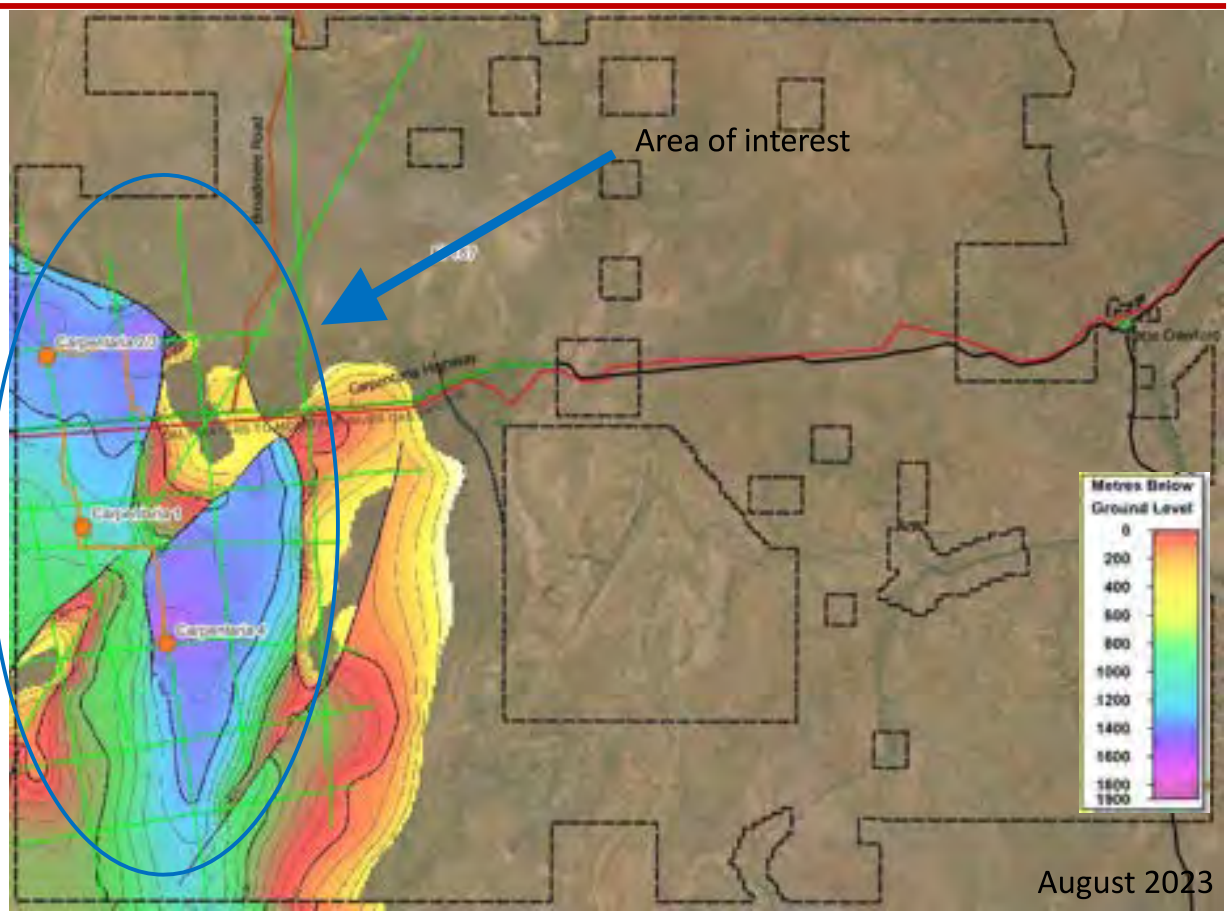
2022
- HF of Carpentaria 2H
- Prod Test of Carpentaria 2H
- Drilled Carpentaria 3/3H
- HF of Carpentaria 3H
- Drilled Carpentaria 4

So far in 2023
- Prod Test of Carpentaria 2H & 3H



EP187 – What have we learnt so far

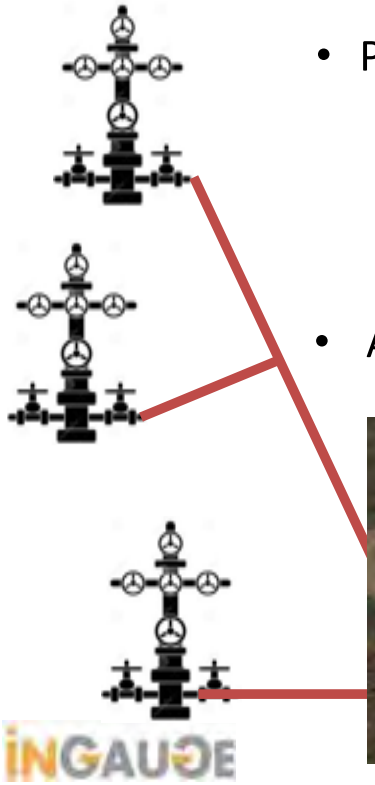
- We believe the area of interest has the potential to produce gas to sell to the market
- If production to market is achieved, the royalty payments may be many millions of dollars
- If production to market is achieved, there is also the opportunity for ongoing local employment and business opportunities



Working towards Production

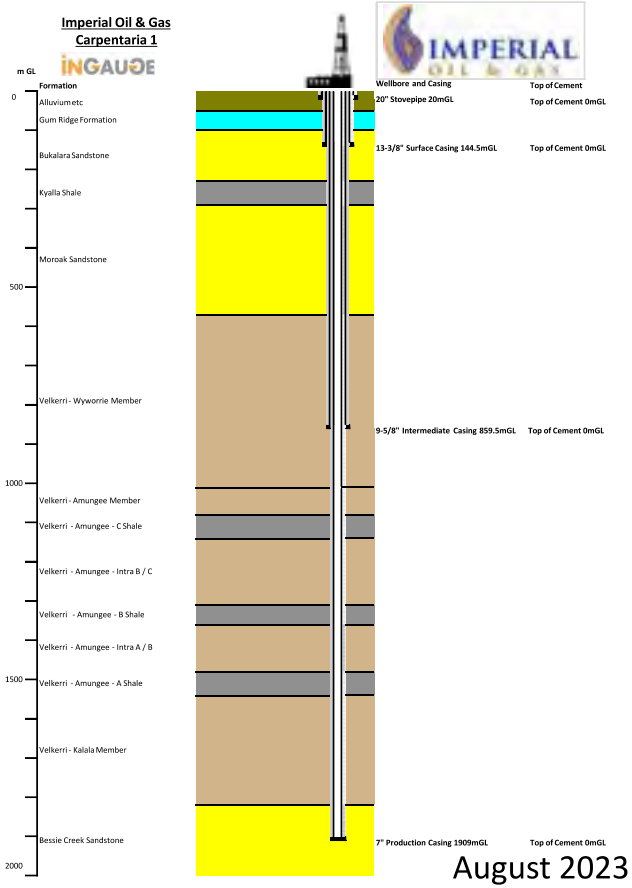
A Production Agreement and other approvals need to be in place before production to market can start

- Production would involve;
  - multiple HF horizontal wells on multiple wellpads
  - multiple wastewater transfer and gas gathering flowlines
  - a compressor station
  - a pipeline to tie into the Australian gas network
- All infrastructure will be constructed to relevant Australian standards



Drilling - Methods

- Only water-based drilling fluids are used
- Each section is drilled, cased and cemented before the next section is drilled
- Aquifer is isolated behind casing and cement before drilling into any hydrocarbon zones
- Drilling fluid and cuttings are stored in lined ponds

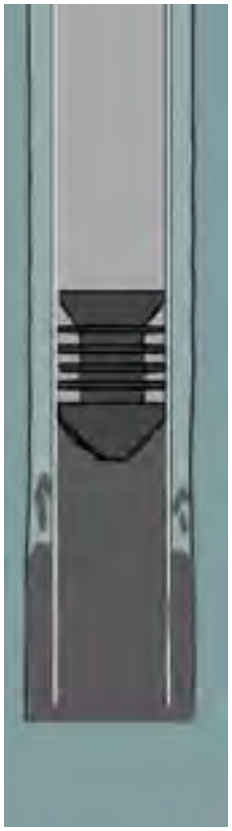


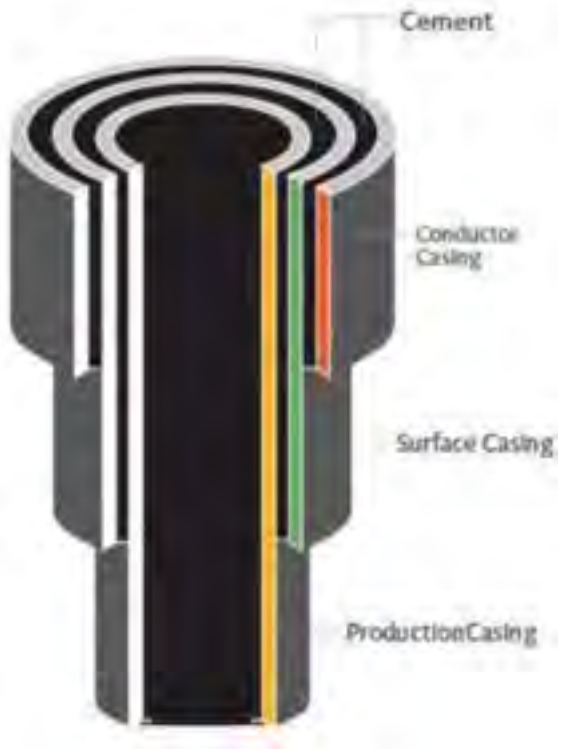
August 2023

Drilling – Casing and cementing

Each section of the well is:

- Drilled
- Cased
  - Casing is run into the drilled hole with a small gap left at the bottom
- Cemented
  - Cement is pumped down the inside of casing
  - It flows around the end of the casing and up the gap between the casing and hole wall





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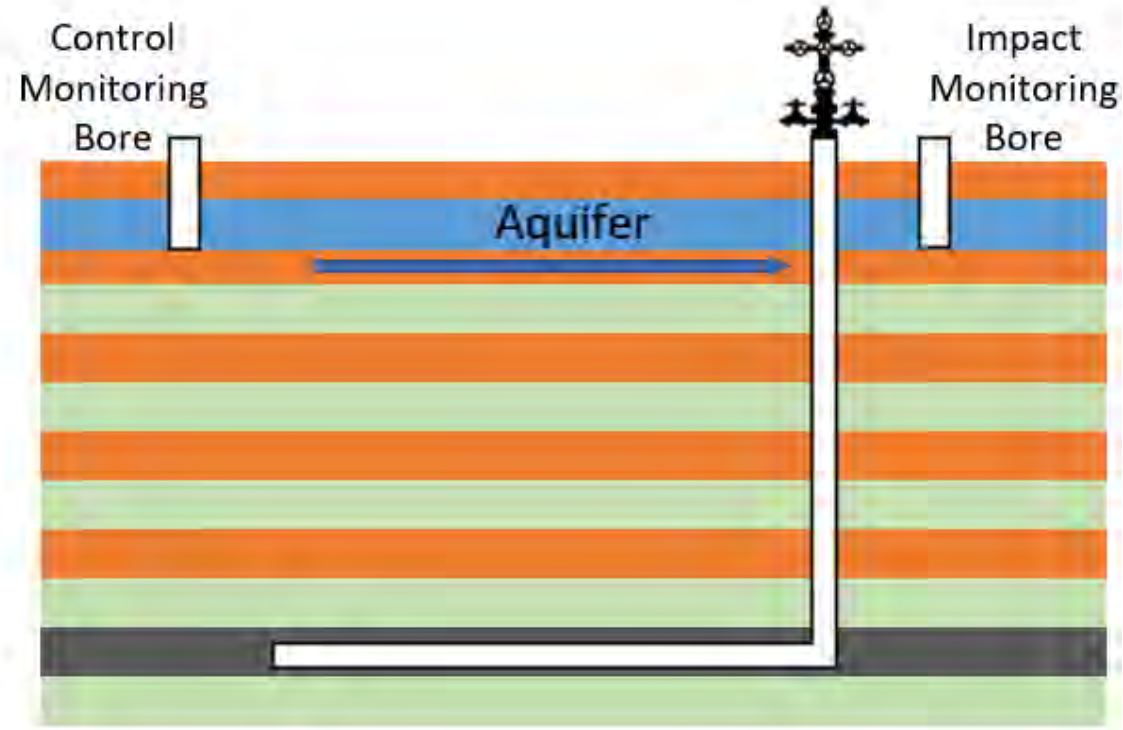
Drilling – Fluid and cuttings storage

Drill fluids and cuttings will be stored in in-ground pits:

- Lined with an impermeable barrier
- Bunded to prevent entry from overland flow
- Fitted with level sensors with remote monitoring

Drilling – Aquifer monitoring

- Two water monitoring bores per aquifer drilled at the wellpad
- Multiple water samples are taken to build a baseline of the water quality before HF
- Water samples taken every 3 months and compared to the water quality baseline
- All water monitoring results are made public



Groundwater Monitoring Results available at https://depws.nt.gov.au/onshore-gas/onshore-gas-in-the-northern-territory/industry-compliance-and-reporting/groundwater-monitoring-results

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Drilling - Horizontal Wells

Horizontal wells:

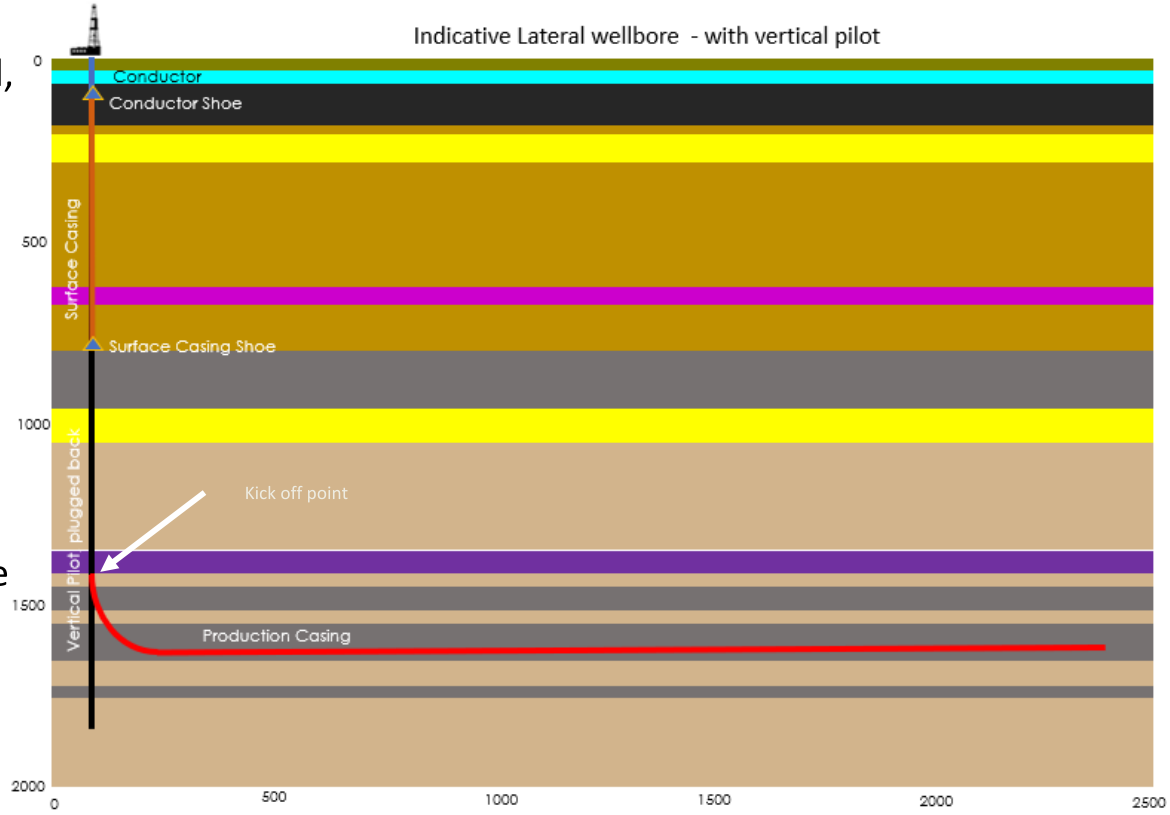
- Reduces the number of wells required, so reduces the surface disturbance

Method:

- Drill a Vertical well first to check formation depths
- Plug back the bottom of the Vertical well to the kickoff point
- Drill the Horizontal well

Note:

- A horizontal well may be drilled without the vertical section below the kick-off point if there is already a vertical well on the wellpad



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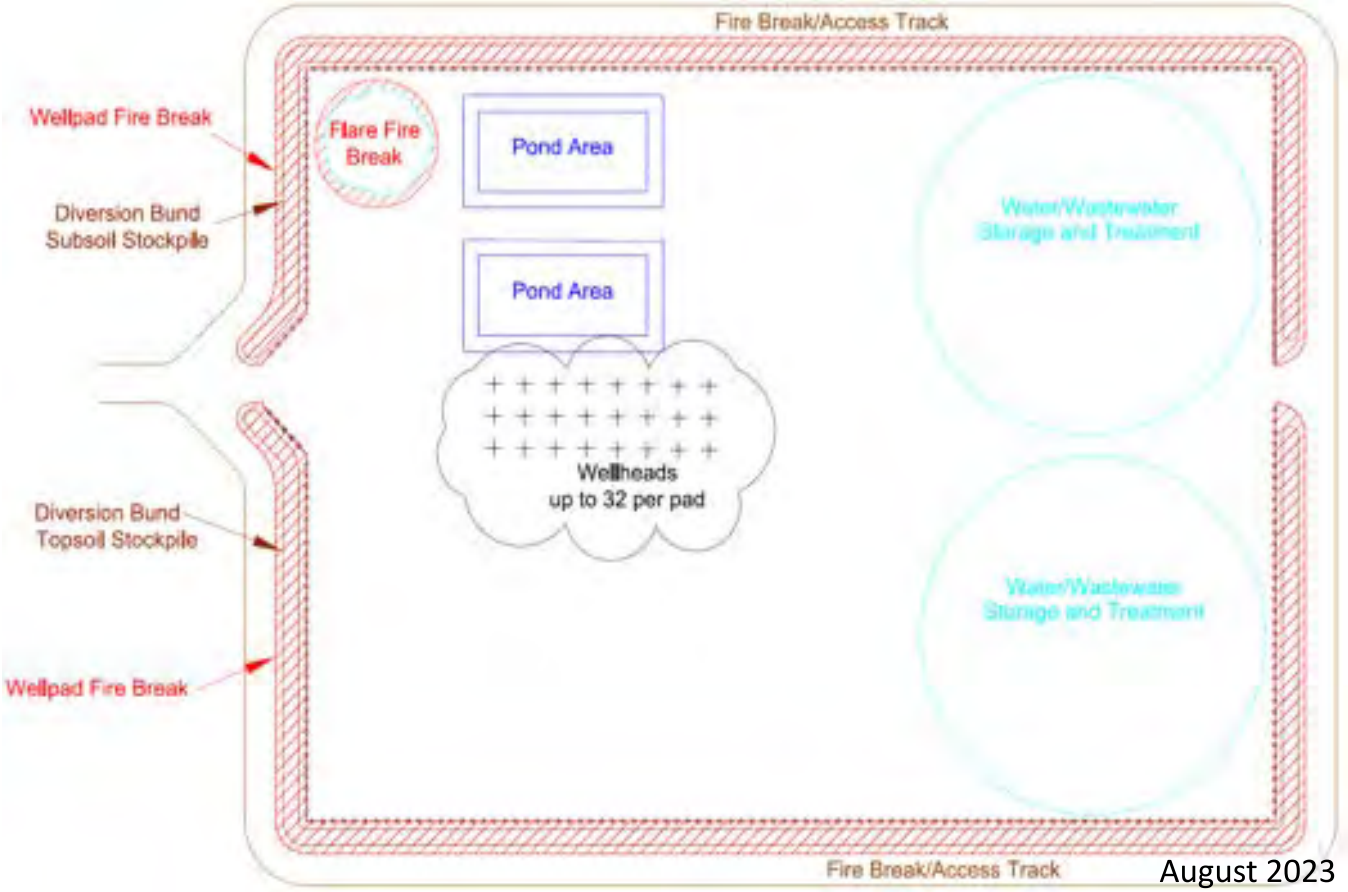
Drilling – Multiwell pads

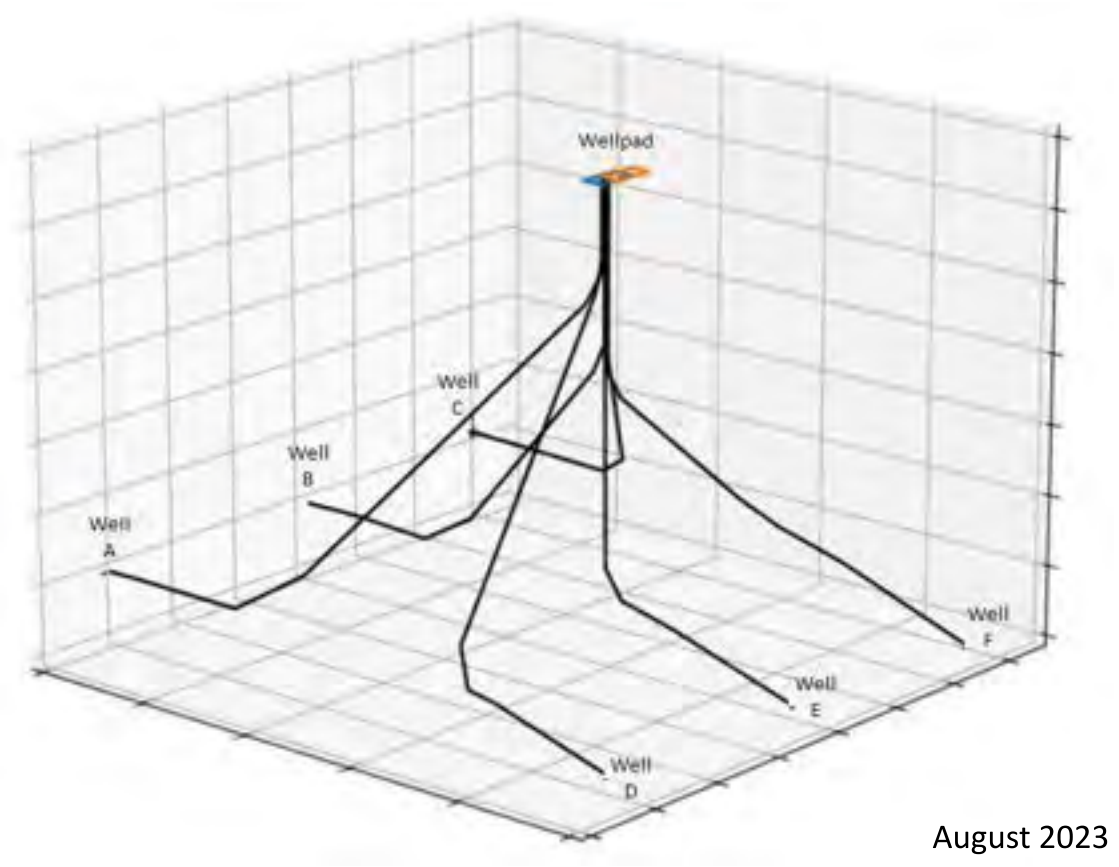
- Multiple wells drilled on the same pad
- Reduce the number of wellpads and access tracks required
- Allows one set of tanks and ponds to be re-used for several wells
- Carpentaria 2/3 is the first multiwell pad for Imperial



August 2023

Drilling - Multiwell pads

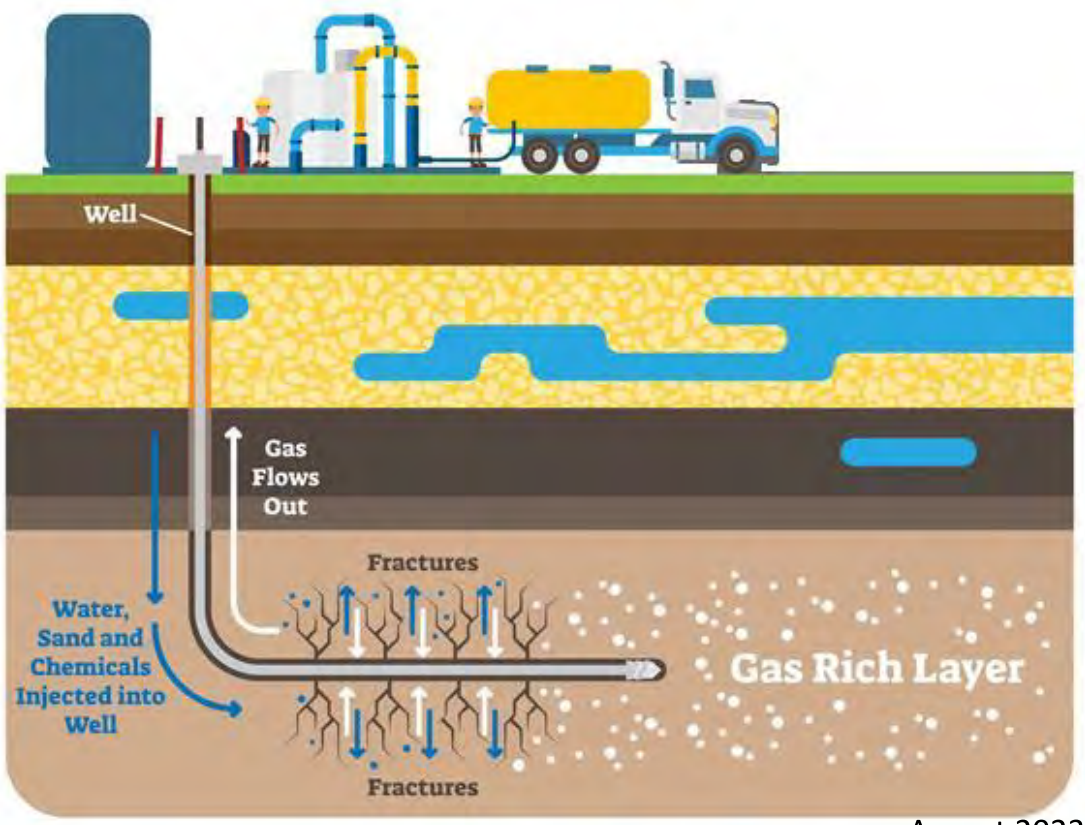
- Multiple wells drilled on the same pad
- Horizontal drilling is used to reach different sub-surface targets from the same well pad
- Reduces the number of well pads and access tracks required, so reduces the surface disturbance



August 2023

Hydraulic fracturing - Methods

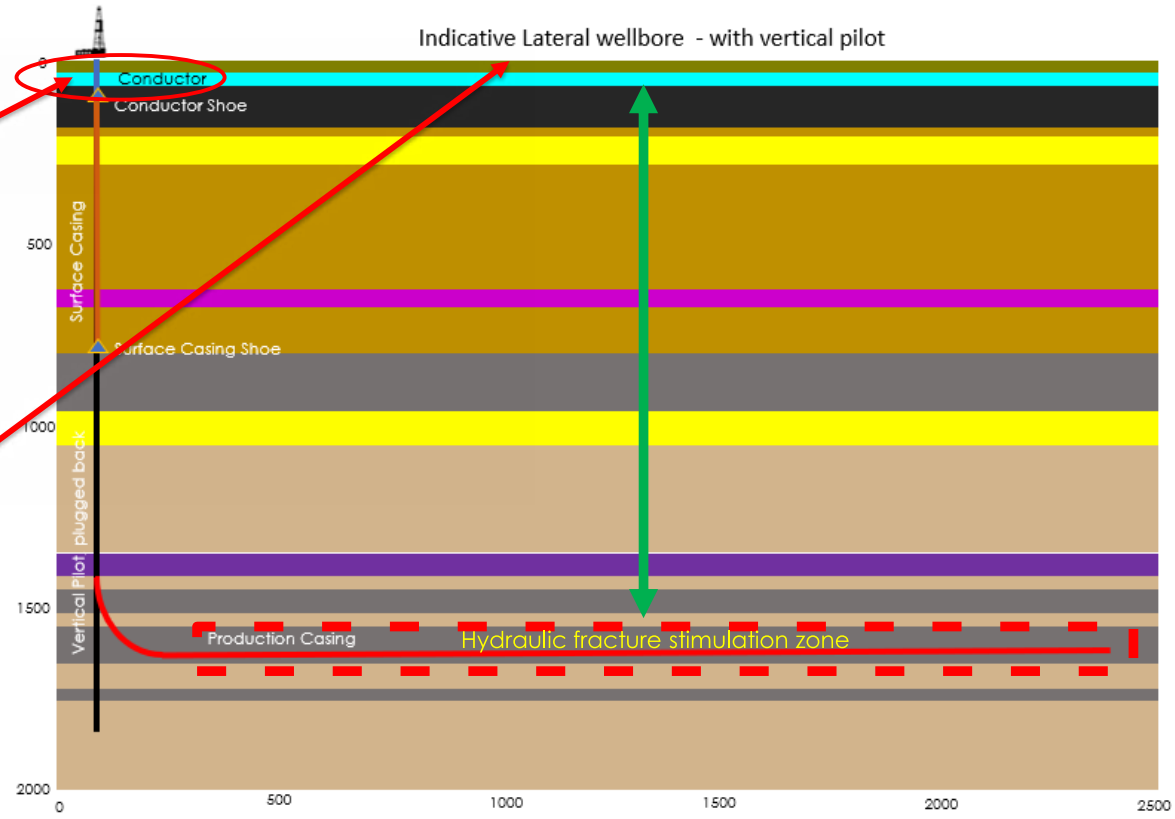
- Fluids (98% water) are pumped into the wellbore at high pressure to create fractures in the shale rock holding the gas
- Sand grains in the fluids go into the fractures in the shale rock to keep them open
- Gas flows through these fractures, and into the wellbore
- Detailed engineering and design work is carried out to ensure fractures stay within the shale rock and do not extend too far from the well bore



August 2023

Hydraulic fracturing – Aquifer Protection

- Over 600 m depth separation between HF zone and the closest aquifers
- Aquifers monitored at the wellpad logged every 4 minutes
  - 2 weeks before HF
  - During HF
  - 4 weeks after HF
- Seismicity Monitoring 500m away from wellpad during HF
- Traffic lights system to stop HF if any Seismic activity caused by HF



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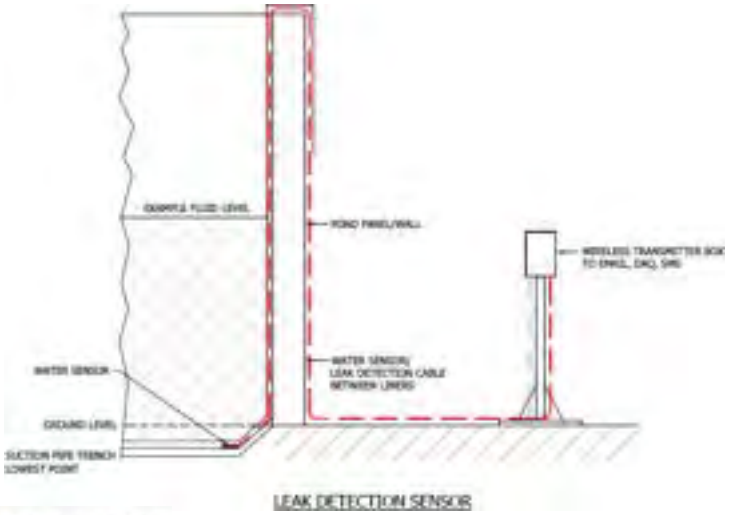
Hydraulic Fracturing – Flowback Fluid

- Tanks are installed to store all flowback fluid
- These tanks have two liners and a leak detection system between the liners to ensure no leakage to the ground



Hydraulic Fracturing – Flowback Fluid storage

- Tanks have freeboard capacity for potential rainfall
- In line with Code of Practice, freeboard must allow for a once in a thousand-year rainfall event
- Bunded to prevent overland flow erosion
- Fitted with level sensors with remote monitoring

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Flowback Fluid - Re-use and disposal

- Flowback fluids are re-used for future HF operations where practicable
- Flowback fluids are disposed of by evaporation
- Residues after evaporation are disposed of by removal from site to a licensed facility

August 2023

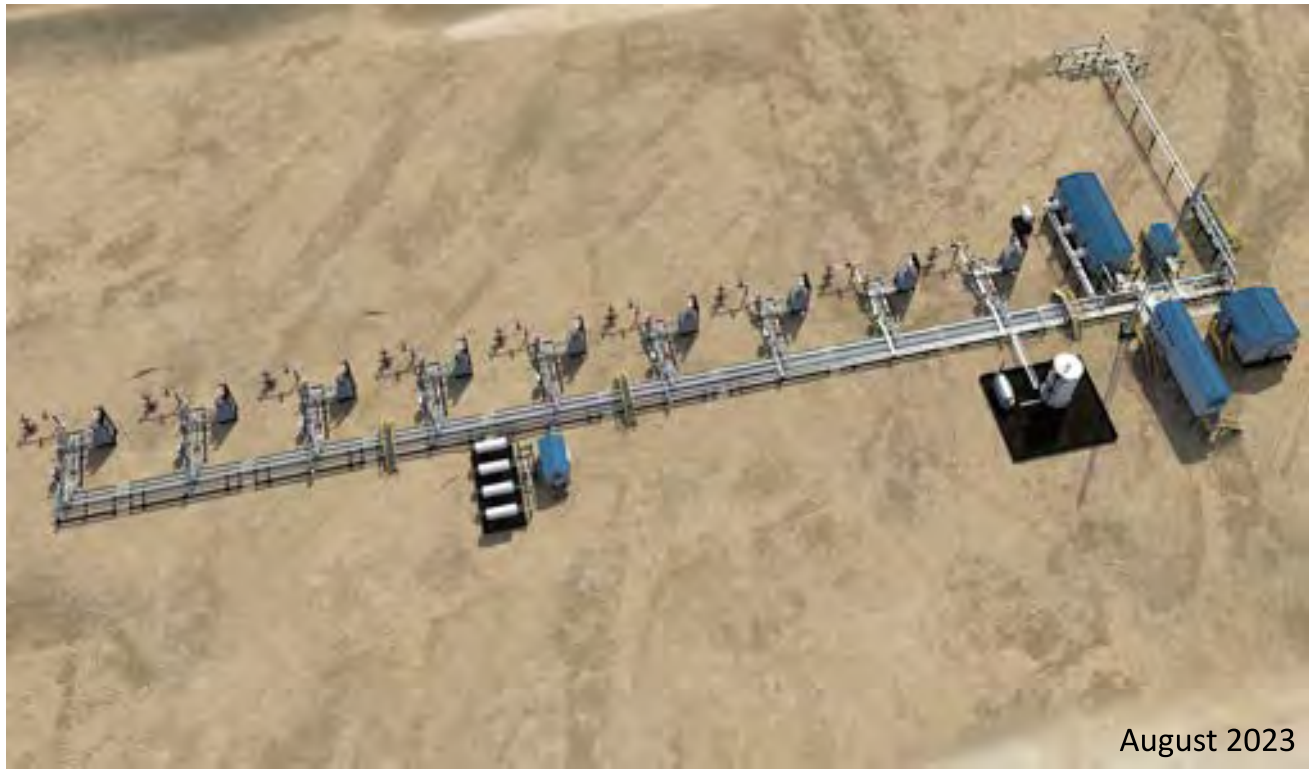
Flowback & Test – What & Why

- Gas is measured and sent to the flare
- Water is measured and sent to double-lined storage
- This gives an understanding of the potential of the well to produce gas

Towards Production– Wellpad facilities

Wellpads will have equipment to:

- Monitor the wellpad back to the compressor station
- Allow remote stopping and starting of the wellpad production
- Separate any moisture from the gas stream
- Measure gas production
- Transfer gas and water to buried flowlines



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Wellpad facilities - Wellheads

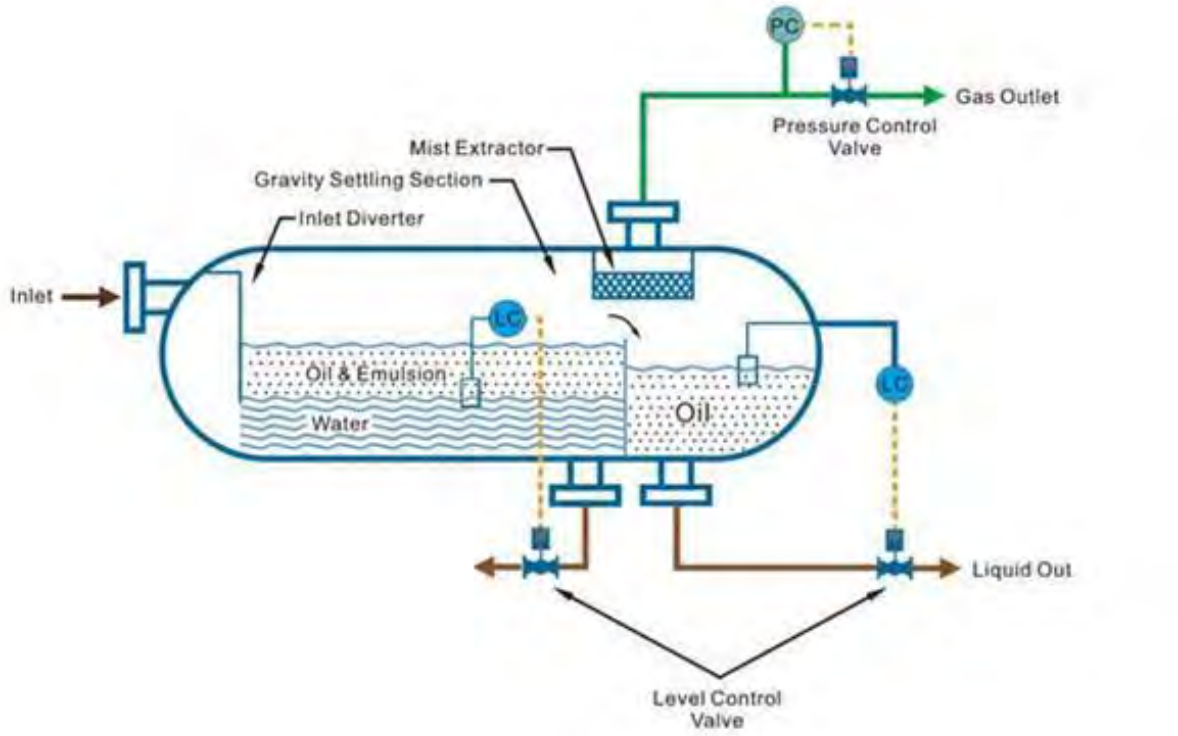
Wellpads will have multiple wellheads:

- One for each well on the pad
- Each wellhead will be controlled independently of other wellheads
- Wellheads will feed gas and flowback/produced water into common facilities on the wellpad

Wellpad facilities - Separator

Wellpads may have separators to:

- Separate HF flowback water from the produced gas during initial well flowback
- Separate formation water (if present) from the produced gas
- Separate hydrocarbon liquids (if present) from the produced gas



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Wellpad facilities – Water handling

Wellpads will have water handling facilities to:

- Store fresh, flowback and produced water for use in HF programs
- Store flowback and produced water from HF programs
- Transfer water/wastewater between wellpads for re-use and disposal

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Wellpad facilities – Wellpad Compression

Wellpads may be fitted with wellpad compression to reduce the backpressure on wells to aid production later in their life.

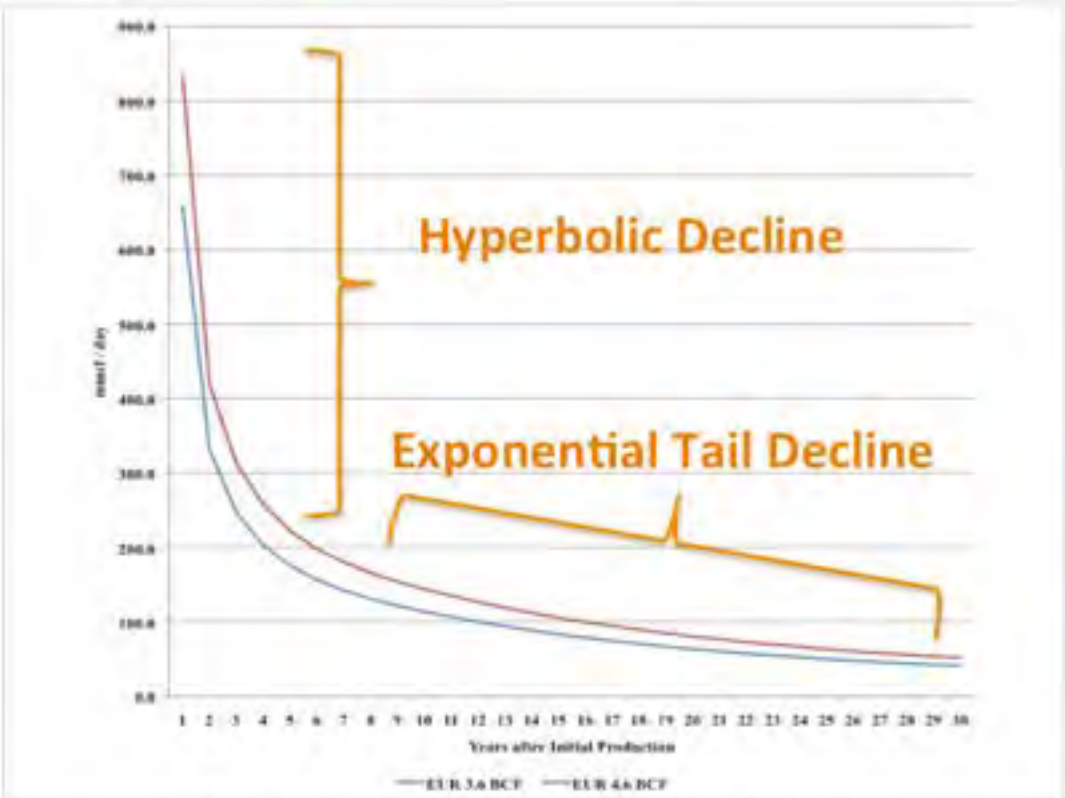


Figure 4.1: Illustrative production decline curves for shale gas wells.

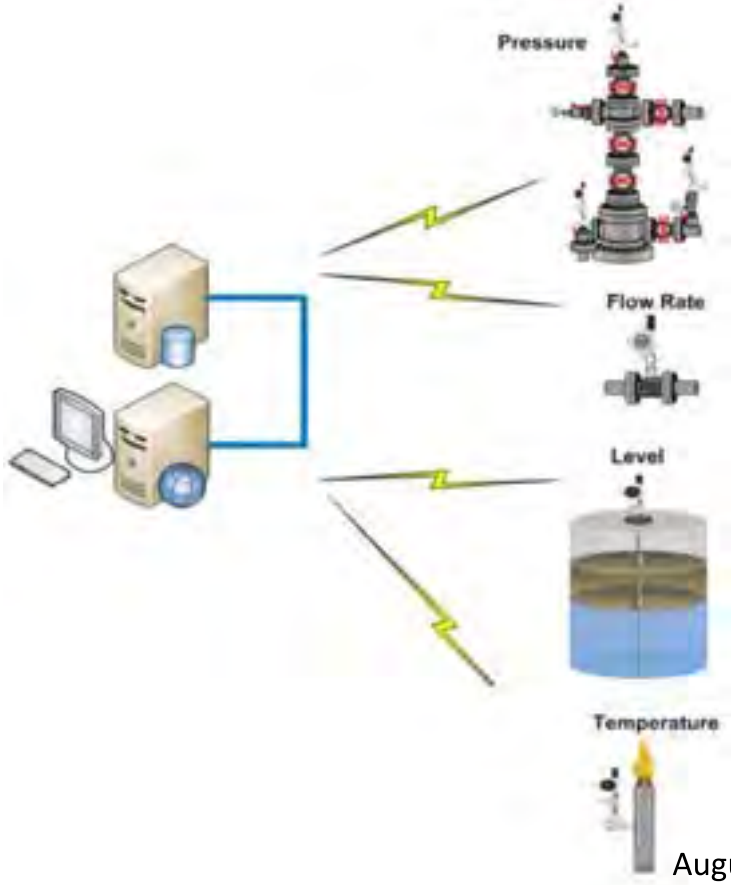
Credit: Seth Blumsack

August 2023

Wellpad facilities – SCADA

Wellpads may have Supervisory Control and Data Acquisition (SCADA) systems to monitor and control wellpad equipment remotely, such as:

- Gas pressures and flow rates
- Water/wastewater levels and flow rates
- Control equipment:
  - Valves
  - Motors
  - Pumps
  - Bores
  - Etc



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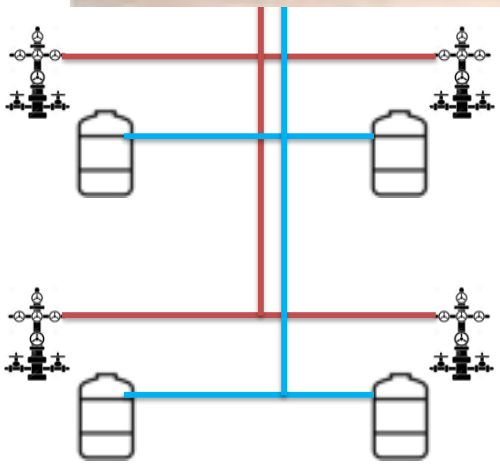
Towards Production– Flowlines

- Buried flowlines connecting the well pads and production facilities will be required to allow the:
  - Gathering of gas
  - Transfer of wastewater for re-use
  - Transfer of water for use
- Flowlines will be constructed from High Density PolyEthylene (HDPE) to relevant Australian codes
- Flowlines will be designed, constructed and tested to suit their Maximum Allowable Operating Pressure (MAOP)
- Traditional Owners will culturally manage first disturbance works



Flowlines – Overview 1

- Flowlines are buried to give extra protection from:
  - Impact damage
  - Fire
  - Flooding and overland flow

- Specialized equipment and personnel are used for flowline construction

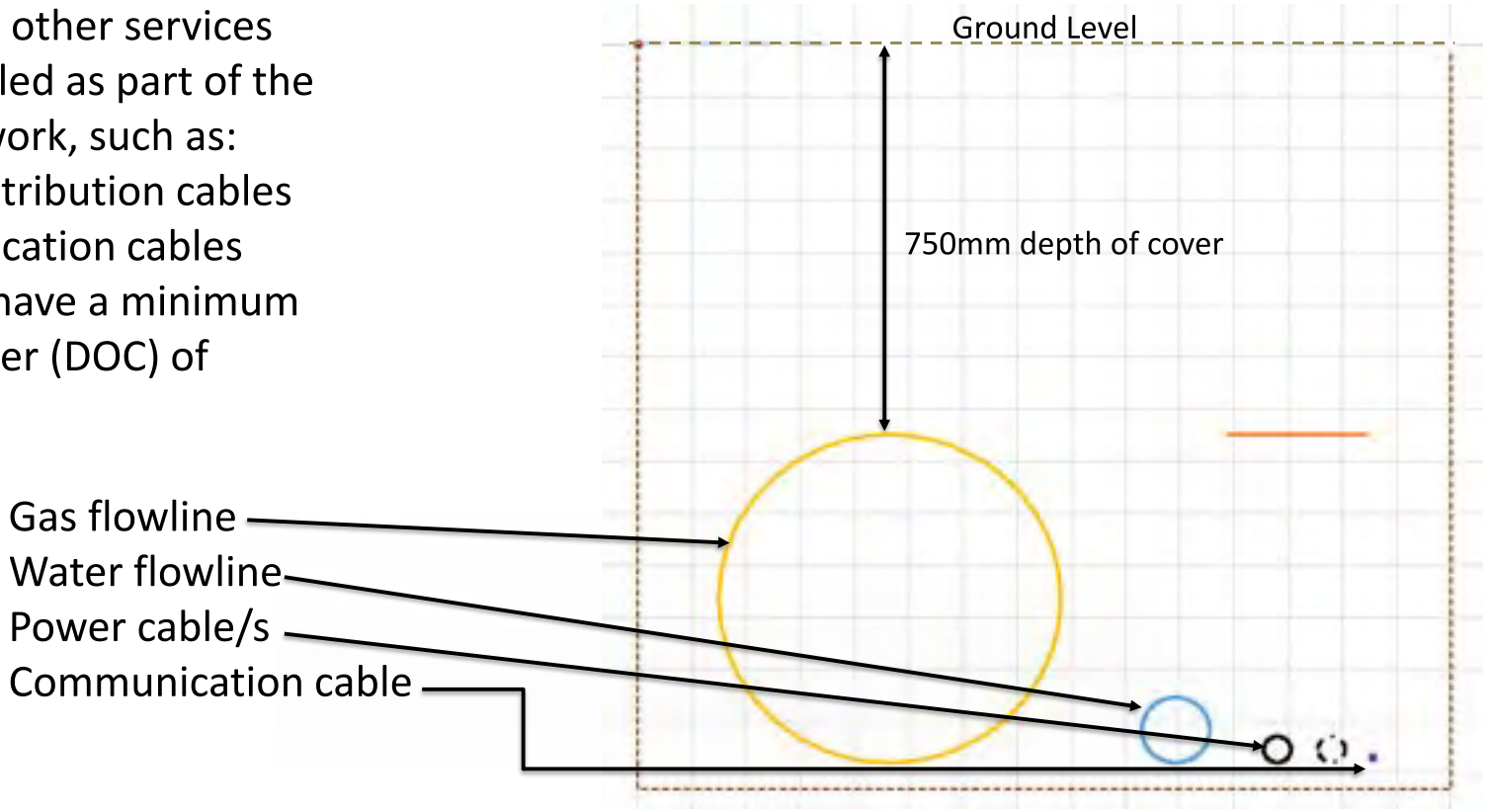
August 2023

Flowlines – Overview 2

- Flowlines are welded and then lowered into trenches on construction Right Of Ways (ROWs)
- Where practicable multiple flowlines will be put in the same trench
- Traditional Owners will culturally manage first disturbance works

Flowlines – Overview 3

- For efficiency other services may be installed as part of the flowline network, such as:
  - Power distribution cables
  - Communication cables
- Services will have a minimum Depth Of Cover (DOC) of 750mm



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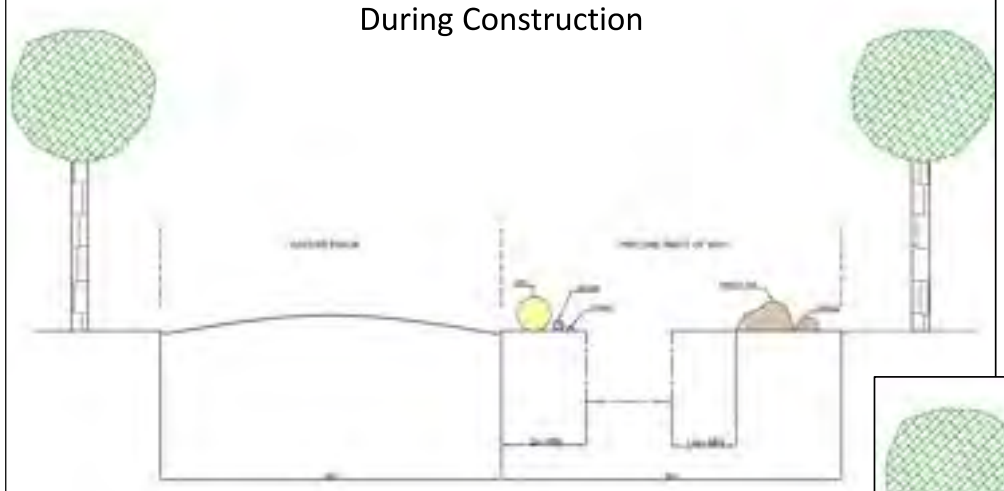
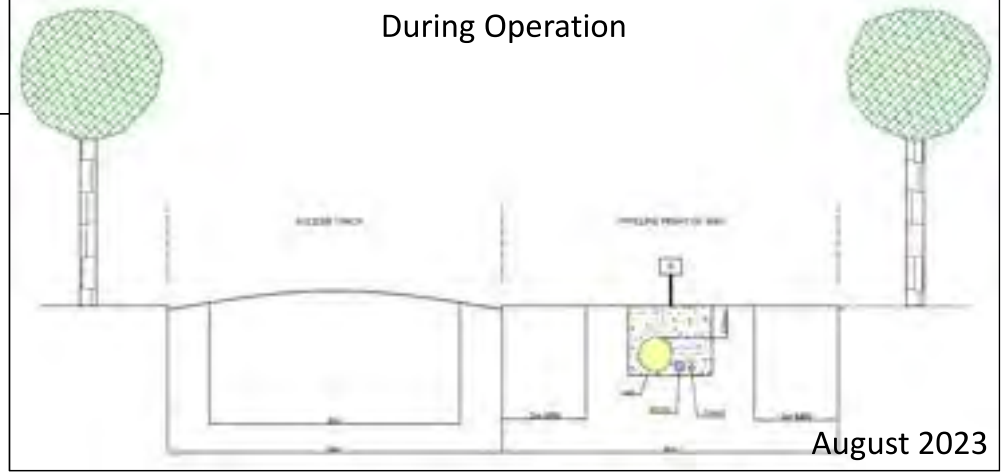
Flowlines – Right Of Way alignments

During Construction



- Flowline Right Of Ways (ROWs) will follow access tracks and seismic lines and will be buried at least 0.75m below the surface

During Operation



- By following access tracks and seismic lines less disturbance area is required during construction, operation and maintenance

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Flowlines – Right Of Way infrastructure

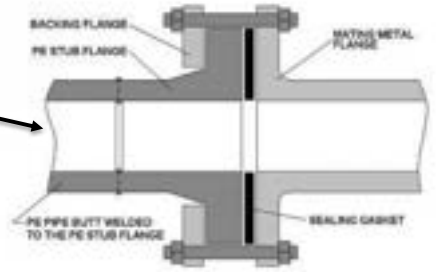
The following infrastructure will be located on ROWs;

- High point vents - to prevent airlocks in wastewater flowlines
- Low Point Drains - to drain condensed water from gas gathering networks
- Valve manifolds - to direct flow through flowlines as required
- Electrical kiosks - to distribute power throughout the network

Flowlines - Jointing

- HDPE gathering networks are constructed from lengths or rolls of pipe
- Lengths or rolls of pipe are joined together by either:
  - Butt fusion welding

  or
  - Electrofusion welding
- Where HDPE pipe is joined to another material flange jointing is used
- Only qualified equipment and personnel will be used for flowline jointing



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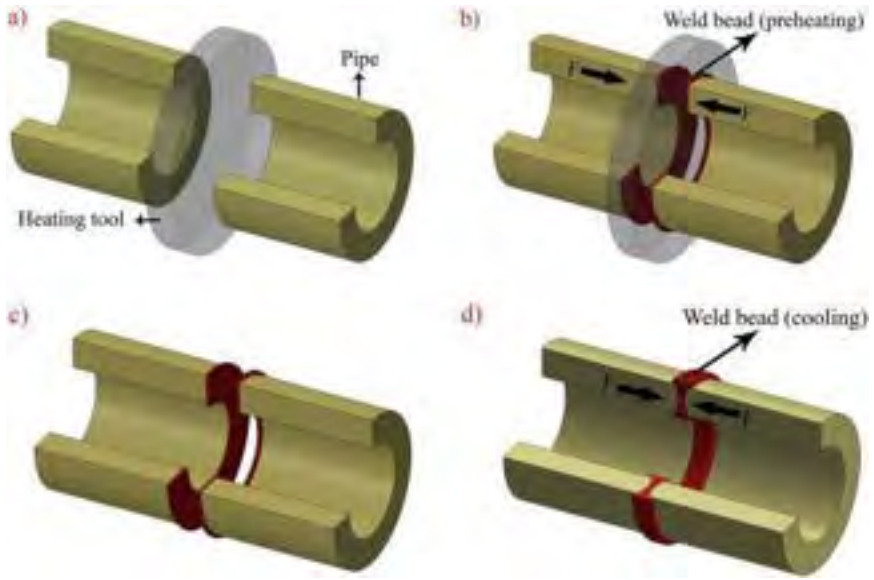
Flowlines – Butt Fusion Weld Jointing

- Butt fusion welding HDPE pipe involves:
  - Removing the oxidized layer from the end of the pipe and squaring the face
  - Heating the pipe to the correct temperature to melt it to allow fusion
  - Forcing the melted ends of the pipe together at the correct pressure
  - Holding the pipe in position during cooling



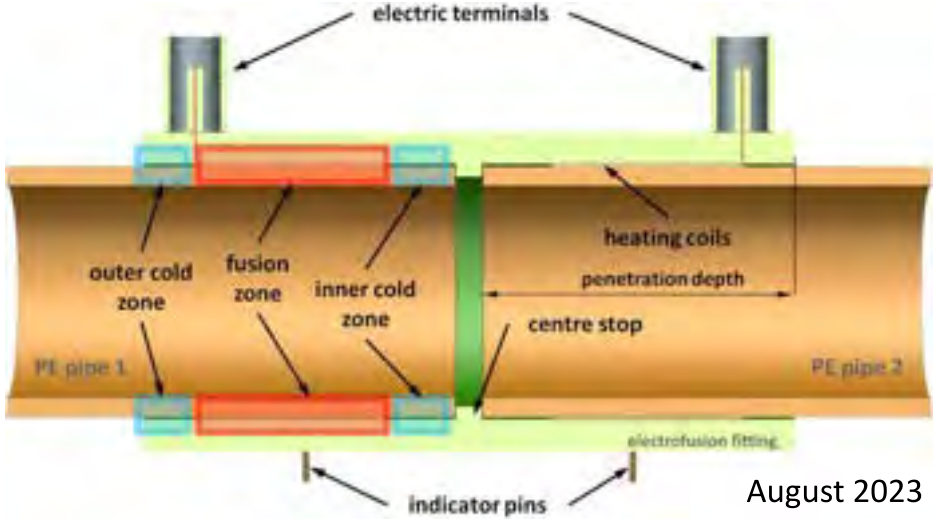
- The correct heating, pressure and cooling parameters are programmed into the welding machine and are logged for each weld

August 2023

Flowlines – Electrofusion Weld Jointing

Electrofusion welding involves:

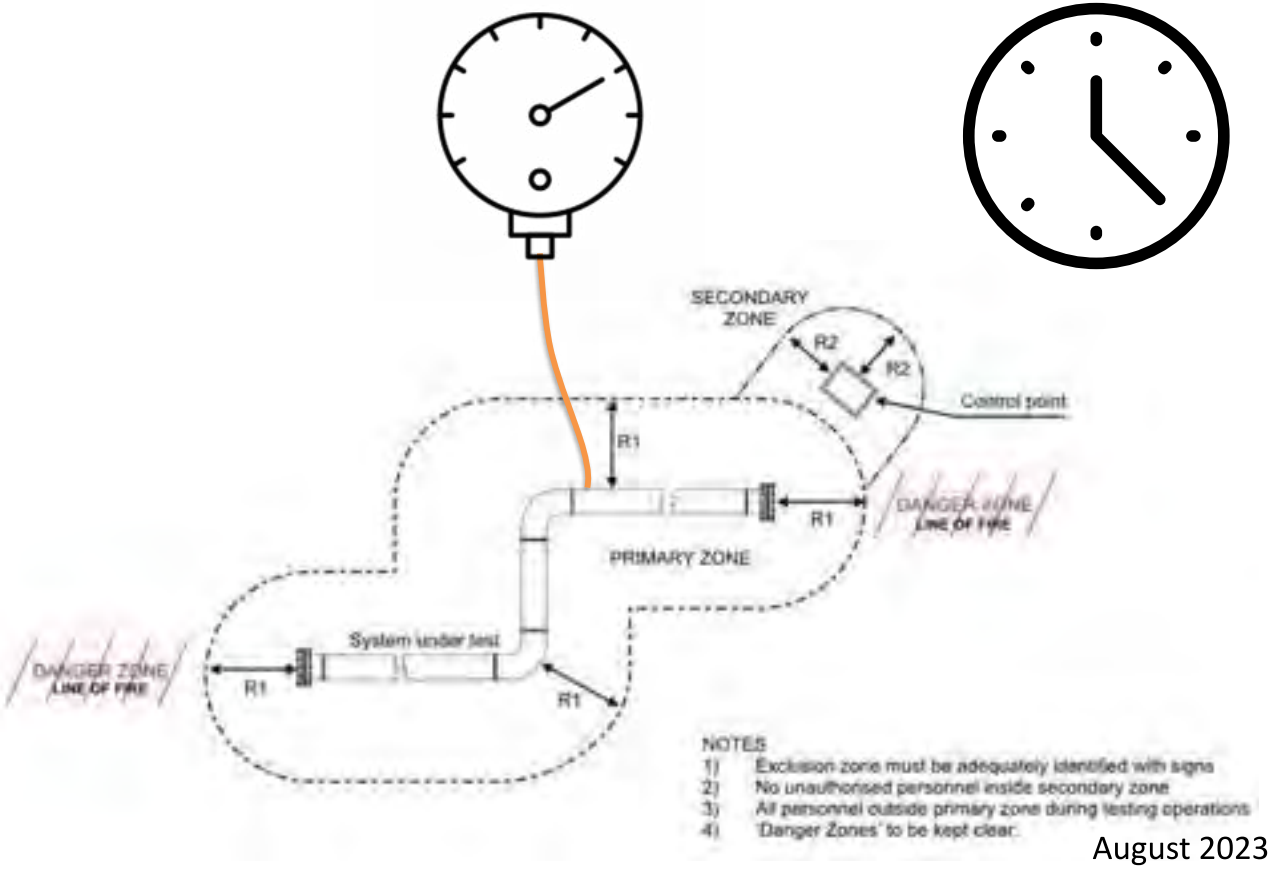
- Pealing the outside of the pipe in the weld area to remove oxidization & get the correct size
- Inserting the pipe ends the correct depth into the electrofusion coupling
- Heating the fusion zone to the correct parameters using the heating coils in the coupling
- Holding the pipe in position during cooling
- The correct heating and cooling parameters are programmed into the welding machine and are logged for each weld



August 2023

Flowlines - Pressure testing

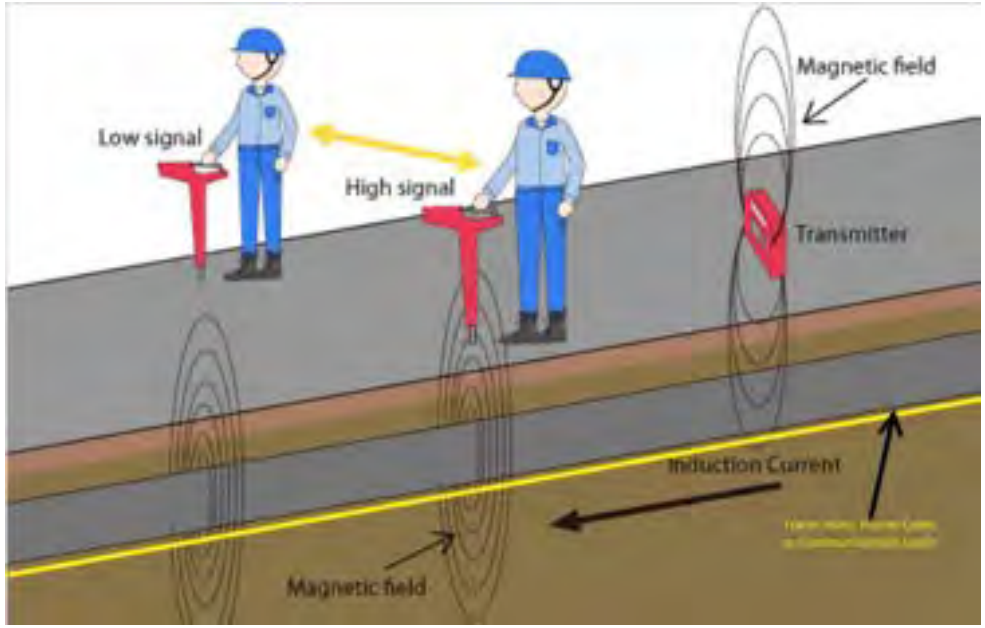
- All gas and wastewater flowlines will be tested before use
- 6-hour strength test:
  - Must hold a pressure greater than the Maximum Allowable Operating Pressure (MAOP) for more than 6 hours without failure
- 24-hour leak test:
  - Must lose less than 1 litre per hour per m^3 of network volume



August 2023

Flowlines – Location

- HDPE flowlines are not easily detectable with underground services locators
- Power and communications cables are easily detected with underground service locators
- Where Gas or Wastewater flowlines are not buried with a power or communications cable, they will be buried with detectable tape to make location easier



August 2023

Flowlines – Marking

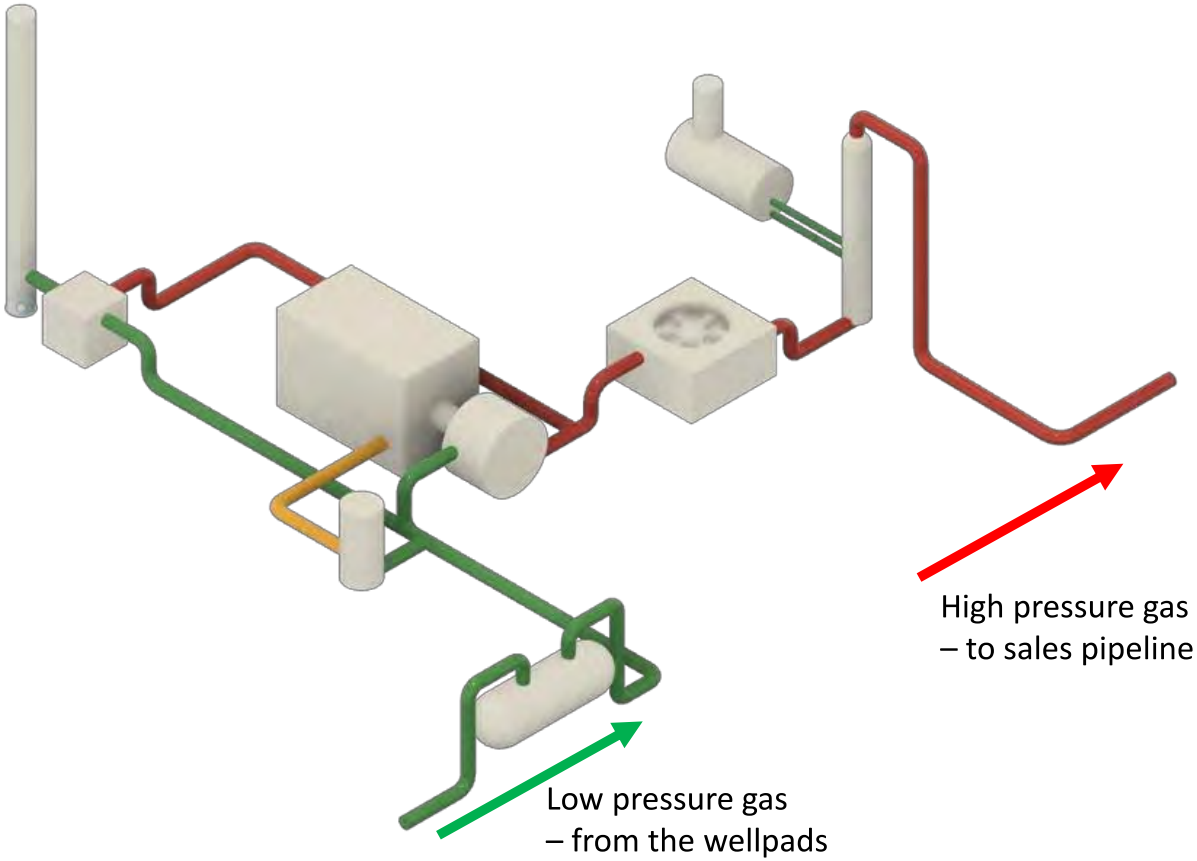
All gas and wastewater flowlines will be signed at:

- Both sides of public roads
- At each property boundary
- Both sides of creeks and rivers
- Both sides of vehicle tracks
- Each change of direction
- Utility crossings (buried or above ground)
- At all network facilities
- A maximum of 500 metres

August 2023

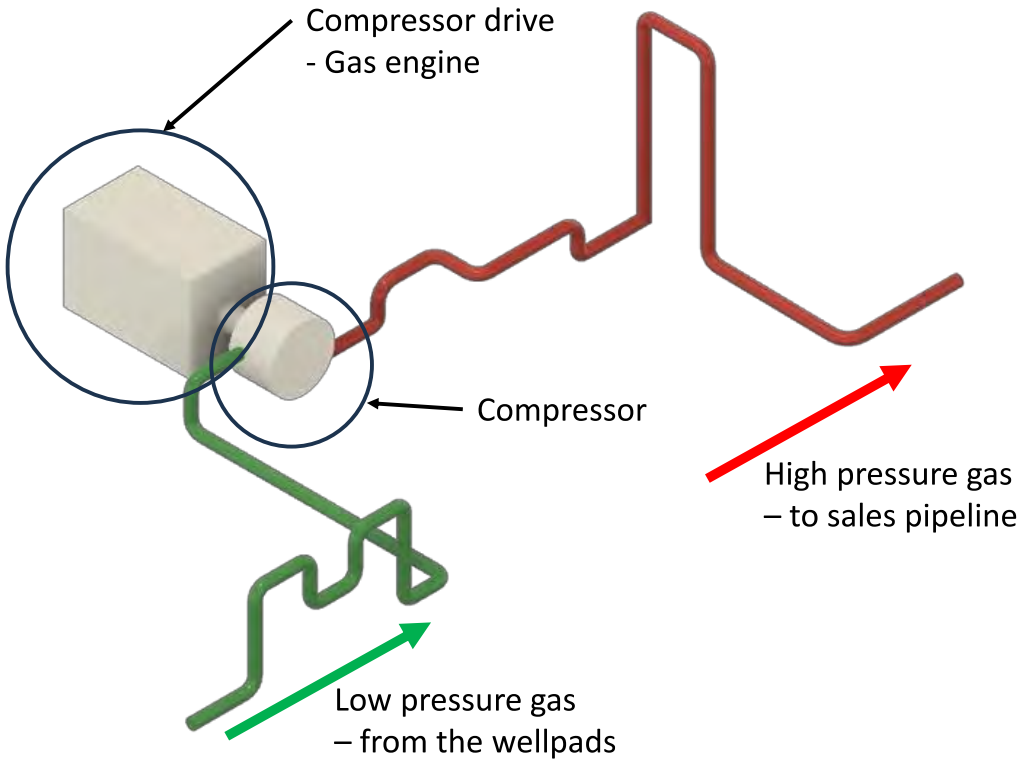
Towards Production – Compressor Station

- A Compressor station will compress, condition and dry the gas to go into the sales gas pipeline and operate 24 hours per day, seven days per week
- All equipment will be constructed to relevant Australian standards
- The facility will include a worksite base for the compressor station operators and the field operators that look after the production wells, water treatment facilities and gathering networks



Compressor station – Compressor

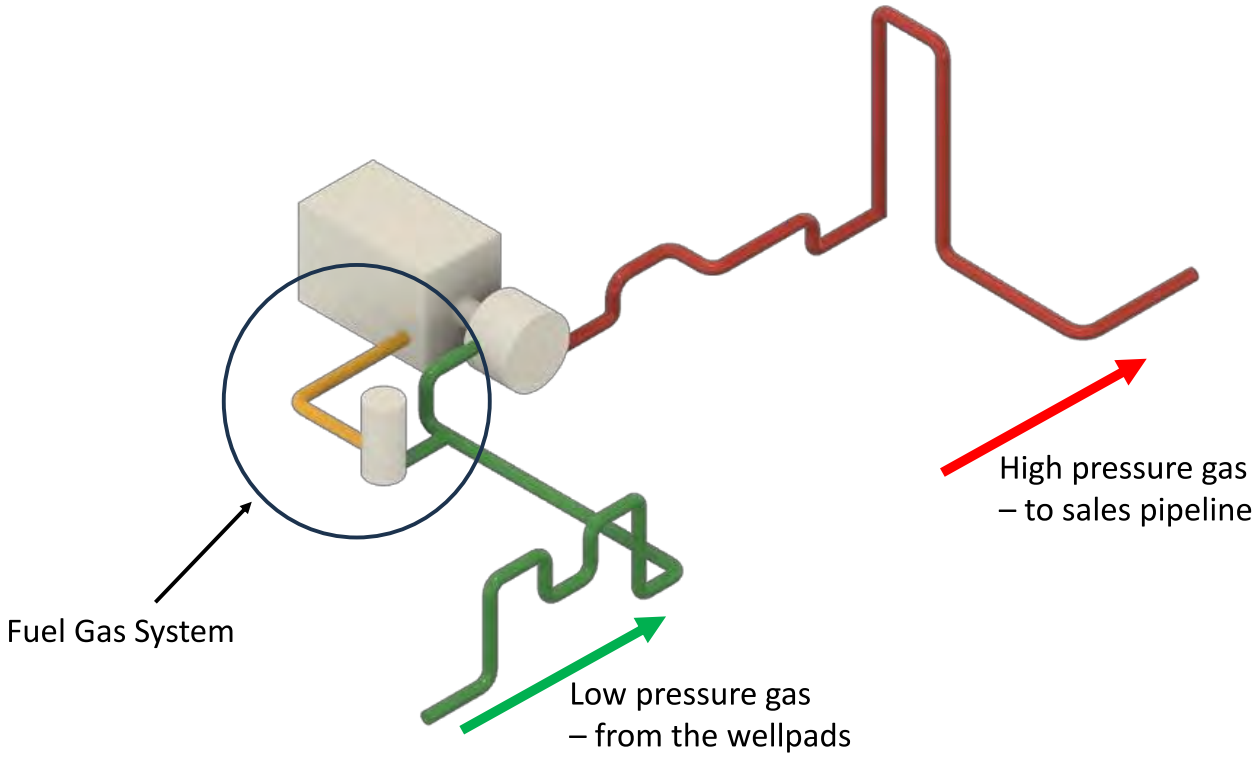
- The gas flows from the wellpads to the compressor station in a network of low-pressure flowlines
- The Compressor raises the pressure of the gas to the pressure needed in the sales gas pipeline
- The Compressor is driven by a gas engine
- The gas flows from the Compressor station to main sales gas pipeline via a high pressure steel pipeline



Compressor station – Fuel Gas

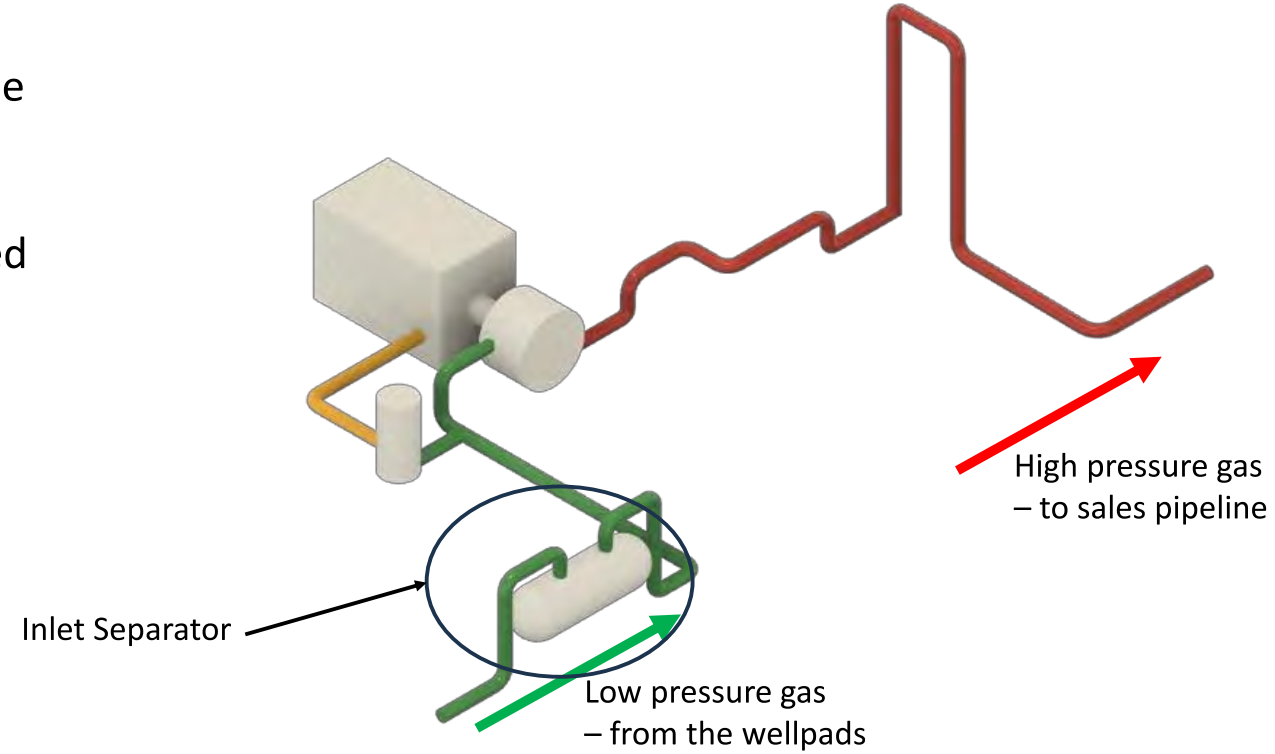
- The Compressor drive engine is powered by gas produced from the field
- The gas is conditioned in the Fuel Gas System to be dry, and at the pressure the engine needs
- Fuel gas will also be used for TEG* reboiling, and for power generation for electric motors for cooler fans, instrument air compressors, offices, workshops etc.

*TEG – see later – Gas Dehydration



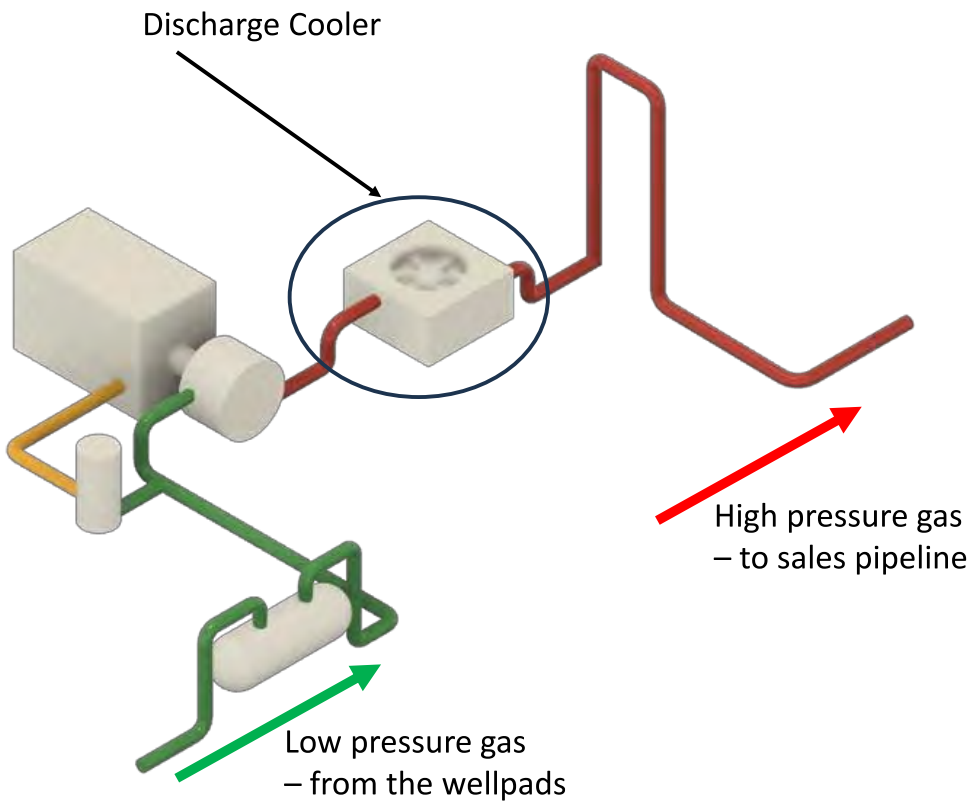
Compressor station – Inlet Separator

- An Inlet Separator is used to remove any liquids in the low-pressure gas from the field to stop it going into the Compressor
- Water from the inlet separator will be transferred to the Water Treatment Facility for re-use via the water transfer network



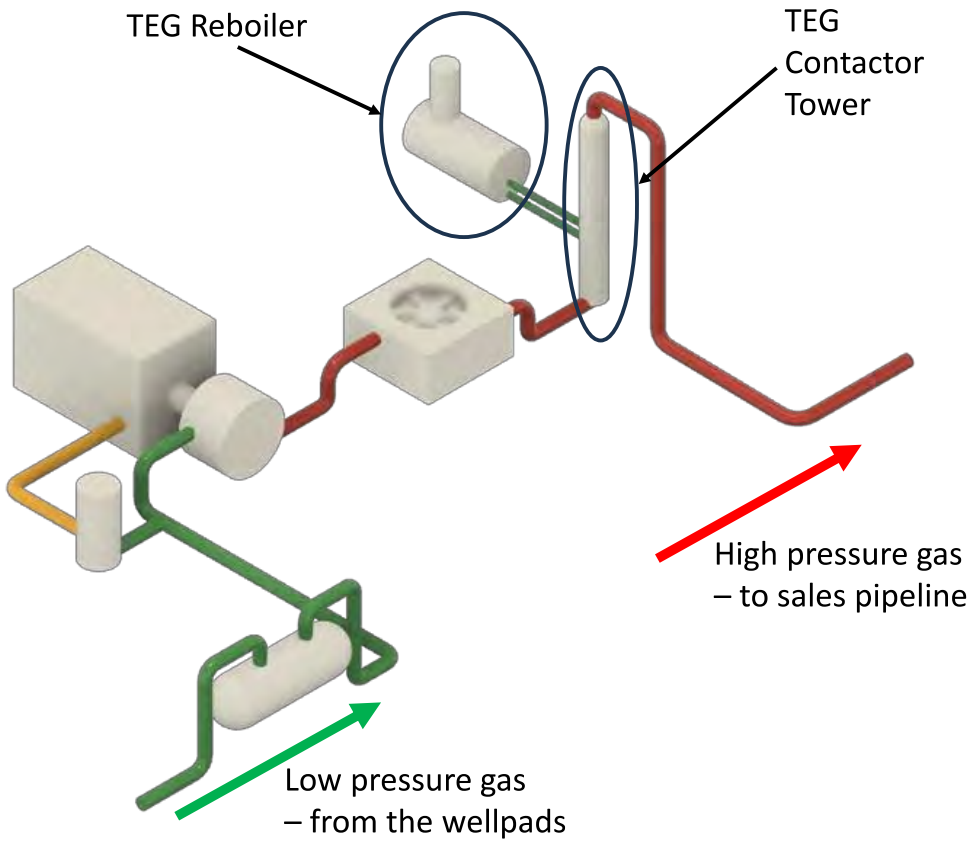
Compressor station – Discharge cooler

- Raising the pressure of the gas also raises its temperature
- A Discharge Cooler is used to cool the gas after it leaves the Compressor



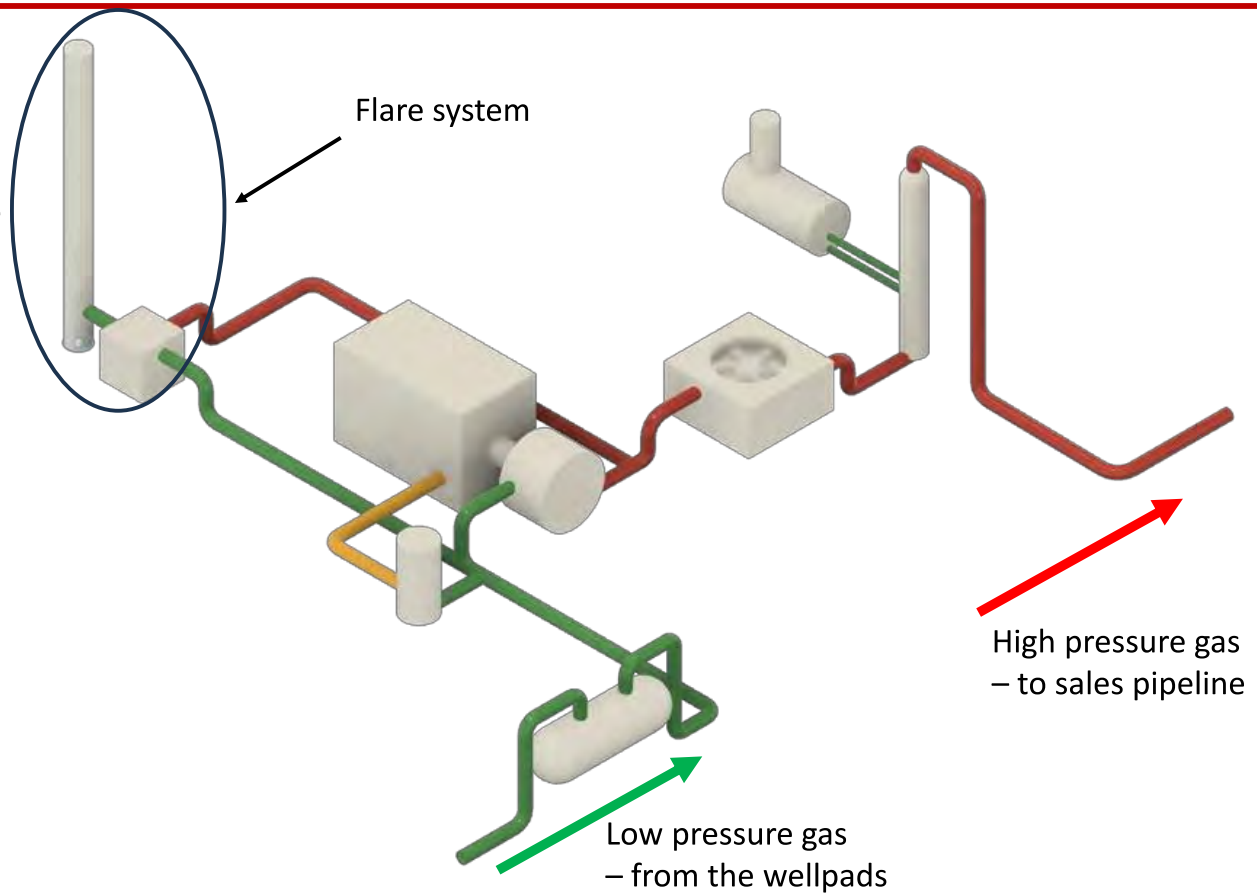
Compressor station – Gas Dehydration

- The compressed gas contains more water vapor than can go to the sales gas pipeline
- A Tri-Ethylene Glycol (TEG) Gas Dehydration system removes this water vapor
- TEG liquid is constantly pumped through the Contactor Tower where water vapor transfers from the gas to the TEG liquid
- The TEG liquid flows from the Contactor to the Reboiler where the water is removed
- The TEG liquid is re-used



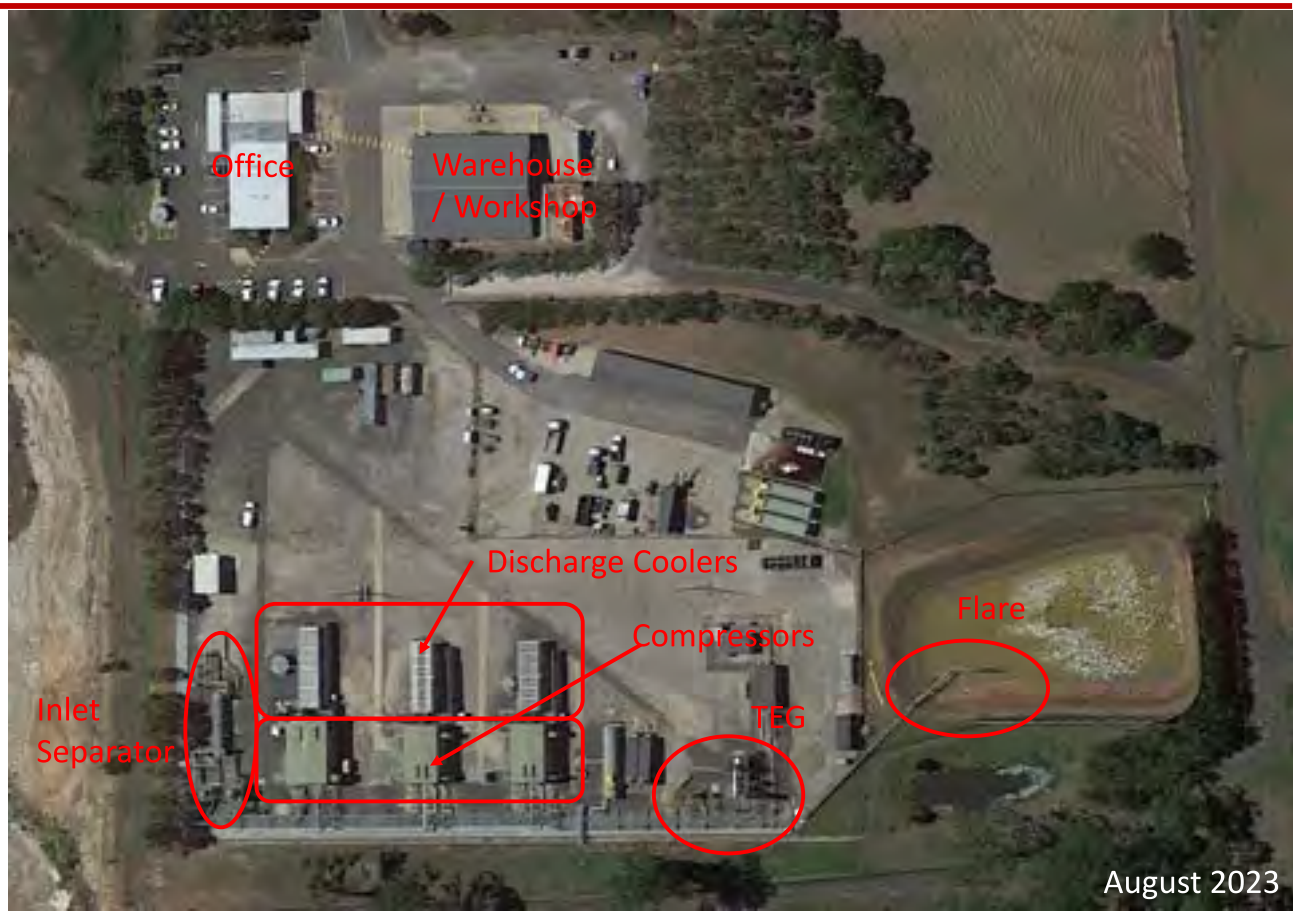
Compressor station – Flare System

- A Flare System allows a safe and controlled method of flaring gas (releasing as an ignited flame to limit methane emissions) if required
- The Flare System can release gas from a Pressure Safety Valve (PSV) in the plant
- The Flare System can also release gas for a planned event such as start-up, maintenance, testing or shutdown
- The Flare system will have a continuously lit pilot burner



Compressor Station - Overview

- Compressor stations can be made up of multiples of these major components, associated pipework and other infrastructure, as shown in this example image
- Compressor Stations operate 24 hours per day, seven days per week



Towards Production - Wastewater treatment facilities

A dedicated water/ wastewater treatment and handling facility will likely be set up to:

- Store flowback and produced water from HF and drilling programs
- Transfer water/wastewater between wellpads for safe and effective re-use and disposal

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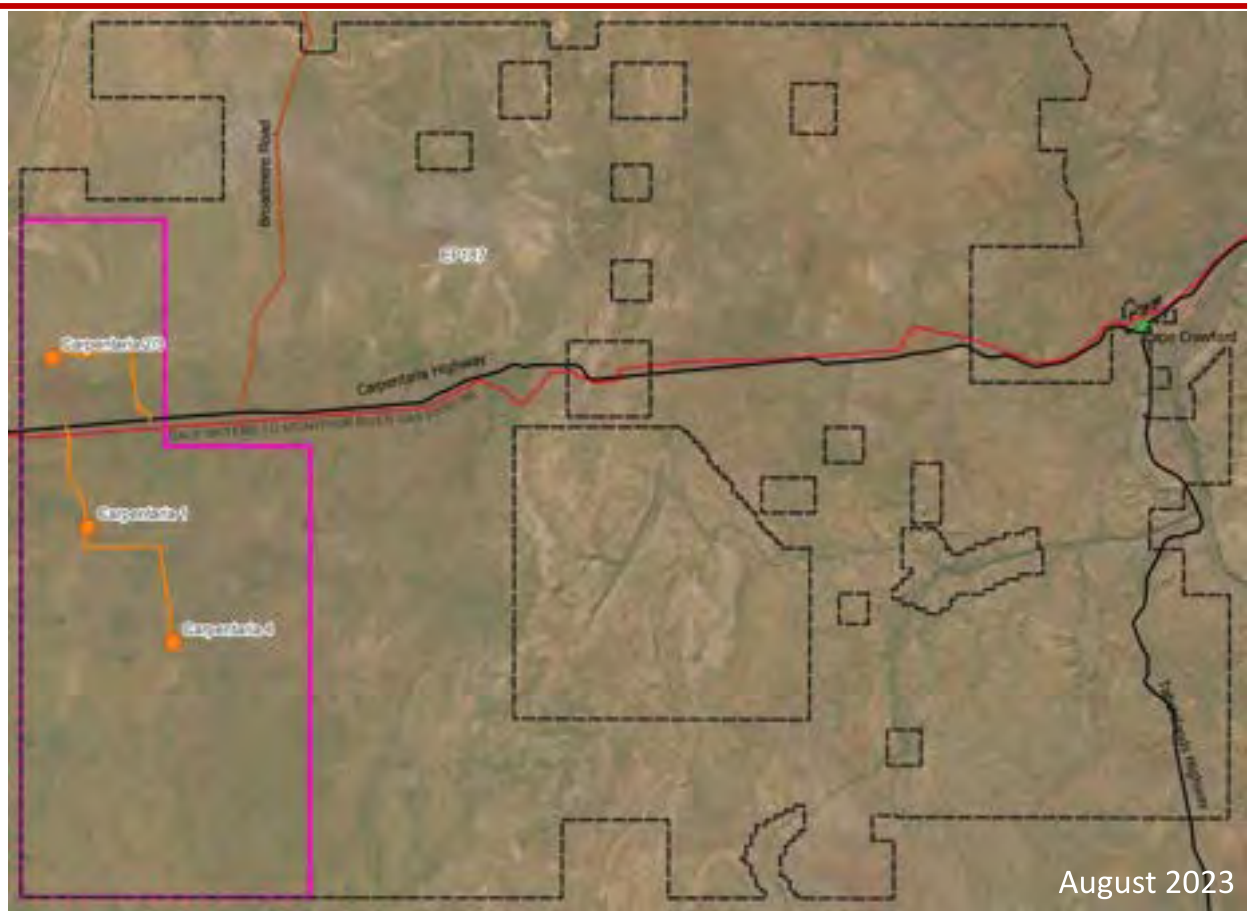
Towards production– When and where

- Currently refining area of interest for progressing to production
- Where:
  Pink outlined area, based on the results so far
- When:
  Currently working with the NLC to start the Production Agreement negotiation process



Towards Production – Planned Wellpads

- Up to 4 new wellpads in the regions shown in red
- Possible use of the existing Carpentaria 1 wellpad
  - No extension of the wellpad
- Possible use of the existing Carpentaria 2/3 wellpad
  - An extension of the wellpad may be needed
- Possible use of the existing Carpentaria 4 wellpad
  - An extension of the wellpad will likely be needed
- Cultural Managers will be on site during all first disturbance works

Towards Production – Planned Wells

- Up to 10 new horizontal wells in the regions shown in blue
- The new horizontal wells will be drilled from:
  - The new wellpads in the red regions
  - The existing Carpentaria 1 wellpad
  - The existing Carpentaria 2/3 wellpad
  - The existing Carpentaria 4 wellpad
- The new horizontal wells will be:
  - Up to 3km of horizontal in seam lateral length
  - Hydraulically Fractured
- Existing wells from previous work programs and existing approvals will also be used

Towards Production – Planned Access

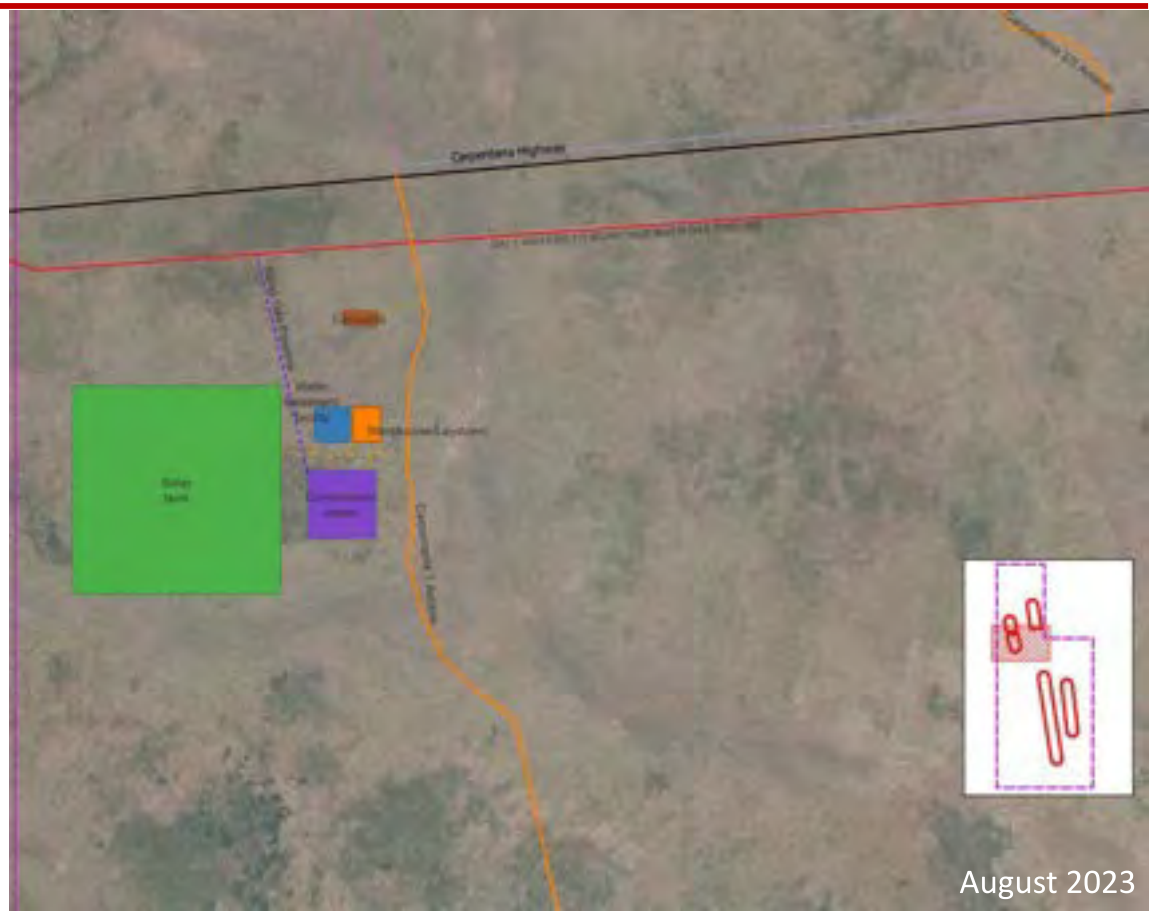
- Existing access tracks to be used
  - Shown in solid orange
- Proposed new access tracks to be constructed as needed
  - Up to 40km of new access required
  - Indicative alignment shown in dashed orange
- Use existing landowner access tracks and fencelines where practicable
  - Likely need widening
- Use existing seismic alignments where practicable
  - Will need recleaning as they have been rehabilitated
  - Will need straightening as seismic clearing went around trees where practicable
  - Will need widening
- Cultural Managers will be on site during all first disturbance works

Towards Production – Planned Flowlines

- Gas flowlines will take gas from the wellpads to the compressor station
- Water/Wastewater flowlines will be used to transfer water/ wastewater between:
  - Wellpads
  - Wastewater Treatment Facilities
  - Compressor station
- Flowlines will be buried for added protection
- Flowlines will follow access tracks where practicable to:
  - Reduce the amount of clearing required
  - Allow easy access for inspection and maintenance
- Up to 70km of gas & 70km of wastewater flowlines are required
- Indicative proposed flowline alignments are shown in dashed orange
- Cultural Managers will be on site during all first disturbance works

Towards Production – Production Facilities

- Production Facilities will include:
  - Compressor Station
  - Water Treatment Facility
  - Workshop/warehouse/ laydown
  - Camp/office
  - Solar farm (later in project)
  - High pressure sales gas pipeline
- Facilities will be near the Carpentaria 1 access, south of the Carpentaria Highway
- Cultural Managers will be on site during first disturbance works



Towards Production – Other Infrastructure

- Other infrastructure to support the project will include:
  - Radio towers
  - Camp and office septic processing units with irrigation
  - Sales gas metering station
- This infrastructure will be at facilities, wellpads or ROWs

Potential employment opportunities

Drilling programs:

- First disturbance cultural management (short duration, weeks)

Production:

- Traineeships/apprenticeships (ongoing, years)

<u>A lot of work needs to be done before production can be realised</u>

August 2023

Potential business opportunities

Drilling programs:

- Civil construction (short duration, weeks)
- Fencing (short duration, days)

Construction: (medium duration, months)

Production:

- Maintenance (ongoing, years)

<u>A lot of work needs to be done before production can be realised</u>

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THANK YOU

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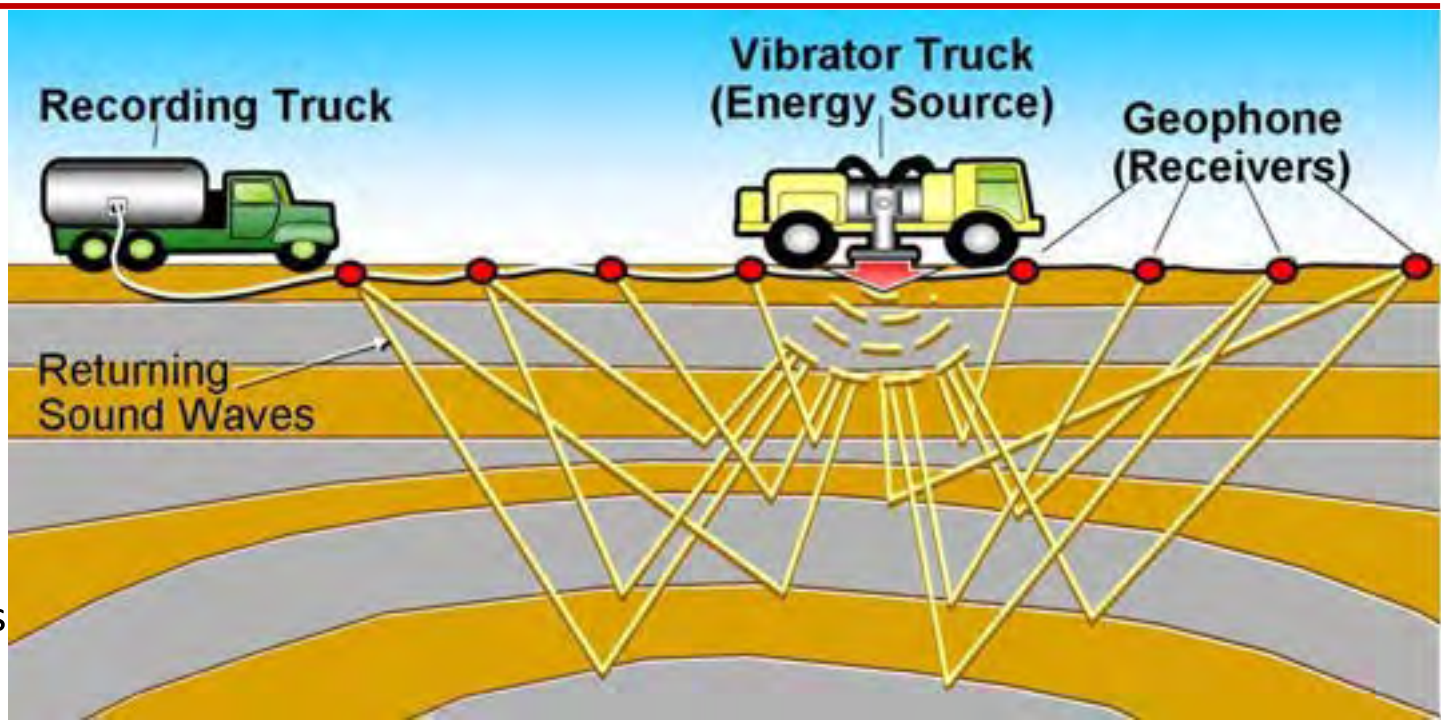
Additional Information Seismic

2D Seismic Survey

How it works:

- Vibroseis buggies put a vibration into the ground
- The vibration travels through the ground, reflecting off of different formations



- Geophones pick up the reflected vibrations and the information is stored
- A map of the subsurface formations is built from the stored information

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2D Seismic - Line Clearing

- Cleared with bulldozer and grader
- Works culturally managed by Traditional Owners
- Work around trees where possible
- Leave roots in soil where possible

2019 - Cultural Managers for 32 days

2021 - No Cultural Managers due to COVID-19

2D Seismic - Geophone install

- Geophones are installed by hand
- Report back to central station/mobile office

2D Seismic - Acquisition

- Vibroseis buggies work in pairs
- Information is monitored in the mobile office

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2D Seismic - Rehabilitation

Left
Seismic lines several days after rehabilitation December 2019

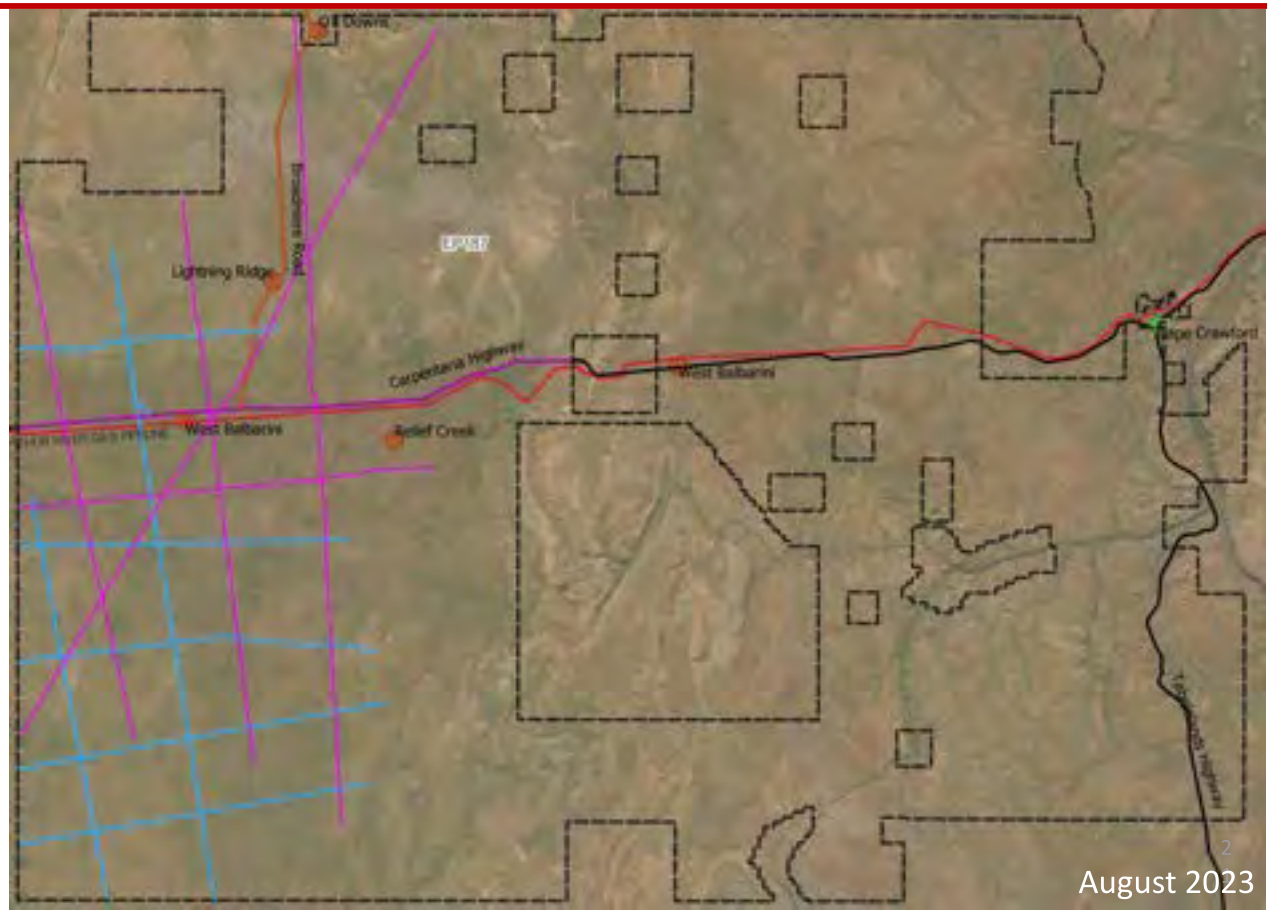
Right
Seismic lines July 2020 during the post wet season weed survey

The July 202 post wet season survey found;
-40% of seismic lines are now hard to find as grass coverage has returned to the same/better as in paddock.
-40% of seismic lines have same grass coverage as the paddock with exception of a cattle trail
-20% of seismic lines have grass coverage striking and are being used by grazier or is slow growing spinifex similar to the surrounding paddock

Cattle pad

2D Seismic – EP187

- 2019 2D seismic program is shown in pink
- 2021 2D seismic is shown in blue



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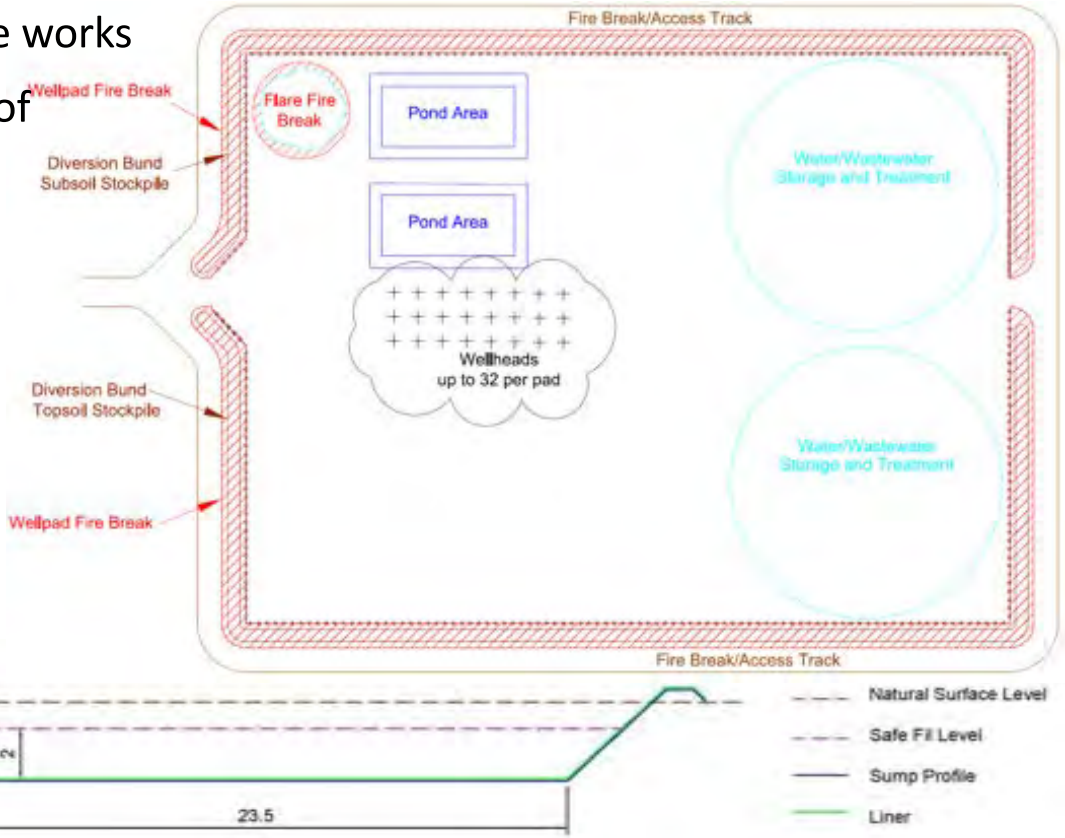
Additional Information Drilling

Drilling - Wellpad Construction

- Clearing and leveling of the site for safe works
- Installation of lined pits of the storage of drilling fluids
- Fencing to keep stock out
- Cultural Managers on site during first disturbance works



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Drilling – Fluid storage freeboard

- Ponds have freeboard capacity for potential rainfall
- In line with Code of Practice, freeboard must allow for a once in a thousand-year rainfall event
- White line markers indicate maximum fill level with freeboard above the line

Drilling – Fluid and cuttings disposal

- Drill fluids will be disposed of by evaporation
- If the residues meet requirements, it will be disposed of by on-site burial
- If residues do not meet requirements, it will be disposed of by removal from site to a licensed facility

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Drilling - Carpentaria 1 V

- Drilled 23/09/2020 to 23/10/2020
- Vertical well drilled to 1890m
- No environmental incidents
- May be re-entered and drilled as a Horizontal well in the future

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Drilling - Carpentaria 2

- Drilled 07/11/2021 to 16/12/2021
- Vertical well drilled to 1800m
- Vertical plugged back to 1050m
- Horizontal well drilled to 3150m
- 1300m of horizontal well in the target formation
- No environmental incidents

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Drilling - Carpentaria 3

- Drilled from the existing Carpentaria 2 pad
- Drilled 13/10/2022 to 21/11/2022
- Horizontal well drilled to 4460m
- ~2500m of horizontal well in the target formation
- No environmental incidents

Drilling - Carpentaria 4

- Drilled 15/12/2022 to 05/01/2023
- Vertical well drilled to 2000m
- No environmental incidents
- Plan to plug back and drill a horizontal well from this wellbore

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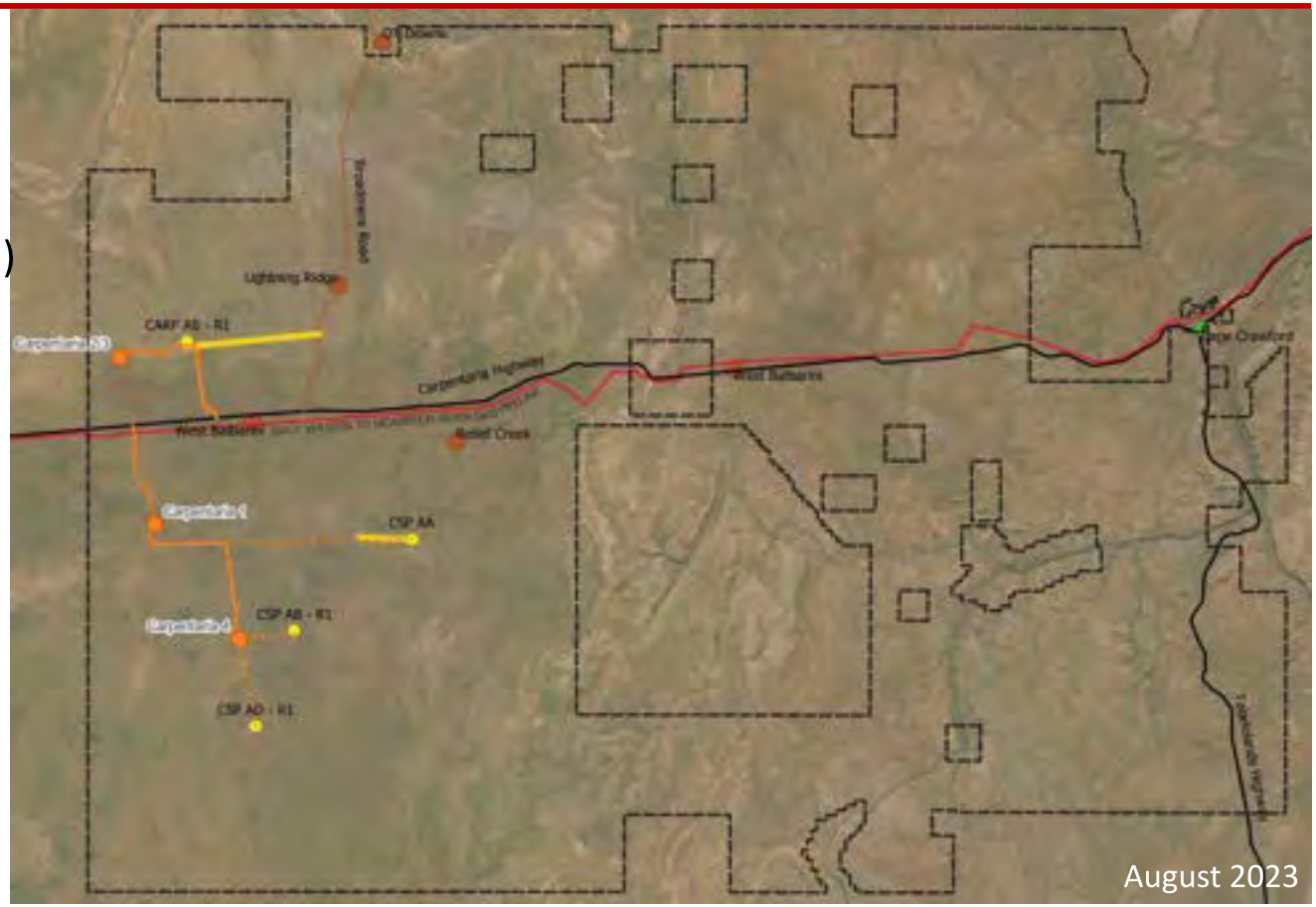
Drilling– EP187

2020
- Carpentaria 1 Vertical (V)

2021
- Carpentaria 2 V
- Carpentaria 2 Horizontal (H)

2022
- Carpentaria 3 H on the Carpentaria 2 wellpad
- Carpentaria 4 V

Future works under approved EMPs
- Carpentaria 1 & 4 H
- Carpentaria 5,6 & 7 V&H



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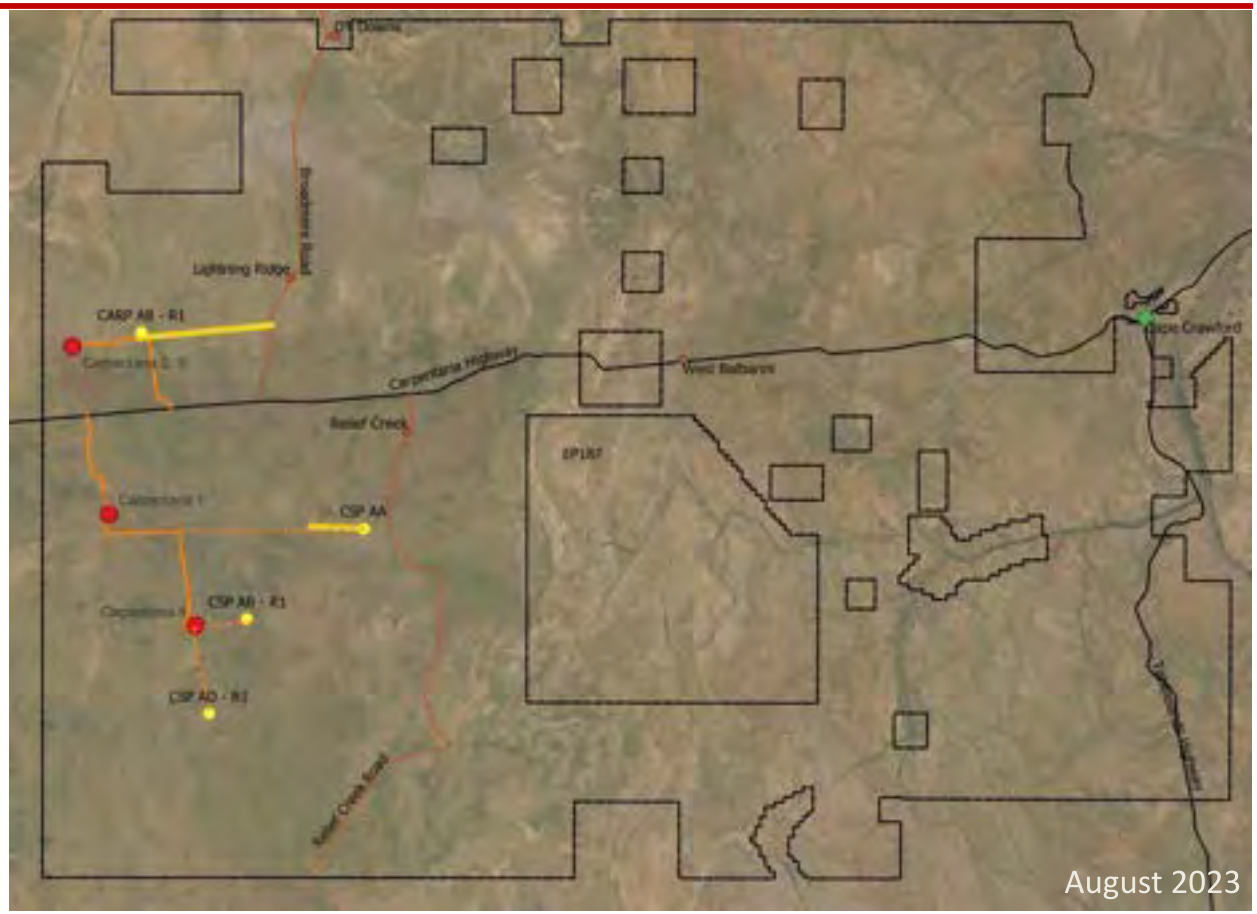
Hydraulic fracturing – EP187

2021
- Carpentaria 1 Vertical

2022
- Carpentaria 2 Horizontal
- Carpentaria 3 Horizontal

Future works
- Carpentaria 1, 4, 5, 6, & 7 Horizontal wells



Towards Production– Wellpad rehabilitation

- Rehabilitation of works goes over the life of the project
- Wellpad ponds are backfilled when no longer needed
- Wellpads are made smaller during production
- Rehabilitated areas are recontoured to natural shapes and revegetated to close to pre disturbance vegetation cover

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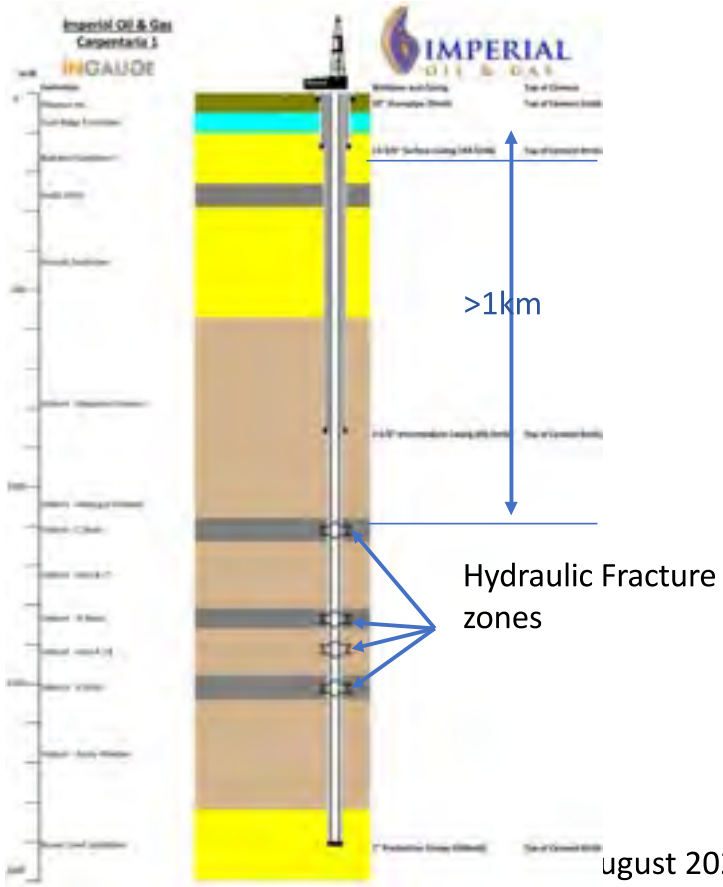
Additional Information Hydraulic Fracturing

2021 Hydraulic Fracture – Carpentaria 1

- Perforated and Fracture stimulated into 4 zones in the Velkerri Formation
- The closest formation over 1km deeper than the bottom of the closest aquifer
- The aquifer monitoring showed no impact on the aquifer from HF
- The well integrity monitoring showed no well integrity issues during HF
- The seismicity sensor showed no seismic events caused by HF



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Hydraulic Fracture – Carpentaria 2

- HF 21 stages in 1km of horizontal wellbore
- No safety or environmental issues
- The closest formation is over 1km deeper than the bottom of the closest aquifer
- Aquifer monitoring showed no impact on the aquifer from HF
- The well integrity monitoring showed no well integrity issues during HF
- The seismicity sensor showed no seismic events caused by the HF

Hydraulic Fracture – Carpentaria 3

- HF 40 stages in ~2.5km of horizontal wellbore
- No safety or environmental issues
- The closest formation is over 1km deeper than the bottom of the closest aquifer
- Aquifer monitoring showed no impact on the aquifer from HF
- The well integrity monitoring showed no well integrity issues during HF
- The seismicity sensor showed no seismic events caused by HF

2021 Hydraulic Fracture – Carpentaria 1

- The aquifer monitoring showed no impact on the aquifer from HF
- The well integrity monitoring showed no well integrity issues during HF
- The seismicity sensor showed no seismic events caused by HF

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Additional Information Production testing

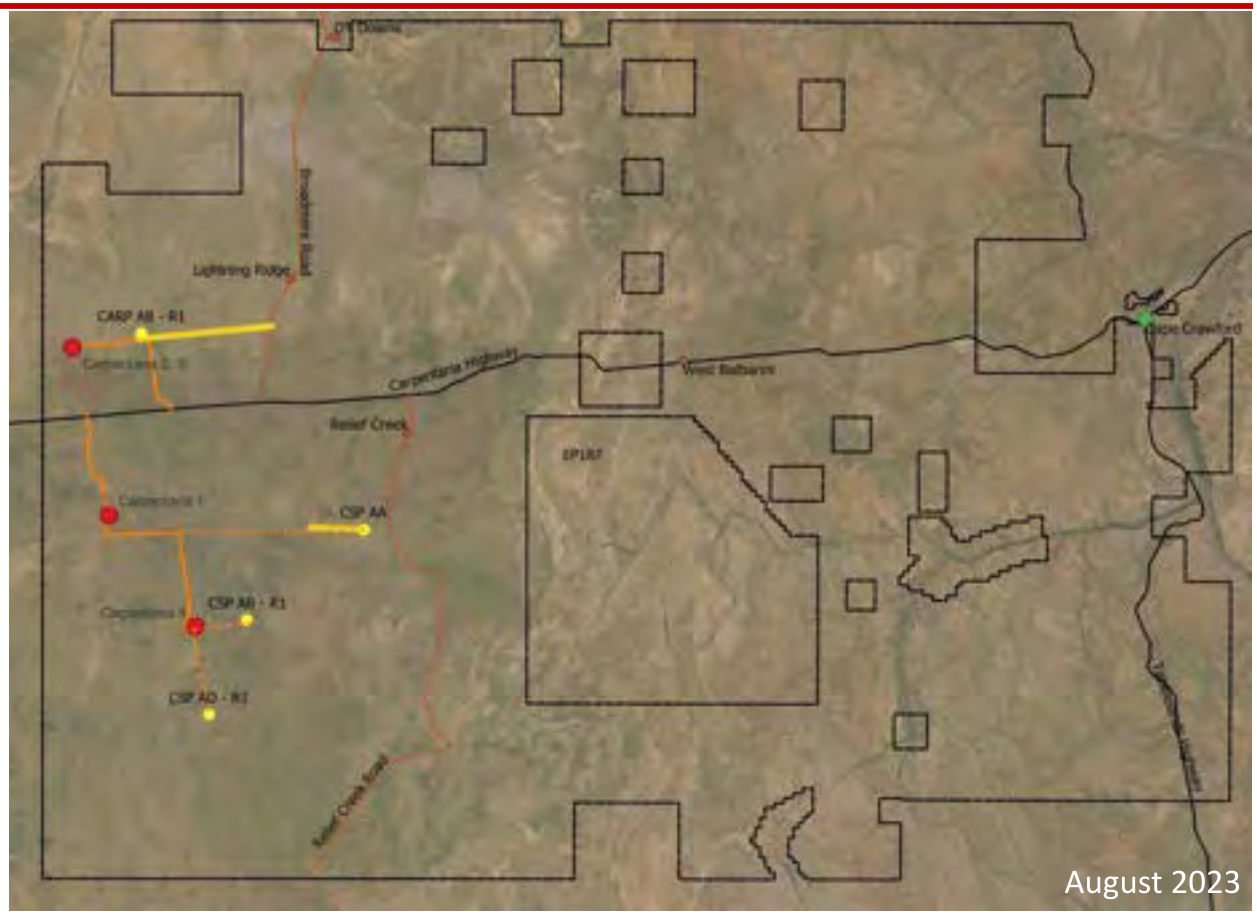
Production Testing – EP187

2021
- Carpentaria 1 Vertical

2022/2023
- Carpentaria 2 Horizontal
- Carpentaria 3 Horizontal ongoing

Future works
- Carpentaria 1, 4, 5, 6, & 7 Horizontal wells

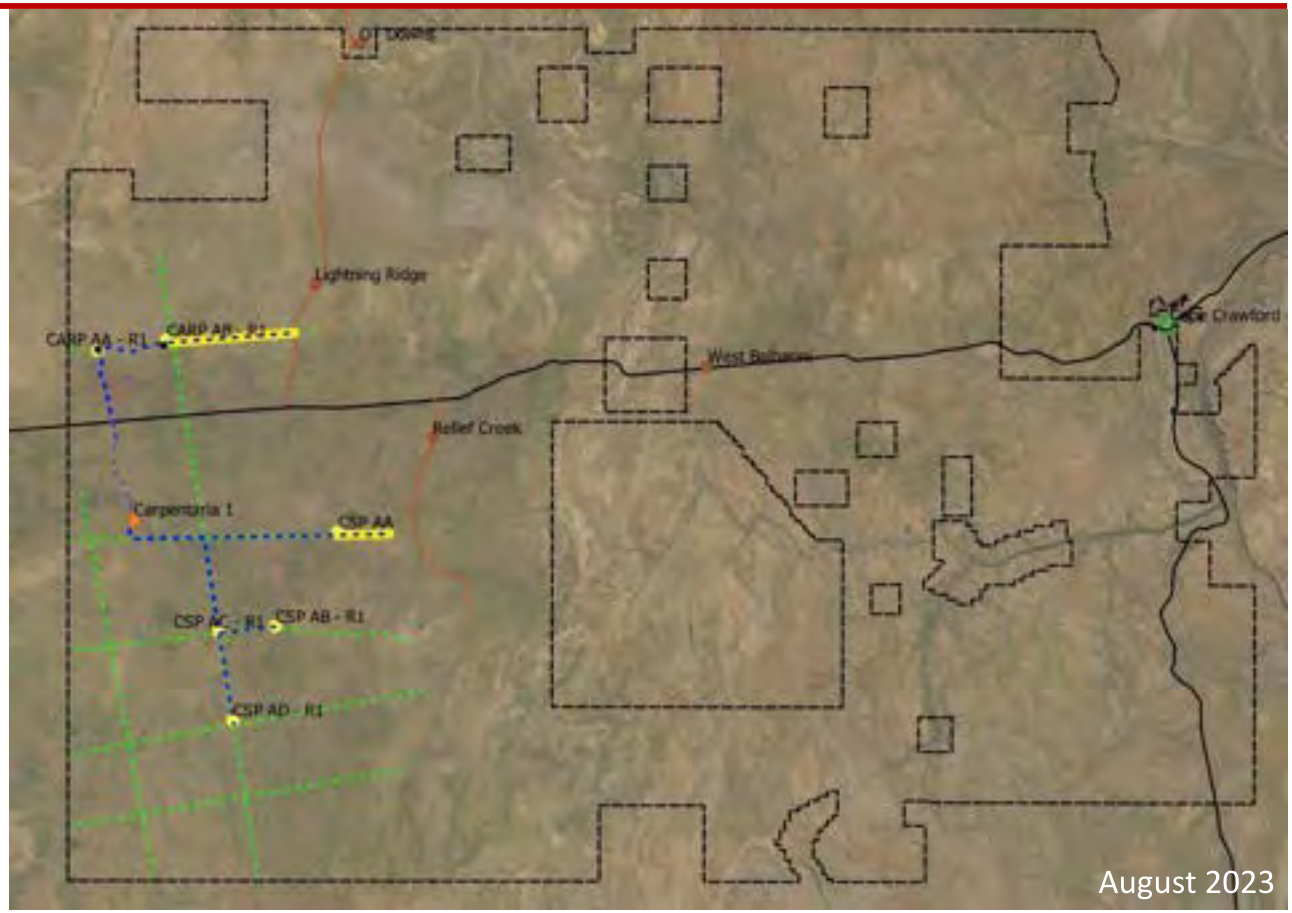
- Orange lines are constructed access tracks
- Dashed lines are planned access tracks
- Red dots are current wellpads
- Yellow dots are planned wellpad locations
- Yellow lines are movement corridors for planned wellpads



Planned works for EP187

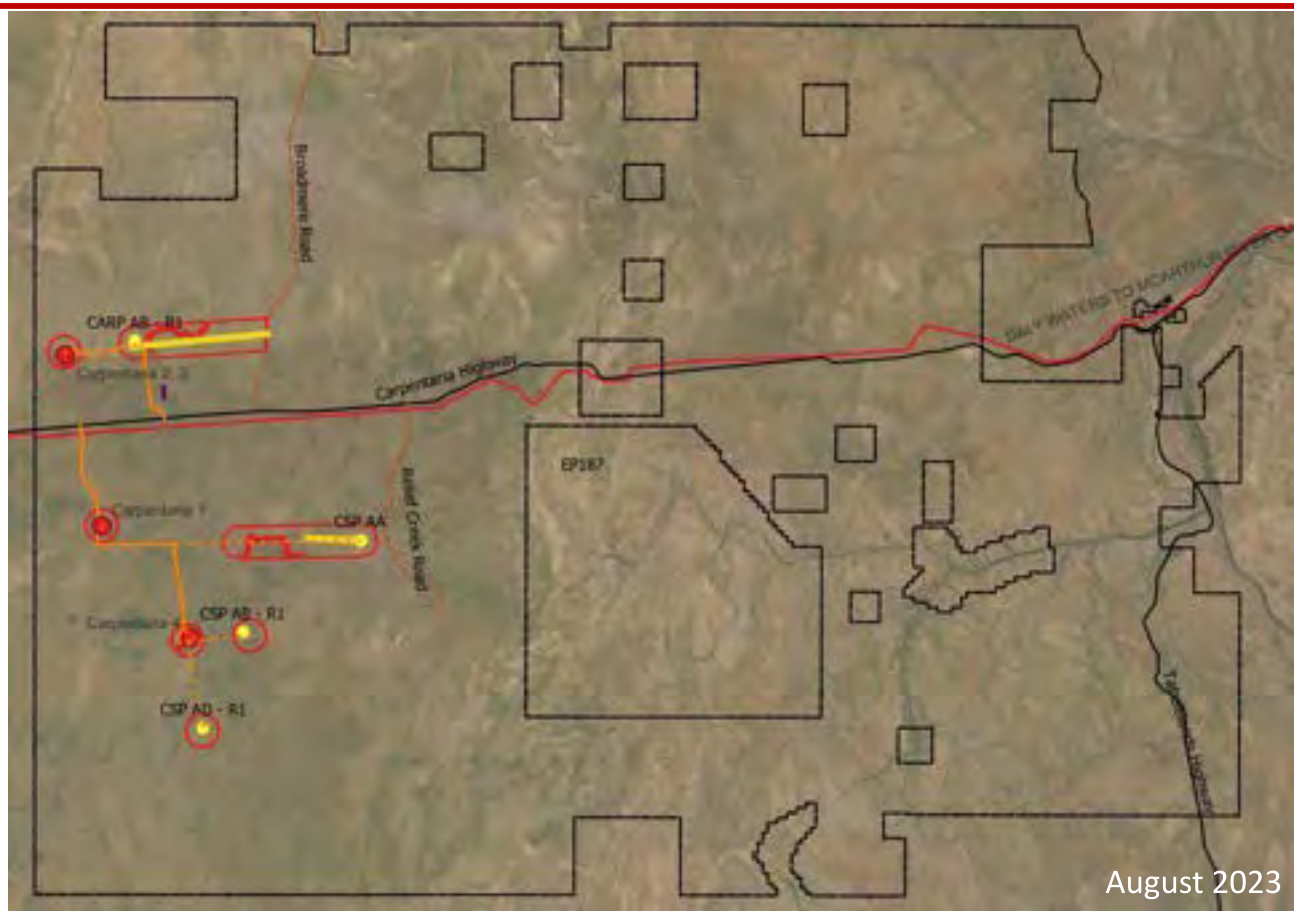
Under approved EMPs

- Up to 4 new wells
  - Wellpads
  - Up to 35km of access tracks
  - Drill as Vertical and Horizontal
  - Hydraulic Fracture
  - Production Test
- Construct up to 58km of buried wastewater flowlines
- Drill a horizontal well from the existing Carpentaria 1 wellbore
  - Hydraulic Fracture
  - Production Test
- These wells may be used as future production wells



Planned works –187 - Wellpads and Access

- Up to 4 new wellpads
  - Yellow dots & lines how the indicative locations of wellpads
  - Red zones show the area that wellpads may be shifted within
- Up to 35km of Access tracks
  - Orange dashed lines
- Access tracks will follow seismic lines to minimise disturbance
- Traditional Owners will culturally manage first disturbance works



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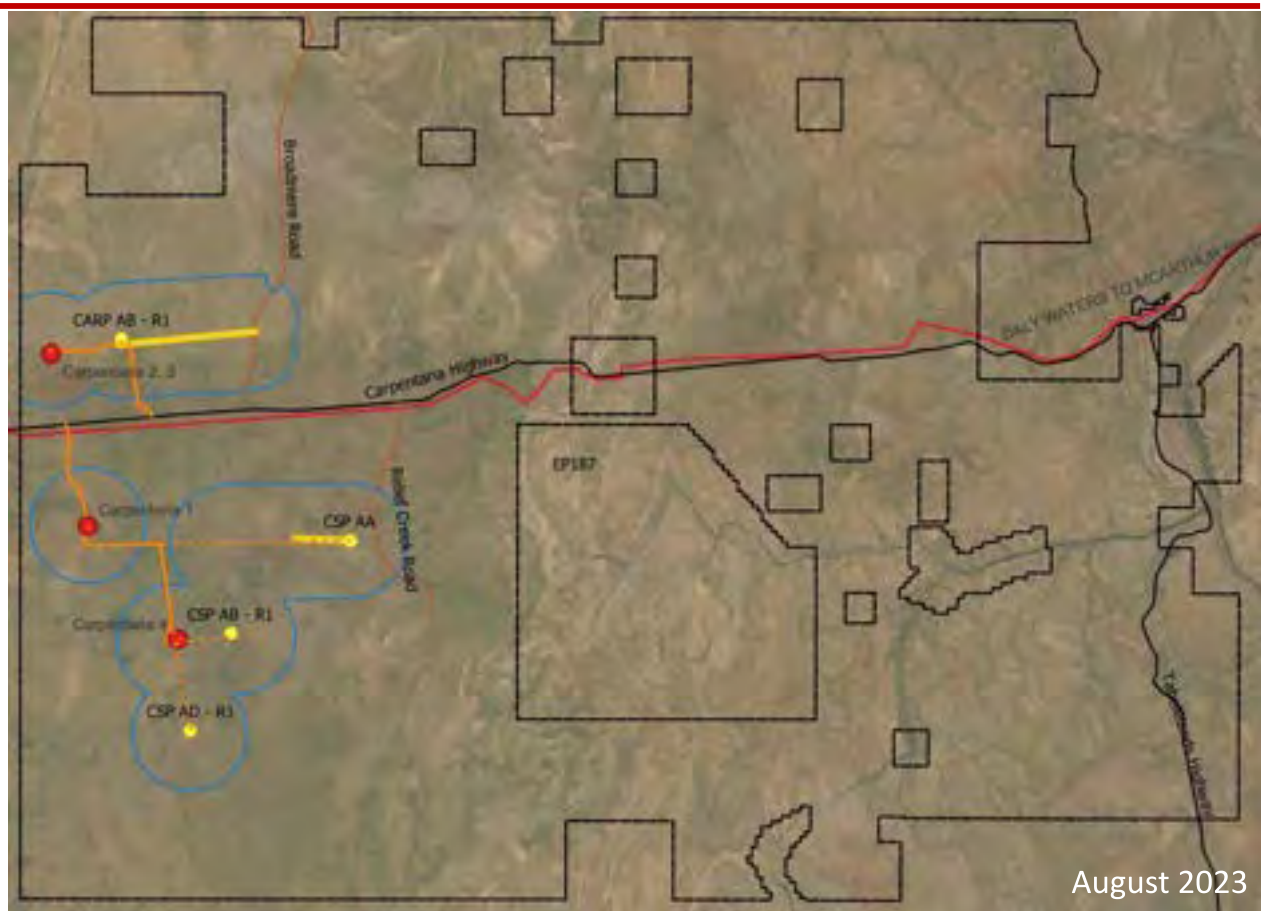
Planned works – EP187 - Wells

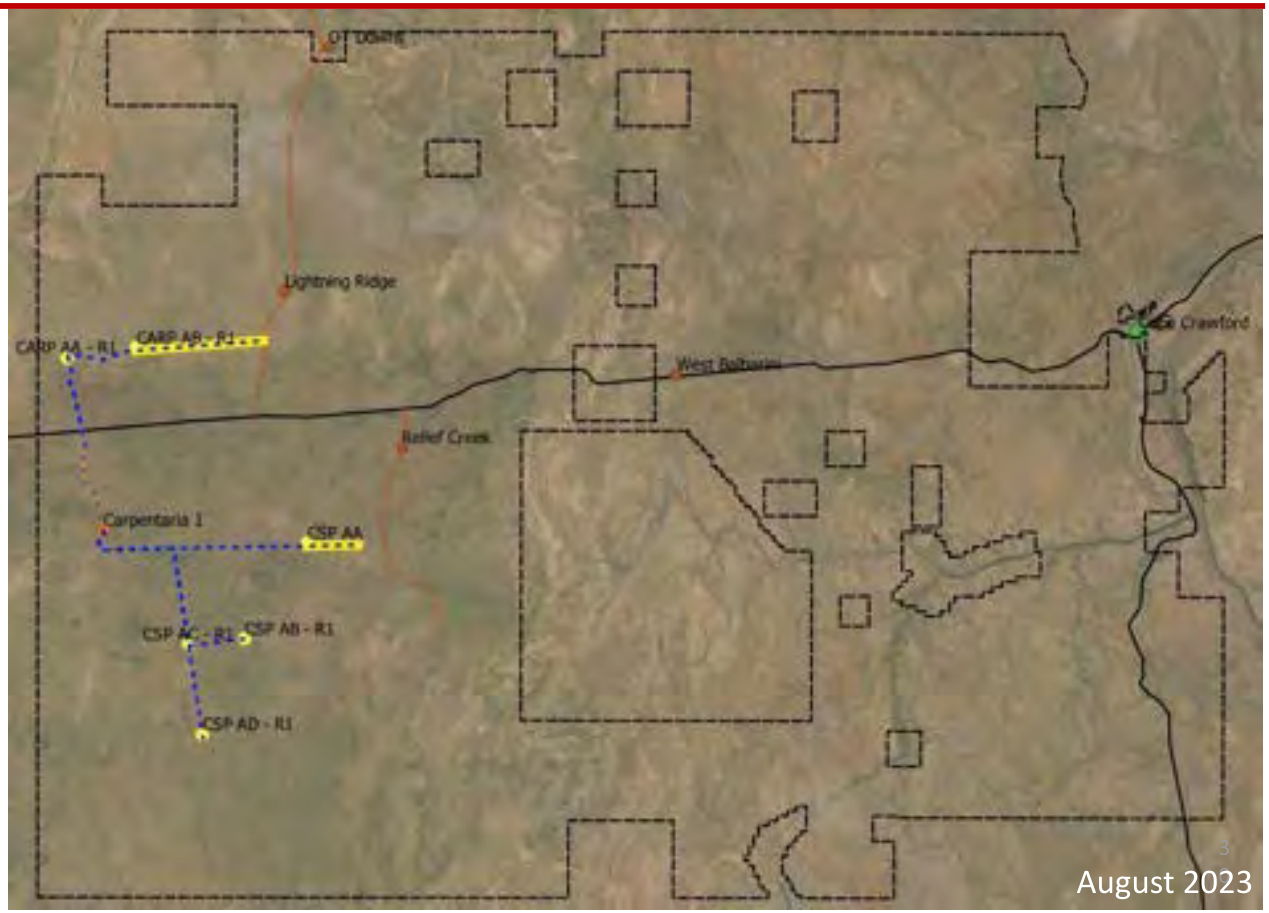
- Up to 4 new wells
- Drill Vertical well
  - Plug Back lower section after getting formation data
  - Drill Horizontal well
  - Hydraulic Fracture
  - Production Test

- Blue lines show the possible subsurface extent of the horizontal well trajectories



Planned works – EP187 - Flowlines

- Up to 58km of wastewater flowlines connecting the wellpads
  - Dashed blue lines
- Follow access tracks and seismic lines to reduce disturbance
- To allow re-use and recycling of wastewater between wellpads
- To reduce the number of tanks required
- Traditional Owners will culturally manage first disturbance works



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Project Water usage

- Imperial has a water extraction license for the activities in EPs 167, 168, 187
- The majority of water is used in Hydraulic Fracturing
- Imperial is re-using Flowback Water where practicable to reduce freshwater requirements
- Only a small volume of water is used in production

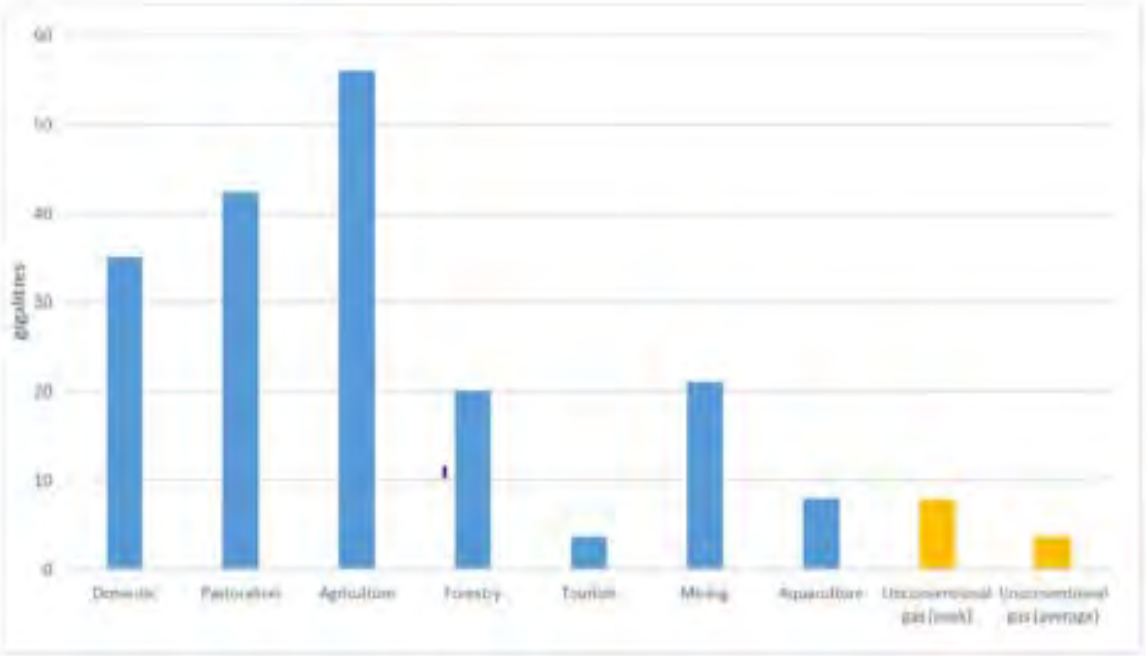


Figure 2-1. Graph comparing estimated annual water use (by industry) in the NT

A "Comparative Impact Study" by EcOz in 2017 found that the water use for gas production is likely to be less than other uses in the NT. https://frackinginquiry.nt.gov.au/?a=440742

August 2023

4.1.3 2023.08.20 – 25 | OCM Story Boards

Developing the Beetaloo Sub-basin

Responsible and successful development of the Beetaloo Sub-basin means:

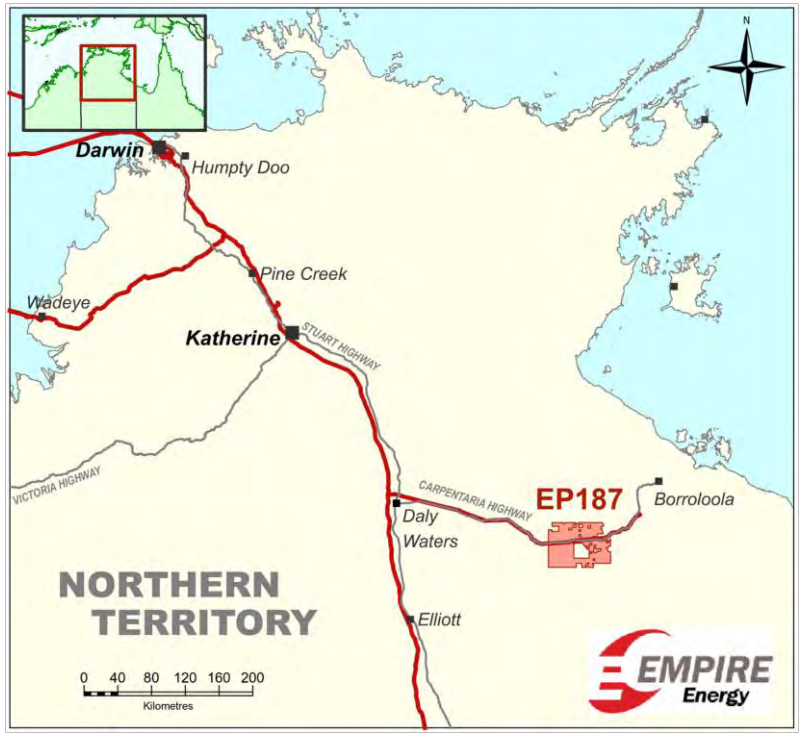
- More jobs for local companies including regional and Aboriginal employment and procurement opportunities.

- We operate with the consent of Traditional Owners and they will receive financial royalty payments.

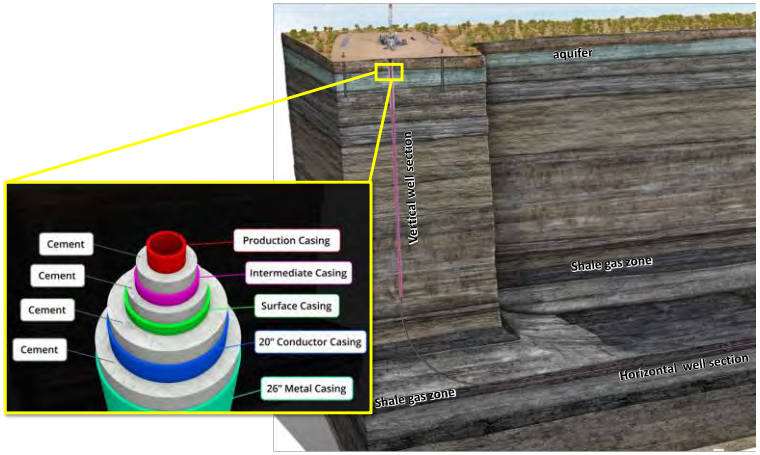
- Taxes and royalties will be paid to the NT Government which can go towards improving local community services, regional roads, more police, schools, hospitals and infrastructure.

- Production of the resource will contribute to energy security for Australia with more domestic supply to the market.

- More gas supply will be important for supporting the clean, reliable energy transition for Australia and internationally.



Protecting Aquifers and Ground Water



Example cross section of a well head

- **Well Integrity** is about keeping control of any fluids in the well and underground. With good well integrity, the well remains completely separated from the aquifers, the surrounding rock formations and the environment at the surface.

- Metal casing and special engineered cement are important components to maintain well integrity. After a section of the well is drilled, steel casing is inserted and set in place with cement.

- The steel keeps the hole open and the cement stops any fluid flow between the well and the rock formations.

- There are multiple layers of cement and steel casing in any aquifer zones. There is over 600m depth separations between the aquifer and the geological target formation.

- Specialised electric logs are used to check the integrity of the cement and casing protecting the aquifer.

More about water

- We understand how important aquifers are to Traditional Owners, pastoralists and the community.

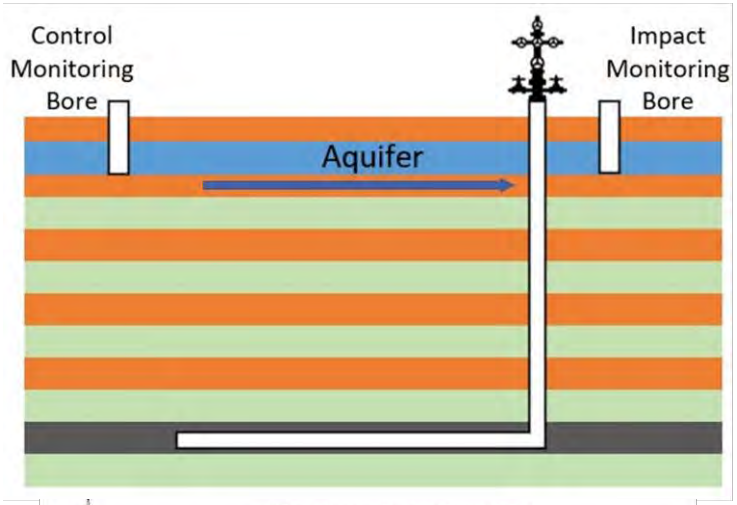
- Both geological and engineered barriers are in place to protect the underground aquifers. There are multiple controls in place to protect the environment and groundwater.

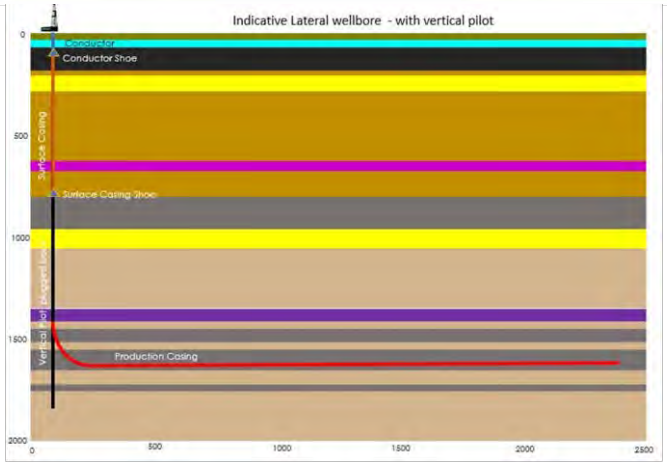
- Groundwater is regulated in the NT and groundwater monitoring is required.

- Groundwater monitoring allows us to monitor natural groundwater variation and detect any groundwater impacts that may occur.

- Before, during and after stimulation, water levels and quality are monitored with a control bore and impact bore located on the wellpad.

- All water monitoring results are submitted to the Regulator and are available to the public online: https://depws.nt.gov.au/onshore-gas/onshore-gas-in-the-northern-territory/industry-compliance-and-reporting/groundwater-monitoring-results





Hydraulic Fracture "Stimulation"

- "Stimulation" is the technical process designed to release gas trapped in shale rocks deep underground.

- "Stimulation" is always required for shale gas production and is sometimes used in conventional production.

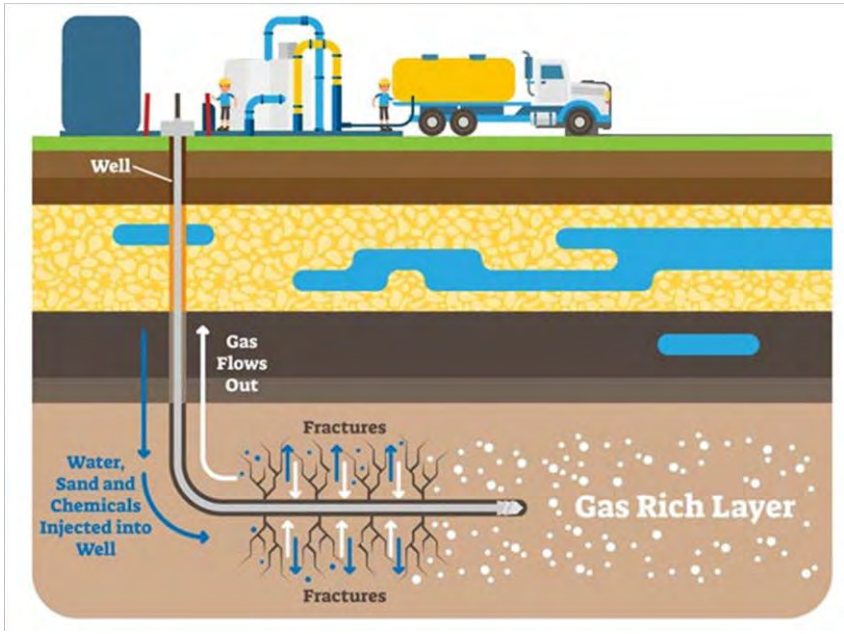
- Fluids are pumped into the well under pressure until the rock develops fractures. The fluid is 99.5% water and sand.

- The fluids carry sand grains (proppant) which get into the fractures to stop them from closing when pumping stops, enabling the gas to flow to the surface.

- The fractures allow the gas to flow from pore spaces into the well bore and to allow gas to be extracted from the shale.

- Fractures extend horizontally by a few hundred metres and tens of metres vertically.

- Vertical fracture height growth is restricted by overlying rocks which form barriers.



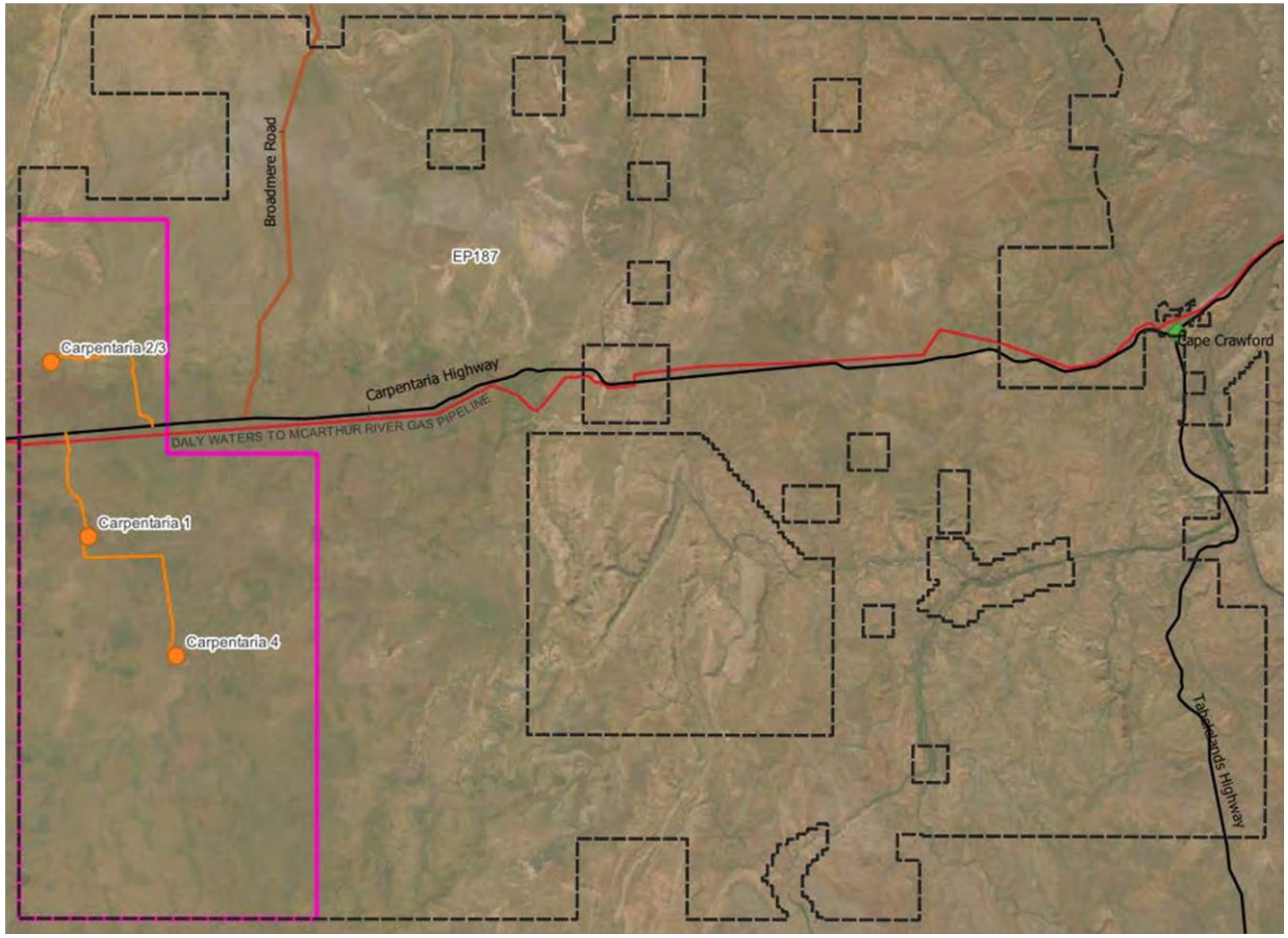
Key facts

- In EP187 there is around 1 km to 1.5 km of rock between the fracked zones and the shallow water sources.

- World-wide there have been millions of wells stimulated. The fracking process has been used safely in Australia over the last 60 years.

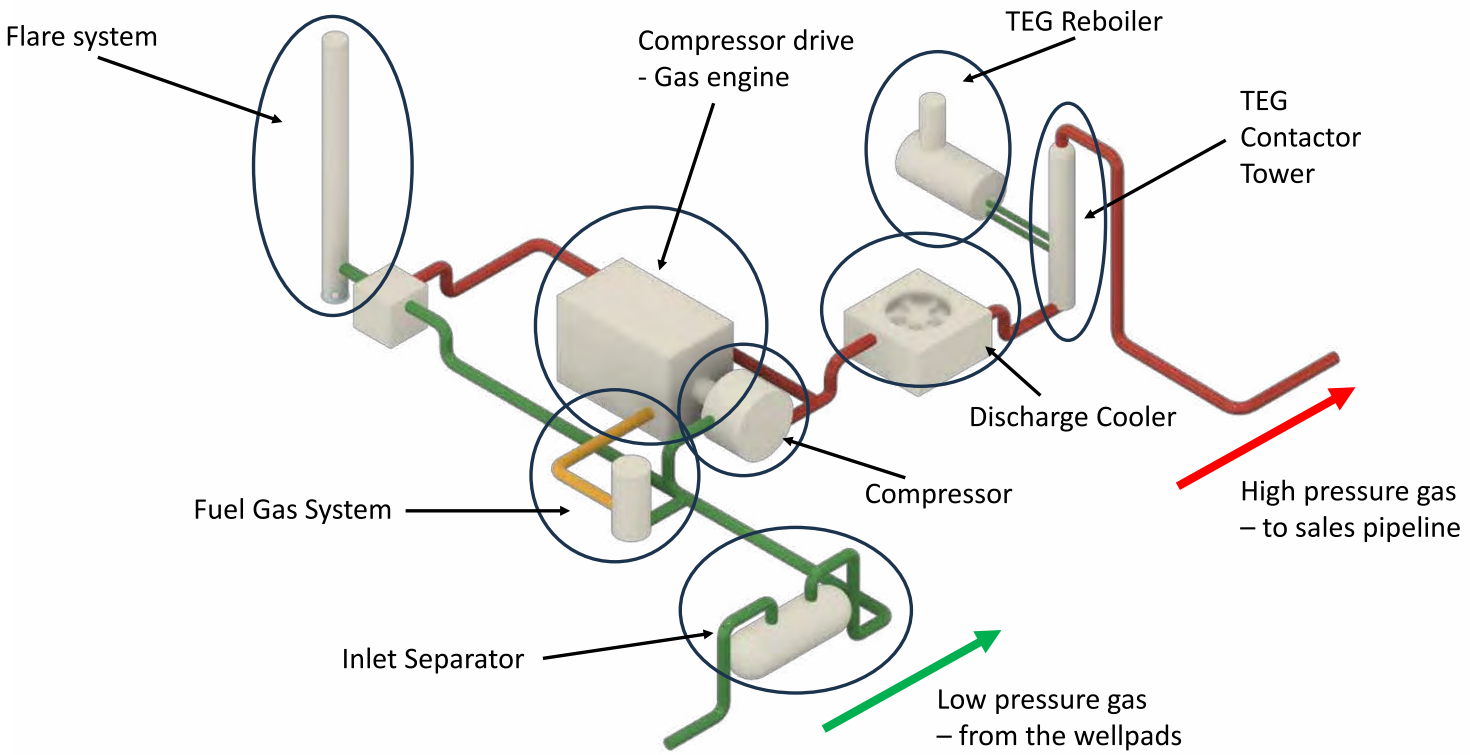
EMPIRE Energy

Location of Activities

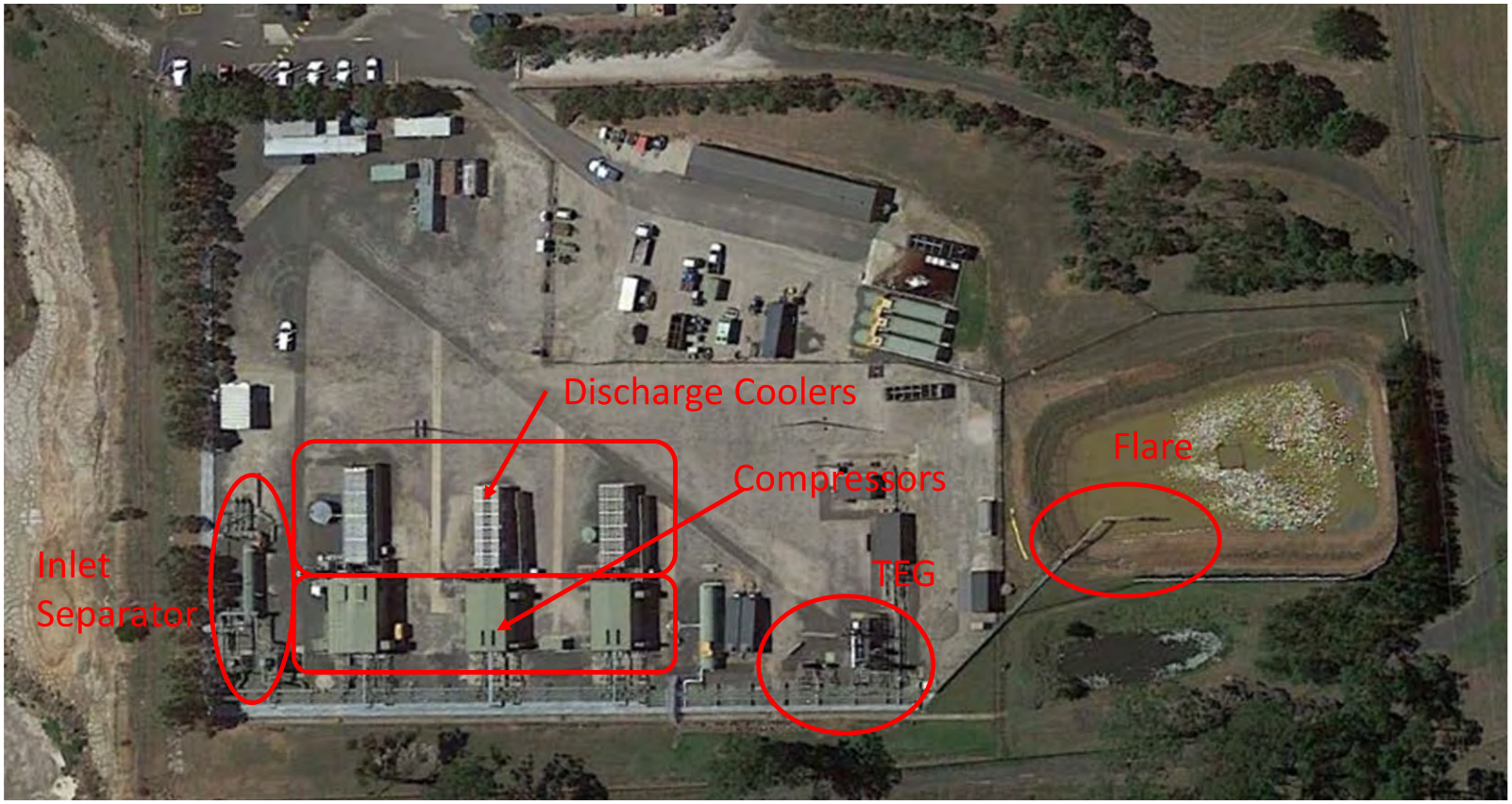


Compressor Station Major Components

A compressor station is made up of multiples of these major components and other support equipment:



Compressor Station Overview



4.1.4 2023.09.14 & 2023.09.20 | Nurrdalinji Emails & Response

From: [redacted]
Sent: Thursday, 14 September 2023 11:54 AM
To: [redacted]
Subject: Information request from Nurrdalinji Aboriginal Corporation

[redacted]

You may have heard the very sad news at the [redacted] Here you can find the statement I have issued abou[redacted]

[redacted] was at the meeting in Katherine on Monday 21 August, Empire promised to provide the detailed slideshow to Nurrdalinji Aboriginal Corporation so we can better understand your plans.

It would be very useful for our Directors and members if you could provide this presentation to us.

Thank you,

[redacted]

https://www.nurrdalinji.org.au/

From: [redacted]
To:
Subject: RE: Information request from Nurrdalinji Aboriginal Corporation
Date: Wednesday, 20 September 2023 3:39:54 PM
Attachments: image001.png
2023 09 SEAAOC Presentation.pdf

[redacted]

Firstly, allow me to pass on the sincere and heartfelt condolences of the entire Empire Energy management team and Board for the tragic and [redacted] We were shocked and saddened to [redacted]

In relation to your request for information, Empire is currently in the consultation and negotiation process with Traditional Owners for the EP187 permit. At this stage, the information you have requested is not all publicly available to share.

I attach hereto a recent corporate presentation that provides detail of a public nature regarding Empire's plans. I trust that this provides you with the detail sought to understand our plans at this stage.

We would be happy to answer any further questions that you may have at the appropriate time for further consultation.

Kind regards,

[redacted]

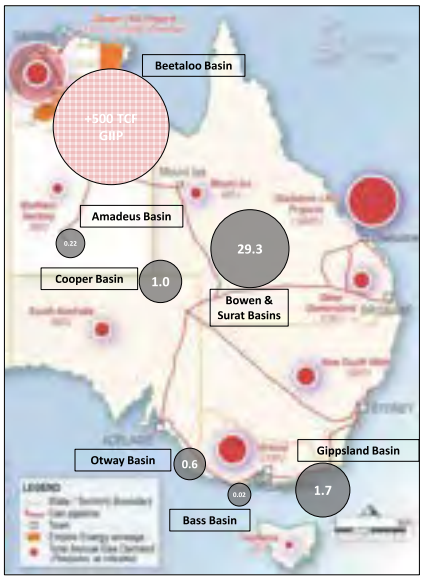
EMPIRE Energy

ASX:EEG

Empire Energy – Beetaloo Basin – On the Path to Pilot Production and Beyond

South East Asia Australia Offshore & Onshore Conference – 13 September 2023

Empire has a Commanding Beetaloo Position



- Total potential Prospective Resources in the Velkerri B shale of between **50 TCF and 100 TCF** (one of five productive shale units) based on Government estimates of **500 TCF** gas-in-place (assuming recovery factors of between 10% and 20%)
- **Large enough to supply both LNG and east coast markets**

- **Empire (100%) NT 2C Contingent Resource of 1,906 PJ (1.63 TCF) gas and 3.5 MMBBLs liquids[1]**
- **Empire (100%) EP187 2C Contingent Resource of 1,739 PJ (1.5 TCF) at an average EUR per well location of 7.9 PJ**
- **Empire (100%) P(50) Prospective Resource of 44,541 PJ (41.67 TCF) gas and 764 MMBBLs liquids[1,2]**

Source: Netherland, Sewell & Associates Inc
1. Western Beetaloo 1.06 PJ per BCF applied
2. Barney Creek – McArthur Basin targets, 1.06 PJ per BCF applied

Beetaloo Velkerri B GIIP Estimate
(SEAAOC 15 November 2018)

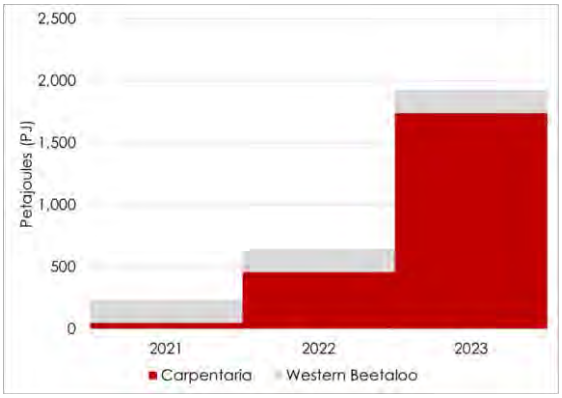
2P Reserves (TCF)
(Energy Quest as at 31 March 2023)

1

Empire has Grown its Certified 2C Contingent Resources

EMPIRE Energy

Empire's on ground activities have grown discovered resources to an LNG Scale



	EP187 Contingent Resources (100%) as at May 2023 Net Sales Gas (PJ)		
	Low Estimate (1C)	Best Estimate (2C)	High Estimate (3C)
Total	304	1,739	3,507
Average EUR Per Development Well	6.2	7.9	9.3
Indicative Pilot Development Well Cost ($20m per well)	$3.23 / GJ	$2.53 / GJ	$2.15 / GJ
Indicative Full Field Development Well Cost ($15m per well)	$2.42 / GJ	$1.90 / GJ	$1.61 / GJ

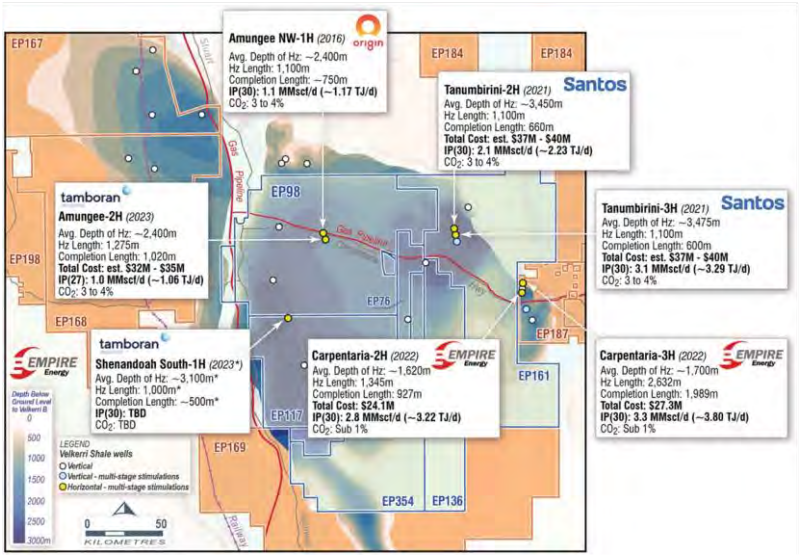
Key Drivers of 2C Uplift			
	▪ Carpentaria-1 drill ▪ Pangaea acquisition	▪ Carpentaria-1 EPT ▪ Carpentaria-2H drill ▪ Charlotte 2D seismic survey	▪ Carpentaria-2H EPT ▪ Carpentaria-3H drill and EPT ▪ Carpentaria-4V drill

Note: Refer to EEG announcement dated 29 May 2023 for Netherland, Sewell & Associates, Inc. Contingent and Prospective Resources

2

Basin-wide Appraisal Drilling is Demonstrating the Commercial Case

EMPIRE Energy



- Empire drilling and fracture stimulation costs ~2/3 of deeper wells (on a like for like basis)
- Empire generating strong flow rates on a per dollar of capex basis, building the economic case for the basin flanks
- Empire's gas has a higher energy content than dry gas (with positive implications for revenue)
- 100% interest in all properties and no private royalties maximises farm out flexibility and economics
- Empire's extremely low in-situ CO2 reduces offset costs

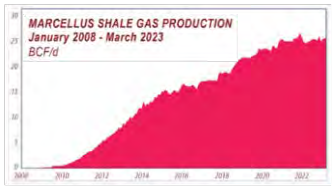
3

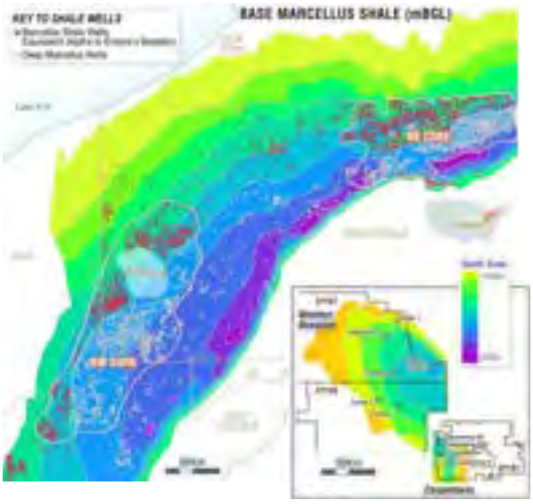
Empire's Beetaloo Footprint Comparable to Marcellus

EMPIRE Energy

- Empire's Beetaloo footprint is comparable in size to significant portions of the core areas of the Marcellus Shale play in the Appalachian Basin
- More than 9,000 wells are producing from similar depths to Empire Beetaloo play (~34 percent of all Marcellus wells)[1] across both core areas
- The majority of the more than 27,000 producing Marcellus Shale wells are less than 2,250 metres below ground level
- **Marcellus shale producing acreage has typically transacted at US$5,000 to US$25,000 per acre[2]. Empire is valued at ~US$70 per acre based on the Carpentaria Project and Western Beetaloo Project alone**

"Marcellus shale gas production has grown by 25 BCF/d over ten years"



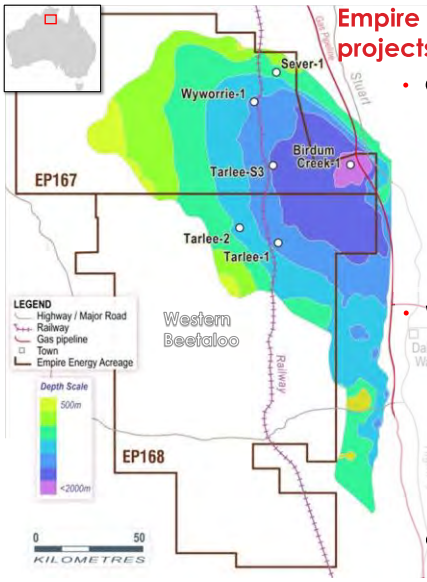


Insert map: Empire's base Velkerri B Shale at same scale as base Marcellus Shale map

Source: U.S. Energy Information Administration - EIA - Independent Statistics and Analysis
1. EIA and relevant State databases
2. https://mercercapital.com/energyvaluationinsights/ma-in-marcellus-utica-basins-2

Large Pilot Development and Appraisal Position (100% EEG)

EMPIRE Energy



Empire has two large scale appraisal and pilot development projects across the Beetaloo Sub-basin connected to infrastructure

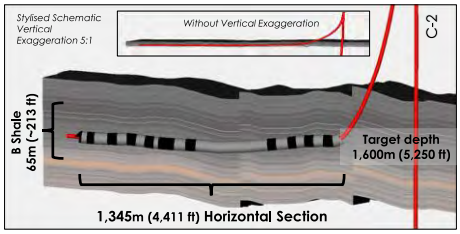
- **Carpentaria – Pilot Development**
  - Covers 110,000 acres
  - Fully delineated with 2D seismic, two horizontal stimulated wells, one vertical multistage simulated well, one step-out vertical well and three Extended Production Tests
  - Focused on FID for pilot project in 2023 and construction in 2024
  - 2C Contingent Resource 1,739 PJ (~1.5 TCF)
  - 2U Prospective Resource 3,542 PJ (~3.0 TCF)
- **Western Beetaloo – Appraisal**
  - Large, extensive play covering ~1m acres
  - Delineated by five spatially drilled wells, ~1,800 metres of core and >1,000 km 2D seismic acquired
  - Further de-risked by activity in Carpentaria (same rock)
  - 2U Prospective Resource ~28 TCF

One of only three operators in the Basin

Empire's First Horizontal Well Flow Test A Success

Carpentaria-2H is the fourth horizontal well in the basin, was drilled 100% within zone, and successfully flowed gas to surface from all 21 frac stages

- **Carpentaria-2H ("C-2H") produced a total of 323 TJ (281 mmscf) over 127 days**
  - This equates to **a normalised rate of 8.25 TJ (7.2 mmscf) per day for an equivalent 3,000m horizontal development well** for the entire test period
- Gas composition remained consistent with high calorific value and **extremely low CO_2 (less than 1%)**
- C-2H was brought back online after an initial 51 days of testing to test the benefit of soaking with excellent results
  - **The post-soak 2023 IP30 is confirmed at 10.5 TJ (9.2 mmscf) per day for an equivalent 3,000 metre horizontal development well**
- Completed without the need for production tubing, well free-flowed through 4 ½" casing. Empire is likely to move to 5 ½" in future scenarios
- **These rates exceed the benchmark other Beetaloo players have put forth as commercial, at a capital cost of ~half of Empire's peers**

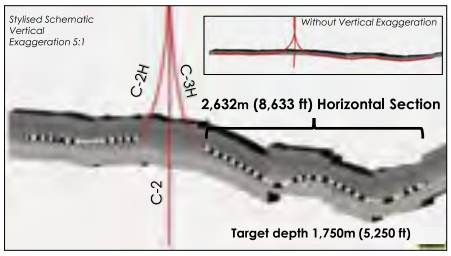


Carpentaria-2H flare

Empire's Record Breaking Carpentaria-3H Horizontal Well

Carpentaria-3H is the longest horizontal shale well, and the largest frac job ever executed in Australia, on time and ~$6m under budget

- **Total horizontal lateral length of 2,632m (8,633 ft)**, with 2,374 m (7,786 ft) successfully placed within the target Velkerri B shale (**90% in zone**), with strong gas shows throughout the target zone
  - **Confirming long horizontals can be drilled in the Beetaloo**
- Carpentaria-3H successfully stimulated, significantly below budget, executing all planned 40 stages across 1,989m (6,526 ft)
- A total of 12.8 million lbs of proppant placed, averaged 319,000 lbs per stage (~2,000 lbs/ft). Comparable to US Shale frac intensity
- Carpentaria-3H was brough back online on 3 August 2023 and has demonstrated the material benefits to productivity of soaking, through significantly increased gas flow rates
- **Following reopening, Carpentaria-3H flowed gas at an average rate of 3.3 mmscf / day (3.8 TJ / day) over the first 30 days ("IP30")**
- **The Carpentaria-3H "post-soak" average daily production rates have increased 30% over the IP27 "pre-soak" test conducted in Q1 2023**



SLB 185 Rig drilling Carpentaria-3H in EP187

Connections to Market for Large Gas Volumes

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- **APA Group (ASX: APA)** and Empire have executed an agreement for the establishment of exclusive midstream gas infrastructure furthering the memorandum of understanding as announced by Empire on 27 October 2021
- **APA will spend up to $5 million** under a proposed early works agreement on Engineering and Design Concepts for midstream gas facilities associated with Empire's Carpentaria Pilot Project, which would materially reduce the capital requirements for Empire to commence commercial production
- APA and Empire are also working on concepts to transport **large volumes of gas from the Beetaloo to Australian east coast markets (in excess of 500 TJ/d)**. The leading concept considers the potential construction of a new pipeline connecting the Beetaloo to APA's existing Carpentaria Gas Pipeline between Mount Isa and Ballera (Queensland)
- Negotiations with NT Government owned utility **Power and Water Corporation** under the existing MOU are advancing to facilitate access to the McArthur River Pipeline
- **Empire is currently in active gas sales negotiations with multiple parties for supply of gas in both the pilot phase and full development phase**

8

Pathway to Carpentaria Pilot Project Production and Revenue

EMPIRE Energy

EXPLORATION & APPRAISAL

2021
- ✓ 2C Contingent Resource: 575 BCFe
- ✓ 2U Prospective Resources: ~48 TCFe

2022
- ✓ Gas Sales & Transportation: APA Group and Power and Water Corporation MoUs Executed
- ✓ Established $15 million credit facility with Macquarie Bank to move to project financing

KEY ACTIVITIES TO CARPENTARIA PILOT PROJECT FID

2023
- ✓ Major 2C Contingent Resource upgrade announced for EP187 to 1,739 PJ
- ✓ Carpentaria-2H flow rates: normalised IP30 of 10.5 TJ (9.2 mmscf) per day for an equivalent 3,000m horizontal development well. Carpentaria-3H flow rates: IP30 of 3.8 TJ (3.3 mmscf) per day
- ✓ Carpentaria-4V: intersected the same stacked Velkerri Formation shales as the Carpentaria Project wells thereby opening the Carpenaria East Area

1. Front End Engineering & Design ("FEED"): including engineering, economic modelling etc
   - **Pilot development (up to 25 TJ/d) – over $90m revenue per annum @ $10/GJ**
2. Subsurface design planning
3. Execute gas sales and transportation agreements – discussions ongoing with multiple parties
4. Arrange financing for pilot (Macquarie Bank credit facility already in place)
5. Obtain government approvals: NT Petroleum Production Licence over Carpentaria
6. Negotiate Northern Land Council ("NLC") Production Agreement with Traditional Owners

POST FID

2024
1. Pilot project construction

2025
1. First gas sales
2. Planning to move to full development (200 TJ/d+ to East Coast then >1 PJ / day LNG export via Darwin)

9

Appendix 1: Empire is Working Sustainably to Develop the Beetaloo

Empire is responsibly developing its Beetaloo gas resources

- Empire's forecast Greenhouse Gas ("GHG") emissions have been independently reviewed based on recent appraisal results, planned field development assumptions and the ***National Greenhouse and Energy Reporting*** framework[1]
- Empire's Scope 1 emissions based on this analysis will include:
  - Fuel combustion e.g. gas for power, diesel use
  - Fugitive emissions associated with operations (aim to minimise)
- Empire estimates its **Scope 1 offsetting obligation is less than 5% of gross revenue** (at $10/GJ gas price) for Carpentaria's full field economic life at the Australian Government's carbon price cap ($75 per tonne indexed at 2% p.a. plus CPI). This obligation is **~2% of gross revenue at the current *Australian Carbon Credit Unit ("ACCU")* price**[1]
  - Empire has commenced engagement with ACCU supply counterparties
- **Carpentaria CO_2 reservoir levels are extremely low (less than 1%)**
- Empire maintains strong relationships with Traditional Owners ("TO") on whose land it operates with their full, informed and prior consent
  - ~30 on-county meetings held with TOs to date. NLC exploration payments paid for the benefit of TOs and thousands of hours of employment for TOs to date

11

1. Estimates have been independently reviewed by HRL Technology Group Pty Limited (https://www.hrlt.com.au)

Appendix 2: Beetaloo Horizontal Well Activity

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#	Well Name	Year	Operator	Average Depth of Horizontal (Below Ground)	Horizontal Length	Total Measured Depth (m)	Drilling Cost ($'M)	Fracture Stimulation Stages	Stimulated Length	Fracture Stimulation and Extend Production Testing Cost ($'M)	Total Cost ($'M)	IP (EPT 1)	IP30 (EPT 2)	CO2
1	Amungee-1H	2015/16	Origin Energy (now TBN)	~2,400m	1,100m	3,808m		11	~750m			IP(57) 1.11mmscf/d	N/A	3 to 4%
2	Tanumbrini-2H	2021/22	Santos	~3,450m	1,000m	4,598m		11	660m		Est. $37 to $40	IP(14) 2.0mmscf/d	2.1mmscf/d	3 to 4%
3	Tanumbrini-3H	2021/22	Santos	~3,3475m	1,000m	4,857m		10	600m		Est. $37 to $40	IP(10) 1.7mmscf/d	3.1mmscf/d	3 to 4%
	Carpentaria-2H	**2021/22**	**Empire**	**~1,620m**	**1,345m**	**3,150m**	**$11.1**	**21**	**927m**	**$13.0**	**$24.1**	**IP(30) 2.4mmscf/d**	**2.8mmscf/d**	**Sub 1%**
	Carpentaria-3H	**2022/23**	**Empire**	**~1,700m**	**2,632m**	**4,460m**	**$10.0**	**40**	**1,989m**	**$17.3**	**$27.3**	**IP(27) 2.6mmscf/d**	**3.3mmscf/d**	**Sub 1%**
4	Amungee-2H	2022/23	Tamboran	~2,400m	1,275m	3,883m	$14.1	25	1,020m	~$18	Est. $32 to $35	IP(50) 0.97mmscf/d	N/A	3 to 4%
	Shenandoah South-1H	2023 - Pending	Tamboran	Est. ~3,000m	Est. ~1,000m				Est. ~500m					

Sources:

1. Falcon Oil & Gas (TSXV: FO, AIM: FOG) release entitled:
   - "Amungee NW-1H – Normalised gas flow rate equivalent to 5 mmscf/d per 1,000m horizontal" dated 3 September 2021

2. Tamboran Resources (ASX: TBN) announcements entitled:
   - "Operational update: Approximately 17 per cent upward revision to Tanumbirini-2H and 3H flow test results" dated 21 March 2022
   - "Tanumbirini-2H and 3H 30-day normalised flow rates exceed estimated Beetaloo commerciality threshold" dated 5 September 2022
   - Total Cost calculated as EP161: Tanumbirini 2H & 3H wells total funds used to date ($18.5m) per Tamboran's Q1 2023 Quarterly Report multiplied by 4 (TBN holds a 25% interest in these wells)

3. Tamboran Resources (ASX: TBN) announcements entitled:
   - "Operational update: Approximately 17 per cent upward revision to Tanumbirini-2H and 3H flow test results" dated 21 March 2022
   - "Tanumbirini-2H and 3H 30-day normalised flow rates exceed estimated Beetaloo commerciality threshold" dated 5 September 2022
   - Total Cost calculated as EP161: Tanumbirini 2H & 3H wells total funds used to date ($18.5m) per Tamboran's Q1 2023 Quarterly Report multiplied by 4 (TBN holds a 25% interest in these wells)

4. Releases entitled:
   - Falcon Oil & Gas, "Amungee NW-2H Well Update" dated 22 June 2023
   - Falcon Oil & Gas, "Operational Update on Amungee NW-2H Drilling" dated 23 December 2022
   - Tamboran Resources, "EP98 Operational Update: Successful completion of 25-stage stimulation program at Amungee-2H" dated 22 March 2023

Disclaimer

EMPIRE Energy

This presentation has been prepared by Empire Energy Group Limited ("Empire" or the "Company"). The information in this presentation is information of a general nature and is subject to change without notice. The information in this presentation does not purport to be complete, nor does it contain all of the information which would be required in a prospectus prepared in accordance with the requirements of the Corporations Act 2001 (Cth). It contains information in a summary form only and should be read in conjunction with Empire's other periodic disclosure announcements to the ASX available at www.asx.com.au.

An investment in Empire shares is subject to known and unknown risks, many of which are beyond the ability of Empire to control or predict. These risks may include, for example, movements in oil and gas prices, a failure to acquire some or all of the targeted acreage, risks associated with the development and operation of the acreage, exchange rate fluctuations, an inability to obtain funding on acceptable terms or at all, loss of key personnel, an inability to obtain appropriate licences, permits and or/or other approvals, inaccuracies in resource estimates, share market risks and changes in general economic conditions. Such risks may affect actual and future results of Empire and its shares.

This presentation contains statements, opinions, projections, forecasts, and other material ("forward looking statements"). These statements can be identified by the use of words like 'anticipate', 'believe', 'intend', 'estimate', 'expect', 'may', 'plan', 'project', 'forecast', 'will', 'should', 'could', 'seek' and other similar expressions. Forward looking statements may be based on assumptions which may or may not prove to be correct. None of Empire, its respective officers, employees, agents, advisers or any other person named in this presentation makes any representation as to the accuracy or likelihood of fulfilment of the forward looking statements or any of the assumptions upon which they are based and disclaim any obligation or undertaking to revise any forward looking statement, whether as a result of new information, future event or otherwise.

Maps and diagrams contained in this presentation are provided to assist with the identification and description of Empire's lease holdings and Empire's intended targets and potential exploration areas within those leases. The maps and diagrams may not be drawn to scale and Empire's intended targets and exploration areas may change in the future.

All financial information is in Australian dollars unless stated otherwise.

The information contained in this presentation does not take into account the investment objectives, financial situation or particular needs of any recipient and is not financial product advice. Before making an investment decision, recipients of this presentation should consider their own needs and situation and, if necessary, seek independent professional advice.

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4.1.5 2023.09.21 & 2023.09.25 | Nurrdalinji Invitation to Senior Leaders Katherine Gathering

From [redacted]
Sent: Thursday, 21 September 2023 4:47 PM
To: [redacted]
Subject: Invitation to Katherine Oct 7-8 Senior Leaders Meeting - Beetaloo Basin

[redacted]

Please find an invitation attached from the Deputy Chair of Nurrdalinji Aboriginal Corporation.

Thank you,

[redacted]
Nurrdalinji Native Title Aboriginal Corporation

IMPERIAL OIL & GAS

Nurrdalinji Native Title Aboriginal Corporation
ABN: 32 608 508 769
ICN: 9392

21 September 2023

[redacted]
Empire Energy
Level 5, 6-10 O'Connell Street
Sydney NSW 2000

[redacted]

Invitation to Beetaloo Basin Senior Leaders Gathering, Katherine, 7-8 October 2023

As you may know, Nurrdalinji Native Title Aboriginal Corporation (Nurrdalinji) was established by native title holders of the Beetaloo Sub-basin/ Barkly regions, and was registered with ORIC on 9 October 2020. Our name "Nurrdalinji" is an Alawa language word meaning "mixed tribe", which reflects the fact that our membership is drawn from a wide area and several different language groups.

Nurrdalinji is an important vehicle for us to express our concerns and to protect the interests of our members and native title holders in the Beetaloo Sub-basin/ Barkly region. We formed Nurrdalinji to act as a clear and faithful voice for native title holders frustrated by the quality and adequacy of the Northern Land Council's (NLC) advice and representation of our interests, most recently in relation to fracking on our country.

The Board of Directors of Nurrdalinji would like to invite you or your representative/s to join us for a meeting we are holding on Saturday 7 and Sunday 8 October 2023 at [redacted] in Katherine.

Nurrdalinji Directors, members and other senior leaders are coming together over two days to discuss protecting Country, water and sacred sites, with special attention to the move to secure production agreements for fracking on our country.

We are concerned that people do not yet have enough information to make informed decisions about this significant development on their country. We know that in our communities there is confusion about what development is actually coming, when, its scale and likely impacts.

We are therefore inviting you to explain to Traditional Custodians the expected process and timelines and development you plan for our country, including pipeline plans, as well as answer questions of participants.

As you may know, we have long called for a regional summit to ensure Traditional Custodians come together as a group across the region so we can collectively understand and discuss all of the information. As there has been no move to date from the NLC to convene such a meeting, we are moving ahead ourselves.

We hope you can join us. Please let us know if you would be willing to take part, either in person or by zoom link.

Kind regards,

[redacted]
Deputy Chairperson, Nurrdalinji

[redacted]

From: [redacted]
To:
Subject: [redacted] re Oct 7-8 Senior Leaders Meeting - Beetaloo Basin
Date: Monday, 25 September 2023 8:39:57 AM
Attachments: image001.png

[redacted]

Thank you for your correspondence received on 21 September 2023, inviting Imperial Oil & Gas representatives to meet with attendees at your upcoming forum on 7-8 October 2023 being held in Katherine. Unfortunately, Imperial representatives will not be available to meet in person on these dates, however we are pleased to accept your invitation to attend by Zoom.

Can you please advise an appropriate time and we will coordinate availability for consultation to discuss appropriate information and answer questions from your attendees? I imagine that 1 hour would be sufficient to cover the material but please advise if your view differs.

If there are any specific matters for consideration, please let me know so that we can maximise the value of the session for all attendees.

Kind Regards,

[redacted]

Head Office:
Level 5, 6 O'Connell Street Sydney NSW 2000
Phone: (02) 9251 1846
www.imperialenergygroup.net

4.1.6 2023.10.25 | Request for Further Information

From: [redacted]
To:
Cc:
Subject: [redacted] - NLC to Imperial Oil and Gas - [redacted]
Date: Wednesday, 25 October 2023 7:35:07 PM
Attachments: 231025 - Letter NLC to Imperial Oil and Gas.pdf

[redacted]

Please find a letter **attached** for your consideration.

Regards

[redacted]

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NORTHERN
LAND COUNCIL

25 October 2023 [redacted]

[redacted]

By email [redacted]

[redacted]

[redacted]

EP187 – PRODUCTION, RECOVERY OF PETROLEUM ON AN APPRAISAL BASIS AND WORK PROGRAM

1. I refer to the email from [redacted] Project Manager, inGauge Energy Pty Ltd on behalf of Imperial Oil and Gas (**Imperial**), to [redacted] NLC Senior Project Officer on 13 October 2024 which attached the document entitled 'Work Program Imperial O&G 2024-2029 EP187 Work Program NT Exploration Permit (EP) 187' (the **Exploration Work Program**).

Background

2. Since 2021, the NLC has been in dialogue with Imperial in relation to Imperial's intention to instigate shale gas production development negotiations with the NLC under section 46 of the *Aboriginal Land Rights (Northern Territory) Act 1976* (NT) (the **Land Rights Act**), which Imperial has yet to progress.

3. By letter to the NLC dated 21 February 2023, Imperial stated that "Upon review, Imperial has determined not to seek to recover petroleum on an appraisal basis under EP 187 at this stage." To date, the NLC has not received any advice from Imperial to the contrary.

4. In April and May 2023, at the request of Imperial, the NLC commenced preliminary consultations with certain of the traditional Aboriginal owners for the area of EP187 in connection with Imperial's shale gas production development aspirations. In August 2023, again at Imperial's request, the NLC facilitated four on-country presentations by

Imperial to certain traditional Aboriginal owners about what shale gas production development might entail on EP187.

5. Imperial recently applied to the Northern Territory Government Aboriginal Areas Protection Authority for an authority certificate for exploration and production works including the construction and operation of up to 100 well pads, apparently in furtherance of Imperial's stated aspirations to progress shale gas production development on EP187.

Exploration Work Program

6. Certain activities referred to in the Exploration Work Program may not clearly constitute exploration activities for the purpose of the Exploration Deed between Imperial and the NLC, dated 5 February 2014. In particular, the activities include: the establishment of a compressor station, solar farm, gathering pipelines and export lines apparently in connection with 'appraisal production infrastructure' as defined in the *Petroleum Act 1984* (NT) (the **Act**) (the **Proposed Activities**).

7. To date neither the NLC nor the traditional Aboriginal owners have been consulted about, and have not provided approval, consent or agreement under the Land Rights Act or otherwise to, the sale or other beneficial use of petroleum recovered on an appraisal basis. I expressly reserve my client's rights to refuse to provide such approval, consent or agreement.

8. In light of the circumstances above, I seek your clarification of the following matters so that I can better assess and advise my client on the legal considerations that arise.

9. Please advise:

   a) whether you intend to apply for Ministerial approval to recover petroleum on an appraisal basis under EP187?

   b) if you intend to apply for Ministerial approval to recover petroleum on an appraisal basis under EP187:
      i. how do you consider you would satisfy the requirements of sub section 57AAA(5)(d) of the Act?
      ii. what are the boundaries of the area in which you intend to recover petroleum on an appraisal basis within EP187?
      iii. what are your estimated profits from the sale of appraisal gas?
      iv what is your estimated expenditure on activities relating to the recovery of petroleum on an appraisal basis?

   c) do you intend to apply for a production licence?

   d) if you have undertaken an environmental assessment and, if so, do you have a draft Environmental Management Plan for the Proposed Activities set out in the Exploration Work Program?

e) what are your proposals for rehabilitation of the land and waters affected by the Proposed Activities and do you have a draft rehabilitation plan?

f) what are your proposals for assessing and minimising any negative social impacts caused by the Proposed Activities?

g) what are your proposals for employment opportunities for traditional Aboriginal owners and other local Aboriginal people as a result of the Proposed Activities?

h) what are your proposals for business/contracting opportunities for Aboriginal-owned entities or entities established by the traditional Aboriginal owners as a result of the Proposed Activities?

I also invite Imperial to provide as much detail and information as possible regarding the activities it proposes to undertake on or in the vicinity of EP187 in the period addressed by the Exploration Work Program (i.e. 2024-2029) to assist my client's understanding of Imperial's overall operations, proposed activities and impacts on EP187.

10. I remind Imperial of its obligation in clause 10.1 of the Exploration Deed, in relation to the provision of information.

Exploration Work Program Meeting

11. The purpose of the Exploration Work Program meeting proposed for the week beginning 20 November 2023 is for Imperial to explain its proposed exploration activities in the area of EP187 to the traditional Aboriginal owners of the land and waters within the area affected by those activities, and give the traditional Aboriginal owners an opportunity to ask questions about and comment on those activities.

12. We require the information requested at paragraph 9 above by Wednesday 1 November 2023, to be in a position to consult with traditional Aboriginal owners in relation to the Proposed Activities at the Exploration Work Program meeting.

13. If Imperial cannot comply with this request, I ask that you amend the Exploration Work Program by Wednesday 1 November 2023 to:

a) remove all references to the Proposed Activities in connection with 'appraisal production infrastructure'

b) provide an updated Table 6 'Estimated Maximum Number of People Likely to be on the site for Facilities Establishment in 2024' and Table 7 'Estimated Field Development and Field Operations Workforce' to ensure it complies with your obligation in clauses 6.1, 6.3, 6.4 and 6.7 of the Exploration Deed.

14. In either case, I ask that by Wednesday 1 November 2023, you:

a) amend the Exploration Work Program to:

i. clarify the activities you intend to conduct in the next 12 months

ii. provide details of the likely Environmental Impact of any activity and any proposals to minimise such impact in accordance with clause 13 of the Exploration Deed

iii. identify any proposed contractors or subcontractors engaged or likely to be engaged in accordance with clauses 6 and 13 of the Exploration Deed

iv. provide Appendices 01 and 02 referred to on page 4.

b) clarify if you propose to undertake any other Reconnaissance Activities and if yes, amend the Exploration Work Program to provide information which includes the nature, scope and objectives of these in accordance with clause 13 of the Exploration Deed.

c) confirm whether the archaeological survey you refer to on page 6 of the Exploration Work Program is the survey to be undertaken on 24-28th of October 2023 or another survey. If the latter, please amend the Exploration Work Program to provide details of the survey.

15. As advised on previous occasions, the NLC cannot guarantee that it will be able to hold the Exploration Work Program meeting in the week beginning 20 November 2023, considering Imperial's changing priorities, the ongoing constraints on our resources and competing demands.

Next steps

16. I look forward to speaking with Imperial's officers and lawyer at our meeting tomorrow, and receiving responses to the specific questions stated above.

17. If you have any questions about this letter please contact me on the details below.

Yours sincerely

[redacted]

4.1.7 2023.11.01 | Imperial's Response

From: [redacted]
To:
Cc:
Subject: Imperial EP187 Carpentaria Pilot Project - Response to NLC
Date: Wednesday, 1 November 2023 3:36:00 PM
Attachments: image001.png
1. Imperial Ltr to NLC - EP187 Carpentaria Pilot Project.pdf

[redacted]

Please find attached correspondence in response to you letter received on 25 October 2023. The letter attached is supported by additional documents which are large files and can be accessed via Dropbox link here

The drop box contains all relevant files including:

1. Imperial Ltr to NLC (as attached)
2. Appendix 1 – Area of Carpentaria Project
3. Appendix 2 – Estimates – Revenue
4. Appendix 3 – Estimates – Costs
5. Revised EP187 2024-2028 Exploration Work Program (EWP)
6. EWP Appendix 01 – Work Methods for Project Activities
7. EWP Appendix 02 – Shapefiles for EWP Activities

Can you please confirm via email you are able to access the files to download on your end?

We look forward to working with NLC through this process and continued engagement with traditional Aboriginal owners. If you have any questions, please do not hesitate to contact me.

[redacted]

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1 November 2023

[redacted]

[redacted]

[redacted]

RE: Carpentaria Pilot Project

I refer to your letter to Imperial dated 25 October 2023 and the subsequent meeting between NLC and Imperial representatives on 26 October 2023.

Exploration Work Program

In response to the questions contained in item 9 of your letter, Imperial confirms and advises:

a) Imperial intends to apply for Ministerial approval to recover petroleum on an appraisal basis in relation to a part of EP 187 (**Carpentaria Pilot Project**).

b) Given that Imperial intends to apply for Ministerial approval for the Carpentaria Pilot Project:

i. Imperial considers Imperial would satisfy the requirements of section 57AAA(5)(d) of the *Petroleum Act* (NT) if Imperial obtained the free, prior and informed consent of relevant traditional Aboriginal owners and entered into a variation to the existing Exploration Deed in relation to EP 187 with the NLC to record the terms and conditions on which any such consent to the Carpentaria Pilot Project was provided.

ii. Imperial intends to undertake the Carpentaria Pilot Project on that part of EP187 shown in Figure 2 of the Exploration Work Program already submitted to the NLC, a copy of which area is attached as Annexure 1.

iii. Imperial forecasts the:

A. revenue;

B. royalties to traditional Aboriginal owners [redacted]

C. royalties to the Territory under the *Petroleum Royalty Act* (NT);

D. Aboriginal Benefits Account distributions to royalty associations related to traditional Aboriginal owners; and

E. profits;

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of the Carpentaria Pilot Project as set out in Annexure 2. Imperial provides no warranty as to the accuracy of the forecasts provided. The forecasts are subject to variables and actual amounts which are not in the control of Imperial and which are not certain at this stage. There may be material changes to the forecasts provided. The forecasts are confidential and are provided subject to the confidentiality provisions of the Exploration Deed.

iv. Imperial forecasts the expenditure on the Carpentaria Pilot Project as set out in Annexure 3. Not all of the forecast expenditure will meet the definition of Exploration Costs as defined in the Exploration Deed. Imperial provides no warranty as to the accuracy of the forecasts provided. The forecasts are subject to variables and actual amounts which are not in the control of Imperial and which are not certain at this stage. There may be material changes to the forecasts provided. The forecasts are confidential and are provided subject to the confidentiality provisions of the Exploration Deed.

c) Imperial intends to apply for a production licence in relation to the area of the Carpentaria Pilot Project when Imperial believes extended well testing has determined that the shale gas reservoir within the area of the Carpentaria Pilot Project is commercially exploitable and Imperial can otherwise meet the requirements of the Petroleum Act for the application and grant of a production licence.

d) Imperial is working on the preparation of the Environment Management Plan (**EMP**) for the Carpentaria Pilot Project. Imperial expects to provide draft sections of the EMP as available to the NLC in mid-November 2023 before the Exploration Work Program meeting, noting this will be an early draft of the EMP, therefore not a complete document and some sections will still have placeholders. The completed EMP will be provided to the NLC 20 days before lodgment, in line with the requirements of the Exploration Deed.

e) Imperial's proposals for the rehabilitation of the Carpentaria Pilot Project are set out in the revised Exploration Work Program provided to the NLC. Imperial has a draft rehabilitation plan for the Carpentaria Pilot Project, and this draft rehabilitation plan will be included in the draft EMP to be provided to the NLC, as referred to above.

f) Imperial is commencing the process of assessing and developing proposals to minimise any negative social impacts caused by the Carpentaria Pilot Project. Social impact assessment and plans for minimising negative impacts will be included in the EMP as such assessment and plans develop with engagement with traditional Aboriginal owners, the NLC and the community generally.

g) The transition from relatively short-term exploration programs to a relatively longer-term Carpentaria Pilot Project will increase the potential for employment opportunities for traditional Aboriginal owners and other local Aboriginal people. Imperial will present further information on proposals for employment at the Exploration Work Program meeting.

h) The transition from relatively short-term exploration programs to a relatively longer-term Carpentaria Pilot Project will increase the potential for business and contracting opportunities for Aboriginal owned entities and entities established by traditional Aboriginal owners. Imperial will present further information on business and contracting opportunities at the Exploration Work Program meeting.

Exploration Work Program Meeting

As requested:

a) Imperial provides in Annexure A an amended Exploration Work Program, which:

i. clarifies the activities Imperial intends to conduct as part of the Carpentaria Pilot Project;

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iii. provides details of the likely environmental impact of the Carpentaria Pilot Project and proposals to minimise such impacts in accordance with clause 13 of the Exploration Deed;

iii. does not yet identify the proposed contractors or subcontractors engaged or likely to be engaged in the Carpentaria Pilot Project (in accordance with clauses 6 and 13 of the Exploration Deed) because, as stated in the Exploration Work Program, Imperial is still in the procurement phase; and

iv. includes Appendices 01 and 02 referred to on page 4 of the Exploration Work Program;

b) Imperial clarifies that it does not propose to undertake any Reconnaissance Activities (as that term is defined in the Exploration Deed) except as provided for as part of the Carpentaria Pilot Project; and

c) Imperial clarifies that the archaeological survey referred to on page 6 of the Exploration Work Program is the survey to be undertaken starting on the 24th of October, 2023.

Development of the Carpentaria Pilot Project

Imperial intends to apply for a production licence when it is in a position to do so. Analysis of exploration results to date have indicated that to establish a commercially viable resource in the area of the Carpentaria Pilot Project multiple wells are required to be drilled and hydraulically fracture stimulated over a period of up to 5 years. The gas produced from such wells would, in the ordinary course of events, be either flared or vented. In either case, greenhouse gasses are emitted directly into the atmosphere, and a part of the finite gas resource is lost without any return to the Territory, traditional Aboriginal owners or Imperial.

Imperial asserts that a better solution to direct greenhouse gas emissions and the waste of a finite resource is to sell any gas produced from extended well testing. Sales of produced gas will result in:

1) minimal flaring or venting wasting the gas resource;

2) less direct greenhouse gas emissions;

3) benefits for businesses and consumers who purchase the gas or electricity generated by the gas;

4) payments to traditional Aboriginal owners by Imperial under the Exploration Deed, with Imperial proposing to make further payments to traditional Aboriginal owners if the royalties on gas provided for in the Production Principles of the Exploration Deed would exceed the payments on Exploration Costs over the life of the Carpentaria Pilot Project;

5) the payment of royalties to the Territory by Imperial;

6) royalty equivalent payments by the Commonwealth to the Aboriginal Benefits Account and the consequent distribution of one-third to royalty associations related to traditional Aboriginal owners affected by the Carpentaria Pilot Project; and

7) a return of some funds to Imperial to assist in offsetting the costs of extended well testing and seeking to establish commercial viability.

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The timing of the Carpentaria Pilot Project is important. Given current gas market conditions and likely financing requirements, Imperial is looking to have all approvals and consents in place in the first quarter of 2024 to allow the commencement of the 2024 Work Program.

If you have any queries, please contact me. Imperial looks forward to working with the NLC and engaging with traditional Aboriginal owners on the opportunity being proposed.

[redacted]

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Appendix 1 – Area of Carpentaria Pilot Project

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[redacted]

4.1.8 2023.11.20 | OCM Presentation Slide Pack (December)

From: [redacted]
To:
Cc:
Subject: EP187 - AWP and On Country Meeting Slides
Date: Monday, 20 November 2023 12:59:00 PM
Attachments: image001.png
231311 OCM slide pack - November 2023 - Final.pdf

[redacted]

As discussed, attached are the slides we have prepared for the EP187 Annual Work Program Meeting for your information.

If you have any questions, please don't hesitate to contact me.

[redacted] nd I are on the road this week so will call you back ASAP if I miss you.

[redacted]

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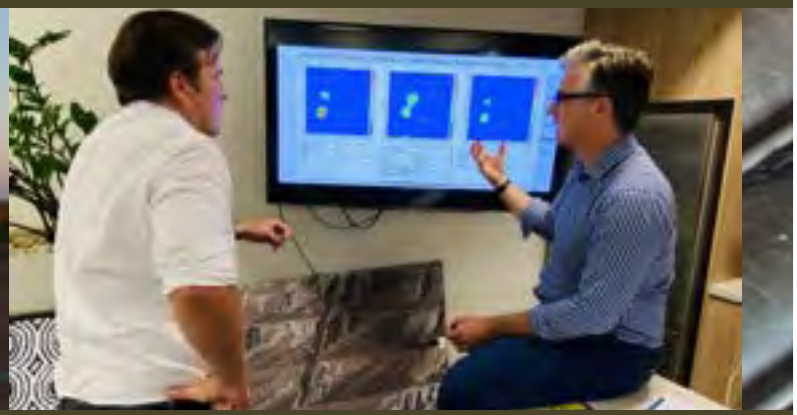
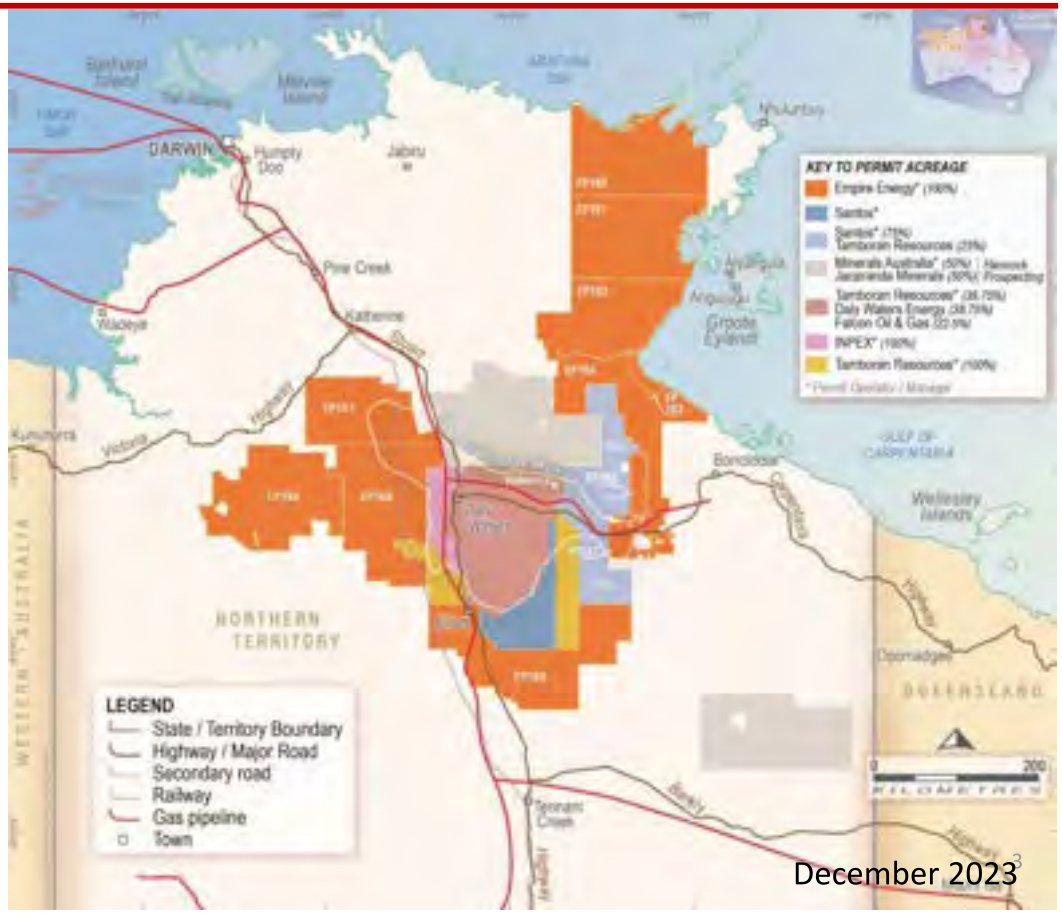
Imperial Oil & Gas – EP187



EP187 Carpentaria Pilot Project - Appraisal Activities – December 2023

Who is Imperial Oil and Gas

- Imperial Oil & Gas Pty Ltd and Imperial Oil & Gas A Pty Ltd are wholly owned by Empire Energy Group Limited
- Empire Energy Group Limited is an oil and gas company listed on the Australian Securities Exchange (ASX:EEG)
- Imperial has been working in the NT for over 10 years, holding Exploration Permits (EPs) 184, 187 and applications for EPs 180, 181, 182, 183, 188
- In 2021 Imperial Oil & Gas A acquired Eps 167, 168, 169 and 198 from Pangaea and EMG
- Empire Energy has worked hard to build a positive and long-lasting understanding with the local communities



On-ground activities so far in EP187

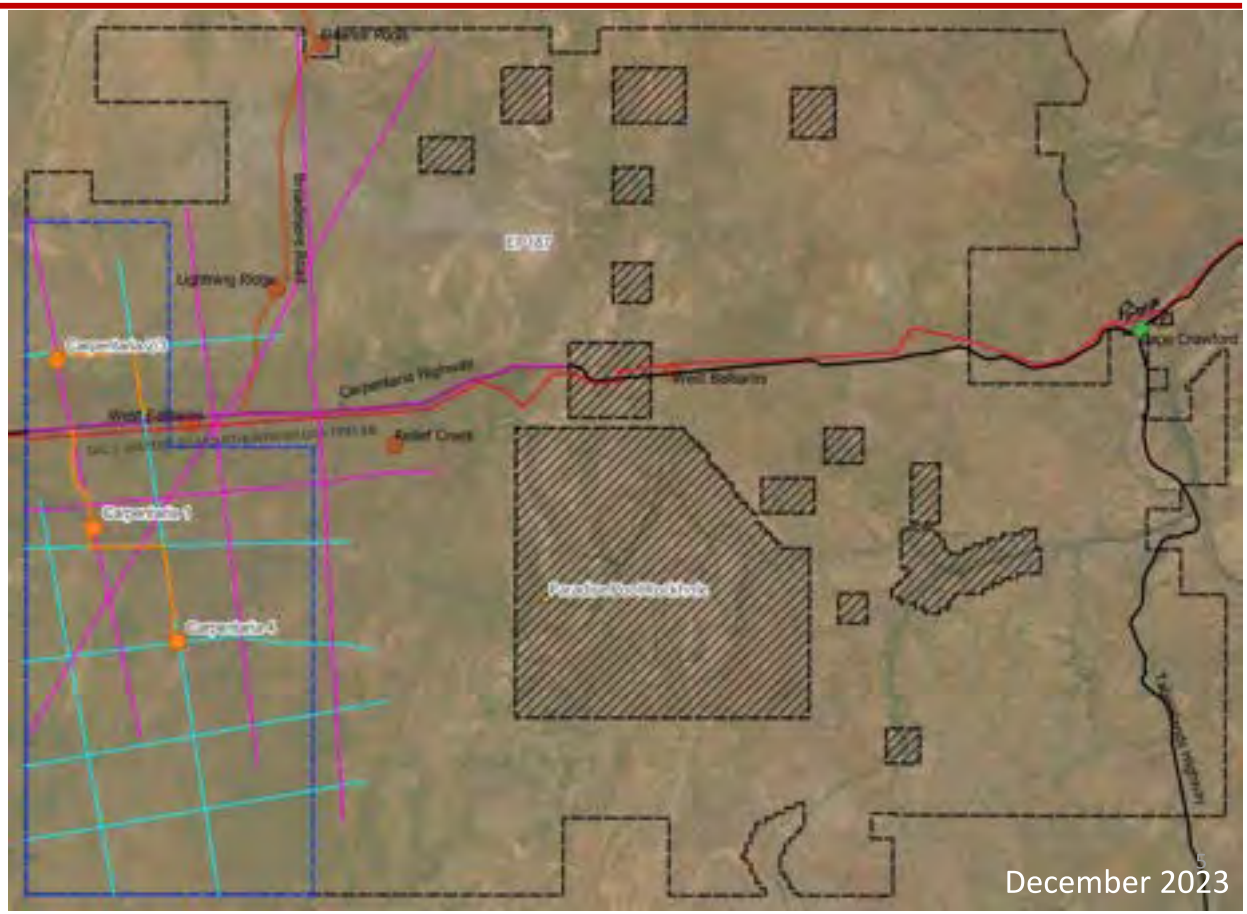
2019
- 231km 2D seismic (pink)

2020
- Drilled Carpentaria 1 well

2021
- 165km 2D seismic (light blue)
- Hydraulic Fracture (HF) of Carpentaria-1
- Prod Test of Carpentaria-1
- Drilled Carpentaria-2V/2H

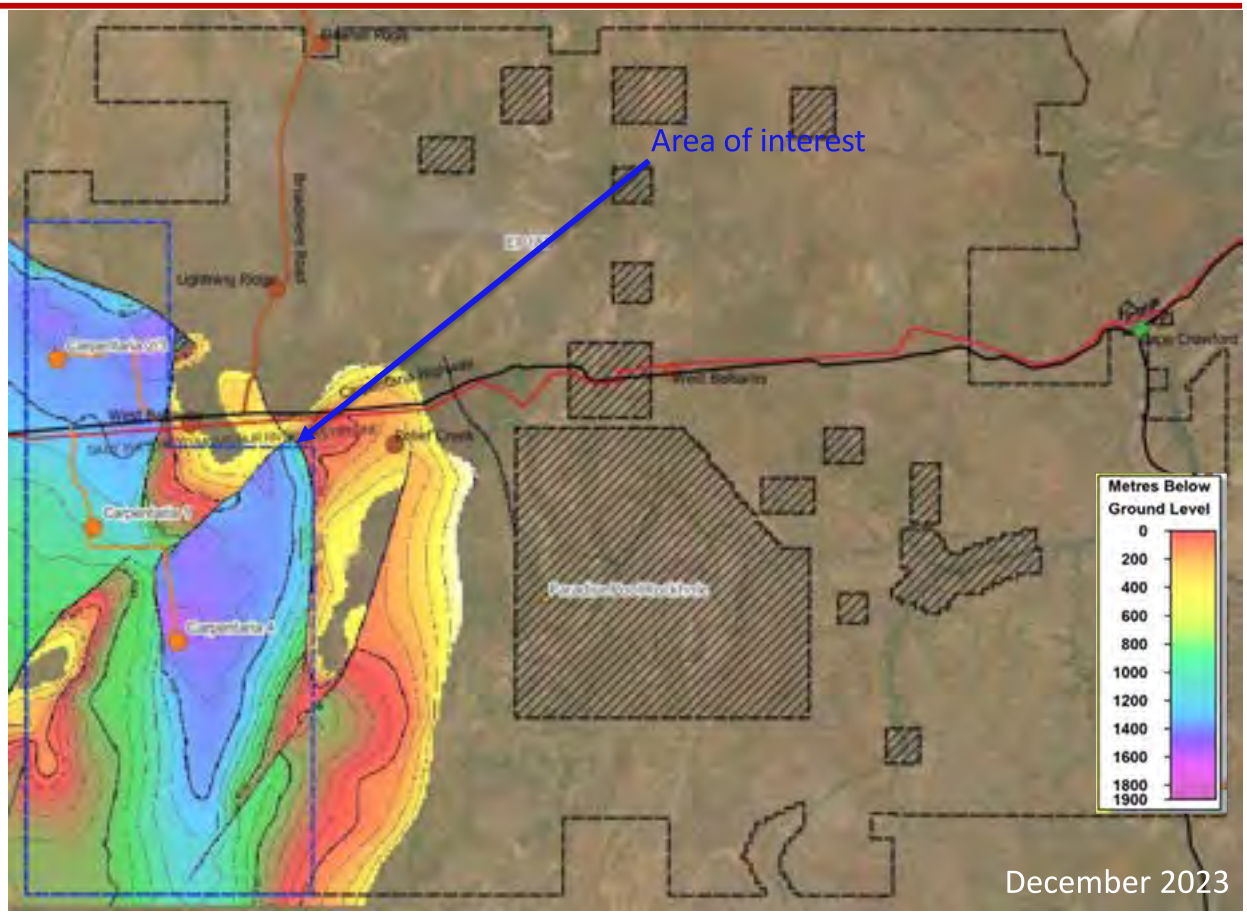
2022
- HF of Carpentaria-2H
- Prod Test of Carpentaria-2H
- Drilled Carpentaria-3/3H
- HF of Carpentaria-3H
- Drilled Carpentaria-4

So far in 2023
- Prod Test of Carpentaria-2H & 3H



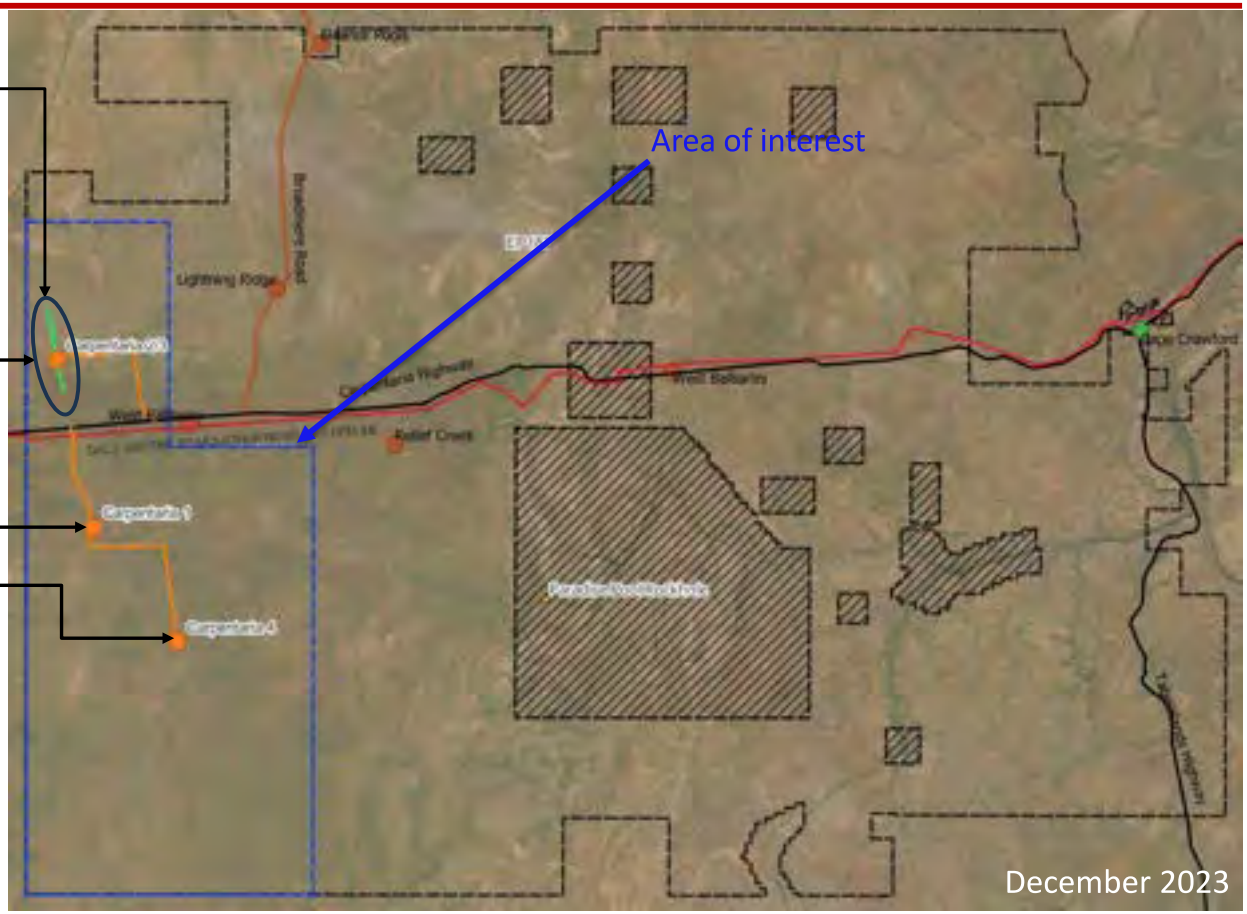
EP187 – What have we learnt & next steps

- From the short -90-130 day EPT results so far we believe the Area of interest is potentially commercially viable for gas production
- Longer-term appraisal testing of more wells is needed to understand whether the project is commercially viable
- A multi-year appraisal program has been developed to allow Imperial to consult on the entire program rather than one year at a time; the following slides cover the complete planned appraisal program



Appraisal: why do we need to test more wells?

- Carpentaria-3H has allowed us to do a ~90-day EPT north of the Carpentaria 2/3 wellpad
- Carpentaria-2H has allowed us to do a ~130-day EPT south of the Carpentaria 2/3 wellpad
- Carpentaria-1 is currently a vertical well, only testing directly below the Carpentaria-1 wellpad
- Carpentaria-4 has not been tested
- To understand whether the project is commercially exploitable, we need to test more wells over the area of interest



Appraisal: why do we need longer tests?

- We have done ~90 to 120-day Extended Production Tests so far, so we only have the information in the dashed area

- To understand whether the project is commercially exploitable, we need to test the wells much longer

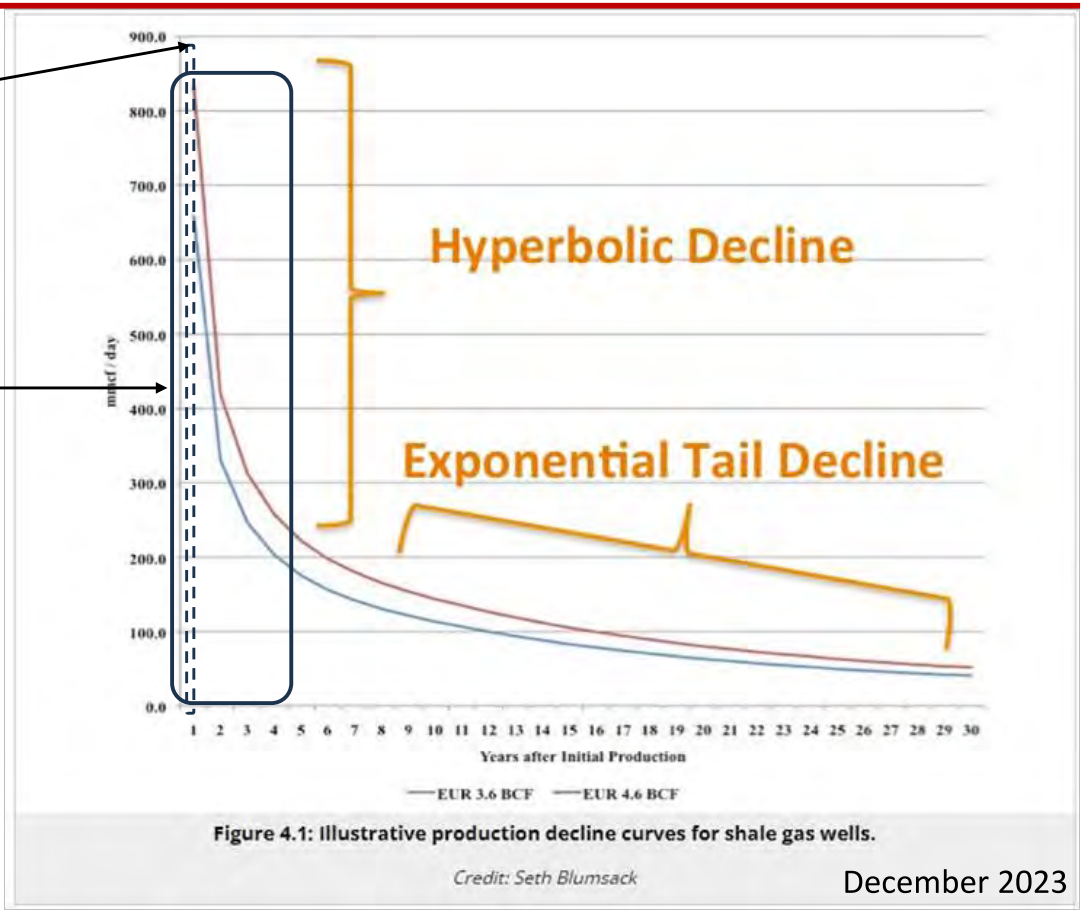


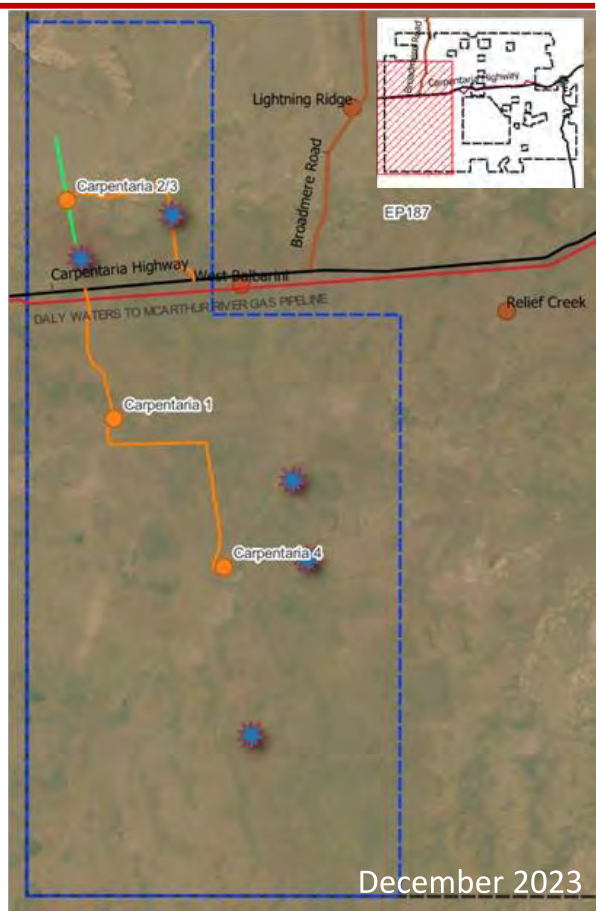
Figure 4.1: Illustrative production decline curves for shale gas wells.

Credit: Seth Blumsack

December 2023

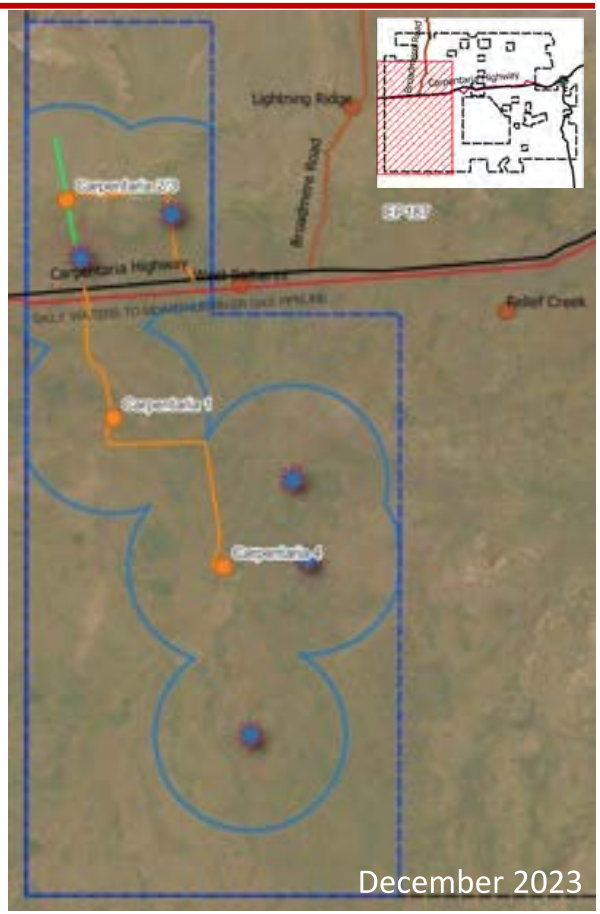
Appraisal – Planned Wellpads

- Up to 4 new wellpads
  - 5 possible locations shown with blue/red stars
- Possible use of the existing Carpentaria-1 wellpad
  - No extension of the wellpad
- Possible use of the existing Carpentaria-2/3 wellpad
  - An extension of the wellpad may be needed
- Possible use of the existing Carpentaria-4 wellpad
  - An extension of the wellpad will likely be needed
- Cultural Managers will be on-site during all first disturbance works



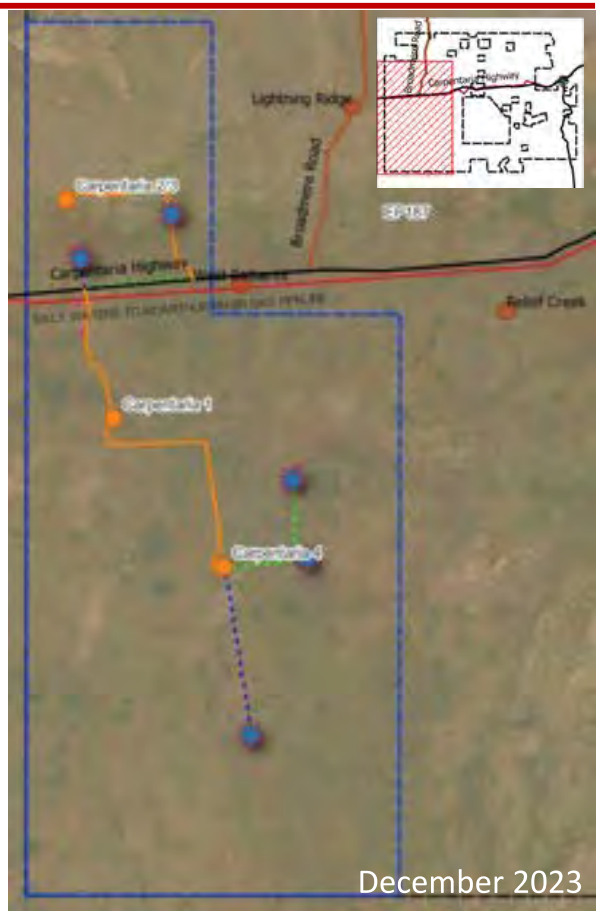
Appraisal – Planned Wells

- Up to 10 new horizontal wells in the regions shown in the blue outline
- The new horizontal wells may be drilled from:
  - The four new wellpads
  - The existing Carpentaria-1 wellpad
  - The existing Carpentaria-2/3 wellpad
  - The existing Carpentaria-4 wellpad
- The new horizontal wells will be:
  - Up to 3km of horizontal in seam lateral length
  - Hydraulically Fractured
  - Appraisal texted
- Existing wells from previous work programs will also be appraisal tested



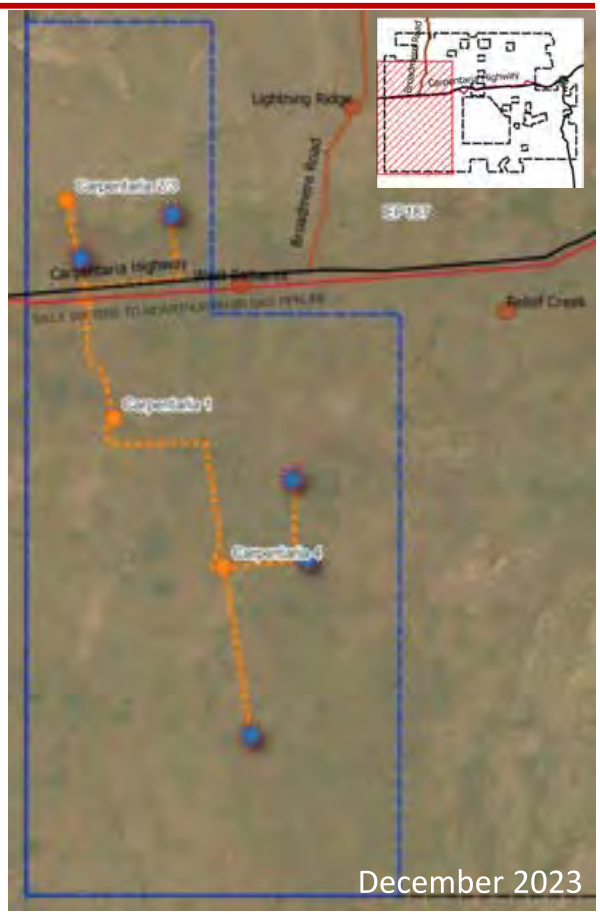
Appraisal – Planned Access

- Existing access tracks to be used
  - Shown in solid orange
- Proposed new access tracks to be constructed as needed
  - Up to 40km of new access tracks required
- Use existing landowner access tracks where practicable
  - Shown as dashed green lines
  - Likely need widening
- Use existing seismic alignments where practicable
  - Shown as dashed blue lines
  - Will need re-clearing as they have been rehabilitated
  - Will need straightening as seismic clearing went around trees where practicable
- Cultural Managers will be on-site during all first disturbance works



Appraisal – Planned Wastewater Flowlines

- Water/Wastewater flowlines will be used to transfer water/ wastewater between:
  - Wellpads
  - Wastewater Treatment Facilities
- Flowlines will be buried for added protection
- Flowlines will follow access tracks where practicable to:
  - Reduce the amount of clearing required
  - Allow easy access for inspection and maintenance
- Up to 70km of wastewater flowlines are required
- Indicative proposed flowline alignments are shown in dashed orange
- Cultural Managers will be on-site during all first disturbance works



Appraisal – Facilities

- If the appraisal program is carried out by sending gas to flare, the facilities will include:
  - Water/wastewater facility
  - Workshop, warehouse and laydown area
  - Camp and office

- Facilities will be near the Carpentaria-1 access, south of the Carpentaria Highway

- Cultural Managers will be on site during the first disturbance works

Appraisal – The sale of appraisal gas

- Flaring (burning) gas from extended well testing increases greenhouse gas emissions and wastes the gas
- The Petroleum Act allows Imperial to sell the gas from extended well testing, rather than flaring the gas, if Imperial obtains the agreement of traditional Aboriginal owners and the Minister responsible for the Petroleum Act
- **Imperial is not seeking agreement today**, Imperial only wishes to provide information about the options, advantages and consequences of selling the extended well testing gas rather than flaring it
- The following slides explain what will be different if the gas from extended well testing sold rather than flared

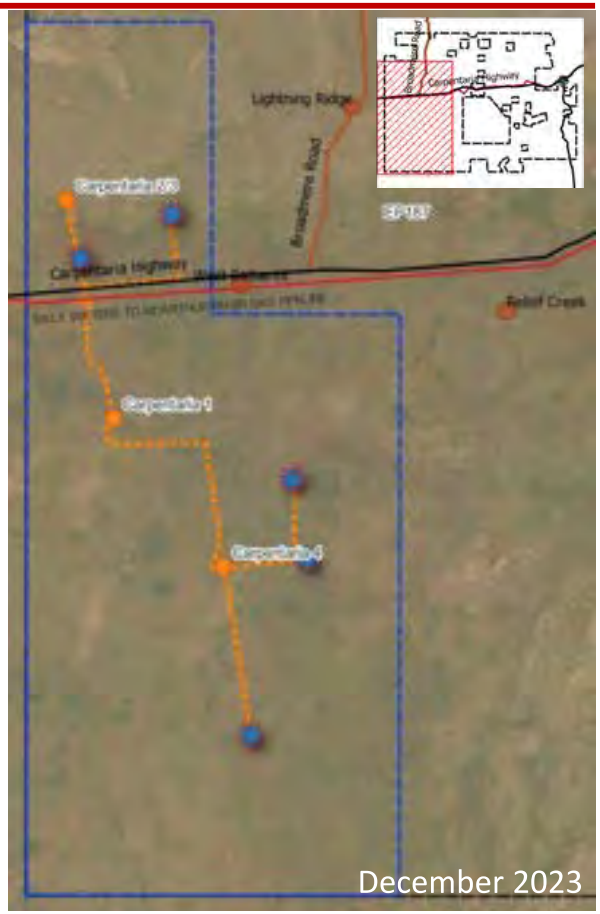
December 2023

Appraisal – Compressor station

- If the sale of appraisal gas is agreed and approved, a compressor station will be constructed, as well as the other facilities
- The compressor station will compress, condition and dry the gas to go into the sales gas pipeline and operate 24 hours per day, seven days per week
- A short high-pressure pipeline will go from the compressor station to the Daly Waters to McArthur River gas pipeline
- Cultural Managers will be on site during all first disturbance works

Appraisal – Planned Gas Flowlines

- If the sale of appraisal gas is agreed and approved, gas flowlines will be constructed
- Gas flowlines will take gas from the wellpads to the compressor station
- Flowlines will be in the same trench as water flowlines, so they will not require any further land disturbance
- Up to 70km of gas flowlines are required
- Indicative proposed flowline alignments are shown in dashed orange
- Cultural Managers will be on-site during all first disturbance works



Appraisal – Activities overview

The activities marked in the "BUA agreed" column will be carried out if the recovery of gas on an appraisal basis and sell it can be agreed between the traditional Aboriginal owners, Imperial, the NLC and the NT Minister responsible for the Petroleum Act.

Activity 2024-2029	BUA not agreed	BUA agreed
Construction of up to 4 Wellpads	✓	✓
Construction of up to 40km of access tracks	✓	✓
Construction of up to 70km of water/wastewater flowlines	✓	✓
Construction of up to 70km of gas-gathering flowlines generally in the same trench as water/wastewater flowlines		✓
Drilling of up to 10 new wells	✓	✓
Hydraulic Fracture of up to 10 new wells	✓	✓
Construction of wellpad facilities on up to 6 wellpads	✓	✓
Operation of up to 6 wellpads	✓	✓
Construction of a Water/wastewater facility	✓	✓
Handling, storage, treatment and re-use of Flowback water and Produced formation water	✓	✓
Drilling of up to 40 new water bores	✓	✓
Construction of a compressor station		✓
Operation of a compressor station		✓
Negotiation of Pipeline easement	✓	✓
Construction of a sales gas pipeline		✓
Clean up flaring of ~30 days per well of up to 10 new wells	✓	✓
Extended Production Testing with flaring for >365 days per well of up to 10 new wells	✓	
Extended Production Testing with flaring for >365 days per well of up to 2 existing wells	✓	
Construction of an operations camp	✓	✓
Operation of an operations camp	✓	✓
Continued use of works carried out under previous Work Programs	✓	✓
Payment from the sale of appraisal gas		✓

December 2023

Appraisal – The sale of appraisal gas

- The main differences if Imperial and the relevant traditional Aboriginal owners reach an agreement to recover gas on an appraisal basis and sell it, and the Minister approves it, are:
  - Gas wells will not be flared for long durations
  - A low-pressure gas gathering network will be constructed with no extra ground disturbance
  - A compressor station and high-pressure pipeline will be constructed and operated 24 hours a day, seven days a week
  - There will be more opportunities for employment and contracting
  - Payments from the sale of appraisal gas may be several millions of dollars

- **Imperial is not seeking agreement today**, Imperial only wishes to provide information about the options, advantages and consequences of selling the extended well testing gas rather than flaring it

December 2023

Appraisal – Land clearing

The activities marked in the "BUA agreed" column will be carried out if the recovery of gas on an appraisal basis and sell it can be agreed between the traditional Aboriginal owners, Imperial, the NLC and the NT Minister responsible for the Petroleum Act.

Land Clearing 2024-2029 (hectares)	BUA not agreed	BUA agreed
Construction of up to 4 wellpads	up to 50 hectares	up to 50 hectares
Construction of up to 40km of access tracks	up to 35 hectares	up to 35 hectares
Construction of up to 70km of water/wastewater flowlines	up to 70 hectares	up to 70 hectares
Construction of up to 70km of gas-gathering flowlines		No extra clearing required
Construction of a Water/wastewater facility	Up to 11 hectares	Up to 11 hectares
Construction of a compressor station		Up to 6 hectares
Construction of a sales gas pipeline		Up to 1 hectares
Construction of gravel pits	up to 50 hectares	up to 50 hectares
Total	**up to 216 hectares (up to 1km by 2.16km if it was all in the one area)**	**up to 222 hectares (up to 1km by 2.22km if it was all in the one area)**

December 2023

Appraisal – Groundwater use

The activities marked in the "BUA agreed" column will be carried out if the recovery of gas on an appraisal basis and sell it can be agreed between the traditional Aboriginal owners, Imperial, the NLC and the NT Minister responsible for the Petroleum Act.

Water use 2024-2029 (megalitres)	BUA not agreed	BUA agreed
Construction of up to 4 wellpads	~10 megalitres	~10 megalitres
Construction of up to 40km of access tracks	~20 megalitres	~20 megalitres
Construction of up to 70km of water/wastewater flowlines	No water required	No water required
Construction of up to 70km of gas-gathering flowlines		No extra clearing required
Construction of a Water/wastewater facility	~1 Megaliter	~1 Megaliter
Construction of a compressor station		~2 megalitres
Construction of a sales gas pipeline		No water required
Construction of gravel pits	No water required	No water required
Drilling of up to 10 new wells	~20 megalitres	~20 megalitres
Hydraulic Fracture of up to 10 new wells	~800 megalitres (Note 1)	~800 megalitres (Note 1)
Maintenance of access tracks, etc over 5 years	~50 megalitres	~50 megalitres
Operation of a compressor station		No water required
Total	**~901 megalitres (Note 2)**	**~903 megalitres (Note 3)**

Note 1: Imperial expects to re-use ~40% of wastewater for hydraulic fracturing, which would reduce this volume to ~460 megalitres

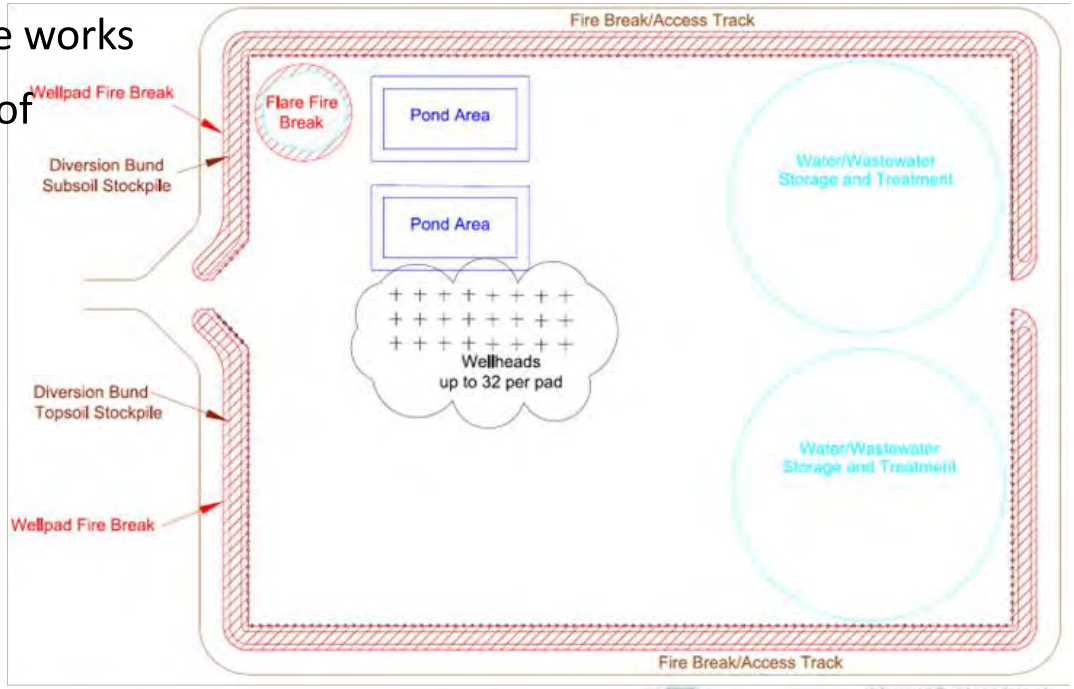
Note 2: Imperial expects to re-use ~40% of wastewater for hydraulic fracturing, which would reduce this volume to ~581 megalitres

Note 3: Imperial expects to re-use ~40% of wastewater for hydraulic fracturing, which would reduce this volume to ~583 megalitres

December 2023

Drilling - Wellpad Construction

- Clearing and leveling of the site for safe works
- Installation of lined pits of the storage of drilling fluids
- Fencing to keep stock out
- Cultural Managers on site during first disturbance works

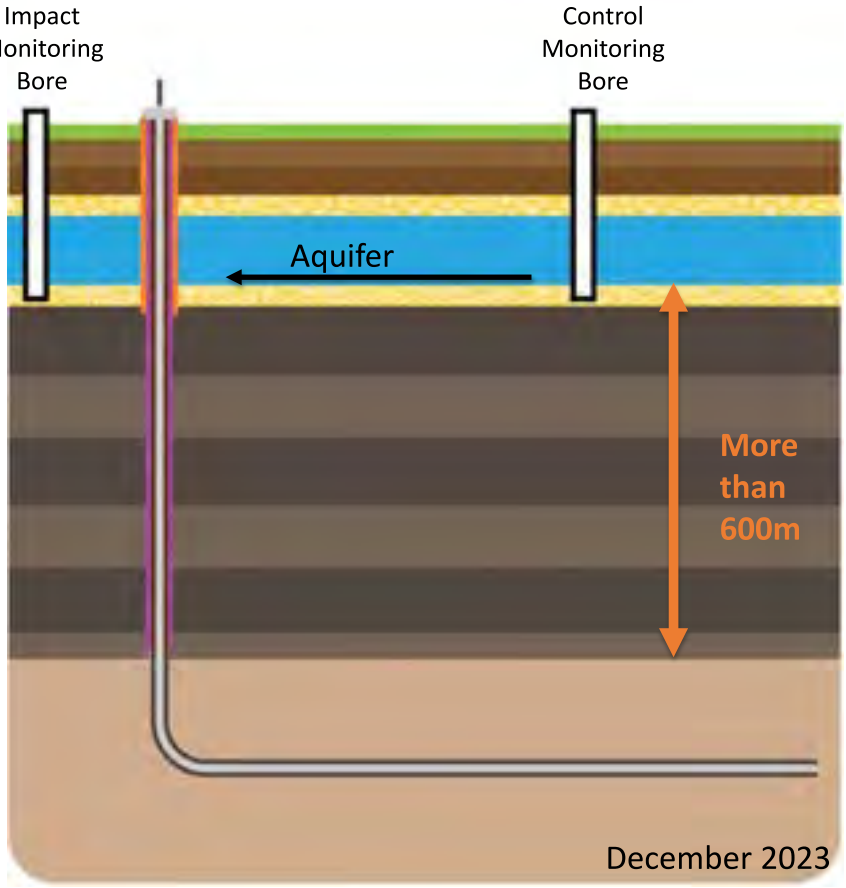


December 2023

Drilling – Aquifer monitoring

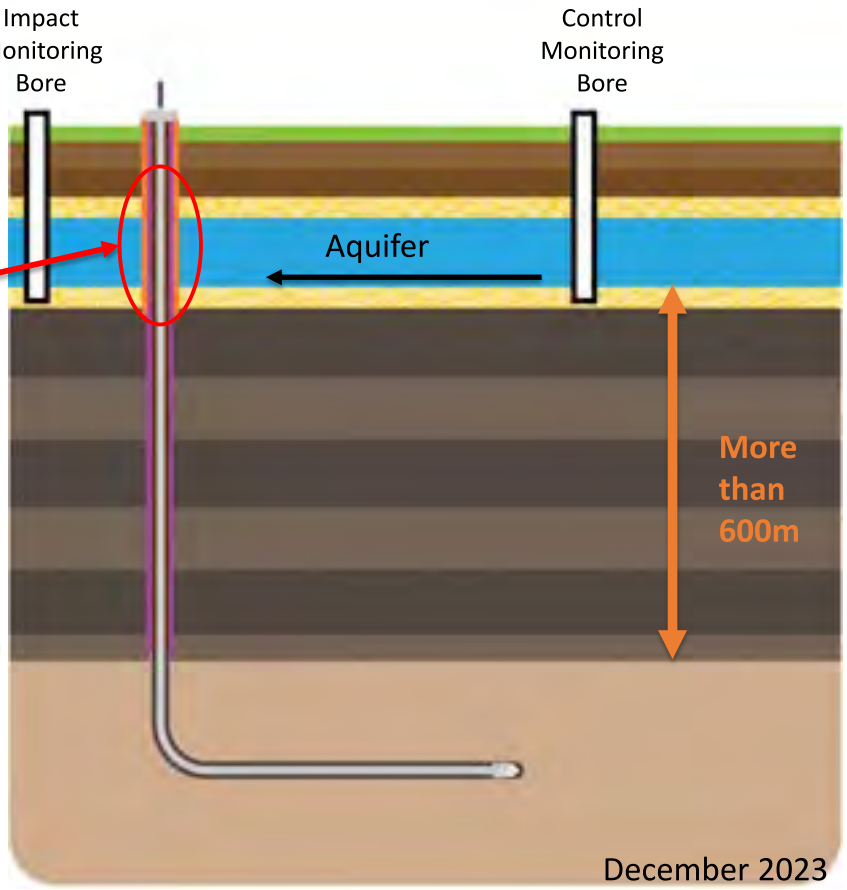
- Two water monitoring bores per aquifer drilled at the well pad
- Multiple water samples are taken to build a baseline of the water quality before HF
- Water samples taken every 3 months and compared to the water quality baseline
- All water monitoring results are made public

Groundwater Monitoring Results available at https://depws.nt.gov.au/onshore-gas/onshore-gas-in-the-northern-territory/industry-compliance-and-reporting/groundwater-monitoring-results



Drilling - Methods

- Only water-based drilling fluids are used
- Each section is drilled, cased and cemented before the next section is drilled
- Aquifer is isolated behind casing and cement before drilling into any hydrocarbon zones
- Drilling fluid and cuttings are stored in lined ponds that are bunded to prevent water entry



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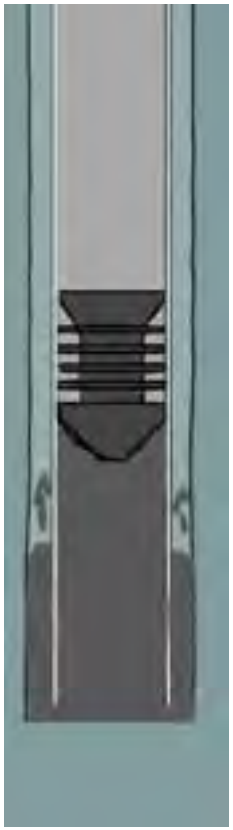
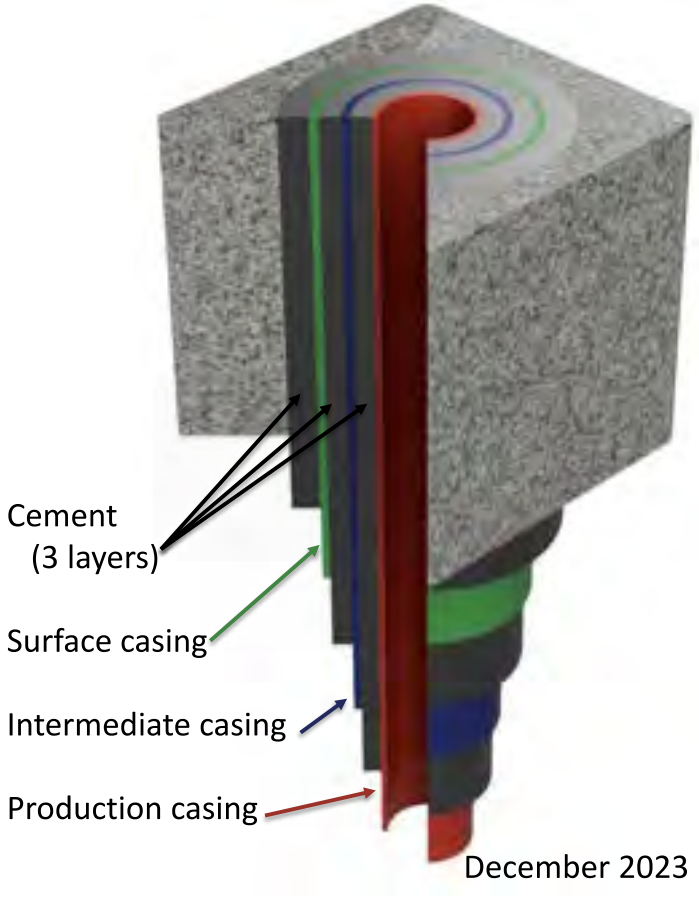
Drilling – Casing and cementing

Each section of the well is:

- Drilled
- Cased
  - Casing is run into the drilled hole with a small gap left at the bottom
- Cemented
  - Cement is pumped down the inside of casing
  - It flows around the end of the casing and up the gap between the casing and hole wall





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Drilling – Fluid and cuttings storage

Drill fluids and cuttings will be stored in in-ground pits:

- Lined with an impermeable barrier
- Bunded to prevent entry from overland flow
- Fitted with remote monitoring

December 2023

Drilling - Horizontal Wells

Horizontal wells:

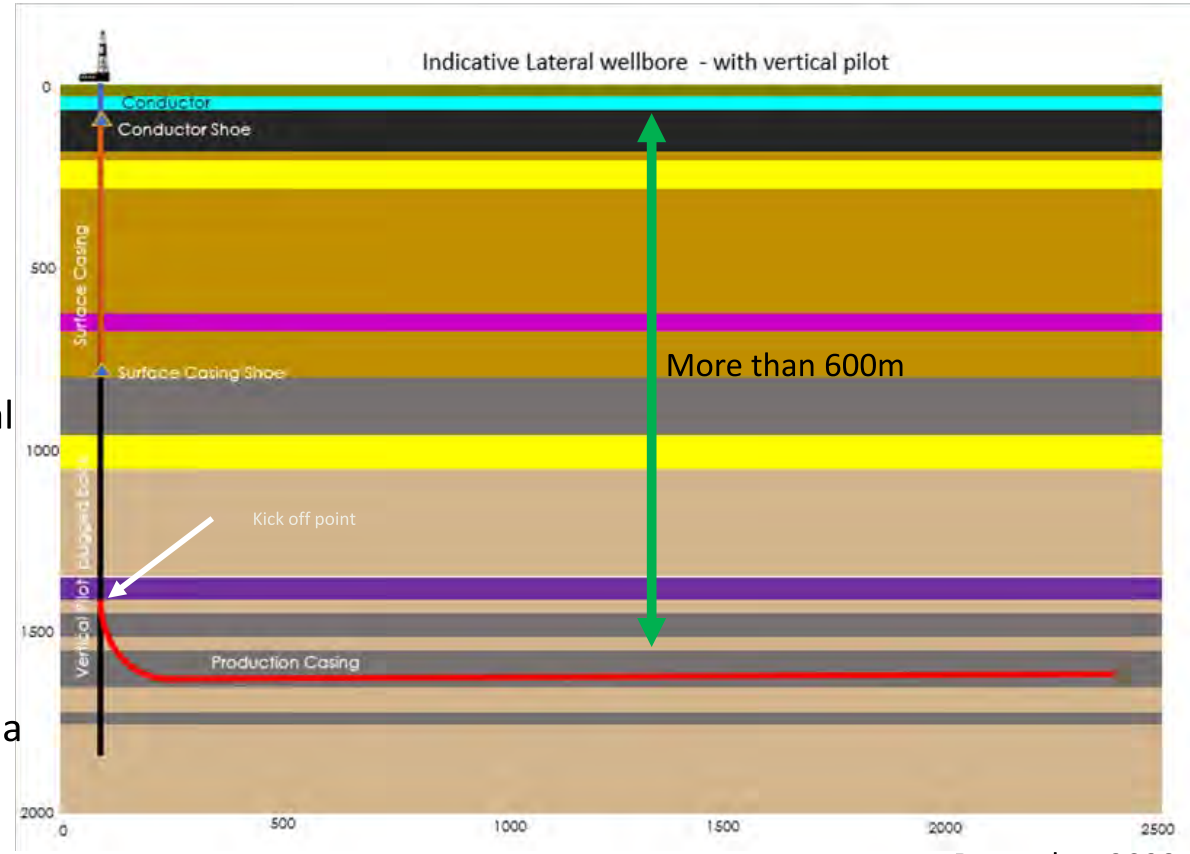
- Reduces the number of wells required, so reduces the surface disturbance

Method:

- Drill a Vertical well first to check formation depths
- Plug back the bottom of the Vertical well to the kickoff point
- Drill the Horizontal well

Note:

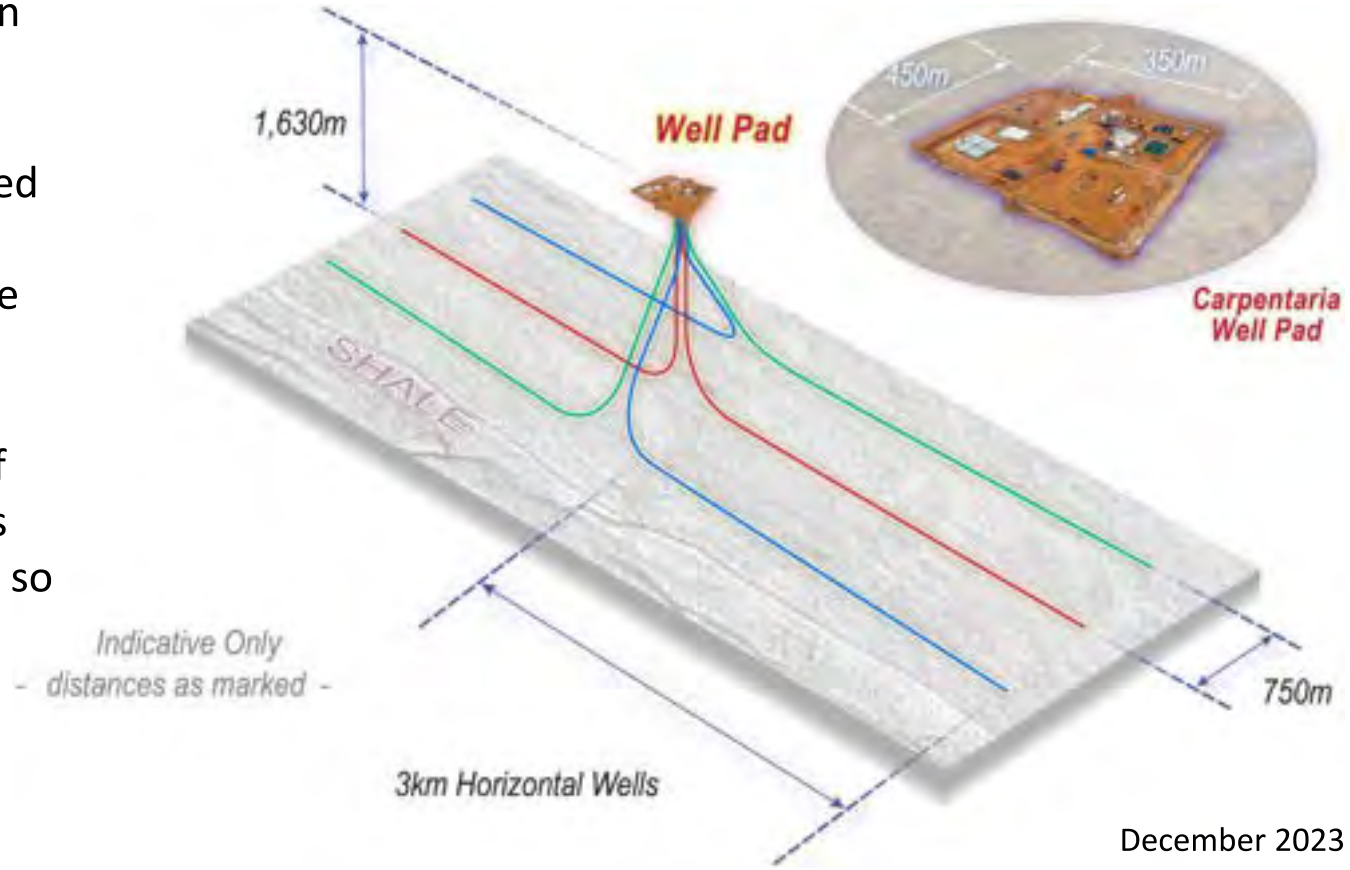
- A horizontal well may be drilled without the vertical section below the kick-off point if there is already a vertical well on the wellpad



December 2023

Drilling - Multiwell pads

- Multiple wells drilled on the same pad
- Horizontal drilling is used to reach different sub-surface targets from the same well pad
- Reduces the number of well pads, access tracks and flowlines required, so reduces the surface disturbance

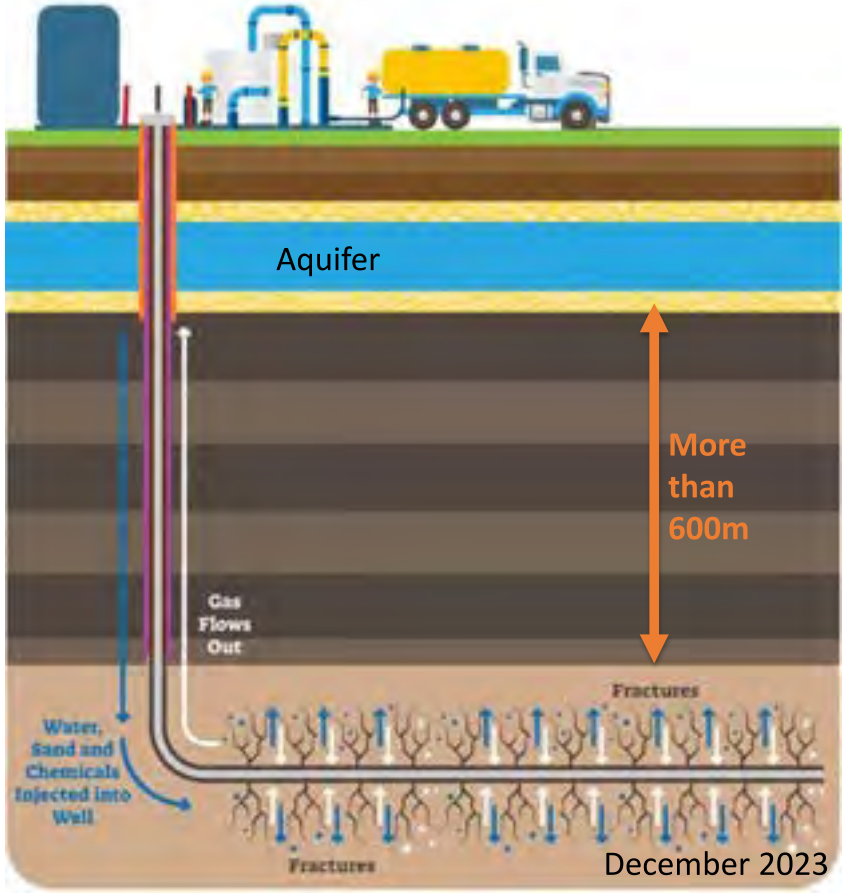


December 2023

Hydraulic fracturing (HF) – How & Why

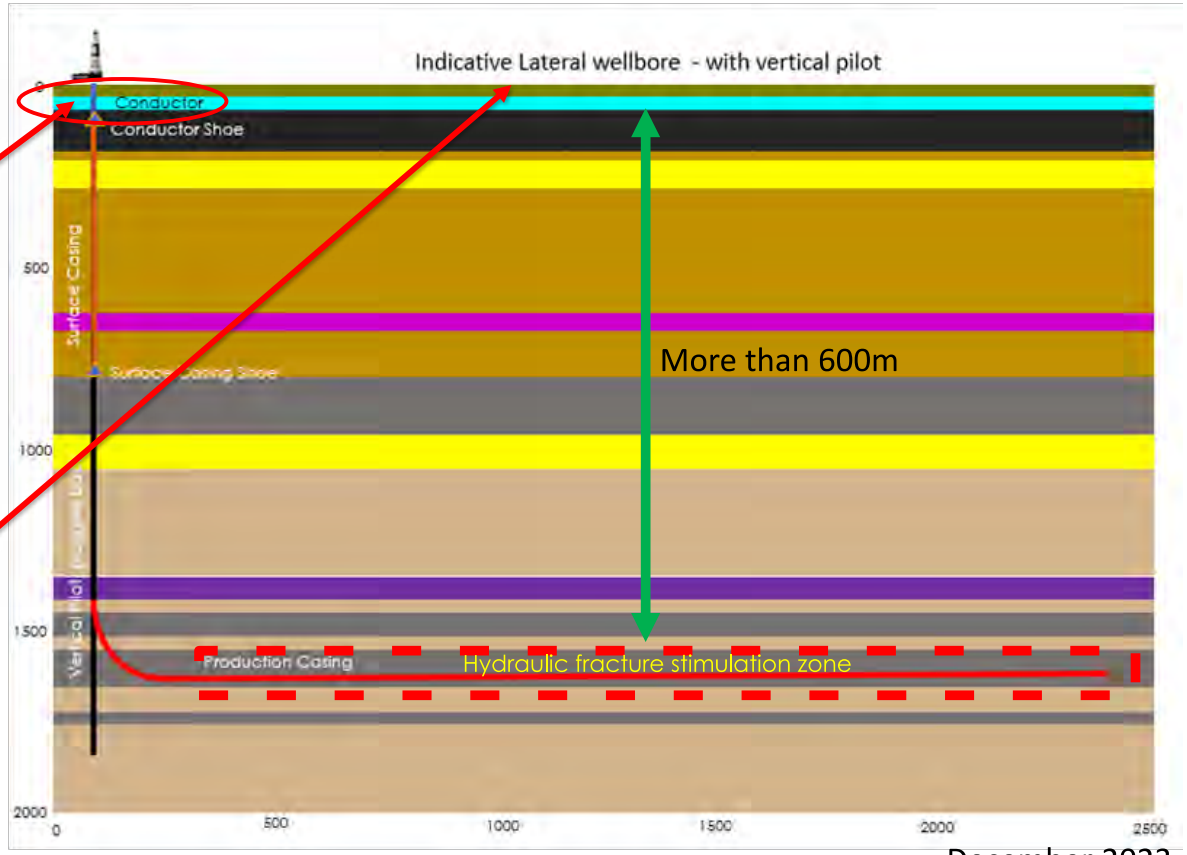
Why:

- To put cracks in the shale to allow gas to flow into the wellbore
- **How it works:**
  - Fluids are pumped into the wellbore at high pressure to create fractures in the shale rock holding the gas
  - Sand grains in the fluids go into the fractures in the shale rock to keep them open
  - Gas flows through these fractures, and into the wellbore
  - Detailed engineering and design work is carried out to ensure fractures do not extend too far from the well bore



Hydraulic fracturing – Aquifer Protection

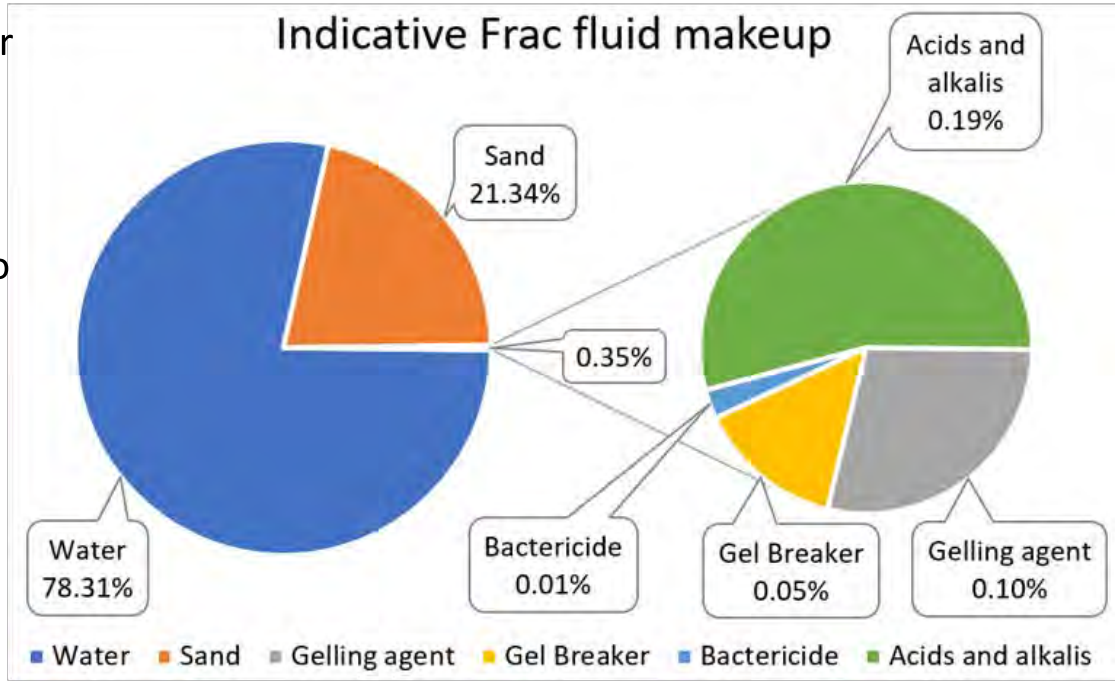
- Over 600 m depth separation between HF zone and the closest aquifers
- Aquifers monitored at the wellpad logged every 4 minutes
  - 2 weeks before HF
  - During HF
  - 4 weeks after HF
- Seismicity Monitoring 500m away from wellpad during HF
- Traffic lights system to stop HF if any Seismic activity caused by HF



December 2023

HF – What is in Frac fluid?

- Over 99.5% of Frac fluid is sand and water
- ~0.19% Acids and alkalis, such as vinegar and washing soda, to assist in the initiation of the fracture and improve fluid flow in the rocks
- ~0.1% Gelling agent such as guar gum to create a gel to help transport the sand
- ~0.05% Gel breaker such as ammonium persulfate (used in hair bleach) to break the gel to allow flowback
- ~0.01% Bactericide such as sodium hypochlorite (pool chlorine) to control bacteria growth in the well



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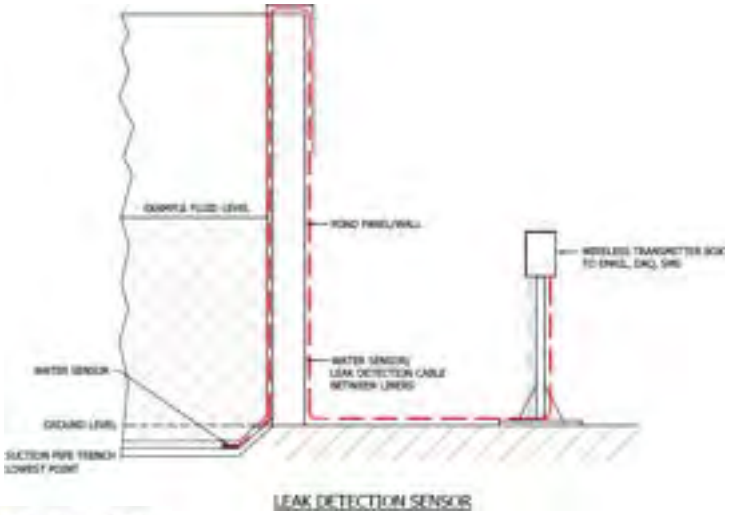
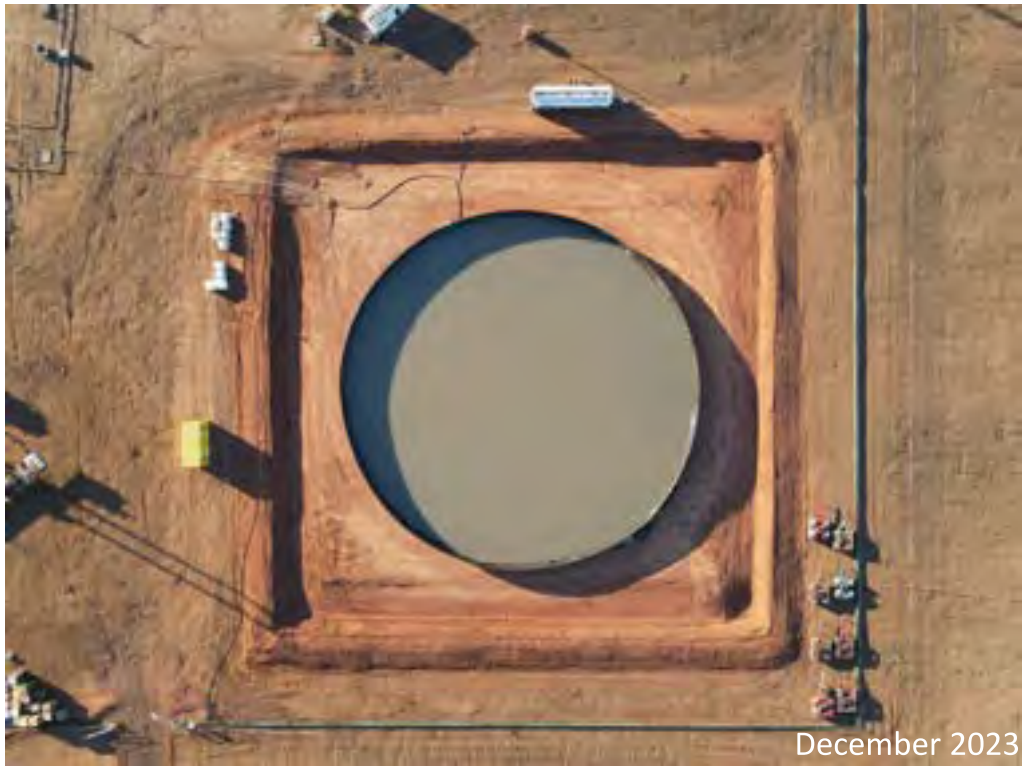
Hydraulic Fracturing – Flowback Fluid

- Tanks are installed to store all flowback fluid
- These tanks have two liners and a leak detection system between the liners to ensure no leakage to the ground





Hydraulic Fracturing – Flowback Fluid storage

- Tanks have freeboard capacity for potential rainfall
- In line with the Code of Practice, freeboard for open-topped tanks must allow for a once-in-a-thousand-year rainfall event during the wet season
- Bunded to prevent overland flow erosion
- Fitted with level sensors with remote monitoring

December 2023

Flowback Fluid - Re-use and disposal

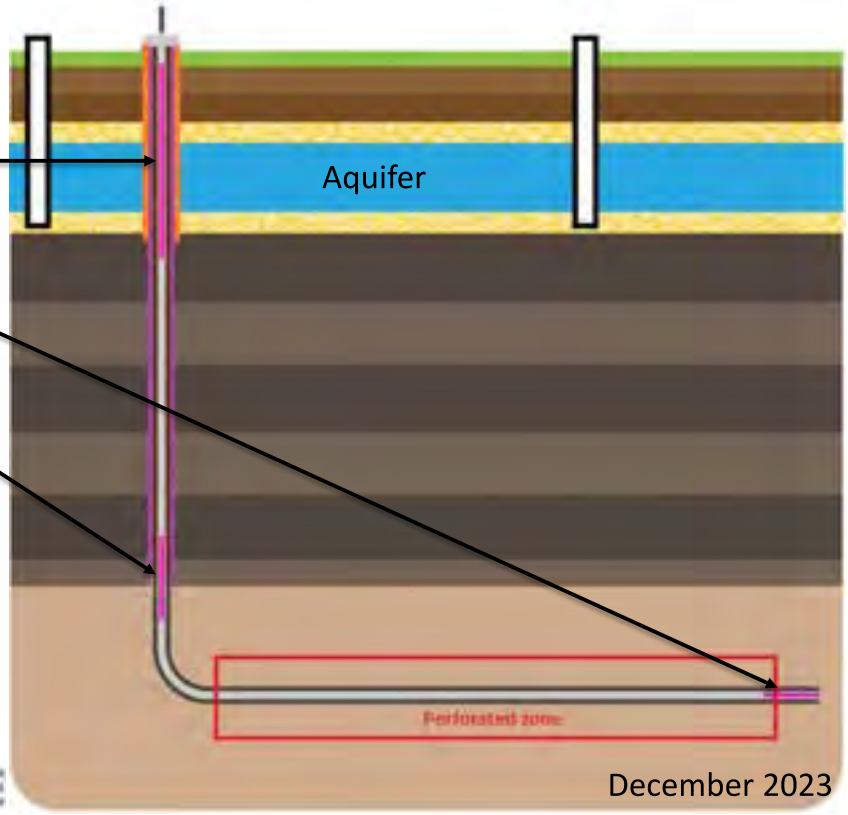
- Flowback fluids are re-used for future HF operations where practicable
- Flowback fluids are disposed of by evaporation
- Residues after evaporation are disposed of by removal from site to a licensed facility

December 2023

Well Abandonment - Overview

Well abandonment is done over multiple stages

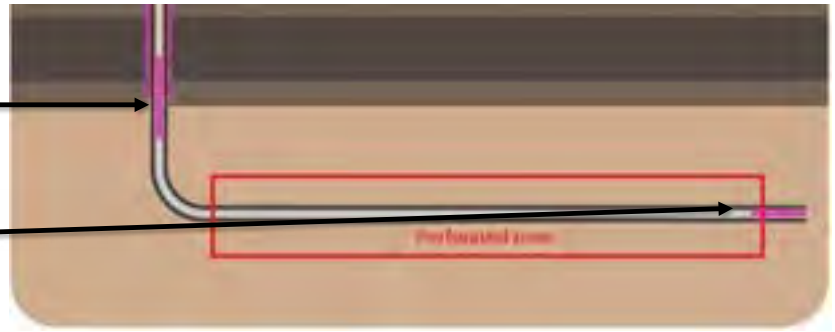
- Stage 1
  - A cement plug from 15m below surface to 50m below the bottom of the deepest aquifer
  - A cement plug at the bottom of the perforations
  - A mechanical plug with a 50m cement plug above it at the top of the shale zone
  - Start well pad rehabilitation
- Stage 2
  - After Stage 1 has been verified by zero pressure on any casing or annulus
  - Well head removal
  - Complete well pad rehabilitation



Well Abandonment – Production zone

The production zone of the wellbore is abandoned by either:

- A mechanical plug with a 50m cement plug above it at the top of the shale zone, and
- A cement plug at the bottom of the perforations



Or by

- A cement plug from 50m below the perforations to at least 100m above the perforations

Each cement plug must be validated before the next isolation is performed

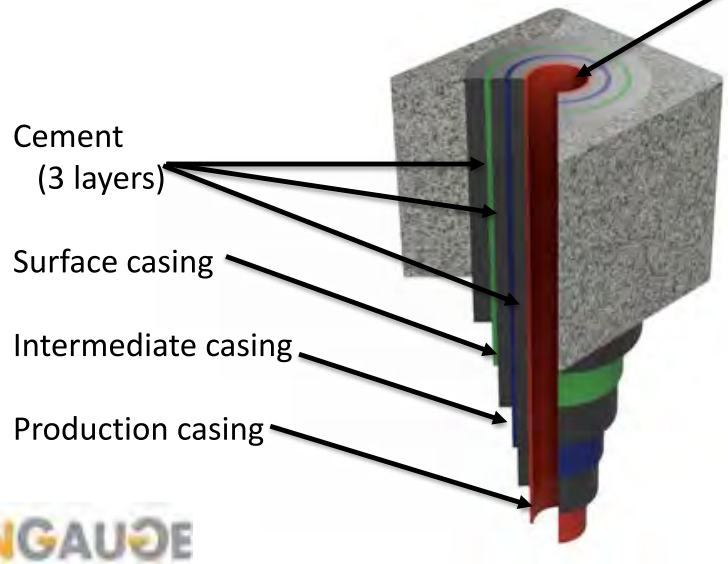
Area of interest

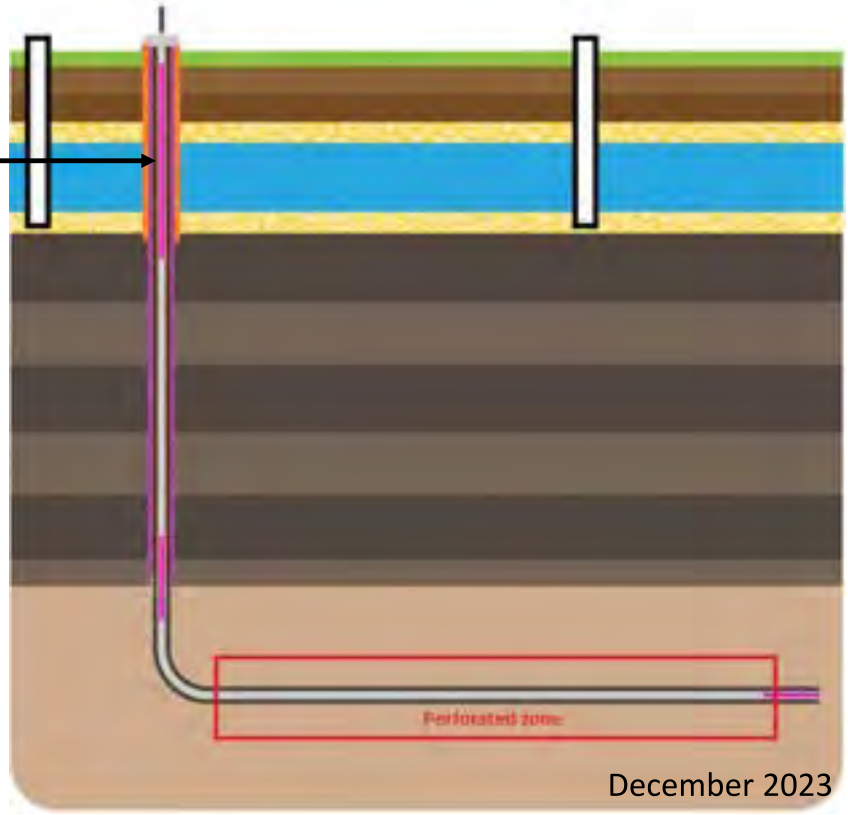
December 2023

Well Abandonment – Aquifer

The aquifer and surface zone of the wellbore is abandoned by:

- A cement plug from 15 m below the surface to 50 m below the bottom of the deepest aquifer in the production casing





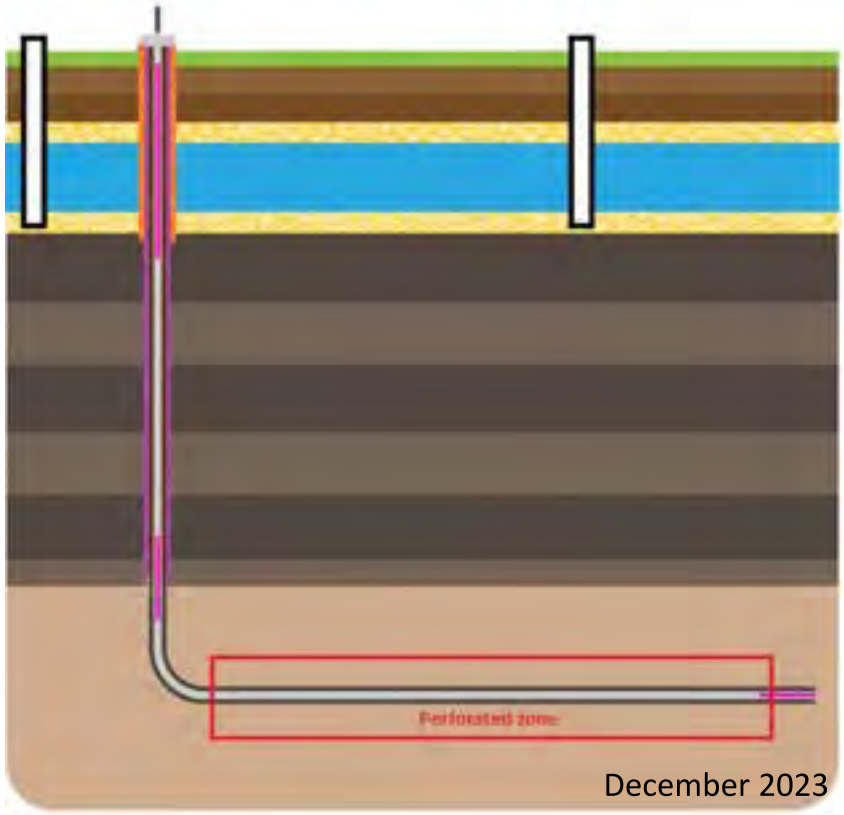
December 2023

Well Abandonment – Stage 2

- Stage 2 well abandonment only takes place after zero pressure on any casing or annulus is confirmed

- After validation, the following is carried out;
  - The wellhead is removed ~1.5m below ground level
  - A steel marker plate is installed
  - Wellpad rehabilitation is carried out

Records of the decommissioning procedure must be kept, these records are submitted to the Regulator



Area of interest

December 2023

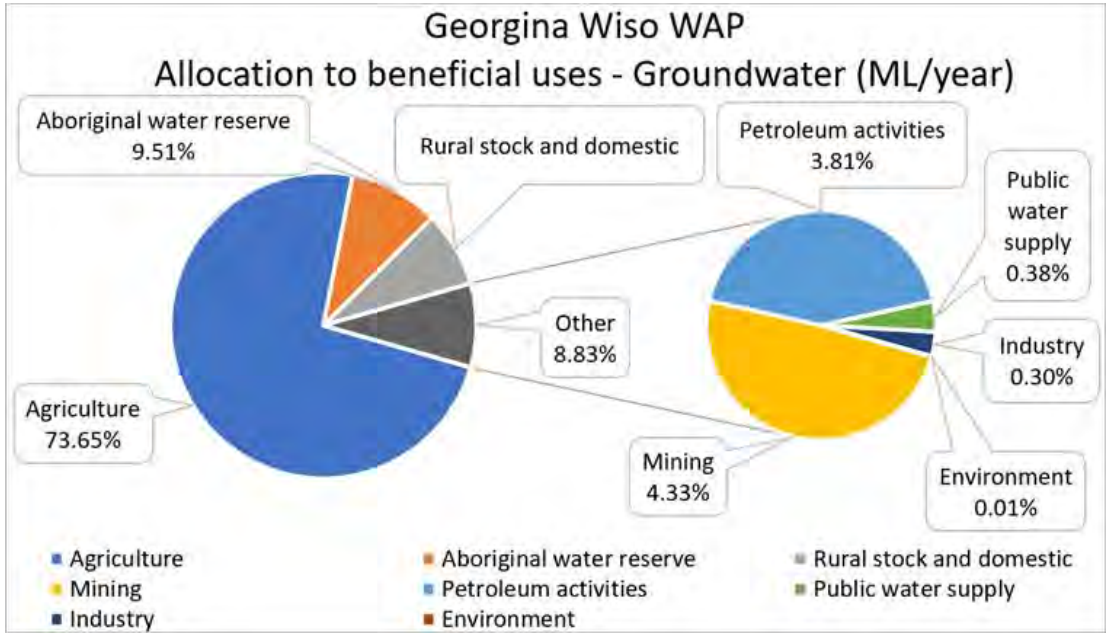
Well Abandonment – Wellpad rehabilitation

- Rehabilitation of works goes over the life of the project
- Wellpad ponds are backfilled when no longer needed
- Wellpads are made smaller when no further drilling is expected
- Rehabilitated areas are recontoured to natural shapes and revegetated to close to pre-disturbance vegetation cover

December 2023

Groundwater use

- The project is located within the Georgina-Wiso Water Allocation Plan (WAP) area
- Imperial is applying for an increase in its EP187 Groundwater Extraction License from 85ML to 750ML per year
- The majority of water is used in Hydraulic Fracturing (HF)
- Imperial is re-using flowback water where practicable for HF to reduce groundwater requirements
- Imperial will not use surface water
- There is no change in water use if an agreement to sell gas is achieved



Source data: *Northern Territory Government (2023) Georgina Wiso Water Allocation Plan 2023-2031 Report 12/2023. Department of Environment, Parks and Water Security: Northern Territory, Australia.*

December 2023

Appraisal testing – What & Why

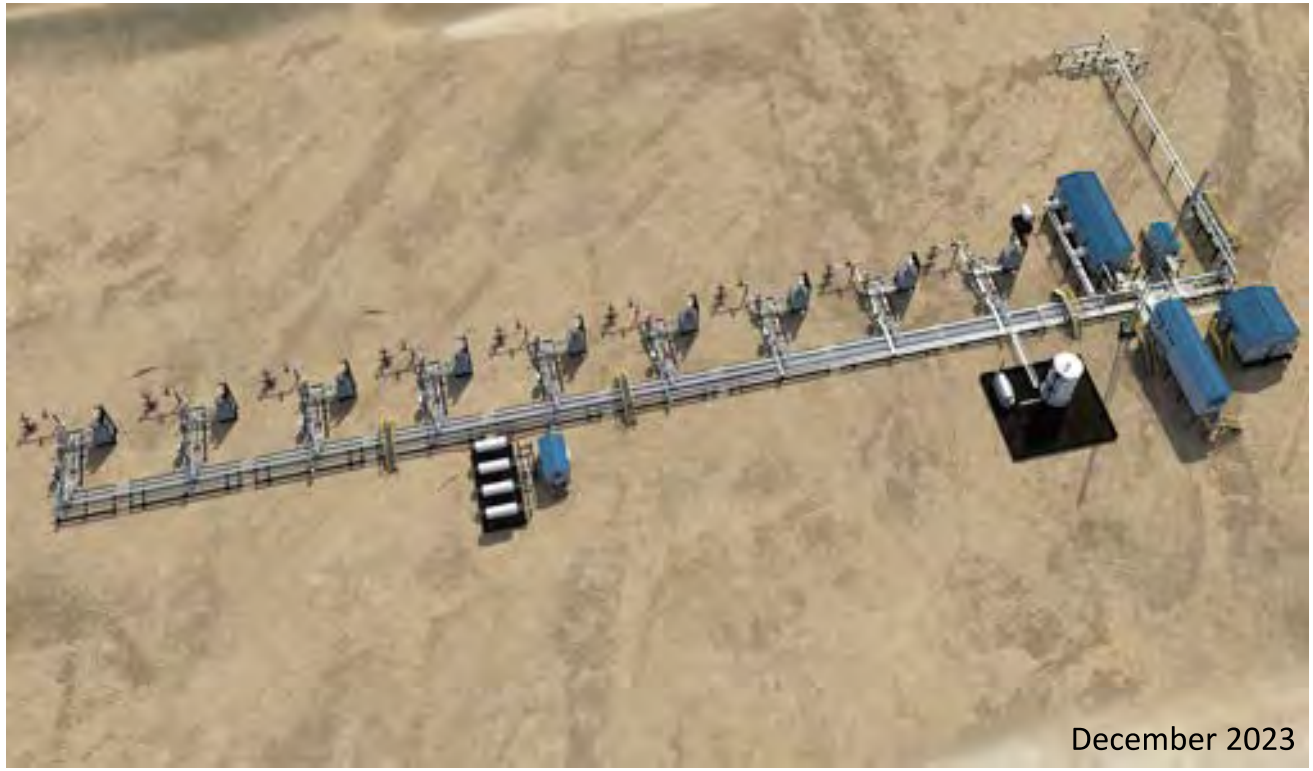
- The appraisal gas well is flowed to a separator vessel
- The gas is measured and has historically been sent to a flare where it is burnt
- Water is measured and sent to double-lined storage, either on the wellpad or a central wastewater facility
- Over time, this gives an understanding of the potential of the well to produce gas
- If the sale of appraisal gas is agreed and approved, rather than the gas going to flare, it will be sold with the benefits going to Imperial, traditional Aboriginal owners, and the Northern Territory government

December 2023

Wellpad facilities

Wellpads will have equipment to:

- Separate any moisture from the gas stream
- Measure gas production
- Transfer gas and water to buried flowlines
- Monitor the wellpad back to the operations office
- Allow remote stopping and starting of the wellpad production



December 2023

Wellpad facilities - Wellheads

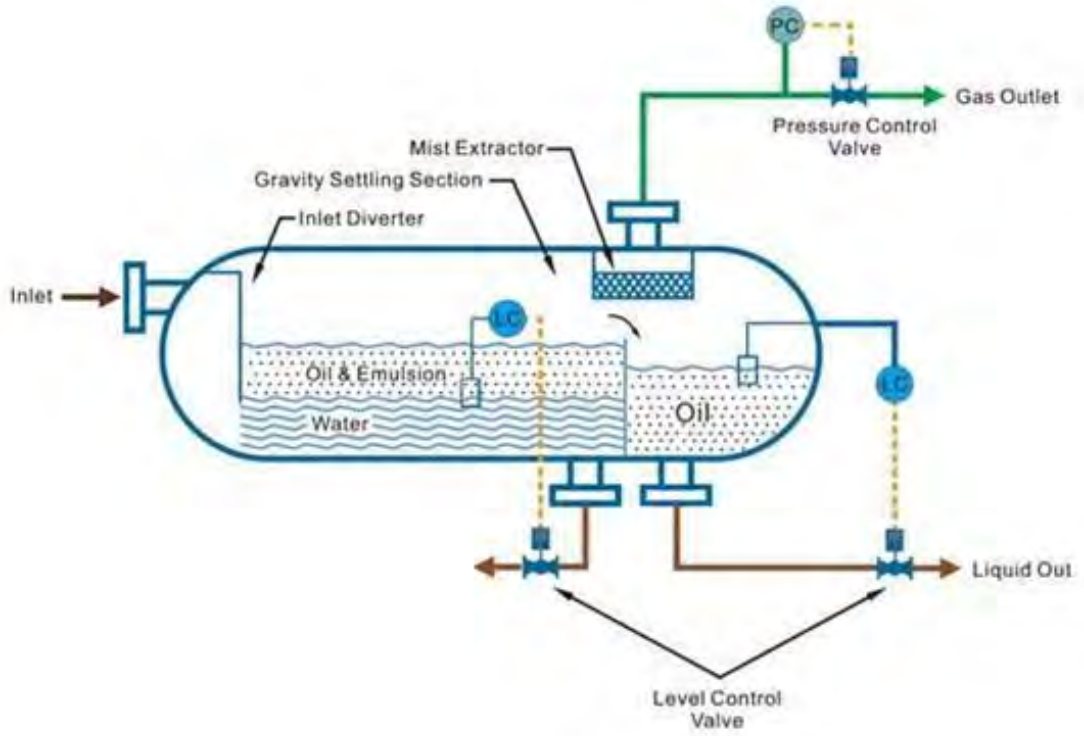
Wellpads will have multiple wellheads:

- One for each well on the pad
- Each wellhead will be controlled independently of other wellheads
- Wellheads will feed gas and flowback fluid and produced water into common facilities on the wellpad

Wellpad facilities - Separator

Wellpads may have separators to:

- Separate HF flowback water from the produced gas during initial well flowback
- Separate formation water (if present) from the produced gas
- Separate hydrocarbon liquids (if present) from the produced gas



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Wellpad facilities – Water handling

Wellpads will have water handling facilities to:

- Store fresh, flowback and produced water for use in HF programs
- Store flowback and produced water from HF programs
- Transfer water/wastewater between wellpads for re-use and disposal

December 2023

Appraisal - Wastewater treatment facilities

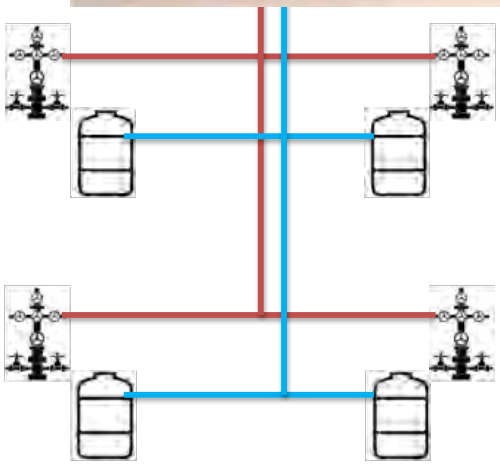
A dedicated water/ wastewater treatment and handling facility will likely be set up to:

- Store flowback and produced water from HF and drilling programs
- Transfer water/wastewater between wellpads for safe and effective re-use and disposal

December 2023

Towards Appraisal– Flowlines

- Buried flowlines connecting the well pads and appraisal facilities will be required to allow the:
  - Transfer of wastewater for re-use
  - Transfer of water for use
  - Gathering of gas for sale if an agreement for gas sale is reached
- Flowlines will be constructed from High-Density PolyEthylene (HDPE) to relevant Australian codes
- Flowlines will be designed, constructed and tested to suit their Maximum Allowable Operating Pressure (MAOP)
- Traditional Owners will culturally manage first disturbance works



December 2023

Flowlines – Overview 1

- Flowlines are buried to give extra protection from:
  - Impact damage
  - Fire
  - Flooding and overland flow

- Specialized equipment and personnel are used for flowline construction

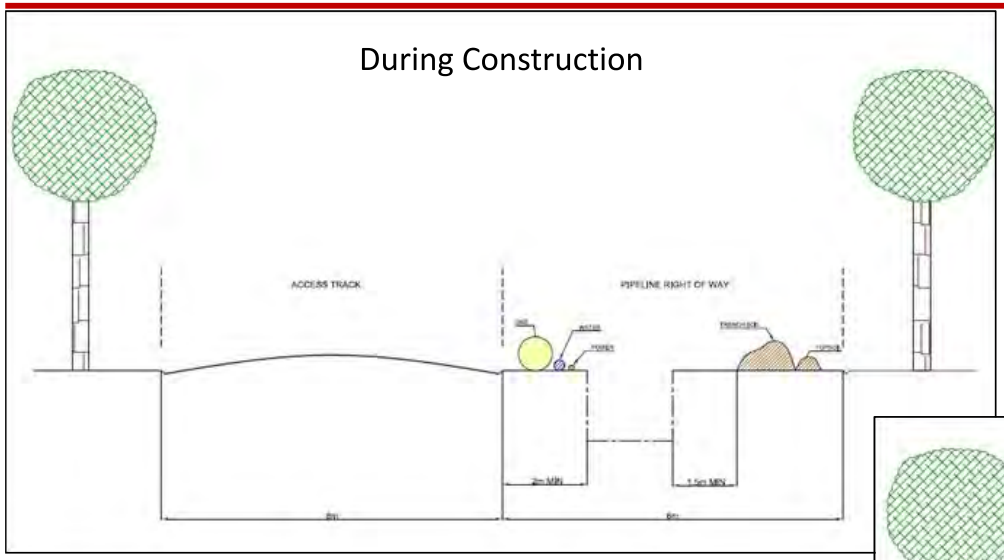
December 2023

Flowlines – Overview 2

- Flowlines are welded and then lowered into trenches on construction Right Of Ways (ROWs)
- Where practicable multiple flowlines will be put in the same trench
- Traditional Owners will culturally manage first disturbance works

Flowlines – Right Of Way alignments

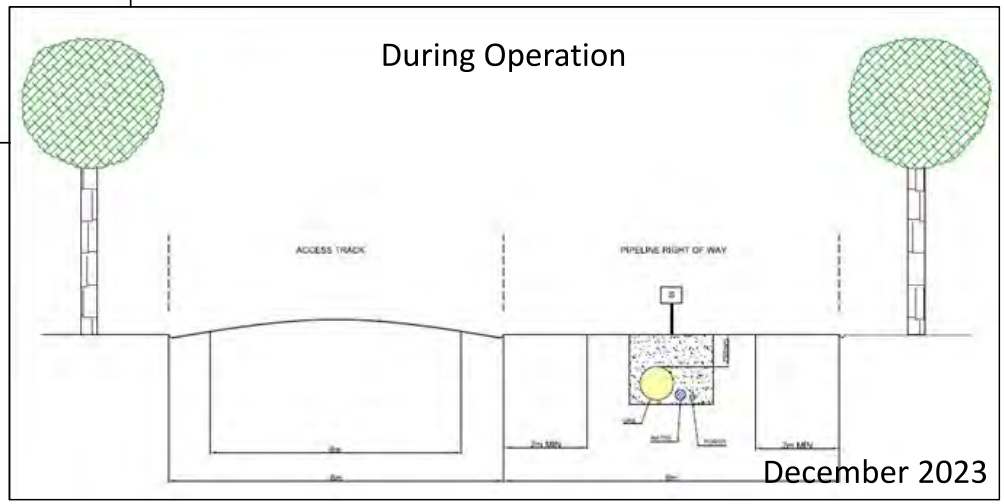
During Construction



- Flowline Right Of Ways (ROWs) will follow access tracks and will be buried at least 0.75m below the surface

- By following access tracks less disturbance area is required during construction, operation and maintenance

During Operation



December 2023

Flowlines – Right Of Way infrastructure

The following infrastructure will be located on ROWs;

- High point vents - to prevent airlocks in wastewater flowlines
- Low Point Drains - to drain condensed water from gas gathering networks
- Valve manifolds - to direct flow through flowlines as required
- Electrical kiosks - to distribute power throughout the network

Flowlines - Jointing

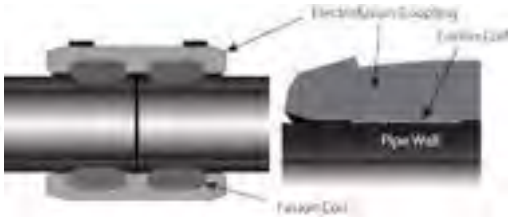
- HDPE gathering networks are constructed from lengths or rolls of pipe

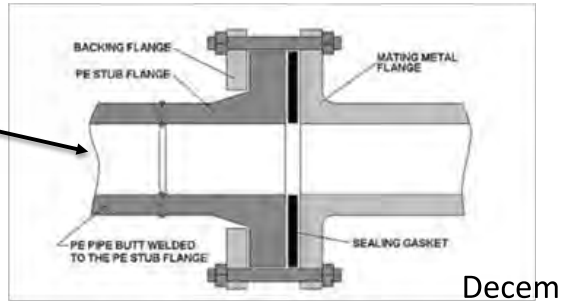
- Lengths or rolls of pipe are joined together by either:
  - Butt fusion welding

  or
  - Electrofusion welding

- Where HDPE pipe is joined to another material flange jointing is used

- Only qualified equipment and personnel will be used for flowline jointing

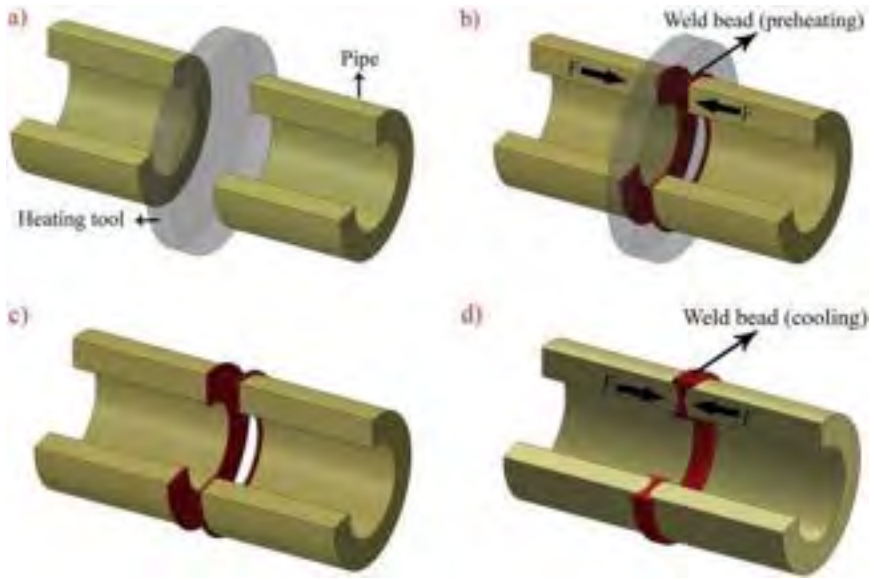




December 2023

Flowlines – Butt Fusion Weld Jointing

- Butt fusion welding HDPE pipe involves:
  - Removing the oxidized layer from the end of the pipe and squaring the face
  - Heating the pipe to the correct temperature to melt it to allow fusion
  - Forcing the melted ends of the pipe together at the correct pressure
  - Holding the pipe in position during cooling



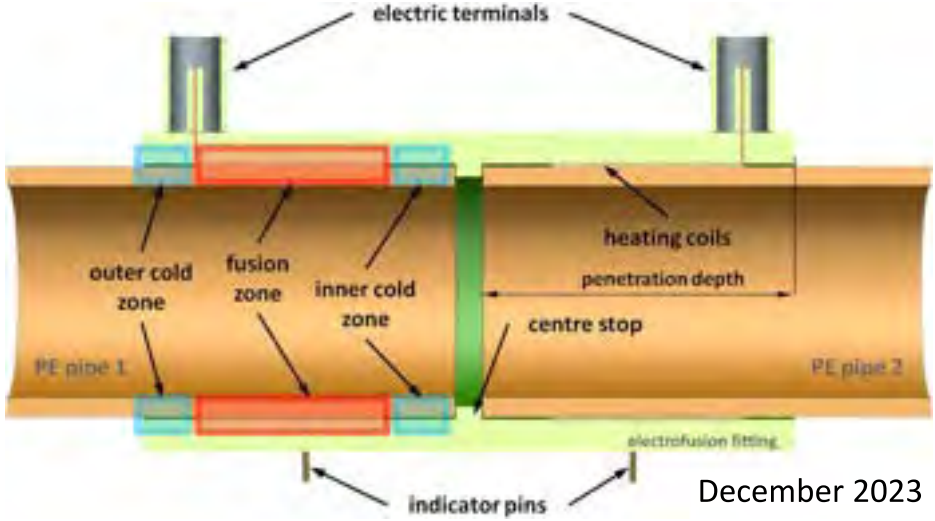
- The correct heating, pressure and cooling parameters are programmed into the welding machine and are logged for each weld

December 2023

Flowlines – Electrofusion Weld Jointing

Electrofusion welding involves:

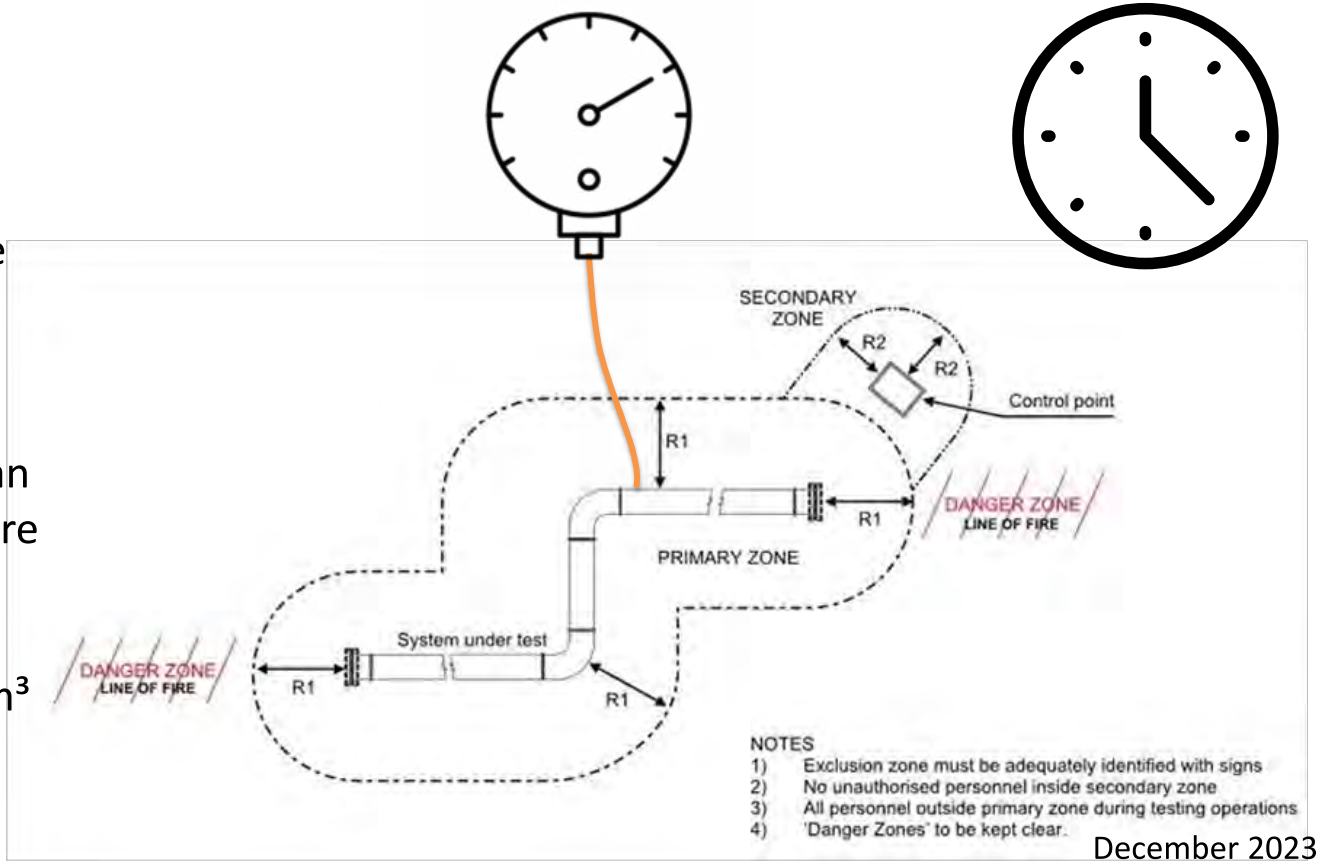
- Pealing the outside of the pipe in the weld area to remove oxidization & get the correct size
- Inserting the pipe ends the correct depth into the electrofusion coupling
- Heating the fusion zone to the correct parameters using the heating coils in the coupling
- Holding the pipe in position during cooling
- The correct heating and cooling parameters are programmed into the welding machine and are logged for each weld



December 2023

Flowlines - Pressure testing

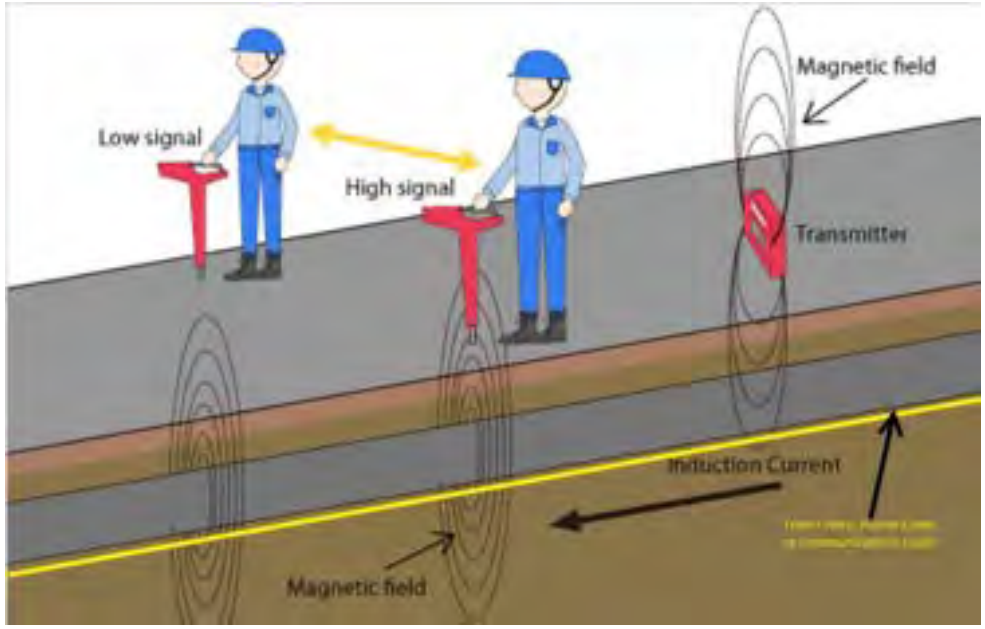
- All gas and wastewater flowlines will be tested before use
- 6-hour strength test:
  - Must hold a pressure greater than the Maximum Allowable Operating Pressure (MAOP) for more than 6 hours without failure
- 24-hour leak test:
  - Must lose less than 1 litre per hour per m^3 of network volume



December 2023

Flowlines – Location

- HDPE flowlines are not easily detectable with underground services locators
- Power and communications cables are easily detected with underground service locators
- Where Gas or Wastewater flowlines are not buried with a power or communications cable, they will be buried with detectable tape to make location easier



December 2023

Flowlines – Marking

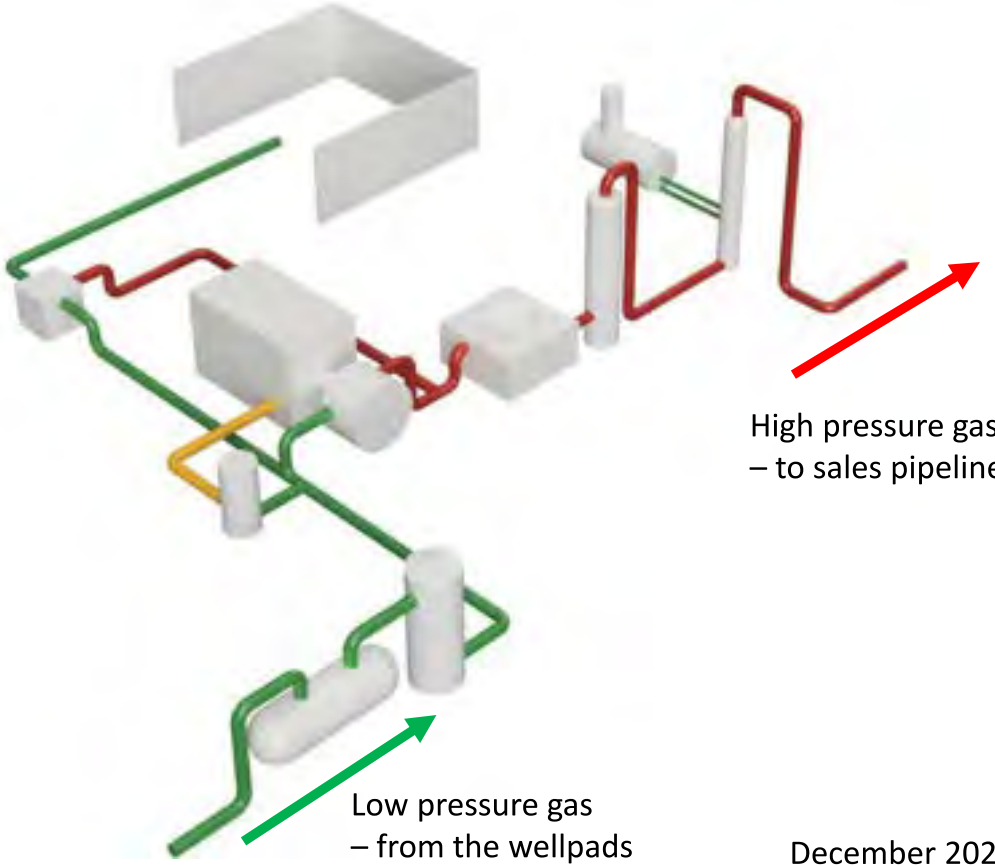
All gas and wastewater flowlines will be signed at:

- Both sides of public roads
- At each property boundary
- Both sides of creeks and rivers
- Both sides of vehicle tracks
- Each change of direction
- Utility crossings (buried or above ground)
- At all network facilities
- A maximum of 500 metres

December 2023

Appraisal facilities – Compressor Station

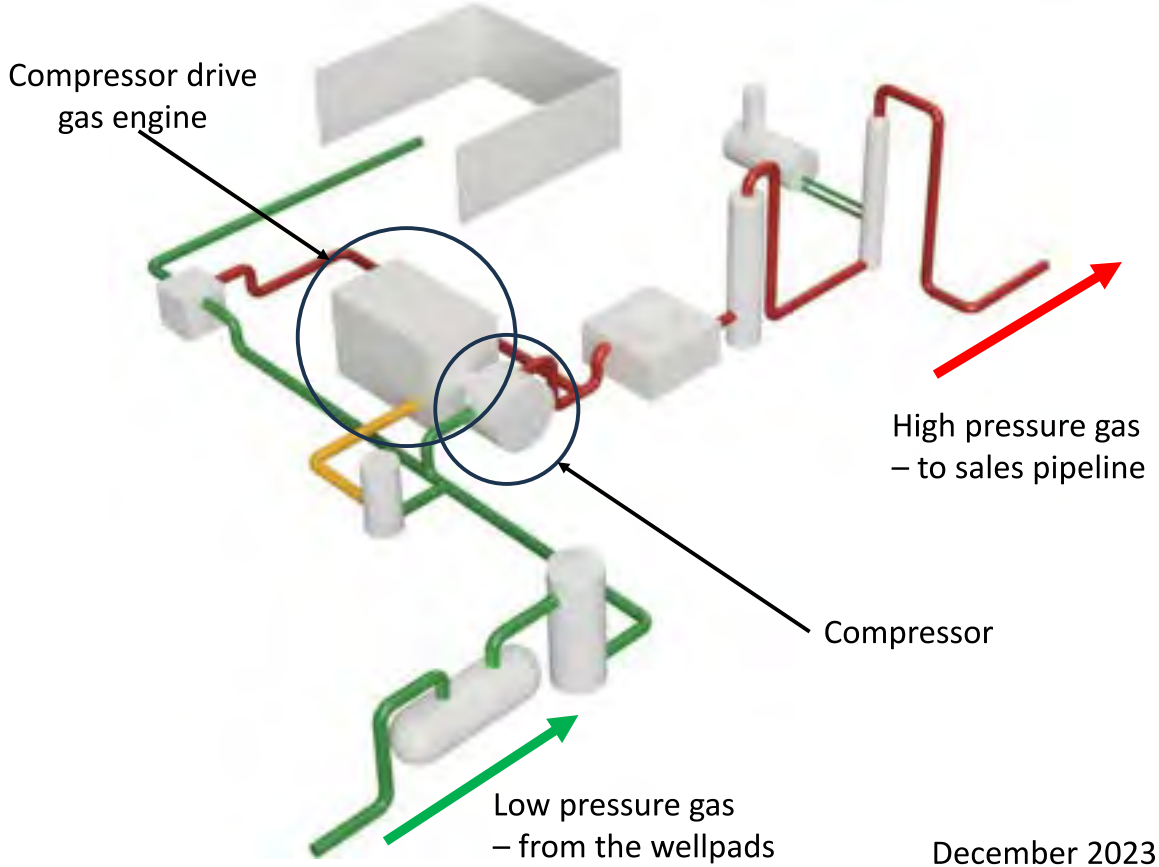
- If the sale of appraisal gas is agreed and approved, a compressor station will be constructed
- The compressor station will compress, condition and dry the gas to go into the sales gas pipeline and operate 24 hours per day, seven days per week
- All equipment will be constructed to relevant Australian standards
- The facility will include a worksite base for the compressor station operators and the field operators that look after the production wells, water treatment facilities and gathering networks



December 2023

Compressor station – Compressor

- The gas flows from the wellpads to the compressor station in a network of low-pressure flowlines
- The compressor raises the pressure of the gas to the pressure needed in the sales gas pipeline
- A gas engine drives the compressor
- The gas flows from the compressor station to the main sales gas pipeline via a high-pressure steel pipeline

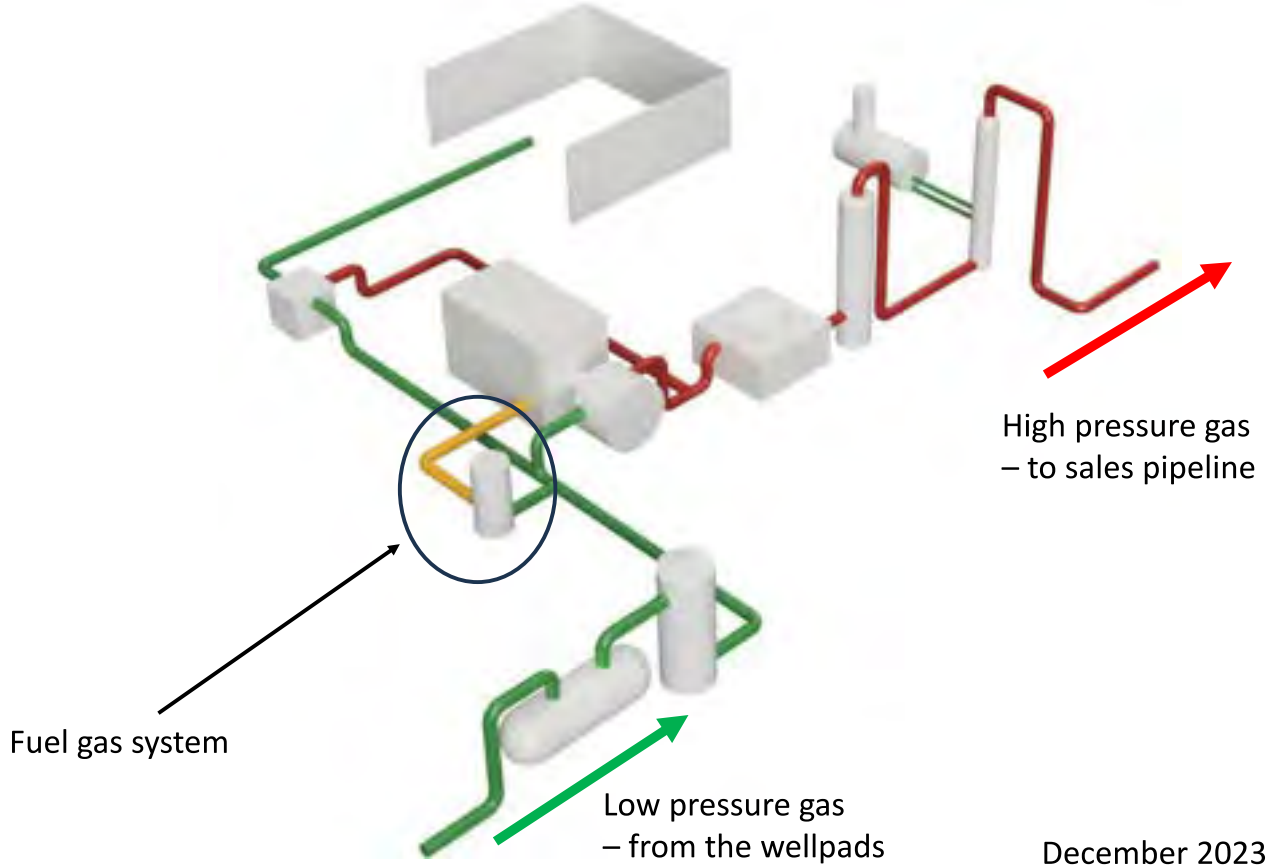


December 2023

Compressor station – Fuel Gas

- The compressor drive engine is powered by gas produced from the field
- The gas is conditioned in the fuel gas system to be dry and at the pressure the engine needs
- Fuel gas will also be used for TEG* reboiling, and for power generation for electric motors for cooler fans, instrument air compressors, offices, workshops etc.

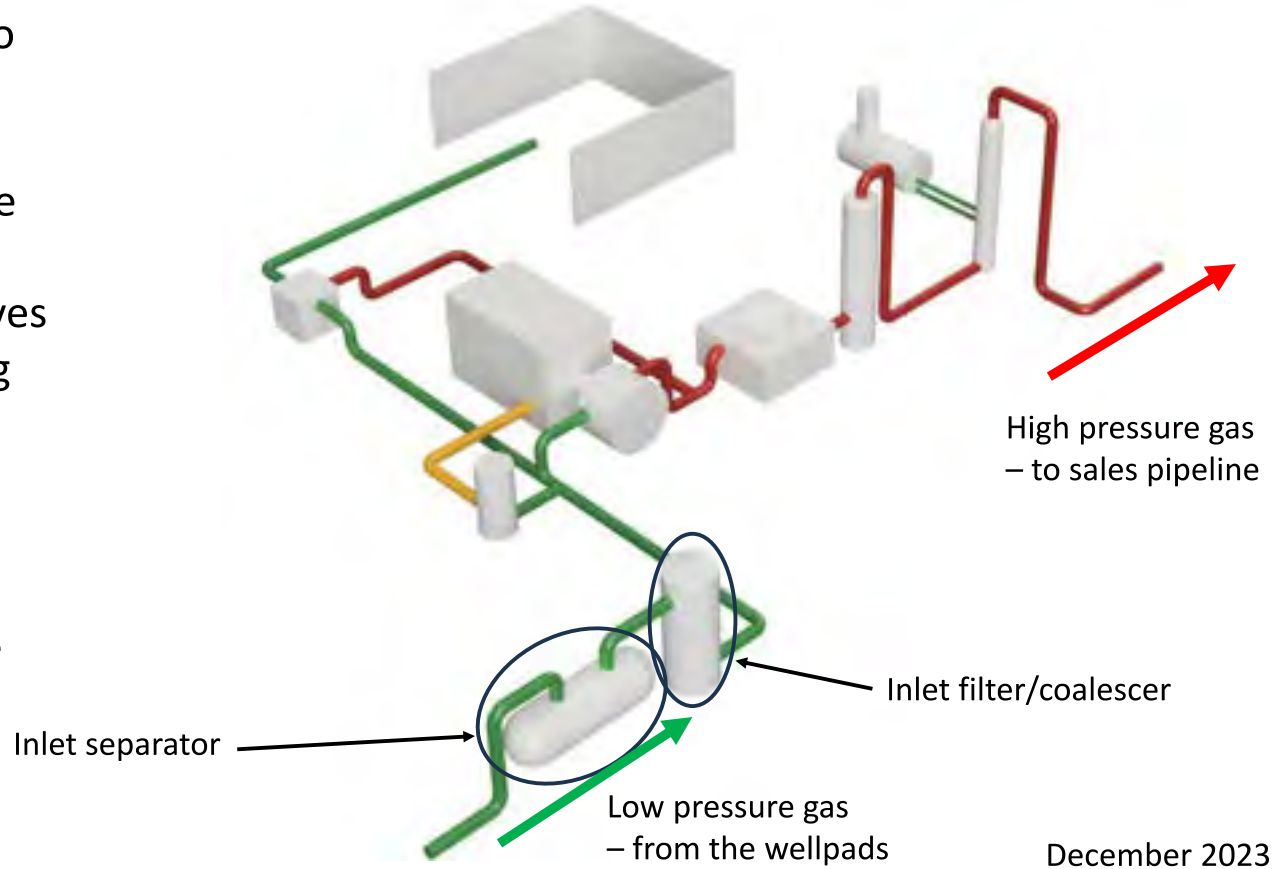
*TEG – see later – Gas Dehydration



December 2023

Compressor station – Inlet water removal

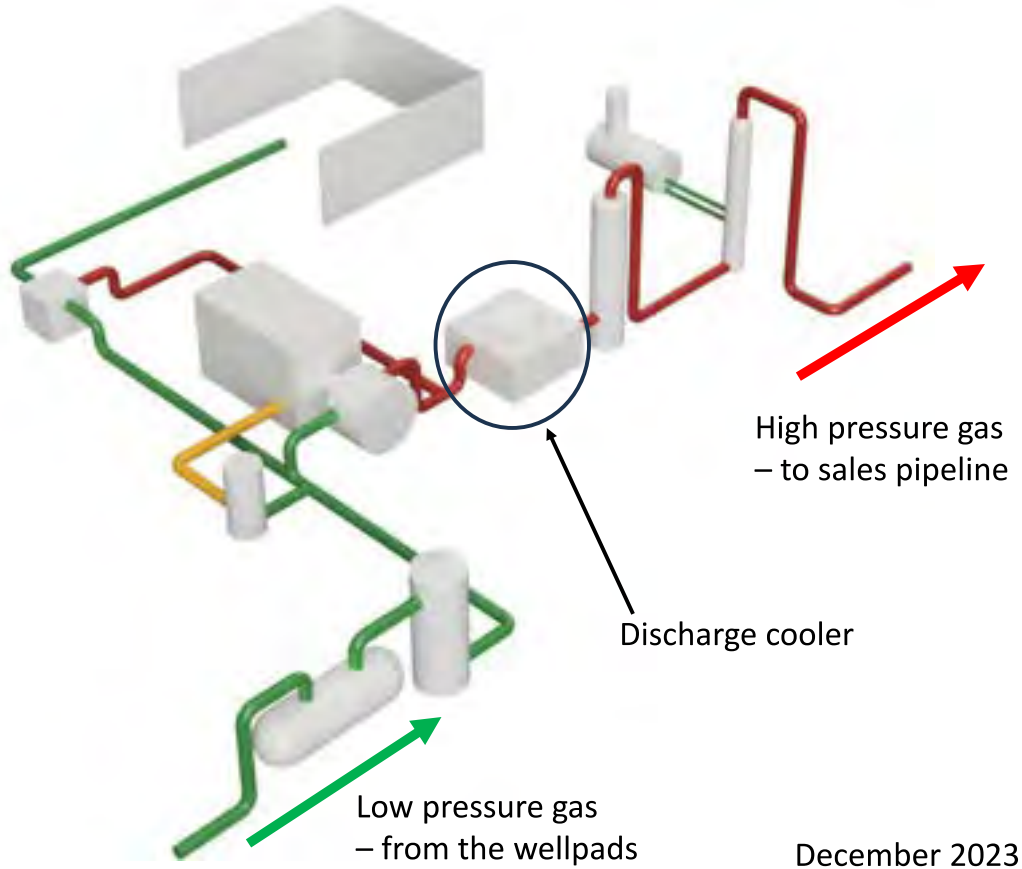
- An Inlet Separator is used to remove any liquids in the low-pressure gas from the field to stop it going into the compressor
- An inlet filter further removes moisture from the incoming gas stream
- Water from the inlet separator and filter will be transferred to the water treatment facility for re-use via the water transfer network



December 2023

Compressor station – Discharge cooler

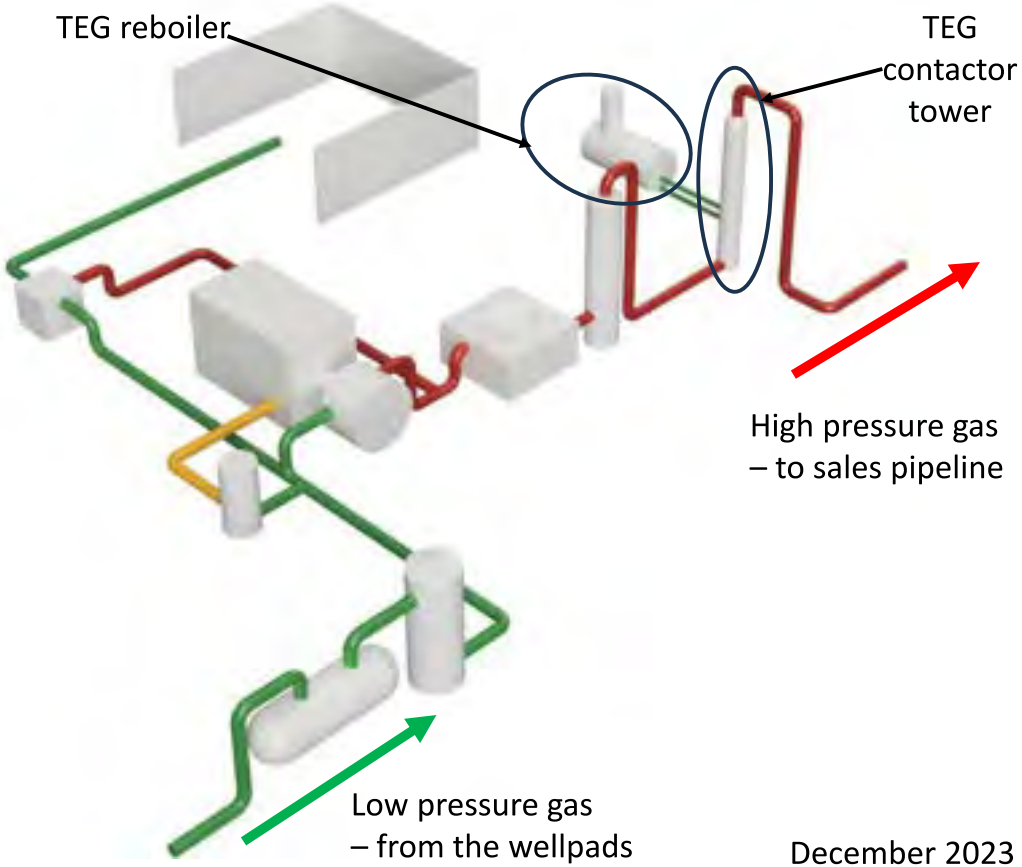
- Raising the pressure of the gas also raises its temperature
- A discharge cooler is used to cool the gas after it leaves the compressor



December 2023

Compressor station – Gas Dehydration

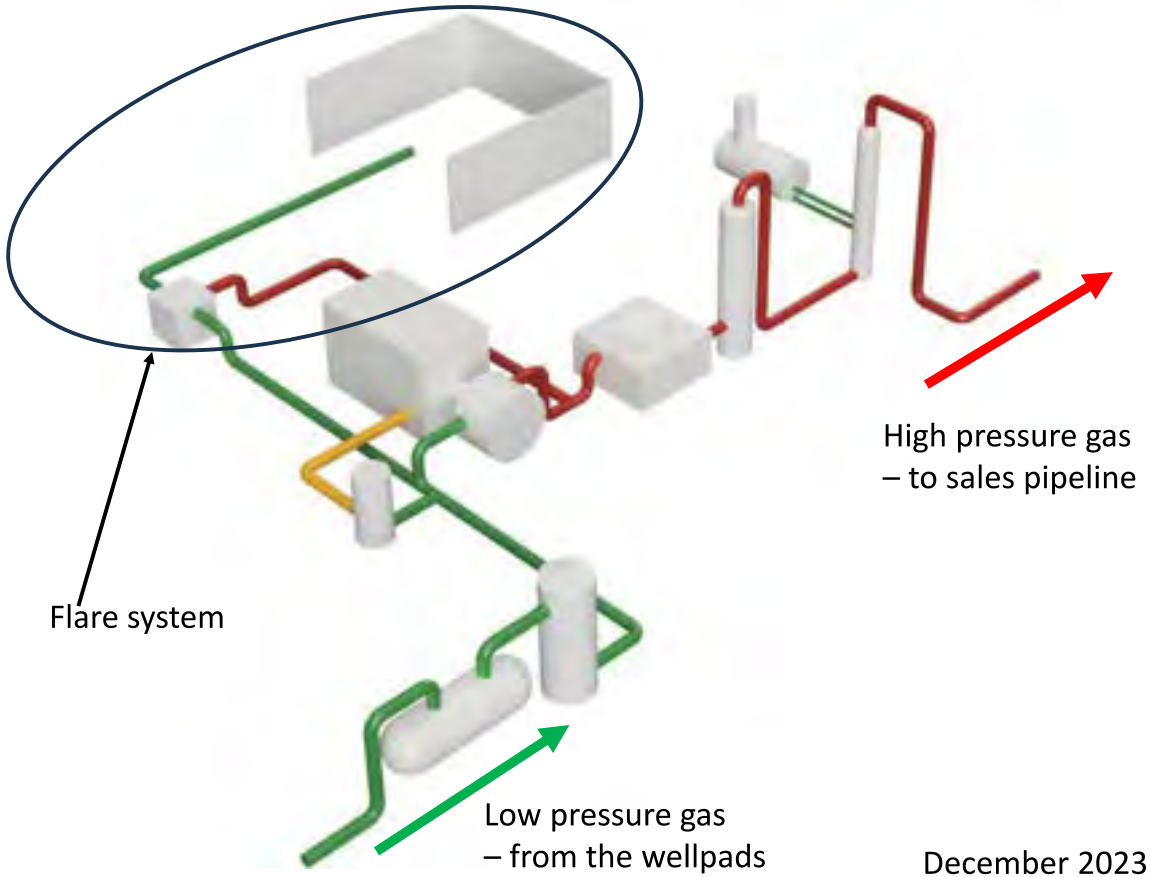
- The compressed gas contains more water vapour than can go to the sales gas pipeline
- A Tri-Ethylene Glycol (TEG) gas dehydration system removes this water vapour
- TEG liquid is constantly pumped through the contactor tower, where water vapour transfers from the gas to the TEG liquid
- The TEG liquid flows from the contactor tower to the reboiler, where the water is removed
- The TEG liquid is re-used



December 2023

Compressor station – Flare system

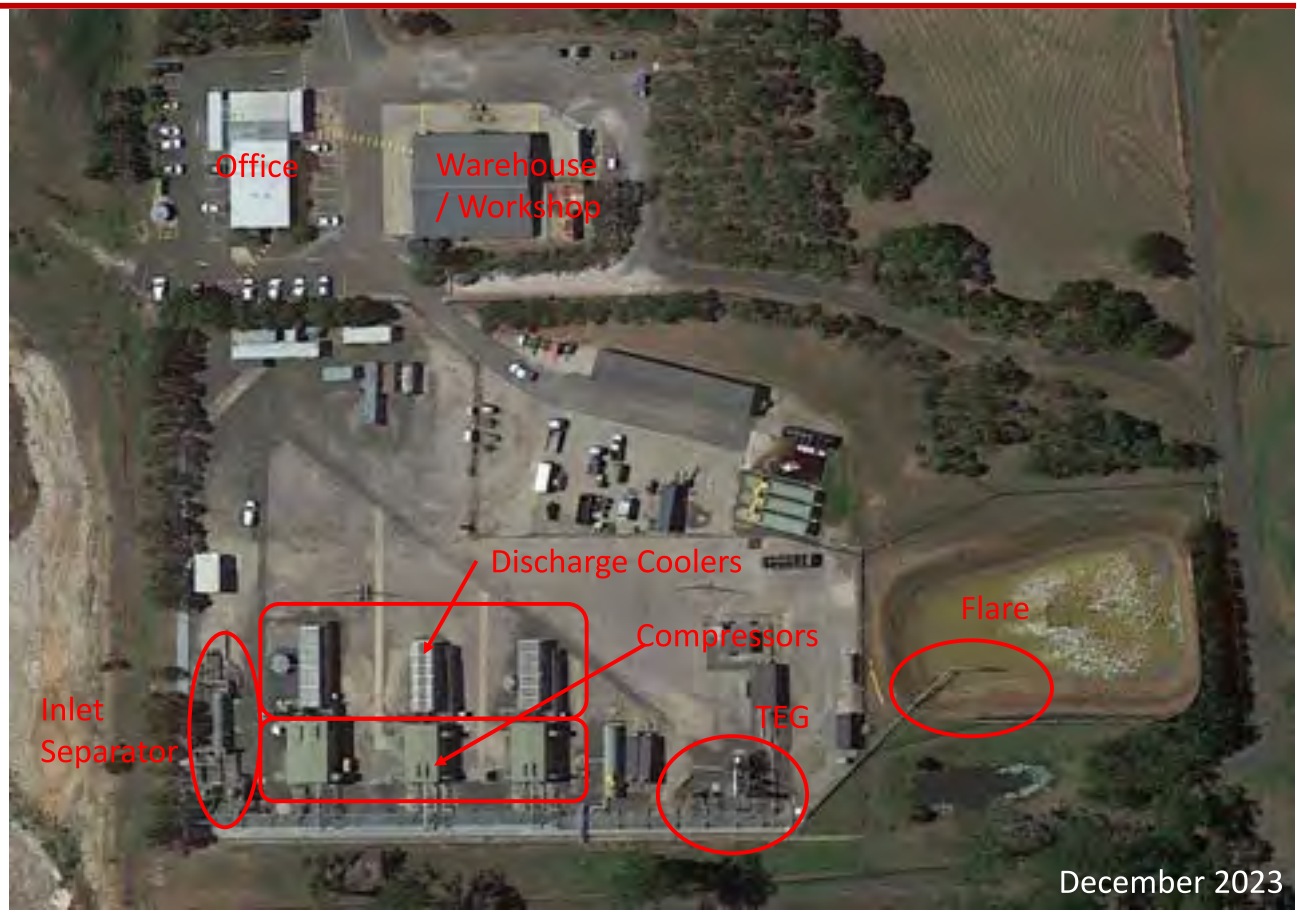
- A flare system allows a safe and controlled method of flaring gas (releasing as an ignited flame to limit methane emissions) if required
- The flare system can release gas from a Pressure Safety Valve (PSV) in the plant
- The flare system can also release gas for a planned event such as start-up, maintenance, testing or shutdown
- The flare system will have a continuously lit pilot burner



December 2023

Compressor Station - Overview

- Compressor stations can be made up of multiples of these major components, associated pipework and other infrastructure, as shown in this example image
- Compressor Stations operate 24 hours per day, seven days per week



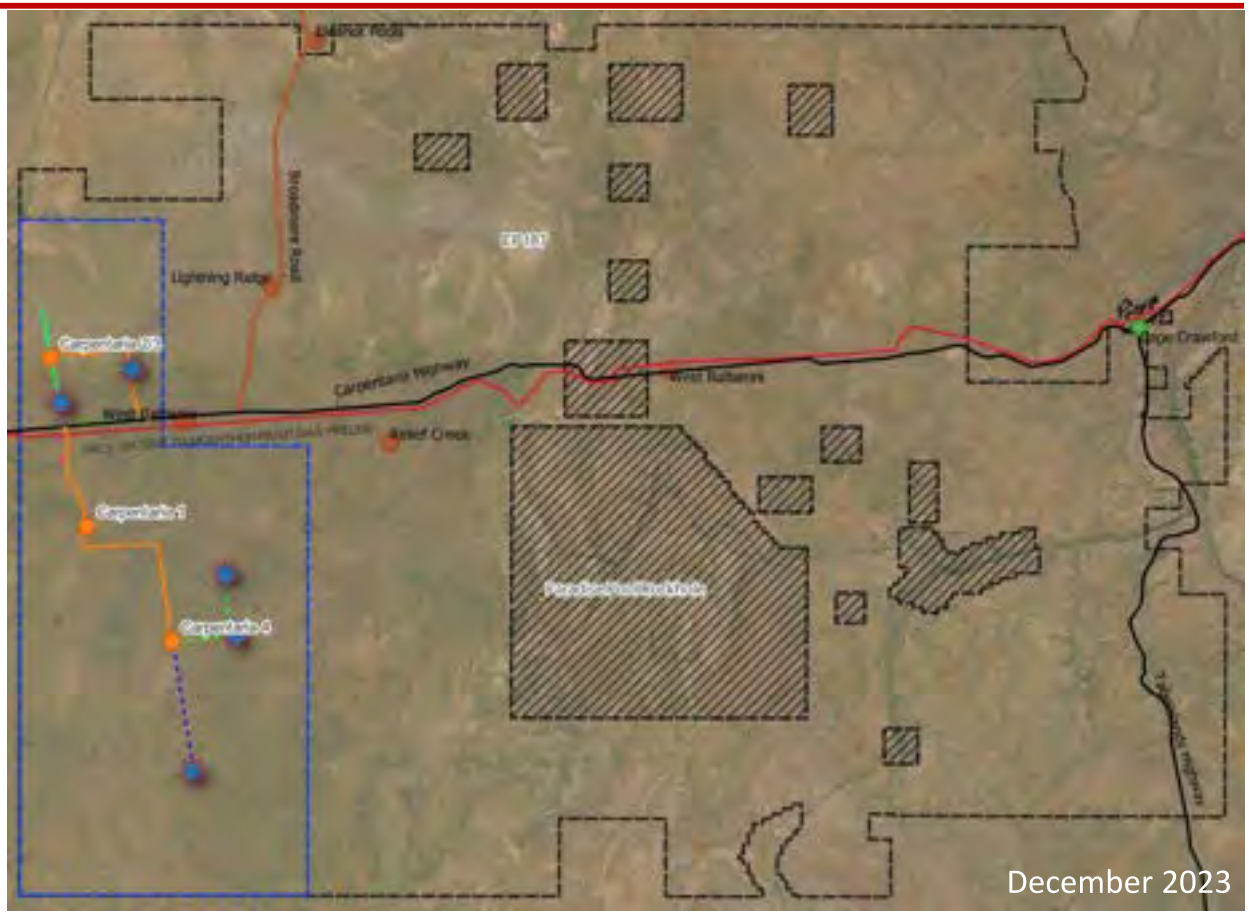
Towards Production – Other Infrastructure

- Other infrastructure to support the project will include:
  - Radio towers
  - Camp and office septic processing units with irrigation
  - Sales gas metering station
- This infrastructure will be at facilities, wellpads or ROWs

December 2023

Towards appraisal – When and where

- When:
  Starting in 2024 for ~5 years
- Currently working with the NLC to start the process of reaching an agreement with the directly affected traditional Aboriginal owners to recover gas on an appraisal basis and sell it
- Imperial will then apply for Ministerial approval
- Where:
  Blue outlined area



Potential employment opportunities

Wellpad, access track and flowline construction, drilling and hydraulic fracturing programs:

- First disturbance cultural management (short duration, weeks)

Facilities construction programs:

- First disturbance cultural management (short duration, weeks)
- Construction work (short/medium duration, weeks/months)

Appraisal to flare:

- Vegetation management (seasonal, weeks)
- Civils maintenance (seasonal, weeks)

Appraisal to sale:

- Traineeships/apprenticeships (ongoing, years)
- Vegetation management (seasonal, weeks)
- Civils maintenance (seasonal, weeks)

The sale of appraisal gas needs to be agreed and approved before appraisal to sale can be realised

December 2023

Potential business opportunities

Wellpad, access track and flowline construction, drilling and hydraulic fracturing programs:

- Civil construction (short duration, weeks)
- Fencing (short duration, days)

Facilities construction programs:

- Construction work (short/medium duration, weeks/months)

Appraisal to flare:

- Vegetation management (seasonal, weeks)
- Civils maintenance (seasonal, weeks)

Appraisal to sale:

- Waste management (ongoing, years)
- Vegetation management (seasonal, weeks)
- Civils maintenance (seasonal, weeks)

The sale of appraisal gas needs to be agreed and approved before appraisal to sale can be realised

December 2023

Moving Forward Together

THANK YOU

Imperial Oil & Gas Pty Ltd

consultation@empiregp.net
Level 5
6-10 O'Connell Street
Sydney NSW 2000

Ph: 02 9251 1846

www.empireenergygroup.net

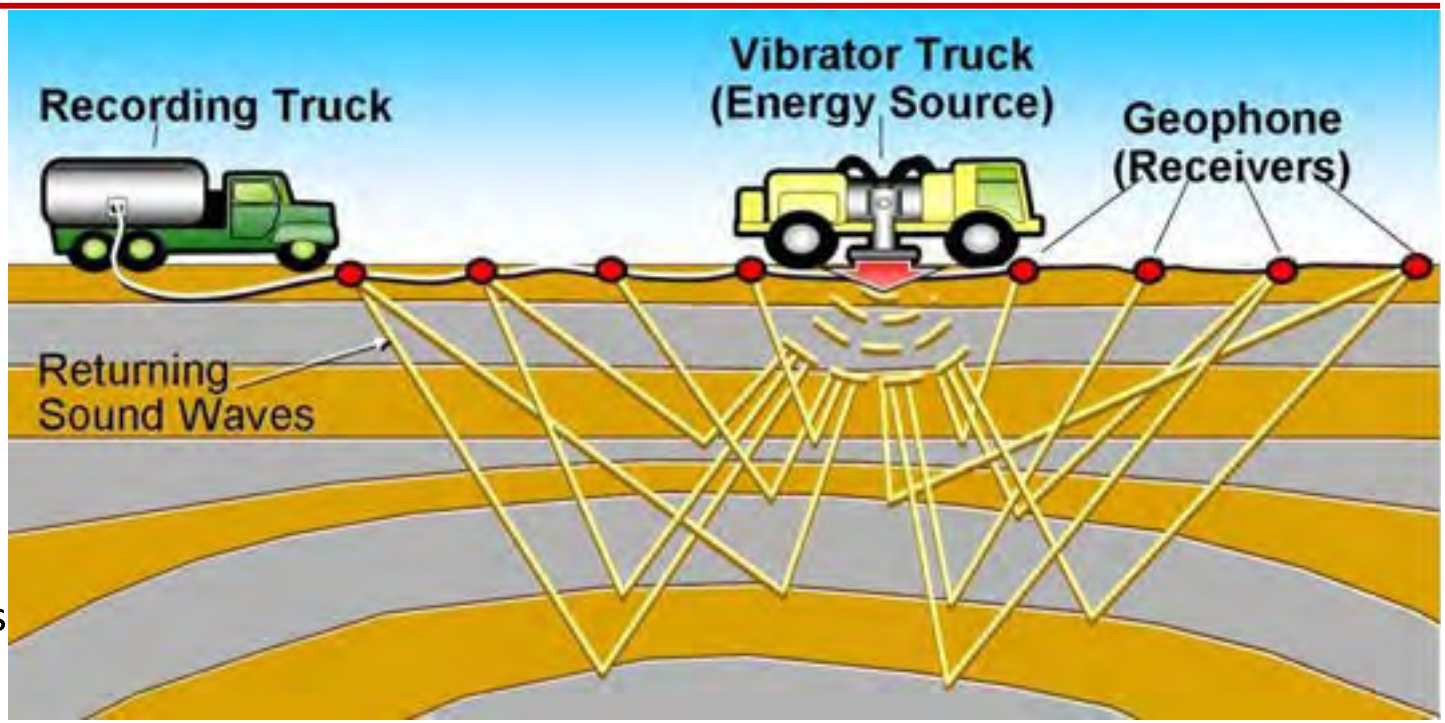
Moving Forward Together

Additional Information Seismic

2D Seismic Survey

How it works:

- Vibroseis buggies put a vibration into the ground
- The vibration travels through the ground, reflecting off of different formations



- Geophones pick up the reflected vibrations and the information is stored
- A map of the subsurface formations is built from the stored information

December 2023

2D Seismic - Line Clearing

- Cleared with bulldozer and grader
- Works culturally managed by Traditional Owners
- Work around trees where possible
- Leave roots in soil where possible

2019 - Cultural Managers for 32 days

2021 - No Cultural Managers due to COVID-19

2D Seismic - Geophone install

- Geophones are installed by hand
- Report back to central station/mobile office

2D Seismic - Acquisition

- Vibroseis buggies work in pairs
- Information is monitored in the mobile office

December 2023

2D Seismic - Rehabilitation

Left
Seismic lines several days after rehabilitation December 2019

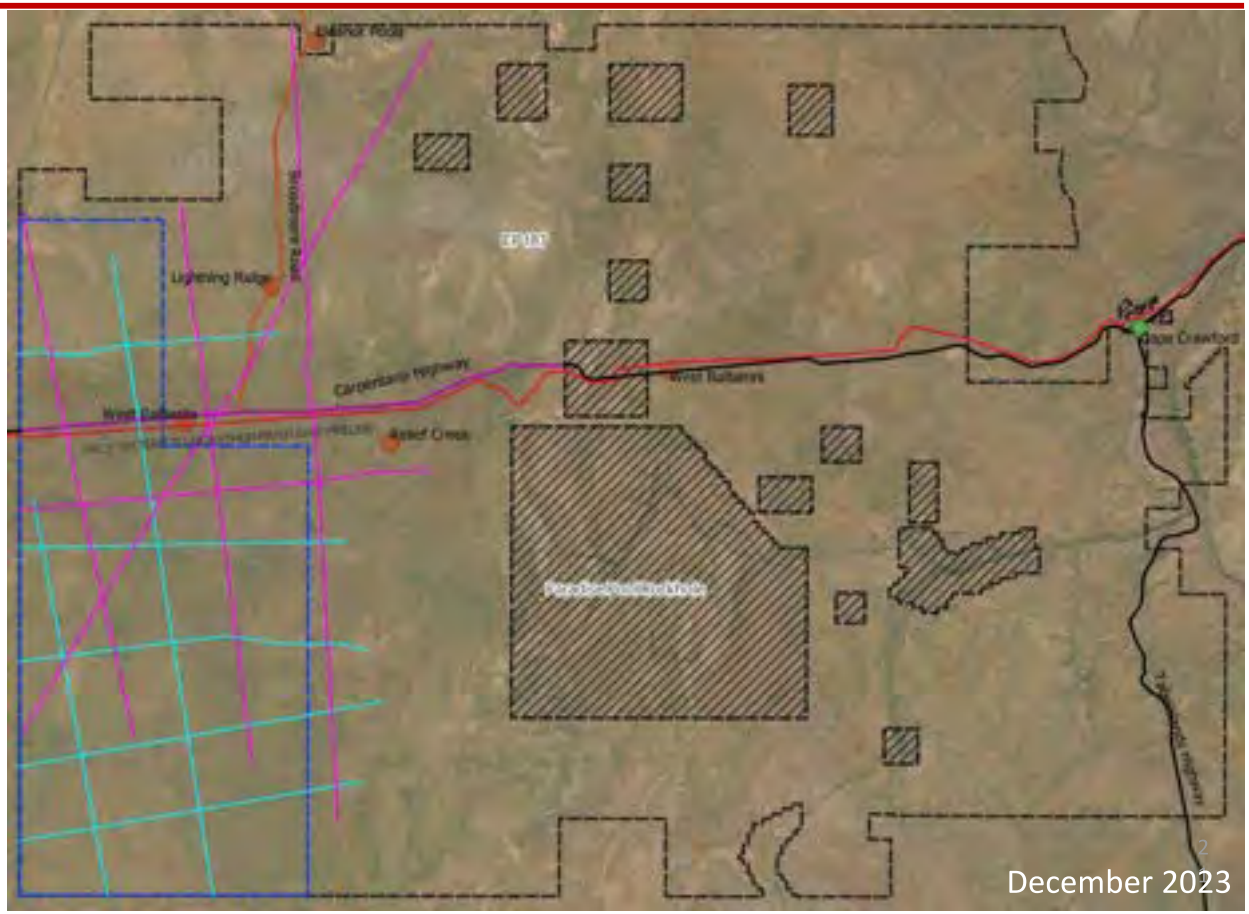
Right
Seismic lines July 2020 during the post wet season weed survey

The July 202 post wet season survey found;
-40% of seismic lines are now hard to find as grass coverage has returned to the same/better as in paddock.
-40% of seismic lines have same grass coverage as the paddock with exception of a cattle trail
-20% of seismic lines have grass coverage striking and are being used by grazier or is slow growing spinifex similar to the surrounding paddock

Cattle pad

2D Seismic – EP187

- 2019 2D seismic program is shown in pink
- 2021 2D seismic is shown in blue



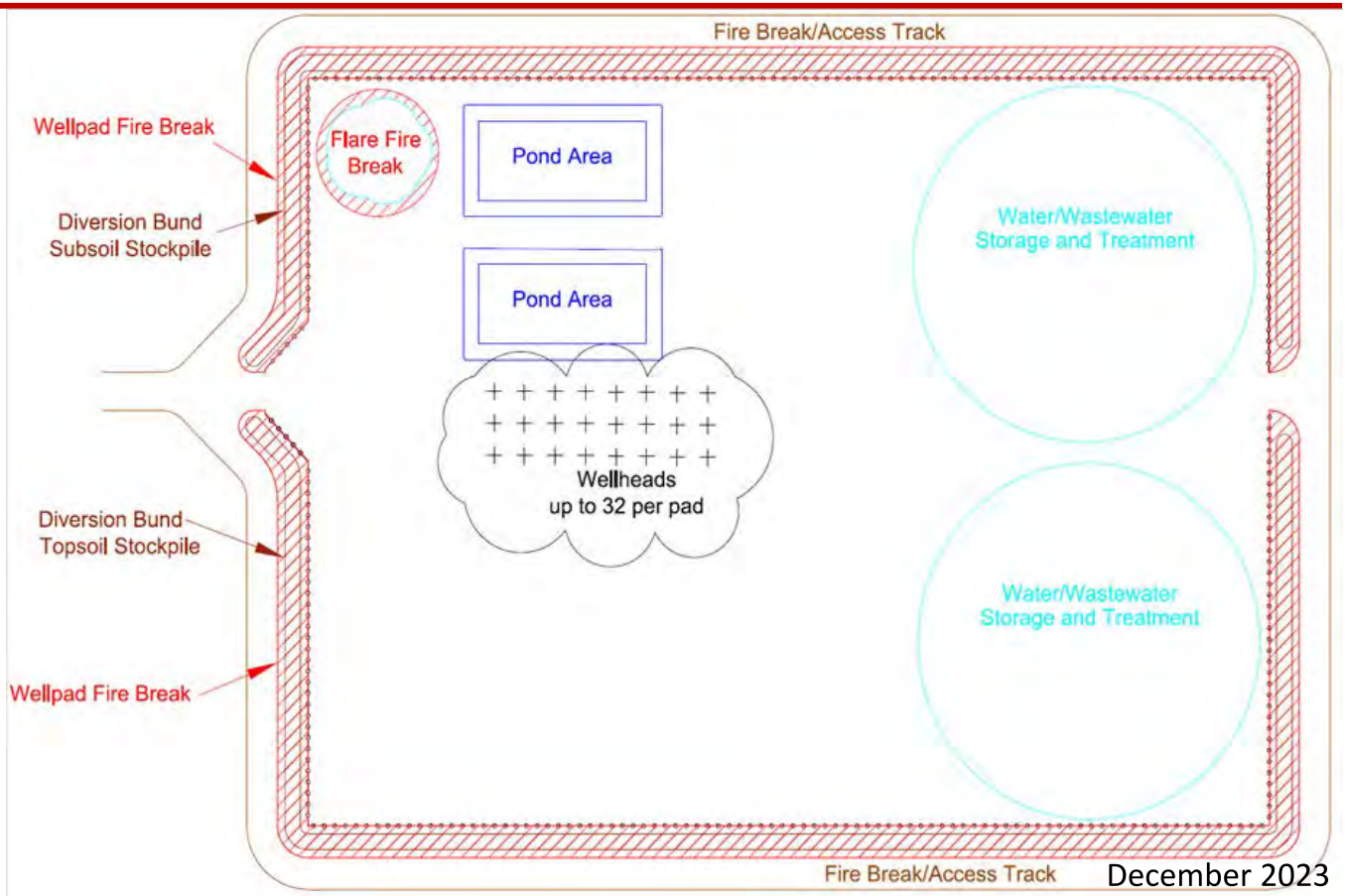
December 2023

Moving Forward Together

Additional Information Drilling

Drilling – Multiwell pads

- Multiple wells drilled on the same pad
- Reduce the number of wellpads, access tracks and flowlines required
- Allows one set of tanks and ponds to be re-used for several wells



December 2023

Drilling – Fluid storage freeboard

- Ponds have freeboard capacity for potential rainfall
- In line with Code of Practice, freeboard must allow for a once in a thousand-year rainfall event
- White line markers indicate maximum fill level with freeboard above the line

Drilling – Fluid and cuttings disposal

- Drill fluids will be disposed of by evaporation
- If the residues meet requirements, it will be disposed of by on-site burial
- If residues do not meet requirements, it will be disposed of by removal from site to a licensed facility

December 2023

Drilling - Carpentaria 1 V

- Drilled 23/09/2020 to 23/10/2020
- Vertical well drilled to 1890m
- No environmental incidents
- May be re-entered and drilled as a Horizontal well in the future

Drilling - Carpentaria 2

- Drilled 07/11/2021 to 16/12/2021
- Vertical well drilled to 1800m
- Vertical plugged back to 1050m
- Horizontal well drilled to 3150m
- 1300m of horizontal well in the target formation
- No environmental incidents

December 2023

Drilling - Carpentaria 3

- Drilled from the existing Carpentaria 2 pad
- Drilled 13/10/2022 to 21/11/2022
- Horizontal well drilled to 4460m
- ~2500m of horizontal well in the target formation
- No environmental incidents

Drilling - Carpentaria 4

- Drilled 15/12/2022 to 05/01/2023
- Vertical well drilled to 2000m
- No environmental incidents
- Plan to plug back and drill a horizontal well from this wellbore

December 2023

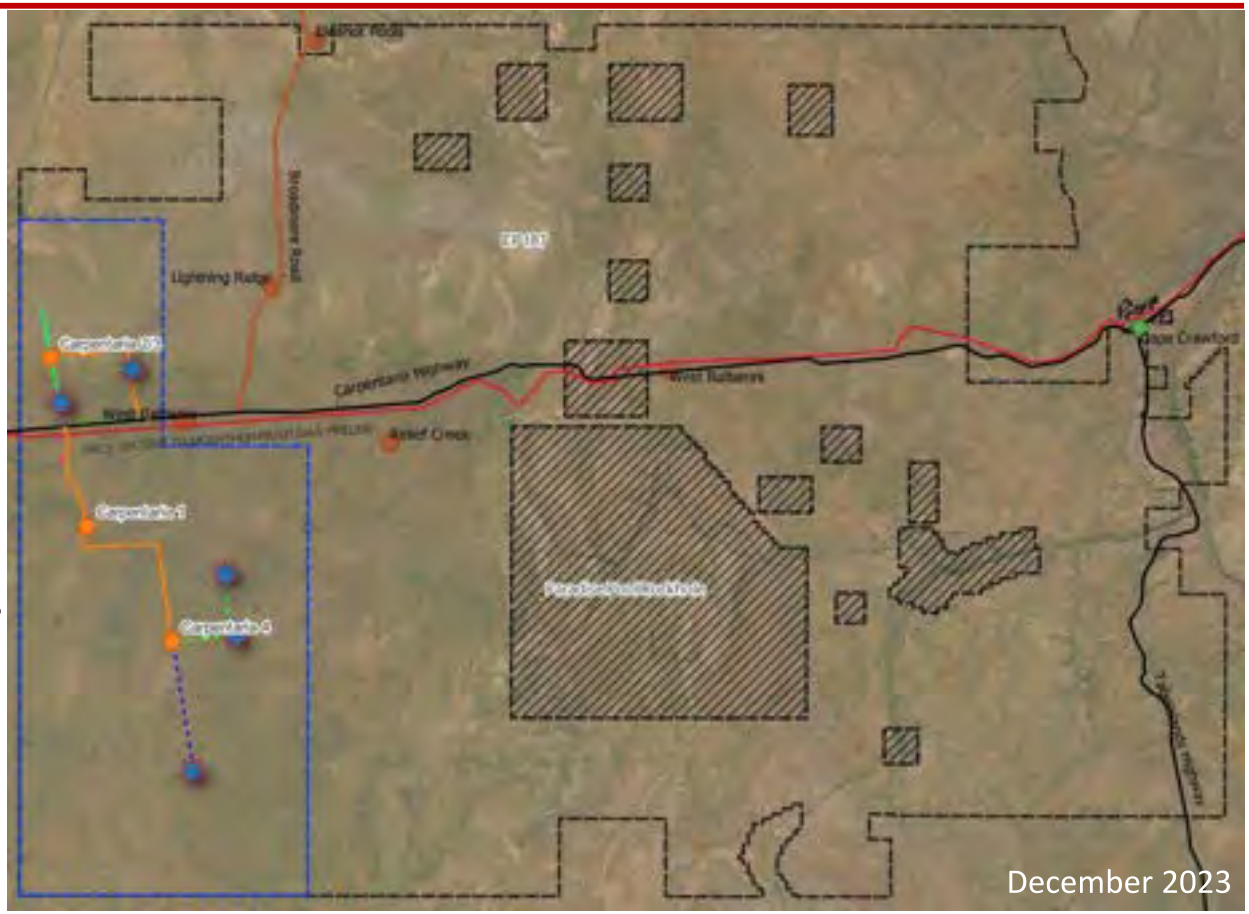
Drilling– EP187

2020
- Carpentaria 1 Vertical (V)

2021
- Carpentaria 2 V
- Carpentaria 2 Horizontal (H)

2022
- Carpentaria 3 H on the Carpentaria 2 wellpad
- Carpentaria 4 V

Future works
- Up to 10 new Horizontal wells



Moving Forward Together

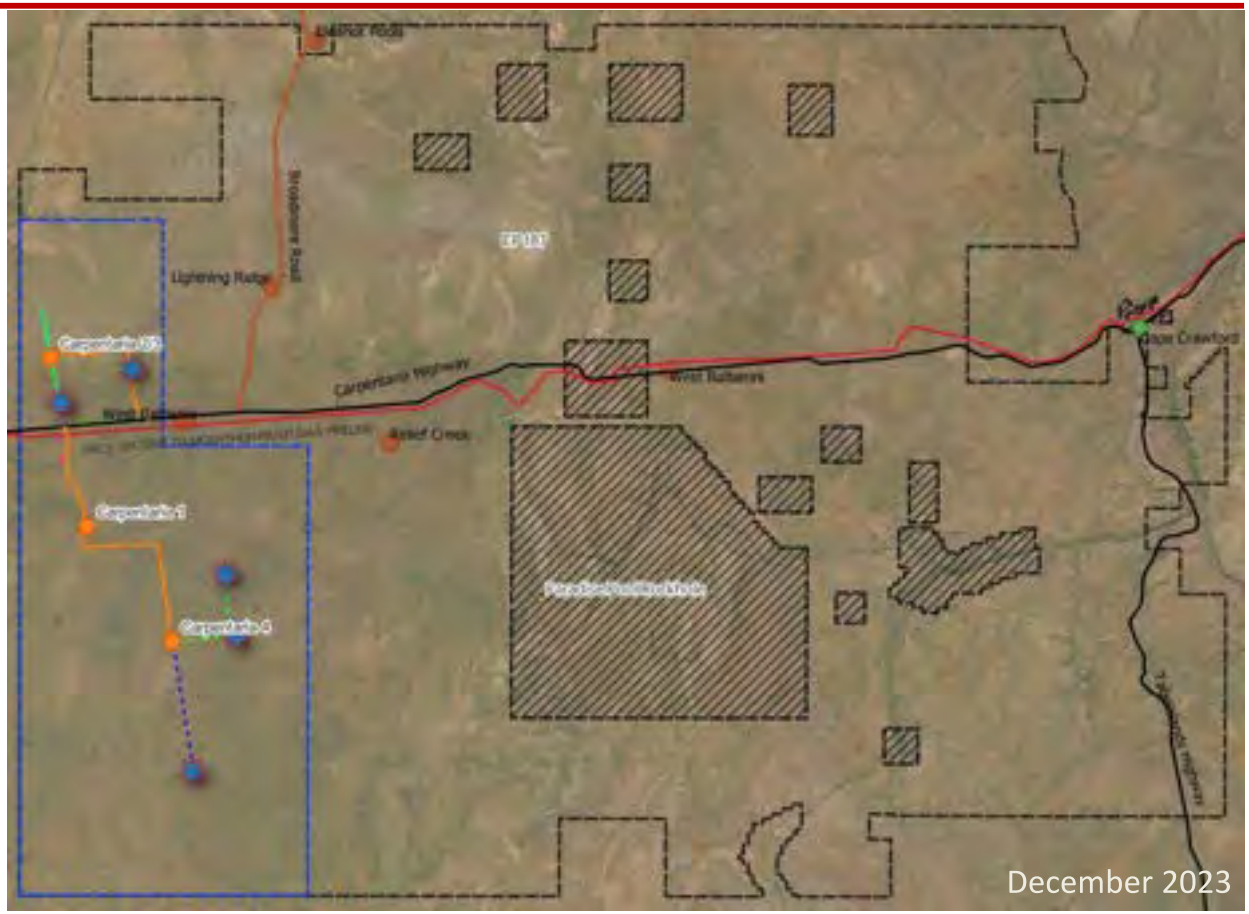
Additional Information Hydraulic Fracturing

Hydraulic fracturing – EP187

2021
- Carpentaria 1 Vertical

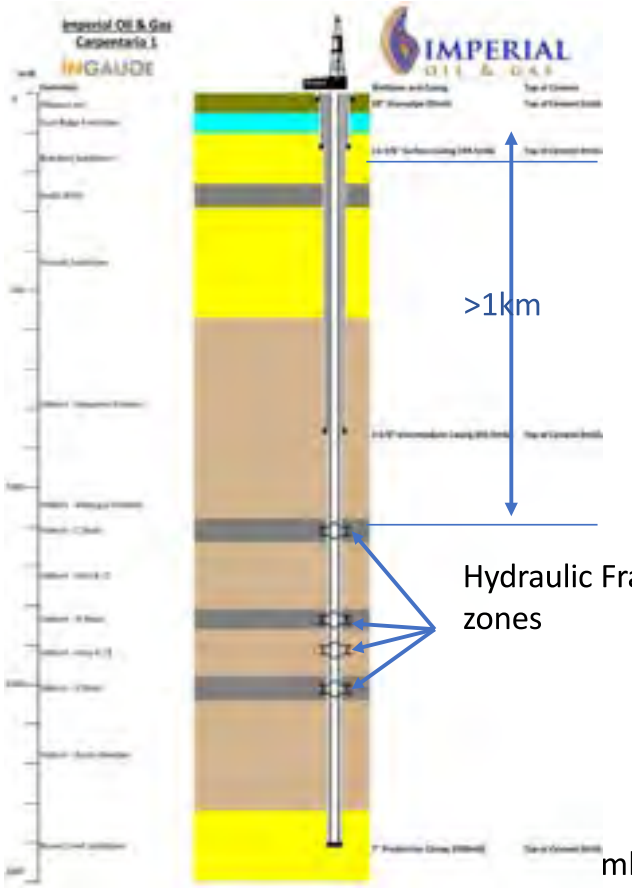
2022
- Carpentaria 2 Horizontal
- Carpentaria 3 Horizontal

Future works
- Up to 10 new Horizontal wells



2021 Hydraulic Fracture – Carpentaria 1

- Perforated and Fracture stimulated into 4 zones in the Velkerri Formation
- The closest formation over 1km deeper than the bottom of the closest aquifer
- The aquifer monitoring showed no impact on the aquifer from HF
- The well integrity monitoring showed no well integrity issues during HF
- The seismicity sensor showed no seismic events caused by HF



mber 2023

Hydraulic Fracture – Carpentaria 2

- HF 21 stages in 1km of horizontal wellbore
- No safety or environmental issues
- The closest formation is over 1km deeper than the bottom of the closest aquifer
- Aquifer monitoring showed no impact on the aquifer from HF
- The well integrity monitoring showed no well integrity issues during HF
- The seismicity sensor showed no seismic events caused by the HF

Hydraulic Fracture – Carpentaria 3

- HF 40 stages in ~2.5km of horizontal wellbore
- No safety or environmental issues
- The closest formation is over 1km deeper than the bottom of the closest aquifer
- Aquifer monitoring showed no impact on the aquifer from HF
- The well integrity monitoring showed no well integrity issues during HF
- The seismicity sensor showed no seismic events caused by HF

2021 Hydraulic Fracture – Carpentaria 1

- The aquifer monitoring showed no impact on the aquifer from HF
- The well integrity monitoring showed no well integrity issues during HF
- The seismicity sensor showed no seismic events caused by HF

Moving Forward Together

Additional Information Production testing

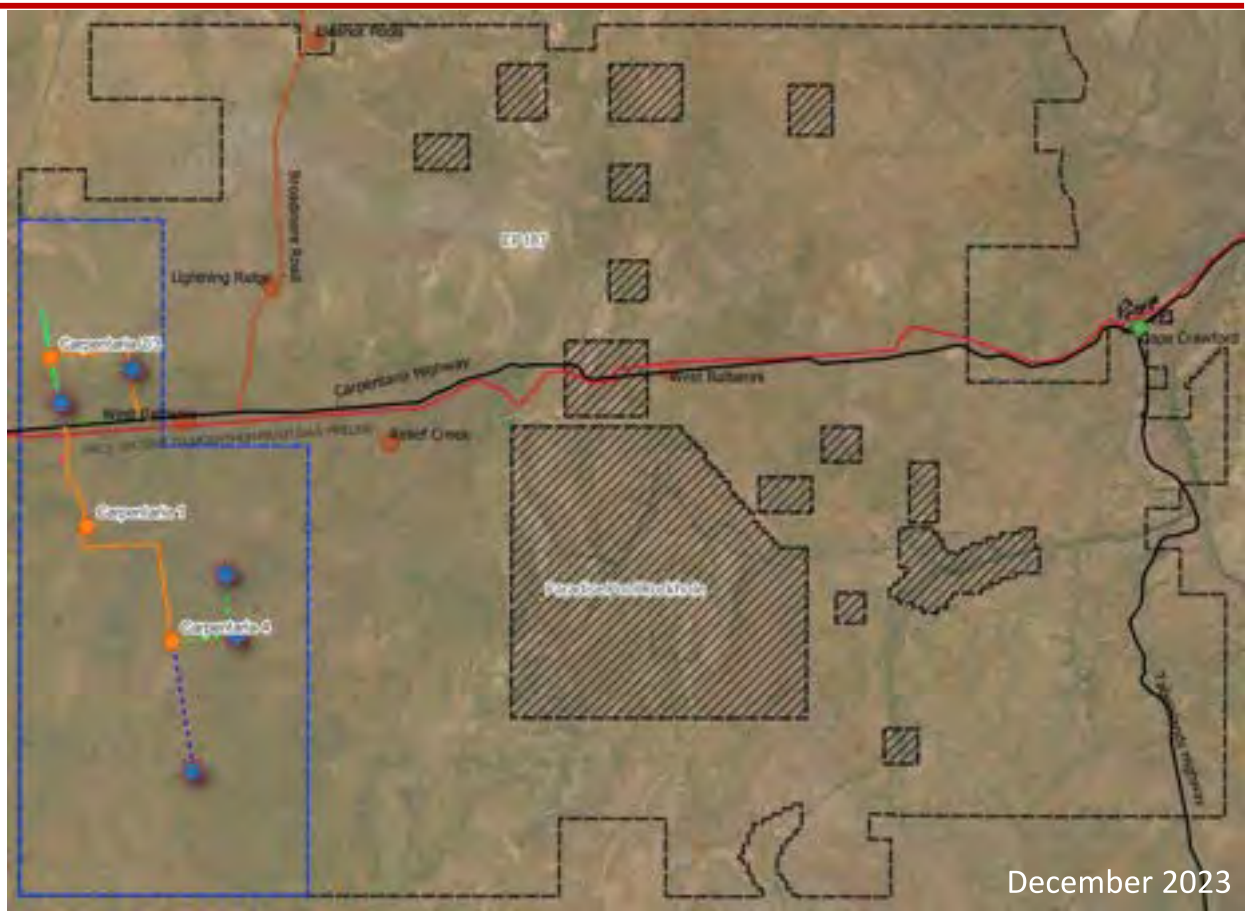
Production Testing – EP187

2021
- Carpentaria 1 Vertical

2022/2023
- Carpentaria 2 Horizontal
- Carpentaria 3 Horizontal

Future works
- Carpentaria 1, 4, 5, 6, & 7 Horizontal wells

- Orange lines are constructed access tracks
- Dashed lines are planned access tracks
- Orange dots are current wellpads
- Blue/red stars are planned wellpad locations



Moving Forward Together

Additional Information
Water use

Project Water usage

- Imperial has a water extraction license for the activities in EPs 167, 168, 187
- The majority of water is used in Hydraulic Fracturing
- Imperial is re-using Flowback Water where practicable to reduce freshwater requirements
- Only a small volume of water is used in production

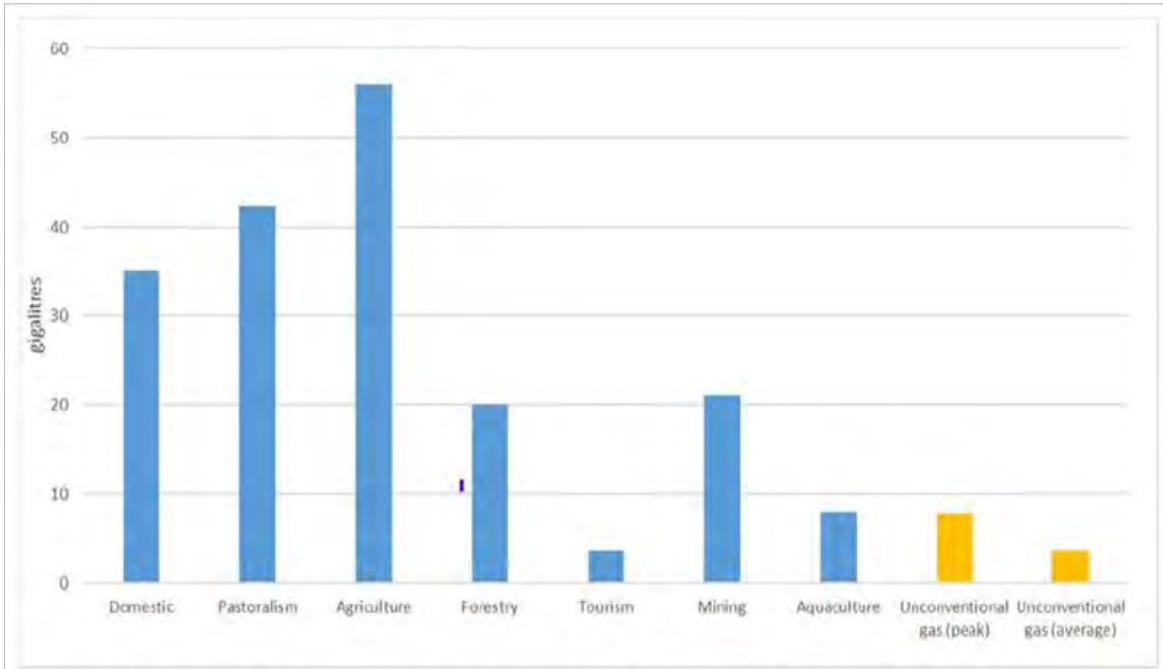


Figure 2-1. Graph comparing estimated annual water use (by industry) in the NT

A "Comparative Impact Study" by EcOz in 2017 found that the water use for gas production is likely to be less than other uses in the NT. https://frackinginquiry.nt.gov.au/?a=440742

December 2023

Moving Forward Together

Additional Information Wellpad facilities

Wellpad facilities – Wellpad Compression

Wellpads may be fitted with wellpad compression to reduce the backpressure on wells to aid production later in their life.

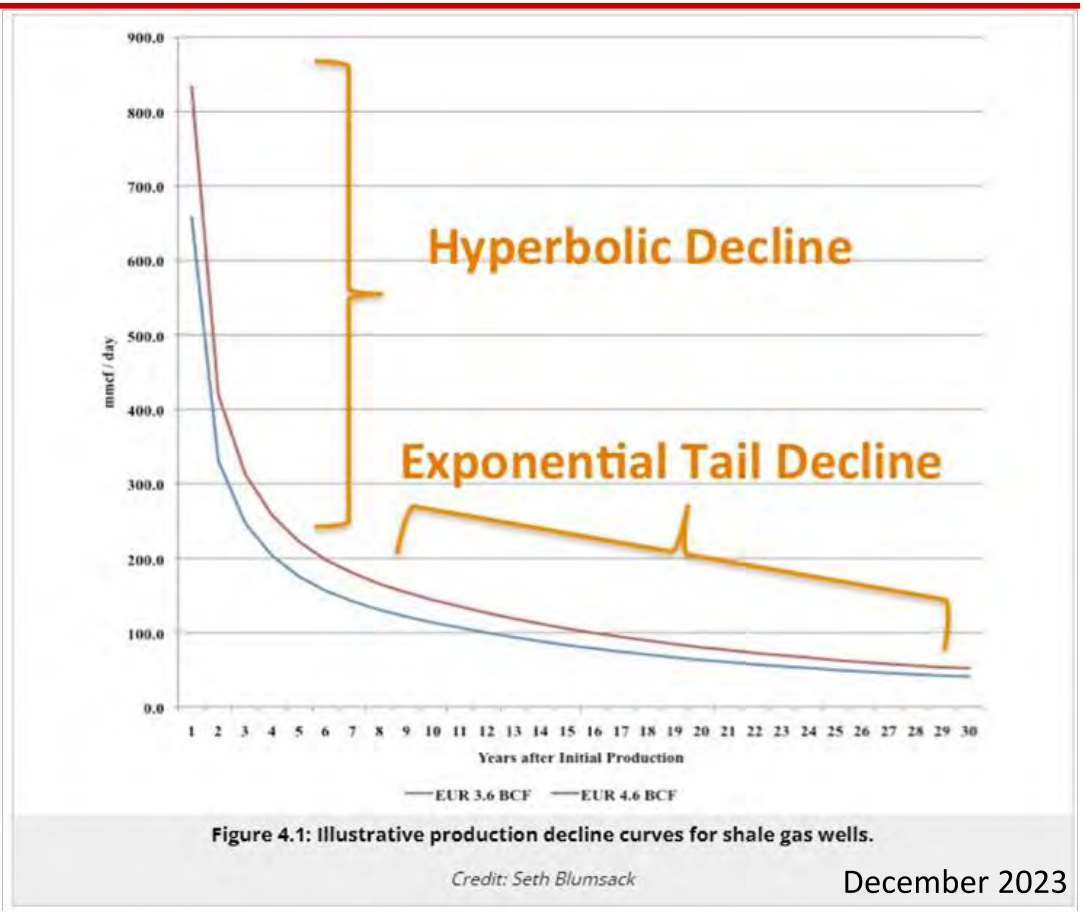


Figure 4.1: Illustrative production decline curves for shale gas wells.

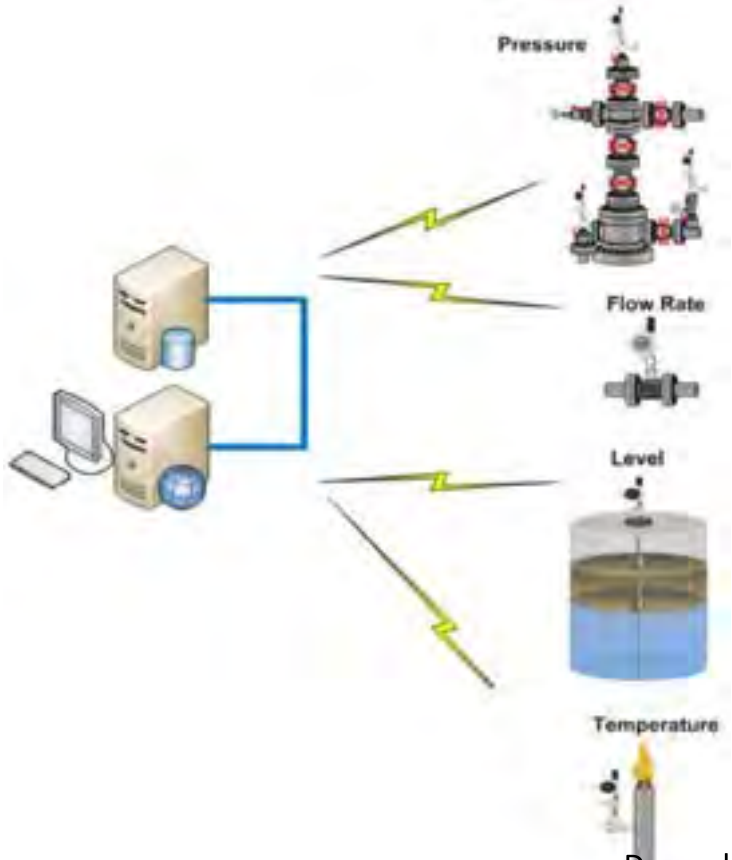
Credit: Seth Blumsack

December 2023

Wellpad facilities – SCADA

Wellpads may have Supervisory Control and Data Acquisition (SCADA) systems to monitor and control wellpad equipment remotely, such as:

- Gas pressures and flow rates
- Water/wastewater levels and flow rates
- Control equipment:
  - Valves
  - Motors
  - Pumps
  - Bores
  - Etc



December 2023

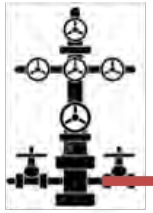
Moving Forward Together

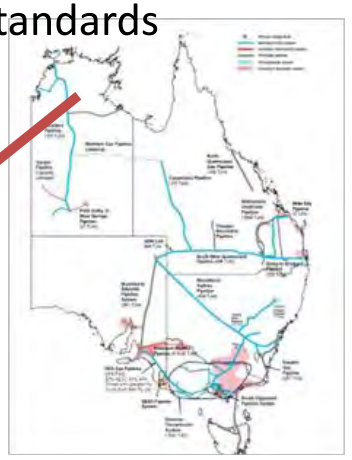
Additional Information Production

Working towards Production

A Production Agreement and other approvals need to be in place before production can start

- Production would involve;
  - multiple HF horizontal wells on multiple wellpads
  - multiple wastewater transfer and gas gathering flowlines
  - a compressor station
  - a pipeline to tie into the Australian gas network
- All infrastructure will be constructed to relevant Australian standards





4.1.9 2023.11.27 | Letter to Imperial – Additional Information Request

From [redacted]
Sent: Monday, 27 November 2023 11:40 AM
To [redacted]
Cc [redacted]
Subject: RE: EP187 and Imperial Carpentaria Pilot Project (NLC-NLC FID8237)

[redacted]

Please find a letter **attached** for your consideration.

You may have already heard but I wanted to let you know that I am leaving the NLC and my last day will be 14 December 2023. We will advise who has taken carriage of this matter within the Legal Branch after that time, but in the interim please continue to keep [redacted] copied into correspondence.

[redacted]

IMPERIAL
OIL & GAS

NORTHERN
LAND COUNCIL

27 November 2023

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

EP 187 – EXPLORATION WORK PROGRAM, FUTURE CONSULTATIONS, ENVIRONMENTAL MANAGEMENT PLAN AND [redacted]

1. Thank you for your letter provided on behalf of Imperial Oil and Gas (**Imperial**) dated 1 November 2023 which provided information in relation to Imperials' proposed Carpentaria Pilot Project and attached the document titled "Exploration Work Program".

2. The purpose of this letter is to respond to some of the information in your letter and set out the NLC's position on a number of matters relating to Imperials' proposed Carpentaria Pilot Project, the upcoming Exploration Work Program meetings, future consultations and [redacted]

Exploration Work Program Meetings, Future Consultations and Environmental Management Plan

Exploration work program meetings and future consultations

3. Pursuant to clause 13.4 of the Exploration Deed in respect of Exploration Permit 187 between Imperial and the NLC dated 5 February 2014 (**Exploration Deed**), we confirm that in the opinion of the NLC:
    a. a meeting for the purposes referred to in clause 13.5 of the Exploration Deed is required; and
    b. a Sacred Site avoidance survey is required.

4. Please confirm that you have applied for an authority certificate for your Exploration Work Program.

5. In accordance with clause 13.5 of the Exploration Deed, the NLC continues to work towards the Exploration Work Program meetings in the week beginning 4 December 2023. However, as advised on numerous previous occasions, the NLC cannot guarantee that it will be able to hold the meetings at this time, particularly due to uncertainty around the date of our late Chairman's funeral.

6. For the purpose of clarity, we would like to set out some background to the upcoming Exploration Work Program meetings relevant to the groups who have been invited to attend.

7. The preliminary advice of the NLC's Anthropology Branch is that, of the three traditional Aboriginal owner groups for the land within EP 187, only two of those groups are traditional Aboriginal owners for the land within the proposed appraisal area.

8. The two traditional Aboriginal owner estate groups for the land within the proposed appraisal area have been invited to attend the upcoming Exploration Work Program meetings. The third traditional Aboriginal owner group has not been invited to attend the upcoming Exploration Work Program meetings. The third group will need to be consulted on the Exploration Work Program next year. This could be done in combination with a consultation in relation to Imperial's proposed Carpentaria Pilot Project and any proposed variation to the Exploration Deed.

9. In your letter of 1 November 2023, you advised that:
    a. Imperial intends to apply for Ministerial approval to recover petroleum on an appraisal basis in relation to a part of EP 187, being the Carpentaria Pilot Project;
    b. Imperial considers it would satisfy the requirements of section 57AAA(5)(d) of the *Petroleum Act* (NT) (the **Act**) if Imperial obtained the free, prior and informed consent of relevant traditional Aboriginal owners and entered into a variation to the Exploration Deed with the NLC to record the terms and conditions on which any such consent to the Carpentaria Pilot Project was provided; and
    c. Imperial is looking to have all approvals and consents in place in the first quarter of 2024 to allow the commencement of the 2024 Exploration Work Program.

10. I reiterate that I reserve my client's rights to refuse to provide approval, consent or agreement under the *Aboriginal Land Rights (Northern Territory) Act 1976* (Cth) or otherwise to, the sale or other beneficial use of petroleum recovered on an appraisal basis.

11. We are keen to understand whether you have canvased with the Minister the arrangements you propose for meeting the requirements of s 57AAA(5)(d) and whether that approach

will meet the Minister's expectations and requirements having regard to the Act and application guidelines. We look forward to learning what steps you have taken.

12. The NLC is also looking to arrange consultations with the traditional Aboriginal owners in relation to the proposed Carpentaria Pilot Project in 2024.

13. In our view, in order for Imperial to obtain the free, prior and informed consent of the relevant traditional Aboriginal owners to enter into any variation to the Exploration Deed in relation to the Carpentaria Pilot Project, it would be incumbent upon Imperial to, among other things:

    a. consult with traditional Aboriginal owners about its proposals for the Carpentaria Pilot Project;
    b. allow sufficient time for the NLC to consult with traditional Aboriginal owners about the Carpentaria Pilot Project, including proposed terms for any variation to the Exploration Deed via a number of consultations, the number of which must be led by the traditional Aboriginal owners, particularly in light of cultural considerations (the year end is an important time for Ceremony in the Barkly Region of the Northern Territory) and the impending wet season (many of the affected communities become isolated for protracted periods of time due to seasonal flooding and road severance) and any other exigencies applying; and
    c. provide accurate and up to date information to the NLC and the traditional Aboriginal owners in relation to its proposed Carpentaria Pilot Project, to enable traditional Aboriginal owners and the NLC to adequately assess the impacts that may be in prospect for the affected land and waters.

Aboriginal employment

14. The NLC welcomes your advice that the proposed Carpentaria Pilot Project will increase the potential for employment opportunities for traditional Aboriginal owners and other local Aboriginal people. We look forward to the information Imperial intends to present on proposals for employment in connection with activities on or in connection with EP 187 and active engagement by Imperial with traditional Aboriginal owners and the NLC.

15. Could Imperial please provide the NLC with the information required by clause 6.7 of the Exploration Deed before the upcoming Exploration Work Program meetings.

Social Impact Assessments

16. The NLC further welcomes your advice that 'Imperial is commencing the process of assessing and developing proposals to minimise any negative social impacts caused by the Carpentaria Pilot Project. Social impact assessment and plans for minimising negative impacts will be included in the EMP as such assessment and plans develop with engagement with traditional Aboriginal owners, the NLC and the community generally.'

17. The NLC sees social impact assessments as a vital aspect of industry s engagement with traditional Aboriginal owners in the development of the onshore gas sector in the Territory. Social impact assessments assist to 'identify key issues from the perspective of those potentially impacted by projects; predict and anticipate change; and embed these understandings into ongoing systems and strategies to proactively respond to the consequences of development.'[1] The NLC proposes to brief an expert to commence a social impact assessment process. For the brief and process to be meaningful, we would need Imperial to provide a detailed description of the Carpentaria Pilot Project. Therefore, we would like Imperial to turn its mind to the information it is able to provide to the NLC in order to progress this assessment. We will also look for clarity about funding this process. We will engage with Imperial on this issue.

Additional Information

18. Could Imperial please provide the following further information in relation to its plans for EP 187:
    a. When will Imperial be finalising its initial concept designs that will be used as the basis for seeking approvals for the Carpentaria Pilot Project?
    b. What is Imperial's environmental approval timetable for the Carpentaria Pilot Project?
    c. What is Imperial's timing for lodgement of the application for a production licence on EP 187?

Nature of the negotiations

19. Imperial's Exploration Work Program refers to both appraisal gas and production negotiations. The NLC understand that Imperial would like to progress negotiations for any variation to the Exploration Deed in earnest next year.

20. We thought it was a good time to be clear that any deal struck with the NLC, if that is what the traditional Aboriginal owners want to achieve, will be based on the totality of the negotiations.

21. All the discussions and the information shared between the parties are without prejudice and the traditional Aboriginal owners may, in the future, instruct the NLC to object to the project or certain information received from Imperial. Therefore, receipt of information from Imperial and a failure to comment or object by traditional Aboriginal owners or the NLC when the information is received, does not waive the rights of the NLC or the traditional Aboriginal owners to ask questions or raise issues about that information in the future. The NLC wants there to be open and transparent communication between the parties.

---

[1] Vanclay, F. and Esteves A M. (Eds). 2011. New Directions in Social Impact Assessment: Conceptual and Methodological Advances. Cheltenham: Edward Elgar.

so that the traditional Aboriginal owners can give Imperial informed consent (if that is what they want to do).

22. Equally, the NLC understands that the information shared by Imperial may evolve over time. This is common in projects of this scale. The NLC would appreciate being kept abreast of these changes as they occur.

Environmental management plan

23. In your letter you also advised that you expect to provide draft sections of the EMP in mid-November 2023 before the previously scheduled Exploration Work Program meetings. Imperial's Exploration Work Program states '[t]he likely Environmental Impact of any activity and any proposals to minimise such impact is described in Imperial's Environmental Management Plan IMP5, which will be provided to the NLC by 20 November 2023 for feedback before lodgement to the regulator'

24. The NLC has not received a copy of the EMP or draft sections of the EMP. Noting that the Exploration Work Program meetings have been tentatively rescheduled for 5 and 7 December 2023, please provide a copy of the draft sections of the EMP as soon as possible, and before close of business on Wednesday 29 November 2023.

25. In order to satisfy the stakeholder engagement requirements in the *Petroleum (Environment) Regulations 2016* (**Regulations**), Imperial is required to provide the information set out in reg 7(2)(a) and, in accordance with reg 7(2)(b), allow a reasonable period for the stakeholder to respond to the information.

26. The NLC requests that, at least 2 months before Imperial intends to submit the final draft of the EMP to the Minister (**EMP**), Imperial provides a copy of the EMP to the NLC, and presents the information contained in the EMP to traditional Aboriginal owners via consultation. We do not consider that Imperial could obtain the free, prior and informed consent (**FPIC**) of the traditional Aboriginal owners in order to enter into any variation to the Exploration Deed with the NLC, or satisfy the stakeholder engagement requirements in the Regulations unless it provides a reasonable timeframe for the NLC and the traditional Aboriginal owners to assess the EMP.

27. Considering the size and content of an EMP, in our view, 2 months is a reasonable time period to allow the NLC and traditional Aboriginal owners to assess and respond to the information, in accordance with reg 7(2)(b) and FPIC standards.

28. For completeness, the NLC does not consider that Imperial will comply with the Regulations or FPIC standards if it consults with the two traditional Aboriginal owner groups on *draft parts* of the EMP at the upcoming Exploration Work Program meetings. Please advise whether Imperial is willing to comply with our request at paragraph 26 above.

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[redacted]

35. If you have any questions about this letter please contact me on the details below.

[redacted]

4.1.10 2023.11.29 | Response to Letter

From: [redacted]
To:
Cc:
Subject:
Date: Wednesday, 29 November 2023 1:52:00 PM
Attachments: image001.png

[redacted] ill provide immediately under a separate email access to a site to download the following:

1. Draft Environment Management Plan (**EMP**) for the Carpentaria Pilot Project. This EMP is subject to revision and further additions including assessments, reviews, feedback, cultural heritage, stakeholder engagement, the outcome of any studies, regulatory requirements and any engineering and processing improvements.

[redacted]

In terms of timeline issues:

1. The initial concept designs for the Carpentaria Pilot Project are set out in the:
   a. the Work Program provided to the NLC on 1 November 2023;
   b. the slide pack provided to the NLC on 20 November 2023; and
   c. the attached EMP.(provided in link to follow)
2. Imperial's environmental approval timeline for the Carpentaria Pilot Project is:
   a. Lodge EMP: February 2024
   b. EMP approval: May 2024
3. Imperial is required to establish the commercial viability of the shale gas reservoir identified in the western area of EP 187 before Imperial applies for a production licence. Imperial proposes to seek to establish commercial viability by the extended well testing provided for by the Carpentaria Pilot Project. Subject to the outcomes of the extended well testing, Imperial expects that it may take between 2 and 5 years before a production licence is applied for.

Imperial has not discussed with the Minister the arrangements Imperial proposes for meeting the requirements of section 57AAA(5)(d) of the Petroleum Act.

Imperial has applied for Authority Certificates for the work program.

[redacted]

4.1.11 2023.12.07-14 | Facilitation of Cultural Monitors

From [redacted]
Sent: Thursday, 7 December 2023 7:53 AM
T [redacted]
C [redacted]
Subject: Imperial O&G - EP187 - Cultural Monitors

[redacted]

Could we please get a couple of cultural monitors from the 18th to the 22nd of December to re-inspect an area covered in the recent site assessment?

This will be a ground survey with access in 4WD, no helicopter or UTV travel is required.

Sorry for the late notice!!

Cheers

[redacted]

<image005.png> <image006.png>

<image007.png> Well Engineering & Project Management

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From: [redacted]
Sent: Thursday, December 7, 2023 9:59 AM
To: [redacted]
Cc: [redacted]
Subject: RE: Imperial O&G - EP187 - Cultural Monitors

[redacted]

I will try to facilitate this- but we do need some more information.

1. Can you please send through spatial files of the area you are requesting cultural monitors to re inspect?
2. What is the nature and purpose of the inspection?
3. Will IOG arrange for accommodation, food PPE like last time?
4. Do you require NLC support for pick ups/drop offs?

Planning for cultural monitor engagement
As previously raised, NLC do require reasonable notice for engagement for cultural monitors – Noting that it is not always possible to provide exact dates, an anticipated schedule for each the upcoming quarters/ works would still be of assistance in planning for these events. Going forward can I please request that an anticipated schedule please be provided to NLC and that future requests for cultural monitor attendance be provided with at least 3 weeks notice to the planned commencement of activity.

Kind regards,

[redacted]

<image004.jpg>

[redacted]

From: [redacted]
Sent: Thursday, 7 December 2023 11:10 AM
To: [redacted]
Cc: [redacted]
Subject: RE: Imperial O&G - EP187 - Cultural Monitors

[redacted]

Sorry about the phone tag; I have been in and out of meetings.
Also, sorry about the short notice; this has only happened in the last 24 hours.

1. Please find the spatial files attached.
2. The inspection is a continuation of the recent on-ground assessment for the upcoming work program.
3. IOG will supply accommodation, meals, PPE, etc.
4. Support for pick-ups/drop-offs would be ideal if it can fit in; if not, we will organise it.

[redacted]

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On 7 Dec 2023, at 11:30 am, [redacted] wrote:

[redacted] one other thing what're the details of the accommodation- same as last time- Heartbreak?

[redacted]

<image004.jpg>

[redacted]

Sent from my iPhone

On 7 Dec 2023, at 1:02 pm [redacted] wrote:

[redacted]

Yes please, at Heartbreak Hotel.

Thanks heaps for your help, again!

[redacted]

From [redacted]
Sent: Thursday, December 14, 2023 8:32 AM
To [redacted]
Subject: Re: Imperial O&G - EP187 - Cultural Monitors

[redacted]

[redacted] will be available to attend the inspection as a cultural monitor.

Could you please advise whether you require NLC support for [redacted] pick ups and drop off to Heartbreak Hotel and what dates/times this would be (i.e pick up on 17th to commence works on 18 and drop off on 23rd)? - noting the NLC Borroloola Regional Office is able to assist with this if needed- though requires your confirmation on timings.

[redacted]

4.1.12 2024.01.15 | Draft EMP

From: [redacted]
Sent: Monday, 15 January 2024 7:58 AM
To [redacted]
Cc: [redacted]
Subject: Updated EMP draft for your information - Carpentaria Pilot Project EP187

[redacted]

As discussed, I have just sent a new link to the updated EMP for your information.

The EMP is still being drafted and reviewed to prepare for final submission.

Please confirm you have received the link and you are able to access the files.

[redacted]

Head Office:
Level 5, 6 O'Connell Street Sydney NSW 2000
Phone: (02) 9251 1846
www.empireenergygroup.net

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From: [redacted]
To:
Cc:
Subject: RE: Updated EMP draft for your information - Carpentaria Pilot Project EP187
Date: Monday, 15 January 2024 10:29:53 AM
Attachments: image001.png

Thank [redacted] I confirm receipt and that we have access to the files linked.

Kind regards,

[redacted]

4.2 NLC Work Program Submission

4.2.1 2023.10.13 | Initial Work Program

From: [redacted]
To:
Cc:

Subject: Imperial O&G - EP187 - 2024-28 Work Program
Date: Friday, 13 October 2023 2:47:31 PM
Attachments: Outlook-ffsoybkz.png
Outlook-5v13e3a2.png
Outlook-a3sap1u3.png
EP187 2024-28 - NLC Work Program - R0.pdf

[redacted]

As discussed, please find attached the 2024-28 EEP187 Work Program.

We look forward to discussing with you on Monday.

[redacted]

<!--[if !vml]-->INGAUGE<!--[endif]-->

<!--[if !vml]--> <!--[endif]-->

<!--[if !vml]--> <!--[endif]-->

Well Engineering & Project Management

Work Program

Imperial O&G

2024 - 2029 EP187 Work Program

NT Exploration Permit (EP) 187

Report Number: EP187 2021-23 - NLC Work Program - Ro
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Work Program

Prepared for:

IMPERIAL OIL AND GAS

Document Control:

Revision	Description	Date	Author(s)	Reviewer
Rev 0	Issued for use	13/10/2023	JB	TH

This report has been prepared by:

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Appendices

The following Appendices support this EMP:

Appendix 01 -	Work Methods for Project Activities
Appendix 02	Shapefiles for Work Program Activities

Summary

This Work Program relates to the Petroleum Exploration permit EP187 located approximately 85 kilometres south-west of Borroloola within the Beetaloo Sub-basin and greater McArthur Basin.

Imperial proposes a multi-year Work Program in the Western flank of EP187, commencing in 2024.

This program builds on the fieldwork carried out under the previous 2019 to 2023 Work Programs.

Imperial is providing a multi-year Work Program to ensure that Imperial's full development plan, subject to current gas pipeline constraints, is communicated to the directly affected traditional owners. Imperial will further consult with the directly affected traditional owners if there are changes to the plan. Potential changes to the plan may entail altering the timing of activities between program years, and/or the movement of planned works within the movement areas, as shown in Figure 7.

Extended well testing is required to determine whether the shale gas resource identified is commercially exploitable, which would require a material amount of gas to be flared or vented to the environment. Given this, in order to reduce the environmental impacts of the flaring or venting, not to waste the gas resource unnecessarily, provide economic benefits to traditional owners, and to provide some revenue to Imperial to offset the costs involve in the extended production testing; Imperial proposes to seek the agreement of traditional owners, the NLC and the NT Minister responsible for the Petroleum Act to the use of the gas that would otherwise be flared or vented as appraisal gas which can be sold with revenues to Imperial and royalties to traditional owners and the Territory.

If Imperial can establish the commercial viability of the shale gas resource Imperial would expect to lodge an application for a production license and to seek to negotiate a production agreement with the NLC (on behalf of the traditional owners) as contemplated by the existing Exploration Agreement.

This Work Program represents a fit for purpose, cost-effective, and environmentally responsible way to progress EP187's ongoing development given the basin's geographical remoteness, an official wet season period spanning six months, and multi-agency clearances and permissions required to undertake site works.

This Work Program has been prepared having regard to clause 13 of the Exploration Deed, Exploration Permit Application 187 between Imperial Oil and Gas Pty Ltd and The Northern Land Council.

This Work Program seeks approval to conduct a program along the Western flank of EP187 comprising:

- Construction of up to 4 Wellpads
- Construction of up to 30km of access tracks
- Construction of up to 60km of water/wastewater flowlines
- Construction of up to 60km of gas gathering flowlines
- Drilling of up to 10 new wells
- Hydraulic Fracture of up to 10 new wells
- Construction of wellpad facilities on up to 6 wellpads
- Operation of up to 6 wellpads
- Construction of a Water/wastewater facility
- Handling, storage, treatment and re-use of Flowback water and Produced formation water
- Drilling of up to 40 new water bores
- Construction of a compressor station
- Operation of a compressor station
- Construction of a sales gas pipeline
- Construction of a solar farm
- Operation of a solar farm
- Construction of an operations camp
- Operation of an operations camp
- Continued use of works carried out under previous Work Programs
- Including all ancillary activities required to conduct the above works.

This Work Program's objective is to ensure that the activities are carried out in a manner by which the impacts and risks to traditional owners, their culture and society and to the environment will be reduced to a level that is as low a reasonably practicable (ALARP).

Land clearing will be required for this Work Program, including for:

- Wellpads
- Access tracks
- Gas and water/wastewater flowline Right of Ways
- Water/wastewater facility
- Compressor station and associated facilities
- Solar farm
- Sales gas pipeline Right of Way
- Campsite
- Gravel pits
- Laydown yard
- Warehouse/workshop.

Imperial has engaged a consultant to carry out an archaeological survey of the proposed work area and the report for this survey will be provided to NLC when available.

(a) Work Program Location

Imperial has selected a proposed location for the activities and a buffer to allow moving locations to reduce the on-ground impacts and allow for optimisation of sub-surface considerations in line with previous Work Programs. The proposed locations of Wellpads to be constructed for relevant activities to be carried out on under this Work Program are listed in Table 1.

Maps showing the proposed locations of the activities to be carried out under this Work Program, including buffer to allow moving on-site are included as follows:

- Figure 1, showing:
  - Existing infrastructure carried out under previous work programs
  - Extent of the Production Agreement negotiation area
- Figure 2, showing:
  - The proposed location of wellpads and access tracks
  - Existing infrastructure carried out under previous work programs
- Figure 3, showing:
  - The proposed location of:
    - Compressor station and associated facilities
    - Solar farm
    - Campsite
    - Water/wastewater facilities
    - Sales gas pipeline
  - Existing infrastructure carried out under previous work programs
  - The location of the Daly Waters to McArthur River Mine Gas Pipeline
- Figure 4, showing:
  - The proposed location of wellpads and gas flowlines
  - Existing infrastructure carried out under previous work programs
- Figure 5, showing:
  - The proposed location of wellpads and water/wastewater flowlines
  - Existing infrastructure carried out under previous work programs
- Figure 6, showing:
  - The proposed location of wellpads and access tracks
  - The extent of proposed lateral Drilling and Hydraulic Fracturing activities under this Work Program
  - Existing infrastructure carried out under previous work programs
- Figure 7, showing:
  - The proposed location of wellpads and access tracks
  - The extent of infrastructure movement areas to be utilised under the work program.
  - Existing infrastructure carried out under previous work programs.

Shapefiles of the proposed activities, and their relevant movement areas are provided as part of this Work Program (appendix 2).

Mapping does not have coordinates shown as the labels obscure too much detail on the maps.

Table 1: General Well Information

General Well Information		
Carpentaria 2/3 (Existing wellpad) (MGA94, Zone 53)	Latitude Longitude Easting Northing	S 16.70086° E 135.102344° 510911 8153533
Carpentaria 4 (Existing wellpad) (MGA94, Zone 53)	Latitude Longitude Easting Northing	S 16.858123° E 135.171868° 518308 8136132
Wellpad BA (New wellpad) (MGA94, Zone 53)	Latitude Longitude Easting Northing	S 16.727199° E 135. 107884° 511500 8150620
Wellpad BB (New wellpad) (MGA94, Zone 53)	Latitude Longitude Easting Northing	S 16. 714247° E 135. 149216° 515907 8152050
Wellpad BC (New wellpad) (MGA94, Zone 53)	Latitude Longitude Easting Northing	S 16.928549° E 135. 184301° 519625 8128340
Wellpad BD (New wellpad) (MGA94, Zone 53)	Latitude Longitude Easting Northing	S 16. 824890° E 135. 204896° 521830 8139805
Wellpad BD (central) (New wellpad) (MGA94, Zone 53)	Latitude Longitude Easting Northing	S 16. 856118° E 135. 209013° 522265 8136350

Figure 1: Existing infrastructure and Production Agreement negotiation area

Figure 2: Location of proposed wellpads and access tracks

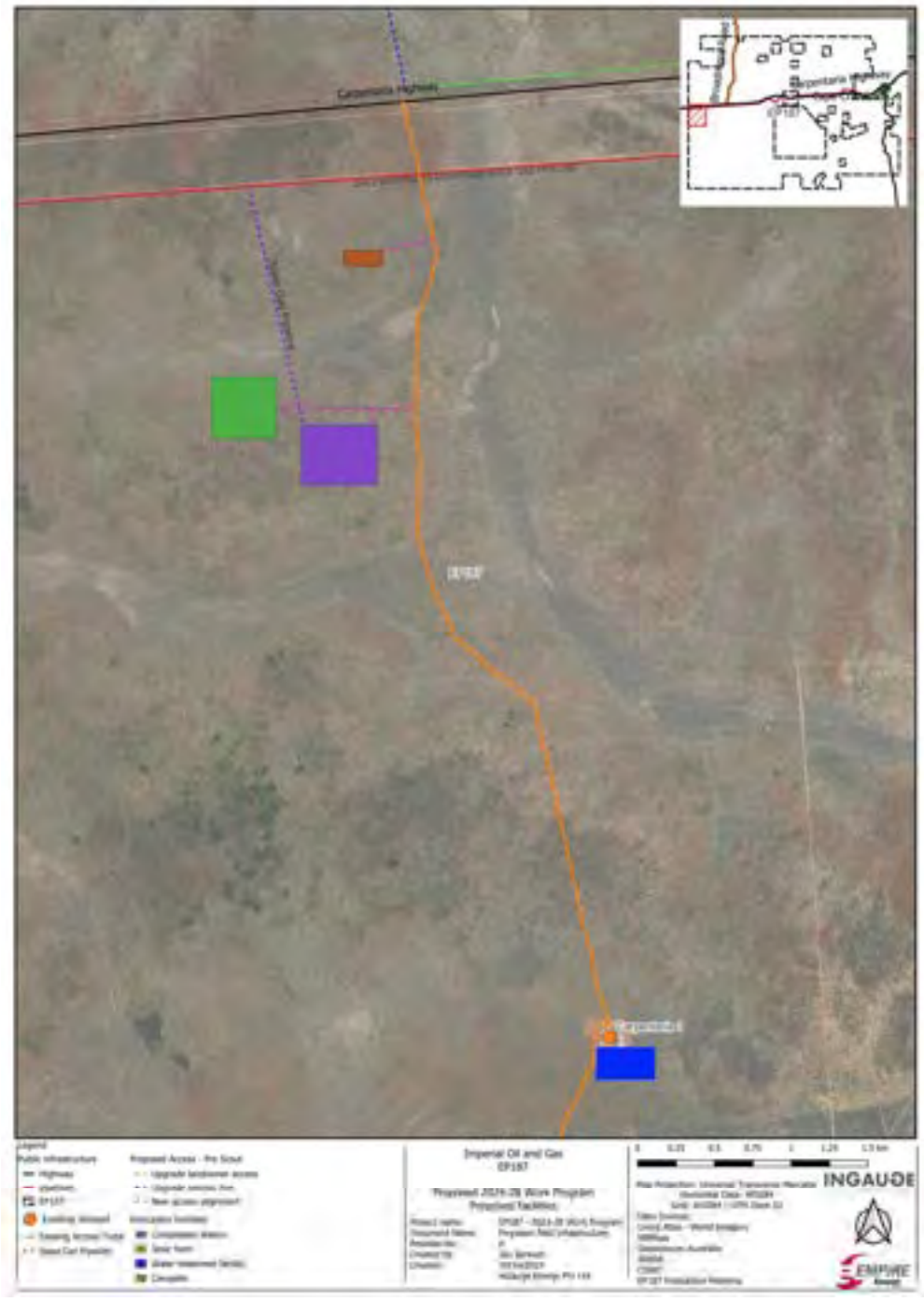

Figure 3: Location of proposed facilities and access tracks

Figure 4: Location of proposed wellpads and gas flowlines

Figure 5: Location of proposed wellpads and water/wastewater flowlines

Figure 6: Location of proposed wellpads and well drilling extent

Figure 7: Location of infrastructure movement areas

(b) Work Program Activities

The regulated activities to be carried out from 2024 through 2028 under this Work Program are listed below.

Work Program activities:

- Acquisition of 2D Seismic data:
  - No Seismic acquisition currently planned under this work program
  - Imperial may carry out maintenance and rehabilitation works on legacy 2D seismic acquisition lines constructed under previous work programs
- Extend Carpentaria 2/3 and Carpentaria 4 wellpads
- Construction of up to four new wellpads:
  - Clear up to 45 hectares for four well pads
  - Construct wellpads, (indicative layout Figure 8)
  - Establish lined ponds, (indicative layout Figure 8)
  - Construct Flowback fluid/Produced water tanks, (indicative layout Figure 8)
  - Drill water production and monitoring bores on wellpads
  - Establish Erosion and Sediment Control devices on wellpads
- Construction of up to 30km of access tracks to up to four well pads:
  - Clear up to 20 hectares for access tracks, as per Figure 2, (indicative layout Figure 9)
  - Establish Erosion and Sediment Control devices on access tracks
- Construction of a compressor station:
  - Clear up to 10 hectares for compressor station
  - Construct compressor station (indicative layout Figure 11)
  - Establish Erosion and Sediment Control devices on compressor station site
- Construction up to 2.5km of a sales gas pipeline form the compressor station to the existing Daly Waters to McArthur River Mine Gas Pipeline:
  - Clear up to 3 hectares for sales gas pipeline
  - Install up to 2.5km of high pressure buried gas pipeline as per Figure 2
  - Establish Erosion and Sediment Control devices on pipeline Right of Way
- Construction of a solar farm:
  - Clear up to 20 hectares for solar farm
  - Construct solar farm (indicative layout as per Figure **12**)
  - Establish Erosion and Sediment Control devices on solar farm site

- Construction of up to 60 km low-pressure gas gathering flowlines between well pads and compressor station:
  - Clear up to 60 hectares for flowline Right Of Way (ROW)
  - Install up to 60 km of buried low-pressure gas gathering flowlines, (indicative layout Figure 9)
  - Establish Erosion and Sediment Control devices on flowline ROW
- Construction of a Water/Wastewater facility:
  - Clear up to 10 hectares for Flowback fluid/Produced water facility
  - Construct Flowback fluid/Produced water facility, (indicative layout Figure 10)
  - Establish Erosion and Sediment Control devices Flowback fluid/Produced water facility
- Construction of up to 60 km low-pressure water flowlines between well pads and water treatment facility:
  - To be constructed on same ROW as gas flowlines (indicative layout Figure 9)
  - Install up to 60km of buried low-pressure water flowlines
- Drilling gas wells from the six wellpads (Carp 2/3, Carpentaria 4 and four new wellpads):
  - Drill up to 10 gas wells from the six wellpads
  - Evaluate, log, test and core above wells, including DFIT
- Hydraulic Fracture stimulation of the above wells
- Completion, connection and workover maintenance of the above wells
- Production Testing of the above wells
- Gas production of the above wells
- Sale of gas from the above wells
- Well suspension and decommissioning of the above wells
- Routine maintenance and monitoring activities
- Any other minor works ancillary of the above.

Figure 8: Indicative Wellpad layout

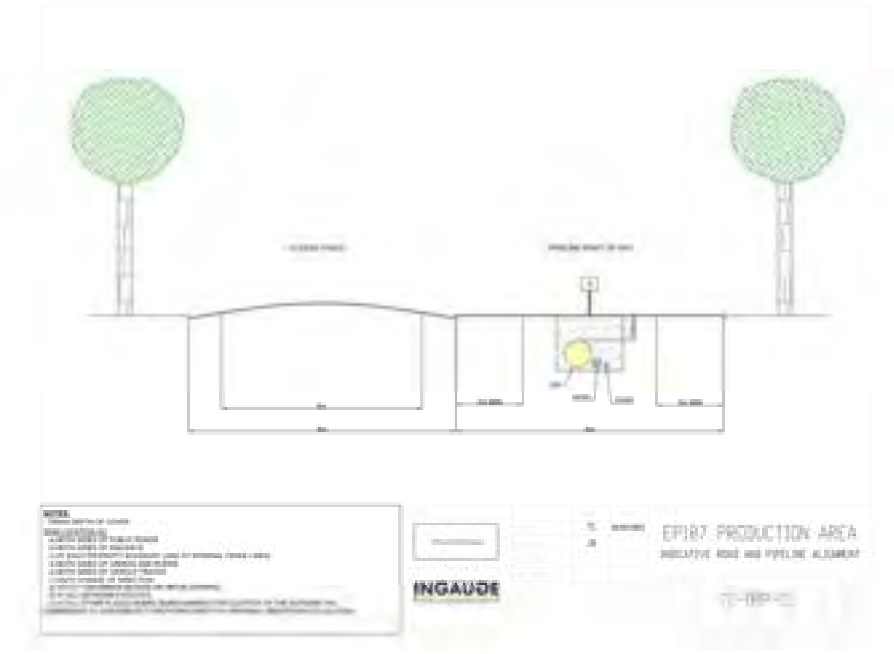

Figure 9: Indicative access track and flowline Right of Way

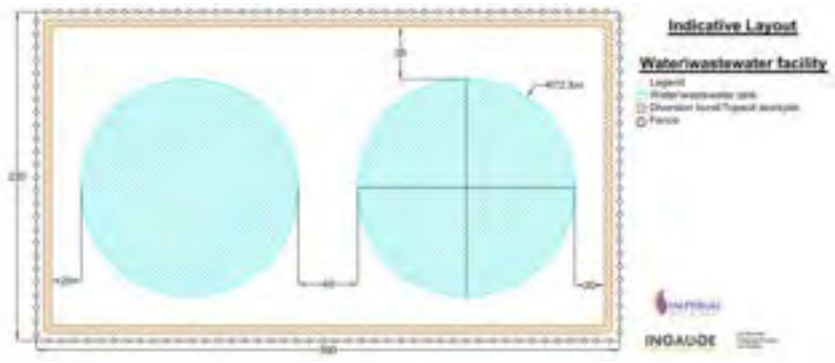

Figure 10: Indicative Water\Wastewater facility layout

Figure 11: Indicative Compressor Station layout

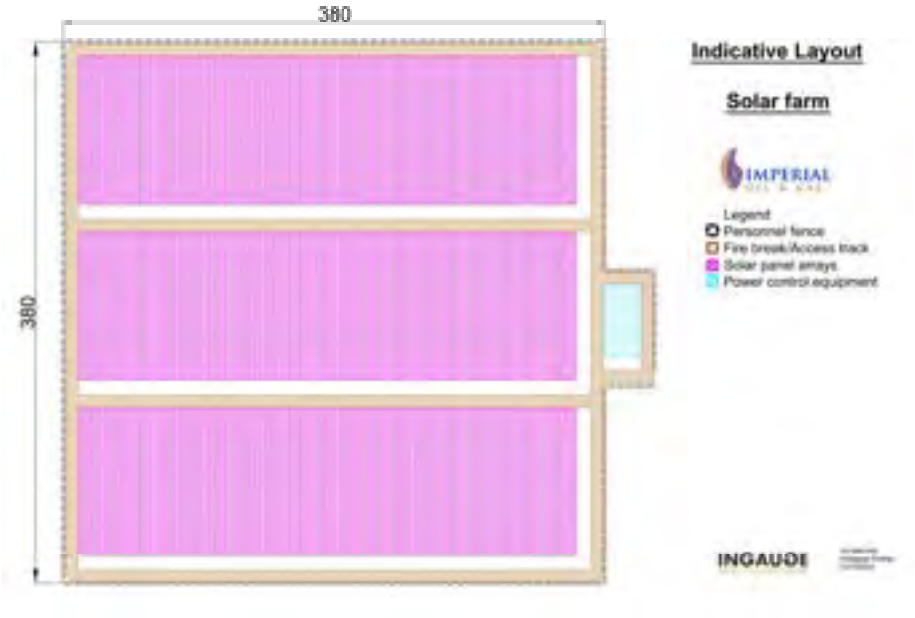

Figure 12: **Indicative Solar Farm layout**

(c) Work Program Timing

An indicative project schedule, including estimated start dates and durations of regulated activities, is provided in Figure 13 below. The actual timing of the work program activities outlined below may be earlier or later than indicated.

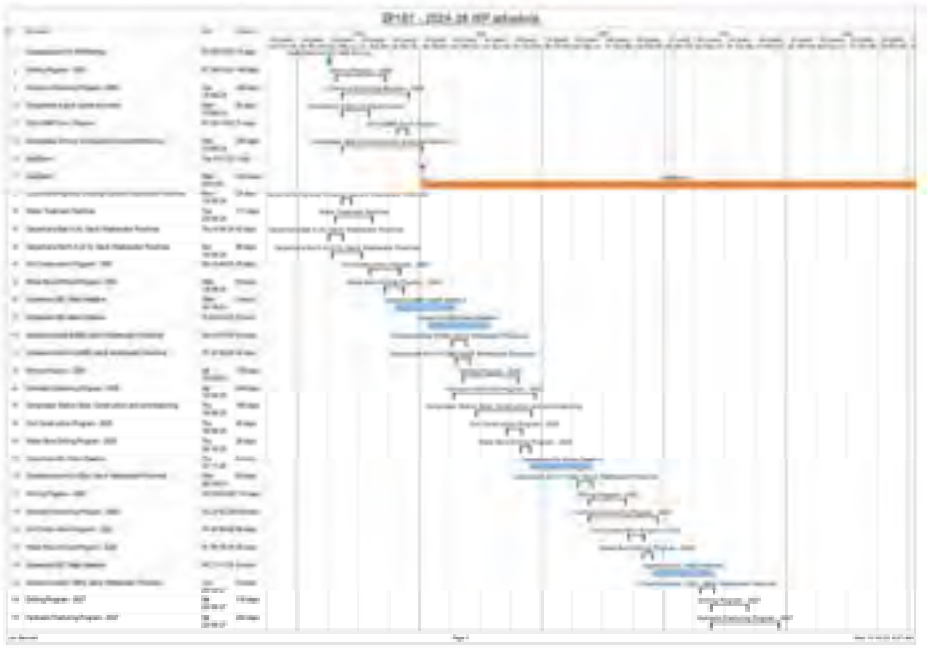

Figure 13: Indicative 2024-28 Work Program Schedule

(d) Work Program Techniques, infrastructure and equipment

The work program techniques, likely infrastructure, and proposed equipment used for the activities under this Work Program are attached in Appendix 1.

(e) Seismic line location

No Seismic acquisition is planned under this Work Program; if this changes Imperial will consult with traditional owners before these works take place.

Imperial may carry our rehabilitation and maintenance works on the legacy 2D seismic acquisition lines constructed under previous work programs.

(f) Drilling and Hydraulic Fracturing materials

Full details regarding the composition of any fluids and solids proposed for use in drilling any well or any Hydraulic Fracturing to be carried out under this Work Program are provided in Imperial's EMP IMP5, which will be provided to NLC at lodgement to the regulator.

Imperial will not use benzene, toluene, ethyl benzene or xylene in any fluids used in hydraulic fracturing.

(g) Environmental Impact

The likely Environmental Impact of any activity and any proposals to minimise such impact is described in Imperial's Environmental Management Plan IMP5, which will be provided to the NLC at time of lodgement to the regulator.

(h) Access

The access to the Work Program area is via the Carpentaria Highway, approximately 202km East of the Stuart Highway intersection, and 60km West of Cape Crawford. The Carpentaria Highway has a 100km/h posted speed limit in the vicinity of the project and is generally a two-way road with a single lane sealed strip, the balance of the road width is unsealed. The Carpentaria Highway is currently undergoing a major road upgrade between the Work Program area and the Stuart Highway, which will likely continue through the duration of this Work Program. Access from the Carpentaria Highway to the Work Program area is via two tee intersections as shown in Figure 1. Imperial has and will continue to design and construct the internal access tracks so that equipment and personnel in field movements avoid using public roads as much as practicable.

The majority of equipment to be utilised for the activities carried out under this Work Program will mobilise to site from Queensland or South Australia. Materials to be utilised for the activities carried out under this Work Program will mainly mobilise to site from Darwin, Queensland, or South Australia.

Airborne access to site will utilise existing airstrips and is likely to be less than five planes per week.

The traffic forecasts to support the activities carried out under this Work Program have been split into the following sections and tables for clarity:

- Facilities establishment related traffic - Table 2
- Drilling and Hydraulic Fracturing equipment and services mobilisation traffic - Table 3
- Drilling and Hydraulic Fracturing materials delivery related traffic - Table 4
- Ongoing operations traffic - Table 5.

Facilities establishment traffic

Facilities establishment is made up of the following subsections:

- Water/wastewater facilities establishment
- Compressor station establishment
- Flowline network establishment
- Solar farm establishment.

Water/wastewater facilities establishment

There will be approximately 20 truckloads of materials to establish the water/wastewater facilities, plus five truckloads of equipment to install the tanks.

Compressor station establishment

There will be approximately 80 truckloads of materials to establish the compressor station, plus 10 truckloads of equipment to construct the compressor station.

Flowline network establishment

There will be approximately 200 truckloads of materials to establish the flowline network, plus 10 truckloads of equipment to install the flowlines.

Solar farm establishment

There will be approximately 100 truckloads of materials to establish the solar farm, plus 10 truckloads of equipment to construct the solar farm.

Table 2: Facilities establishment traffic

Activity	Total Loads	Truck Movements per week during activity
Civil construction mobilisation	10	10
Water/wastewater tank delivery	20	5
Compressor station delivery	80	10
Flowline construction mobilisation	10	10
Flowline material delivery	200	10
Solar Farm construction mobilisation	100	10
Solar Farm construction material delivery	10	10
Fuel delivery	12	1
Rubbish and waste removal	12	1

Drilling and Hydraulic Fracturing equipment and services mobilisation traffic

The peak maximum anticipated traffic movements associated with equipment and services to be used for drilling and hydraulic fracturing under this Work Program will be for the mobilisation and demobilisation of the equipment "Spreads" (the term used to describe the various trucks and equipment needed) for drilling and hydraulic fracturing activities. This will peak at approximately 30 vehicles per day, with the likely duration of the mobilisations and demobilisations being approximately five days each at the start and end of each drilling or HF campaign.

The peak maximum anticipated traffic movements of civil construction, completions and workover equipment are anticipated to be minor, with a peak of 15 vehicle movements for several days during equipment mobilisation and demobilisation.

Table 3: Drilling and Hydraulic Fracturing equipment and services traffic

Activity	Total Loads (per well)	Truck Movements per week during activity
Drilling rig mobilisation	30	30
Completions rig mobilisation	10	10
HF spread mobilisation	20	20

Drilling and Hydraulic Fracturing materials delivery related traffic

There will be 30-50 truckloads per well to each wellpad required to transport drilling fluids, casing, cement, fuel, etc. for drilling activities.

There will be 150 - 200 truckloads per well to each wellpad required for hydraulic fracturing proppant, chemicals fuel, etc. for hydraulic fracturing activities.

There will be no dominant traffic flow direction for the program's supplies delivery, with traffic likely to be roughly split between north (from Darwin) and south (from Queensland and South Australia).

There will be a daily commute by 4WD to mobilise and demobilise Civil Construction crews from Cape Crawford to the project area for the duration of those activities.

Table 4: Estimated operational trucking requirements.

Activity	Total Loads (per well)	Truck Movements per week during activity
Drilling materials delivery	50	10
HF materials delivery	200	80
Food delivery	12	1
Rubbish and waste removal	12	1
Potable water delivery	24	2
Fuel delivery	12	1

Ongoing operations traffic

Average daily traffic during the remainder of the Work Program is likely to be two to three heavy vehicle movements per month for supplies and two to three light vehicle movements per week.

Roadworks and construction activities.

The activities under this Work Program do not require the construction of any new intersections onto the Carpentaria Highway. Access tracks to be constructed include those shown in Figure 2.

Imperial does not propose to upgrade or construct any landing strips under this work program.

(i) Campsites

Imperial will use wellpads constructed under this Work Program, and existing disturbance areas from previous Work Programs for temporary campsites to carry out civil construction, drilling, hydraulic fracturing, compressor station and water treatment facility construction, and the installation of gathering networks as required.

Imperial will construct a campsite for ongoing operations personnel, as shown in Figure 3.

(j) Resources obtained from within the Permit Area

For the activities under this Work Program, Imperial intends to extract water from water bores located on the Carpentaria 1 wellpad, the Carpentaria 2/3 wellpad, the Carpentaria 4 wellpad, and from water bores to be drilled on the new wellpads, under the approved water license GRF10316, (or a replacement water license).

Imperial will apply for an increase in the volume to be extracted under GRF10316 (or a replacement water license) to cover this and future work programs' requirements.

Water required for the multi-year project is anticipated to be up to 650ML. A breakdown of the water usage and its volumes is provided in Table 5.

Table 5:Estimated Water Use for this Work Program

Use	Scope	Total Use (ML)
Civil Construction	1.5 ML per wellpad	6
Drilling	2.5ML per well	25
HF fluid make-up	50ML per well (Note 1)	500
Completion	0.5ML per well	5
Operational Activities	Road and site maintenance at 1ML p/m Vehicle wash downs (0.1ML per month)	66
Camp Use	200L/day per person per day on site (0.5ML per Month, by 60 months)	30
Totals		632

Note 1. Imperial will use Flowback fluid and Produced water from hydraulic fracturing (HF) activities in subsequent HF activities to reduce this water volume where practicable; Imperial predicts that ~40% of produced HF fluid requirements will be met by this practice. The volume stated above assumes no re-use and such re-use will reduce the volumes required.

Imperial does not foresee the timber being obtained from within the Permit Area and surrounding areas.

Imperial will obtain gravel from the wellpads, and gravel pits constructed under this and existing Work Programs to build and maintain infrastructure required for this Work Program.

(k) Proposed Contractors

Imperial is in the process of contracting and procurement for the activities to be carried out under this Work Program; the identity of the parties tendering is commercial in confidence at this time.

Imperial uses a prequalification process while selecting contractors to ensure that they have the safety systems and procedures in place to ensure all works re carried out safely and in line with Imperial's approval conditions.

(l) Personnel

The number of personnel likely to be on site from time to time for Work Program activities , broken down into the project stages, is as follows;

Facilities Establishment personnel

The initial facilities establishment stages of the Work Program will involve a relatively short duration of high-intensity activities to allow production activities to commence. The majority of the activities during the facilities management stage of the Work Program will be the construction of:

- Well pad hydrocarbon facilities
- Gas gathering network
- Compressor station
- High-pressure gas export pipeline and metering station
- Water/wastewater flowline network
- Water/wastewater facilities construction
- Water/wastewater facilities construction
- Support facilities construction

An estimate of the maximum number of people likely to be on the Production Area for the facilities establishment is shown in Table 6 below.

Table 6: Estimated Maximum Number of People Likely to be on the site for Facilities Establishment

Facilities establishment Workforce (employment and contract)	Jan 2024	Feb 2024	Mar 2024	Apr 2024	May 2024	Jun 2024	Jul 2024	Aug 2024	Sep 2024	Oct 2024	Nov 2024	Dec 2024
Well pad hydrocarbon facilities						10	10	10				
Gas gathering network									20	20		
Compressor station					40	40	40	20	20	20	20	10
High-pressure gas export pipeline and metering station				10	10	10						
Support facilities construction					30	30						
Compressor station and support facilities civil construction			20	20	20	20						
Totals	0	0	20	30	100	110	50	30	40	40	20	10

Ongoing personnel

Ongoing operations, starting at the initial facilities establishment stage completion. Unlike the initial facilities establishment stage, these ongoing operations will be ongoing for the life of the Work Program.

The ongoing field scope will consist mainly of the following:

- Compressor station operation
- Hydrocarbon well monitoring and operation
- Wastewater treatment facility operation
- Gas gathering and water/wastewater transfer infrastructure operation and maintenance.

The field operations will occur throughout the year, 24 hours a day, seven days per week.

Imperial employees will likely carry out the core field production operations. The number of Imperial employees required to carry out these ongoing production operations will likely be 4 – 10 people, depending on the size of the field operation and the number of wells online at the time.

There will be planned maintenance and as-required repairs carried out to support the ongoing field operations; these will include but not be limited to:

- Compressor station scheduled maintenance and as-needed repairs
- Wastewater treatment facility scheduled maintenance and as-needed repairs
- Hydrocarbon well workovers
- Road network repairs and maintenance.

Service provider companies will carry out these planned maintenance and as-needed repairs, as they will be short-duration and require specialist personnel and equipment. Imperial will program the planned maintenance activities during the local dry season where practicable.

The estimated workforce (employment and contract) to meet an indicative annual program is shown in Table 7 below.

Table 7: Estimated Field Development and Field Operations Workforce (Employed and Contractor

Field Development and Field Operations Workforce (employment and contract	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Drilling					40	40	40					
Hydraulic Fracturing								60	60			
Gathering network construction						20	20	20				
Civil construction				15	15	15						
Production operations	7	7	7	7	7	7	7	7	7	7	7	7
Production maintenance				10	5	5	15	5	5	10		
Total	7	7	7	32	72	67	82	92	72	17	7	7

(m) Access Roads

Access roads and tracks to be used under this project are:

- Public roads, including but not limited to the Carpentaria Highway
- Imperial Constructed Access Tracks, as shown in Figure 2 and Figure 9.

(n) Other activities

Imperial does not expect that there will be any other aspect of any activity that is likely to have an Environmental Impact or impact upon the traditional owners.

4.2.2 2023.11.01 | Updated Work Program

Work Program

Imperial O&G

2024 - 2029 EP187 Work Program

NT Exploration Permit (EP) 187

Report Number: EP187 2024-28 - NLC Work Program - R1
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Work Program

Prepared for:

IMPERIAL OIL AND GAS

Document Control:

Revision	Description	Date	Author(s)	Reviewer
Rev 0	Issued for use	13/10/2023	JB	TH
Rev 1	Revised for additional information	31/10/2023	JB	KW

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Appendices

The following Appendices support this EMP:

Appendix 01 -	Work Methods for Project Activities
Appendix 02	Shapefiles for Work Program Activities

Summary

This Work Program relates to the Petroleum Exploration permit EP187 located approximately 85 kilometres south-west of Borroloola within the Beetaloo Sub-basin and greater McArthur Basin.

Imperial proposes a multi-year Work Program in the Western flank of EP187, commencing in 2024.

This program builds on the fieldwork carried out under the previous 2019 to 2023 Work Programs.

Imperial is providing a multi-year Work Program to ensure that Imperial's full development plan, subject to current gas pipeline constraints, is communicated to the directly affected traditional owners. Imperial will further consult with the directly affected traditional owners if there are changes to the plan. Potential changes to the plan may entail altering the timing of activities between program years, and/or the movement of planned works within the movement areas, as shown in Figure 7.

Extended well testing is required to determine whether the shale gas resource identified is commercially exploitable, which would require a material amount of gas to be flared or vented to the environment. Given this, in order to reduce the environmental impacts of the flaring or venting, not to waste the gas resource unnecessarily, provide economic benefits to traditional owners, and to provide some revenue to Imperial to offset the costs involve in the extended production testing; Imperial proposes to seek the agreement of traditional owners, the NLC and the NT Minister responsible for the Petroleum Act to the use of the gas that would otherwise be flared or vented as appraisal gas which can be sold with revenues to Imperial and royalties to traditional owners and the Territory For the readability of this document, Imperial has called the agreement to be sought for the use of the gas that would otherwise be flared or vented as appraisal gas a Beneficial Use Agreement (BUA).

If Imperial can establish the commercial viability of the shale gas resource Imperial would expect to lodge an application for a production license and to seek to negotiate a production agreement with the NLC (on behalf of the traditional owners) as contemplated by the existing Exploration Agreement.

This Work Program represents a fit for purpose, cost-effective, and environmentally responsible way to progress EP187's ongoing development given the basin's geographical remoteness, an official wet season period spanning six months, and multi-agency clearances and permissions required to undertake site works.

This Work Program has been prepared having regard to clause 13 of the Exploration Deed, Exploration Permit Application 187 between Imperial Oil and Gas Pty Ltd and The Northern Land Council.

Work Program

This Work Program seeks approval to conduct a program along the Western flank of EP187 comprising the activities in Table 1. The activities marked in the "BUA not agreed" column will be carried out if a Beneficial Use Agreement cannot be agreed between the Imperial, the traditional Aboriginal owners, the NLC and the NT Minister responsible for the Petroleum Act. The activities marked in the "BUA agreed" column will be carried out if a Beneficial Use Agreement can be agreed between the Imperial, the traditional Aboriginal owners, the NLC and the NT Minister responsible for the Petroleum Act.

Table 1: Work Program Activities

Activity	BUA not agreed	BUA agreed
Construction of up to 4 Wellpads	✓	✓
Construction of up to 30km of access tracks	✓	✓
Construction of up to 60km of water/wastewater flowlines	✓	✓
Construction of up to 60km of gas gathering flowlines generally in the same trench as water/wastewater flowlines		✓
Drilling of up to 10 new wells	✓	✓
Hydraulic Fracture of up to 10 new wells	✓	✓
Construction of wellpad facilities on up to 6 wellpads	✓	✓
Operation of up to 6 wellpads	✓	✓
Construction of a Water/wastewater facility	✓	✓
Handling, storage, treatment and re-use of Flowback water and Produced formation water	✓	✓
Drilling of up to 40 new water bores	✓	✓
Construction of a compressor station		✓
Operation of a compressor station		✓
Negotiation of Pipeline easement	✓	✓
Construction of a sales gas pipeline		✓
Clean up flaring of <30 days per well of up to 10 new wells	✓	✓
Extended Production Testing with flaring for >365 days per well of up to 10 new wells	✓	
Extended Production Testing with flaring for >365 days per well of up to 2 existing wells	✓	
Construction of an operations camp	✓	✓
Operation of an operations camp	✓	✓
Continued use of works carried out under previous Work Programs	✓	✓
Including all ancillary activities required to conduct the above works.	✓	✓

This Work Program's objective is to ensure that the activities are carried out in a manner by which the impacts and risks to traditional owners, their culture and society and to the environment will be reduced to a level that is as low a reasonably practicable (ALARP).

Land clearing will be required for this Work Program, including for:

- Wellpads
- Access tracks
- Gas and water/wastewater flowline Right of Ways
- Water/wastewater facility
- Campsite
- Gravel pits
- Laydown yard
- Warehouse/workshop.

Additional land clearing will be required for this Work Program if a Beneficial Use Agreement can be agreed between Imperial, the traditional Aboriginal owners, the NLC and the NT Minister responsible for the Petroleum Act, for;

- Compressor station and associated facilities
- Sales gas pipeline Right of Way

Imperial has engaged a consultant to carry out an archaeological survey of the proposed work area and the report for this survey will be provided to NLC when available.

(a) Work Program Location

Imperial has selected a proposed location for the activities and a buffer to allow moving locations to reduce the on-ground impacts and allow for optimisation of sub-surface considerations in line with previous Work Programs. The proposed locations of Wellpads to be constructed for relevant activities to be carried out on under this Work Program are listed in Table 2.

Maps showing the proposed locations of the activities to be carried out under this Work Program, including buffer to allow moving on-site are included as follows:

- Figure 1, showing:
  - Existing infrastructure carried out under previous work programs
  - Extent of the Appraisal Agreement negotiation area
- Figure 2, showing:
  - The proposed location of wellpads and access tracks
  - Existing infrastructure carried out under previous work programs
- Figure 3, showing:
  - The proposed location of:
    - Compressor station and associated facilities
    - Campsite
    - Water/wastewater facilities
    - Sales gas pipeline
  - Existing infrastructure carried out under previous work programs
  - The location of the Daly Waters to McArthur River Mine Gas Pipeline
- Figure 4, showing:
  - The proposed location of wellpads and gas flowlines
  - Existing infrastructure carried out under previous work programs
- Figure 5, showing:
  - The proposed location of wellpads and water/wastewater flowlines
  - Existing infrastructure carried out under previous work programs
- Figure 6, showing:
  - The proposed location of wellpads and access tracks
  - The extent of proposed lateral Drilling and Hydraulic Fracturing activities under this Work Program
  - Existing infrastructure carried out under previous work programs
- Figure 7, showing:
  - The proposed location of wellpads and access tracks
  - The extent of infrastructure movement areas to be utilised under the work program.
  - Existing infrastructure carried out under previous work programs.

Shapefiles of the proposed activities, and their relevant movement areas are provided as part of this Work Program (appendix 2).

Mapping does not have coordinates shown as the labels obscure too much detail on the maps.

Table 2: General Well Information

General Well Information		
Carpentaria 2/3 (Existing wellpad) (MGA94, Zone 53)	Latitude Longitude Easting Northing	S 16.70086° E 135.102344° 510911 8153533
Carpentaria 4 (Existing wellpad) (MGA94, Zone 53)	Latitude Longitude Easting Northing	S 16.858123° E 135.171868° 518308 8136132
Wellpad BA (New wellpad) (MGA94, Zone 53)	Latitude Longitude Easting Northing	S 16.727199° E 135. 107884° 511500 8150620
Wellpad BB (New wellpad) (MGA94, Zone 53)	Latitude Longitude Easting Northing	S 16. 714247° E 135. 149216° 515907 8152050
Wellpad BC (New wellpad) (MGA94, Zone 53)	Latitude Longitude Easting Northing	S 16.928549° E 135. 184301° 519625 8128340
Wellpad BD (New wellpad) (MGA94, Zone 53)	Latitude Longitude Easting Northing	S 16. 824890° E 135. 204896° 521830 8139805
Wellpad BD (central) (New wellpad) (MGA94, Zone 53)	Latitude Longitude Easting Northing	S 16. 856118° E 135. 209013° 522265 8136350

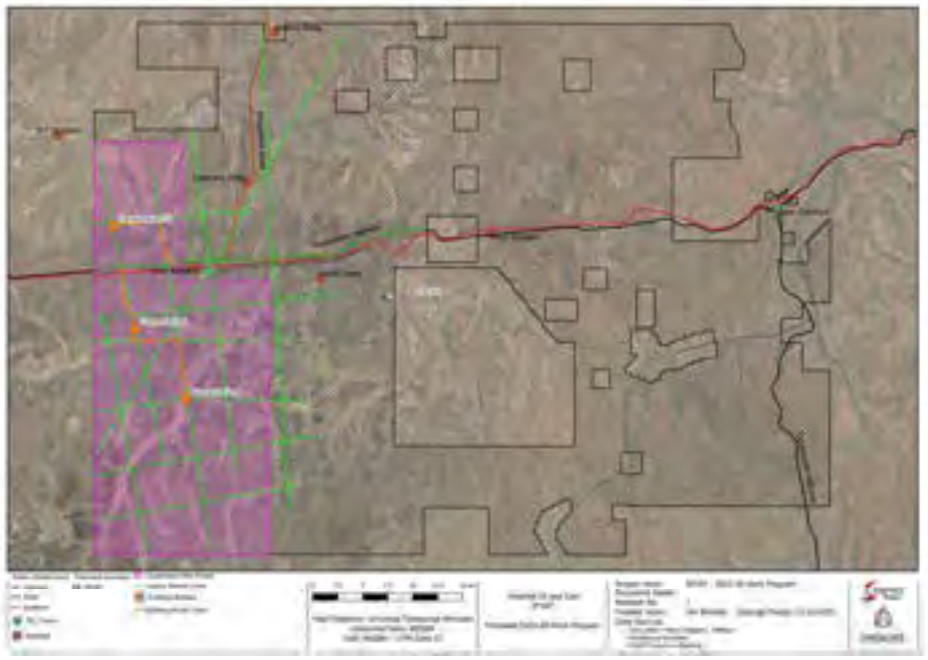

Figure 1: Existing infrastructure and Appraisal Agreement negotiation area

Figure 2: Location of proposed wellpads and access tracks

Figure 3: Location of proposed facilities and access tracks

Figure 4: Location of proposed wellpads and gas flowlines

Figure 5: Location of proposed wellpads and water/wastewater flowlines

Figure 6: Location of proposed wellpads and well drilling extent

Figure 7: Location of infrastructure movement areas

(b) Work Program Activities

The regulated activities to be carried out from 2024 through 2028 under this Work Program are listed below.

Work Program activities:

- Acquisition of 2D Seismic data:
  - No Seismic acquisition currently planned under this work program
  - Imperial may carry out maintenance and rehabilitation works on legacy 2D seismic acquisition lines constructed under previous work programs
- Extend Carpentaria 2/3 and Carpentaria 4 wellpads
- Construction of up to four new wellpads:
  - Clear up to 45 hectares for four well pads
  - Construct wellpads, (indicative layout Figure 8)
  - Establish lined ponds, (indicative layout Figure 8)
  - Construct Flowback fluid/Produced water tanks, (indicative layout Figure 8)
  - Drill water production and monitoring bores on wellpads
  - Establish Erosion and Sediment Control devices on wellpads
- Construction of up to 30km of access tracks to up to four well pads:
  - Clear up to 20 hectares for access tracks, as per Figure 2, (indicative layout Figure 9)
  - Establish Erosion and Sediment Control devices on access tracks

- Construction of a Water/Wastewater facility:
  - Clear up to 10 hectares for Flowback fluid/Produced water facility
  - Construct Flowback fluid/Produced water facility, (indicative layout Figure 10)
  - Establish Erosion and Sediment Control devices Flowback fluid/Produced water facility
- Construction of up to 60 km low-pressure water flowlines between well pads and water treatment facility:
  - Clear up to 60 hectares for flowline Right Of Way (ROW)
  - Install up to 60km of buried low-pressure water flowlines
    Establish Erosion and Sediment Control devices on flowline ROW
- Drilling gas wells from the six wellpads (Carp 2/3, Carpentaria 4 and four new wellpads):
  - Drill up to 10 gas wells from the six wellpads
  - Evaluate, log, test and core above wells, including DFIT
- Hydraulic Fracture stimulation of the above wells
- Completion, connection, intervention, and workover maintenance of the above wells
- Production Testing of the above wells to flare
- Well suspension and decommissioning of the above wells
- Routine maintenance and monitoring activities
- Any other minor works ancillary of the above.

Additional Work Program activities to be carried out if a Beneficial Use Agreement is agreed between the Imperial, the traditional Aboriginal owners, the NLC and the NT Minister responsible for the Petroleum Act, are;

- Construction of up to 60 km low-pressure gas gathering flowlines between well pads and compressor station:
  - Install up to 60 km of buried low-pressure gas gathering flowlines, (indicative layout Figure 9)
  - To be constructed on same ROW as water flowlines (indicative layout Figure 9)
- Construction of a compressor station:
  - Clear up to 10 hectares for compressor station
  - Construct compressor station (indicative layout Figure 11)
  - Establish Erosion and Sediment Control devices on compressor station site
- Construction up to 1.5km of a sales gas pipeline form the compressor station to the existing Daly Waters to McArthur River Mine Gas Pipeline:
  - Clear up to 3 hectares for sales gas pipeline
  - Install up to 2.5km of high pressure buried gas pipeline as per Figure 2
  - Establish Erosion and Sediment Control devices on pipeline Right of Way

- Production Testing of the above wells to sales
- Gas production of the above wells
- Sale of gas from the above wells

Figure 8: Indicative Wellpad layout

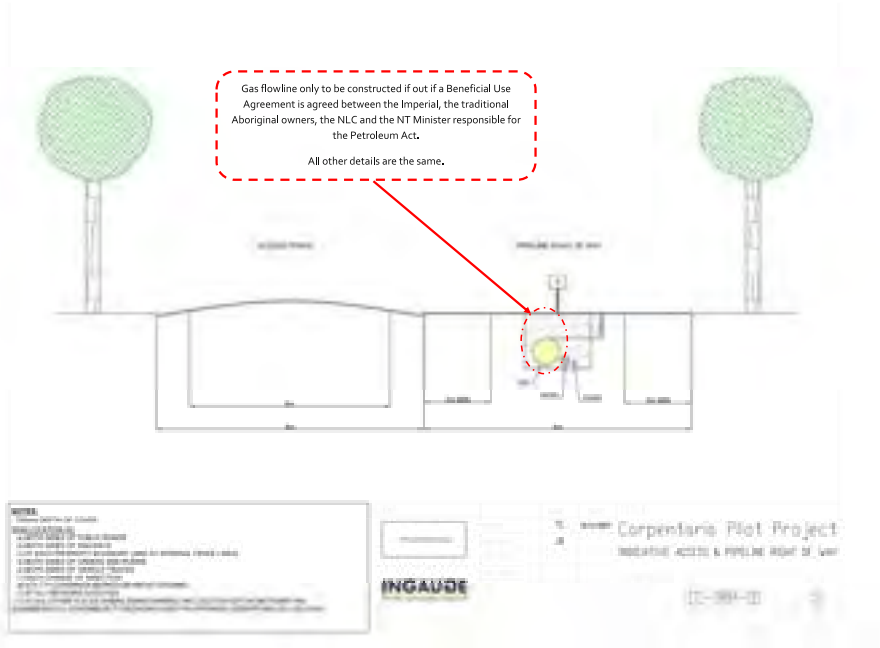

Figure 9: Indicative access track and flowline Right of Way

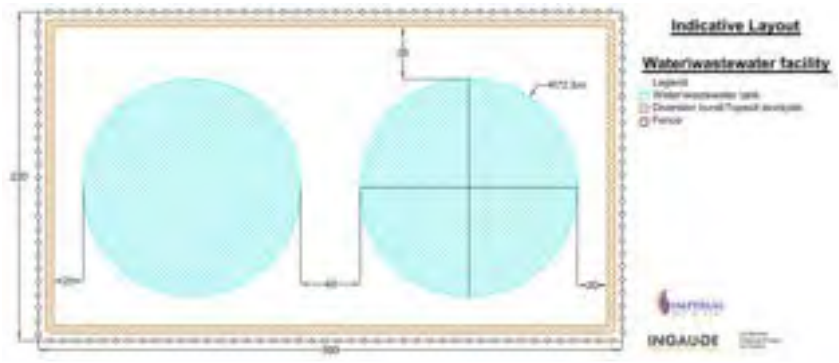

Figure 10: Indicative Water\Wastewater facility layout

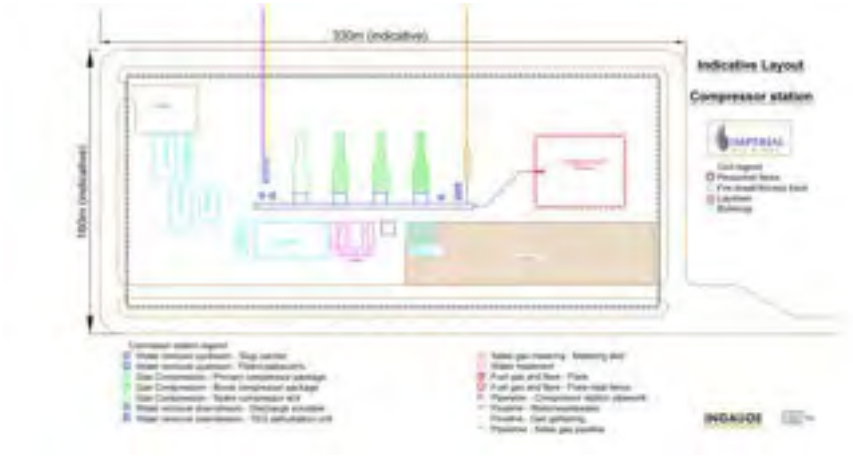

Figure 11: Indicative Compressor Station layout

(c) Work Program Timing

An indicative project schedule, including estimated start dates and durations of regulated activities, is provided in Figure 12 below. A more detailed view of the first 12 month's indicative project schedule, including estimated start dates and durations of regulated activities, is provided in Figure 13 below. The actual timing of the work program activities outlined below may be earlier or later than indicated.

Figure 12: Indicative 2024-28 Work Program Schedule

Figure 13: Indicative 2024 Work Program Schedule

(d) Work Program Techniques, infrastructure and equipment

The work program techniques, likely infrastructure, and proposed equipment used for the activities under this Work Program are attached in Appendix 1.

(e) Seismic line location

No Seismic acquisition is planned under this Work Program; if this changes Imperial will consult with traditional owners before these works take place.

Imperial may carry our rehabilitation and maintenance works on the legacy 2D seismic acquisition lines constructed under previous work programs.

(f) Drilling and Hydraulic Fracturing materials

Full details regarding the composition of any fluids and solids proposed for use in drilling any well or any Hydraulic Fracturing to be carried out under this Work Program are provided in Imperial's EMP IMP5, which will be provided to NLC at lodgement to the regulator.

Imperial will not use benzene, toluene, ethyl benzene or xylene in any fluids used in hydraulic fracturing.

(g) Environmental Impact

The likely Environmental Impact of any activity and any proposals to minimise such impact is described in Imperial's Environmental Management Plan IMP5, which will be provided to the NLC by 20 November 2023 for feedback before lodgement to the regulator.

(h) Access

The access to the Work Program area is via the Carpentaria Highway, approximately 202km East of the Stuart Highway intersection, and 60km West of Cape Crawford. The Carpentaria Highway has a 100km/h posted speed limit in the vicinity of the project and is generally a two-way road with a single lane sealed strip, the balance of the road width is unsealed. The Carpentaria Highway is currently undergoing a major road upgrade between the Work Program area and the Stuart Highway, which will likely continue through the duration of this Work Program. Access from the Carpentaria Highway to the Work Program area is via two tee intersections as shown in Figure 1. Imperial has and will continue to design and construct the internal access tracks so that equipment and personnel in field movements avoid using public roads as much as practicable.

The majority of equipment to be utilised for the activities carried out under this Work Program will mobilise to site from Queensland or South Australia. Materials to be utilised for the activities carried out under this Work Program will mainly mobilise to site from Darwin, Queensland, or South Australia.

Airborne access to site will utilise existing airstrips and is likely to be less than five planes per week.

The traffic forecasts to support the activities carried out under this Work Program have been split into the following sections and tables for clarity:

- Facilities establishment related traffic - Table 3
- Drilling and Hydraulic Fracturing equipment and services mobilisation traffic - Table 4
- Drilling and Hydraulic Fracturing materials delivery related traffic - Table 5
- Ongoing operations traffic - Table 6.

Facilities establishment traffic

Facilities establishment is made up of the following subsections:

- Water/wastewater facilities establishment
- Flowline network establishment
- Compressor station establishment

Water/wastewater facilities establishment

There will be approximately 20 truckloads of materials to establish the water/wastewater facilities, plus five truckloads of equipment to install the tanks.

Compressor station establishment

There will be approximately 80 truckloads of materials to establish the compressor station, plus 10 truckloads of equipment to construct the compressor station if a Beneficial Use Agreement is agreed between the Imperial, the traditional Aboriginal owners, the NLC and the NT Minister responsible for the Petroleum Act. This activity is highlighted in blue in the table below.

Flowline network establishment

There will be approximately 200 truckloads of materials to establish the flowline network, plus 10 truckloads of equipment to install the flowlines.

Table 3: Facilities establishment traffic

Activity	Total Loads	Truck Movements per week during activity
Civil construction mobilisation	10	10
Water/wastewater tank delivery	20	5
Flowline construction mobilisation	10	10
Flowline material delivery	200	10
Fuel delivery	12	1
Rubbish and waste removal	12	1
Compressor station delivery	80	10

Drilling and Hydraulic Fracturing equipment and services mobilisation traffic

The peak maximum anticipated traffic movements associated with equipment and services to be used for drilling and hydraulic fracturing under this Work Program will be for the mobilisation and demobilisation of the equipment "Spreads" (the term used to describe the various trucks and equipment needed) for drilling and hydraulic fracturing activities. This will peak at approximately 30

vehicles per day, with the likely duration of the mobilisations and demobilisations being approximately five days each at the start and end of each drilling or HF campaign.

The peak maximum anticipated traffic movements of civil construction, completions and workover equipment are anticipated to be minor, with a peak of 15 vehicle movements for several days during equipment mobilisation and demobilisation.

Table 4: Drilling and Hydraulic Fracturing equipment and services traffic

Activity	Total Loads (per well)	Truck Movements per week during activity
Drilling rig mobilisation	30	30
Completions rig mobilisation	10	10
HF spread mobilisation	20	20

Drilling and Hydraulic Fracturing materials delivery related traffic

There will be 30-50 truckloads per well to each wellpad required to transport drilling fluids, casing, cement, fuel, etc. for drilling activities.

There will be 200 - 250 truckloads per well to each wellpad required for hydraulic fracturing proppant, chemicals fuel, etc. for hydraulic fracturing activities.

There will be no dominant traffic flow direction for the program's supplies delivery, with traffic likely to be roughly split between north (from Darwin) and south (from Queensland and South Australia).

There will be a daily commute by 4WD to mobilise and demobilise Civil Construction crews from Cape Crawford to the project area for the duration of those activities.

Table 5: Estimated operational trucking requirements.

Activity	Total Loads (per well)	Truck Movements per week during activity
Drilling materials delivery	50	10
HF materials delivery	250	80
Food delivery	12	1
Rubbish and waste removal	12	1
Potable water delivery	24	2
Fuel delivery	12	1

Ongoing operations traffic

Average daily traffic during the remainder of the Work Program is likely to be two to three heavy vehicle movements per month for supplies and two to three light vehicle movements per week.

Roadworks and construction activities.

The activities under this Work Program do not require the construction of any new intersections onto the Carpentaria Highway. Access tracks to be constructed include those shown in Figure 2.

Imperial does not propose to upgrade or construct any landing strips under this work program.

(i) Campsites

Imperial will use wellpads constructed under this Work Program, and existing disturbance areas from previous Work Programs for temporary campsites to carry out civil construction, drilling, hydraulic fracturing, compressor station and water treatment facility construction, and the installation of gathering networks as required.

Imperial will construct a campsite for ongoing operations personnel, as shown in Figure 3.

(j) Resources obtained from within the Permit Area

For the activities under this Work Program, Imperial intends to extract water from water bores located on the Carpentaria 1 wellpad, the Carpentaria 2/3 wellpad, the Carpentaria 4 wellpad, and from water bores to be drilled on the new wellpads, under the approved water license GRF10316, (or a replacement water license).

Imperial will apply for an increase in the volume to be extracted under GRF10316 (or a replacement water license) to cover this and future work programs' requirements.

Water required for the multi-year project is anticipated to be up to 650ML. A breakdown of the water usage and its volumes is provided in Table 6.

Table 6:Estimated Water Use for this Work Program

Use	Scope	Total Use (ML)
Civil Construction	1.5 ML per wellpad	6
Drilling	2.5ML per well	25
HF fluid make-up	80ML per well (Note 1)	800
Completion	0.5ML per well	5
Operational Activities	Road and site maintenance at 1ML p/m Vehicle wash downs (0.1ML per month)	66
Camp Use	200L/day per person per day on site (0.5ML per Month, by 60 months)	30
Totals		932

Note 1. Imperial will use Flowback fluid and Produced water from hydraulic fracturing (HF) activities in subsequent HF activities to reduce this water volume where practicable; Imperial predicts that ~40% of produced HF fluid requirements will be met by this practice. The volume stated above assumes no re-use and such re-use will reduce the volumes required.

Imperial does not foresee the timber being obtained from within the Permit Area and surrounding areas.

Imperial will obtain gravel from the wellpads, and gravel pits constructed under this and existing Work Programs to build and maintain infrastructure required for this Work Program.

(k) Proposed Contractors

Imperial is in the process of contracting and procurement for the activities to be carried out under this Work Program; the identity of the parties tendering is commercial in confidence at this time.

Imperial uses a prequalification process while selecting contractors to ensure that they have the safety systems and procedures in place to ensure all works re carried out safely and in line with Imperial's approval conditions.

(l) Personnel

The number of personnel likely to be on site from time to time for Work Program activities, broken down into the project stages, is as follows;

Facilities Establishment personnel

The initial facilities establishment stages of the Work Program will involve a relatively short duration of high-intensity activities to allow appraisal activities to commence. The majority of the activities during the facilities establishment stage of the Work Program will be the construction of:

- Well pad hydrocarbon facilities
- Water/wastewater flowline network
- Water/wastewater facilities construction
- Water/wastewater facilities construction
- Support facilities construction

The additional activities during the facilities establishment stage of the Work Program if a Beneficial Use Agreement is agreed between the Imperial, the traditional Aboriginal owners, the NLC and the NT Minister responsible for the Petroleum Act will be the construction of:

- Gas gathering network
- Compressor station
- High-pressure gas export pipeline and metering station

An estimate of the maximum number of people likely to be on the Appraisal Area for the facilities establishment is shown in the Table 7 below. The additional activities during the facilities establishment stage of the Work Program if a Beneficial Use Agreement is agreed between the Imperial, the traditional Aboriginal owners, the NLC and the NT Minister responsible for the Petroleum Act are highlighted blue.

Table 7: Estimated Maximum Number of People Likely to be on the site for Facilities Establishment

Facilities establishment Workforce (employment and contract)	**Jan 2024**	**Feb 2024**	**Mar 2024**	**Apr 2024**	**May 2024**	**Jun 2024**	**Jul 2024**	**Aug 2024**	**Sep 2024**	**Oct 2024**	**Nov 2024**	**Dec 2024**
Well pad hydrocarbon facilities						10	10	10				
Gas gathering network									20	20		
Support facilities construction					30	30						
Compressor station					40	40	40	20	20	20	20	10
High-pressure gas export pipeline and metering station				10	10	10						
Compressor station and support facilities civil construction			20	20	20	20						
Totals	0	0	20	30	100	110	50	30	40	40	20	10

Ongoing personnel

Ongoing operations, starting at the initial facilities establishment stage completion. Unlike the initial facilities establishment stage, these ongoing operations will be ongoing for the life of the Work Program.

The ongoing field scope will consist mainly of the following:

- Hydrocarbon well monitoring and operation
- Wastewater treatment facility operation
- Flowline and associated infrastructure operation and maintenance.

The additional ongoing field activities if a Beneficial Use Agreement is agreed between the Imperial, the traditional Aboriginal owners, the NLC and the NT Minister responsible for the Petroleum Act will be:

- Compressor station operation

The field operations will occur throughout the year, 24 hours a day, seven days per week.

Imperial employees will likely carry out the core field appraisal operations. The number of Imperial employees required to carry out these ongoing appraisal operations will likely be 4 – 10 people, depending on the size of the field operation and the number of wells online at the time.

There will be planned maintenance and as-required repairs carried out to support the ongoing field operations; these will include but not be limited to:

- Wastewater treatment facility scheduled maintenance and as-needed repairs
- Hydrocarbon well workovers
- Road network repairs and maintenance.

The additional planned maintenance and as-required repairs carried out to support the ongoing field operations activities if a Beneficial Use Agreement is agreed between the Imperial, the traditional Aboriginal owners, the NLC and the NT Minister responsible for the Petroleum Act will include but not be limited to:

- Compressor station scheduled maintenance and as-needed repairs

Service provider companies will carry out these planned maintenance and as-needed repairs, as they will be short-duration and require specialist personnel and equipment. Imperial will program the planned maintenance activities during the local dry season where practicable.

The estimated workforce (employment and contract) to meet an indicative annual program is shown in Table 8 below. The extra estimated workforce (employment and contract) if a Beneficial Use Agreement is agreed between the Imperial, the traditional Aboriginal owners, the NLC and the NT Minister responsible for the Petroleum Act is highlighted in blue.

Table 8: Estimated Field Development and Field Operations Workforce (Employed and Contractor

Field Development and Field Operations Workforce (employment and contract	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Drilling					40	40	40					
Hydraulic Fracturing								60	60			
Gathering network construction						20	20	20				
Civil construction				15	15	15						
Appraisal operations	2	2	2	2	2	2	2	2	2	2	2	2
Appraisal maintenance				5	2	2	5	2	2	5		
Appraisal operations	5	5	5	5	5	5	5	5	5	5	5	5
Appraisal maintenance				5	3	2	10	3	3	5		
Total	7	7	7	32	72	67	82	92	72	17	7	7

(m) Access Roads

Access roads and tracks to be used under this project are:

- Public roads, including but not limited to the Carpentaria Highway
- Imperial Constructed Access Tracks, as shown in Figure 2 and Figure 9.

(n) Rehabilitation

Imperial will carry out rehabilitation activities on the Appraisal Area in line with the requirements of the Code of Practice: Onshore Petroleum Activities in the Northern Territory.

Imperial will carry out progressive rehabilitation of significantly disturbed land which is no longer required for the ongoing conduct of petroleum activities or future petroleum activities. This rehabilitation will commence as soon as practicable following the disturbed land becoming no longer required for the ongoing conduct of petroleum activities or future petroleum activities.

Imperial will monitor rehabilitation progress annually and perform maintenance works as required until a section of significantly disturbed land is rehabilitated per the rehabilitation plan.

Imperial will compile EMPs for approval by the Regulator as part of the proposed activities and part of an EMP's requirements is a rehabilitation plan which will cover the requirements for successful rehabilitation, as well as monitoring and reporting and the ability to relinquish and transfer assets to landholders.

(o) Other activities

Imperial does not expect that there will be any other aspect of any activity that is likely to have an Environmental Impact or impact upon the traditional owners.

(p) Reconnaissance activities

Imperial is carrying out reconnaissance activities starting 24 October 2023 to support the activities to be carried out under this Work Program. Imperial does not currently envisage the need for future reconnaissance activities to support this Work Program. If the requirement for future reconnaissance is identified, imperial will work with the NLC as soon as the need is known to facilitate these activities.

4.2.3 2023.11.01 | Work Program Appendix - Work Methods for Project Activities

Imperial Oil & Gas A Pty Ltd

2024-28 Work Program

Carpentaria Gas Project

Appendix 01

Work Methods for Project Activities

Rev.	Description	Date	Authors	Reviewer	Approved
1	Updated	20/12/2022	Vicky Cartwright Charles Dack Jon Bennett	Jon Bennet	Charles Dack
2	Issued for Re-submission	22/06/2023	Vicky Cartwright	Nick Fraser	Trent Smith
3	Updated for new scope	31/10/2023	Jon Bennett	Kelvin Wuttke Luke Jordan Tony Horvat	

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1 Access Track Construction

1.1 Overview

Eight-metre-wide access tracks will be constructed, as required, to provide access to well pads, campsites, gravel pits or water bores, compressor station, water treatment facility, etc. Where practicable, existing access tracks will be utilised. Where new access tracks are required, they will follow the disturbance footprint of the seismic survey or existing disturbed areas where practicable. The construction of access tracks will require vegetation clearing and rootstock removal, including areas within riparian zones. Where this is required, the path of least impact will be selected within the working corridor. Access tracks will be increased to a maximum width of 15m at intersections to provide vehicles with a safe turning radius and visibility. If road sections require a wear surface, where practicable, the material will be sourced from local quarries and turn out drains constructed; these drains will avoid mature trees.

The impact to trees of significance, or environmentally sensitive flora or fauna, will be minimised as practicable during the proposed program. A decision tree for tree clearing, when constructing linear infrastructure i.e., access tracks and flowlines, is shown in Figure 1.

1.2 Methodology

Timber and vegetation will be cleared from the access track alignment and stockpiled for future rehabilitation activities. To avoid further clearing, cleared timber and vegetation will be stockpiled in a naturally occurring clear area, where one is available in the immediate vicinity.

The access track will be formed and compacted using on-site materials; where local materials are unsuitable, additional materials will be imported, e.g., watercourse crossings.

An indicative access track and right of way section is shown in Figure 2.

Figure 1: Tree Clearing Decision Tree for Infrastructure Construction

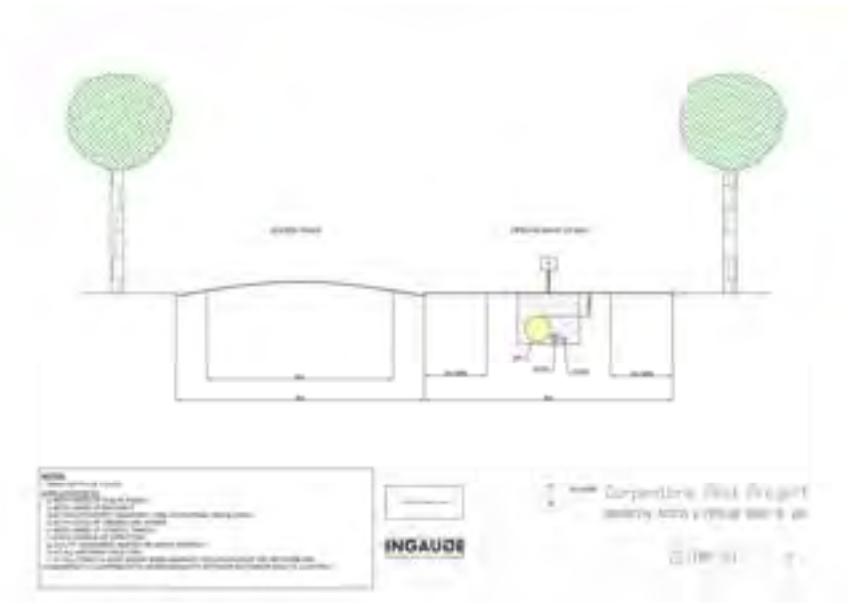

Figure 2: Indicative Access track and flowline Right of Way

2 Flowline Construction, Operation, and Decommissioning

2.1 Overview

To provide safe and efficient transfer of high volumes of fluids between well pads, at low pressure (≤1,500kPag) Polyethylene (PE) flowlines wastewater gathering network may be installed.

Fluids transferred in the Gathering Network may include:

- Groundwater.
- Drilling fluids.
- Flowback fluids.
- Wastewater.
- Gas

Flowlines will be constructed, operated, maintained, and abandoned in line with the "*Code of Practice for Upstream PE Gathering Lines in the CSG Industry and Companion Papers*" [APGA, 2019] (hereafter referred to as *the PEGN Code*).

The motivation to install and operate the Wastewater Gathering Network is to:

- Reduce the land clearing requirements for storage tanks at each well site.
- Provide the capability for recycling and reuse of fluids between well sites.
- Optimise in-field flowback fluid and wastewater treatment to a centralised location.
- Reduce trucking requirements.
- Reduce the amount of wastewater for final disposal.
- Operate the well site to minimise the potential for contaminant releases to the environment and any potential impacts of such releases.

A gas gathering network will be installed to gathering gas from wellpads to the Carpentaria Pilot Project compressor station.

Imperial A will bury any flowlines outside of well pad fences to protect them from fire, flood, and damage from livestock and human activity; this is in line with industry best practice.

Flowlines will follow the disturbance footprint of access tracks, or other disturbed areas, to reduce the amount of land clearing required and allow efficient construction, operation, and maintenance.

2.2 Methodology

Flowline installation will be carried out utilising the following steps:

1. Right of Way (ROW) Clearing & Grubbing
2. Pipe Stringing
3. Pipe Jointing
4. Trenching and Bedding
5. Placing of Pipe into the Trench
6. Backfilling and Compaction
7. Pressure/Leak Testing
8. Pipe Survey, Location and Marker-Signposting
9. Commissioning
10. ROW Reinstatement

Further detail is provided in the following sections.

2.2.1 Right of Way Clearing & Grubbing

By following access tracks with Right of Way where practicable, clearing requirements will be reduced to widening existing access tracks by up to 8m, as opposed to clearing a dedicated 14m wide flowline route. Flowlines will be buried parallel to access tracks, avoiding above traffic flow, and enabling the current access track to be used as work areas. This arrangement will also allow for easy inspection of the ROW without a dedicated access track.

Timber, vegetation, and debris such as rocks etc., will be cleared and grubbed next to access track alignment for ROWs, and stockpiled on the edge of the ROW for future rehabilitation activities.

Before any ROW clearing is carried out in watercourses, the 7-day weather forecast will be checked to ensure an adequate window for the trenching, installation, backfill, and stabilisation works to be carried out.

2.2.2 Pipe Stringing

The pipe will be either stick (~12m lengths) or coils of up to 100m. The pipe will be strung out on the ROW when clearing and grubbing of each ROW section is complete. The pipe will not be strung across access tracks or watercourse crossings until it is ready for installation on the same day. When the pipe is strung from end to end, adequate topographic and geomorphic provision shall allow for unimpeded overland flow/drainage, access by property owners, fauna, and construction traffic.

2.2.3 Pipe Jointing

PE pipe or fittings can be joined by heat fusion (welding) or mechanical fittings only. Adhesives, cement, or elastomeric joints are unable to be used in joining PE pipes and fittings for water applications in the oil and gas industry.

There are several types of heat fusion joints currently available, including butt fusion welding (butt welding), electrofusion welding, and saddle fusion welding. Saddle fusion welding is typically not used in the oil and gas industry.

Pipe jointing is a skilled operation, which requires several very specific procedures to be performed to achieve a successful joint. Prior to construction, Imperial A will approve the service provider's jointing procedures, and use data loggers verify conformance to the nominated welding parameters. Additionally, a unique weld numbering system will be established to identify each production weld, and tie-in for traceability records.

2.2.3.1 Butt Welding

The most widely used method for joining individual lengths of PE pipe is by heat fusion of the pipe butt ends, as illustrated in Figure 3.

This technique, which precludes the need for specially modified pipe ends or couplings, produces a permanent, economic, and flow-efficient connection. Welding parameters used will follow PIPA Guideline POP 003 [PIPA, 2018], which provides guidelines for butt fusion welding parameters. The welding temperatures for PE pipe used in constructing flowlines are not high enough to be considered a potential cause for ignition.

Figure 3: Standard Butt Fusion Join [APGA, 2019]

The following procedures will be adopted to ensure the integrity of the fusion welds:

1. The welding contractor shall have:
    a. Demonstrated experience in fusion welding of PE pipe.
    b. Suitably sized equipment which has been maintained in good condition with calibration status documentation available.
    c. Qualified operators who have an up-to-date log detailing project and welding experience

2. Assessment of the proposed welding procedures:
    a. Pre-qualified welding procedures for pipe class and diameters being proposed for the project and the welding machines or control box which will be used, and destructive weld testing data may be considered.
    b. Carry out trial welds on the actual pipe to be used for the contract and have these destructively tested to meet the specified performance requirements (testing and minimum performance requirements are detailed in **Section 2.3.9 –** Inspection and Testing).
    c. Determine and document the agreed welding parameters, procedures, and welding equipment (this may also include the use of welding tents, pipe end covers etc.); and
    d. The agreed welding parameters, procedures and welding equipment become the contract requirements and should not be varied without additional evaluation and testing.
3. Determine quality control and assurance requirements, including but not limited to:
    a. Inspection for wall thickness and welding zone preparation.
    b. Internal inspection of pipe for obstruction and cleanliness. Including the removal of swarf after machining welding face for butt welding.
    c. Maintaining a detailed welding log for each weld (including unique weld ID and GPS location record keeping).
    d. Destructive testing of a percentage of welds.
    e. Visual and non-destructive assessment of each weld.
4. Continuously review process and results.
    a. Butt fusion welding is a skilled operation; several very specific procedures need to be carried out to achieve a successful joint. All operators carrying out butt fusion welding will be trained by appropriately registered training organisations (RTOs), meeting the prerequisite training requirements of PMBWELD 301.

2.2.3.2 Electrofusion Welding

The main difference between butt welding and electrofusion is how the heat is applied. The electrofusion joint is heated internally by a conductor at the joint interface. Heat is created as an electric current applied to the conductive material in the fitting. PE pipe to pipe connections made using the electrofusion process requires electrofusion couplings, as shown in Figure 4.

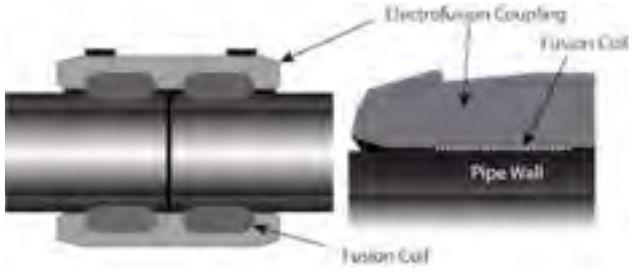

Figure 4: Typical Electrofusion Joint [PPI, 2023]

Electrofusion (EF) fittings shall conform to AS/NZS 4129 and be third-party certified by a JAS-ANZ accredited certifier under the StandardsMark, GasMark, WaterMark schemes, or equivalent.

To consistently make satisfactory electrofusion joints, it is essential to follow the jointing procedure, emphasising pipe surface preparation, cleanliness, joint restraint during the fusion and cooling cycles, and temperature control.

Electrofusion is a skilled operation; several specific procedures need to be carried out to achieve a successful joint. Imperial A will approve welding procedures before construction begins. All operators carrying out electrofusion welding will be trained by appropriate RTOs, meeting the prerequisite training requirements of PMBWELD 302.

2.2.3.3 Mechanical Joints

Where fusion joints are not appropriate, mechanical fittings can be used, particularly for the 50mm and smaller PE pipes. Three basic fittings can be used:

- Flanges.
- Mechanical compression joints.
- Mechanical couplings.

When jointing of PE pipe is required to other materials, a flanged joint is generally the most practical for field jointing. Otherwise, a material transition fitting can be considered and welded in.

Imperial A will preferentially use flanges for jointing to other materials.

2.2.3.4 Flanges

When jointing is required to other materials, a flanged joint is generally the most practical.

Jointing to other pipe materials may also be achieved using mechanical flange adaptors similar to mechanical couplers, except one end is replaced by a flange.

A typical flange connection is shown in Figure 5.

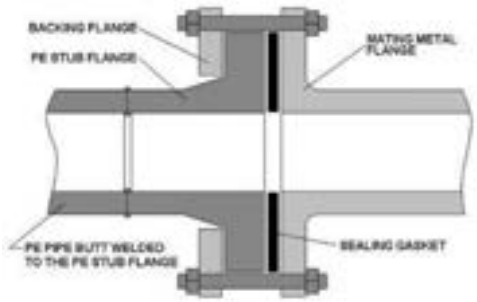

Figure 5: Typical Flanged Connection [APGA, 2019]

2.2.3.5 Mechanical Compression Joints

Mechanical compression joints will be installed following the manufacturer's requirements.

2.2.3.6 Mechanical Couplings

Mechanical couplings will be installed following the manufacturer's requirements.

2.2.4 Trenching and Bedding

A trench will be excavated to a depth that will give 750mm depth of cover (DOC) to flowlines installed, except where the flowline crosses an access track or watercourse, where it will have a DOC of no less than 1,200mm.

Trench excavation will be carried out using a trenching machine, excavator with an attachment, or similar. In both instances, the objective is to achieve a trench bottom free of rocks, stones or other material with an angular profile that may cause damage to the pipe and a trench profile in continuous contact with the pipe. When such conditions are achieved, the pipe will be laid directly on the trench bed; if this is not achievable from the direct trenching operations, bedding will be applied into the trench to achieve the same.

Any trenches that are left open overnight will be:

- Fenced with electric fencing to exclude livestock.
- Fitted with fauna ladders to allow fauna egress.
- Checked by a Fauna Spotter before starting works the next day, and any fauna removed.

No trenches across watercourses or access tracks will not be left open overnight.

Before any trenching is carried out in watercourses, Imperial A will check the 7-day weather forecast to ensure there is an adequate weather window for the trenching, installation, backfill, and stabilisation works to be carried out.

2.2.5 Placing of Pipe into the Trench

The pipe will be lowered into the trench without excessive strain and laid with sufficient slack to allow for contraction caused by temperature changes.

PE pipe up to approximately 160 mm diameter can usually be placed in the trench manually. Heavier larger diameter, pipe will require handling equipment to lift, move, and carefully lower the pipe into the trench.

2.2.6 Backing and Compaction

Following the laying of pipe, excavated material will be used to backfill the trench. Several quality assurance steps and processes will be used, including:

- The initial bedding material will be screened to ensure it is free of rocks, stones or other material with an angular profile that may cause damage to the pipe. The balance of the trench will be backfilled and compacted using excavated material.
- Compaction shall be performed to ensure the required compaction level is achieved while ensuring that any stress placed upon the pipe is acceptable.
- The standard of backfill and compaction shall minimise subsequent soil movement and prevent subsidence of the trenched area.
- The permeability of the backfilled and compacted trench shall be similar to that of the unexcavated material to minimise damage along the trench invert and potential "tunnel' erosion.
- Where scouring could occur in a trench, barriers shall be installed to prevent scouring. Barriers shall be built of non-degradable foam, sandbags, or other approved material.

2.2.7 Pressure/Leak Testing

All new components of the flowline network and any part of an existing network that is diverted or altered in any way shall be subject to a pressure test to validate mechanical strength and detect leakage of the network before commissioning.

The PE Gathering Networks' pressure testing will be broken into two separate tests, a strength test, and a leak test. The strength test proves the pipe's integrity and identifies any large leaks or defects in the network being tested. The leak test determines if there are any small leaks in the network. The leak test shall be undertaken after the successful completion of a strength test. Further details on strength and leak testing are covered in **Sections 2.3.9.8** and **2.3.9.9** respectively.

Due to the viscoelastic nature of PE, it is not practical to conduct such tests in a manner that ensures no pressure change. Variations of atmospheric pressure, the temperature of the test fluid in the pipe, and material creep significantly affect the test pressure. Therefore, it is necessary to permit some drop in measured pressure over the test period.

2.2.7.1 Pressure Test Safety

Pressure testing is considered one of the significant hazards in the development of a PE Network.

Pressure testing equipment will be fitted with regulators and Pressure Safety Valves (PSV) to ensure the Gathering Network is not over-pressured during testing. The primary safety control for pressure testing is QA/QC conformance, primarily in material selection and welding. The secondary safety control measure is the introduction and use of calculated exclusion zones.

2.2.7.2 Pressure Testing Exclusion Zones

The test section will have a defined primary exclusion zone, determined by the amount of stored energy released upon test section failure.

A secondary exclusion zone boundary shall be established around the control point.

Figure 6 shows the configuration of exclusion zones for pressure testing.

Figure 6: Defined Exclusion Zones [APGA, 2019]

2.2.7.3 Exclusion Zones During Pressure Tests

The primary exclusion zone is designed to achieve a specified distance from the test to the safe area for any unauthorised person to be located during the test.

While the test pressure is being introduced, and for the actual strength test period, strict precautions will be implemented to ensure that unauthorised persons are prevented from entering the exclusion zone (primary and secondary) test areas. Barriers, signs, or other markers shall be displayed to indicate the entry points to the restricted area. Consideration will be given to manning road crossings and other higher-risk locations while the test section is under test to ensure that no persons enter the test area.

After successfully completing the strength test, and after the pressure has been reduced to Maximum Allowable Operating Pressure (MAOP) or lower, authorised personnel may be allowed inside the primary exclusion zone.

The test equipment will be located outside the primary exclusion zone and be surrounded by a secondary exclusion zone. During testing operations, no unauthorised person will be permitted to enter this zone.

2.2.7.4 Pressure Testing Primary Exclusion Zone (R1)

The primary exclusion zone boundary shall be calculated using the approach defined in ASME PCC-2 or following *Section 8.2.9* of *the PEGN Code* requirements. This approach calculates the amount of stored energy and then calculates a distance based on the blast wave impact on personnel and structures. The minimum primary exclusion zone is:

- 30 m if the calculated energy is less than 135.5 MJ.
- 60 m if the calculated energy is between 135.5 and 271 MJ.

For energy levels greater than 271MJ, the distance Rscaled(2TNT)1/3 in metres, calculated following *Appendix B2* of *the PEGN Code*, based on a Rscaled number of 20, where TNT (Trinitrotoluene) is the energy measured in kilograms of TNT.

These distances are subject to an increase in the specific direction of failure to allow for potential projected missiles.

2.2.7.5 Pressure Testing Secondary Exclusion Zone (R2)

The secondary exclusion zone boundary shall be established around the control point. The minimum recommended approach is to use the distance based on a scaled number of 20. In this calculation, the stored energy is the energy in the test equipment – hoses and headers. An alternative is to use an exclusion distance of 10 m.

2.2.7.6 Preliminary Testing

Sections of the network in key areas may need to be preliminary tested or pre-tested separate from the main network section. Examples are roads, creek crossings, and sections near plants and houses where the impact of a pressure test failure is critical. The fabricated pipe sections to be installed will be preliminary tested where possible. These sections can later be tied into a long test section. The preliminary section's exclusion zone can be reduced in these cases as it has previously passed a strength test.

2.2.7.7 Test Plan

A test plan will be developed for all pressure tests. This plan can be a generalised document covering most test cases. However, in all cases the particular risks and hazards associated with a test shall be understood and managed.
The test plan will be able to:

- Ensure that all risk controls are implemented.
- Ensure the completion of a Job Safety Analysis (JSA), and that all items identified are adhered to.
- Ensure that all relevant equipment has a current calibration certificate from a recognised and certified testing agency.
- Ensure that all measuring equipment is located at a suitable distance from the test section, to conform with exclusion zone requirements.
- Ensure that fluid and wastes disposal procedures outlined in the **EMP** are followed.

The person or persons responsible for the preparation of the test plan shall have appropriate qualifications and experience.

2.2.7.8 Strength Test

A strength test intends to confirm both a pipe 's integrity and identify any large leaks or defects in the network. If at the end of the test period, the test section's pressure is above MAOP and there is no evidence of a sudden pressure drop, then the test section will be considered to have passed. After completing the strength test, the pipe shall then be subject to a leak test process.

The criteria for pneumatic strength testing are shown in **Table 1**.

Table 1: Strength Test Criteria

Pneumatic Strength Test	Acceptance Criteria
• Starting pressure fp x MAOP. • Test pressure to remain between fp x MAOP & MAOP during the test.	• Structural integrity maintained for 6 hours while pressure held between fp x MAOP & MAOP.

2.2.7.9 Leak Test

The leak test intends to identify any small leaks in the network. The 24-hour leak test shall be undertaken after a successfully completed strength test. The minimum starting test pressure shall be the nominated MAOP of the test network. The criteria for pneumatic strength testing are shown in **Table 2** as per *Section 8.4.2.2.* of *the PEGN Code* [APGA, 2019].

Exclusion zones are generally not required for leak tests as the network has been proven to have adequate structural integrity and no significant leaks. However, it is recommended that exclusion zones be maintained for above-ground pipe sections and testing equipment – ensuring unauthorised people are excluded from test areas.

Table 2: Pneumatic Leak Test Criteria

Pneumatic Leak Test Method	Acceptance Criteria
• Allowable Pressure Loss (pneumatic pressure decay test). • Details of this test method and calculations are described in CP-8-003 Leak Test Methods and Appendix B1 of the PEGN Code, respectively.	• The acceptable volume loss is 1 litre/hr/actual m3 volume of test fluid. • NOTE: The word "fluid' in this context means air or another gaseous medium.

Tracer gas will not be used for leak testing of the constructed flowlines.

2.2.8 Pipe Survey, Location, and Marker-Signposting

2.2.8.1 Pipe Survey

A survey will be made to locate the Gathering Network (and all related infrastructure) relative to permanent marks and benchmarks conforming to Mapping Grid of Australia (MGA 94) [ICSM, 2021] or other approved datum.

The survey will develop sufficient information on the constructed Gathering Network to satisfy the materials traceability requirements of the PE.

Specific survey locations that will be captured occur at crossings (such as road, rail, creeks, rivers, third-party infrastructure) at changes of direction, fence lines, and boundaries.

2.2.8.2 Survey Accuracy

The uncertainty of the x-y coordinates shall not exceed 500mm, and the uncertainty of the as-built top of pipe level shall not exceed 50mm.

2.2.8.3 Pipe Location

All buried flowlines will have a detectable tracer wire installed, including bored sections. This detectable tracer wire enables the pipe location to be traced, with a pipe locator, reducing the likelihood of damage during future excavations. Tracer wire will be metallic, electrically insulated and have a minimum diameter of 14 gauge. Tracer wire shall be resistant to corrosion damage by either using coated copper wire or by other means.

2.2.8.4 Marker Signposting

Marker signs will be installed to alert people of the Wastewater Gathering Network's presence and, if they plan to carry out work nearby, of the possible consequences of inflicting unintended damage. Markers also instruct those intending to work near the Gathering Network to contact the nominated network operator and provide relevant contact details. Pipe marker signs shall conform to the requirements for safety signs per AS 1319 *'Safety Signs for the Occupational Environment'* [INDUSTRIAL WARNING SIGNS COMMITTEE SF/5, 1994].

Marker signs shall:

- Indicate the approximate position of the pipe.
- Indicate that excavating near the pipe is hazardous.
- Include a direction to contact the Gathering Network operator before commencing excavation near the network.

Signs shall be placed at the following locations and be inter-visible:

- Both sides of public roads.
- Both sides of railways.
- At each property boundary (and at internal fence lines as appropriate).
- Both sides of creeks and rivers.
- Both sides of vehicle tracks.
- Each change of direction.
- At utility crossings (buried or above ground).
- At all network facilities.

Signs shall also be placed at all other locations where sign-marking (the network location) is considered to contribute to network safety, by properly identifying its location.

2.2.9 Commissioning

Commissioning is broadly defined as the range of activities required between mechanical completion of the plant or network, and its handover for operation. It involves introducing process fluids and the functional and performance testing of all related equipment and systems before handover.

Commissioning will always be preceded by acceptance pressure testing of the relevant network section. As this Gathering Network is very simple in design and operation, the commissioning plan will be equally simplistic.

Commissioning will ensure that both the PE pipes and all associated facilities are checked and verified by a competent and qualified inspector, ensuring they are fit for the nominated operating envelopes for all Gathering Networks. Such facilities shall include valves, flanges, protective devices (pressure safety valves), electrical and instrumentation equipment where applicable.

The network shall not be considered ready to commence or recommence operation until, as a minimum, the following checklist has been completed:

1. The network safety management study has been reviewed, and the network determined as ready for operation.
2. The strength and leak test requirements have been achieved and documented.
3. The MAOP has been established.
4. All tie-in welds to existing facilities that have not been subjected to item (2.) above, have been subjected to the requirements of *Section 7.5.1, 7.7.1, 7.8* and *7.9* of *the PEGN Code*.
5. All components have been tested for satisfactory operation.

Sufficient operating, maintenance and emergency personnel have been trained and qualified as competent.

2.2.10 ROW Reinstatement

After backfilling has been completed, construction tools, equipment, and debris will be removed. Areas disturbed by the installation will be reinstated as soon as practicable, including pulling stockpiled timber back over the ROW. Where pipelines are not co-located with new or existing access tracks, or previously cleared areas stockpiled timber will not be pulled back over the flowline ROW so that light vehicles can traverse the alignment for inspections and maintenance.

Due to the irregular use by only light vehicles, revegetation will occur, and management of regrowth of trees that will impede access will be carried out on an as needs basis.

Appropriate measures shall be taken to prevent erosion and minimise long-term degradation of the environment (e.g., the construction of contour banks or diversion banks.

Fences that have been removed to provide temporary access to the route will be re-erected.

2.2.11 ROW Inspection Maintenance and Monitoring

ROWs will be inspected before, and after, the wet season for evidence of subsidence and/or surface and tunnel erosion. Where identified subsidence, surface and tunnel erosion will be rectified before the onset of the wet season.

2.2.12 Materials Selection

Polyethylene is a thermoplastic and behaves differently from metals.; however, these properties are well-known and are embraced in Australian and other international standards.

PE100 resins used in today's pipes have high toughness, excellent resistance to slow crack growth and rapid crack propagation. They also have an inherent resistance to water and many chemicals. Polyethylene is now the material of choice for many water, wastewater, gas, and other applications.

Materials used for the construction of the Gathering Network will comply with *Section 3* of the *PEGN Code* [APGA, 2019].

2.2.13 Watercourse Crossing

Directional drilling is the default methodology for crossing a waterway with defined banks or a defined drainage channel with a buried service. A waterway crossing study will be carried out where a buried service alignment crosses a waterway with defined banks or a defined drainage channel before construction is carried out. If this study indicate that an open trench method of crossing can be constructed without adversely impacting water flow patterns or waterhole water retention timings, open trench methods will be used; if not, directional drilling will be used. Before any flowline construction work is carried out in watercourses, Imperial A will check the 7-day forecast to ensure an adequate window for the trenching, installation, backfill, and stabilisation works to be carried out. A decision tree for the Flowline waterway crossing methodology is presented in Figure 7 Imperial A considers that when applying the above methodology, that the residual risk is ALARP and acceptable when crossing a watercourse.

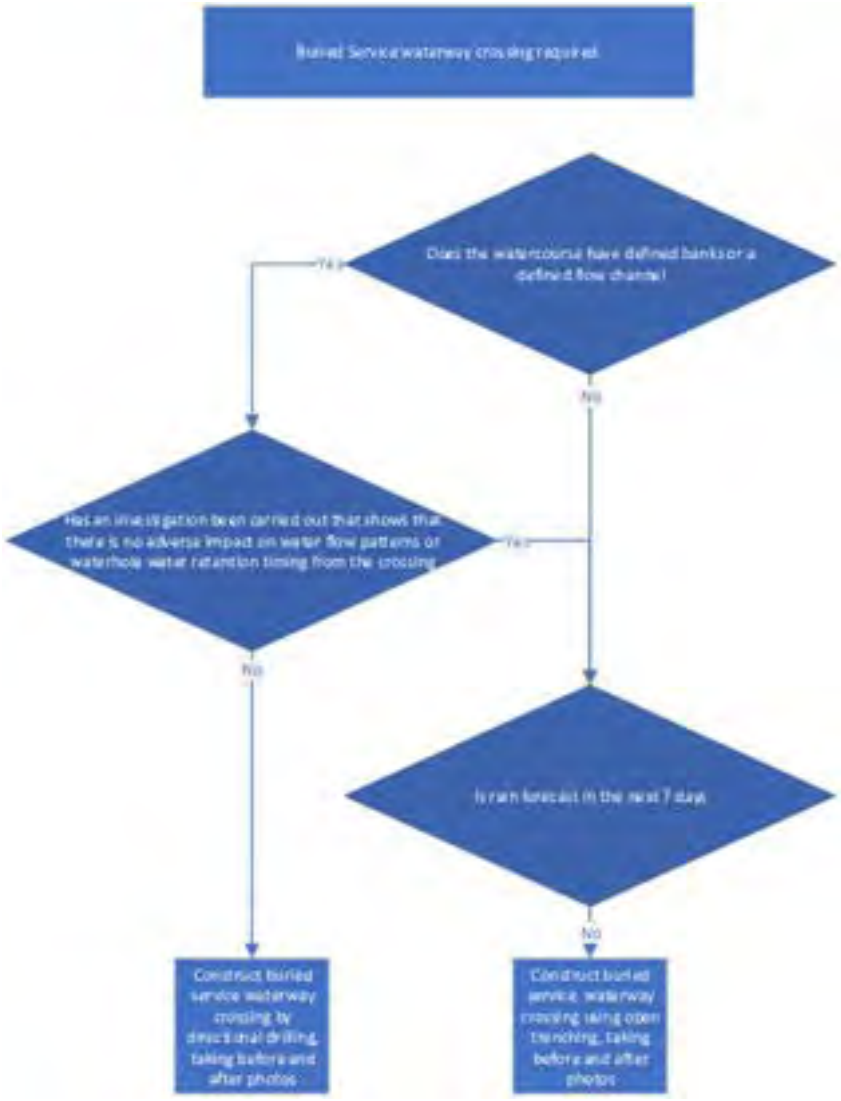

Figure 7: Buried Service Waterway Crossing Methodology Decision Tree

2.2.14 High Point Vents, Low Point Drains and in Field Valves

Water/wastewater flowlines in undulating areas are prone to air locking; as a preventative method, High Point Vents (HPVs) will be installed in these areas to release gas build up from the flowlines. HPVs will be visually checked weekly when flowlines are in use, i.e., whenever flowlines contain wastewater.

Gas flowlines in undulating areas are prone to water locking; as a preventative method, Low Point Drains (LPDs) will be installed in these areas to release water from the gas flowline. LPDs will be visually checked weekly when flowlines are in use, i.e., whenever flowlines contain wastewater.

Infield valves will be installed as required to allow efficient use of the network.

Any above-ground infrastructure outside of well pad fence lines will be barricaded to prevent livestock access. Erosion and sediment controls will be constructed.

2.2.14.1 Abandonment

When a network is abandoned, it shall be disconnected from all fluid sources and flushed clear of fluids. Disposal of any fluids shall meet all relevant environmental and safety requirements. As the Gathering Network will be constructed from PE, the risk of subsidence caused by flowline collapse is minimal.

When a network is abandoned, the following additional requirements shall be completed:

- The cutting and removal of all sections of buried pipes that come to the surface.
    - At a minimum of 750 mm below the natural surface, or
    - At the pipe depth, whichever is the lesser.
- The removal of all surface equipment.
- The removal of all signage associated with the network on completion of the post abandonment maintenance period.

Obtaining landowner releases for the completed abandonment.

Upon completing the network section's abandonment in place, the records identifying and locating sections of the abandoned network shall be prepared as part of the relinquishment procedure.

These records shall be publicly available to prevent possible mistakes in identifying an abandoned network as an operational network.

3 Well Pad Construction

3.1 Overview

Well pads will be constructed as required to provide a safe and efficient workplace for drilling and other well pad regulated activities.

The construction of well pads will include:

- Clearing and levelling the well pad work area.
- Constructing lined pits for the storage of freshwater, drilling fluids, and drilling cuttings.
- Constructing water production and groundwater monitoring bores.
- Constructing tank pads for the placement of above ground enclosed or open topped treatment tanks.
- Installing a drilling cellar and conductor.
- Installing above ground tanks for storing and disposing of frac flowback fluid and produced water.
- Fencing well pads to prevent livestock and personnel entry.
- Clearing firebreaks.
- Installing erosion and sediment control devices.

3.2 Methodology

Timber and vegetation will be cleared from the site and stockpiled for future rehabilitation activities.

The site will be levelled and compacted using on-site materials as far as practicable.

Pits will be constructed using bulldozers and excavators, with berms consolidated with watering and compaction.

The footprint for any above-ground tanks will be consolidated and tested to the tank supplier's requirements.

Water monitoring production and monitoring bores will be drilled by licensed drillers, in line with permit conditions.

Fire breaks will be constructed and maintained at wellpads.

Erosion and sediment controls will be constructed at wellpads.

Wellpads will be fenced to exclude livestock, barbed wire will be used in line with local pastoral practices. An indicative wellpad layout is attached in Figure 9.

3.3 Cut and Fill Well Pad Methodology

Where a natural slope is too great for a drilling rig to operate safely, the well pad will be cut and filled to flat, using the following methodology.

3.3.1 Vegetation Stockpiling and Dirty Water Filtration

Vegetation will be stripped from the site and windrowed along the downslope section of the well pad and fire access track. This has the benefit of filtering any runoff from the work site during construction, and from the well pad fill batters post-construction, as shown in **Figure 19**.

3.3.2 Topsoil and Clean Water Diversion

Topsoil from the site shall be stripped and windrowed above the cut batter and fire access track, on the upslope extent of the site as shown in Figure 8 and **Figure 19**. Care should be taken to ensure that water intercepted by the topsoil bund does not drain back onto the pad or to dirty water catch drains.

Figure 8: Topsoil Windrow Above the Cut Batter used to Divert Clean Water away from the Well Pad

3.3.3 Levelling the Well Pad

The well pad will be cut and filled to flat, balancing the on-site material volumes to avoid the need to bring material onto the site or remove material from the site. The well pad will be compacted to provide a good working surface and crowned along the Plant North/South Centreline to achieve a 1% fall back to the well pad edge draining to the plant East and West batters. Both cut and fill batters will be at a 1:1 slope.

The cut batters will be protected from erosion by the topsoil stockpile/clean water diversion bund preventing significant water volumes from washing over them, as shown in Figure 10..

The fill batters will be protected by constructing a bund at the top to prevent water from the well pad from running down the batter face, as shown in Figure 10..

3.3.4 Well Pad Drainage

Significant volumes of water are expected to runoff from the compacted pad. This water will drain plant East and West on the well pad to shallow spoon drains constructed inside the bunds at the top of the fill batters and the toes of the cut batters. These drains will be contoured to take the runoff to the cut/fill point of the well pad , as shown in Figure 10.

3.3.5 Sediment Control

Drains shall be installed from the cut/fill point on the pad to type 2 sediment controls, as shown in Figure 10.

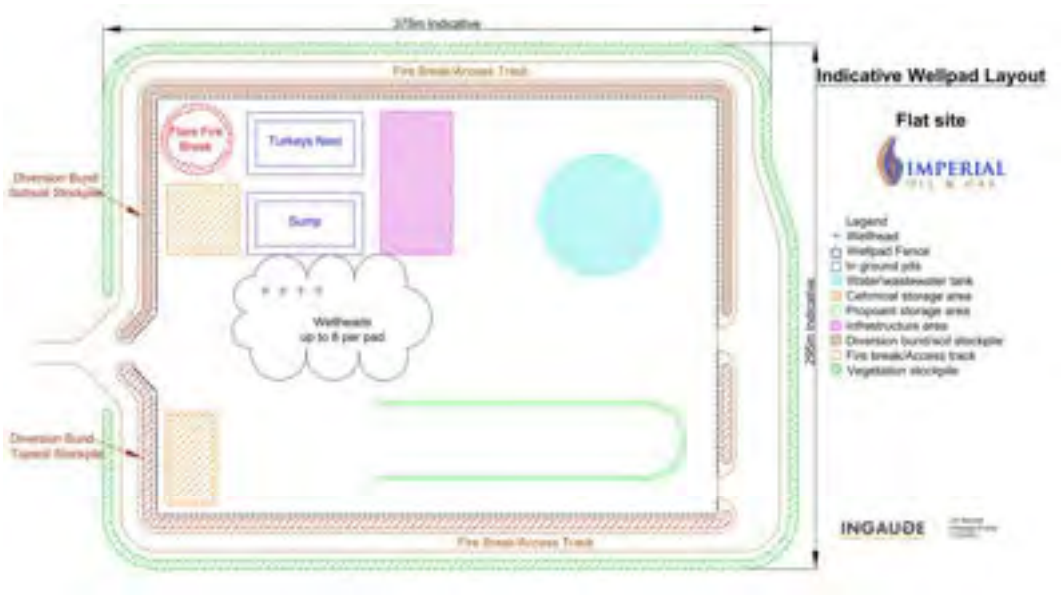

Figure 9: Indicative wellpad layout

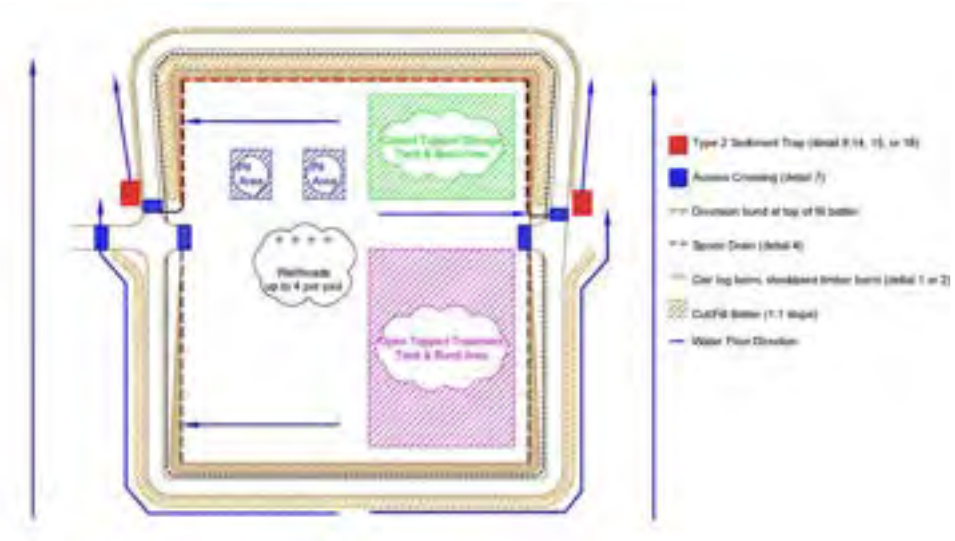

Figure 10: Indicative erosion and sediment control devices for wellpads

4 Water Bores

4.1 Overview

Water bores are required for:

- Provide access to aquifers that could be impacted by regulated activities to establish baseline water qualities.
- Provide access to aquifers that could be impacted by regulated activities to measure any impacts.
- The production of water required to carry out regulated activities.

Where water bores are to be drilled for the above purposes:

- A Bore Work Permit will be sought and issued by Water Resources for all water bores drilled.
- All bores will be drilled, commissioned, and tested according to the issued Bore Work Permit conditions by appropriately licensed drillers.
- Where a water bore is co-located with a well pad, no additional clearing will be done beyond the extent required for the well pad, including fire access trails and breaks.
- Where a water bore is not co-located with a well pad, water bores will be placed in previously cleared or naturally cleared areas as a priority where practicable.

4.2 Camps and Campsites

A camp will be constructed and operated as part of the Carpentaria Pilot Project for the longer-term appraisal activities. Temporary camps will be utilised for the shorter duration construction, drilling and hydraulic fracturing activities. Existing disturbances or wellpads constructed under this work program will be used for these temporary camps.

5 Gravel Pits

5.1 Overview

On-site material will be used for the majority of civil construction works. Gravel will be required to give a better running surface on some road sections and may be required to cap some well pads, depending on the on-site material.

Where gravel is required, local gravel pits will be established; the establishment of these pits will include the following:

- Gravel pits will use the same site selection criteria as well pads.
- Clearing of vegetation, to be stockpiled around the perimeter of the cleared area for rehabilitation.
- Stripping of topsoil (if required):
    - Topsoil will be stockpiled around the upslope side of the gravel pit to divert overland flow from entering the gravel pit.
    - If there is no topsoil on-site (e.g., Pea Gravel site), a diversion bund will be constructed upslope to divert any overland flow.
- A whoa boy will be constructed on the access track so that water does not flow down the access track into the gravel pit.
- Batters will not be steeper than 1:1, to allow safe passage for animals, and people.
- Gravel pits will not be fenced.
- Gravel pits will intentionally be kept wide and shallow to facilitate rehabilitation.

An indicative layout for a gravel pit is shown in Figure 11.

Figure 11: Indicate Gravel Pit Layout

6 Drilling

6.1 Overview

There are three potential well designs to be carried out under this Work Program:

1. A cased horizontal production well with a plugged back open hole vertical pilot.
    - The open hole vertical pilot in this design is drilled and logged to confirm the prognosed formations depths before being plugged back to the horizontal kick-off point and horizontal section drilled and cased.
2. A cased horizontal production well from a plugged back cased hole vertical well.
    - The bottom section of the vertical cased hole in this design is plugged back to the horizontal kick-off point, a whipstock is set, and an exit is milled into the casing to allow a horizontal section to be drilled and cased.
3. A cased horizontal production well without a vertical pilot.

The surface and intermediate hole sections are the same under all three well designs so that they will be covered once; the production section for each design will be covered in dedicated sections below.

This Work Program also includes multi-well pads, where more than one wellbore is drilled from a well pad; the details of the extra complexity of collision avoidance for multi-well pads are covered in **Section 6.5**.

6.2 Surface Hole Section

The surface hole section will be drilled from the pre-installed cellar and conductor to a depth that isolates any shallow aquifer/s.

During drilling of in the Beetaloo Sub Basin, total drilling fluid losses are generally observed in the shallow aquifers. This scenario is anticipated in current well designs, with high permeability conduits, fractures and cavernous zones expected in karstic formations. Loss of circulation material (LCM) is generally not successful for responding to fluid losses in these formations. When total losses occur, the drilling fluid systems are reduced back to water to maintain dynamic well control while minimising drilling additive losses to the formation.

The 'surface casing' will be installed into the surface hole and cemented (specifically engineered cement) to seal the aquifer off from the rest of the wellbore to prevent fluid crossflow between formations. During cement operations, cement may also be lost to the formation resulting in cement slumping or "patchy" cement sections. If cementing of the surface casing for a well is unsuccessful (i.e., the cement does not return to the surface or slumping is observed), top-up cement job/s will be undertaken. This process involves spotting cement from the surface in the annulus of the surface casing and formation.

6.3 Intermediate Hole Section

The surface casing shoe will be drilled out; drilling will then progress down to the target intermediate hole depth for a vertical well, or the 'kick off' point for a horizontal well. When the intermediate hole section reaches its target depth, the intermediate casing is installed and cemented to isolate potential hydrocarbon-bearing zones and the surface.

A Formation Integrity Test (FIT) or Leak-off Test (LOT) will be carried out at the intermediate casing shoe to prove integrity before drilling ahead.

6.4 Horizontal Production Hole Sections

A horizontal wellbore can be drilled from a dedicated intermediate section or plugged back from a vertical wellbore.

Where a horizontal wellbore is being drilled from a dedicated intermediate section, the following will apply. The intermediate casing shoe will be drilled out, and a short section of the production hole will be drilled. A FIT or LOT will be carried out at the intermediate casing shoe to prove integrity before directionally drilling ahead.

Where a horizontal wellbore is being drilled from the intermediate section of a vertical open hole pilot, the following will apply. The vertical open-hole section will be abandoned and plugged back to above the kick-off point before directionally drilling ahead.

Where a horizontal wellbore is being drilled from the intermediate section of a vertical cased hole pilot, the following will apply:

- The vertical cased-hole section will be abandoned back to the kick-off point, a whipstock set into the intermediate casing, and an exit point milled into the intermediate casing.
- Once the kick-off operation has occurred, the production section will be directionally drilled horizontally within the selected shale target/s, the horizontal section length within the selected shale target will be up to 3,500m.

When drilling horizontal wellbores or, for that matter, any directional well, standard directional drilling techniques and equipment are employed to enable accurate wellbore direction to be recorded and maintained.

6.5 Collision Avoidance on Multi-Well Pads

An added complexity of multi-well pads is collision avoidance of wellbores; unplanned wellbore collisions can have serious safety and environmental consequences. To minimise the risk of wellbore collision, the position of any existing wellbores and the well being drilled need to be clearly understood and a Separation Factor maintained.

While directionally drilling, standard directional drilling techniques and equipment are employed to enable accurate wellbore direction to be recorded and maintained. A "Separation Factor" for the well is also continually calculated and monitored. The use of separation factors is a standard industry control that has been effectively used for multi-well pad drilling within Australia and internationally.

Industry practice generally maintains a Separation Factor greater than two between well paths unless an internal risk assessment is carried out to avoid wellbore collision. Separation factors are covered in more detail in **Section 6.5.1.1.**

Imperial A will follow this industry practice whilst drilling multiple wells on a pad under this Work Program.

6.5.1.1 Separation Factors

A visual representation of separation factors is provided in Figure 13 and Figure 14. The level of uncertainty of a wellbore's position increases along its path, as shown in Figure 12, due to several factors:

- Relative Depth Error.
  - Error in measuring along the hole depth, e.g., stretch in a wireline.
- Misalignment Error.
  - Error due to instrument misalignment in the wellbore.
- True Inclination Error.
  - Error in inclination reading.
- Compass reference error.
  - A constant error in direction due to misalignment, e.g., gyro error or error in magnetic declination.
- Drill string Magnetisation.
  - Magnetic interference caused by "hot spots."
- Gyrocompass.
  - Error due to gyron Gimbal drift.

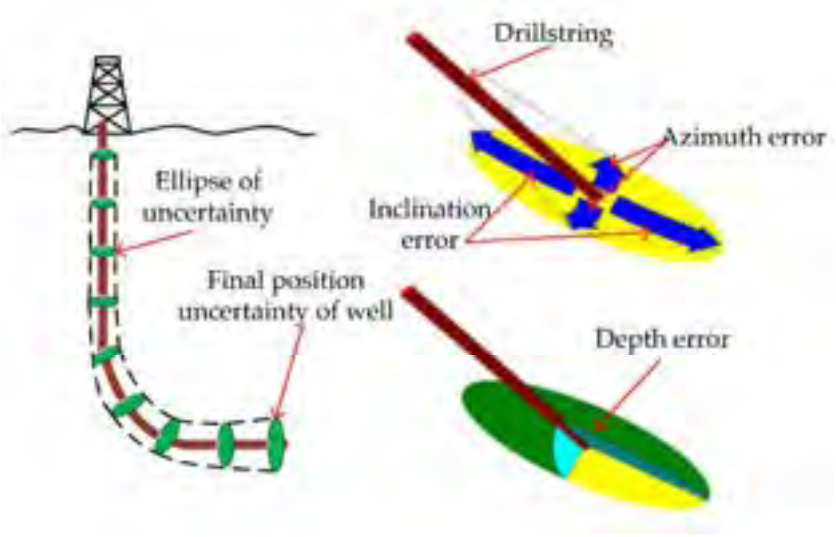

Figure 12: Wellbore Uncertainty [C. P. GOONERATNE et al., 2017; ANGUS JAMIESON, 2012]

Because of this increase in uncertainty along the well path, a Separation Factor is used, rather than standard separation distance. The separation factor is a ratio of the centre-to-centre distance of the wellbores over the sum of the uncertainty of both wellbores, as shown in Figure 13.

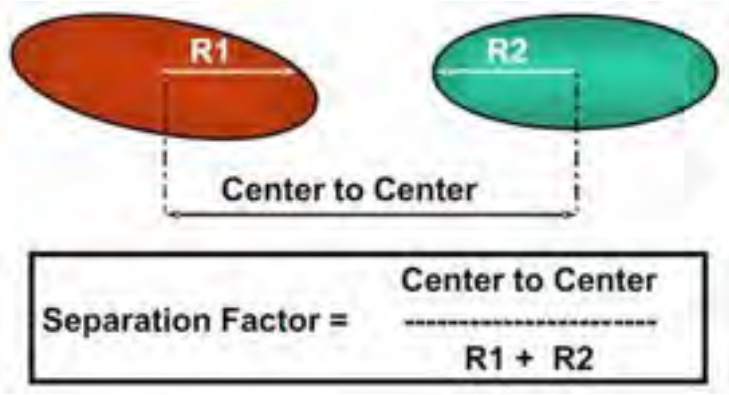

Figure 13: Separation Factor Equation

As shown in Figure 14 separation factor of:

- Greater than 1, the two ellipses of uncertainty do not overlap.
- 1, the two ellipses of uncertainly just touch.
- Less than 1, the two ellipses of uncertainty overlap.

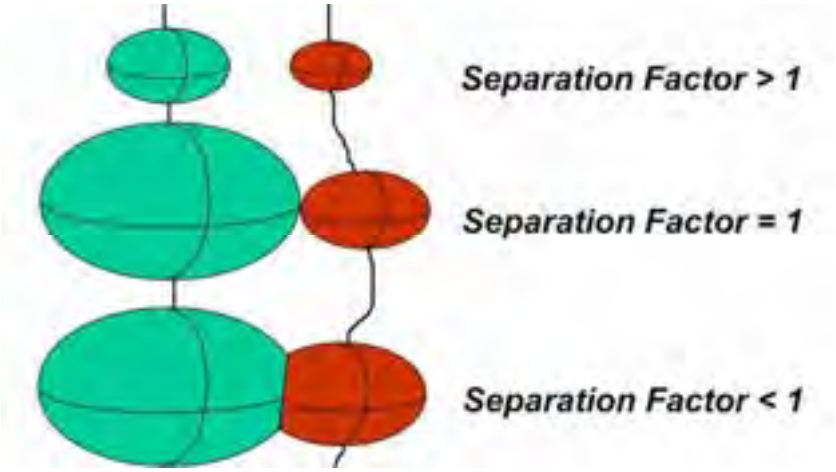

Figure 14: Separation Factor Comparison

7 Diagnostic Fracture Injection Test (DFIT)

7.1 Overview

During a Diagnostic Fracture Injection Test (DFIT), a relatively small volume of freshwater (without proppant) is injected into the target formation, creating a hydraulic fracture. After the injection, the wellbore pressure is monitored for a short period (up to an hour). The pressure measurements are used to infer properties of the formation, including the leak-off coefficient, permeability, fracture closure pressure (related to the magnitude of the minimum principal stress and the net pressure), and formation pressure. These are key parameters for hydraulic fracture design and reservoir engineering in shale.

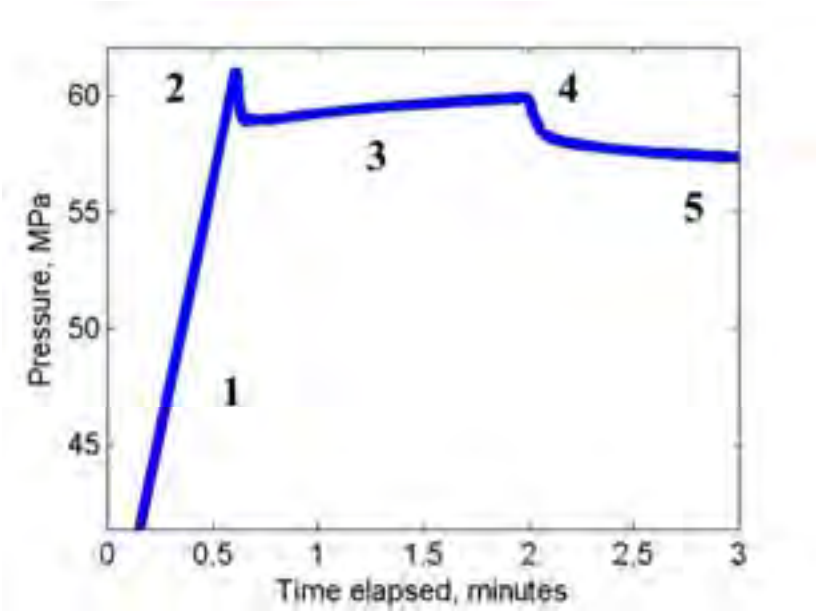

Figure 15: A Typical Pressure Response During Injection in a DFIT [MARK MCCLURE, 2017]

During period #1, a fracture has not formed, and wellbore storage controls the pressure behaviour. The leak-off point occurs at #2, the fracture propagation pressure is reached at #3, and the ISIP (initial shut-in pressure) is reached at #4. DFIT analysis is primarily interested in analysing the trends in pressure in the hours and days after shut-in.

8 Perforation

8.1 Overview

The casing at the identified formation is perforated to provide communication between the wellbore and the formation target zones. The perforation selection method will depend on the size, penetration depth, and hole type required to allow recoverable flow.

There are three primary methods of perforation that can be used as described below:

- **Hydro-jetting –** uses sand and water jetted through small holes in the bottom hole assembly to create holes in the casing across the target formation – there is no perforating charge. Hydro-jetting allows for targeted or pinpoint perforating, making between 3 and 4 holes per event.
- **Wireline Conveyed Perforating (WCP) –** the most widely used perforating technique in the Cooper Basin. As the name suggests, WCP uses a wireline to deploy the perforating charge.
- **Tubing Conveyed Perforating (TCP) –** uses the same technology as conventional wireline perforating but is run using a coiled tubing unit or jointed tubing (not wireline). TCP is the preferred perforating method when operating in underbalanced or overbalanced conditions.

9 Hydraulic Fracturing

9.1 Overview

Hydraulic Fracturing (HF) is a commonly used oil and gas well completion process. It typically involves injecting a slurry of water, sand, and a small amount of chemicals under high pressure into a bedrock formation via the well. This process is intended to create new fractures in the rock and increase the size, extent, and connectivity of existing natural fractures. HF is a well-stimulation technique used commonly in low-permeability rocks like tight sandstone, shale, and some coal beds to increase oil and/or gas flow to a well from petroleum-bearing rock formations.

During HF activities, HF fluid is pressurised by high-pressure pumping units and directed downhole via a manifold to discrete target intervals along the vertical or horizontal wellbore (referred to as "stages"). Each stage is isolated and perforated using a plug and perforation gun assembly deployed via wireline. The fractures propagate radially from the well through the target formation as the pressure is sustained. Once optimal fracture propagation has been initiated, the proppant (sand) is pumped down the well and into the open fractures to prevent them from closing. This process is repeated for each stage. The final number of stages pumped is dependent on the useable length of the wellbore, the design fluid rates, the number of perforations per stage and in-situ geological conditions. Once all stages are complete, the well is suspended, awaiting completion and well-testing activities.

During each HF, wellbore pressures are monitored to ensure operations have not compromised the production casing or the cement barriers' integrity.

HF fluid primarily consists of water and sand (proppant), plus chemicals commonly found in food and other domestic household products.

All fluid additives (water and chemicals) and sand are mixed on the surface immediately before being pumped through HF equipment. The mixture and pumping schedules (rates, volumes, and proppant) are based on an HF model, determining the desired fracture attributes. The HF model will be completed before the commencement of HF activities and underpinned by a Mechanical Earth Model (MEM). The MEM will be generated from data collected during drilling, wireline logging, core analysis and DFIT tests. The HF fluid mixture and pumping schedule are continuously updated during and after each stage to ensure optimal outcomes. An example of the process and a modelled side view fracture is illustrated in Figure 16 and Figure 17.

All HF activities will be undertaken as per *the Code* and relevant NT, and Federal Government, legislations, and regulations.

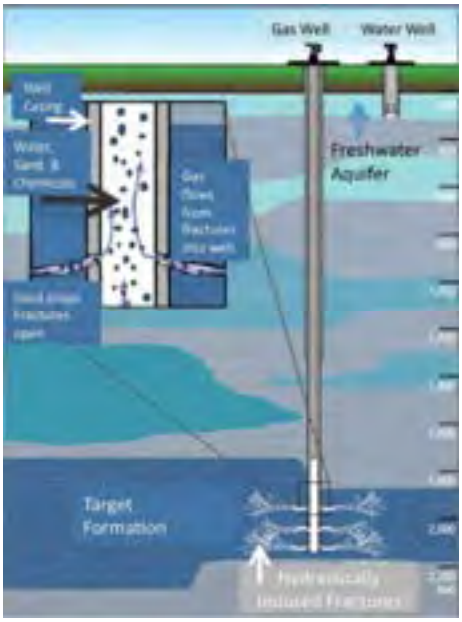

Figure 16: Indicative Hydraulic Fracture Schematic [EPA (US), 2011]

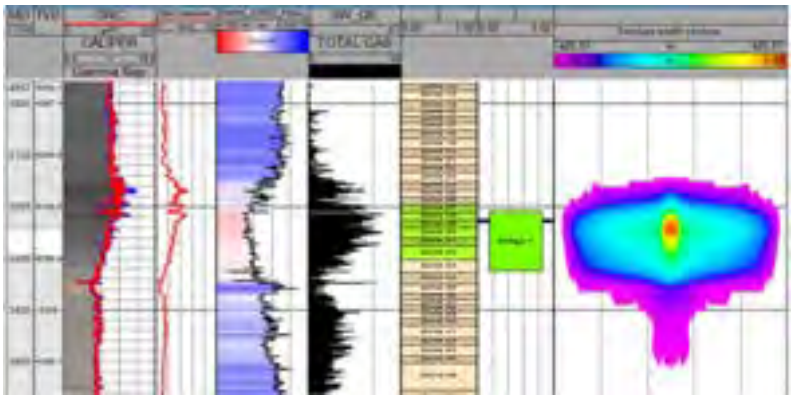

Figure 17: Example HF Model

9.2 Hydraulic Fracture Stages

The hydraulic fracture in a horizontal well can be placed several ways, but the most common way is to use a plug and perforate method in multiple stages. This method involves using perforating tools to place perforations, or holes, in the steel casing and cement around the wellbore. The perforations are placed in sections along the wellbore length within the target shale.

The fracture stimulation is then pumped, and the fracture is placed through these perforations. The wellbore is broken into sections called "Stages" to control the HF operation and allow each stage to be successfully placed.

The following images demonstrate the process followed. The first stage of the wellbore is perforated, as shown in Figure 18.

Figure 18: Perforation of 1st Stage

The first stage of hydraulic fracture is then pumped, as shown in Figure 19.

Figure 19: 1st Stage Hydraulic Fracture

After the first stage of hydraulic fracture is pumped, a plug is set to isolate that stage from the balance of the wellbore; the second stage is then perforated, as shown in Figure 20.

Figure 20: 1st Stage Plug, 2nd Stage Perforation

This process is repeated along the wellbore until the entire length of the target zone of the wellbore is hydraulically fractured. Each of the stages of the wellbore is separately treated with a hydraulic fracture job. There will be several smaller fractures within each stage that each come from the various perforations put in the casing.

Each stage is designed to optimise the available fluid and the pumping capacity of equipment on-site, balancing the trade-off between the size of a stage for efficiency and placement control. If more stages are placed in a certain length, the size of each stage will reduce.

In addition, as the well gets longer and more perforations and more fracture stages are added, the additional length the fluid travels adds friction pressure such that the volume pumped per stage has to be reduced; therefore, the stages tend to get smaller as the well gets longer and the number of stages increases. As a result, the volume pumped per fracture stimulation stage is not standard and is not a fixed volume, and the length of a stage is not a fixed length. The volume of fluid pumped is therefore not proportional to the number of stages placed.

The number of stages hydraulically fractured in a length of the wellbore can be varied to optimise this control; Figure 21 and Figure 22 show the same length wellbore, with the same amount of hydraulically fractured length and the same total fluid volume broken into five and ten stages, respectively.

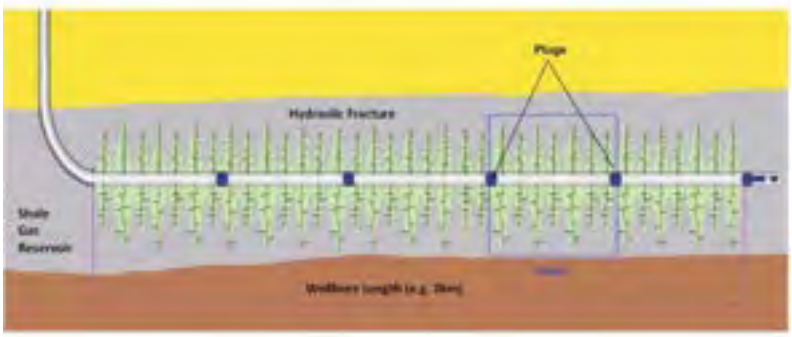

Figure 21: Wellbore Split into 5 HF Stages

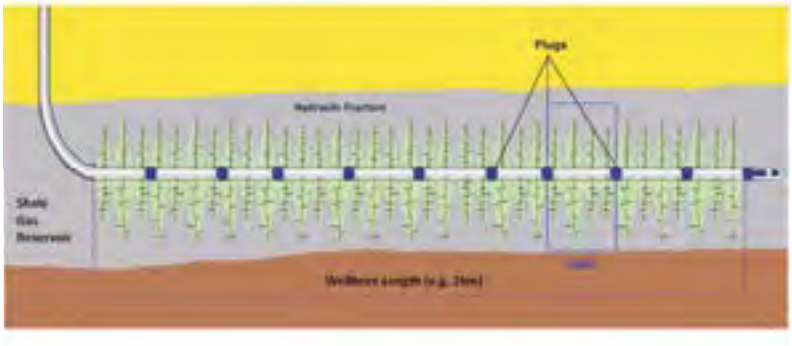

Figure 22: Wellbore Split into 10 HF Stage

As each stage has an incremental cost, a wellbore that is hydraulically fractured with a higher number of smaller stages will have a higher cost than the same wellbore fractured with fewer larger stages, even though a similar amount of fluid and proppant is pumped; however, the resultant design flow control may justify this cost.

The amount of hydraulic fracture fluid chemical and proppant use is primarily based on the type of fluid used in the design, the wellbore length, the perforation spacing and the design volume of each fracture node, not the number of stages.

Once all the stages are complete, and regardless of the number of stages, the isolation plugs are removed, and access to the full length of the wellbore is regained as part of the cleanout hydraulic fracture operations, as shown in Figure 23.

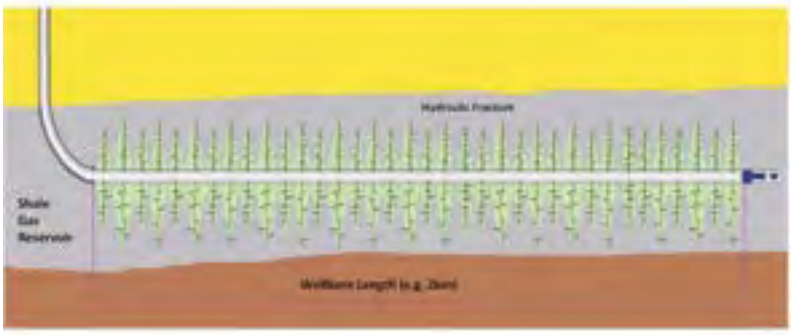

Figure 23: Wellbore with Plugs Removed

The design for the exploration wells under this **EMP** calls for up to 50 stages; however, these stages will be smaller and more closely spaced than if fewer stages were to be pumped in the same well. The total volume of fluid pumped is based on a range of design inputs and will not necessarily increase simply because of the number of stages.

9.3 Proppant and Chemical Additives

The chemicals used for hydraulic fracture HF account for less than 1% of the mixture to assist in carrying and dispersing the sand in the low permeability rock; the balance is freshwater and sand. These chemicals are also commonly used in household products, including food additives, soap, cosmetics, and toothpaste.

All chemicals added to HF fluid perform a specific purpose, including:

- **Acids and bases:** controls pH and clear the perforations before HF.
- **Chemical inhibitors:** such as scale prevention.
- **Biocides:** controls or eliminates bacteria in the fluid to ensure that it isn't introduced to the target formation.
- **Clay control:** prevents clays from swelling.
- **Corrosion inhibitors:** prevents equipment from rusting.
- **Friction reducers:** reduces friction between the HF fluid and piping, allowing the fluid to be injected further without pressure drop.
- **Surfactants:** reduces the surface tension of the hydraulic fracturing fluid; this allows the HF fluid to be injected further without pressure drop.
- **Viscosity regulators:** increases or decreases the thickness of a fluid.

All transportation, handling, storage, and disposal of chemicals will comply with the required *NT regulations*, this includes:

- **Transportation:** from the supplier warehouse to the well pad and between well pads (*Transport of Dangerous Goods by Road and Rail (National Uniform Legislation*) [Department of the Attorney-General and Justice, 2010].
- **Use:** handling, blending, injecting etc. (*NT Dangerous Goods Act, Work Health and Safety Act,* and *the Code* [Northern Territory of Australia, 1998a, 2011; DENR et al., 2019]).
- **Storage:** storage of chemicals and recovery of fluids (including storage in produced water and flowback fluid treatment tanks) at the well pad and associated vendor chemicals (*NT Dangerous Goods Act, Work Health and Safety Act and the Code* [Northern Territory of Australia, 2011; DENR et al., 2019; Department of the Attorney-General and Justice, 1998]).
- **Disposal:** recovered vendor chemical additives in wastes and hydraulic fracturing flowback (*NT Waste Management and Pollution Control Act 1998* [Northern Territory of Australia, 1998b]).

For further information, see **Appendix 06** (Wastewater Management Plan) and **Appendix 07** (Spill Management Plan).

9.3.1 Tracers

Unique ID tracers can be detected at extremely low concentrations (ppb) and are used to determine each fracture Stage's performance. In doing this, the knowledge learnt allows for optimising resource extraction in future campaigns. The presence and concentration of chemical tracers detected during flowback can be measured to determine each stage's fluid recovery relative contribution.

Tracers are harmless chemicals designed to be unique in composition every well. They can be absorbed into both the water or gas phases, allowing them to be delineated from source due to each stages unique tracer.

9.4 HF Equipment

Fracturing equipment is operated across different pressures and injection rates specific to the well. The equipment is highly mobile, designed to comply with state, territory and federal regulation and fitted with safeguards to ensure compliance and safety systems.

9.4.1 Wellhead

The wellhead is the portion of the well's anatomy that shows above ground. It comprises housings and valves that cap the wellbore and serve as a point used to inject into and control the well. The wellhead provides the primary surface barriers for well control; an example is shown in Figure 24.

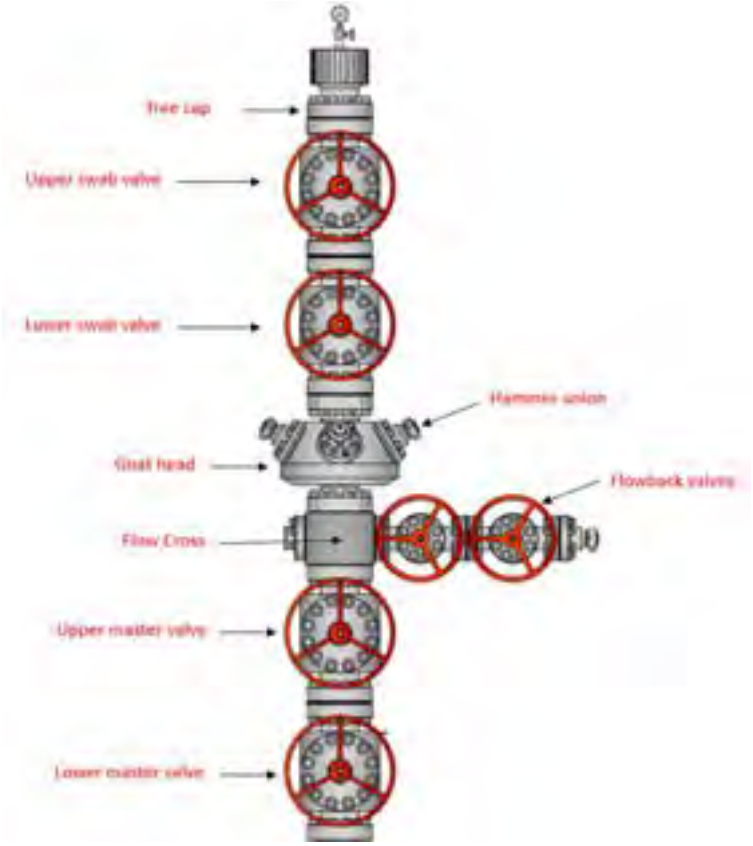

Figure 24: Typical HF Wellhead

The wellhead integrity will be regularly verified during the fracturing operations by testing conductivity pressure against the main wellhead valves. Additionally, pressure will be recorded of the secondary seals and the seals between the tubing head and spool.

Once the fracturing operations are completed, the upper valves (above the production flow-cross) can be removed as they are not required for flowback or appraisal (production) test operations.

9.4.2 Sand Trailer Units

Sand trailers are ample storage, and delivery trailer units are used to hold the proppant (sand or ceramic material) needed for the HF operations.

9.4.3 Blender Units

Blender units are used to mix the proppant and fluid additives before their injection into the well. The blended HF fluid, without proppant, is referred to as the "clean fluid". The blended HF fluid, with proppant added, is referred to as "slurry". Chemical additives are precisely measured, controlled, and recorded by the blender units throughout the HF treatment process.

9.4.4 High-Pressure Pumps

High-pressure pumps are required to inject the hydraulic fracturing fluid mixtures from the Blender Unit down the well via the surface lines and wellhead or coiled tubing unit. The pumps contain programmable pressure triggers (kick-outs) to prevent pressure from exceeding the wellbore design limits. High pressure treating iron (pipes, manifolds, connectors, etc.) connecting the HF pumps and the wellhead also contains pressure safety valves (PSVs) set to open at a pre-set pressure to ensure the well components are protected.

9.4.5 Control and Data Acquisition Unit

An on-site mobile office is connected to all units during HF treatment to monitor, record and plot all data received throughout the treatment. Supervisors will continually monitor and control the treatment to ensure the process goes according to the design.

10 Completion

10.1 Overview

A completion is a generic term used to describe the events and equipment necessary to leave a wellbore ready for production once drilling operations have been concluded, including but not limited to the assembly of downhole tubulars and equipment required to enable safe and efficient production from an oil or gas well.

A completion will be run into the well for well testing after cased hole fracture stimulation if the initial flowback rates cannot sustain free flow up the casing. The completion will be run using a workover rig; this will involve the following activities:

- Ensure the well is dead using appropriately weighted fluid.
- Cleanout the wellbore by running tubing into the well and circulating out any debris from the wellbore, including proppant and plugs.
- Run tubing into the well.
- Land the tubing in a hanger in the wellhead.
- Set a packer to isolate the tubing annulus.
- Install surface master valves and pressure test wellhead seals.
- Install Flowback and EPT surface equipment for well testing.

11 Flow-back and Extended Production Testing, and Appraisal Activities

11.1 Overview

Flowback and Extended Production Testing (EPT), and appraisal activities are carried out to remove the HF fluid from the formation and validate the well production rates over an extended period of time to determine whether the shale gas resource identified is commercially exploitable. A three-phase separator is connected to the wellhead's outlet; the separator splits the well flowback fluids into gas, oil, and water by gravity level controllers.

Depending on the composition, the gas is directed to flare, condensate to storage tanks or flare, and water to flowback tanks, directly to storage or treatment tanks, or to the water/wastewater flowline network. All gas, water and condensate flow volumes are measured and recorded. A generic layout of a flowback and EPT package is shown in Figure 25 below.

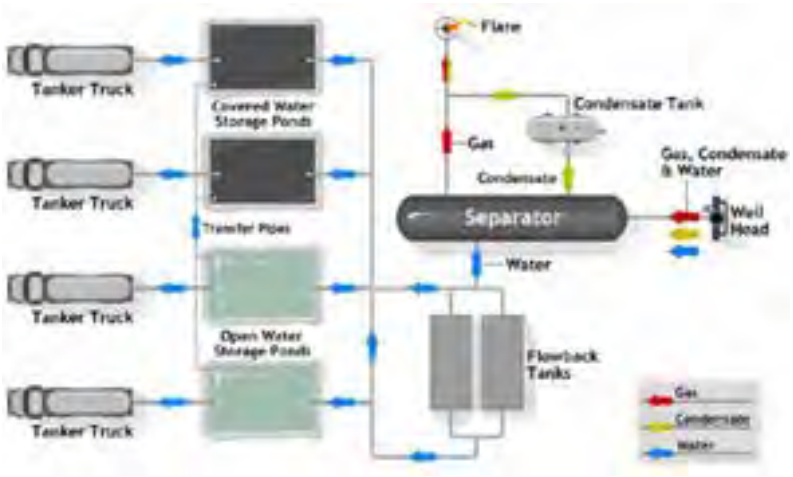

Figure 25: Example of Well Test Equipment Schematic [ORIGIN, 2021]

11.2 Flowback and EPT Equipment

11.2.1 Separator

The separator package splits the comingled flow from the wellbore into gas, water, and condensate. All gas, water and condensate flow volumes are measured and recorded.

11.2.2 Above Ground Storage Tanks

Temporary water storage and treatment tanks will be utilised on-site during the hydraulic flowback and EPT process.

11.2.3 Flare

Produced gas, and pending results, potentially condensate, during EPT will be sent to a flare system to allow a controlled release and gas burning. It is equipped with an autoignition system that provides electrical impulses to generate a spark every 1.3 seconds to ensure that the flare is always operational. Any flares used will have a tip efficiency of greater than 96%.

11.3 Sale of appraisal gas

Extended well testing is required to determine whether the shale gas resource identified is commercially exploitable, which would require a material amount of gas to be flared or vented to the environment. Given this, in order to reduce the environmental impacts of the flaring or venting, not to waste the gas resource unnecessarily, provide economic benefits to traditional owners, and to provide some revenue to Imperial to offset the costs involve in the extended production testing; Imperial proposes to seek the agreement of traditional owners, the NLC and the NT Minister responsible for the Petroleum Act to the use of the gas that would otherwise be flared or vented as appraisal gas which can be sold with revenues to Imperial and royalties to traditional owners and the Territory For the readability of this document, Imperial has called the agreement to be sought for the use of the gas that would otherwise be flared or vented as appraisal gas a Beneficial Use Agreement (BUA).

If a Beneficial Use Agreement can be established, gas will go to the gas gathering network rather than to flare after the initial well clean-up. The gas gathering network will transport the gas to the compressor station for compression and subsequent sale.

12 Gas compressor station

A gas compressor station will be installed and operated as part of the Carpentaria Gas Project. The Carpentaria Gas Project compressor station takes gas from the low-pressure gathering network, conditions it and increases the pressure of the gas for discharge into the high-pressure sales gas pipeline, then into the Daly Waters to McArthur River Gas Pipeline. The Carpentaria Gas Project compressor station will run 24 hours per day, seven days per week. **Figure 26** shows an indicative compressor station layout.

The following subsections provide an overview of the process flow through a compressor station.

A high-level process flow of the Carpentaria Gas Project compressor station, the major process stages include:

1. Water removal upstream of compression
2. Gas compression
3. Water removal & gas dehydration downstream of compression
4. Metering and composition analysis of sales gas
5. Water treatment
6. Fuel gas and flare systems

Figure 27 shows a schematic of the above process flow relative to the Carpentaria Gas Project

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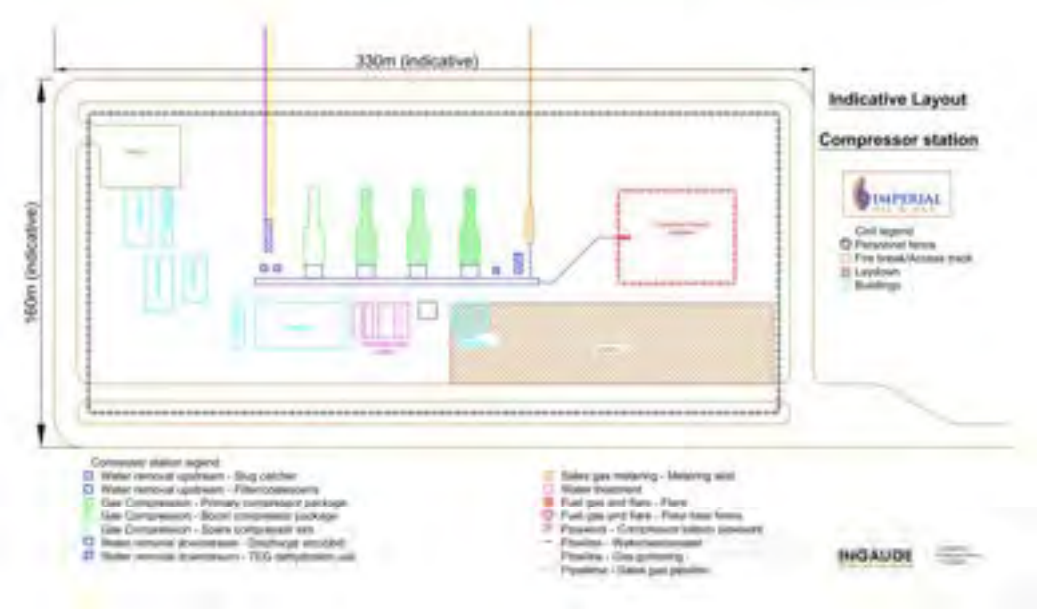

Figure 26: Indicative compressor station layout

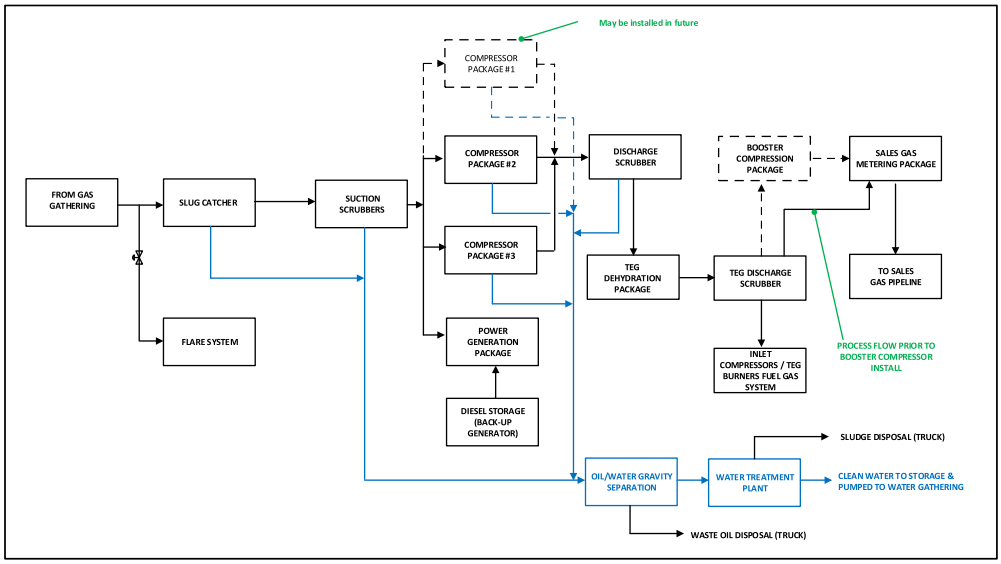

Figure 27: Indicative Compressor station process flow

12.1 Water Removal Upstream of Compression

Gas from the field gathering network will first enter a slug catcher, a slug catcher is a horizontal two-phase separator vessel that is design to capture any potential slugs of free water that may enter the compression facility from the gas gathering network. Any water collected in the vessel is automatically drained to the wastewater system. **Figure 28** shows an indicative slug catcher.

Figure 28: Indicative Slug Catcher

Downstream of the slug catcher, filter/coalescer vessel/s are installed to further remove water from the gas stream. **Figure 29** shows an indicative filter/coalescer, there may be multiple of these units installed in parallel, as shown in **Figure 26**.

Figure 29: Indicative filter/coalescer

12.2 Gas Compression

Gas from the filter/coalescer vessel/s will be compressed to a typical pressure of 7500kPag via self-contained compressor packages. Each package will also be comprised of a fin-fan cooler to reduce the gas temperature after each stage of compression, interstage scrubber vessels to knock-out any water/lube oil condensed between compression stages in the fin fan cooler and a lubricating oil recirculation system. Each compressor package will its own control system. Key operating data from each compressor package will be available in the control room. **Figure 30** shows an indicative compressor package, including the compressor (right of the image) and fin fan cooler (left of the image) **Figure 31** shows and indicative compressor, and **Figure 32**, shows an indicative gas powered compressor drive engine, each compressor package contains one each of these units. There will be multiple of these compressor packages as shown in **Figure 26**.

Figure 30: Indicative Compressor Package, including compressor unit and fin fan cooler

Figure 31: Indicative compressor unit

Figure 32: Indicative gas compressor drive engine

12.3 Water Removal Downstream of Compressors

The cooled gas leaving the compressor packages will pass through a scrubber vessel where any condensed water / lube oil will be removed from the gas stream. This vertical vessel is provided with level instrumentation to automatically drain liquids from the system and a demister pad to reduce liquid carryover in mist form. **Figure 33** shows an indicative discharge scrubber.

Figure 33: Indicative discharge scrubber

The gas from the scrubber vessel will be sent to a Tri-Ethelyne Glycol (TEG) dehydration unit, to remove moisture from the gas to meet the sales gas specifications. The key equipment items comprising the TEG dehydration unit are the contactor, reboiler, and TEG pumps. TEG liquid is constantly pumped through the contactor where water vapor transfers from the gas to the TEG liquid, the TEG liquid flows from the contactor to the reboiler where the water is removed from the TEG by heating the TEG above the boil point of water, the TEG is then cooled before returning to the contactor. **Figure 34** shows an indicative TEG gas dehydration unit.

Figure 34: Indicative TEG gas dehydration unit

12.4 Sales Gas Metering

Gas from the TEG dehydration unit will be directed to the Sales Gas Metering Skid which is comprised of a filter vessel which contains coalescing filter elements which remove very fine particulate matter and liquids (particularly TEG) from the gas stream prior to metering and delivery into the pipeline, a gas chromatograph unit/s to measure gas composition, and a custody transfer flowmeter which measures the sales gas flow volumes. **Figure 35** shows an indicative sales gas metering skid.

Figure 35: Indicative sales gas metering skid

12.5 Booster Compressor Package

A booster compressor unit may be installed downstream of the sales gas metering skid to achieve the required delivery pressure into the Daly Waters to McArthur River Gas Pipeline at the EP187 tie-in location. If fitted, the booster compression unit will contain similar equipment as the gas compression units described in Section 12.2, other than it will have an electric drive motor rather than a gas fuelled engine.

12.6 Ancillary equipment

12.6.1 Power Supply

The compressor station will include gas-fired power generation infrastructure to supply the electrical loads for the compressor package fin fan cooler motors, electric motor driven pumps/air compressors, control system hardware, air conditioners, and lighting, etc.

This infrastructure will include gas engine generators, an LV Switchroom, load banks, and a back-up diesel genset with associated diesel fuel storage.

The infrastructure requirements to provide reliable power supply would likely consist of 2x 1500kVA gas fired generator sets and 1x 200kVA diesel generator set.

12.6.2 Fuel Gas System

The compressor station will use produced gas taken from as fuel gas for the power generator, compressor engine driver, TEG reboiler burner and flare pilot.

12.6.3 Water Processing System

The liquids removed from the gas stream in the slug catcher, filter/coalescers, and scrubbers will be drained into a fully enclosed in-ground concrete tank and subsequently pumped to an above ground horizontal water storage tank where lube oil from the compressor cylinders will be separated from the water by gravity separation and periodically trucked offsite for disposal.

The water stream leaving the separator may be subsequently processed in processing unit where it will be treated via a timed reaction process to remove oils and greases, suspended solids, and surfactants. The treated water and sludge would then be discharged over a band filter. The treated water will filter through to a Filtrate Catch Tray before being returned to the water/wastewater flowline network. The process wastes will be trapped on the band filter and readily disposed of offsite as a dry sludge.

12.6.4 Flare System

A horizontal ground flare system will be used for the safe disposal of waste/off-spec gas during compressor station upsets or abnormal conditions. The flare will be equipped with pilot and ignition system. A barrier wall will be installed to protect the surroundings from heat radiation. An air compressor provides pressure-regulated combustion air to the flare ignition system.

12.6.5 Control System.

The compressor station will be controlled by a Programmable Logic Controller (PLC) based control system located in the equipment room. The plant control system will provide automatic control of the circuit, regulatory and supervisory control of the process with an operator interface (screens) located in the control room. The system will be configured to provide outputs to alarms, control the function of selected process equipment, and provide logging and trending facilities to assist in analysis of the operating plant. It also provides operator access to Plant Stop pushbutton.

The plant control system also consists of the following components:

- A Burner Management System for both pilot and main burners in the TEG unit
- A flow computer which analyses data from the metering system and carries out all the custody transfer calculations
- An uninterruptible power supply (UPS) for the control system and emergency lighting, and the associated back-up batteries
- Back-up batteries for the SCADA system UPS
- A system to allow switching over to an emergency generator in the event of loss of mains power.

13 Water/wastewater facility

13.1 Overview

A water/wastewater facility will be constructed and operated as part of the Carpentaria Pilot Project to enable the safe and efficient handling, storage, and use of water, flowback fluid, and produced water.

13.2 Water/wastewater facility location and design

The water/wastewater facility will be located so that it is above 1 in 100-year flood modelling inundation areas. The water/wastewater facility will be fenced to prevent the entry of livestock and unauthorised personnel and bunded to prevent overland flow around the tanks during large rainfall events. The area of the facility will be large enough to allow free and easy access for the construction and maintenance of the tank/s, the construction and operation of water/wastewater treatment equipment if required, and the collection and removal of rainwater from inside the bund during storm events. An indicative layout is provided in **Figure 37**.

13.3 Water/wastewater Storage

13.3.1 Wastewater tank design

Wastewater will be stored in engineered lined tank/s fitted with leak detection and secondary bunding; the secondary bunding may be a secondary liner in the tank/s or bunding external to the tank/s. Wastewater tanks will be built on bases that are constructed and compacted to the tank suppliers' specifications, including drainage away from the outside of the tank to prevent rainwater ponding at the tank's base during rainfall events. **Figure 37** shows an indicative wastewater tank fitted with a cover.

13.3.2 Wastewater tank freeboard

The wastewater tank/s may be covered or uncovered, depending on operational requirements. If the wastewater tank/s are covered, a freeboard of 500mm will be maintained at all times. If the wastewater tank/s are not covered, a freeboard adequate to contain a 1 in 1000-year storm event will be maintained during the local wet season, and a freeboard of 500mm will be maintained during the local dry season. If the wastewater tank/s are covered, the freshwater from above the cover during rainfall will be disposed of to grade or utilised in the water/wastewater stream.

13.3.3 Wastewater tank maintenance

Wastewater tanks will be inspected and maintained following the manufacturers' requirements.

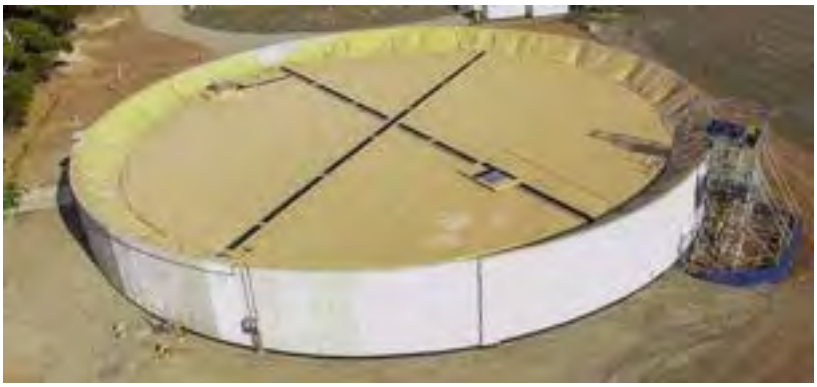

Figure 36: Indicative Water/wastewater tank, fitted with cover

13.4 Fluid movement to and from the water/wastewater facility

Water/wastewater will primarily be delivered to the water/wastewater facility tanks from the water/wastewater flowline network from water bores, wellpads, and the compressor station; trucking may also be utilised for delivery from the same sources if needed due to operational requirements.

Water/wastewater will be delivered to wellpads for use in Hydraulic Fracturing operations via the same water/wastewater flowline network; trucking may also be utilised for delivery to the wellpads if needed due to operational requirements.

Residues may be removed from the water/wastewater facility from time to time for off-site disposal.

13.5 Water/wastewater treatment

It is intended that Wastewater will be blended with fresh water from bores and used for Hydraulic Fracturing without further treatment. If blending with fresh water from bores does not bring the wastewater to a make-up suitable for Hydraulic Fracturing, further treatment may be required, such as chemical treatment, filtering, osmosis, or distillation. If this treatment is required, it will be carried out at the water/wastewater facility, and residues from this processing will be removed from the water/wastewater facility for re-use or off-site disposal.

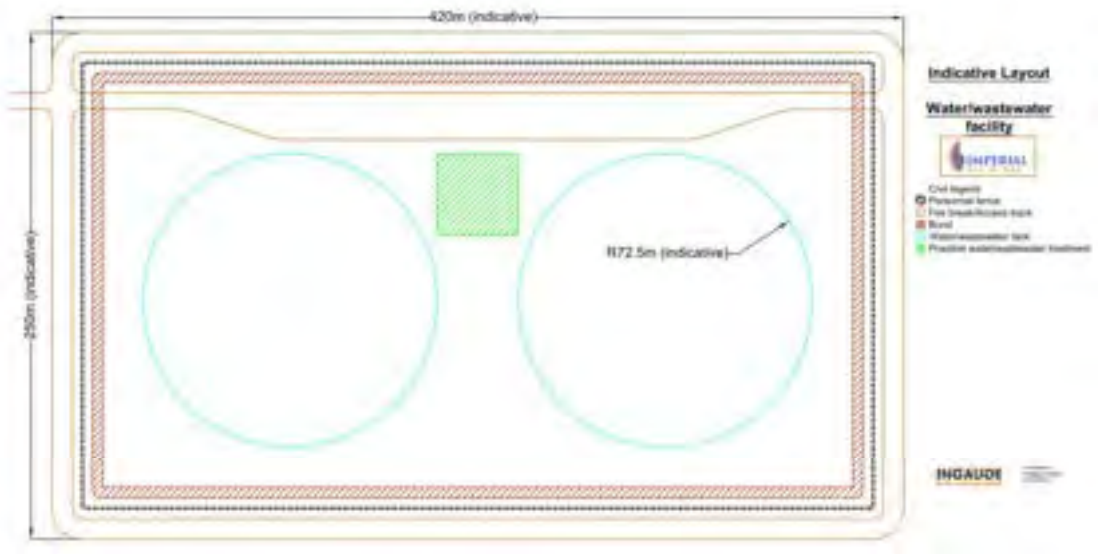

Figure 37: Indicative Water/wastewater facility layout

14 References

EPA (US). (2011). *Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources* (EPA Hydraluic Fracturing Study Plan, Issue. **https://www.epa.gov/sites/default/files/documents/hf_study_plan_110211_final_508.pdf**

APGA. (2019). *Code of Practice Upstream Polyethylene Gathering Networks – CSG Industry*. APGA. Retrieved from **https://www.apga.org.au/resources/code-practice-upstream-pe-gathering-lines-csg-industry-and-companion-papers**

Northern Territory of Australia. (1998a). *Dangerous Goods Act*. In 2022 (Ed.), *In Force*. REPD015: Department of the Attorney-General and Justice.

Northern Territory of Australia. (1998b). *Waste Management and Pollution Control Act 1998*. In 2022 (Ed.), *In Force*. REPW015: DEPWS.

Northern Territory of Australia. (2011). *Work Health and Safety (National Uniform Legislation) Act 2011*. In 2020 (Ed.), *In Force*. REPW025: Department of the Attorney-General and Justice.

Ben Bagherian. (2019). *Application of Neural Networks and Machine Learning in Tiltmeter Analysis in Hydraulic Fracturing Diagnostics*. AAPG Annual Convention and Exhibition, San Antonio, Texas.

Industrial Warning Signs Committee SF/5. (1994). *Australian Standard. Safety Signs for the Occupational Environment* AS 1319-1994. Retrieved from **https://www.standards.org.au/standards-catalogue/sa-snz/other/sf-005/as--1319-1994**

DENR, & DPIR. (2019). *Code of Practice: Onshore Petroleum Activities in the Northern Territory*. Department of Environment and Natural Resources & Department of Primary Industry and Resources Retrieved from **https://depws.nt.gov.au/__data/assets/pdf_file/0011/705890/code-of-practice-onshore-petroleum-activity-nt.pdf**

C. P. Gooneratne, B. Li, & T. E. Moellendick. (2017). *Downhole Applications of Magnetic Sensors*. *Sensors (Basel)*, *17*(10). **https://doi.org/10.3390/s17102384**

Chao Huang, & Tieyuan Zhu. (2019). *Passive seismic imaging of subsurface natural fractures: application to Marcellus shale microseismic data*. *Geophysical Journal International*, *218*(2), 1087-1099. **https://doi.org/10.1093/gji/ggz214**

ICSM. (2021). *Geocentric Datum of Australia 2020 Technical Manual* Intergovernmental Committee on Surveying and Mapping (ICSM), Geodesy Working Group (GWG) Retrieved from **https://www.icsm.gov.au/sites/default/files/2021-04/GDA2020%20Technical%20Manual%20V1.6.pdf**

Angus Jamieson. (2012). *Introduction to Wellbore Positioning* (V01.7.12 ed.). University of the Highlands and Islands. **https://www.westpaq.com/wp-content/uploads/2013/04/Introduction-to-Wellbore-Positioning.pdf**

Department of the Attorney-General and Justice. (1998). *Dangerous Goods Act - 1998*. Department of the Attorney-General and Justice: Department of the Attorney-General and Justice. Retrieved from **https://legislation.nt.gov.au/en/Legislation/DANGEROUS-GOODS-ACT-1998**

Department of the Attorney-General and Justice. (2010). *Transport of Dangerous Goods by Road and Rail (National Uniform Legislation) Act*. Department of the Attorney-General and Justice: Department of the Attorney-General and Justice. Retrieved from

https://legislation.nt.gov.au/Legislation/TRANSPORT-OF-DANGEROUS-GOODS-BY-ROAD-AND-RAIL-NATIONAL-UNIFORM-LEGISLATION-ACT-2010

Mark McClure. (2017). *Diagnostic Fracture Injection Tests: The Basics*. **https://www.resfrac.com/blog/diagnostic-fracture-injection-tests-basics**

Origin. (2021). *Beetaloo Sub-Basin Kyalla 117 N2 Multi-Well Drilling, Stimulation and Well Testing Program. Environmental Management Plan. EP 117*. **https://depws.nt.gov.au/__data/assets/pdf_file/0009/979065/Approved-EMP.pdf**

PIPA. (2018). *Industry Guidelines POP003: Butt Fusion Jointings of PE Pipes and Fittings - Reconmended Parameters* Plastics Industry PPE Association of Australia. Retrieved from **https://pipa.com.au/wp-content/uploads/2020/10/PIPA-POP003-Butt-Fusion-Jointing-of-PE-Pipes-and-Fittings-Recommended-Parameters-Issue-7.pdf**

PPI. (2023). *Electrofusion*. Plastic Pipe Institute. **https://www.plasticpipe.org/MunicipalAdvisoryBoard/MunicipalAdvisoryBoard/Navigation/Connection-Menu/Fusion-Pages/Electrofusion.aspx**