Appendix L Water Monitoring Suites

Groundwater monitoring suite extracted from the Code of Practice for Onshore Petroleum Activities in the Northern Territory

General	LOR	Cations and Metals	LOR
рН	0.01 pH units	Calcium	1 mg/L
Electrical conductivity	1 μS/cm	Chromium	0.001 mg/L
Total Dissolved Solids	10 mg/L	Copper	0.001 mg/L
Total Suspended Solids	1 mg/L	Iron	0.05 mg/L
Alkalinity	1 mg/L	Lead	0.001 mg/L
Gross Alpha	0.05 Bq/L	Magnesium	1 mg/L
Gross Beta	0.1 Bq/L	Manganese	0.001 mg/L
Water level	±10 cm (AHD)	Mercury	0.0001 mg/L
Groundwater pressure		Potassium	1 mg/L
Anions		Silver	0.001 mg/L
Chloride	1 mg/L	Arsenic	0.001 mg/L
Fluoride	0.1 mg/L	Barium	0.001 mg/L
Sulfate	1 mg/L	Boron	0.05 mg/L
Nitrate	0.01 mg/L	Cadmium	0.0001 mg/L
Nitrite	0.01 mg/L	Lithium	0.001 mg/L
Petroleum		Selenium	0.01 mg/L
TRH	100 µg//L	Silica	0.1 mg/L
PAH Suite	0.5 µg//L	Strontium	0.001 mg/L
BTEX	1 µg/L	Sodium	1 mg/L
Diss. Methane	10 µg/L	Zinc	0.005 mg/L
Diss. Ethane	10 µg/L		
Diss. Propane	10 µg/L		

Table 6: Minimum suite of analytes for groundwater monitoring.

Wastewater characterisation suite

Parameter	Reporting Units	Limit of Reporting	Method
Physical Parameters			
Dissolved oxygen (DO)	mg/L	0.1	Field
Electrical Conductivity (EC)	us/cm	1	Field
Total Dissolved Solids (TDS)	mg/L	10	АРНА 2540С

ParameterReporting UnitsReportingMethodTotal Suspended Solids (TSS)mg/L5APHA	od 2540C			
Total Suspended Solids (TSS) mg/L 5 APHA	2540C			
pH 0.1 Field				
Sodium Adsorption Ratioratio0.01APHA	4500			
Temperature°C0.1Field				
Nutrients				
Nitrate mg/L 0.01 APHA	VC13			
Nitrite mg/L 0.01 APHA	4500 NO2			
Total Nitrogen mg/L 0.1 APHA	4500 NORG			
total Kjeldahl Nitrogen mg/L 0.1 APHA	NORG/TKN			
Ammonia mg/L 0.01 APHA	NH4			
Reactive Phosphorous mg/L 0.01 APHA	4500P			
Total Phosphorousmg/L0.01APHA	4500P			
Anions				
Sulphate mg/L 1 APHA	4500-SO4-C			
Chloride mg/L 1 APHA	4500-CI-C			
Carbonate mg/L 1 APHA	2320 B			
Bicarbonate (as CaCO3 equivalent) mg/L 1 APHA	2310 В			
Bicarbonate Alkalinity (as CaCO3 equivalent)mg/L1APHA	2320 В			
Hydroxide Alkalinity (as CaCO3 equivalent)mg/L0.01APHA	2320 В			
Total Alkalinity (as CaCO3 equivalent)mg/L0.01APHA	2320 В			
Fluoride mg/L 0.1 APHA	4500 F-C			
Bromide mg/L 0.01 APHA	4110B			
Total Cyanidemg/L0.004APHA	4500 CN-0			
Major Cations				
Sodium mg/L 1 APHA	4500 Na			
Magnesium mg/L 1 APHA	4500 Mg			

Parameter	Reporting Units	Limit of Reporting	Method
Potassium	mg/L	1	АРНА 4500 К
Calcium	mg/L	1	APHA 4500 Ca
	l	I	1
	Metals and Metalloids	(total and dissolved	(b
Aluminium	mg/L	0.001	USEPA 6010 ICP/AES
Antimony	mg/L	0.001	USEPA 6010 ICP/AES
Arsenic	mg/L	0.001	USEPA 6010 ICP/AES
Barium	mg/L	0.001	USEPA 6010 ICP/AES
Beryllium	mg/L	0.001	USEPA 6010 ICP/AES
Boron	mg/L	0.001	USEPA 6010 ICP/AES
Bromide	mg/L	0.001	USEPA 6010 ICP/AES
Cadmium	mg/L	0.001	USEPA 6010 ICP/AES
Chromium	mg/L	0.001	USEPA 6010 ICP/AES
Copper	mg/L	0.001	USEPA 6010 ICP/AES
Iron	mg/L	0.001	USEPA 6010 ICP/AES
Lead	mg/L	0.001	USEPA 6010 ICP/AES
Manganese	mg/L	0.001	USEPA 6010 ICP/AES
Mercury	mg/L	0.001	USEPA 6010 ICP/AES
Molybdenum	mg/L	0.001	USEPA 6010 ICP/AES
Nickel	mg/L	0.001	USEPA 6010 ICP/AES
Selenium	mg/L	0.001	USEPA 6010 ICP/AES
Silica	mg/L	0.1	USEPA 6010 ICP/AES
Silver	mg/L	0.001	USEPA 6010 ICP/AES
Strontium	mg/L	0.001	USEPA 6010 ICP/AES
Thorium	mg/L	0.001	USEPA 6010 ICP/AES
Tin	mg/L	0.001	USEPA 6010 ICP/AES
Uranium	mg/L	0.001	USEPA 6010 ICP/AES
Vanadium	mg/L	0.001	USEPA 6010 ICP/AES
Zinc	mg/L	0.001	USEPA 6010 ICP/AES
	Naturally Occuring Ra	dioactive Material.	
alpha radiation	Bq/L	0.05	ASTM D7283-06

Parameter	Reporting Units	Limit of Reporting	Method
beta radiation	Bq/L	0.05	ASTM D7283-06
			·
	BTE	x	
Benzene	mg/L	0.001	USEPA 5030/8260 HS or P&T/GC/MS
Toluene	mg/L	0.001	USEPA 5030/8260 HS or P&T/GC/MS
Ethylbenzene	mg/L	0.001	USEPA 5030/8260 HS or P&T/GC/MS
M and p Xylene	mg/L	0.001	USEPA 5030/8260 HS or P&T/GC/MS
O Xylene	mg/L	0.001	USEPA 5030/8260 HS or P&T/GC/MS
Total Xylene	mg/L	0.001	USEPA 5030/8260 HS or P&T/GC/MS
	Hydroca	rbons	
TRH C6 - C10	mg/L	0.02	USEPA 5030/8260 HS or P&T/GC/MS
TRH C6 - C10 less BTEX	mg/L	0.02	USEPA 5030/8260 HS or P&T/GC/MS
TRH >C10 - C16	mg/L	0.02	USEPA 5030/8260 HS or P&T/GC/MS
TRH >C10 - C16 less Naphthalene	mg/L	0.02	USEPA 5030/8260 HS or P&T/GC/MS
TRH >C16 - C34	mg/L	0.01	USEPA 5030/8260 HS or P&T/GC/MS
TRH >C34 - C40	mg/L	0.01	USEPA 5030/8260 HS or P&T/GC/MS
Total TRH C6 - C40	mg/L	0.01	USEPA 5030/8260 HS or P&T/GC/MS
	·		·
	Polycyclic Aromati	c Hydrocarbons	
3-Methylcholanthrene	mg/L	0.001	USEPA 3510/8270 GC/MS
7, 12- Dimethylbenz(a)anthracene	mg/L	0.001	USEPA 3510/8270 GC/MS

Parameter	Reporting Units	Limit of Reporting	Method	
Accessible		0.001		
Acenaphthene	mg/L	0.001	USEPA 3510/8270 GC/MS	
Acenaphthylene	mg/L	0.001	USEPA 3510/8270 GC/MS	
Anthracene	mg/L	0.001	USEPA 3510/8270 GC/MS	
Benzo (a) pyrene	mg/L	0.001	USEPA 3510/8270 GC/MS	
Benzo (b) fluoranthene	mg/L	0.001	USEPA 3510/8270 GC/MS	
Benzo (ghi) perylene	mg/L	0.001	USEPA 3510/8270 GC/MS	
Benzo (k) fluoranthene	mg/L	0.001	USEPA 3510/8270 GC/MS	
Benzo (a) anthracene	mg/L	0.001	USEPA 3510/8270 GC/MS	
Chrysene	mg/L	0.001	USEPA 3510/8270 GC/MS	
Dibenz (ah) anthracene	mg/L	0.001	USEPA 3510/8270 GC/MS	
Fluoranthene	mg/L	0.001	USEPA 3510/8270 GC/MS	
Fluorene	mg/L	0.001	USEPA 3510/8270 GC/MS	
Indeno (1,2,3-cd) pyrene	mg/L	0.001	USEPA 3510/8270 GC/MS	
Naphthalene	mg/L	0.001	USEPA 3510/8270 GC/MS	
Phenanthrene	mg/L	0.001	USEPA 3510/8270 GC/MS	
Pyrene	mg/L	0.001	USEPA 3510/8270 GC/MS	
Carcinogenic PAHs				
(benzo[a}pyrene equivalents	mg/L	0.001	USEPA 3510/8270 GC/MS	
Total PAH	mg/L	0.001	USEPA 3510/8270 GC/MS	
Volatile Organic Compounds				
2 3 4 6-Tetrachlorophenol	mg/l	0.005	LISEPA 3510/8270 GC/MS	

2,3,4,6-Tetrachlorophenol	mg/L	0.005	USEPA 3510/8270 GC/MS
2,4,5-Trichlorophenol	mg/L	0.005	USEPA 3510/8270 GC/MS
2,4,6-Trichlorophenol	mg/L	0.005	USEPA 3510/8270 GC/MS
2,4-Dichlorophenol	mg/L	0.005	USEPA 3510/8270 GC/MS
2,4-Dimethylphenol	mg/L	0.005	USEPA 3510/8270 GC/MS
2,4-Dinitrophenol	mg/L	0.005	USEPA 3510/8270 GC/MS
2,6-Dichlorophenol	mg/L	0.005	USEPA 3510/8270 GC/MS
2-Chlorophenol	mg/L	0.005	USEPA 3510/8270 GC/MS
2-Methyl-4,6-dinitrophenol	mg/L	0.005	USEPA 3510/8270 GC/MS
2-Nitrophenol	mg/L	0.005	USEPA 3510/8270 GC/MS
4-Chloro-3-methylphenol	mg/L	0.005	USEPA 3510/8270 GC/MS

Parameter	Reporting Units	Limit of Reporting	Method	
4-Nitrophenol	mg/L	0.005	USEPA 3510/8270 GC/MS	
Dinoseb	mg/L	0.005	USEPA 3510/8270 GC/MS	
Formaldehyde	mg/L	0.001	USEPA 3510/8270 GC/MS	
Hexachlorophene	mg/L	0.005	USEPA 3510/8270 GC/MS	
m- and p-Cresol	mg/L	0.005	USEPA 3510/8270 GC/MS	
Pentachlorophenol	mg/L	0.005	USEPA 3510/8270 GC/MS	
Phenol	mg/L	0.005	USEPA 3510/8270 GC/MS	
Organic Carbon				
Dissolved Organic Carbon	mg/L	1	APHA 5310 B	
Total Organic Carbon	mg/L	1	APHA 5310 B	

Appendix M Rehabilitation Plan

Exploration Permit 117

Rehabilitation Management Plan 2020/21

Kyalla 117 N2 Lease

origin

Location of Kyalla 117 N2	
Property land uses	Gas exploration and cattle grazing
Site management aim	The aim is to rehabilitate any part of the land affected by the Regulated Petroleum Activity to a safe condi- tion consistent with industry standards and in consul- tation with Landholder.
Rehabilitation objectives	The rehabilitation objective is to provide a stable land form, which supports a resilient self- sustaining vegetation community that can withstand impacts including fire and cattle grazing and is safe to humans and wildlife, whilst utilising appropriate site infrastructure for ongoing pastoral activities (i.e. ac- cess tracks, water bores, fencing and laydown areas).

		Contact Details		Name		
Origin Rehabili	tation Officer	Mobile : 0467 679 003RobertSatellite phone : 0147 612 733Robert.Wear@upstream.originenergy.com.au		Robert Wear	Canopy Cover (9	6) •
		Site Environment Summar	у		Ground Cover (9	<u>()</u>
Infrastructure	Size (ha)	Vegetation Community	Soil Type / Slop)e		"
Drill Lease Pad	5.5 ha	Eucalypt low woodland	Late	ritic silty Sand <1% Slope		•
Camp Area	1.2 ha	Eucalypt low woodland	Lateritic silty Sand <1% slope		Erosion	•
Sewer Spray Fields	1.0 ha	Eucalypt low woodland	Late	ritic silty Sand <1% slope	Weede	
Access Track	2.1 ha	Eucalypt low woodland	Later	ritic silty Sands	weeds	
			·	<1% slope		- •
Heli Pad	0.40 ha	Eucalypt low woodland	Lateritic silty Sands <1% slope		Safety for huma	ns •
Wet weather storage area	1.0 ha	Eucalypt low woodland	Later	ritic silty Sands <1% slope	and wildlife	



Site Description (pre-disturbance)

Kyalla 117 N2 (-16°50' 29.01, 133°39' 0.16) is located in the EP117 tenement. The natural vegetation community that exists at Kyalla 117 N2 is of Eucalyptus low woodland which is broadly dominated by *Corymbia dichromophloia* and ground cover of Triodia bitextura.

The Landform at Kyalla 117 N2 is characterised by plains and rises associated with deeply weathered lateritic profiles, including sand sheets. Soils at this site are sandy at the surface, with a loamy sand to sandy loam A horizon.

The site is in good ecological condition. The site contained moderate to high habitat values for wildlife, with coverage of leaf litter, grass cover and woody debris. Seem-ingly good continuous cover exists adjoining adjacent woodland habitat. Minor disturbance was evident from recent grazing and burning impacts. There is no

evidence of weeds or feral animals

This Plan should be read in conjunction with the Overarching Environmental Management Plan and Emergency Response Plans for Oriain's operations in the Beetaloo Basin. NDIX_Kyalla 117 N2 Rehabilitation Plan | Version 2 | 20/01/2020



Aerial View of Kyalla 117 N2 pre-disturbance showing Corymbia dichromophloia and Erythrophleum chlorostachys low woodland.

Rehabilitation Strategy				
Parameters	Methods	Objective	Early Rehabili-	
Vegetation Ground cover	 Implement progressive rehabilitation within 12 months upon completion of petroleum activities. Implement rehabilitation of gravel pits upon cessation of use. Disturbed areas to be allowed to naturally regenerate or revegetate on completion of Regulated Activity. All compacted areas to be ripped and scarified to promote regeneration of vegetation, this may require assistance through spread of native seed stock. Where possible, native seed stock would be supplied by local Indigenous suppliers. Previously removed vegetation and topsoil will be uni- 	 Establish vegetation similar to adjacent vegetation, unless agreement with landowner and Regulator for alternative use. The type of ground cover applied to completed earthworks to be compatible with the anticipated long-term land use, environmental risk, and site rehabilitation measures. 	Long-Term Rehabilitation	
	 formly re-spread over disturbed area to assist with rehabilitation process through agencies of increased infiltration and return of seed-bearing topsoil, as well as reducing erosion. If required, additional native seed mix from the area could be respread to speed up rehabilitation process. 			
Landform stability	All windrows are to be removed as soon as practicable.		TAN .	



Triodia bitextura ground cover at Kyalla 117 N2.

Rehabilitation

Assessment

Stage Preliminary

(February June).

Final Success Criteria

A minimum of 10-20% canopy cover for open woodland community. It is noted that Eucalypt woodlands will recover faster than the Lancewood/ Bullwaddy community, however should have signs of regrowth following rehabilitation and within 12-18 months after rainfall.

Minimum 60% ground cover using locally available material including re-served topsoil/cleared vegetation before the onset of the first wet season resulting in a minimum of 40% bare ground.

A minimum of 40-60% ground foliage cover and diversity to be achieved within the first 12 months and maintained for at least 3 years following re-habilitation. Success will be dependent on minimised cattle movements and rainfall.

Less than 5 % erosion should be evident after the first 12 months and no subsidence or erosion should be evident for at least 5 years after completion.

No establishment of weed species declared under the Northern Territory Weeds Management Act 2013.

All hazardous material and waste removed from site upon completion of works to licensed landfill facilities or recycling facilities.

Rehabilitation of disturbance areas should be similar in landform to the surrounding area. No steep slopes or barriers to remain on site that endan-ger either wildlife or humans

Water bores and exploration wells to be sealed and isolated Removal of all surface facilities including fencing (star pickets/fencing wire) Remediation and backfilling of all sumps/ponds.

	Monitoring Program				
Timing	Method	Measurable attributes			
6 to 9 Months post rehabili- tation, end of wet season survey (February to June).	 Establish 14 permanent 100m x 4m woody species transects (one per hectare), with photo monitoring point/s, include 2 analogue sites in nearby undisturbed vegetation community. Collect 1 x 1 m ground cover quadrats every 10 m along transect. Transects to be randomly selected with start and end marked with start picket. Edge effects (i.e. impacts from the picket of the	 Indication of seed germination and plant establishment rates. Vegetation cover (species and abundance). Land condition (e.g. erosion canopy cover, ground cover, habitat quality). Weed presence (species and density). Disturbance (fire and feral animal/cattle) Incidental observations from surrounding area. 			
Years 1. 2 and	 through reducing plot mar- gins to <20m. Monitoring to be undertaken 	Early assessment of rehabilita-			
3 post reha- bilitation, end of wet season survey (February to June).	 using permanent transects. Collect data as per preliminary methods. Compare results from previous assessment to determine if require additional management inputs (i.e. seeding, stabilisation). Review success criteria. 	 tion will determine attributes of woody plants in each 100m x 4m transect. Including assessment of spe- cies, Diameter at Breast Height (DBH) (>1.5cm) and height (>2m), in addition to parame- ters described within the pre- liminary assessment. 			
Annually until final success criteria has been met, end of wet season survey (February to June).	 Monitoring to be undertaken using permanent transects. Collect data as per prelimi- nary methods. Compare results from previ- ous assessment to determine if require additional manage- ment inputs (i.e. seeding, stabilisation). Review success criteria. 	 Long-term assessment will determine establishment, recruitment and growth rate attributes of plant species, in addition to parameters de- scribed during Early Rehabili- tation stage. 			



Kyalla 117 N2 Corymbia dichromophloia and Erythrophleum chlorostachys low woodland

Appendix N Unexpected finds protocol



Unexpected Heritage Finds Procedure

Integrated Gas

UNEXPECTED HERITAGE FINDS PROCEDURE Beetaloo Asset (Northern Territory)

This documents details the Unexpected Heritage Finds Procedure for the Beetaloo Exploration Program.

Revision	Date	Description	Originator	Checked	Approved
0	31/03/2019	Unexpected Heritage Finds Procedure	Luke Kirkwood/Alana Court		МК

Review due: 31/03/2019

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THE THREE WHATS

What can go wrong? What could cause it to go wrong? What can I do to prevent it?

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Appendix A	Cultural Heritage Audit Checklist	
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8

1. Purpose

The purpose of this procedure is to set out the actions to be undertaken by Origin staff and contractor if a suspected find of Aboriginal and non-Aboriginal cultural heritage is made during civil construction activities.

2. Scope

This procedure covers the requirements associated with:

- The identification of cultural heritage artefacts or areas within the Beetaloo Permit Area.
- The assessment of the risk and control measures to be taken if a suspected Indigenous and non-Indigenous cultural heritage find is discovered; including investigation, notification, recording and reporting, means of communication, measures to avoid cultural heritage and dispute resolution.

It applies to all fieldwork conducted in the Beetaloo Basin.

3. Responsibility

These personnel are responsible for the following activities:

Indigenous Community Manager	Procedure issue and maintenance
Managers / Superintendents / Supervisors	Implementation of this procedure
All Employees / Contractors	Complying with this procedure

4. Requirements

The following management measures are recommended for unexpected heritage finds and are to be included as part of daily toolbox discussions.

4.1 Action in Event of Unexpected Discovery

- 1. If suspected previously unrecorded cultural heritage is uncovered during project work, work in the immediate vicinity of the find must stop and the area is to be flagged off with suitable markers (star pickets, flagging or barrier mesh).
- 2. The project work crew may continue work at least 100 m from the site of the find (or other distance approved by the relevant Heritage specialist, providing that at all times the cultural heritage duty of care is observed.

4.2 Recording and Reporting

- 3. The project work crew must record the suspected find on the Appropriate Forms. This will include GPS location and should include photographs of the suspected find.
- 4. The project crew must not disturb the suspected find in any way; for example, touch painted art, or collect/relocate the suspected find as this may be illegal and may reduce the scientific and cultural value of the cultural heritage.
- 5. The immediate supervisor of the project work crew must notify the relevant Heritage Specialist for the area –

o Xxxx

o xxxx

and advise them of the nature of the suspected find.

4.3 Measures to Avoid Harm to Aboriginal Cultural Heritage

Aboriginal finds can include the following:

- Stone artefacts (sharp edged rocks that have identifiable features demonstrating evidence of human modification. See attached information sheet)
- Scarred Trees (trees with symmetrical scars that might demonstrate evidence of removal of bark for use in coolamons, shields and huts. See attached information sheet)
- Grindstones (Large sandstone items (either fixed in bedrock or mobile) that have manmade • grooves in them demonstrating use. See attached information sheet)
- Stone Axes (heavy hatchet head like stone items, typically with the leading edge sharpened. . See attached information sheet)
- Bone, Shell and Charcoal (potential historical food waste dumps (also known as Middens). • See attached information sheet)

Subsurface works may typically encounter shell, charcoal and bone which will appear as lens from a centimetre to several metres in depth.

Prior to surface works, civil construction team should be aware of potential for surface finds of artefacts and avoid impacts to scarred trees.

Procedure

If an object of potential Aboriginal cultural heritage value is uncovered:

- All work to cease within 10 metres of the suspected find, and the area to be cordoned off 1 using temporary fencing.
- 2. Site Supervisor is to be immediately notified who will then engage a qualified Heritage Advisor to assess the find and recommend any necessary management measures.
- 3. Once notified, the relevant Heritage specialists will provide further directions for managing the suspected find, in accordance with legislative requirements and the relevant Cultural Heritage Management Plans where applicable.
- This may include flagging the discovery, deviating project work around the suspected find or 4 relocating the work front to a new location removed from the suspected find.
- If the find is determined to be Aboriginal heritage, the Site Supervisor or Heritage Advisor to 5. notify the relevant Heritage Department.
- 6. Work is not to recommence in the vicinity of the find until direction is provided by the Heritage Department.
- 7. If the project work cannot deviate around the suspected find for technical or economic reasons and it is necessary to excavate, relocate, remove or harm the suspected find, it will be necessary for Origin to seek the advice and consent of the Traditional Owners for the area as to whether the suspected find is aboriginal cultural heritage, and whether Origin can excavate, relocate, remove or harm the find. If this action is required then there could be considerable delay (one day to several weeks).

4.4 Historical Cultural Heritage

Historic finds can include the following:

- Glass (Coloured glass, bottles (complete or fragmentary etc.)
- Metal (identifiable metallic objects such as cutlery, buckles, farming equipment, woodworking and metal equipment etc.)
- Ceramic (Plates, cups, ink wells, pipes, etc.)
- Wood (identifiable human manufactured wooden items)
- Stone (identifiable human manufactured stone items)
- Bone, Shell and Charcoal (potential historical food waste dumps)

Procedure

The following management measures are recommended for unexpected historic finds:

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- 1. All work to cease within 10 metres of the suspected find, and the area to be cordoned off using temporary fencing.
- 2. Site Supervisor is to be immediately notified who will then engage a qualified Heritage Advisor to assess the find and recommend any necessary management measures.
- Once notified, the relevant Heritage specialists will provide further directions for managing the suspected find, in accordance with legislative requirements and the relevant Cultural Heritage Management Plans where applicable.
- 4. If the find is determined to be of heritage importance, work is not to recommence in the vicinity of the find until direction is provided from the relevant Heritage Department.

4.5 Discovery of Human Remains

If any suspected human remains are discovered during any activity works, they must be initially assumed under the provisions of the relevant *Coroners Act* to be a crime scene and treated accordingly. The following procedure is to be applied:

- 1. All activity in the vicinity must cease and the Site Supervisor to be notified immediately.
- 2. The Police must be notified immediately of the discovery by the Site Supervisor or appointed supervisor in charge of the works area.
- 3. The remains must be left in place and protected from harm or damage with a minimum of at least a 50m buffer. It is important to use best judgement and restrict all movement in the immediate vicinity around the discovery until directed otherwise by the Police as this could contaminate a potential crime scene. Likewise do not set up temporary fencing unless directed by the Police.
- 4. If the appointed expert investigating the find under the relevant *Coroners Act* believes that there is reasonable grounds to believe the remains to be:
 - a. a crime scene, the Police will provide direction on the management of the discovery
 - b. Aboriginal ancestral remains or historical remains, the relevant Director Heritage Branch, Department of Tourism and Culture, is to be contacted on (08) 8999 5039 (Darwin office) or (08) 8951 9247 (Alice Springs office) or email <u>heritage@nt.gov.au</u>.

4.6 Aboriginal Heritage Awareness Training

- 1. Origin staff / contractors conducting project work that may have the potential to harm aboriginal or historic cultural heritage must be aware of their duty to take all reasonable and practicable measures to ensure the project work does not harm any cultural heritage.
- In addition all Origin staff / contractors undertaking earth disturbance activities that have the potential to harm heritage sites and artefacts shall undergo Cultural Heritage Identification Training to provide them with basic knowledge on the scientific characteristics of Aboriginal heritage and artefacts.
- Origin staff / contractors must be made aware of the conditions set out in the AAPA Certificate (AAPA C2019/014) and the obligations of all persons (who enter on, or carry out works or use land on which there is a sacred site) under Part IV of the Northern Territory Aboriginal Sacred Sites Act 1989.

5. Records

The following records should be kept and maintained in order to demonstrate compliance with the requirements of this procedure:

- Appropriate Forms
- Information Sheets
- Staff Training records.

6. Definitions

Archaeological places or objects e	Archaeological places or objects exist within or in the vicinity of the Origin Permit Areas. All such materials are protected under
	the Northern Territory Heritage Act.

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Unexpected Heritage Finds Procedure

Aboriginal Cultural Heritage	Has the same meaning as in the relevant Aboriginal Cultural Heritage legislation. It includes pre-settlement and post- settlement significant aboriginal areas and significant aboriginal objects.
Aboriginal Heritage	Training may consist of any of:
Awareness Training	Briefings on relevant Aboriginal Cultural Heritage
	Briefings on particular arrangements with aboriginal parties
	Identification of aboriginal heritage artefacts
	Awareness sessions run for Origin staff by traditional owner groups
Burial Sites	Possibility of burial sites located within the Permit Area. Under
	the Northern Territory Criminal Code it is an offence to interfere
	with remains of a deceased person.
	Northern Territory Heritage Act it is an offence to interfere
	with the remains of a deceased Aboriginal person without
	authorization under that Act.
Cultural Heritage	Has the same meaning as defined in Aboriginal Cultural Heritage
Duty of Care	legislation guidelines applicable to the relevant State in which
	activities are occurring.
Find	Means a significant Aboriginal object or, evidence of
	archaeological or historic significance of Aboriginal occupation of
	an area or Aboriginal human remains, found in the course of
	undertaking an activity covered by the guidelines.
Traditional Owners	A descendant of the tribe or ethnic group that occupied a
	particular region before European settlement, as recognised by
	Australian law.

7. References

- 1. Aboriginal Cultural Heritage legislation applicable to the Northern Territory
- 2. Aboriginal Areas Protection Authority Certificate
- 3. OEUP-1000-PRO-NCH-002 Unexpected Aboriginal Cultural Heritage Find (Traditional Owner Representative Present)
- 4. OEUP-1000-GDL-NCH-001 The Discovery Management & Handling of Human Remains

8. Appendices

Appendix A Cultural Heritage Audit Checklist (OEUP-1000-FRM-NCH-003)

9. Document information and history

DOCUMENT CUSTODIAN GROUP

Title	Name/s			
DOCUMENT AUTHOR				
Position	Name			
Heritage Consultant	Luke Kirkwood			
STAKEHOLDERS AND OTHER CONTRIBUTORS				
Position	Name			
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Unexpected Heritage Finds Procedure

DOCUMENT HISTORY

Rev	Date	Changes made in document	Reviewer/s	Consolidator	Approver

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Appendix A Cultural Heritage Audit Checklist

Cultural Heritage Audit Checklist OEUP-1000-FRM-NCH-003

Purpose	To ensure the appropriate management of cultural heritage has been undertaken, recorded & maintained in accordance with Origin Energy's procedures, directives, Government statutory requirements & Cultural Heritage Management Plans.
Reference	This form should be used in conjunction with the "Unexpected Aboriginal Cultural Heritage Find (Traditional Owner Representative Not Present)" (OEUP-1000-PRO-NCH-003) and/or the "Unexpected Aboriginal Cultural Heritage Find (Traditional Owner Representative Present)" (OEUP-1000-PRO-NCH-002) procedures.
Records	This document, once completed, will be kept as a record by the Native Title & Cultural Heritage (NTCH) unit and a copy to be retained on Site.
Notes for use:	 Form to be completed & signed by a Supervisor or a representative from a Traditional Owner group. Form to be reviewed & counter signed by Cultural Heritage Team Leader.

Section 1 - Audit Checklist

Task	Requirement	Compliance Notes	Status
1.	There is evidence that in the event of a suspected find the work crew stopped work in the immediate area of the suspected find while the suspected find was investigated.		
2.	There is evidence that the Appropriate Forms have been completed in the event of a suspected find.		
3.	There is evidence that copies of the Appropriate Forms are maintained by Origin's field based Cultural Heritage Team Leader.		
4.	There is evidence that the project work crew referred any suspected finds to Origin's Heritage specialist.		
5.	There is evidence that in the event that a suspected find could not be avoided, consent to remove / relocate / harm the find was obtained in accordance with statutory requirements and any relevant Cultural Heritage Management Plans.		
6.	There is evidence that Origin staff / contractors have undertaken Heritage Awareness training and/or Heritage Identification training.		

OK - Evidence of requirement in place	NC - Non-conformance	
IO - Improvement Opportunity	NA - Not applicable at this site	

Section 2 - Approvals

Signature: Name:	 Date: Position:	Supervisor and/or Traditional Owner Representative

Signature:	 Date:	
Name:	 Position:	Cultural Heritage Team Leader

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Appendix O Stakeholder Engagement Plan

BEETALOO EXPLORATION PROJECT Early Stage Stakeholder Engagement Plan

Abbreviations/Acronyms

Abbreviation/Acronym	Description	
ABC	Australian Broadcasting Corporation	
ABS	Australian Bureau of Statistics	
SEIFA	ABS Socio-Economic Indexes for Areas	
BA	Beetaloo Asset	
BESSEP	Beetaloo Early Stage Stakeholder Engagement Plan	
BESCG	Beetaloo Early Stage Stakeholder Coordination Group	
CAAMA	Central Australian Aboriginal Media Association	
COFMP	Community Observation and Feedback Management Procedure	
COAG	Council of Australian Governments	
CSO	Civic Society Organisation	
DME	(NT) Department of Mines and Energy	
EGM IG	Executive General Manager Integrated Gas	
EAA	(NT) Environmental Assessment Act	
EIA	Environmental Impact Assessment	
EIS	Environmental Impact Statement	
EPA	(NT) Environmental Protection Authority	
ESD	Ecological Sustainable Development	
GM B&GA	General Manager Beetaloo and Growth Assets	
IAP2	International Association for Public Participation's	
LAGs	Local Aboriginal Groups	
LGA	Local Government Authority	
NGO	Non-government Organisation	
NLC	Northern Land Council	
NOI	Notice of Intent	
NT	Northern Territory	
NTG	Northern Territory Government	
NT Inquiry	Scientific Inquiry into Hydraulic Fracturing in the Northern Territory	
SLTO	Social Licence to Operate	
SREBA	Strategic Regional Environmental Baseline Assessment	
TEABBA	Top End Aboriginal Bush Broadcasting Association	
TOs	Aboriginal Traditional Owners	

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1 EXECUTIVE SUMMARY

Origin Energy (Origin) recognises that early and on-going engagement with stakeholders is fundamental to conducting itself in an open and responsive way to secure a 'social license to operate'. This Beetaloo Early Stage Stakeholder Engagement Plan (**BESSEP**) covers Origin's proposed stakeholder engagement activity for the Beetaloo Exploration Project (**BEP**) for calendar years 2019-20. It provides an overview of the BEP, its key stakeholders and their concerns, how they interact with Origin, and the expected engagement activities and accountabilities of BEP and Origin personnel.

The BEP early stage work comprises the installation of nine (9) hydrocarbon exploration wells (permitted under the NT Petroleum Act) over five (5) operating years, within Petroleum Exploration Permits 76, 98 and 117 (EP76, EP98 and EP117); in total covering 18,500 km² in the Barkly Region.

The BESSEP is designed to be a 'living' document, to be constantly reviewed and evolve during the life of the BEP to reflect information gained through stakeholder engagement, evolving BEP activities and changes in stakeholder perceptions, priorities and concerns. This BESSEP has been developed in the context of Origin's *Values, Policies and Directives,* as well as relevant NT legislative and regulatory requirements, International Financial Corporation (**IFC**) standards, and the Exploration Agreements between Origin, Native Title claimants/holders in the project area and their representative body - the Northern Land Council.

As the BEP early stage work progresses, the BESSEP will require continuously updated internal and external key messages and communication plans, particularly at project gateway points. Should early stage activities (exploration and appraisal) prove successful, a development stage SEP having greater emphasis on broader stakeholders at NT and Commonwealth level will be needed, anticipated by reference in this BESSEP.

An Origin internal coordination group, the Beetaloo Stakeholder Engagement Coordination Group (**BSECG**) - established for the duration of early stage work -, is designed to facilitate broad internal understanding and accountability for BEP stakeholder work and consistency in key messages for both internal and external stakeholders. All key messages and formal engagement activities within the BESSEP are discussed and agreed by the General Manager, Beetaloo and Growth Assets; the Executive General Manager Integrated Gas and the Executive General Manager, Corporate Affairs.

The BSECG meets regularly, involving representatives from Origin's functional teams that have contact with external stakeholders, including Beetaloo and Growth Assets, Corporate and External Affairs, Investor Relations, Health, Safety and Environment, People and Culture, Procurement and Security. BEP stakeholder activities are conducted according to Origin's engagement principles (Free, Prior, and Informed) and make use of existing systems and procedures - such as Origin's Community Complaints and Feedback Management Procedure (**CCFMP**). These provide for an accessible record of engagement on BEP issues, as well as guiding any complaints assessment and resolution.

A comprehensive understanding of stakeholders' early concerns and expectations has emerged as a result of discussions and inquires to date; these include direct economic effects, social and cultural heritage impact, community health and safety, and potential effects on water and regional development. These and other concerns that may arise in the future will play a major role in shaping stakeholder engagement focus and activities.

The relationships between stakeholders, the team responsible for delivering the BEP and other functional teams within Origin have been mapped. Inter-team integration and coordination is vital for consistent stakeholder engagement. The BSECG also discusses, agrees and allocates accountabilities for specific issues and roles to specific BEP and Origin functional teams. To this end, initial stakeholder relationship accountabilities have been mapped and are presented in the BESSEP.

2 INTRODUCTION

2.1 BEETALOO EXPLORATION PROJECT

Centred 620 kilometres south-east of Darwin (see Figure 1), the Beetaloo Basin underlies an area of approximately 35,260 km2, of which Origin's and Falcon Oil and Gas joint venture exploration licences aggregate 18,500 km2 (52.5%). The basin is considered highly prospective for shale gas and associated liquids. Results and analysis to date suggests that the physical characteristics and properties of the source rocks and play fairway are conducive to successful unconventional development.





2.2 THE FARM-IN AGREEMENT AND PROJECT SCOPE

Origin together with Falcon Oil and Gas Australia Limited (Falcon) are the tenement holders for three (3) (hydrocarbons) exploration permits in the Beetaloo Basin. Origin holds a seventy (70) per cent interest in the three (3) permits and Falcon holds a thirty (30) per cent interest.

2.3 THE EXPLORATION PERMIT COMMITMENTS

The exploration permit holders are required to deliver nine (9) exploratory wells over five years. Prior to a moratorium introduced in September 2016, Origin had delivered four (4) exploratory wells, comprising three (3) non-stimulated vertical wells and one (1) horizontal stimulated well.

In April 2018, after a fifteen (15) month inquiry¹ (the NT Inquiry) involving a panel of eleven (11) subject matter experts led by The Hon Justice Rachael Pepper, the NT Government (NTG) lifted the moratorium. Resumption of exploration activities is contingent, however, on the efficient and effective implementation by the NTG of the NT Inquiry recommendations relating to exploration activities. It is envisaged, that if the NTG implements the required pre-exploration recommendations (approximately 35 of 135 total recommendations) in a timely manner, Origin will be able to resume permitted exploration activities in 2019.

2.4 BEETALOO EARLY STAGE STAKEHOLDER ENGAGEMENT PLAN

2.4.1 Scope

Stakeholder engagement seeks to ensure affected stakeholders gain an understanding of the impacts of a proposal, in this case the Beetaloo Exploration Project (BEP), of proposed mitigation measures and benefits, and that they have an opportunity to communicate feedback to Origin. For this to occur effectively, engagement methods need to be fit for purpose and appropriate to relevant stakeholders including consideration of literacy, culture, gender, age and language. This is particularly important in the NT when engaging with Aboriginal communities, who make up a majority of affected people in remote regions of the NT such as Beetaloo. Origin is particular conscious of Aboriginal cultural protocols, language and associated sensitivities.

This BESSEP covers stakeholder work for early stage² (exploration) activities, whilst creating a framework for escalating and broader stakeholder engagement should the exploration work prove successful. The plan will need to be further developed for any future development project. As it stands, it addresses the activities and accountabilities of Origin (the Operator) and all operator engaged personnel who may interact with BEP stakeholders.

In compiling the plan, Origin was guided by the International Finance Corporation definition of stakeholders as "persons or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project and / or the ability to influence its outcome, either positively or negatively". Similarly, consistent with the BEP being still at early stage exploration, communities are defined as "the host communities being the inhabitants of the immediate and surrounding area that may be affected in some way by project activities". On this basis Origin believes that its host Traditional Owners, host Pastoral leaseholders, employees, contractors and local and regional community groups are its primary stakeholders. Other stakeholders include community hubs and towns in the Barkly region, local and NT governments and government agencies, NT residents more broadly, Civil Society Organisations (**CSOs**), special interest groups, media, academic commentators and other businesses.

While the BESSEP seeks to cover the broadest group of interested parties, Origin believes that working closely in a participatory manner with directly impacted stakeholders - those who share non-exclusive access to the land associated with the permit area and hold decision making authority for that land - are primary. Origin will listen, seek to understand and respond to the interests and concerns of other stakeholders, while remaining respectful of local concerns and customs as it evaluates the potential of the Beetaloo and NT other natural gas basins.

Origin provides relevant information to stakeholders and encourages those who are interested to ask questions and provide feedback on perceived and potential impacts, particularly on local communities and the environment. Origin will respond to reasonable requests by providing additional information, by incorporating appropriate suggestions into management and mitigation plans and, where possible, by modifying aspects of the BEP design and activity. Origin proactively engages with responsible Civic Society Organsations (CSOs) to help make its public consultation as broad-based as possible.

¹ Scientific Inquiry into Hydraulic Fracturing in the Northern Territory, commissioned by the NTG

² The term 'Early Stage' is used deliberately to avoid cross-confusion with technical stage gate terminology.

3 BACKGROUND

Origin's internal BESSEP has been developed in the context of relevant NT and Commonwealth Government legislative and regulatory requirements, exploration access agreements with Traditional Native Title Holders / Owners and pastoral leaseholders, and in accordance with Origin's Values, Policies and Directives. An understanding of social and socioeconomic context is central to the way Origin and the BEP seek to operate. In particular, Origin aligns its SEP work to the NT EPA's expectations for how early and effective stakeholder engagement is conducted and demonstrated to satisfy NT *Environmental Assessment Act* considerations. The NT EPA recommends alignment to the International Association for Public Participation's (IAP2) Quality Assurance Standard for Community and Stakeholder Engagement; and this BESSEP is written accordingly.

3.1 RELEVENT LAWS AND REGULATIONS

Applicable NT and Commonwealth Government Laws and Regulations are outlined below;

NT Legislation

- Petroleum Act 2016, Petroleum (Environment) Regulations 2016 and Schedule of Onshore Petroleum Exploration and Production Requirements 2016
- Petroleum (Prospecting and Mining) Regulations 2001
- Aboriginal Land Act 2013
- Biological Control Act 2016
- Bushfires Management Act 2016 (and associated Regulations)
- Control of Roads Act 2018
- Dangerous Goods Act 2012 (and associated Regulations)
- Environmental Assessment Act 2013 (and associated Regulations)
- Environmental Offences and Penalties Act 2011
- Fire and Emergency Act 2016
- Heritage Act 2016 (and associated Regulations)
- Natural Environment Protection Council (Northern Territory) Act
- Northern Territory Aboriginal Sacred Sites Act 2013 (and associated Regulations)
- Pastoral Land Act 2016 (and associated Regulations)
- Plant Health Act 2015
- Public and Environmental Health Act 2016 (and associated Regulations)
- Public Health (General Sanitation, Mosquito Prevention, Rat Exclusion and Prevention) Regulations 1988
- Soil Conservation and Land Utilisation Act 2016
- Territory Parks and Wildlife Conservation Act 2014 (TPWC Act) (and associated Regulations)
- Waste Management and Pollution Control Act 2016 (and associated Regulations)
- Water Act 2016
- Weeds Management Act 2013
- Work Health and Safety (National Uniform Legislation) Act 2014

Commonwealth Legislation

- Aboriginal and Torres Strait Islander Heritage Protection Act 1984
- Aboriginal Land Rights (Northern Territory) Act 1976
- Australian Heritage Council Act 2003
- Environment Protection and Biodiversity Conservation Act 1999
- National Environment Protection Council Act 1994
- National Greenhouse and Energy Reporting Act 2007
- Native Title Act 1993

Codes of Practice and Relevant Guidelines

Codes of Practice

- Codes of Practice for Small On-Site Sewage and Sullage Treatment Systems and the Disposal or reuse of Sewage Effluent (NT Department of Health, 2014)
- Petroleum Act S21E (and Stakeholder Engagement Guidelines Land Access)

Guidelines

- AS1940 The Storage and Handling of Flammable and Combustible Liquids, 2004
- Best Practice Erosion and Sediment Control (International Erosion Control Association, 2008)
- Bores, Drilling and Dams
- Guideline for the Preparation of an Environmental Management Plan (NT EPA, 2015)
- Northern Territory Natural Resource Management Plan 2016-2020 (Territory Natural Resource Management, 2016)
- ISO19011 Guidelines for auditing management systems, 2018
- Leading Practice Sustainable Development Program for the Mining Industry (Australian Government, 2016)
- Minimum Construction Requirements for Water Bores in Australia (National Water Commission, 2012)
- Northern Territory Land Clearing Guidelines (NRETAS, 2010)
- Northern Territory Noise Management Framework Guideline (NT EPA, 2018)
- Weed Management Planning Guide Onshore Shale Gas Development Projects (DENR, 2018)

3.2 ORIGINS VALUES, POLICIES AND CORE PROCESSES

The BEP uses a suite of Origin management documents that provide information about how it manages its business, assets and operations. The BESSEP interfaces with the relevant core process documents listed below.

- HSE Management System
- Cultural Heritage Management System;
- Core Process Safe Control of Work
- Core Process Manage Assets;
- Core Process Management of Change

3.3 EXPLORATION ACCESS AGREEMENTS

Origin aims to formalise its interactions, obligations and commitments with local and land connected groups through specific agreements, in the case of the BEP these include;

- Tripartite Deeds and Exploration Agreements with Native Title Holders
- Compensation and Access Agreements with host pastoral leaseholders

3.4 ORIGIN AND BEP ENGAGEMENT PRINCIPLES

Origin's BEP stakeholder engagement is based on the following overarching objectives and principles:

- The objective of stakeholder engagement is to secure support for the exploration program from host communities and other stakeholders.
- Full transparency in all stakeholder engagement, activities and payments, consistent with the societal expectations and Origin's policy on bribery and corruption.
- Ongoing provision of clear, factual and accurate information in an open and transparent manner to relevant stakeholders, consistent with the concept of free, prior and informed consultation.
- Where appropriate, Origin formalises and dignifies its engagement with stakeholder institutions through agreements that set out mutual expectations and obligations.
- Engagement and agreements adhere to the principles of good governance and balanced representation.
- Through formal and informal dialogue, Origin provides sufficient opportunities for stakeholders to raise issues, to make suggestions and to voice their concerns and expectations of the BEP
- Origin helps relevant stakeholders understand the information provided, seeks their feedback and lets them know how their discussion and contributions are considered.
- Engagement occurs on the basis of mutual respect, ensuring through induction training that BEP personnel and contractors understand what this means and behave accordingly.
- Origin responds in a timely way to stakeholder feedback, concerns, complaints and requests, and
 Constructive relationships between Origin, BEP and influential stakeholders are managed through personal contact assigned to specific Origin and BEP staff.

In particular, the BEP conforms to the principle of free, prior and informed consent for affected Aboriginal stakeholders, based on transparent communication and relationship building. Free, prior and informed consent at the BEP means affected Native Title holders are consulted about proposed work and given opportunities to discuss and influence the way that work and decisions that may affect them are conducted. Consent does not mean every Aboriginal stakeholder must agree to what is being proposed; rather, it means that Origin has ensured and complied with a thorough process of consultation and participation in decision-making with the Native Title holders has been followed, recognised in formal Agreements. These Agreements ensure that potential negative effects of Origin's activities are avoided or minimised, and that fair and positive contributions to Native Title holders and community development are made.

3.5 DEFINED AREAS OF INFLUENCE

Origin defines its BEP 'Areas of Influence' as follows;

- **Direct 'Area of Influence'** is the immediate footprint of physical infrastructure and associated works inside the exploration permit area.
- **Indirect 'Area of Influence'** is the Barkly Region, involving real and perceived community interests and concerns including direct economic effects, social and cultural heritage impact, community health and safety, and potential impacts on water and regional development.
- Combined 'Area of Influence' is the NT overall.

3.6 SUSTAINABLE AND REGIONAL DEVELOPMENT APPROACH

Origin in pursuing its business objectives aims to also generate sustainable, long-term benefits to directly affected community groups, to the Barkly region generally and more broadly into the rest of the NT. To

enable successful long-term development, Origin has incorporated sustainable development principles in its management approach, aligned with the NTG's policy aim of ecologically sustainable development (ESD) of natural resources. ESD is defined, in the Council of Australian Governments (COAG) endorsed National Strategy for ESD as *"using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life now."*.

Sustainable development in the BEP context means operating in a way that leaves no negative liabilities for current and future residents in the Areas of Influence, while seeking to ensure any development generates an equitable distribution of benefit across various legitimate stakeholders. The conversion of a substantial proportion of in-situ natural capital into social and human capital in a way that is deemed fair by a majority of stakeholders is key. Beyond royalty payments to the NT Government (as owner of the natural resource), and payments to Native Title holders (host Traditional Owners) (as per Exploration Access Agreements) and host pastoralists (as per Access and Compensation Agreements); Origin seeks to maximise broad-based local participation in education, training, employment and enterprise opportunities engendered by its presence. The broader objective of training, employment and enterprise may only be progressed post exploration success.

Origin's sustainable development focal points are 'people', 'environment', 'communities' and the 'health and safety' of all those who participate in, or are affected by, the activities of its assets. At granular levels, Origin applies materiality and risk assessments and stakeholder priority analysis to all decision making. This business-driven approach leads to the most effective possible management and mitigation of potential adverse impacts; and it requires Origin to work in partnership with others who have the necessary knowledge and skills to maximise the creation of enduring value for BEP investors, employees and the people of the NT.

4 SOCIAL AND SOCIOECONOMIC CONTEXT

There are particular social difficulties associated with the NT's sparsely populated regions, its long distances, harsh climates, and for Aboriginal people, the many different language and cultural groups and a history of relationships with governments and operators of development proposals. These require special consideration when planning engagement with Aboriginal stakeholders. Origin adheres to the Aboriginal engagement principles recommended by the NT Environmental Protection Agency (EPA), set out in Appendix II and those required under the Aboriginal Land Rights Act and the Native Title Act.

The BEP is located within the Barkly and Roper Gulf Local Government Areas (LGA) in the central interior of the NT, midway between the towns of Katherine and Tennant Creek, straddling the Stuart Highway – Carpentaria Highway junction, and the North Australian railway line and gas pipelines running north to Darwin and east to the Eastern Australian pipeline network.

4.1 SOCIOECONOMIC CHARACTERISTICS OF THE BEP AREA OF INFLUENCE

A preliminary socioeconomic study of the BEP Direct and Indirect Areas of Influence was completed in January 2018 by Coffey Services as part of the NT Inquiry³.

Three local government areas fall within the study area. Of these, the Katherine LAGs area has the highest employment, education and income levels, closely reflecting NT norms for many key socioeconomic indicators. Roper Gulf LGA (administrative centre at Daly Waters) and Barkly LGA (Newcastle Waters and Elliott) are substantially disadvantaged by comparison to the NT overall, and especially in terms of educational involvement and average level of schooling attained.

Population trends in the region are difficult to properly measure because of the transient nature of many regional communities. Changes in Australian Bureau of Statistics (ABS) statistical geography between census years is an extra complication. While the data show that the LGAs experienced overall growth across census years, it appears that the population of the Katherine urban centre has slightly decreased in the past two decades. Katherine LGA has a population age distribution similar to the NT overall,

³ Beetaloo sub-basin Social Impact Assessment Case Study, 17 January 2018. Coffey Services Australia Pty Limited

whereas Roper-Gulf LGA and Barkly LGA both have younger populations, with median ages below that of the NT and Australia.

All three LGAs have high proportions of Aboriginal people within their populations. The LGAs with higher percentages of Aboriginal people also have the highest levels of socioeconomic disadvantage, including the key areas of education, employment and income. The Katherine LGA has the smallest proportion of reported Aboriginal persons (25%), generally greater income, higher levels of human capital and a more skilled labour catchment, meaning it could be better positioned to participate in economic opportunities associated with any future developments.

All three LGAs have unemployment rates higher than that of the NT generally. Roper-Gulf LGA has the highest unemployment rate, followed closely by the Barkly LGA. Aboriginal unemployment across the entire study area is much higher than the NT generally.

Housing and transport infrastructure are not well developed in the region, and the extent to which Origin and the BEP engages with civic infrastructure will be an element of the BEP's community engagement.

The region has a history of resource extraction and agriculture dominated industry, and this is an integral aspect of the region's sociocultural identity and legacy.

Socioeconomic Indicator	Katherine LGA	Roper-Gulf LGA	Barkly LGA	NT Overall
Population	9,187	6,121	6,823	211,945
Median Age	31	24	27	31
% Aboriginal	25.5	81.8	69.1	26.8
Median Weekly Total Household Income	1,534	1,126	1,158	1,674
% of persons who completed at least year 12 or equivalent	36.8	18.2	20.5	39.9
% of Aboriginal persons who completed at least year 12 or equivalent	13.7	11.5	7.7	N/A
Unemployment Rate %	6.0	18.8	10.6	5.3
Aboriginal Unemployment Rate %	26.2	26.2	23.1	N/A
Median Rent (\$/Week)	200	50	50	225
% of households who qualify as being under rental stress	6.2	2.5	5.8	9.0

Table 1: Table of Socio-Economic Indicators – LGAs by Comparison

Table 2: Table of Relative Socio-Economic Conditions

ABS Socio-Economic Indexes for Areas (SEIFA) 2011 – Summary Selected LGAs⁴

⁴ Australian Bureau of Statistics (2011e), Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA) 2011

Local Government Area	Index of Relative Socio-Economic Advantage and Disadvantage		Index of Relative Socio-Economic Disadvantage		Index of Economic Resources		Index of Education and Occupation	
	Score	Decile	Score	Decile	Score	Decile	Score	Decile
Katherine LGA	944	4 (40%)	940	3 (30%)	920	2 (20%)	974	7 (70%)
Roper-Gulf LGA	650	1 (10%)	578	1 (10%)	588	1 (10%)	854	1 (10%)
Barkly LGA	738	1 (10%)	680	1 (10%)	712	1 (10%)	923	3 (30%)

Note: BEP LAGs are evaluated relative to all LGAs in Australia. Score = A lower score indicates that an area is relatively disadvantaged compared to an area with a higher score. Scores are an ordinal measure. Scores are standardised so that the average equals 1000 and the standard deviation is 100. Decile = All areas are ordered from lowest to highest score and assigned a number from 1 to 10. A Decile of 1 means that the LGA falls into the bottom 10% of LGAs. The total set of LGAs is divided into ten equal sized groups.

Knowledge base work as part of the the Strategic Regional Environmental Baseline Assessment (SREBA) to be undertaken as part of the NT Inquiry can and should be used to guide and inform future socioeconomic support programmes - should the project achieve exploration success and proceed to a development.

4.2 LOCAL COMMUNITIES

Three small population hubs, too small to be called towns, are located in the BEP Direct Area of Influence. The location of host community hubs and pastoral stations is shown in Figure 3and brief descriptions of key stakeholder groups follow.

Figure 3: Origin's Exploration Permits, Host Community Hubs and Pastoral Stations

Daly Waters is 620 kilometres south of Darwin and three kilometres west of the Stuart Highway, comprising an airfield, a general store and humble housing supporting a resident population of approximately 20 people. The name Daly Waters was given to a series of natural springs by John McDouall Stuart during his third attempt to cross Australia from south to north, in 1861-2. Stuart named the springs after the new Governor of South Australia, Sir Dominick Daly. The Overland Telegraph Line reached Daly Waters from the north and connected to Tennant Creek in 1872. Daly Rivers Airfield was a centre for the London to Sydney air race in 1926, a refuelling stop for early Qantas lights to Singapore, a World War II Airforce base and more recently an operational base for joint military manoeuvres. Although the airfield was closed to commercial traffic in 1965, the original Qantas hangar still stands, housing exhibits of photographs and equipment from the area's aviation past.

Local Traditional Owners are the Jingili people who believe the dreaming tracks of the emu and the sun travelled through what is now Daly Waters to the southern parts of the NT. They gained legally recognised native title rights over both the townsite and ten surrounding pastoral leases covering an area of 30,000 square kilometres (11,583 square miles) in 2009.

Elliott is located close to the halfway point between Darwin and Alice Springs on the Stuart Highway. It has a population of 355 people, many being Jingili people. The township is situated at the site of Number 8 Bore on Newcastle Waters cattle station, the site of an Australian Army camp during World War II and is named after Army Captain R.D (Snow) Elliott MBE.

5 BEP STAKEHOLDER ENGAGEMENT STRATEGY

5.1 BEP STAKEHOLDER ENGAGEMENT OBJECTIVES

The BEP stakeholder engagement goals are to:

- Identify BEP stakeholders;
- Understand and anticipate BEP stakeholder concerns and opportunities for shared outcomes
- Communicate proactively with BEP stakeholders about proposed and current BEP activities, using consistent key messages;
- Achieve BEP objectives while respecting the concerns and issues of relevant stakeholders as they relate to potential BEP impacts;
- Align engagement and messaging consistent with BEP activities, and any subsequent design, construction, operations and activities;
- Develop, implement and maintain constructive relationships with relevant BEP stakeholders, striving for mutual understanding, respect and collaboration;
- Establish and maintain coordinated, internal processes for BEP stakeholder engagement and issues management;
- Share information and feedback across the BEP team, and where appropriate, report back to relevant BEP stakeholders; and
- Tailor language, format, materials and activities to specific BEP stakeholders.

5.2 DEVELOPMENT OF COMMUNICATION PLANS AND KEY MESSAGES

The BESSEP requires that internal and external communication plans and key messages are developed for each major activity associated with the design and delivery of the BEP.

Figure 2: Cascading of Engagement and Communication Plans and Key Messages



5.3 STAKEHOLDER ENGAGEMENT PROCESS

This section describes the process that BEP follows in undertaking stakeholder engagement activities. It includes:

The strategic imperatives and tools for stakeholder engagement activities;

- A process for coordinating stakeholder engagement activities across Origin and BEP functions;
- A procedure for managing BEP-related complaints, grievances and feedback, and
- A basis for monitoring and evaluating stakeholder engagement activities.

5.4 STRATEGIC IMPERATIVES FOR STAKEHOLDER ENGAGEMENT

This BESSEP is based on the principles and objectives set out in Section 3.4, including that engagement activity should be:

- Free (free of coercion and intimidation);
- Prior (timely disclosure of information), and
- Informed (relevant, understandable and accessible information).

BEP stakeholder engagement makes use of Origin's CCFMP (see *Appendix A*), and other management systems and core processes where relevant. These provide for an accessible record of BEP engagement on stakeholder issues and concerns, as well as guiding community group complaints assessment and resolution.

5.5 ENGAGEMENT TOOLS

The BEP adopts and continuously refines engagement techniques to suit the circumstances and the social norms of particular stakeholders. For example, when engaging with host Traditional Owners and local communities in the BEP Areas of Influence, cultural issues and education levels are carefully considered. Information and consultation sessions use clear, non-technical language; are based on consistent key messages, and specifically seek questions and comments.

Participatory tools and methodologies such as workshops and group sessions are also employed where appropriate to increase stakeholder involvement and ask about suggested alternative ways of doing things, especially if there is controversy or complexity and a need to build a consensus around possible solutions. Specific tools can be used to engage sub-groups including different cultural groups, women, elders, small business owners, and youth. The selection of tailored engagement practices is based on the:

- Number and interest of stakeholders;
- Location and venue of the engagement;
- Social and legal complexity of the issue to be discussed;
- Significance of potential effects, and
- Desired outcomes of engagement.

The type of engagement for each targeted stakeholder group will change as the BEP progresses, however stakeholder groups that are directly and materially affected by a particular component of the BEP are regarded as the most important to be properly informed and involved in decisions that affect them. Three complementary components, described below, typically provide the basis for stakeholder engagement.

5.5.1 Sharing Information

- Newsletter used for providing regular feedback and updates to a broad range of stakeholders.
- Community Notice Boards used for announcing upcoming activity and general updates at local and regional centres, catalysing 'word of mouth' cascade.
- Mass Media local newspaper and radio, TV, Social Media announcing upcoming activity and general updates
- Origin BEP Website (<u>www.originenergy.com.au/beetaloo</u>) for sharing information with stakeholders who have internet access.

5.5.2 Direct Dialogue

- Face to face meetings for direct discussions with individuals and small groups for the exchange of specific information relevant to them.
- Site visits and specific presentations for the delivery of key messages and specific studies, reports or data at specific BEP milestones.
- Public meetings for regular updates and discussion with local community groups (e.g. at Traditional Owner, local and regional public meetings)

5.5.3 Collecting and Compiling Stakeholder Input

Information gained through stakeholder engagement is diarised and compiled for analysis through Origin's information management system. This also allows for information sharing with relevant stakeholders (with appropriate levels of confidentiality protection). Examples of information venues include:

- Individual Meetings direct discussions with individuals or small groups, allowing the sharing of specific information with select people and small groups.
- Groups Sessions to collect data and feedback on specific decisions or activities (such as Sacred Site Clearance Surveys), or for regularly meeting with groups of community leaders or special interest groups such as local Regional Economic Development Sessions Committees, CSOs, women, elders and youth groups.
- Studies and Surveys for background and baseline information or collection of opinions or perspectives of sampled populations or different stakeholder groups.

5.5.4 Communication and Engagement Tools

Communication and engagement tools and materials for different stakeholder groups are summarised in Table 3 and Table 4. Importantly, desired outcomes for all engagements are considered when selecting appropriate engagement methods. For example, host Traditional Owners, host pastoral leaseholders and the NT government are key stakeholders with which good working relationships are continuously maintained, so working with them to develop integrated regional development plans aligned to the BEP is important, rather than adopting a 'for information' approach.

6 STAKEHOLDER IDENTIFICATION

Under the IFC definition, stakeholders can include locally affected community groups and individuals, their formal and informal representatives, provincial and local government authorities, politicians, religious leaders, civic society organisations and groups with special interests, the academic community and other businesses"⁵

Two important considerations influence how the BEP categorises its stakeholders, identified according to whether they:

- May be directly and/or indirectly affected by BEP activities or infrastructure
- Are indirectly affected and have the potential to influence BEP design and/or operations.

A high-level list of BEP stakeholder groups is provided in Table 3 and Table 4.

Table 3: Summary of Directly Affected Stakeholder Groups

Directly-Affected BEP Stakeholder Groups			
Directly Affected Community Groups	Preferred Engagement Methods		

⁵ International Finance Corporation. 2007. "Stakeholder Engagement - Good Practice Handbook for Companies Doing Business in Emerging Markets".

Directly-Affected BEP Stakeholder Groups					
Host Traditional Owners (Native Title Holders / Claimants for the shared land of Origin's Exploration Permits tenure)	On-country meetings, face-to-face meetings, ground and aerial surveys including group sessions, workshops, other local working groups (Cultural Heritage monitors), local disclosure materials (e.g. storyboards and brochures etc.) Site visits, and email and hard copy communications with the Local Aboriginal Group (LAG) representative - the Northern Land Council				
Host Pastoral Leaseholders (holding pastoral leases for the shared land area of Origin's Exploration Permits tenure)	Face to face individual meetings, Site visits, email communication				
BEP and Origin					
Origin employees - Contractors and contractor personnel	Internal communications - email, website, individual and group / team meetings / discussions, intranet social media (Workplace), monthly Head of IG address				
Origin Suppliers Supply chain partners (transport authorities, transport companies) Other service providers and partners	Individual discussions, questionnaires, group sessions and workshops, supplier development programme				

Table 4: Other BEP Stakeholder Groups

Other BEP Stakeholder Groups					
Other Groups	Preferred Engagement Methods				
Barkly region community residents (Daly Waters, Elliot, Katherine, Tennant Creek, Borroloola)	Local government and regional meetings, individual meetings, surveys, group sessions / discussions and workshops, other local working groups, local disclosure materials (e.g. newsletter, brochures etc.) Regional Shows, Open Days, community development programmes (as partners). Site visits				
Other TOs from the Roper and Barkly regions and Aboriginal Peoples from elsewhere in the NT	On-country meetings, face-to-face meetings, local disclosure materials (e.g. storyboards and brochures etc.) Site visits, and email and hard copy communications with the Local Aboriginal Group (LAG) representative - the Northern Land Council				
Media (print, radio, TV) Social media channels (LinkedIn, Facebook, and Twitter)	Interviews, press releases/newspaper articles, website, fact sheets				
NT Government	Regular face-to-face meetings, email and hard copy communications				
Industry					
NT Industry Associations and other extractive companies	Individual meetings, presentations at meetings, surveys, group sessions and workshops, local disclosure materials (e.g. newsletter, brochures etc. Site tours				

6.1 DESCRIPTIONS OF BEP KEY STAKEHOLDERS

The location of host community hubs and pastoral stations is shown in Figure 3and brief descriptions of key stakeholder groups follow.



Figure 3: Origin's Exploration Permits, Host Community Hubs and Pastoral Stations
6.1.1 Local Aboriginal Groups and Host Traditional Owners

Four (4) native title claims and three (3) determined native title areas intersect with Origin's exploration tenements. Origin works with all of them as land-connected Aboriginal peoples. The Local Aboriginal Groups (LAGs) and host Traditional Owners have appointed the Northern Land Council (NLC) as their representative, and legally binding Exploration Access Agreements and Tripartite Deeds are in place detailing the terms and conditions associated with Exploration Permits 76, 98 and 117. Origin also works with the NLC and LAGs to ensure that sacred site avoidance and clearance is undertaken prior to commencing each year's work activities, and to ensure work conditions and instructions are relevant to the most up to date information and regulations. Custodians may vary according to where proposed work activities are to take place.

6.1.2 Other Traditional Owners and NT Aboriginal Peoples

There are a number of Aboriginal communities and groups located away from Origin's tenements that have an interest in the BEP. Origin seeks the NLC's assistance (as the Statutory Representative body in the NT) to work with these groups in order to listen, communicate and engage with a broad cross section of the NT's Aboriginal and Torres Strait Island peoples.

6.1.3 Host Pastoralist Leaseholders

Nine (9) pastoral leases have non-exclusive tenure rights that intersect with Origin's Exploration Permits 76, 98 and 117.

To date, Origin has signed Compensation and Access Agreements for single-year activities with four (4) of these pastoral property owners.

6.1.4 Other Barkly and Roper Gulf Pastoralists

Other pastoral leaseholders located within the Barkly Regional and Roper Gulf LGAs are potentially indirectly affected by Origin's BEP. Origin engages with these leaseholders through the Northern Territory Cattlemen's Association and the two respective LGA Councils, and directly if requested.

6.1.5 Northern Territory Government

The NT Government's representative and administrative functions are important stakeholders in the BEP. Various government departments, such as the Environmental Protection Authority (EPA), Department of Environment and Natural Resources (DENR) and the Department of Primary Industry and Resources (DPIR), have important regulatory roles to play, requiring detailed formal procedural contact and documentation. Less formal engagement is also important, to provide constant up-to-date information and forward-looking indication of regulatory workflows.

6.1.6 Commonwealth Government

The Commonwealth Government is an important BEP stakeholder, particularly in the context of national interest considerations, which will increase if and when the project develops beyond early stage exploration. For historical and on-going NT dependency reasons, various Commonwealth authorities and regulators play are larger role in NT matters than they do in State jurisdictions, particular regarding greenhouse and energy matters, Native Title and land rights; and water, environment and biodiversity.

6.1.7 Regional Residents and Local Government Authorities

Residents of surrounding regions, towns and townships, such as the Roper Gulf, Katherine and Tennant Creek, have a strong indirect interest in the BEP. Given the nature of the NT, with long distances and a sparse population base, many services and potential employees will be drawn from places 100s km away. Regular engagement with local and regional councils should be consistent and ongoing.

6.1.8 Employees and contractors

Employees and contractors are important in three ways:

- as directly affected people who need timely and correct BEP information to make decisions about their and their family's daily lives and future;
- as 'role models' whose behaviour, demeanour and visible respect during interactions with other stakeholders, and particularly traditional owner and pastoral community members, are the single most important factor determining how the BEP is regarded by others, and
- as conduits of information to broader stakeholder groups, usually in face to face situations, this is
 often reported as the most credible form of communication exchange.

Accordingly, it is vital that internal communications with employees and contractors is well balanced, covering what is important for them to know, and in a way that effectively communicates the key issues. Employee communication works best when (1) it is face-to-face; (2) it is between a manager and direct report; and (3) it is delivered in the language of the recipient. Hence, pre-start and 'tool box' meetings are very effective places for information exchange with employees and contractors. This can be assisted by providing key message fact sheets to managers, superintendents and supervisors, and asking them to pass these on verbally to their work crews. Newsletters and regular fact sheets on important matters should also be available in crib rooms, notice boards, mess areas and the seat pockets of work vehicles. All contractors have written into their contacts the level of information cascade expected to their work crews and sub-contractors.

6.1.9 Unions

While the workforce at the BEP is non-unionised, the principle of choice is maintained by Origin and various employee unions are a recognised stakeholder.

6.1.10 NT Training and Education Institutions

The ability of the BEP to locate and employ qualified NT-based employees is very dependent on the education and training NT residents can access. In the event of exploration success and the approval of a commercial development, this will become particularly important, hence keeping NT Training and Education providers informed of potential future trades and professionals demand is an important requirement.

6.1.11 Barkly and NT Businesses

Origin has a proven strategy of maximising local service and supply, for early stage work at the BEP to date this has largely been confined to civils, hospitality, logistics and transport services. In the event of exploration success and commercial development, this could escalate. Engagement with chambers of commerce, industry associations and local and Aboriginal businesses is a critical component of the BESSEP. Given the socioeconomic and geographic characteristics of the BEP Areas of Influence.

6.1.12 Civic Society Organisations (CSOs)

CSOs have the potential to positively or negatively influence BEP outcomes. While most do not have any formal role in BEP permitting, they have the ability to influence those stakeholders having a formal role. CSOs include organisations that have existed in NT and Australia for many years, such as NGOs, religious organisations and more recently smaller localised environmental protection alliances.

Contrasting to activist groups and their local alliances, other supportive and neutral CSOs are critically important for the BEP. These include emergency and service organisations such as the Royal Flying Doctor Service and Careflight, who are a vital part of the BEP's operational support. Engaging with these organisations on a proactive and regular basis is an important element in the BESSEP.

6.1.13 NT Industry Associations and Extractive Businesses

Disseminating the relevant facts about the BEP, and working to 'raise the performance' of all extractive and resource operators, is optimally approached through industry associations.

6.1.14 Media

Media sources in Barkly Region and the NT include:

- Television
- Print the main local newspapers are the NT News and Katherine Times. The NT News is produced daily, and the Katherine Times is produced weekly. Both newspapers are circulated throughout the Barkly, where they are widely accessible and read.
- Social Media with the increasing coverage of mobile phone use, social media applications such as Facebook and Twitter are becoming more prevalent in all parts of the Barkly Region.
- Radio CAAMA, TEABBA and the ABC all broadcast into the Barkly region.

Social Media is frequently unbalanced with little reference to fact, and a proactive approach to media management, using existing media contacts and the provision of Origin generated community stories, is required to generate positive sharing of mutual benefit opportunities.

7 KEY BEP STAKEHOLDER ISSUES, CONCERNS AND MESSAGES

A comprehensive and dynamic understanding of stakeholder concerns and expectations allows the BEP to identify and implement stakeholder engagement activities that support BEP objectives. Already a number of specific stakeholder concerns and expectations have emerged as a result of participatory discussions (see Table 5). These and other concerns and expectations that arise in the future will play a major role in shaping stakeholder engagement focus and activities. The process of identifying, recording and responding to feedback from stakeholders will be ongoing and expand in the event that the BEP progresses to full evaluation and development.

Type of Potential Issue	Stakeholder Concern	Stakeholder groups that have expressed this type of interest
Economic and Infrastructure	Demand for employment opportunities for local people. Interest in the creation of business opportunities for local, regional and NT based companies	Darwin Major Business Group Chamber of Commerce and Industry Manufacturers Council NT Indigenous Business Network Industry Capability Network Katherine Mining and Services Association Regional Economic Development Committees Local Government NT Government NT Gattlemens Association
Social and Cultural Heritage Impact	Concerns regarding impact of the BEP on cultural heritage	Traditional Owners Anti-development activists NT Inquiry members
Compensation	Requests for compensation above and beyond productive land valuations	Pastoralists legal representation
Community Health and Safety	Concerns about potential effect on water quality and quantity (detailed below)	Traditional Owners, Pastoralists, other community members and special interest advocacy groups.

Table 5: Key Stakeholder Group Issues and Concerns

Type of Potential Issue	Stakeholder Concern	Stakeholder groups that have expressed this type of interest
Education	Adequate provision of kindergarten, education and vocational training facilities and programs as demand for qualified personnel increases.	Supporters of industry and those interested in ensuring that there is adequate provision for training and preparing Territorians for future job and business opportunities
Water	Effect of ground and other water sources during hydraulic fracture and ongoing operations.	Traditional Owners, other community members and special interest advocacy groups.
Regional Development	Improvements in road and telecommunications infrastructure	NT and local government authorities Barkly pastoralists Barkly Traditional Owners Barkly community members generally NT Cattlemens Association
Lower power prices	Possible interest in a fixed price formula for Power and Water / Jacana Energy customers from Beetaloo Basin natural gas (rather than introduction of a Gas Reservation Policy)	Darwin business owners
Business Opportunities	Interest in securing service, material and labour supply contracts and other sub- contracting opportunities. Interest in the provision of security services.	Established business people Traditional Owners Pastoralists Existing suppliers Members of the NT Parliament Local Government Councillors Regional Economic Development Committees
Road Traffic	Concern about increased heavy truck use on Stuart Highway and Carpentaria Highway	Road users and transport operators
Social/Environmental Advocacy Interest	Interest in challenging the BEP on the grounds of perception or real social, visual and/or environmental effects.	Local, regional and Darwin based advocacy groups with links to national and international NGOs; partisan academics; and some Unions

7.1 ISSUES MANAGEMENT

Constructively responding to stakeholder issues that arise during BEP activity is a key component of successful stakeholder engagement, specifically:

- Anticipating and planning for potential issues at all stages of the BEP activities;
- Responding to stakeholders about their issues, setting out roles and responsibilities, and coordinating and communicating response measures;
- Differentiating between BEP-specific and/or immediate response issues, and Origin-wide issues that require higher level response;
- Communicating the issues management process to BEP team members;

- Assigning issues accountabilities to BEP and Origin functions and staff;
- Coordinating issues response activities and keeping relevant stakeholders advised of mitigation steps that are both underway and planned;
- Managing any community observation and feedback at a local level, wherever possible, and
- Tracking and reporting on the progress of issues resolution.

7.2 7.2 KEY MESSAGES

The language and format of engagement with different stakeholder groups is tailored to their circumstance, and their needs and norms of communication. However, it is vital that there is consistency in the content of what is being communicated. Each stakeholder group should be receiving the same information, or subsets of information, relevant to their own circumstance and engagement objective.

7.3 8.1 ANALYSIS PROCESS

Complementary to social risk assessment, BEP stakeholders are prioritised using an influence/impact matrix.

Influence the stakeholder's ability to influence the approval, rejection or progress of the BEP

Impact the impact physically (i.e. location) of preferred BEP design options or the impact of the investigation / preferred option on the stakeholder's workload and their involvement in decision making (e.g. approvals and reviews).

Use of an influence/impact matrix enables stakeholders to be mapped into four strategic areas: *Work with closely; Maintain confidence; Keep informed;* and *Monitor and respond*



Figure 4: Stakeholder Influence/impact Matrix

7.3.1 Work With Closely

Key activities for these stakeholders include:

- Public events/open days;
- Focus group discussions;
- Phone calls as required;
- Select individual face-to-face meetings and briefings, at their location;
- Government meetings;
- Early and continuous transparent communications;
- Regular site visits;
- Regular community and township visits;
- Newsletter/information sheets;
- Quality information, topic specific, including maps and diagrams;
- Clear processes for engagement and decision making;
- Training, where appropriate; and
- An established and accessible complaints process, and Feedback and response procedure.

Although concerns and disagreement are normal, a clear process based on Origin's CCFMP will be developed in situations where inflexibility sets in and agreement between stakeholders is not occurring. Most concerns can be resolved by face-to-face discussion; however, some escalate to disagreement and dispute, at which point independent fact checking is usually called for. If there is still no resolution, then the parties can agree to third party mediation.

7.3.2 Maintain Confidence

Key activities for these stakeholders include:

- Specific face-to-face meetings and briefings;
- Public events/open days
- Newsletter/information sheets;
- Briefing notes and papers;
- Timely, quality controlled information;
- Presentations;
- Site visits;
- Specific information papers as required;
- Access to relevant studies (Feasibility study, ESIA)

7.3.3 Keep Informed

. Key activities include:

- Community meetings, briefings and notice boards;
- Newsletters, with maps and diagrams;
- Access to complaints and grievance process;
- Media releases and public announcements;
- Web and social media;
- Training opportunities, and
- Feedback and response procedure.

7.3.4 Monitor and Respond

Key activities include:

Media releases and public announcements;

- General and social media; internet monitoring;
- Feedback and response procedure, and
- Participation in major events organised by the BEP

8 COORDINATION OF STAKEHOLDER ENGAGEMENT

8.1 9.1 STAKEHOLDER AND BEP FUNCTIONAL RELATIONSHIPS

Given the complexity of stakeholder interests and expectations, successful stakeholder engagement requires information sharing and coordination among Origin's various functional teams and leaders. Figure 5 shows the high-level accountability by Origin/BEP's functional teams for managing stakeholders.



Figure 5: BEP Stakeholder Engagement Pyramid

Inter-team integration and coordination is vital for consistent stakeholder engagement; Figure 6 shows in more detail specific BEP stakeholder management accountabilities. Although the map indicates the BEP stakeholders with which specific functions are most likely to interact, certain communication processes may target all interested and affected stakeholders collectively.



Figure 6: BEP Stakeholder Functional Team Relationships

8.2 9.2 STAKEHOLDER ENGAGEMENT COORDINATION

The BESCG⁶, chaired by the GM Beetaloo and Growth Assets, will play a bridging role to coordinate Origin and BEP decisions related to stakeholder engagement, accountabilities and activities, in accordance with the following principles:

- Organising meetings to discuss and agree current and proposed BEP stakeholder engagement approaches.
- Providing strategic input into stakeholder engagement planning for BEP issues.
- Coordinating consistent key messages to be used by BEP and Origin functional teams in their BEP stakeholder engagement activities.
- Ensuring that BEP stakeholder issues are recorded and reviewed, and that they receive an appropriate and timely response to expressed issues.
- Considering BEP stakeholder responses and other information, and make recommendations to help the BEP achieve its over-arching stakeholder engagement goals.
- Participating in managing and resolving complex issues, complaints and recommendations that may arise during the BEP.
- Helping develop overarching reports on BEP progress for key BEP stakeholders.
- Sustaining relationships and maintaining continuity when there are personnel changes both within the BEP and Origin, and within BEP stakeholder groups.
- Passing information gained from BEP stakeholders back to BEP leaders.

⁶ The BESSCG initially includes the GMB&GA, Corporate Affairs Manager Northern Australia; Communications and External Relations Manager, BEP Project Manager; Investor Relations Manager; Procurement Leads; Regional Relationship Specialist; and HSE Leads

- Ensuring that BEP stakeholder engagement commitments are practical and functional, have received the appropriate internal approval, and do not conflict with any other BEP commitments or be detrimental to the BEP and Origin's business interests and other stakeholders.
- Ensuring BEP stakeholder engagement is documented for internal and external reporting and approval purposes.

9 DATA COLLECTION AND MANAGEMENT

Stakeholder data management is a key component of effective stakeholder engagement. A fit-forpurpose data management system be maintained by Origin to manage the information generated through its stakeholder engagement. The data management system supports the storage and analysis of data provided by stakeholders, along with associated social and environmental data. This system will be used for BEP stakeholder engagement purposes.

A vital element of SEP output is feedback to stakeholders themselves. Origin ensures feedback is provided to all stakeholder participants it engages with through processes that have been agreed. Usually this takes of the form of suitable collated material that provides confidentiality to any individuals.

10 EFFECTIVENESS REVIEW

Origin will monitor the effectiveness of BEP stakeholder engagement activities. Monitoring measures have been developed (Table 6) and will be included in the monthly BESCG meetings.

Topic/Aspects	Methods	Accountability	Timeframe
Complaints, observations and feedback specific to BEP stakeholder matters	 Origin will review its Community feedback register for BEP-specific complaints <i>closed</i> and those <i>unresolved</i> per period (and dynamically as they occur). Number of BEP complaints opened in the month. Month tracking of complaint progress. Number of complaints closed in the month. Type of complaints Origin will ensure that the BEP team provides feedback to the stakeholder and other relevant bodies on the type of complaints received, how they are being addressed and outcomes achieved. 	Corporate Affairs Manager Nth Aust.	Monthly
Informal Community Sentiment	Origin's BEP Regional Relationship Specialist (RRS) and Field Supervisor (FS) note comments made during their day to day interactions with community members and other BEP stakeholders. Positive and negative comments, and other sentiments and queries on the BEP will be noted.	BEP RRS, FS and other BEP team members	Monthly Whenever interactions occur

Table 6: SEP Effectiveness Review Measures

Topic/Aspects	Methods	Accountability	Timeframe
Formal Stakeholder Feedback	Origin will specifically seek formal commentary on matters relating to the BEP from stakeholders in standing committees, such as the Regional Economic Development Committees, Town and Regional Councils, and from <i>Community</i> <i>Engagement Forum Members (Darwin,</i> <i>Katherine, Tennant Creek, Alice Springs,</i> <i>Borrroloola, Nhulunbuy, Palmerston and</i> <i>Rural Darwin) – to be established quarterly</i> <i>from Q2 2020</i>	Corporate Affairs Manager Nth Aust.	Quarterly

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Appendix P Stakeholder Engagement log

Part A- Stakeholder Engagement Log Summary

Date	Originator of communication	Company of contact	Person of contact	Contact type	Summary of contact	Does it trigger merit review?	A statement of the interest holders response to stakeholder	Change to EMP required ?
				9 (1) f	9(1)c	9 (1)d	9 (1) e	
10/07/2018	Interest holder	NLC	Greg Macdonald	Written	Origin request to obtain site clearances for its proposed 2018/19/20 exploration program. This request included a description of the proposed activities (including up to 10 wells at each location, estimated duration and summary of key environmental considerations and risk controls.	No	NA	NA
17/07/2018	Interest holder	NLC	Greg Macdonald	Written	Origin provided additional information regarding maps and proposed site locations.	No	NA	NA
3/09/2019	Interest holder	NLC	Greg Macdonald	Meeting	Meeting to discuss up coming site clearances and scope amendment by Origin. Additional information on lease pad layout and revised site list include.	No	NA	NA
4/09/2018	Interest holder	NLC	Greg Macdonald	Meeting	Revised work program spatial information sent to NLC outlining variation to site clearance scope. Additional information on lease pad layout and revised site list included	No	No	Yes
16/11/2019	stakeholder	Origin Energy	Stephanie Stonier	Written	NLC Conditions of Work Report to Operator _Origin_181115 received. Report summarised clearance activities, identified restricted work areas and conditions of work.	No	Yes	Yes

Details of changes the interest holder has made as a result of the stakeholder engagement
9 (1)g
NA
NA
NA
Location in proximity to Jingaloo community Kyalla W2-1 removed from scope
Identified restricted work areas and conditions of work add to the emp where relevant.

Date	Originator of communication	Company of contact	Person of contact	Contact type	Summary of contact	Does it trigger merit review?	A statement of the interest holders response to stakeholder	Change to EMP required ?
03/04/2019- 10/04/2019	Interest Holder	NLC/TO	NLC/TO	Meeting	x6 on country meetings in Elliot with Native Title family groups regarding NLC Cleared Areas CA3 (Amungee NW1H (existing well site location), CA5 (Kyalla 117) and CA10 (Velkerri 76). Wednesday 8 May 2019, X1 meeting in Darwin with Native Title family for NLC Cleared Areas from Sacred Site Clearance and Avoidance Survey in response to Origin's WPS - All meeting included overview of the proposed work program and the environmental controls to address environmental risks. Origin used Story boards to present and discuss key aspects regarding the environment and its protection	No	NA	NA
23/01/2019	Interest Holder	AAPA	AAPA	Written	Electronic application AAPA to Amend AAPA Certificate 2018/103 to include drilling, well testing and hydraulic fracturing activities	No	NA	NA
18/02/2019	Interest Holder	AAPA	ΑΑΡΑ	Written	Email confirmation of wording within AAPA certificate 2018/13 variation application	No	NA	NA
18/02/2019	stakeholder	Origin Energy	Stephanie Stonier	Written	Email requesting information associated with AAPA certificate amendment 2018/103 to include hydraulic fracture activities.	No	NA	NA
19/02/2019	Interest Holder	AAPA	AAPA	Written	Email providing information requested from AAPA including exploration agreement with custodians and anthropological reports	No	NA	NA

Details of changes the in holder has made as a res stakeholder engagemen	iterest sult of the t
NA	
NA	
NA	
NA	
NA	

Date	Originator of communication	Company of contact	Person of contact	Contact type	Summary of contact	Does it trigger merit review?	A statement of the interest holders response to stakeholder	Change to EMP required ?
19/02/2019	stakeholder	Origin	Stephanie Stopier	Written	AAPA email to Origin confirming	No	NA	NA
7/03/2019	Origin Energy	AAPA	AAPA	Written	AAPA issuing or AAPA certificate C2019/014 covering all drilling, stimulation and well testing activities. Please note, no constraint identified within the AAPA certificate (such as use of borrow pit identified) related to the Velkerri 76 S2 site.	No	Yes	Yes
23/04/2019	stakeholder	Origin Energy	Stephanie Stonier	Written	Electronic application to ammend certification C2019/014	No	NA	NA
23/04/2019	Origin Energy	AAPA	AAPA	Written	Email confirmation of variation lodged for AAPA certificate C2019/014 to updated Gravel pit locations resulting from a report error	No	NA	NA
24/04/2019	stakeholder	Origin Energy	Stephanie Stonier	Written	Updated GIS coordinate re-issued by AAPA due to GIS discrepancy with NLC data.	No	Yes	Yes
9/05/2019	Stakeholder	Origin Energy	Stephanie Stonier	Written	AAPA issuing of AAPA certificate C2020/003	No	Yes	Yes
28/11/2019	Origin Energy	Hayfield Shenandoah Station	Val Dyer	Verbal- face to face	Discussed the current drilling operations and status of how things are working between the parties. Discussed potential future E&A activities on the site. The pastoralist ask questions regarding the access agreement, business opportunities, management of bushfires and monthly reporting. Compensation payment was discussed. Pastoralists provided a property tour to OE representatives to demonstrate and discuss their cattle operations to provide OE an understanding of how the property is run.	No	N/A	N/A

Detai	Is of changes the interest
holde	er has made as a result of the
stake	holder engagement
NA	
Ident	ified restricted work areas and
condi	tions of work add to the emp
wher	e relevant.
NA	
NA	
Grave	el pit location amended
throu	gh EMP to reflect correct
locati	ions
Grave	el pit location amended
throu	gh EMP to reflect correct
locati	ions
N/A	

Date	Originator of communication	Company of contact	Person of contact	Contact type	Summary of contact	Does it trigger merit review?	A statement of the interest holders response to stakeholder	Change to EMP required ?
10/12/2019	Origin Energy	Hayfield Shenandoah Station	Val Dyer	Email	Origin mailed Pastoralist to thank them for the meeting and to let them know OE would be following up her questions.	No	N/A	N/A
18/12/2019	Origin Energy	Hayfield Shenandoah Station	Val Dyer	Email	OE contact email Val with information to answer questions raised by pastoralist on the 28/11/2019. These are operational questions.	No	Origin provided an update ot the Access agreement amendment, monthly report and revised bushfire management plan.	N/A
20/12/2019	Origin Energy	Hayfield Shenandoah Station	Val Dyer	Verbal telephone	OE called to follow up on information provided to pastoralist and confirmed a stakeholder engagement pack for the additional 2 wells on site will be sent through.	No	N/A	No
27/12/2019	Origin Energy	Hayfield Shenandoah Station	Val Dyer	Email	OE emailed a copy of the stakeholder engagement pack that provides a description of the regulated activity, environmental impacts and risks, how the activity would impact on the pastoralists rights and environmental outcomes and objectives.	No	Yes - refer correspondence received on the 16/02/2020	No

Details of changes the interest holder has made as a result of the stakeholder engagement
N/A
N/A
N/A

Date	Originator of communication	Company of contact	Person of contact	Contact type	Summary of contact	Does it trigger merit review?	A statement of the interest holders response to stakeholder	Change to EMP required ?
16/02/2020	stakeholder	Origin Energy	Dave Armstrong	Telephone conversation	Hayfield representative asked for additional information from the stakeholder engaging pack regarding: 1. cuttings and mud disposal on-site. 2. dispute resolution	No	Origin provided additional information regarding the Dispute resolution process, disposal of drill waste on- site, clarification on wastewater (sewage) irrigation, Water take volumes and general feedback on environmental outcomes.	No
03/03/2020	Origin Energy	Hayfield Shenandoah Station	Val Dyer	Email	Origin Energy Emailed stakeholder a copy of the Land Access variation for the 2 additional wells.	NO	Val Dyer provided a written response on 12 March 2020 regarding status of LACA. Val Dyer also mentioned they had spoken to DENR regarding the disposal of drilling waste onsite and the approval processes. Val requested a copy of the independent assessment report when available, for which Origin has agreed to provide once completed. Stakeholder also mentioned they would not agree to onsite disposal if the area would be classified as "contaminated", as this would go against Origin's commitment to "no adverse impacts on soil"	NO

Details of changes the interest holder has made as a result of the stakeholder engagement

Origin, through the EMP and compliance with the code of Practice is not authorised to dispose of Drilling waste onsite if such a disposal would create environmental harm. Origin is committed to complying with this condition and has other offsite disposals as backup.

Origin, through the EMP and compliance with the code of Practice is not authorised to dispose of Drilling waste onsite if such a disposal would create environmental harm. This, as correctly pointed out by the stakeholder, would contravene the EMP Environmental outcome of having no adverse impacts to soil. Origin is committed to complying with this condition and has other offsite disposals as backup. Origin will provide the report to the Dyers.

Date	Originator of communication	Company of contact	Person of contact	Contact type	Summary of contact	Does it trigger merit review?	A statement of the interest holders response to stakeholder	Change to EMP required ?
16/03/2020	Origin Energy	Hayfield Shenandoah Station	Val Dyer	Email	Origin provided a further statement about its commitment to ensuring soil did not become contaminated through mud disposal. Origin also provided an overview of Origin's Coronavirus management strategy and strategies to protect the Pastoralist.	No	Stakeholder thanked Origin for the update	No
29/06/2020	Origin Energy	NLC	NLC	Face to Face	Meeting to provide an update of the Beetaloo exploration project and discuss sacred sites clearances.	No	Ongoing consultation/engagement with NLC regarding Origins current and future activities.	No

Details of cha	nges the interest ade as a result of the
stakeholder e	ngagement
N.	
NO	
Ν/Δ	

Date	Originator of communication	Company of contact	Person of contact	Contact type	Summary of contact	Does it trigger merit review?	A statement of the interest holders response to stakeholder	Change to EMP required ?
23/07/2020	Origin Energy	NLC	NLC	Workshop	Overview of future project phases and approvals processes	No	Origin and NLC discussed the various phases of the project from exploration to development and the various activities associated.	No
22/09/2020	Origin Energy	NLC/ TO's	Russel Jeffrey/ Steph Stonier	Face to Face	Site visit to the Kyalla 117 N2 site to inspect the Kyalla 117 N2-1H site during stimulation. The Origin operations team walked the TO's through the site and provided them an overview of the processes and various environmental controls.	No	Origin fielded various questions regarding the processes	No

Detail holde	s of changes the interest r has made as a result of the
stakel	holder engagement
N/A	
N/A	

Date	Originator of communication	Company of contact	Person of contact	Contact type	Summary of contact	Does it trigger merit review?	A statement of the interest holders response to stakeholder	Change to EMP required ?
27/10/2020	Origin Energy	NLC	N:V	Face to Face	Ongoing meeting to discuss sacred site clearances and exploration activities.	No	Origin discussed a range of future exploration activities and provided a summary of the relevant site and environmental constraints	No

Details of changes the interest holder has made as a result of the stakeholder engagement	
N/A	

PART B Detailed Stakeholder Summary of Information provided and relevant PER sections

Section 7(2)(a)	Document and Content					
	Email from Origin to APN Pty Ltd					
	 Initial engagement and introduction post moratorium 					
	Email from Origin to APN Pty Ltd					
	o Information of potential well locations and activities					
	Email from Origin to APN Pty Ltd					
	o Requesting access to the property to conduct greenhouse gas baseline emission monitoring - access granted SUM					
	Email from Origin to Val Dyer					
	o Requesting access for scouting of drill location and weeds survey - access granted					
	Letter from Origin to APN Group (on behalf of Hayfield Shenandoah)					
	 Includes a table outlining the regulated activities Origin proposes to perform for Kyalla 117 N2 including: 					
	 Drilling of 1-3 new wells; 					
	 Construction of a new well pad; 					
	 Drilling of 3-4 new water bores (1-2 extraction and 2 monitoring); 					
(i) "the regulated activity the interest	 Construction of a drilling camp; and 					
holder proposes to carry out"	 Construction of a new access road. 					
	 Includes a timetable outlining the work program Origin proposes to undertake. 					
	Letter from Origin to APN Pty Ltd (Draft Land Access and Compensation Agreement)					
	• Lists the activities Origin proposes to carry out on Hayfield Shenandoah from the date of the Agreement until December 2020, including:					
	\circ Monitoring, maintenance and rehabilitation of existing wells, access roads and monitoring bores;					
	 Walking the area of the exploration permits; 					
	 Driving along existing roads and tracks in the area; 					
	 Identifying and installing water monitoring or extraction bores including, where required, the construction of access roads to drill these bores; 					
	 Taking soil or water samples; 					
	 Geophysical surveying not involving site preparation; 					
	 Aerial, electrical or environmental surveying; 					
	 Emissions monitoring, including installation or monitoring stations; 					
	 Survey pegging; 					

Date Provided

2-Jul-18

5-Jul-18

30-Jul-18

22-Aug-18

25-Aug-18

22-Aug-18

o Scouting (including preliminary consideration of appropriate sites for wells and other infrastructure);

o Investigations and surveys and any other minimal impact activities including, without limitation,

environmental, flora and fauna, geotechnical, cultural heritage and native title field work; and

o All other activities incidental to the activities above which will have no impact or only a minor impact.

Signed Early Access Agreement

o Received signed Early Access Agreement from APN Pty Ltd

Access request to drill water monitoring bores under the signed Early Access Agreement - access granted

Draft Pastoral Land Access and Compensation Agreement

• Clause 10 provides that Origin must not carry out any regulated activities within 5 kilometres of a residence and within 1 kilometre of a garden or artificial water accumulation. Origin must also erect and maintain appropriate temporary fencing.

- Gates, grids, fences and access points;
- Existing access roads;
- New access track(s);
- Petroleum exploration well;
- Rig laydown area;
- o Laydown area;
- Water bore;
- o Campsite; and
- Scouting, surveys and soil and water sampling activities.
- Item 3 of Schedule 2 list the indicative duration of the Agreed Petroleum Activities.

Hayfield homestead bore water test results

o Origin provided water test results of the Hayfield homestead bore

Draft Beetaloo Basin Civil Construction Program – Kyalla 117 N2 Environment Management Plan

• Provides detailed description of activity including lease pad, camp pad, access tracks gravel pits and all associated infrastructure.

Draft Beetaloo Basin Kyalla 117 N2Drilling, Stimulation and Well Testing Environment Management Plan

includes detailed description of all drilling, stimulation and well testing activities

Meeting with Val Dyer representing APN Pty Ltd and DEPWS in Darwin

o Introduce APN Pty Ltd to DEPWS personnel and explain the process of assessing an EMP

Meeting and presentation in Darwin to Val Dyer on behalf of APN Pty Ltd on June 11th to discuss specific details of EMP and landholder requests covering Lock the Gate letters including:

- o Drilling activities
- o Stimulation activities
- o Wastewater management and risk to fauna
- o Chemical management

15-Sep-18

6-Nov-18

13-Nov-18

07/12/2018 11/12/2018

3-May-19

3-May-19

11-Jun-19

11-Jun-19

	o Well integrity and aquifer isolation
	o Weed and groundwater monitoring
	o General questions
	Meeting and presentation at Hayfield Station on July 3rd to discuss specific details of EMP and landholder requests covering:
	o Well integrity and Design (specifically aquifer isolation)
	o Cement design
	o Wastewater storage- including risk to fauna
	o Weed management
	o General discussion on risk
	Kyalla 117 N2 Drilling, Stimulation and Well Testing EMP Variation Stakeholder Engagement Pack- 2 additional E&A wells
	o Description and location of regulated activity
	o Activity timeline
	o Environmental Risk Summary
	o consequences for stakeholder Rights and Activities
	Draft Pastoral Land Access and Compensation Agreement
	 Identifies the affected Pastoral Property (NT Portion 7026/7027) activities to be undertaken on
	Item 2 of Schedule 2 states the access tracks and well site are shown in the plans attached to Annexure D of the
	agreement.
	Letter from Origin to Val Dyer (on behalf of Hayfield Shenandoah)
(ii) "the location (or locations) where it is	 Includes a map and coordinates table detailing the locations and clearance buffers of proposed work at three well locations, including the Kyalla 117 N2 well.
proposed to carry out the activity"	• The map included in the letter shows the planned route of access tracks across the land and the proposed clearance areas.
	 Attachment 2 is a draft work program of activities Origin intends to undertake on the land.
	Draft Beetaloo Basin Civil Construction Program – Kyalla 117 N2 Environment Management Plan
	includes maps of proposed locations
	Draft Beetaloo Basin Kyalla 117 N2Drilling, Stimulation and Well Testing Environment Management Plan
	includes maps of proposed locations
	Kyalla 117 N2 Drilling, Stimulation and Well Testing EMP Variation Stakeholder Engagement Pack- 2 additional E&A wells
	o Table 1- proposed infrastructure location and disturbance area
	o Figure 2 and 3- maps provided overview of activity at both a regional and local scale.
(iii) "the anticipated environmental	
impacts and environmental risks of the	Origin Beetaloo Sub-basin water Extraction Licence
activity's	

3-Jul-19

27-Nov-19

20-Nov-18

22-Aug-18

3-May-19

3-May-19

 Includes full details of Origin's proposed water use for all regulated activities. Licence also defines the allowed total volume that can extracted and the maximum monthly extraction rate. Provision of document was followed up with discussion with Origin representative of how this relates to total water draw and recharge of the aquifer. Origin Response to APN questions on Operations and Environmental Risks AND • Various questions from APN regarding activities proposed and controls in place that will support (iv) "the proposed environmental • Detail questions and response pertaining to regulations outcomes in relation to the activity" Draft Beetaloo Basin Civil Construction Program – Kyalla 117 N2 Environment Management Plan • Provides detailed description for and associated risks of the physical environment of the EP98, EP117 and EP76 area, including : o Climate; Geology; o Soils; Hydrology; and o Hydrogeology. Provides detailed description for and associated risks of the biological environment of the EP98, EP117 and EP76 area, including : o Bioregions; Vegetation communities; o Flora; Weeds; o Fauna; o Significant / endangered fauna; and • Feral and pest fauna. • Provides a description of environmental and cultural sensitives, including: Native title; o Archaeology Assessment; o Areas of cultural significance; Natural resources; Non-indigenous heritage; Historic heritage assessment; and o Protected or conservation areas. • Includes an outline of Origin's risk management approach and management tools . • Includes detailed tables of environmental impacts, risks and outcomes for specific environmental aspects, including: Soil and erosion; • Surface Water and Groundwater ;

17-May-19

- o Vegetation, Flora, Fauna and Habitat;
- Weeds;
- Waste Management
- o Air Quality Dust and Emissions;
- o Lighting, noise, vibration and visual amenity;
- o Bushfire;
- o Cultural heritage and sacred sites ; and
- o Community.

• Provides an emergency response plan to account for situations of high risk of environmental harm occurring, including bushfire and contaminant spills

• Includes table outlining water bore drilling program risk assessment.

Draft Beetaloo Basin Kyalla 117 N2Drilling, Stimulation and Well Testing Environment Management Plan

- Includes an assessment of environmental factors against environmental objectives at risk.
- Provides a detailed description for and associated risks of the physical environment of the EP98, EP117 and EP76 area including:
 - o Climate;
 - Geology;
 - o Soils;
 - o Hydrology; and
 - o Hydrogeology.
 - Provides a detailed description for and associated risks of the biological environment of the EP98, EP117 and EP76 area,

including:

- o Bioregions;
- Vegetation communities;
- o Flora;
- Weeds;
- o Fauna;
- Significant / endangered fauna;
- o Feral and pest fauna.
- Provides description of environmental and cultural sensitives, including:
 - Native title;
 - Archaeology Assessment;
 - o Areas of cultural significance;
 - Natural resources;
 - Non-indigenous heritage;
 - o Historic heritage assessment; and

 Protected or conservation areas.
 Includes an outline of Origin's risk management approach and management tools.
Includes detailed tables of environmental impacts, risks and outcomes for specific environmental aspects, including:
 Soil and erosion ;
 Surface Water and Groundwater
 Vegetation, Flora, Fauna and Habitat
o Weeds
 Waste Management ;
 Air Quality – Dust and Emissions ;
 Lighting, noise, vibration and visual amenity ;
o Bushfire ;
 Cultural heritage and sacred sites ;
o Community ; and
o Traffic
• Provides an emergency response plan to account for situations of high risk of environmental harm occurring, including bushfire and contaminant spills).
• Appendix F - Erosion and Sediment Control Plan includes an assessment of the permit area erosion susceptibility, including:
 Erosion hazard assessment for Kyalla;
 Soil loss estimate; and
 Erosion risk and determination of erosion and sediment control.
Appendix J– Environmental Risk Assessment includes detailed table assessing environmental factors against activity risk sources.
Meeting and presentation in Darwin with Val Dyer representing APN Pty Ltd on June 11th to discuss specific details of EMP and landholder requests covering Lock the Gate letters including:
o Drilling activities
o Stimulation activities
o Wastewater management and risk to fauna
o Chemical management
o Well integrity and aquifer isolation
o Weed and groundwater monitoring
o General questions
Meeting and presentation at Hayfield Station on July 3rd to discuss specific details of EMP and landholder requests covering:
o Well integrity and Design (specifically aquifer isolation)
o Cement design
o Wastewater storage- including risk to fauna

_			

11-Jun-19

3-Jul-19

	o Weed management
	o General discussion on risk
	Kyalla 117 N2 Drilling, Stimulation and Well Testing EMP Variation Stakeholder Engagement Pack- 2 additional E&A wells
	o updated risk assessment of all risks (including new scope)
	o • Increase in groundwater take from approximately 50ML up to 120 ML (worst case)
	o Increased generation of flowback and wastewater storage duration and volume
	o Increase drilling mud and cutting waste storage and on-site disposal
	o Potential increase in flaring intensity and duration (under a success case)
	o Increased total activity duration by up to 18 months o Table 2- summarises the environmental outcomes, risks and controls for each relevant environmental aspect.
	Letter from Origin to Val Dyer (on behalf of Hayfield Shenandoah)
	 Includes a map and coordinates table detailing the locations and clearance buffers of proposed work at three well locations, including the Kyalla 117 N2 well.
	• The map included in the letter shows the planned route of access tracks across the land and the proposed clearance areas.
	 Attachment 2 is a draft work program of activities Origin intends to undertake on the land.
	Draft Pastoral Land Access and Compensation Agreement
	Clause 3 provides that Origin must conduct the regulated activities in such a way:
	\circ as to not interfere with the lawful rights or activities of the stakeholder;
	\circ that is in accordance with good exploration and petroleum industry practice;
	\circ that is within an agreed access area and not on any part of the pastoral property.
(v) "the possible consequences of carrying out the activity to the stakeholder's rights	Clause 5 provides that Origin must give written notice of at least 10 business days before commencing the regulated activities.
or activities"	Clause 7 provides the stakeholder with an opportunity to inspect the regulated activities.
	• Clause 8 provides the stakeholder an avenue to make suggestions to Origin about the regulated activities where they affect the stakeholder's activities or rights.
	• Clause 10 provides that Origin must not carry out any regulated activities within 5 kilometres of a residence and within 1 kilometre of a garden or artificial water accumulation. Origin must also erect and maintain appropriate temporary fencing.
	• Clause 11 requires Origin to use best endeavours to ensure that the regulated activities do not cause an impaired capacity to any water aquifers beneath the property and having the property certified as 'organic'.
	Beetaloo Basin Exploration Project – Kyalla 117 N2 civil Construction Environmental Management Plan
	Includes detailed tables of environmental impacts, risks and outcomes for specific environmental aspects, including:
	 Soil and erosion;
	 Surface Water and Groundwater ;
	 Vegetation, Flora, Fauna and Habitat;
	o Weeds;

TBA

22-Aug-18

20-Nov-18

- Waste Management
- o Air Quality Dust and Emissions;
- o Lighting, noise, vibration and visual amenity;
- Bushfire;
- o Cultural heritage and sacred sites ; and
- o Community.

• Provides an emergency response plan to account for situations of high risk of environmental harm occurring, including bushfire and contaminant spills

• Includes table outlining water bore drilling program risk assessment.

Draft Beetaloo Basin Kyalla 117 N2Drilling, Stimulation and Well Testing Environment Management Plan

- Includes an assessment of environmental factors against environmental objectives at risk.
- Provides a detailed description for and associated risks of the physical environment of the EP98, EP117 and EP76 area

including:

- o Climate;
 - Geology;
 - o Soils;
 - Hydrology; and
 - Hydrogeology.
- Provides a detailed description for and associated risks of the biological environment of the EP98, EP117 and EP76 area,

including:

- o Bioregions;
- Vegetation communities;
- o Flora;
- Weeds;
- o Fauna;
- Significant / endangered fauna;
- Feral and pest fauna.
- Provides description of environmental and cultural sensitives, including:
 - Native title;
 - Archaeology Assessment;
 - Areas of cultural significance;
 - Natural resources;
 - Non-indigenous heritage;
 - Historic heritage assessment; and
 - o Protected or conservation areas.
- Includes an outline of Origin's risk management approach and management tools.

-]

-]

- Includes detailed tables of environmental impacts, risks and outcomes for specific environmental aspects, including:
 - Soil and erosion ;
 - $\,\circ\,$ Surface Water and Groundwater
 - o Vegetation, Flora, Fauna and Habitat
 - \circ Weeds
 - Waste Management ;
 - o Air Quality Dust and Emissions ;
 - o Lighting, noise, vibration and visual amenity;
 - o Bushfire;
 - o Cultural heritage and sacred sites;
 - o Community ; and
 - Traffic

• Provides an emergency response plan to account for situations of high risk of environmental harm occurring, including bushfire and contaminant spills).

• Appendix F - Erosion and Sediment Control Plan includes an assessment of the permit area erosion susceptibility,

including:

- Erosion hazard assessment for Kyalla;
- o Soil loss estimate; and
- o Erosion risk and determination of erosion and sediment control.
- Appendix J Environmental Risk Assessment includes detailed table assessing environmental factors against activity risk

sources.

Meeting and presentation in Darwin with Val Dyer representing APN Pty Ltd on June 11th to discuss specific details of EMP and landholder requests covering Lock the Gate letters including:

- o Drilling activities
- o Stimulation activities
- o Wastewater management and risk to fauna
- o Chemical management
- o Well integrity and aquifer isolation
- o Weed and groundwater monitoring
- o General questions

Meeting and presentation at Hayfield Station on July 3rd to discuss specific details of EMP and landholder requests covering:

- o Well integrity and Design (specifically aquifer isolation)
- o Cement design
- o Wastewater storage- including risk to fauna
- o Weed management
- o General discussion on risk

11-Jun-19

3-Jul-19

Meeting with the Hayfield Station Members on the 28/11/2019 to discuss current operations and future potential Exploration Activities
Discussed operational on ground access options, impacts on their cattle business and how to work together to reduce impacts, future activity time lines, potential drilling scenarios based upon locations (including the multi-well scenario at Kyalla 117 N2-1H), stakeholder engagement packs. information, Land access agreements and future options agreements, protection of groundwater, future communication and potential benefits to their business.
Kyalla 117 N2 Drilling, Stimulation and Well Testing EMP Variation Stakeholder Engagement Pack- 2 additional E&A wells Email to Val Dyer
o updated activity description o updated risk assessment of all risks (including new scope)
o Increase in groundwater take from approximately 50ML up to 120 ML (worst case)
o Increased generation of flowback and wastewater storage duration and volume
o Increase drilling mud and cutting waste storage and on-site disposal
o Potential increase in flaring intensity and duration (under a success case)
o Increased total activity duration by up to 18 months o Environmental objectives and outcomes from undertaking the activities

Part C Stakeholder Engagement Pack Provided to Pastoralists

28-Nov-19

27-Dec-19



HAYFIELD/ SHENANDOAH KYALLA 117 N2 VARIATION Pastoralist Engagement Pack

Provided to Pastoralist on 27/12/2019



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List of Appendices

Appendix A – Stakeholder Feedback Form

Appendix B General Well Site Construction and Operations

Appendix C Environmental Management Plan (EMP)

Appendix D Code of Practice for Onshore Petroleum Activities within the Northern Territory



1 Purpose

Origin is proposing to submit a variation to the Kyalla 117 N2 Drilling, Stimulation and Well Testing Environmental Management Plan NT-2050-15-MP-025. The variation will seek approval for an additional 2 exploration wells to be drilled, stimulated, tested, maintained and decommissioned on the Kyalla 117 N2 site.

Origin presents this document to the operators and interest holders of Hayfield/ Shenandoah Station to provide an understanding of:

- the regulated activity the interest holder proposes to carry out (Section 2,);
- the location (or locations) where it is proposed to carry out the activity (Section 2);
- The timeline of the proposed activity (section 3);
- the potential environmental impacts, risks, controls and outcomes of the activity (Section 4)
- the possible consequences of carrying out the activity to the Pastoral Lessees rights or activities (Section 5);
- a proposed plan for ongoing engagement (Section 5); and
- draft Environmental Management Plan provides a detailed scope of proposed regulated activities and associated risk assessments and risk management (Appendix C)

Origin proposes that any questions or feedback to the information provided in this pack is formalised via the form included in Appendix A within 60 days of receipt. Origin will ensure that all responses are reviewed, and feedback provided as appropriate. Origin also offers a face to face meeting with the Stakeholder where subject matter experts can present the information in this pack and answer any questions. Face to face meetings must be arranged within 30 days of receipt of the pack to ensure engagement can be completed within the allocated 60 day period. It should also be noted that Origin is committed to ongoing stakeholder engagement and discussion on the activities will be ongoing through-out the life of the activities.

Origin acknowledges that in some circumstances, there may exist a difference of opinion or view that cannot be addressed during the stakeholder engagement period. In such cases, Origin will seek the decision/advice of the Department of Environment and Natural Resources (DENR) through the EMP assessment and approval process.

1.1 Background

Origin holds three petroleum exploration permits in the Barkly region under the Beetaloo Joint Venture with Falcon Oil and Gas. These permits consist of EP76, EP98 and EP117 which cover 18,512 square kilometres (km²) of largely pastoral leases on the Sturt Plain, part of the Barkly Tableland, within the Northern Territory (Figure 1) and were originally granted by the NT Minister for Mines and Energy under the *Petroleum Act*.

Since becoming Operator of the exploration permits in 2014, Origin has drilled four vertical wells (Kyalla S-1, Amungee NW-1, Beetaloo W-1 and the recent Kyalla 117 N2) and one horizontal well (Amungee NW-1H). A successful hydraulic fracture stimulation and production test was undertaken on the Amungee NW-1H well in 2016, highlighting the potential of the Beetaloo Sub-Basin as a future unconventional shale gas development.

New exploration activity ceased in September 2016, when the Northern Territory Government (NTG) introduced a moratorium on hydraulic fracture stimulation of unconventional reservoirs pending the outcome of an independent scientific inquiry.

The Inquiry handed down its Final Report to the Northern Territory Government (NTG) on Tuesday 27 March 2018. The Inquiry concluded that the risks associated with unconventional onshore shale gas extraction in the NT could be appropriately managed provided all the recommendations were adopted and implemented. The NTG subsequently accepted all 135 recommendations and announced the lifting of the moratorium on 17 April 2018. Of the 135 recommendations, 35 were required to be implemented prior to the commencement of exploration, with the remaining recommendations required to be implemented prior to the commencement of production.

This stakeholder engagement pack provides information to you in relation to the proposed variation of Kyalla 117 N2 Drilling, Stimulation and Well Testing Environmental Management Plan NT-2050-15-MP-025 for 2 additional exploration wells proposed on the Hayfield Shenandoah Property. The pack will give you a detailed description of Origin's activities and how Origin proposes to manage the environmental impacts and risks associated with its activities, including how it will address its regulatory obligations and relevant Inquiry Recommendations that have underpinned the Code of Practice for Petroleum Activities in the NT (CoP). This engagement pack aims to leverage off the existing information within the approved Kyalla 117 Drilling Stimulation and Well Testing EMP. This ensures the communication regarding the proposed additional activities can be targeted, focusing on the proposed new scope and potential additional risks.





Figure 1: Location of Origin Permit Area.

2 Description and Location of the Regulated Activities Variation

Origin is proposing to submit a variation to the Kyalla 117 N2 Drilling, Stimulation and Well Testing Environmental Management Plan NT-2050-15-MP-025. The variation will seek approval for an additional 2 exploration wells to be drilled, stimulated, tested, maintained and decommissioned on the Kyalla 117 N2 site.

The proposed variation includes:

- Use of existing access tracks connecting the Stuart Highway to the Kyalla 117 N2 Site
- Use of existing gravel pits
- Use of existing Kyalla 117 N2 exploration well lease pad
- Use of existing water bore for water extraction as per Origin's licence conditions
- Potential extension of Kyalla 117 N2 lease pad by 1 hectare for additional wells (contingent), this extension will remain within the existing fenced area
- Use of existing camp pad and helipad and sewer spray fields
- Operation of a camp during drilling, stimulation and well testing, including wastewater irrigation
- Asset maintenance and monitoring works required for each new exploration well
- Maintenance, suspension and decommissioning of each new exploration wells



- Site decommissioning and rehabilitation
- The drilling, stimulation and well testing of an additional 2 horizontal exploration wells (Kyalla 117 N2-2 and Kyalla 117 N2-3), increasing the total wells onsite to 3.
- Drilling of each exploration well consisting of:
 - Construction of 2 additional well cellars to accommodate each exploration well
 - Modification to existing drilling mud sump to accommodate new well locations
 - Drilling of up to 2 additional; vertical exploration wells up to ~2000m below ground level
 - Drilling of up to 2 additional horizontal exploration well sections up to 3000m (refer to Figure 4: Proposed Kyalla 117 N2-1 well schematic)
- Hydraulic fracture stimulation of each horizontal exploration wells
 - stimulation of up to 30 stages each new well
 - storage and handling of bulk quantities of proppant (sand), fuel and chemicals to support drilling, stimulation and well testing activities.
- Exploration well completion and testing
 - up to 12 months of well testing of each of the 2 additional wells, which includes flaring and condensate storage and transportation
 - predicted 10-15ML of flowback wastewater stored in tank onsite double lined tanks (depending on recovery rates)
 - use of evaporation tanks and mechanical evaporators to reduce the volume of wastewater
- All low impact activities ancillary to the above.

The proposed locations of the infrastructure is within the NLC and AAPA cleared subject land area and is provided in Table 1, Figure 2 and Figure 3. It is noted that the nominated areas for infrastructure may be changed slightly to minimise environmental and heritage impacts (e.g. significant tree or habitat avoidance, or any chance-finds with archaeological artefacts) and to accommodate with pastoral requirements. Such modification will be made within the existing surveyed areas.

Table 1 Proposed infrastructure location and disturbance area



Exploration Permit	Infrastructure Name	Station	Zone*	Approx Easting	Approx Northing	Proposed Disturbance Area (ha)
EP117	Kyalla 117 N2 Lease Pad and sewer spray field	Hayfield	53	356370	8137492	1
EP117	Kyalla 117 Camp Pad and sewer spray field	Hayfield	53	356448	8137815	Existing
EP117	Kyalla 117 Helipad	Hayfield	53	356270	8137839	Existing
EP117	Gravel Pit 1 and access track	Hayfield	53	333794	8135076	3
EP117	Gravel Pit 2 and access track	Hayfield	53	339862	8134869	3
EP117	Gravel Pit 4 and access track	Hayfield	53	360391	8135085	3
EP117	Existing Access tracks Stuart Hwy to Kyalla 117 + Access to Amungee Mungee Boundary	Hayfield	53	See Figure	2	Existing

* Universal Transverse Mercator (UTM) geographic coordinate system is Geocentric Datum of Australia (GDA) 94.





Figure 2 Location of proposed activities within Origin's Exploration tenure




Figure 3 Site location map - note well locations indicative to change within pad area





Figure 4: Proposed Kyalla 117 N2-1 well schematic

3 Activity Timeline

The additional 2 exploration wells proposed for the Kyalla 117 N2 site is subject to the results of the Kyalla 117 N2-1 exploration well. The potential timeline of the additional 2 wells is not yet fixed, with no firm decision to proceed with the decision to drill at this stage. Subsequently, four potential timelines exist:

- No additional wells are drilled.
- One and or two of the wells are drilled in 2020 immediately after well testing of the Kyalla 117 N2 well
- One and or two of the wells are drilled in late 2020 or 2021 after the drilling of Velkerri 76 S2 on the adjacent property.
- One and or two of the wells are drilled post 2021.

4 Environmental Risk Summary

The risks and potential impacts associated with the drilling stimulation, testing and maintenance are covered under the existing Kyalla 117 N2 Drilling, Stimulation and Well Testing EMP NT-2050-15-MP-025. A copy of the EMP can be found on the DENR website here: <u>https://denr.nt.gov.au/onshore-gas/environment-management-plan/approved-emps</u> and can be consulted where additional information on individual activities is required.

The potential additional risks and controls associated with the increase in the number of wells have been summarised in the following section, along with the proposed controls/ mitigating factors. The additional proposed scope and associated risks and controls will be submitted to DENR for formal assessment and approval.



The increased risks/ impacts are restricted to the following aspects, as summarised below;

- Increase in groundwater take from approximately 50ML up to 120 ML (worst case)
- Increased generation of flowback and wastewater storage duration and volume
- Increase drilling mud and cutting waste storage and onsite disposal
- Potential increase in flaring intensity and duration (under a success case)
- Increased total activity duration by up to 18 months



Aspect	Environmental Outcomes	Potential Impact/ Risk	Controls
Waste	 No adverse impacts on soil, surface water, groundwater, sensitive habitat and air quality Minimise creation of food sources or habitat for pest species Minimise waste generation through reduce, reuse, recycle programs 	Additional wastewater to be stored onsite. Additional drill mud cutting to be stored and disposed of onsite.	Existing flowback tanks are likely to be able to manage predicted flowback volume. - flowback to be stored in double lined tanks with leak detection -enhanced evaporation units to be used to minimise offsite flowback transportation -Site to be bunded during flowback storage -Drill cuttings will be excavated from sump and dried within a lined containment area to enable additional cuttings and mud volumes. Once completed, cuttings and muds will be mixed, buried and covered onsite in accordance with the Code of Practice.
Traffic	 Minimise the impact of traffic on pastoralist amenity and tourism 	Access to the site is likely to extend for an additional 12-18 months (to end 2021) to accommodate additional drilling, stimulation and well testing activities. Success case may result in daily/weekly condensate trucking (depending on rates)	The majority of equipment is onsite. Site is located away from pastoralist main access points Maximum peak traffic during demobilisation is 44 movements per day for 2 weeks.

Table 2 Environmental risks and controls of proposed variation



Aspect	Environmental Outcomes	Potential Impact/ Risk	Controls
Water use ad quality	 To manage exploration activities to prevent unsustainable depletion of groundwater resources Preserve groundwater quantity and quality for livestock supplies (the surrounding water use) 	 Cumulative 2019/2020 groundwater take increased from approximately 50ML to 120ML (over 2 years) All wells designed to protect aquifers with multiple engineered and verified well barriers in place. 	Groundwater take is covered by a Water extraction Licence. The impact of all use has been assessed and approved by DENR.
Emissions	 Avoid environmental nuisance at sensitive receptors Minimise greenhouse gas emissions 	Potential increase in duration and intensity of flaring emissions (success case)	-Site located away from sensitive receptors -Increased flaring rates unlikely to materially increase impact of flare.
Noise	 Minimise impacts to pastoralists and sensitive receptors from noise 	No additional risks/ impacts predicted	Activities are located away from sensitive receptors.
Dust	 Minimise impacts to pastoralists and surrounding ecological communities from dust 	No additional risks/ impacts predicted	Dust suppression to be used on access tracks and adjacent sites to minimise dust emissions
Soils	 Avoid, minimise and control soil erosion and discharge of sediment or soil into waterways or established drainage systems Minimise disturbance of soil, vegetation and drainage during site activities Prevent the contamination of soil to maintain the viability of soil resources 	No additional risks/ impacts predicted	Existing controls in place including: -Secondary containment -Spill management plan -lined wastewater tanks -Site maintained to minimise sediment releases, with erosion and sediment control plan in place
Bushfire	 Minimise the risk of causing bushfires from Origin's activities Avoid impacts on pastoral infrastructure, environmental habitat and fauna, impacts on culturally-significant sites, public infrastructure and community lands 	No additional risks/ impacts predicted	Existing bushfire management strategies in place.
Weeds	Avoid the introduction of weedsAvoid the spread of existing weeds	no increased weed risk	-All equipment and loads to be inspected and certified weed free.



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Pastoralist Engagement Pack

Aspect	Environmental Outcomes	Potential Impact/ Risk	Controls
Surface Water	 Avoid and minimise the potential contamination caused by the discharge of sediment or contaminated storm water to waterways or established drainage systems. Contain any potential contaminants for treatment or disposal. 	No increased risk	-No offsite releases of wastewater -Site fully bunded during wastewater storage -Site maintained to minimise sediment releases, with erosion and sediment control plan in place
Flora and Fauna	 Minimise disturbance to flora and fauna No disturbance to high conservation areas 	Minimal increase in risk to existing flora and fauna resulting in clearing	 The additional proposed 1 hectare clearance is located within the fenced area of the site. The vegetation community surrounding the activity is regional extensive and not threatened. Impacts to endangered flora and fauna are not anticipated.



5 Consequences for Stakeholder Rights and Activities

5.1 Stakeholders Rights

Pastoral Lessees within the Northern Territory have non-exclusive rights to conduct their pastoral activities on the land granted under the Northern Territory Pastoral Lands Act (2016). Origin respects these legal rights and seeks a sustainable relationship with Pastoral Lessees so that both parties' can co-exist on the land. Origin proposes to achieve this via the following key principles:

- 1. Formal engagement aligned with the requirements of Section 7.2 (a) of the *NT Petroleum (Environment) Regulations*
- 2. Structured and timely process for the execution of an access agreement and associated compensation
- 3. Mutually agreed ongoing, regular engagement and communications

5.2 Stakeholders Activities

The proposed additional activities under the existing Kyalla 117 Drilling, stimulation and Well Testing EMP (as defined in Section 2), are located in existing disturbed areas operated by Origin. The proposed additional activity will not directly interfere with existing pastoral infrastructure. Figure 2 and Figure 3 includes infrastructure layout maps of the location of the regulated activities in full detail. Appendix C provides detailed information on the environmental impacts, risks and impacts associated with these Regulated activities, which highlight the potential consequences to Pastoral operations. Key considerations when understanding the consequences to Pastoral operations:

- To ensure sustainable co-existence, Origin will compensate the Pastoral Lessee for the impact of Regulated activities on pastoral operations
- The regulated activities are associated with petroleum exploration activities, therefore likely to be temporary in nature. Origin will rehabilitate to its original condition or as agreed with the Pastoral Lessee.

A summary of the potential consequences of the activity and mitigation controls are summarised in Table 3 Potential consequences and control measures

Activity	Potential Consequence to Activities	Mitigations for Consequence
Land & Stock		
Wellpad and new access road	 Reduction in grazing area Restricted access to well lease pads during activity duration 	 Minimal additional disturbance area located within fenced zone Short term use <3 yrs Full fencing and bunding of wellpad Industry-proven coexistence of cattle and petroleum industry End of life rehabilitation to return land back to pre-existing state or as agreed to with pastoralist Hayfield Code of Conduct agreed with Pastoral Lessee
Existing Access Tracks	 Traffic along access track Temporary access restrictions during rig mobilisations and heavy transport operations Interference with stock 	 Ongoing maintenance of the existing road to enable dual carriage Main traffic movements limited to over 3-6 month period Hayfield Code of Conduct agreed with Pastoral Lessee

Table 3 Potential consequences and control measures



Activity	Potential Consequence to	Mitigations for Consequence
	ACTIVITIES	
		 Origin Pastoral lease notification of large movements Road remains shared use asset of Pastoral lessee
Lease pads	 Contamination of soils from activities Impact to organic certification 	 All activities must comply with Codes of Practice for Petroleum activities, including spill management, wastewater management and waste management site to be rehabilitated back to pre- disturbance level with no harmful contamination permitted. Site fully bunded Activity restricted to a small area, with no contaminates released to surrounding areas Contaminants affecting organic certification (agrichemicals, GMO, pesticides etc) are typically not associated with Petroleum activities.
Water		
Ground Water	Pastoral bores rates and/or quality	 Modelling supported extraction limits set by DENR through extraction licence RF 10285 No material reduction in water quality or quantity predicted to surrounding groundwater extraction bores Baseline monitoring of local bores within 10km of petroleum wells Ongoing control and impact groundwater water monitoring Aquifer protected through the use of multiple cement and steel casing barriers Well integrity validated prior to completing stimulation.
Weeds		
Weed Control	Noxious weeds	 Baseline weeds survey completed Ongoing weeds surveys and NTG bi-annual monitoring Vehicle and Equipment to be clean and have valid weed hygiene certificates prior to access Weed identification training of key personnel Weed management plans
Air Quality		
Dust	• Dust	 Short period of high volume traffic movements Equipment movements to consider time of day to reduce impacts on traffic Dust suppression utilised during high volume traffic movements and around sensitive features (homesteads, cattle yards etc.)
Emissions	Increased Emissions from flares and wells	 Flares are used to reduce the risk associated with vented hydrocarbons Short period of operations and testing



Activity	Potential Consequence to Activities	Mitigations for Consequence
		 Baseline emissions monitoring conducted and is ongoing Emissions monitoring at all locations No well pad within 50km of a residence
Light, Noise and Visua	al Amenity	
Light and Noise	Interaction with stock	 Site location chosen to minimise impacts on pastoralist operations- including appropriate separation distances between sensitive receptors and activities. Short duration of drilling and stimulation activities
Visual Amenity	Pastoral visual amenity	 Site location chosen to minimise impacts on pastoralist amenity- including appropriate separation distances between sensitive receptors and activities. Short duration of drilling and stimulation activities Site not located in major thoroughfare and away from the majority of pastoralist

5.3 Stakeholder Engagement Plan Feedback

Origin propose frequent discussions with nominated representatives of the Pastoral lease to ensure that clear understanding of the activities and ongoing program. Origin would also like to ensure that the Pastoral lessees have the ability to attend at exploration activities to further seek comfort in their understanding and to highlight the nature in which operations are conducted.

Origin seek a frequency suitable to the nominated representatives for a phone call or meeting to discuss these activities and progress as well as during field operations committing to formal reporting with updates on field activities. Additionally, as part of the induction process ,Origin extends an offer to the Pastoralists to address staff and contractors and provide them with an overview of the Pastoral business and history of the property and share their expectations in working to agreed work instructions and restricted areas.

All feedback on the proposed activities and their potential impacts, risks and proposed controls should be provided to Origin via the feedback form in Appendix A within 60 days.

All lessee comments and associated Origin responses will be documented within the final EMP submitted to DENR for assessment.



6 Acronyms & Abbreviations

Acronym	Meaning
AAPA	Aboriginal Areas Protection Authority
ALARP	As Low As Reasonably Practicable
BMP	Bushfire Management Plan
DENR	Department of Environment and Natural Resources
DOTEE	Department of The Environment and Energy (Cmwlth)
DPIR	Department of Primary Industries and Resource (NT)
EC	Electrical Conductivity
EPA	Environment Protection Authority (NT)
EP	Exploration Permit (e.g. EP76, EP98 and EP117)
EMP	Environmental Management Plan
ERP	Emergency Response Plan
ESCP	Erosion and Sediment Control Plan
GHG	Greenhouse Gas
На	hectare
HFS	Hydraulic Fracture Stimulation
IBA	Important Bird Area
JV	Joint Venture
Km	Kilometre
LOS	Level of Service
m	metre
MEMP	Methane Management Plan
MSDS	Material Safety Data Sheet
mTVDGL	metre True Vertical Depth below ground level
Mm	millimetre
NGERS	National Greenhouse and Energy Reporting Scheme
NICNAS	National Industrial Chemicals Notification and Assessment Scheme
NT	Northern Territory
RWA	Restricted Work Area
SPMP	Spill Management Plan
ТО	Traditional Owner
WEL	Water Extraction Licence
WMP	Weed management Plan
WWMP	Wastewater Management Plan



Appendix A – Stakeholder Feedback Form



Stal	keholder:				
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Appendix B General Well Site Construction and Operations



Figure 5: General Lease Construction





Figure 6: General Camp Area





Figure 7:General Drilling Operations





Figure 8: Example of stimulation lease layout.





1. Panel Transportation



2. Panel assembly



3. Tank assembly



5. Geomembrane installation



8. Tank commissioning



8. Cover installation



7. secondary liner installation



6. Primary liner installation

Figure 9 Wastewater tank construction steps





Figure 10: Example of spill mats used to contain drilling and tarps to protect sand.





Figure 11:General Site Configuration



Appendix C Environmental Management Plan (EMP)

Please note the accompanied EMP is in draft version and is currently awaiting approval from NT Government, pending response from the NT Government this EMP is subject to change. Please also note the timeframes presented are forecast only and are subject to change.



BEETALOO BASIN DRILLING, STIMULATION AND WELL TESTING PROGRAM Environment Management Plan

EP117

Review record

Rev	Date	Reason for issue	Author	Reviewer	Approver
0	27/04/2018	EMP released for acceptance	M.Kernke	E.Wong	T.Boyes
1.0	05/08/2019	EMP released for approval	M.Kernke	E.Wong	T.Boyes
2.0	16/12/2019	EMP Variation to include additional wells	M.Kernke		



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Appendix D Code of Practice for Onshore Petroleum Activities within the Northern Territory

Code of Practice: Onshore Petroleum Activities in the Northern Territory

31 May 2019



Document details

Document title	Code of Practice: Onshore Petroleum Activities in the Northern Territory	
Contact details	Department of Environment and Natural Resources 08 8924 4218	
Approved by	Minister for Environment and Natural Resources and	
	Minister for Primary Industry and Resources	
Date approved	30 May 2019 and 31 May 2019	
Document review	Minimum 2 years	

Change history

Version	Date	Author	Changes made
1	15 March 2019	NT Govt	Public consultation draft
1.1	28 May 2019	NT Govt	Final draft
2	31 May 2019	NT Govt	Approved version. Title updated, dates included.

Appendix Q: Community Engagement Log

Engagement item	Date of engagement
NLC Meeting held with NLC representatives to provide an update of the Beetaloo Exploration Project and discuss forward exploration activities and associated clearances	05/11/2020
NLC and Native Title Holder Sacred Stie clearance	12/10/2020
with information on Origin's Beetaloo Basin Project and Activities.	
Traditional Owner visit to site	22/09/2020
Origin representative provided Native title holders an escorted visit to the Kyalla 117 N2 site, discussed the regulated activities, environmental controls (such as groundwater monitoring) and provided an update to the Beetaloo Exploration Project.	
NLC	01/09/2020
Meeting held with NLC representatives to provide an update of the Beetaloo Exploration Project and discuss forward exploration activities and associated clearances	
NLC	18/08/2020
Meeting held with NLC representatives to provide an update of the Beetaloo Exploration Project	
NTG Onshore Supply chain working group	16/06/2020
Origin representative provided an update of the Beetaloo Exploration Project	
NLC	29/05/2020
Meeting held with NLC representatives to provide an update of the Beetaloo Exploration Project	
Energy Club NT	05/06/2020

Engagement item	Date of engagement
Origin representative provided an update of the Beetaloo Exploration Project and potential business opportunity discussion	
Red dust	11/04/2020
Origin Beetaloo exploration project presentation and partnership update	
Traditional owner meeting	11/04/2020
Origin representatives visited Native Title holder sin Elliot to provide an update on the Beetaloo Exploration Project	
Darwin Rotary Club	06/05/2020
Origin representative provided the rotary club an overview of the Beetaloo Exploration Project	
NLC	05/02/2020
Meeting held with NLC representatives to provide an update of the Beetaloo Exploration Project	
Back to Business in the Territory with Energy Club NT	04/02/2020
Origin provided the NT Business community an overview of Origin's potential future activities and potential business opportunities.	
NLC- Traditional Owner Employment opportunities	16/09/2019
Origin representative met with NLC representatives to discuss future employment opportunities for host Traditional Owners.	
Traditional Owner meeting	16/08/2019
Origin Chairman visited a number of Traditional owners within the Beetaloo to discuss the project and ongoing engagement.	
NT Environmental Protection Agency Meeting	
Origin and NT EPA meeting to discuss recent EMP content and future project overview	13/08/2019
Darwin show	25/07/2019

Engagement item	Date of engagement
Origin representative attended industry booth. Origin provided educational material in the form of story boards covering its proposed exploration activities, including an overview of shale exploration and hydraulic fracturing activities. Origin representatives also answered community questions about the Beetaloo exploration project and potential future job opportunities.	
Katherine Show	
Origin representative attended industry booth. Origin provided educational material in the form of story boards covering its proposed exploration activities, including an overview of shale exploration and hydraulic fracturing activities. Origin representatives also answered community questions about the Beetaloo exploration project and potential future job opportunities.	19/07/2019
Tennant Creek show	
Origin representative attended industry booth. Origin provided educational material in the form of story boards covering its proposed exploration activities, including an overview of shale exploration and hydraulic fracturing activities. Origin representatives also answered community questions about the Beetaloo exploration project and potential future job opportunities.	12/07/2019
Beetaloo "Meet the buyer" event with NT business in Tennant Creek	11/07/2019
Origin presented an overview of the Beetaloo exploration project, including local procurement opportunities to local business representatives. 1 on 1 meetings were held with local businesses to further understand capabilities.	
Beetaloo "Meet the buyer" event with NT business in Alice Springs	9/07/2019
Origin presented an overview of the Beetaloo exploration project, including local procurement opportunities to local business representatives. 1 on 1 meetings were held with local businesses to further understand capabilities.	
Full council meeting of the Northern Land Council	17/06/2019

Engagement item	Date of engagement
Origin representatives presented an overview of the Beetaloo Exploration Project to the NLC council.	
Beetaloo "Meet the buyer" event with NT business in Darwin	6/06/2019
Origin presented an overview of the Beetaloo exploration project, including local procurement opportunities to local business representatives. Origin's tier 1 contractors (such as Drillers and completion providers) also presented an outline of their scope and opportunities. 1 on 1 meetings were held with local businesses to further understand capabilities.	
Katherine mining services association conference	
Origin presented to the conference an overview and update on the Beetaloo Exploration Project.	16/05/2019
Darwin Port users Group	4/04/2019
Origin presented to the group an overview and update on the Beetaloo Exploration Project.	
GHD Beetaloo discussion	3/04/2019
Provided an update of the Beetaloo exploration project	
NT Cattleman's Association annual conference	28/03/2019
Origin representative attended the conference	
Meeting with the Alice Spring Chamber of Commerce annual conference	18/03/2019
Origin representative presented an overview and update of the Beetaloo exploration project and future business opportunities.	
NT Inquiry Community Business Reference Meeting	12/03/2019
Origin representative presented an overview and update of the Beetaloo exploration project	
Meeting with the Industry Capability Network	22/03/2019
Discussed the future Beetaloo exploration program and future opportunities	

Engagement item	Date of engagement
NT Economic Recovery Summit	27/02/2019
Origin representative presented an overview and update of the Beetaloo exploration project and future business opportunities.	
Indigenous Business Network Board	15/02/2019
Origin representative presented an overview and update of the Beetaloo exploration project and future potential indigenous employment and business opportunities.	
Energy Club NT	13/02/2019
Origin representative presented an overview and update of the Beetaloo exploration project, an update of the Us shale trip and future business opportunities.	
Industry Capability Network	
Origin provided an update to the Beetaloo exploration project and answered questions on the project.	1/02/2019
Roper Gulf regional Council	19-Dec-18
Meeting to discuss overview of the Beetaloo Exploration project and forward plans	
Geological and Bioregional Assessment Workshop- CSIRO, DEPWS, DIPR, Santos, Pangea and Central Petroleum	04-05/12/2018
Origin presented information :	
Origin's tenure	
Geology of the region	
 proposed forward exploration activities 	
Roper Gulf Regional Council	
Origin provided an update on the Beetaloo Exploration Project.	19-Oct-18
NT Government Department of Business Innovation and Trade	13-Oct-18
Origin provided an overview of the forward Beetaloo exploration project.	

Engagement item	Date of engagement
Geological and Bioregional Assessment Meeting	
Discussion regarding the geology and hydrogeology of the Beetaloo Basin	11-Oct-18
Beetaloo industry operators meeting with CSIRO, DEPWS, Santos and Pangea	
General discussion on Origin's Beetaloo exploration project	
Discussion of water and wastewater management in the Beetaloo	
Beetaloo industry operators meeting with CSIRO, DEWPS, Santos and Pangea	10-Oct-18
General discussion on Origin's Beetaloo exploration project	
Discussion of methane emission monitoring and management in the Beetaloo	
Barkly Regional Council	
Provided update on the Beetaloo Exploration project	27-Sep-18
Barkly Regional Economic Development Committee	
Provided of the Beetaloo Exploration project	27-Sep-18
	25-Sep-20
Charles Darwin University	
Meeting in Alice Springs to provide a project update and discuss training options for trades	13-Sep-18
Darwin Major Business Group Meeting	6-Sep-18
Provided of the Beetaloo Exploration project	
Meeting with Northern Land Council	3-Sep-19
Meeting to discuss Beetaloo sacred sites clearance survey for future exploration work.	
Geological and Bioregional Assessments first User Panel meeting	
Provided updated of Beetaloo exploration project and discussed forward GBA program	
Engagement item	Date of engagement
--	--------------------
Darwin show	
Origin representative manning the APPEA booth providing an overview of the Beetaloo exploration project	26-Jul-19
Katherine show	20-Jul-19
Origin representative manning the APPEA booth providing an overview of the Beetaloo exploration project	
CSIRO	
Meeting to discuss Beetaloo project overview and proposed background methane monitoring program across Origin's tenure	16-Jul-19
Tennant Creek Show	13-Jul-19
Origin representative manning the APPEA booth providing an overview of the Beetaloo exploration project	
Alice Springs Show	
Origin representative manning the APPEA booth providing an overview of the Beetaloo exploration project	6-Jul-18
Northern Land council	
meeting to discuss the update on sacred site clearances for the proposed 2019 potential locations for exploration activities	
Engineers Australia Young Pipelines and Young Engineers Australia	28-Jun-19
Origin presented information :	
Origin's tenure	
• Geology of the region	
 proposed forward exploration activities 	
NT Department of Primary industry and Resources and Department of Environment and Natural Resources	
Discussing regarding the Inquiry recommendations and implementation strategy.	27-Jun-18

Engagement item	Date of engagement
GHD	
Origin provided GHD an overview of the future Beetaloo exploration program	24/05/2018 and 25/06/2018
NT Department of Primary industry and Resources and Department of Environment and Natural Resources	
Discussing regarding the Inquiry recommendations and implementation strategy.	25-May-18
NT Department of Primary industry and Resources and Department of Environment and Natural Resources	
Discussing regarding the Inquiry recommendations and implementation strategy.	18-May-18
Meeting with the NT Government Delegation at the APPEA conference	16-May-18
update on the potential forward Beetaloo exploration project	
NT Daly Waters Camp Draft	
Origin sponsored and attended event	5/05/2018
NT Department of Primary industry and Resources	3/05/2018
Discussing regarding the Inquiry recommendations and implementation strategy.	
Northern Territory Cattleman's Association	23-Mar-18
Origin representatives attended NTCA	
Alice Springs Chamber of Commerce Alice Springs Regional Mining conference	19-Mar-18
Origin representatives attended NTCA	

Appendix R Origin Project Poster Series

2019 Work Program

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September 2018.





Amungee NW-1 & NW-1H (Drilling & Environmental Controls)

The Amungee NW-1 / NW-1H well is in the in centre of Exploration Permit 98 (EP98) in the northern Beetaloo Sub-Basin, just south of the Carpentaria Highway and around 60 km east of Daly Waters.

Amungee is the first horizontal well to be drilled in Origin's exploration program in the Beetaloo sub-basin and the first to be fracture stimulated, within existing regulations and with consent of the pastoralist and Traditional Owners.

The vertical stage of the well (NW-1) was successfully drilled in September 2015 to a depth of around 2,600 metres. The horizontal section (NW-1H), around 1,100 metres long, was drilled and fracture stimulated in 2016.

Subsequent production testing over a 57-day period confirmed the wells ability to flow gas, returning an average of 1.1 million cubic feet of gas per day.



Groundwater monitoring

Groundwater monitoring is a regulatory requirement that allows us to detect any potential groundwater impacts that may occur from exploration activities. It also improves our understanding of the natural variability of water volumes and quality, and broader hydrogeological system in the Beetaloo sub-Basin.

Groundwater monitoring commenced in 2014, before current exploration activities commenced. A formal monitoring plan was implemented the following year - focussing on the shallower aquifers which are separated from the target formations containing gas by over 1.5km of low permeability rock.





This monitoring has found there no evidence of any impact from current exploration activities.





Beetaloo Basin Gas

Our exploration program is evaluating both dry gas and liquids rich wet gas in the Velkerri and shallower Kyalla shale formations. Each play has different characteristics.

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A Billion Years In The Making

The Beetaloo Basin is 1.4 billion years old - much older than the dinosaurs that roamed the earth between 150 to 200 million years ago.

It's the Proterozoic age, continents are yet to form and the Top End is part of a vast tropical sea. The Earth's atmosphere is around 3% oxygen and complex life like plants and animals are yet to evolve. Micro-organisms like algae are the main life form. As they die they settle on the

ocean floor.

The right combination of depth and temperature then combines to creates the shale rocks we now know as the Velkerri formation, trapping vast reserves of natural gas around two and a half kilometers below surface.









The Resource Potential

We estimate our project could have as much as 61 that already recognised as a contingent resource.

Just how big is this? The Inpex project is 12 trillion



Beetaloo Exploration Project



The Benefits

If successful, and development goes ahead, the project means: • more work for and jobs with local companies, including Aboriginal

- companies
- the opportunity to supply goods and services to the project
- financial payment for host pastoralists and Native Title holders
- taxes and royalties providing government with more money telecommunications
- energy security (delivering gas to the Eastern Australia)

Our Permit Commitments

	and the second se			Moratorium		
EP	2014	2015	2016	2017-2018	2019-2020	2021-2022
98	Geological and geophysical studies	2 vertical wells, 1 horizontal well	1 HFS horizontal well		Geological and geophysical studies	Geological and geophysical studies
117	Geological and geophysical studies	Geological and geophysical studies	1 vertical well		1 vertical pilot / evaluation well 1 HFS horizontal well	1 HFS horizontal well
76	Geological and geophysical studies	Geological and geophysical studies	Geological and geophysical studies		1 vertical pilot / evaluation well 1 HFS horizontal well	1 HFS horizontal well
Permit Year	1	2	3		4	5

Hydraulic Fracture Stimulation 4 March 2019



that can go to improving community services, infrastructure and

Beetaloo W1 (Drilling & Environmental Controls)

The Beetaloo W-1 well is in the centre of Exploration Permit 117 (EP117) in the southern Beetaloo Sub-Basin, east of the Stuart Highway and around 54 km northeast of Elliott.

The vertical well was successfully drilled in July 2016 to a depth of around 3,100 metres within the lower Velkerri formation. The well was cased and suspended in September that year.

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Groundwater monitoring

Groundwater monitoring is a regulatory requirement that allows us to detect any potential groundwater impacts that may occur from exploration activities. It also improves our understanding of the natural variability of water volumes and quality, and broader hydrogeological system in the Beetaloo sub-Basin.

Groundwater monitoring commenced in 2014, before current exploration activities commenced. A formal monitoring plan was implemented the following year - focussing on the shallower aquifers which are separated from the target formations containing gas by over 1.5km of low permeability rock.



Daly. Water Legend Origin permit Other permit Major road Monitored Bore Monitored Bore with Logger Phase 1 Exploration Well and 10km radius Newcastle Waters Typical Stock Bore Average Beetaloo Basin Water Bore Aquifer Undifferentiated Cretaceous Gum Ridge Lip Antrim Plateau Basalt Bukalara Sandstone Protective Steel Casing Chambers River Formation øukalorkmi Sandstone Kyalla Formation Moroak Sandstone Upper Velkerri Member



Head Detail Conductor Casing Surface Casing Cement Intermediate Casing Formations Production Casing

This monitoring has found there no evidence of any impact from current exploration activities.

- aquifers;
- methane in trace concentrations







Groundwater levels have remained stable in the shallower Cretaceous and Cambrian Limestone

• The Cenozoic perched aquifer closest to surface responds strongly to rainfall, but water levels recede quickly suggesting a limited storage volume;

• Little or no hydrocarbons have been detected in bore sampling. Only one location found dissolved

• All water sampled is suitable for stock use



Conventional and Unconventional are industry terms used to define where gas is found underground and how it's extracted.



Conventional and Unconventional

It's the same gas (natural gas reserves are mostly methane with some propane, butane and light condensates) - the main difference is how it occurs in nature today.

Conventional gas has typically migrated from where it formed millions of years ago to a sandstone reservoir where it's trapped between porous grains under a denser layer of rock that acts as a cap or seal.

Extracting gas from either source can require a range of different techniques and processes.

It's a common misunderstanding that conventional reserves do not require fracture stimulation and unconventional reserves do.

For example, around a third of conventional wells in the Mereenie field near Alice Springs have been fracked.



Drilling For Shale Gas

Our exploration program includes drilling both vertical and horizontal wells that target the underground shale rock formations in the Beetaloo Basin.

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Long Reach **Horizontal Drilling**

Steps in Horizontal Drilling:

- 1. Negotiate and agree access, obtain approval and bring in drilling rig and equipment
- 2. Drill vertical section of well using conventional methods
- **3.** Drill kick-off (curved) section, with the use of a downhole motor mounted directly above the bit, in order to make the turn from vertical to horizontal. Downhole instruments called MWD (measuring while drilling) packages transmit sensor readings upward, allowing operators at the surface to build the angle
- **4.** Drill horizontal wellbore, still using MWD to hold the angle and direction
- 5. Case off the well with steel casing and cement to allow for completion and fracture stimulation, preparing the well for production



Vertical Wells and Long Reach **Horizontal Wells**

- Exploration Phase/s
- some information on production capability
- economic gas and liquid recovery rates
- development





Origin will drill both vertical and horizontal wells during the

Vertical wells allow a more cost effective assessment of the potential for gas and liquids in the target zones and provide

Horizontal wells will be required to assess the potential for

Horizontal wells are most likely to be required for field



Groundwater monitoring is a regulatory requirement that allows us to detect any potential groundwater impacts that may occur from exploration activities.

It also improves our understanding of the natural variability of water volumes and quality, and broader hydrogeological system in the Beetaloo sub-Basin.

00

Groundwater monitoring commenced in 2014, before current exploration activities commenced. A formal monitoring plan was implemented the following year - focussing on the shallower aquifers which are separated from the target formations containing gas by over 1.5km of low permeability rock.

This monitoring has found there no evidence of any impact from current exploration activities.

- Groundwater levels have remained stable in the shallower Cretaceous and Cambrian Limestone aquifers;
- The Cenozoic perched aquifer closest to surface responds strongly to rainfall, but water levels recede quickly suggesting a limited storage volume;
- Little or no hydrocarbons have been detected in bore sampling. Only one location found dissolved methane in trace concentrations
- All water sampled is suitable for stock use

Groundwater Monitoring









- Origin permit
- Major road

- Extent of Beetaloo Basin

- Water Bore

- **Monitored Bore**
- **Monitored Bore** with Logger
- Phase 1 Exploration Well and 10km radius

(Fracking)

Fracking is the technical process designed to release the gas trapped in the dense shale rocks deep underground.

It involves pumping water mixed with sand and some chemical additives in low concentrations under pressure to fracture the shale, creating tiny pathways in the rock that allow the gas to flow into the well and be brought to the surface.

Key facts about fracking in the Beetaloo

- Distance offers important protection there's over 2 kilometres between the shallower aquifers and the deeper rocks where gas is found.
- Both zones are effectively sealed off by several thick geological layers in between called aquatards.
- It's not physically possible for a fracture to extend upwards into the aquifer. Because of the distance, and because the amount of energy and pressure used in fracking isn't enough to connect and create pathways outside of the rock formation where gas is found.
- Any natural vertical fractures or old abandoned bores are extremely unlikely to provide a pathway for fracking fluids to reach a fresh water zone due to the greater weight (what's called hydrostatic head pressure) pushing down from above.
- Seismic work allows us to map the geology and avoid any large structures or faults.

Hydraulic Fracture Stimulation





Multi -pad drilling and horizontal wells have a small surface footprint - minimising disruption to pastoral operations.

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- In our submission to the NT Scientific Inquiry we described the surface footprint for large scale development scenario being no more than 10 square kilometres.
- This is based on multi-pad well design, and related surface infrastructure taking up no more than 2 per cent of a 500 square km land area.
- As further context, this total development area would occur on a handful of pastoral leases.









es	Dimensions per pad	Area per pad
	140m x 140m	02km ²
per pad	3km x 30m	09km ²
	3km x 10m	03km ²
pad	-	.10km ²
er pad	6km x 1.6km	9.6km ²
 ▲ 1.6km 		
ing		
	Horizontal	drilling

Well Integrity

Engineering standards, steel and cement ensure the drilling and fracking of gas wells do not create a pathway between the underground layers of rock or deteriorate over time.

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Built Strong - To Last The Test Of Time

A gas well has three main parts - the steel casing, the above ground well head, and cement which is engineered to be as strong as the rock that it will live in.

Casing and cement hold the hole open and protect or prevent any cross flow between the surrounding underground formations. The cement is pumped down the inside and back up the outside of the casing.

Engineering Standards And Performance Data

	Catego	ry	Description	Risk
	1		Shallow surface casing + top of production casing cement below over pressured hydrocarbon reservoir	High
	2		Shallow surface casing + top of production casing cement below under pressured hydrocarbon reservoir	
	3		Shallow surface casing + top of production casing cement above top of gas	
	4 Shallow surface casing + top casing cement above surface casing shoe	Shallow surface casing + top of production casing cement above surface casing shoe		
Origin's	5		Deep surface casing + top of production casing cement below under pressured hydrocarbon reservoir	
minimum design requirement for a producing well	6		Deep surface casing + top of production casing cement above top of gas	
Origin's minimum design requirement for a P&A well	7		Deep surface casing + top of production casing cement above surface casing shoe	
	8		Deep surface casing + 1 intermediate casing + top of production casing cement below top of gas	
Origin's Beetaloo wells	9		Shallow surface casing + 1 intermediate casing + top of production casing cement above casing shoe	
	10		Deep surface casing + 1 intermediate casing + top of production casing cement above top of gas	
	11		Deep surface casing + 1 intermediate casing + top of production casing cement above casing shoe	
	12		Deep surface casing + 2 intermediate casing strings + top of production casing cement above casing shoe	Low



An x-ray device sent down the well (a technique called logging) combined with pressure testing confirm the quality of the job.

The casing is designed to ensure its strong enough to withstand the most extreme loads it could be subjected to.

Added to this is a program of regulatory control and oversight, and the requirement to appropriately decommission every well at the end of its operational life.



(a)

Vertical a	nd devia	ated wel	ls							
CATEGORY	ORIGINAL WELL COUNT	POTENTIAL BARRIER FAILURES	POTENTIAL BARRIER FAILURES %	CATASTROPHIC BARRIER FAILURES	CATASTROPHIC BARRIER FAILURES %	AVG COMPLETION DATE	P&A WELL COUNT	CURRENT WELL COUNT	ORIGINAL AVG SURFACE CASING DEPTH (FT)	ORIGINAL AVG TOP OF PRODUCTION CEMENT (FT)
Category 1	166	100	60.24%	3	1.81%	1979	57	15	253	7,334
Category 2	621	219	35.27%	5	0.81%	1983	138	301	306	6,566
Category 3	46	16	34.78%	1	2.17%	1987	14	31	321	4,008
Category 4	7	0	0.00%	0	0.00%	1982	1	15	222	125
Category 5	8,789	77	0.88%	1	0.01%	1995	782	6,140	559	6,111
Category 6	5,433	6	0.11%	0	0.00%	2007	105	7,181	712	2,816
Category 7	1,766	0	0.00%		0.00%	2009	8	2,040	719	534
TOTAL	16,828	418	2.48%	10	0.06%		1,105	15,723		
	1 4 7									

(b) Horizontal wells

CATEGORY	ORIGINAL WELL COUNT	POTENTIAL BARRIER FAILURES	POTENTIAL BARRIER FAILURES %	CATASTROPHIC BARRIER FAILURES	CATASTROPHIC BARRIER FAILURES %	AVG COMPLETION DATE	P&A WELL COUNT	CURRENT WELL COUNT	ORIGINAL AVG SURFACE CASING DEPTH (FT)	ORIGINAL AVG TOP OF PRODUCTION CEMENT (FT)
Category 1	0	0	0.00%		0.00%	NA	0	0	NA	NA
Category 2	0	0	0.00%	0	0.00%	NA	0	0	NA	NA
Category 3	0	0	0.00%	0	0.00%	NA	0	0	NA	NA
Category 4	0	0	0.00%	0	0.00%	NA	0	0	NA	NA
Category 5	0	0	0.00%	0	0.00%	NA	0	0	NA	NA
Category 6	269	0	0.00%	0	0.00%	2012	1	268	789	2,153
Category 7	704	0	0.00%		0.00%	2012	2	702	929	442
TOTAL	973	0	0.00%	0	0.00%		3	970		
D&A	0									







Well Construction -**Protecting Aquifers**



Many Australians know Origin as one of the country's largest electricity retailers. We also have significant interests in power generation and natural gas production. This includes exploring for natural gas reserves to develop as future energy sources. Where we find that it makes good sense to produce the gas, we develop and deliver it to our customers in Australia and overseas.

How We Operate

We know we have to get energy right. For our customers. For our communities. For the planet.

Relationships are built on trust and doing what we say what will do. We realise every community is different and that locals know the areas where we work far better than we do.

We promise to talk with you about our plans and listen, to help better guide our decision making.

Co-existence is a proven reality in other parts of the country today.

We will always look for ways we can work together to create shared benefit for all Territorians.

Gas wells on Qld grazing lands



Where We Operate









Australia's Leading Energy Retailer

4.1 million gas, electricity and LPG customer accounts



One Of Australia's Leading Energy Companies



Ensuring **Domestic Gas** Supply

Delivering around 30% of all gas on the east coast with APLNG



Growing Renewable Supply

Targeted to make up more than 25% of our generation mix by 2020





Generation Gas Gas Pumped hydro Solar (contracted) Wind (contracted) Coal Under construction LPG Seaboard Terminal **Electricity Customer Accounts** Natural Gas Customer Accounts **Exploration Acreage** Origin Upstream Acreage APLNG Upstream Acreage

O Office



Powering Australia

7,000 MW of gas, coal and renewable generation and storage across the east coast

Appendix S Environmental Commitment Register

Obligation Details	Accountability	When
Layout of the site and exact siting of infrastructure will be informed by the environmental sensitivities and mitigation measures identified in this EMP.	Project Manager	Site establishment
Land clearance will not be undertaken as a part of this activity, unless authorised to do so.	Civil Construction Superintendent	Continuous
The monitoring and maintenance under the erosion and sediment control plan shall be implemented.	Civil Construction Superintendent	Pre and post wet season
The Spill management plan will be implemented including spill prevention, detection, response and reporting measures.	Drilling and Completions Lead –	Throughout the activity
The wastewater management plan will be implemented including the use of covered tanks, wastewater characterisation, storage monitoring and appropriate disposal.	Drilling and Completions Lead –	Throughout the activity
The bushfire management plan will be implemented to reduce the risk of bushfires. This includes the use of appropriate separation distances between flares and the surrounding vegetation	Drilling and Completions Lead –	Throughout the activity
The Methane emission management plan shall be implemented, including the strategies to prevent, detect, remediate and report potential leaks.	Drilling and Completions Lead –	Throughout the activity
Secondary containment will be implemented for all chemical storage and handling areas	Drilling and Completions Lead –	Throughout the activity
Origin and its sub-contractors will prioritise the use of local labour where such skill sets are available.	Project Manager	Activity planning
The weed management plan shall be implemented, including assuring all equipment and vehicles on-site have a valid weed hygiene certificate and routine monitoring is completed. All identified weeds associated with Origin's activities to be treated and managed in consultation with the DEPWS Weeds Officer.	Project Manager/ Civil Construction Superintendent / Drilling and Completions Lead	Throughout the activity
The site shall be fenced to prevent fauna and livestock access to wastewater	Project Manager	Site establishment and post drilling
Where monitoring confirms bird or bat mortality associated with on-site wastewater storages, Origin will implement additional controls to prevent such impacts from occurring. This may include netting or bird deterrents as appropriate.	Drilling and Completions Lead	During wastewater storage
The Well Operations Management Plan approved by DITT will be implemented to ensure the protection of aquifers and the environment. This includes protecting aquifers through the use of multiple cement and casing barriers and performing the specified well integrity verification testing.	Drilling and Completions Lead	All E&A drilling, stimulation, well testing and decommissioning activities

Obligation Details	Accountability	When
All Groundwater will be extracted, monitored and recorded in accordance with the Water extraction licence.	Project Manager/ Civil Construction Superintendent / Drilling and Completions Lead	Throughout the activity
All wastes will be transported and disposed of at licenced facilities in accordance with the NT Waste Management and Pollution Control Act 1998.	Project Manager/ Civil Construction Superintendent / Drilling and Completions Lead	Throughout the activity
Drilling muds and cuttings will be tested in accordance with the Code of Practice for Onshore Petroleum Activities in the Northern Territory. Where an independent experts considers on-site disposal of muds and cuttings as being environmentally sound, a report will be submitted to DEPWS for approval a to the proposed disposal approach and potential risks.	Health Safety and Environment Representative (HSE Representative)	Prior to the disposal of muds
Where Origin's activities cause a material impact on the quality and quantity of a stock or domestic bore, Origin will make good such impacts in accordance with section 7.5.2.2 of the Inquiry Report. This may include adjusting pump heights, compensation or where appropriate, re-drilling/modifying the bore into an alternative water source.	Project Manager	Upon confirmation an activity has resulted in impairment to a water supply point
Each aquifer intersected will be isolated from overlying aquifers with a cemented casing string as per the WOMP.	Drilling and Completions Lead	During drilling of an E&A well
No material changes in the quality and quantity of aquifers will result from Origin's activities.	Project Manager	Throughout the activity
Surface water will not be used for any activities proposed in this EMP or future operations.	Project Manager	Throughout the activity
Stormwater flooding across the cleared site will be managed to minimise impacts from erosion and sedimentation.	Project Manager	Throughout the activity
Records of weed distribution will be maintained within Origin's GIS and if required provided to the Weeds Officer at DEPWS.	Health Safety and Environment Representative (HSE Representative)	Throughout the activity
Origin have committed to comply with conditions as prescribed by AAPA for the duration of the program.	Project Manager	Throughout the activity
Origin has committed resources and time to allow competent and experienced personnel to participate in educational and community information sessions from Darwin in the North, to Alice Springs in the South and across to Borroloola in the East.	Project Manager	Planning and implementation of activities
Appropriate housekeeping standards will be maintained, and the site will be maintained free of rubbish.	Project Manager/ Civil Construction Superintendent /	Throughout the activity

Obligation Details	Accountability	When
	Drilling and Completions Lead	
Camps will be utilised to mitigate the impact on available accommodate and townships.	Project Manager/ Civil Construction Superintendent / Drilling and Completions Lead	Throughout the activity
Wastewater, sewage and sullage generated by the domestic camp activities will be managed by a Department of Health (DoH) approved sewage treatment system or captured and removed from site.	Drilling and Completions Lead	During wastewater (sewage) management
Monitor road conditions to ensure deterioration with possible increase in dust creation, does not occur and undertake road rehabilitation as required.	Project Manager/ Civil Construction Superintendent / Drilling and Completions Lead	Daily during the activity
Origin will progressively implement a rehabilitation plan in consultation with DEPWS to rehabilitate all disturbed areas	Health Safety and Environment Representative (HSE Representative)	With 12 months of determining an asset is no longer required
Work instructions summarising the requirements of this EMP shall be prepared and submitted to contractors performing work under this EMP. Origin shall ensure all relevant hold points are enforced and signed off prior to commencing work.	Health Safety and Environment Representative (HSE Representative)	Prior to commencement of an activity.

Appendix T Emergency Response Plan



Emergency Response Plan NT-2050-15-MP-0024

Integrated Gas

EMERGENCY RESPONSE PLAN Beetaloo Asset (Northern Territory)

This documents details the Emergency Response Plan for the Beetaloo Asset in a manned and unmanned status.

Revision	Date	Description	Originator	Checked	Approved
0	29/04/2019	Issued for use	L Fulford	B Baldwin M Hanson Ed Wong	T Boyes
1	19/07/2019	Update based on DENR feedback	L Fulford	M Hanson	T Boyes
2	03/12/2019	Update based on DENR feedback	L Fulford	M Kernke	L Fulford
3	18/02/2020	Stage 3 update	L Fulford	E Wong	L Fulford
3.1	17/01/2021	Updated with DEPWS comments	G. Bertini		M. Kernke

Review due: 18/02/2021

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THE THREE WHATS

What can go wrong? What could cause it to go wrong? What can I do to prevent it?

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1. Site Emergency Response Plan (SERP) activation immediate actions

When a site level emergency is declared, this plan will be activated and escalated where appropriate.

Table 1: Activation immediate actions

Triggers for Activation				
Site Emergency Response Team activations (<u>actual</u> or <u>potential</u>) for impacts of any of the following and/or at the discretion of the Person in Charge (PIC).				
People	Serious temporary injury/illness or worse to any person			
Environment	Moderate effects on biological physical environment and serious short term effect to eco-system functions			
Asset	Serious dama	age or loss to production, property and/or infrastructure		
Reputation	Serious impa	ct to community or cultural heritage		
Liability	Serious bread	ch of law or regulation		
1 – Isolate and Ev	acuate			
Muster	Account for a	Il personnel (upwind) whilst assessing the situation		
Isolate	Either through	n Emergency Shutdown Devices (ESD's) or remotely		
Evacuate	If required evacuate to designated evacuation points either upwind or at a safe distance as determined by event type or respective response guideline			
Control	Establish control points to coordinate response and restrict access			
Meeting Points	Nominate predetermined Emergency Services meeting points or establish meeting points near known landmarks or road intersections and establish sentry to meet Emergency Services upon their arrival			
2 – Communicate	and Escalate			
Confirm	Confirm details of the emergency (type of emergency, injuries, contained or uncontained etc.) and response required.			
Activate	Activate ERT, SEMT, brief GEMT-L, contact Emergency Services, communicate with other Stakeholders			
Escalate	Consider likel	y impacts		
Impacts (actual &	Most likely	What is realistically likely to happen and who / what is impacted?		
potential)	Worst case	How bad could it really get and then who / what is impacted?		
SEMT-Leader: Bri for further activation	SEMT-Leader: Brief On-Call GEMT Leader 0477 755 369 on situation, response and triggers for further activation.			
3 – Respond				
Continually reas	ssess situation	Appoint OSC		
Designate communication channels Establish exclusion zones				
Activate approp	riate resources	Develop SMEACS briefing		
Apply Incident F	Response Guid	elines • Provide regular updates		
4 – Response Management				
Personnel	Appropriate personnel in the ERT, SEMT and from outside resources			
Resources	Appropriate resources available to manage the incident			
Tools	Appropriate tools available for the ERT, SEMT, OSC and other responders			

Figure 1: Detection, Assessment, Response Flowchart



2. Introduction

This Emergency Response Plan (ERP) encompasses all Growth Asset's activities within the Beetaloo Asset and will be activated to manage emergency events at site.

Locations / site specific information may be recorded either in a contractors emergency response plan (ERP), bridging document, or through another means of providing emergency information, e.g Emergency Response Notification (ERN) form.

The Site Emergency Response Plan (SERP) is designed to direct and guide the On Scene Commander (OSC) and Emergency Response Team (ERT) (if nominated) to respond effectively to site level emergencies and return the site to normal operations.

Further support is provided through the Origin Emergency Response Framework via the Group Emergency Management Plan (GEMP <u>6522903</u>) and Crisis Management Plan (CMP <u>ORG-RMS-PLA-001</u>).

2.1 Purpose

The purpose of this plan is to describe how to effectively manage site emergencies for the Beetaloo Asset whilst in a manned and unmanned condition.

The plan will:

- Briefly describe the Origin emergency response structure
- Explain the notification and escalation paths for an emergency
- Identify key people and explain what they will do during an emergency
- Describe important information about site infrastructure including:
 - o Location
 - o Geographic area
 - o Isolation points (if applicable)
 - Exclusion zones (if applicable)
 - o Other technical information
- Provide tools and templates to use during an emergency.

2.2 Scope

This Plan supports normal manned operations and response to unmanned locations. Unmanned relates to periodic contractor service visits and occasional small team visits.

This plan applies to all employees, contractors and visitors to the following Beetaloo Asset locations and activities:

- Asset Locations details as described in Section 3.
- Activities included in scope are:
 - o General travel activities (Walking, Land transport).
 - Non/minimum risk activities such as visual inspections, routine low risk maintenance and monitoring tasks.
 - Accompanying or guiding contractors who are engaged in the above mentioned activities.
 - o Laydown yards within tenure.
 - Construction Work (such as access tracks, lease builds, site earthworks, remediation)
 - o Drilling, well completion, intervention or abandonment activities.
 - Transport to and from work areas (not including chartered flights to Airfield)

This plan excludes:

- Chartered flights to airfield and commercial flights to Darwin
- Third Line Logistics Freight and Haulage from Depots to Laydown Yards
- Accommodation in commercial establishments outside of the work areas identified in Section 3.

2.3 Compliance with Civil Legislation and Australian Standards

This plan meets the requirements as identified by legislation for emergency response plans including:

Australian Standards, Codes, Guidelines and Commonwealth Legislation

- Work Health and Safety Act 2011.
- Work Health and Safety Regulations 2011.
- Environment Protection and Biodiversity Conservation Act 1999.
- Australian Dangerous Goods Code.
- National Environment Protection (Assessment of Site Contamination) Measure (NEPM) 1999 as amended 2013.

Northern Territory

- Work Health and Safety (National Uniform Legislation) Act 2016.
- Work Health and Safety (National Uniform Legislation) Regulations 2017.
- Petroleum Act 2018.
- Petroleum Regulations 2013.
- Petroleum (Environment) Regulations 2018.
- Code of Practice for Petroleum Activities in the Northern Territory
- Bushfire Management Act 2016.
- Bushfire Management (General) Regulations 2018.
- Dangerous Goods Act 2012.
- Dangerous Goods Regulations 2018.
- Transport of Dangerous Goods by Road and Rail (National Uniform Legislation) Act and Regulations.
- Waste Management and Pollution Control Act 2016.
- Northern Territory Contaminated Land Guideline (June 2017).

2.4 Operator Details

Origin Energy B2 Limited ("Origin")

Level 25

180 Ann Street, Brisbane, QLD, 4000

2.5 Definition of a Site Emergency

An emergency is defined as an unplanned event within a specific site, facility, field or area, accidentally or deliberately caused, which requires a response to normalise the activity and which may result in an incident such as:

- Injury to people
- A near miss

- Loss of control of any health, safety environment or community related incident as part of the operation
- Damage to the environment
- An uncontrolled release of a substance to air, land and water
- Loss of reputation
- Loss of business
- Loss or damage to product or assets
- Loss of production
- The potential for any of the above

2.6 Project, Construction and Mobile Work Group ER Philosophy.

These teams will have the ability to provide a basic response to: incipient fires, minor spills and basic medical emergencies, in order to preserve life, contain incidents (if able) and reduce the impact on our people, the community, environment and assets.

Section 4, Appendix B and Appendix G identify where increased response capability has been introduced to mitigate the consequences of specific incident types, e,g, Loss of Well Control. Depending on the magnitude of the scenario event, escalation could also include emergency services.

2.7 Site Emergency Management Team Activation/Escalation

This Site Emergency Response Plan (SERP) is activated for emergencies that cause or have the potential to cause SERIOUS or greater consequences. Consequence classification is based on Origins Risk Management Directive <u>ORG-</u><u>RMS-DIR-001</u>

The Site Emergency Management Team Leader (SEMT-L) or On Scene Commander (OSC) has the authority to activate this SERP. Notification must occur to the Group Emergency Management Team (GEMT) Leader, however escalation and activation of the GEMT is determined by the GEMT on call leader. Escalation to the GEMT is conducted by ringing the GEMT-L on call phone <u>0477 755 369</u>. The Origin Emergency Management Structure Escalation Chart shows the different escalation levels between the SERT, GEMT and Crisis Management Team (CMT).

Under certain circumstances the GEMT may be activated without the activation of the SERP / SERT. If required the GEMT-L may then require the activation of SERP's / SERT's to manage an incident/s.

2.8 Document Hierarchy

The Document Hierarchy for Origin Emergency response is identified in Figure 2 below.



Figure 2 Hierarchy of Emergency Response documentation

2.8.1 Document Hierarchy for Principal Contractors

The relationship of Origin Emergency Response documentation for the Beetaloo Project, in conjunction with Contractor Emergency Response documentation is demonstrated in Figure 3 below.

Emergency Management - Overview



Emergency Response System Framework – Activity Specific



SEMT – Beetalo	o & Growth Assets	SEMT – Ass	sets Services
Operational Monitoring Activities	Access, Drill Pad, and Site Remediation Civil Construction Activities	Exploration Well Drilling, Completion, Stimulation and Testing Activities	Logistics, Transport, and Warehousing Field Support Activities
OSC Managed by Beetaloo & Growth Assets Projects and Operations Manager	OSC managed by Beetaloo & Growth Assets Civil Superintendent	OSC managed by Asset Services Well Site Representative	OSC managed by Asset Services Field Manager
Internal Operational Emergency Response Protocols for In-Field Monitoring Activities – managed by Beetaloo ERP.	Principal Contractor ERP – relevant to Construction Project Scopes (externally appointed contractor/s)	Rig Operator ERP – relevant to Drilling, Completion, Stimulation, DFIT and Testing Activities	Contractor ERPs – relevant to Scope of Services (e.g. warehousing, logistics services, aviation)

Contractor Bridging Plans, Work Programs and Contractor Assurance protocols applied as part of contractor engagement, review and mobilisation to ensure alignment with Origin and Beetaloo scope specific Emergency requirements.

I





2.8.2 Emergency Management Structure

Figure 4 below identifies the Command and Control and escalation pathway for emergencies. Figure 3 identifies the escalation pathways for each component in Beetaloo & Growth Assets including Asset Services.



Figure 4 – Emergency Management Structure

3. Beetaloo Asset Locations and Field Activities

The Integrated Gas Growth Asset Business conducts operations in the Northern Territory (NT) at Beetaloo. The activities conducted in this scope include the following areas:

3.1.1 Drilling, Hydraulic Fracturing Stimulation (HFS), Completion and Well Testing Activities

Works are executed by Rig contractors, and are supervised by an Origin Wellsite Representative (company representative) who at times may additionally undertake rigless operations. Contractors undertaking these scopes of work operate under their own Safety Management System and Emergency Response Plans at designated locations identified within this Emergency Response Plan.

Additionally, these activities are supported by the IG Asset Services Emergency Response Plan CDN/ID 19601361 (where deemed applicable).

IG Field Management is executed through the Asset Services Field Managers located within project areas during project duration, details of these are provided within Contacts list within Appendix A.

3.1.2 Civil construction and related activities

Works such as establishing lay down areas, construction of access tracks, are usually executed by contractors operating under their own Safety Management System and Emergency Response Plans at various Beetaloo locations which are bridged to Origin Energy requirements. Beetaloo Field Management is executed through the Beetaloo & Growth Assets Projects & Operations Manager and the Beetaloo & Growth Assets Civil Superintendent whom is located within the project areas during project duration.

3.1.3 Commissioning

Works relating to commissioning of infrastructure are executed by contractors for electrical facilities and Rig Contractors for hydrocarbons as per Contractor Safe Systems of Work.

3.1.4 Projects

Works may be executed at varying locations to expand or support capability improvement to Origin Assets at Beetaloo including water monitoring bores, helicopter landing sites, or communication equipment. These Projects are usually delivered by contractors operating under their own Safety Management System and Emergency Response Plans bridged to Origin Energy requirements.

3.1.5 Field Support (logistics)

Where applicable, mobile camps will be executed by Principal Contractors. Warehousing and laydown activities will be managed by specific location ERP for the activity.

3.1.6 Existing well inspection monitoring

Well inspection monitoring activities are undertaken by local contractors working directly for Origin, these contractors report through the Beetaloo & Growth Assets Projects & Operations Manager and Beetaloo & Growth Assets Civil Superintendent located within project areas during project duration. The process undertaken for existing wells is detailed within Appendix B.

3.2 Field Sites / Locations

Site specific details, include location, proximity to emergency services and townships can be found within Appendix C. The maps below identify the location of the Beetaloo Project as well as specific Site locations referenced within this plan.



Figure 5: Location of Beetaloo Asset within Northern Territory





4. Emergency Scenario Responses

If an incident occurs, the designated Person in Charge as determined by the Beetaloo Safety Management Plan – NT-2050-15-MP-001 (Field Supervisor) will nominate an OSC and also which Origin business unit SEMT-L will be initiated. These aspect is indicated within Figure 3.

The designated SEMT-L will liaise with the Associated contractor (and Contract Owner) and notify the On-Call GEMT Leader (if deemed required). If an emergency event exceeds the contractors capability, i.e. Loss of well control, then Origin Beetaloo Asset will assume management of the incident and delegate management to internal Origin expertise, i.e Asset Services, Drilling & Completions team. The Integrated Gas Asset Services team will then determine if external support is required.

Category	Response Procedures		
GENERAL	 Evacuation and Alarms First Responder – Immediate Action Checklist Activate Emergency Shutdown Device Shift Change Over Checklist Termination of Emergency 		
FIRE	 Fire – (Plant, Building/Storage / Accommodation (Including mobile camps), Electrical) Bushfire 		
PERSONAL SAFETY	 Medical Emergency Vehicle Accident Missing Overdue worker Lone Worker Snakebite Snakebite Rescue from Height Rescue from Confined space Rescue from Heights Communicable Disease Electrical Shock Man Down Aviation 		
ENVIRONMENT	 Environment Related Incident (Earthquake) Environment – Weather Related Incident – Storm and Lightning Loss of Containment / Spill Flood 		
FACILITY & EQUIPMENT	 Major Structural / Mechanical Damage HV / LV Electrical Fault 		
HAZMAT	 Diesel Nitrogen Loss of Well Control level 1 or 2 		
SECURITY	 Protest / Trespass Bomb Threat Armed Intruder Lockdown 		

4.1 Scenario Flip Charts

The Emergency Scenario Flip Charts (CDN 3676134) provide an easy to understand detailed response to identified emergency situations and also provide additional scenarios that may not be mentioned. Appendix H contains four main responses from the Flip Charts for ease of reference being: 1.) Bushfire 2.) Flood 3.) Spill and 4.) Loss of Well Control.

4.2 Contractor Scenarios

For some undertakings, for example a Well control event, Origin will delegate its responsibility to a Contractor, or Sub-Contractor with suitable emergency response capability as Origin will have limited/if any field presence at times.

It will be the responsibility of the contractor to provide an initial emergency response and coordinate the emergency event. If an Origin employee is involved in an emergency event at a site under the control of a contractor it is expected that the Origin employee will conform to the contractors response requirements and support the contractor if willing and competent to do so.

Notification of the event will follow normal reporting processes within the business unit. The activation of the GEMT may be required for an incident involving the contractor. While an Origin SEMT-L may be required to coordinate Origin aspects at the incident site, in support of the contractor, contractor management will more likely occur through a nominated Origin contact (i.e.Contract Owner) who will liaise with the contractor emergency management team.

Depending on location of works the contractor may be able to call upon other nearby parties or State Emergency Services for assistance in responding or handling the incident; however the contractor retains responsibility for managing the emergency event.

4.3 Well Monitoring and Control

Appendix B and Appendix C contain all information pertaining to the monitoring of remote wells, well control and classification of well control incidents.

A loss of Well Control is considered a Major Accident Event (MAE) which, while rare, requires additional controls and engineering assessments to mitigate potential consequences.

4.3.1 Potential Major Accident Events

A Major Accident Event is an *uncontrolled incident, including fire, explosion or release of dangerous substance with the potential to lead to multiple fatalities or major environmental damage* (potential for critical or catastrophic consequence as per Origin Risk Matrix).

If the Business Unit undertaking the work has the potential for a Major Accident Event to occur these will be identified in the Business Unit Safety Management Plan (SMP) or Safety Case.

For more information refer to MAE hazard assessment and risk reduction (ALARP & SFAIRP requirements) procedure (<u>CDN/ID: 7983063</u>) or contact the Process Safety Advisor at Origin (details in contact list).

5. Campaign specific ERP arrangements

5.1 Roles

The following roles and responsibilities are essential to ensure effective communication within Beetaloo Asset when responding to emergency events.

- First Responder (FR), located at the incident scene and may be a Contractor
- On Scene Commander (OSC) located at the incident scene
- Site Emergency Management Team Leader (SEMT-L), located at either:
 - the Field Emergency Control Room (ECR); or
 - o The Brisbane ECR, 180 Ann Street, Level 29, Room 29:12

Individuals may undertake multiple roles depending on the nature of the emergency, its duration and complexity. The functional roles that will assist the SEMT-L are listed below and known as the Site Emergency Management Team (SEMT).

- Operations
- Planning
- Logistics
- Log Keeper

Additional roles such as Technical Engineering, Travel and Accommodation Services may supplement the SEMT depending on the type of incident.

If the SEMT-L is unable to undertake their responsibilities a competent alternate or delegate SEMT-L must be appointed to ensure the SEMT continues to function.

If required, depending on the nature and severity of the incident, the Group Emergency Management Team (GEMT) may be activated to support the response. The GEMT can be called upon to support

such issues as Regulatory notifications, provide additional manning to site, or source assets required to support the site, such as Aviation.

For in-depth information regarding the above positions refer to the Duty cards in the OSC/SEMT toolkits

SEMT and OSC Toolkit (AUS-IGMS-SAF-GDL CDN 6893451)

http://im.originenergy.com.au/otcs/cs.exe/Open/6893451

5.2 Responsibilities

A summary of responsibilities are located below, with contractors found in the PC ERP.

Roles and responsibilities				
Contractor work parties / First Responder	 Respond to the situation as per the contractors emergency response plan. Actively participate in the risk management process to assist in the development of emergency action plans; Check the notice boards for any recent updates to information; Maintain a high level of awareness of actions to be taken in the event of an emergency situation; Follow instructions from Emergency Controller, Emergency Services personnel, Fire Wardens, First Aiders and other designated emergency personnel as appropriate; and Prior to commencing any work or entering a work area, sign on to prestart or JRA for the associated activity. 			
First Aiders	 Ensure their first aid competencies (minimum <i>Apply First Aid and CPR</i>) are maintained and advise the PM prior to the expiry; Provide first aid treatment or assessment as needed, working within their skill level; Determine need for medical assistance and provide information to Medical personnel or Emergency services as required; Ensure that first aid kits are maintained and complete and items are in-date; and Ensure that all treatments provided, regardless of the type or complexities are recorded. 			
Site Paramedic / Nurse Practioner	 Provide care on site available during the 12 hr work day (on call 24/7 whilst on location) Ensures that medical response emergency equipment is suitable and located appropriately; Checks that Emergency action plans are appropriate for the activity/hazards identified; Test communication and advises of any changes; 			
Origin work /travel team supervisor (Person in Charge) On Scene Commander	 Escalate to the Person in Charge, for Beetaloo & Growth Assets managed activities whom is the Beetaloo & Growth Assets Civil Superintendent or delegate, For Integrated Gas Asset Services (IGAS) managed activities (identified in Figure 3) to the designated Field Manager. Maintain a log of events Escalate to Emergency Services, if required. Act as On Scene Commander (OSC) and manage first response at site level Ensure that emergency action plans are discussed on a regular basis at Pre-Start / Toolbox meetings, so that all persons under their control are aware of the project emergency procedures; Ensure that emergency equipment is maintained in good working order (complete, clean and available for immediate use); 			
	 Advise the HSE Representative or Person in Charge (e.g Operations/Project Manager/Field Manager) of any operational issues that may impact with or affect the emergency action plans; 			
---	--			
	 Ensure that emergency action plans are prominently displayed and available for use by all workers; and 			
	 Take role of on-scene commander especially in first response to an emergency incident. During first response, ensure safety of other team members and ensure that emergency situation is communicated to the Emergency Controller. 			
For Civil and existing infrastructure (exploration wells)	 Act as Site Emergency Management Team Leader (SEMT-L) (with respect to taking call from OSC and escalating to Project Manager Provide well monitoring trend analysis as required 			
activities managed by Beetaloo & Growth	 Act as journey contact for field teams. 			
Assets Team.	Escalate to GEMT-L as required.			
	Support field team with emergency service direction/calls as			
Operations Manager Growth Assets	requested			
For D&C activities managed by Integrated	 Act as Site Emergency Management Team Leader (SEMT-L) (with respect to taking call from OSC and escalating to D&C Beetaloo Project Manager 			
Gas Asset Services	 Provide well monitoring trend analysis as required 			
	Act as journey contact for field teams.			
Asset Services – D&C	Escalate to GEMT-L as required.			
Field Manager	 Support field team with emergency service direction/calls as requested 			
General Manager	Receive call from PIC and support where required.			
Beetaloo & Growth Assets	Participate in Group Emergency Management Team if activated.			
General Manager	Receive call from PIC and support where required.			
Asset Services	Participate in Group Emergency Management Team if activated.			

5.3 Communications

The communication flow between contractors (rig), external services and Origin is demonstrated in the flow chart below:



Figure 6: Communication flow

6. Emergency Management and Control

After an emergency is detected, the following emergency management stages will be used to control and contain the incident and return to business as usual.

- Raise the alarm
- Isolate and secure
- Communicate and Escalate
- Respond and Recover

6.1 Raise the alarm

One or more of the following methods can be used to raise the alarm:

- in person
- radio (Digital, UHF, VHF etc)
- phone (mobile, satellite or landline)
- Emergency alarm

6.2 Isolate and Evacuate

- Stop all work and make sure the worksite is safe
 - o Secure the well, or impacted area
 - o stop vehicle and mobile plant operations
- If you need to abandon vehicles and mobile plant
 - o pull over and park in a safe area
 - o ensure access and egress to the site is not impeded
 - o switch off and leave the keys in the ignition
- Plan a safe route to the muster point and avoid movement through unsafe areas
- Account for all people
- Stand by at the muster point until stood-down or instructed to evacuate

6.3 Communicate and Escalate

- Gather information where is the emergency, what has happened, who is affected, is anyone missing, where are the safe areas etc
- Advise and update the Site Safety Manager
- Call Emergency Services (police, fire, ambulance) if required
- Identify meeting points for responders (Origin Medical Providers, ERT etc) and Emergency Services
- SEMT activates if required

6.4 Respond and Recover

- Apply first aid to injured people (if safe to do so)
- Activate ERT
- Consider Simultaneous Operations (SIMOPS), advise nearby work groups and if on an IG Asset, the Asset SEMT-L
- Assist Emergency Services
- Follow response procedures

6.5 Meeting Emergency Services

Where Emergency Services such as Ambulance, Police and Fire Services dispatched by road or air, an Origin employee or contractor, whenever possible, will meet the Emergency Service at a designated location and direct them to the incident site.

Meeting points with Emergency Services should be pre-identified if practicable and communicated to the Emergency Services on call out.

6.6 Hazard awareness

Any person arriving at the emergency site (Origin responders, Origin medical providers, Emergency Services) will be made familiar with:

Hazards generated by the incident (fire, heat radiation, chemical exposure etc)

Released on 18/02/2020 – Revision 3 - Status Issued For Use. Document Custodian is: General Manager – Beetaloo & Growth Assets

- Known hazardous areas
- Known safe locations and distances
- Appropriate PPE (if known)

6.7 Shift changeover during an emergency

Shift changeovers are required for continuity of emergency management. The SEMT-L is responsible for change over of personnel involved in the emergency. Effective changeover will be achieved by:

- Staggering changeover times
- Avoiding changeovers during critical periods
- Having changeovers in daylight, where possible
- Briefing incoming personnel

6.8 Termination of emergency and recovery actions

The SEMT-L will declare when the response phase will stop and determine the recovery strategy and resources required in consultation with the GEMT-L if GEMT is activated.

All activities required to terminate an emergency and conduct recovery operations are located in Paragraph 8 of this document.

7. Post Emergency Actions

The following post emergency actions must occur in order to ensure the Asset, and Business as a whole, successfully learns from the incident and returns to pre-incident state operations.

7.1 After Action Review

A debrief or After Action Review (AAR) is to be held after each emergency in accordance with the After Action Review Procedure <u>CDN 8189619</u> and using the After Action Review Form <u>CDN 13853829</u>. An AAR is designed to discuss strengths and weaknesses and necessary improvements for this plan and related procedures. All AAR's shall be entered into OCIS along with any action items identified within the corresponding Incident tab.

7.2 Incident investigation

All incident investigations should be conducted in accordance with the Integrated Gas Manage Incidents and Learning Core Process found within <u>ProMapp</u>. The following steps should also be considered:

- Secure the incident site, restrict access and do not disturb anything until investigators have finished and handed back control of the site.
- Gather any evidence that may assist the investigations (list of people involved, response logs, situation boards, photographs etc).

The incident reporting system 'Origin Collective Intelligence System' (OCIS) will be used to record all incidents and actions arising from the emergency.

7.3 Recovery Actions

Prior to resuming work, develop a recovery plan that considers the following:

- Check plant and equipment for structural, physical and electrical/instrumentation integrity
- Ensure all active detection and protection systems are restored
- Replenish emergency response equipment as required
- Replace or return any third party emergency equipment

In addition, consider the following points:

- People who were involved may require counselling, depending on the nature of the incident
- People should be debriefed, with all relevant information captured for a 'lessons learnt'
- Conduct a tool box talk on specific start up activities before restarting work

- Consider the potential for loss of confidence or potential IR issues following the incident or the response to that incident
- Emergency response plans and training may need to be revised before resuming normal activities.

7.4 Post Incident Clean-Up

Post incident clean up must be done using the following guidelines:

- Conduct an initial inspection to identify the extent of equipment and plant damage
- Assess potential decontamination needs (removal of chemicals/oil/foam from plant/equipment, contaminated soil etc.)
- Store all contaminated material in proper containers, pending offsite disposal by licensed hazardous waste contractors
- Repair or replace damaged equipment and plant
- Inspect and test affected equipment
- Attend to commissioning and site reinstatement

8. Training and Capability

IG emergency response competency-based training is managed by Organisational Capability. Training is captured in People Central on the Origin Intranet (Source). Managers and supervisors are responsible for identifying and organising training for people required to perform emergency response roles. All personnel must be given specific instructions and training on how to respond to emergencies and in the correct use of emergency equipment available.

Emergency training may be in the form of:

- Competency based training
- Simulated exercises
- Desktop exercises
- Toolboxes
- Practical drills
- Resource and equipment checks

8.1 Drills and Exercises

The Emergency Exercise Planning and Reporting Procedure AUS-1000-SAF-PRO-00010 <u>CDN/ID</u> <u>3674898</u> details the minimum requirements for the planning and conduct of exercises.

All drills and exercises require an After Action Review to determine what worked well and what requires improvement. All actions are to be recorded in OCIS and reviewed until close out.

Figure 7 details the Beetaloo Assets annual exercise program.

In addition to this schedule the IG Well Control Standard (INT-1000-35-TS-001) mandates emergency response exercises to be conducted as follows:

- For continuous operations, IG D&C related activities shall conduct two Well Control Emergency response exercises per year to evaluate the effectiveness of the response of all stakeholders
- For projects that are campaign based, a Well Control Emergency Response Exercise shall be held at the start of the campaign involving all stakeholders. Subsequent exercises shall be conducted on a minimum twice annual basis if applicable.

Personnel safety

HA7MA1

		Jan	Feb	Mar	Apr	Мау	Jun
			1st Qtr		2nd Qtr		
Shift 1 and 2	Primary	Environmental		Environmental	Personnel safety	Structural failure	Personnel safety
	Secondary	Personnel safety	Personnel safety	HAZMAT	Security	Personnel safety	Personnel safety
		Jul	Aug	Sep	Oct	Nov	Dec
		3rd Qtr		4th Qtr			
Shift 1 and 2	Primary	Personnel safety	Personnel safety	Security	Structural / Equipment failure - Water		Personnel safety



Personnel safety

8.2 Training Requirements

Secondary

Security

The Site ER job task analysis and Site Supervisor/Wellsite Representative job task analysis identifies the minimum requirements for trained personnel for specific roles that comprise the ERT and SEMT. It is the Contractor / Site Manager responsibility to maintain minimum levels of trained staff to meet their sites requirements.

8.3 Training and Competency

- All parties must be familiarised with the contents of this ERP.
- All personnel identified to fulfil emergency response roles within this ERP must be competent
- Minimum one remote first aid trained person per work party or travelling team.

Personnel safety

9. **Response Resources**

The following response resources may aid in the preparation for, and management of, emergencies by the Beetaloo Asset.

9.1 Planning and Preparation

Enabling activities, such as ensuring minimum training and ensuring hardware maintenance, which are required to be carried out to support this plan are detailed in the:

- Beetaloo Basin Groundwater Monitoring Bore Installation Environmental Management Plan,
- Bushfire Management Plan
- Spill Contingency Management Plan
- Civil Construction Environmental Management Plans, and the
- Drilling, Completion, Hydraulic Fracture Stimulation and Well Testing Environmental Management Plan, in conjunction with the requirements of the Origin Integrated Gas HSEMS.

Dependent on workscope the relevant Person in charge (Field Supervisor) is responsible for ensuring that any staff mobilised to conduct work for OE in the Beetaloo Basin have been appropriately briefed, completed appropriate inductions and completed the nominated minimum training as applicable to the work conducted.

9.2 Equipment and Unmanned Phase

During operations, emergency response equipment available at each Site, and their layout, will be detailed and provided within contractor specific ERPs.

Emergency response assistance will be provided by Triple P Contracting within an unmanned aspect, this will only involve monitoring the location from a distance to ensure appropriate escalation can occur if required.

9.3 Incident Response Procedures Flip Charts

Emergency Scenario Flip Charts <u>CDN 3676134</u> are intended to provide further assistance to each role in dealing with various pre–defined emergency scenarios. The charts define the key roles and

responsibilities to ensure essential response actions are undertaken. The flip charts can be found in Core Process Manage Incidents and Learning.

9.4 Spill Response

The Beetaloo Spill Management Plan (NT-2050-15-MP-030) provides specific information on how to manage and handle spill response within the Beetaloo Asset (included spills located off tenure). This document should be referenced for all non emergency spill response scenarios. For managing spills, Emergency Scenario Flip Charts <u>CDN 3676134</u> and Appendix H should be utilised to manage Spills.

9.5 Chemical Response & Risk

The Chemical Response guidelines (QLD-1000-SAF-PRO CDN 4411922) provide specific information for specific chemicals that are used on Origin sites. The guidelines provide information on:

- PPE requirements
- Chemical details and description
- First Aid requirements
- Evacuation considerations
- Fire and spill management

Whilst this document was developed for QLD based Integrated gas sites it can be used on other sites if the same chemicals are present and the SDS lists the same response requirements. Any differences between the Chemical Response Procedures and the SDS must be risk assessed with appropriate controls adopted.

Additionally, an Hydraulic Fracturing Chemical Risk Assessments were completed for the activities. The fluid systems reviewed were:

- Hydraluic fracture stimulation fluids;
- Hydraulic fracture chemical tracers; and
- Drilling fluids

As part of the Chemical Risk Assessment an hazard assessment was undertaken with the evaluation of the environmental hazard of the chemical additives in the hydraulic fracturing fluid systems, based on their environmental persistence, bioaccumulation and aquatic toxicity properties.

Also included was an evaluation of human health effects (i.e.genotoxicity, carcinogenicity, reproductive toxicity, oral toxicity, inhalation toxicity, dermal toxicity, chronic repeated dose toxicity).

Chemical Response Procedures (<u>CDN 4411922</u>) Beetaloo Chemical Risk Assessment (NT-2050-15-AR-0003)

9.6 SEMT and OSC Toolkit

The link below identifies forms and procedures that can be used to help the OSC or SEMT in an emergency situation. These include:

SEMT and OSC Toolkit			
Duty Cards	SEMT Duty Cards		
Initial Emergency Response Actions for All Incidents	Checklists		
OSC Forms	SEMT Forms		
OSC Worksheets	SEMT Worksheets		
Checklists	ECR Equipment and Layout		
Landing of Careflight Helicopter in The Field	ECR Status Boards		

SEMT and OSC Toolkit (AUS-IGMS-SAF-GDL- CDN 6893451)

9.7 Bushfire Management

Specific wellsite Bushfire Managements Plans (BMPs) have been prepared for each wellsite location as per Code of Practice for Petroleum Activities requirements, these BMPs can be found in **Appendix D4**.

The following link can provide technical advice in developing Bushfire Management processes as it provides access to Prevention and Response resources such as:

- IG Bushfire Standard
- Bushfire Preparedness Tool
- Generic Bushfire Asset Protection Zone (APZ) Guide
- Beetaloo Bushfire Management Plan
- <u>https://www.pfes.nt.gov.au/incidentmap</u>

Bushfire Management Source Bushfire Page Link

9.8 Flood Management

In the preparation and response to a flood event, the following resources have been developed to help the site prepare for and manage a flood response

- Camp Isolation Readiness Check sheet (Appendix I).
- Flood Mapping via OLIMAPS (where available)

Betaloo Assets teams can use the above tools to develop site Specific Flood Plans. The plan should take into consideration:

- Sources of flooding i.e. rivers, dam over flows etc.
- Fixed and temporary assets affected by flooding
- Access roads that are cut off and at what levels.
- Seasonal Preparedness Activities at a minimum to prepare site for a flood
- Flood Warning or Watch
- Need to isolate equipment affected by flooding
- Flood Recovery requirements

9.9 Security Toolkits

In addition to the Emergency Response Flip Charts (CDN 6893451) the following documentation supports response to different security scenarios:

- IG Security Management Plan CDN 8278592
- Wellsite Safety and Security Level Classification Procedure
- Regional Protest Plan CDN 7654911
- Beetaloo Security Plan NT-2050-95-MN-001

Security Toolkits Source Security Page

9.10 Aviation Resources

Specific aviation resources can be sourced for use during an emergency. The IG Aviation Management Plan INT-1000-SAF-PLN-00007 can help to develop site specific aviation appropriate emergency response actions for the business unit's area.

Additionally, the Beetaloo Aviation Management plan provides further guidance for specific aviation practices within the Asset.

Further tools can be found at the IG <u>Transport and Aviation Source Page</u>

The plan identifies

- Aviation Tasking Process
- Aviation Bookings (fixed and rotary winged aircraft)
- Landing Site Management including approved Airfields and Helicopter landing site requirements.

Aviation Management Plan

Integrated Gas Aviation Management Plan

In addition to the aviation management plan the below link provides details on the following:

- Helicopter Landing Sites technical inspection report form
- Helicopter Landing site design plate
- Helicopter Landing Site Officers
- Approved Helicopter Landing Site Register and requirements
- Aerial Firefighting
- Helicopter Landing Site Officer operators manual

Aviation Resources

http://source.originenergy.com.au/Business/Gas/hse/risk/Pages/Transport.aspx

9.10.1 Helicopter Landing Site Officer (HLSO)

If a helicopter is required for an emergency situation a designated / trained Helicopter Landing Site Officer (HLSO) should be sourced (where available) to support ground activities. It is the responsibility of the HLSO to ensure that they are familiar with the landing locations and the requirements associated with the Helicopter Landing Site Officer Operations Procedure – Integrated Gas (<u>CDN/ID 7983075</u>).

Landing Site Coordinates should be identified in either the Emergency Response Notification (ERN) document that is prefilled by the rig when moving to a new well location or if conducting a Campaign then nominated in the campaign specific bridging document.

9.11 Emergency Control Room

The Emergency Control Room (ECR), manned by the Growth Assets SEMT, is the coordination centre and "communication hub" for Beetaloo Asset based emergency incidents. The ECR must be activated to help assist the affected site oversee the operational emergency response and well-being of personnel involved in, or affected by, the emergency. The Beetaloo Asset ECR is located in 180 Ann Street in room 29:12 and contains appropriate tools, documents and stationery to support a response.

Emergency Control Room ECR Tools

9.12 Emergency Equipment

A detailed list of Beetaloo major ER equipment is located in Appendix G.

10. Stakeholder Management

An emergency will be coordinated and supported by the SEMT at the ECR and SEMT at site. The bridging document or the ERN will contain site specific contacts that can be contacted in an emergency.

10.1 Group Emergency Management Team (GEMT)

The GEMT provides support to an emergency situation and manages the higher level requirements to assist the SEMT whilst dealing with regulators, media, legal and industry partners. For every activation of the SEMT, the SEMT-L must contact the on call GEMT-L and advise of the situation. The GEMT-L will determine whether the GEMT will be activated. The SEMTL and GEMTL must be familiar with the levels of incident management categories located within the Emergency response Assessment and Escalation procedure (CDN 8629094)

When an incident has escalated to include the GEMT, the SEMT-L, having consulted with the OSC, will communicate regularly with the GEMT Operations Lead to provide updates and make requests for support.

Group Emergency Management Plan (INT-IGMS-SAF-PLN CDN 6522903)

10.2 Emergency Services

First Responders must notify the OSC and in turn the SEMT-L if they call Emergency Services. Once notified, the OSC is responsible for all communications back to the SEMT.

Upon arrival, Emergency Services may take control of the emergency or leave the control to Origin to manage, depending on the type of emergency and the assistance that is required. In most circumstances Emergency Services will require assistance from Origin for local and technical knowledge and for additional resources to manage the incident.

Where Emergency Services take control of the incident it must be remembered that they are not able to command Origin personnel or resources, this command must still be managed by an Origin representative such as the OSC. This same control over the Emergency Services personnel and resources must be managed by the Emergency Services representative, such as the Incident Controller or senior officer.

10.2.1 Emergency Manifest

A hard copy Emergency Manifest, identifying notifiable quantities of hazardous substances, should be located on arrival at permanent field locations in an easily accessible and identifiable place. An Emergency Service Manifest template found in Open Text Templates (and <u>CDN 5362370</u>) can be used to develop the Emergency Manifest.

10.3 Next of Kin

In the event of a death, serious injury or other emergency, involving Origin personnel, advice to relatives about the condition of a person or about the incident will be coordinated by People and Culture (P&C) through the GEMT.

During or after an emergency, the SEMT-L will refer any queries or concerns from relatives to People and Culture. P&C may also activate Employee Assistance Program (EAP) providers to support site personnel or relatives affected by an incident.

Principal Contractors and Contractor companies are responsible for management of next of kin communication in consultation with Police services, and EAP management in accordance with their emergency response plans and relevant State obligations. Where Contractors do not maintain their own EAP provider, P&C may extend EAP services as determined by the GEMT-L and P&C GEMT representative.

10.4 Landowners / Pastoralists

Contact with local landowners can be initiated by the SEMT-L in extreme circumstances; however Land Relations Advisors are to be used in the first instance. When activated, stakeholder communications will be handled by the GEMT and are addressed in the Group Emergency Management Plan (INT-IGMS-SAF-PLN-00004). Refer to Appendix A for contact details.

10.5 Regulatory Notification

A regulatory notifiable incident is an incident or non-compliance with an External Mandatory Obligation or External Voluntary Obligation that requires notification or reporting to a Regulator as prescribed by applicable Laws and Regulations. HSE regulatory notifiable incidents required to be reported to a regulator are listed in Appendix A.1.

Any regulatory incident notification to joint venture parties must follow the contractual arrangements specified in the joint venture agreement.

The Origin Energy joint venture representative must be consulted to determine Origin Energy's contractual obligations for incident notification and reporting.

Any correspondence between Origin Energy and joint venture partners must be conducted through the joint venture representative unless other arrangements have been agreed.

Verbal Notification	Written Notification
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Risk Assurance Compliance and Process Safety Team	IntegratedGasCompliance@upstream.originenergy.com.au
On-call number 0475 813 986	

Integrated Gas management of Regulatory Notifiable Incidents (<u>INT-IGMS-BUS-PRO-00001</u> <u>CDN/ID 5814101</u>)

10.6 Dealing with Media Enquires

During an emergency event, media attention may occur at the affected site. All communications with the media must be in accordance with the Origin Media Policy (ORG-CGOV-POL-005). If personnel receive an enquiry from a journalist or reporter, whether in person or by phone and are asked about Origin, they should say:

"I am not in a position to comment but if you give me your name and telephone number I will organise for the most appropriate person to call you."

Always ask for:

- the journalist / reporter's name;
- publication / media outlet;
- contact phone number and / or email, and
- publication deadline.

The SEMT-L will advise the GEMT-L on call and External Affairs managers at the earliest opportunity of any media contact or enquiry. Refer to Appendix A – Table 3 for External Affairs contact details.

It is important to remember that there is no such thing as "off the record". Even if you are speaking informally, you could be quoted at any time.

11. **Review and update**

The ERP will be reviewed and updated as necessary in response to one or more of the following:

- annually
- when major changes have occurred, which may affect the Emergency Response coordination or capabilities
- following routine testing of the plan
- after an actual emergency or
- before installing and commissioning new plant and equipment.

During the review, the following aspects are also to be considered:

- lessons learned from an emergency
- changes in legal requirements
- improvements to effectiveness in terms of response strategy, management and communication
- developments in the latest techniques and technology in handling an emergency
- changes to, or movement of people within our organisation
- changes to contact numbers of internal and external organisations

revisions to existing, or availability of, emergency management tools and equipment and resource suppliers and contractors.

12. Associated Documents

Document	Document Reference	
Incident Response Procedures	QLD-1000-SAF-PRO-00041	

Document	Document Reference
Chemical Response Procedures	QLD-1000-SAF-PRO-00095
SEMT Toolkit	AUS-IGMS-SAF-GDL-00002
Emergency Response Exercise Planning Form	AUS-1000-SAF-FRM-00012
IG Group Emergency Management Plan (GEMP)	INT-IGMS-SAF-PLN-00004
Crisis Management Plan	ORG-RMS-PLA-001
Emergency Response Exercise Planning and Reporting Procedure	AUS-1000-SAF-PRO-00010
Risk Management Policy	ORG-RISK-POL-001
Origin Risk Toolkit	ORG-RSK-TOOL-001

13. Document information and history

DOCUMENT CUSTODIAN GROUP

Title	Name/s	
General Manager – Beetaloo & Growth Assets	Tracey Boyes	

DOCU	MENT	AUTH	OR
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Position	Name	
HSE Lead – Growth Assets	Lucas Fulford	

STAKEHOLDERS AND OTHER CONTRIBUTORS

Position	Name
Emergency Response and Security SME – HSE, Risk and Compliance (RAC)	Bruce Baldwin
Operations & Projects Manager – Growth Assets	Matthew Hanson
D&C Project Manager – Growth Assets	Ed Wong
Field Manager – Asset Services (Beetaloo)	Troy Beetson
Logistics Manager – Asset Services	Peter Runge
Environmental Specialist – Growth Assets	Matt Kernke

DOCUMENT HISTORY

Rev	Date	Changes made in document	Reviewer/s	Consolidator	Approver
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Emergency Response Plan

A	25/03/2019	Consolidation of previous Beetaloo campaign ER plans, unmanned ERP to align with Integrated Gas ERP requirements to form Asset ERP.	B Baldwin	L Fulford	
0	29/04/2019	Issued for Use	B Baldwin M Hanson Ed Wong	L Fulford	T Boyes
1	21/06/2019	 Update references around regulatory reporting requirements based on NT regulator DNER feedback. Update from NT police comments. Combined wells and lease pad locations into one location in Appendix C for ease of reference. 	M Kernke	L Fulford	T Boyes
2	03/12/2019	Police contact details updated in Appendix A1.	M Kernke	L Fulford	L Fulford
3	08/01/2020	Update to Appendix C – Well control information, addition of Boots & Coots information. Addition of Appendix D – Bushfire Management Plans	E Wong	L Fulford	L Fulford

Appendix A Contact lists

External Agencies				
Role	Name	Primary		
Local Emergency Services	Police, Fire, Ambulance	000 (or 112 from mobile)		
Hospital	Katherine Hospital	(08) 8973 9211 Kintore Clinic Katherine (08) 8972 1677		
Field response contractor / initial inspections	Triple P Contracting (PPP)	Gordon Jackson0456 618 367Susey Jackson0487 120 819Sat Phone0147157201Email:triplepcontracting@outlook.com		
Remote Well Monitoring Assistance	Vincent James Operations Support Manager MPC Kinetic	+61 419 822 992		
Bushfires NT	Fire control officer	Katherine (08) 8973 8871		
Volunteer Bushfire brigade		(08) 8975 9936		
Regional Shire Council	Roper Gulf Shire	08 8972 9000 or 1300 366 208		
Regional Shire Council	Barkley Shire			
Police (non-emergency)	Police Link	131 444 Elliott - (08) 8969 2010 Katherine – (08) 8973 8000		
Poisons Information Centre	n/a	13 11 26		
Bureau of Meteorology	Cyclone Warnings Forecasts & Warnings	1300 659 211 08 8920 3826		
NT DPIR's Petroleum Operations Team	after-hours	+61 1300 935 250		
NT DNER		08 8973 8871 or 08 8973 8872 or 08 8973 8870 DENR Note, also required to notify landholder		
NT EPA Pollution Hotline	n/a	1800 064 567		
NT WorkSafe	n/a	1800 019 115 ntworksafe@nt.gov.au		
Department of Main roads	n/a	1300 654 628		
NT power and water	n/a	1800 245 090		
Well Control supplier (for lev3)	Boots & Coots Services Well Control and Prevention	24 hr. hotline 1 800 BLOWOUT or + 1 281 931 8884		

Origin Beetaloo contacts			
Role	Name	Primary	
Group Emergency Management Team (GEMT) Leader On-Call		+61 477 755 369	
Origin IG Compliance		+61 475 813 986	
		IntegratedGasCompliance@origin.com.au	
General Manager – Beetaloo & Growth Assets	Tracey Boyes	+61 475 949 668 <u>Tracey.boyes@origin.com.au</u>	
Construction Supervisor – Beetaloo & Growth Assets	Robert Wear	+61 467 679 003 sat phone 0450 942 082	
[Weeds officer]		robert.wear@origin.com.au	
Operations & Projects Manager – Beetaloo & Growth Assets	Matthew Hanson	+61 477 748 843 Matthew.hanson@origin.com.au	
Ed Wong – D&C Project Manager – Beetaloo & Growth Assets	Ed Wong	+61 467 791 931 <u>Ed.wong@origin.com.au</u>	
HSE Lead – Beetaloo & Growth Assets	Gabrielle Bertini	+61 0477 723 282 Gabrielle.Bertini@origin.com.au	
Environmental Specialist – Beetaloo & Growth Assets	Matt Kernke	+61 467 700 565 Matt.kernke@origin.com.au	
Corporate Affairs - Beetaloo & Growth Assets	Stephanie Stonier	+61 475 940 931 Stephanie.stonier@origin.com.au	
Senior Petroleum Engineer – Beetaloo & Growth Assets	Alex Cote	+61 408 612 889 Alexander.Cote@origin.com.au	
Senior Project Engineer - Beetaloo &	Mitch Roll	+61 423 929 661	
Growth Assets		Mitchell.roll@origin.com.au	
Rig Superintendent – Asset Services	James Boorman	+61 436 617 346	
		James.boorman1@origin.com.au	
Field Manager – Asset Services	Troy Beetson /	+61 475 977 156 (Troy)	
(Beetaloo Stage 2 campaign)	Josh Fisher	Troy.beetson@origin.com.au	
		+61 459 022 252 (Josh)	
Field HSE Advisor – Asset Services	Zeak Cheney / Shaun McGrath	+61 4/7 390 119 (Zeak)	
(Beetaloo Stage 2 campaign)	ondan mooraan	<u>zeak.cheney(@ongin.com.au</u> +61 477 357 045 (Shaup)	
		Shaun mcgrath@origin.com.au	
External Affairs Manager - IG		(Chris) +61 429 078 331	
→ direct media enquires	Chris Zipf	Christopher Zipf@origin com au	
	Or	(Tony) +61 477 394 576	
	Tony Hancox	Tony.Hancox@origin.com.au	
Process Safety SME – HSE RAC -	Liana Bonnette	+61 455 092 572	
Origin		Liana.bonnette@origin.com.au	
Emergency Response and Security	Bruce Baldwin	+61 467 802 482	
Specialist – HSE KAC - Origin		อานุธีย.มิสเนพทาญมาเรื่อการเกิด	

Emergency Response Plan

For contacting neighbouring properties/pastoralists, all escalation is to be undertaken by the Beetaloo & Growth Assets Project and Operations Manager – Matthew Hanson (or delegate).

Neighbouring Properties					
Property Name	Contact Name	Phone	Direct Neighbouring Properties		
Amungee Mungee	Adrian Brown (owner)	(08) 89 711293 Katherine office +61 427 825159 Adrian	Nutwood Downs –North Tanunbirini – East Hayfield – West		
		(08) 89 759 599 Amungee homestead	Beetaloo – South		
		UHF 18 VHF 123600			
Beetaloo	Scotty & Jane	(08) 89 644 613 Office	Amungee Mungee – North Hayfield/Shenandoah – N/W		
	Armstrong (son-in- law/ manager)	(08) 89 644 711	NCW – West NCW – South (Tandi/Uchar)		
		UHF 16 VHF 123850			
Sturt Plains	Brad & Lisa Dyer	+61 429 806 477 Brad	Buchannan – West		
Hayfield/Shenandoah	Justin & Sally Dyer	(08) 89 759 920 Hayfield	Amungee Mungee – East Beetaloo – East		
	(001.0000)	+61 408 802 741 Justin	NCW – South		
		+61 417 836 551 Val			
		UHF 17 VHF 123900			
Hidden Valley	David & Jenny James	(08) 89 759 999 (08) 89 759 622 Kitchen	Sunday Creek – North Kalala – East		
			Buchannan – South		
Kalala	Ray & Pam Murphy	(08) 89 759 936 Office +61 427 759 938 Ray	Sunday Creek – West Maryfield – North Nutwood Downs – East		
	Tosser Murphy (son)	+61 488 759 944 Tosser	Hayfield/Shenan – South		
			Hidden Valley - West		
Newcastle Waters	Jak Andrews	(08) 89 644 527	Beetaloo – North		
Nutwood Downs	Rod & Rayna Dunbar		Kalala – West		
			Amungee Mungee – South		
Tanunbirini	Mick Tasker (Manager)	(08) 89 759 929	Amungee Mungee - West		
			- ÷		

A.1. Incident Notification Matrix – Northern Territory

As detailed in the IG Management of HSE Regulatory Notifiable Incidents procedure, incidents that may potentially be notifiable will be escalated via the various field team, through their functional lead (Field Manager / Operations and Projects Manager) and through to the IG RAC & Process Safety team who will provide guidance in interpreting notification requirements and guiding the external authority notification.

Integrated Gas Regulatory Incident Notification Guideline (NT regulatory notification matrix)				
Legislation	Incident	Way report must be given	When report must be given	Contact Details
Work Health and Safety (National Uniform Legislation) Act 2011	A PCBU must notify the regulator as soon as they become aware of a death, serious injury or illness or dangerous incident that arises out of the conduct of the business or undertaking.	By telephone	Immediately after becoming aware	1800 019 115 Worksafe
Sections 35 - 39	 A dangerous incident includes: Uncontrolled escape, spillage or leakage of a substance, gas or pressurised substance Uncontrolled implosion, explosion or fire Electric shock Fall or release from height of plant, substance or thing Collapse, overturning, failure or malfunction of, or damage to, any plant/equipment/structure/excavation In-rush of water, mud or gas in an underground excavation tunnel or interruption of ventilation in said tunnel A serious injury or illness means that results in: work related injury immediate hospital treatment as an in-patient immediate treatment for serious injuries (for example amputation, scalping, a spinal injury, loss of a bodily function or a serious laceration, burn, head injury or eye injury), or medical treatment within 48 hours of exposure to a substance. 			ntworksafe@nt.gov.au
Schedule of Onshore Petroleum Exploration and Production Requirements 2019	An incident involving death or serious injury (reports shall be in addition to, and not take precedence over reports required by NT WorkSafe) A serious injury is one which requires immediate attention by a medical practitioner	by telephone AND in writing	immediately As soon as practicable	1300 935 250 DPIR <u>Petroleum.Operations@nt.gov.au</u>
	An incident involving serious damage (other than Environmental Harm) including loss, destruction or damage to property exceeding \$50k or when any person dies or suffers serious injury	by telephone AND in writing	immediately As soon as practicable	1300 935 250 DPIR Petroleum.Operations@nt.gov.au
	An incident involving or could potentially involve the injury to a person or serious damage to property that is professionally considered to have been caused by an event that is not in the normal or ordinary course of an operation (Potentially Hazardous event)	by telephone AND in writing	immediately As soon as practicable	1300 935 250 DPIR <u>Petroleum.Operations@nt.gov.au</u>
	An incident where damage to property occurs (<\$50k) that is not serious damage to property, but which results in a significant loss of structural integrity or load bearing capacity in the property damaged or results in some other significant unsafe condition	by telephone AND in writing	immediately As soon as practicable	1300 935 250 DPIR <u>Petroleum.Operations@nt.gov.au</u>
	An incident that is considered to be an emergency	by telephone	Immediately (after 000)	1300 935 250 DPIR <u>Petroleum.Operations@nt.gov.au</u>

Integrated Gas Regulatory Incident Notification Guideline					
	(NT regulatory notification matrix)				
Legislation	Incident	Way report must be given	When report must be given	Contact Details	
Petroleum Act 1984 and associated Regulations	Reportable Incident: An incident, arising from a regulated activity, that has caused or has the potential to cause material environmental harm or serious environmental harm.	by telephone OR in writing	As soon as practicable (not later than 2 hours after the incident)	1300 935 250 DPIR	
	 Material environmental harm means harm that: (a) Is not trivial or negligible in nature; (b) Consists of an environmental nuisance of a high impact or on a wide scale; (c) Results, or is likely to result, in not more than \$50k or the prescribed amount (whichever is greater) being spent in taking appropriate action to prevent or minimise the environmental harm or rehabilitate the environment; or (d) Results in actual or potential loss or damage to the value of not more than \$50k or the prescribed amount (whichever is greater). Serious environmental harm means environmental harm that is more serious than material environmental harm and includes environmental harm that: (a) Is irreversible or otherwise of a high impact or on a wide scale; (b) Damages an aspect of the environment that is of a high conservation value, high cultural value or high community value or is of special significance; (c) Results or is likely to result in more than \$50k or the prescribed amount (whichever is greater) being spent in taking appropriate action to prevent or minimise the environmental harm or rehabilitate the environment; or (d) Results in actual or potential loss or damage to the value of more than \$50k or the prescribed amount (whichever is greater) being spent in taking appropriate action to prevent or minimise the environmental harm or rehabilitate the environment; or (d) Results in actual or potential loss or damage to the value of more than \$50k or the prescribed amount (whichever is greater). 	AND in writing	<24 hours after oral notice (written notification) 3 days after the incident (initial report) 90 days intervals from the date of the initial report (interim reports) 30 days after clean up or rehabilitation (final)	Petroleum.Operations@nt.gov.au	
	Recordable Incident: An incident that has resulted in an environmental impact or environmental risk not specified in the current plant for the activity; or has resulted in the contravention of an environmental performance standard specified in the current plan for the activity; or is inconsistent with an environmental outcome specified in the current plan for the activity; and is not a reportable incident.	In writing	15 days after each 90 day period after then day on which the environmental management plan is approved.	1300 935 250 DPIR <u>Petroleum.Operations@nt.gov.au</u>	
Environmental Protection Biodiversity Conservation Act 1999	Incidents considered to have an impact to Matters of National Environmental Significance	in writing	within 5 business days of becoming aware	Compliance@environment.gov.au	
Energy Pipelines Act 1981 and associated Regulations	 A reportable incident that involves: Death or serious injury (or the potential to cause) Significant damage to a pipeline (or potential to cause) Immediate investigation 	By telephone AND In writing	As soon as practicable As soon as practicable	1300 935 250 DPIR <u>Petroleum.Operations@nt.gov.au</u>	
	 A significant pipeline accident event that: Is connected with work carried out on or in relation to a pipeline Causes, or has the potential to cause human death 	By telephone AND in writing	As soon as practicable As soon as practicable	1300 935 250 DPIR <u>Petroleum.Operations@nt.gov.au</u>	
Environmental Assessment Act 1982 and associated Regulations	Alteration of action in such a manner that the environmental significance of the proposed action may be changed	in writing	As soon as practicable after the alteration	08 8924 4218 NT EPA ntepa@nt.gov.au	
Bushfires Management Act 2016 and associated Regulations	Unable to control a fire on the land	All reasonable steps	Following the fact	08 8973 8871 or 08 8973 8872 or 08 8973 8870 DENR Note, also required to notify landholder	

Integrated Gas Regulatory Incident Notification Guideline					
(NT regulatory notification matrix)					
Legislation	Incident		Way report must be given	When report must be given	Contact Details
Waste Management and Pollution Control Act 1998 and associated Regulations	 An incident that causes, or is threatening or may threaten to cause, pollution resulting in material environmental harm or serious environmental harm. This includes road transport incidents and spills that may occur off the lease (spill response). Refer to the definition of <i>material</i> and <i>serious environmental harm</i> provided in <i>Petroleum Act</i> section above. <i>Pollution</i> means: (a) A contaminant or waste that is emitted, discharged, deposited or disturbed or that escapes, or (b) A contaminant, effect or phenomenon, that is present in the environment as a consequence of an emission, discharge, deposition, escape or disturbance of a contaminant or waste. Note: does not apply to incidents confined within petroleum activities land (including air and water above or below) – see the EMP for the area of petroleum activities land [Note: Applicable for off tenure Spills] 		by telephone	Within 24 hours of becoming aware	1800 064 567 NT EPA Pollution@nt.gov.au
Heritage Act 2011 and associated Regulations Discovery of archaeological places and objects			In writing	As soon as practicable (within 7 days of discovery)	08 8999 5039 DTC - Heritage Branch heritage@nt.gov.au
Weeds Management Act 2001	First becoming aware of a declared weed that has not previously been, present on the land.	e of a declared weed that has not previously been, or known to have been,		14 days of becoming aware	08 8999 4567 DENR weedinfo@nt.gov.au
Dangerous Goods Act 1998 and associated Regulations Becoming aware of theft, loss of, or unauthorised interference with explosives.		osives.	Not specified	Immediately after becoming aware	Police Assistance Line 131 444
Internal Contacts	Internal Contacts				
The on-call phone number is 0475 813 986 and is monitored 24/7 by the Integrated Gas Regulatory Compliance Team		integratedgascompliance@	upstream.originenergy.com.au		
a. Work Health & Safety Incident Notification form		http://www.worksafe.nt.gov.au/LawsAndCompliance/Pages/incident-reporting.aspx			
b. Pollution Report Form		https://ntepa.nt.gov.au/wash http://im.originenergy.com.a	te-pollution/hotline/pollution-report- au/otcs/cs.exe/properties/7486053	form	
c. Aviation Accident or Incident Notification Form		https://www.atsb.gov.au/mandatory/asair-form.aspx?			

Appendix B Well Inspection and Monitoring Protocol

B.1. Well Pressure Remote Monitoring

The Amungee NW-1H well is suspended at surface for monitoring and recording of the reservoir pressure buildup. Real time pressure monitoring exists and a pressure anomaly or loss of communications to site will trigger an email alarm to a minimum of 7 people (listed below) and to a 24/7 monitored email at the Origin's National Response (NRC) centre. The NRC will send a further SMS and text to voice message to the notification list to alert the team of the alarm. The SMS will include time details to call into a conference call number at a set time (nominally 10 minutes time – but to be stated in the message). NRC will start the the conference call however if NRC was unable to contact any one on the list by phone before the call, and no one joins the conference call they escalate to GEMT.

The group on the conference call can then decide if the site requires inspection and agrees on the person (the nominated SERT-L) to deploy Triple P or other services to site. NRC will continue on the conference call maintaining notes of discussions. NRC will follow the below process flow when activated from an alarm.

Conference call number to be used.



Current list of people receiving notifications. All people on this list should have this list of people in their contacts to facilitate quick communications.

Role	Name	Primary
Construction Superintendent – Beetaloo & Growth Assets	Robert Wear	+61 467 679 003 sat phone 0147162733
Operations & Project Manager – Beetaloo & Growth Assets	Matthew Hanson	+61 477 748 843

General Manager – Beetaloo & Growth Assets	Tracey Boyes	+61 475 949 668
D&C Project Manager – Asset Services	Ed Wong	+61 475 836 554
Senior Petroleum Engineer – Beetaloo & Growth Assets	Alex Cote	+61 408 612 889
Senior Project Engineer - Beetaloo & Growth Assets	Mitch Roll	+61 423 929 661
HSE Lead – Beetaloo & Growth Assets	Lucas Fulford	+61 477 749 524

If it is determined there is an unexplained pressure change in the well or unrecoverable communications issue then Triple P is deployed to site to assess the situation. The site person shall only deploy to site if it is possible to do so and travel in daylight hours. The requirement is to be at site within 6 hours. This in practice means that they should only be deployed to site if the event occurs before noon. If the event occurs after noon they should notified so as to be on site as early as possible the next morning. Triple P will follow the procedure detailed in the "Well Control" Section B3.

Once on site Triple P will use the satellite phone to call back the person that deployed them to report the situation on site and received further instructions. If the information received from Triple P is that the situation on site is not normal then this triggers an emergency event and Triple P becomes the On Scene Command (OSC) and the Beetaloo & Growth Assets Operations and Project Manager (or the senior person in the group which has responded to the alarm) will be the SERT-L and notifies the General Manager Growth Assets (Tracey Boyes 0475949668).

Other key stakeholders, specifically Stephanie Stonier (0475940931) and any of the alarm monitoring team not already invovled, should then be notified as soon as possible.

• Triple P

0	Gordon Jackson	0456 618 367
0	Susey Jackson	0487 120 819
0	Sat Phone	0147157201
0	Email	triplepcontracting@outlook.com

Well control incidents may require the mobilisation of specialised response contractors information on this is listed within Appendix C4.

Appendix C Well Control

C.1. Unmanned

A specific standard operating procedure has been undertaken for well inspection monitoring where detailed instructions are provided to the worker undertaken the well inspection.

In the event of an uncontrolled release from a wellhead (being observed in the field):

Move out of harm's way. Find safe upwind location (at least 50 metres away).

Considerations:

- o Determine wind direction.
- o Always pay attention to Fire, fumes, electrical, ignition and Health Risks.
- o What is the type of Leak and source?
- Monitor situation visually from distance.
- Secure site and keep all non-essential personnel and ignition sources away from the hazardous area. (secure location)
- Alert others near-by
- Assess the situation determine the level of the immediate threat.

If a report is received from any source (for instance tourists travelling along highway see the well on fire) that an incident has occurred then the response for a pressure change in the well, exactation is to be immediately initiated.

If the responding group are reasonably certain that loss of containment has occurred then Triple P should be sent to site to secure access from the highway and confirm the situation on site and escalation through General Manager – Beetaloo & Growth Assets to GEMT should occur with the recommendation to notify Asset Services to arrange third party Well Control Services to prepare to deploy, or deploy if the report is very credible (information on this process is located in Appendix C4).

If there is a high level of doubt about the information, Triple P contracting should be deployed to obtained reliable information from site (keeping a safe distance away with any potential ignition source).

Note: After consultation with the Project Manager and/or Well Integrity team representative - and you if are competent, confident – and i**f it is safe** to do so; **contain the incident** by shutting in the well – if flow is through wellbore; then activation of the self actuation UMV may be appropriate; of if escape is evident to be from an annular space, it may be possible to isolate via a manually operated valve.

Caution: Well control incidents may require the mobilisaiton of specialised response contractors.

Please refer to Appendix B for Well Inspection and alarm flow chart or NT-2050-35-MN-0001 Amungee NW-1H Remote Pressure Monitoring trouble shooting manual for well integrity monitoring and data transmission details.

C.2. Well Control Incident Classification

In the event that a Well Control Incident exceeds level 1 and 2, the Person in Charge (Wellsite Representative) will activate the SEMT who in turns, notifies the GEMT-L and the involvement of a contracted third party specialist to handle the well control integrity event.

The Well Control specific incident response plan is detailed the Origin Well Control Standard – INT-1000-35-TS-001 and the Asset Services Emergency Response Plan – QLD 1000 SAF PLN CDN/ID 19601361; for well control events these documents are to be followed. The following information is guidance on different levels of well control. Additionally, Appendix G4 gives an basic overview on how Well Control events are managed.

Level 1	Level 2	Level 3
(an uncomplicated kick or a low	(a kick with some complications	(complete loss of well control or
risk production / well integrity	or a low - moderate risk well	a moderate - high risk well
event)	integrity event)	integrity event)
Generally, these are events that commonly occur during drilling and workover operations. Additionally covers low risk well integrity events during the production phase. Emergency interfacing is limited due to pressure and flow containment. Personnel and equipment are not threatened, and there are no injuries or fire involved. Thus, the situation can be handled using resources and procedures available on-site (or readily mobilisable in the case of a well integrity event). The situation is managed immediately by the Driller who will keep the rig manager informed of the situation. Caution: Level 1 incidents can escalate quickly to a more serious and threatening level if not handled properly.	 A Level 2 event can be defined as an abnormal well control event during drilling and workover operations involving some sort of complication in which: Well control has NOT been lost at the surface Resources beyond the normal capabilities of the rig crew or production operations staff may be required Outside well control consultation, materials, equipment or personnel may be required Includes low - moderate risk production events (e.g. noticeable leak or significant annular pressure). There are no injuries or fires associated with this incident level since control has not been totally lost. The situation is typically managed by the Rig with the OSC liaising. The SEMT is on Standby but not activated. The incident is generally not sufficiently threatening to activate the GEMT to deal with the situation. 	A Level 3 emergency denotes a complete loss of well control at surface during drilling and workover operations with no opportunity to restore it using all the resources available on-site. Includes moderate – high risk well integrity events during the production phase. Level 3 Incidents require the SEMT to activate including notification to the GEMT to effectively deal with the situation. External Well Control support (i.e. Boots & Coots, Wild Well Control, Cudd, etc.) must be activated upon confirming that the well is out of control at surface and measures must be immediately taken to protect people, the environment and material assets. These emergencies, although serious at the outset, have the potential to escalate further during control attempts. Such escalation may cause serious structural damage or total loss of the facility, rig, BOP stack and wellhead due to explosion, fire, loss of buoyancy or location subsidence and could affect nearby wells & infrastructure.

In conjunction with the Well Control contractor, three levels of well control event have been defined in the Wellsite ERP and are mirrored in the Well Control Standard (INT-1000-35-TS-001).

Each level defines the level of escalation required including potential mobilisation of the Well Control contractor.

Well Control Incident Level 1 - Uncomplicated Kick		
Situation managed by:	WSR in consultation with Field Manager or Drilling Superintendent, Drilling/Completion Engineer	
Support:	Usually none required	
Communication:	Field Manager/Drilling Superintendent to liaise with Brisbane based D&C operations lead as required	
Example situation:	Influx while drilling	

Well Control Incident Level 2 – Kick with Complication		
Situation managed by:	WSR in consultation with Field Manager or Drilling Superintendent, Drilling/Completion Engineer	
	SERT on standby	
Support:	Technical Team as required	

	Well control specialist as required		
Communication:	WSR/Field Manager or Drilling Superintendent to liaise with Technical Team		
	Technical team to liaise with IG D&C management as required		
Example situation:	 Severe lost circulation combined with influx into wellbore Kick taken with pipe out of hole Leak or mechanical failure of well control equipment Gain and loss situations Plugged workstring Influx taken while running casing or pumping cement Loss of casing shoe integrity Any complication experienced during live well operations 		

Well Control Incident Level 3 – Loss of Containment				
Situation managed by:	Onsite: SERT			
	Office: GEMT			
Support:	Technical Team to support SERT and GEMT as required			
	Well control specialist onsite and in office as required			
Communication:	SERT-L to liaise with GEMT-L			
	Support functions to report to SERT-L or GEMT-L as required			
Example situation:	 Severe lost circulation combined with influx into wellbore Kick taken with pipe out of hole 			
	Leak or mechanical failure of well control equipment			
	Gain and loss situations			
	Plugged workstring			
	Influx taken while running casing or pumping cement			
	Loss of casing shoe integrity			
	Any complication experienced during live well operations			

C.3. Response to Level 3 Well Control Event

Human safety shall always be the highest priority in a Well Control event. Untrained personnel should never attempt to conduct well intervention activities due to the extreme risk for significant injury, fatality or event escalation. The primary focus immediately following a Level 3 well control event should consist of rig evacuation and care for injured parties. During drilling/completion operations the rig contractors rig evacuation procedures shall be the prevailing document(s). The senior drilling contractor representative (Rig Manager) shall serve as the On Scene Commander (OSC) during evacuation and Search and Rescue operations. Upon completion and confirmation of a full muster, the Rig Manager shall be relieved of OSC duties by the ranking Origin Energy representative.

Initial procedures as defined in the Wellsite ERP include, but are not limited to, the following:

- Evacuate and make sure everybody is safe and all personnel accounted for
- Isolate the area and restrict access
- Notify applicable groups (including well control specialists if required)
- Conduct initial assessments

C.3.1 Initial Assessment

In the event of a well control event, factually correct information is essential to aid in decision making. Once the site has been secured, personnel accounted for and appropriate notifications made, information should be gathered which aids the response to the incident. **Appendix C8 & C9** C.8include templates to aid in gathering the information necessary in such an event.

C.3.2 Further Considerations for Initial Response

The response to a Well Control event will depend on situation. Hence, a specific plan would be made after the initial assessments are completed. For a loss of containment event where fire is an issue, then a suitable water source and storage capacity onsite will be one of the main issues with the response. This should be addressed as a matter of urgency. Calculation of water requirements are outlined in **Appendix C13**.

Once the site has been secured, some hazards and potential solutions are outlined in **Appendix C10**. Information in this Appendix should be used to identify the site specific issues relevant to the event and mobilise services and materials that may be required to respond.

C.4. Well Control Contractor Mobilisation

The current primary well control contractor is Boots & Cootsfor Origin Energy's Northern Territory operations.

Although it will always be impossible to establish a plan that will be perfectly suited to a given loss of containment event, a well control package has been contracted to cover commonly required equipment for such occasions. To deal with a loss of containment event, regardless of the technical solution employed, requires mobilization of specific equipment and personnel, and more importantly proper engineering of any envisaged solution.

The Coalition Well Control Package shall only be mobilized upon request of the operator following declaration of a Level 3 type event. Dispatch of the equipment shall only be authorized by the following Origin Energy representatives:

Position	Incumbent
General Manager Drilling and Completions	Jamie Rodda
Drilling & Completions Manager	Ben Corbett

Table 2 - Origin Personnel Authorised to Mobilise Well Control Package

C.5. Well Control Contractor Contact details:

Alan Vick | Eastern Hemisphere – Technical Support - BD Manager

Well Control and Prevention | Boot and Coots

avick@boots-coots.com

G-Tower 199 Jalan Tun Razak, Kuala Lumpur Malaysia 50450

| Office - +603-2182-4346 | M: +6012 647-2692 | VOIP 886034346

USA Mobile +1 281 352 9737

24 Hr. Emergency Hotline 1 800 BLOWOUT (USA) or +1 281 931-8884 (International)

Appendix C9 has a well condition data sheet which should be completed and sent to Boots and Coots for their initial assessment of the situation.

C.6. Well Control Equipment Mobilisation

In addition to mobilising Boots and Coots personnel, preparation should commence to mobilise the Coalition Well Control package. The well control equipment package is stored and maintained at **Halliburton offices situated at 9 Roma Downs Road, Roma, Queensland Australia,4455**. The package consists of a total of eight (8) enclosed DMV type steel containers. An evaluation shall be conducted based on the scale of incident and a determination made as to the need to mobilize the full or partial equipment package.

The actual package would get mobilised to site once it was checked over by Boots and Coots personnel, but the trucks required to mobilise it site should be organised. Boots and Coots estimates that two road trains with a total of eight flatdeck trainers will be required to transport the well control

equipment to site, along with a 25T crane to load and unload the trucks. **Appendix C11** provides information on the Boots and Coots Well Control Package.

In addition to the Boots and Coots well control package, a range of equipment and services may be required depending on actual event in question. Origin has existing contracts in place for the services that may be required. Primary contractors will be updated to ascertain equipment requirements, these are listed in **Appendix C12** and a list of equipment and services that may be required to respond to a situation.

C.7. Level 3 Well Control Emergency Response Exercises

It is recommended that a Level 3 loss of containment event be simulated yearly as minimum to test the Emergency Management structure (SERT, GEMT, CMT) in line with the requirements set out in the Wellsite ERP. Scenarios should progress from level 1 to level 3 (blowout stage) to ensure that all Emergency Management leaders are provided an opportunity to participate. In addition, the drills should include the primary well control contractor and support contractors to test their state of readiness. The aim of the exercise is to simulate the loss containment event, test personnel's response to the event, test the mobilisation and function of the Emergency Management structures, and test the mobilisation of the contractors required to respond to the well control event. Any lessons learned from the exercise should be incorporated when appropriate to continually improve Origin's response to such an event.

C.8. Well Control Incident Questionnaire

Question	Answer
Are there any injuries and is immediate assistance required for evacuation of personnel?	
What assistance is currently underway for injured personnel?	
Has the rig been abandoned/evacuated?	
What are the weather conditions?	
Has the location been secured?	
When were applicable contingency plans put into effect?	
Determine the current status of the emergency:	
Is there a fire? If not, should ignition be considered?	
Is there any pollution?	
Can source of pollution be stopped?	
Are toxic gases present?	
What is the condition of the drilling/workover rig?	
Is the rig still on location?	
Should rig, or can rig, be moved off location?	
Are the BOP's operable?	
What is the current status of the well?	
Is the wellhead/tree intact?	
Pressure readings (annulus and drill pipe)?	
Previous casing size and depth?	
What is the well depth?	
Mud weight?	
Where is the drill pipe/tubing?	

Initial information to be obtained following well control incident.

Emergency Response Plan

Is an attempt to shut in the well feasible if not already done?

C.9. Well Control Incident Call In Form

Date and time of incident:	Location:		
Contact name:	Contact number:		
Rig:	WC Incident Level:		
Injured parties:			
Name	Company	Type of Injury	
1.			
2.			
а. А.			
Brief Summary (facts only):			
What has been done so far to secure the site:			
Who has been contacted so far:			
Government/Regulatory Bodies Notified and Media	a Coverage:		

Initial well conditions			
Shut In Drill pipe pressure (psi):		Shut In Casing pressure (psi):	
Pit gain volume (bbl):		Mud weight (ppg):	
Well depth (mMDRT):		Casing shoe depth (mMDRT):	
(mTVDRT if required)		(mTVDRT if required)	
Last casing size (in):		Last FIT/LOT (ppg):	
Hole size (in):		Bit depth (mMDRT):	
		(mTVDRT if required)	
Float in drill string: Ported?		If yes, drill pipe pressure to open float (psi):	
Operation in progress at til	me of kick:		
Actions since time of kick:			
Current conditions (if dif	forant from initial a	anditions reported above);	
Current conditions (if dif	ferent from initial c	onditions reported above):	
pressure (psi):		Shut in Casing pressure (psi):	
BOPs closed (Y/N):			
Current operation and plan	IS:		

C.10. Further Considerations for Initial Response – Possible Hazards and Solutions

Hazard	Services/Materials	Task		
Security				
Visitors entering	Self powered site office with	Secure entry to site (ie lock gate)		
dangerous site	toilet and fridge.	Contact security contractor to mobilise		
Lack of communication	Digital radios	Supply digital radios for working party		
Visibility at night	Light plants	Contact primary contractor to mobilise		
visionity at hight	Light plants	equipment as required		
Landowner not informed of	N/A	Contact landholder access team to discuss		
situation		how landholder is to be informed		
	People			
Fatigue	Additional SERT personnel	Ensure sufficient personnel at site location to man SERT 24hrs		
	Lease Preparati	on		
Fire – overgrown with grass	Slasher	Contact primary contractor to mobilise equipment as required		
Uneven ground	Grader	Contact primary contractor to mobilise equipment as required		
		Seek approval and blade fire break if safe to		
Removal ground soil	Excavator	Contact primary contractor to mobilise		
Ignition	N/A	equipment as required		
Ignition	N/A	at the wellsite are removed/disabled if safe to		
		do so		
Movement around well	Bobcat & Backhoe	Contact primary contractor to mobilise		
		equipment as required		
		Tentatively confirm work to remove fence		
		around well pending well controls specialist		
Water used in well kill	Bobcat and/or backhoe	Consider if application(s) of permits required		
operations causing		to construct any in earth holding basin or		
contamination		water recovery trenches		
		Contact primary contractor to mobilise		
Housekeeping -	Crane/Forklift	Contact primary contractor to mobilise		
equipment on	Truck	equipment as required		
wellpad/lease		Clear lease as much as safely possible to		
		allow access to wellhead considering		
		equipment which may be required to solve		
Loop of containment	Operations accordination	Well control situation		
offecting pearby wells	Operations coordination	n other wells are hearby (le on production		
enecting hearby wens		on wells to ensure pressures haven't		
		significantly changed		
	Water			
Insufficient water to	Water	Confirm an adequate water source close by		
respond to event - fire		See Appendix G for method to estimate water		
control and well kill		requirements		
Inability to deliver sufficient	Water trucks	Determine volume of water required for event		
water to site		requirements		
		Contact primary contractor to mobilise		
		equipment as required		
Inability to pump water	Water pump(s) w/- suction &	Contact primary contractor to mobilise		
required	discharge hose	equipment as required		
Inability to store sufficient	Onsite fluid storage tanks	Determine volume of water required for event		
water at site		See Appendix G for method to estimate water		
		requirements		
		contract primary contractor to mobilise		
1	1	equipment as required		

Logistics			
Inability to move heavy	100 t Crane(s)	Contact primary contractor to mobilise	
equipment around well	equipment as required		
Delay due to lack of road	Road transport	Contact primary contractor to mobilise	
transport		equipment as required	
		Sufficient road transport available to move	
		required equipment (may need 24hr	
		coverage)	
	Wellbore Fluids	5	
Gas	SCUF vent tank with generator	Contact primary contractor to mobilise	
	to run same	equipment as required	
Return fluids	Storage tank	Contact primary contractor to mobilise	
		equipment as required	
Storage tank overflow	Vac trucks to remove fluid	Contact primary contractor to mobilise	
0		equipment as required	
	Well Kill/Isolatio	n i i i i i i i i i i i i i i i i i i i	
Inability to kill well	Mud or cementing pump with	Contact primary contractor to mobilise	
-	sufficient hard lines	equipment as required	
Inability to kill well	Fluid Storage/Mud Tank(s) with	Contact primary contractor to mobilise	
-	sufficient hard lines	equipment as required	
Hydrocarbon zone	Cement unit, cement, additives	Contact primary contractor to mobilise	
isolation	and associated equipment	equipment as required	
	Wellhead Equipm	ent	
Isolation of well before	VR plug lubricator	Contact primary contractor to mobilise	
side outlet valve removal		equipment as required	
Surface facility isolations	Origin Operator	Contact production operations to discuss	
not in place		situation	
	Specialised Servi	ces	
Inable to fabricate	Machine shop	Contact primary contractor to mobilise	
equipment		equipment as required	
Removal of	Welding services Contact primary contractor to mobilise		
equipment/fabrication	-	equipment as required	
HSE			
HSE – hydrocarbon spill,	Evaluate if any specialist HSE	Contact primary contractor to mobilise	
uncontrolled release of	services are required (ie air	equipment as required	
well fluids into the air	sampling, radiation		
	assessment, noise		
	assessment)		

C.11. Boots & Coots Well Control Package Specifications

The Boots & Coots Well Control Equipment package consists of eight (8) standardized and certified DMV steel containers. All containers are of the same standard size with a maximum weight of not more than 10,000 kg. The containers have been specially modified to meet the needs of the well control specialists and the equipment necessary to mitigate a reasonably forseeable well control event. Specifically the package consists of the following individual units.

The containers include the following equipment:

Container 1	Workshop
Container 2	4000 gpm Water Pump #1
Container 3	4000 gpm Water Pump #2
Container 4	Pump Suction Piping
Container 5	Pump Discharge Piping/Nozzles
Container 6	Generator/ Casing Cutters
Container 7	Water Monitor Stands/ Tin
Container 8	Tool Shed

Below are some photos of the equipment



C.12. Sample Equipment List & Primary Support Contractors

Description		Contractor
Logistics support	:	
Trucking to transport 8 sea containers & support operation	8	
Crane, 25T to load/unload above sea containers	1	
D-8 or D-9 Caterpillar bulldozer w/ hydraulic winch	1	

D-8 or D-9 Caterpillar bulldozer w/ rippers	2		
Front end loader, large capacity rough terrain	1		
Track hoe, 235 Caterpillar or equivalent	1		
Bobcat	1		
Slasher	1		
Forklift	1		
150 ton Crawler crane w/ minimum of 100' boom (capping crane)	1		
40 – 60 ton hydraulic crane (for rigging up firefighting equipment)	2		
Tandem Rig up Truck/ Pole Truck	1		
Vacuum trucks (for hauling firewater or discharge from well)			
Water tankers	Calculate		
Refuelling/Lube truck (for refuelling heavy equipment, fire pumps)	1		
Road grader, Maintainer	1		
Transportation for workforce	1		
Self powered site office with toilet and fridge	1-2		
Digital radios	6		
Rental Equipmen	t		
185 cfm air compressor	1		
Light plants, trailer mounted	4		
Generator	1		
Pressure washers	2		
4 wheelers, Kawasaki mules or alternative all-terrain vehicles			
Metal for Fabricating Suppor	t Equipment		
3' x 8' sheets corrugated tin	250		
Large diameter pipe for fire water supply line (12"-16")	1000 ft		
2" steel plate	1		
1" steel plate	2		
1/2" –5/8" steel plate	2		
2" x 2" x 1/4" angle iron (Heat shields for bulldozers)	1500 ft		
3/16" or ¼" diamond plate, expanded metal or floor grating (flooring for monitor sheds, cutting sheds, etc.)	50		
2 3/8" or 2 7/8" junk tubing (structural for building monitor sheds, sheds, and heat shield)	2000 ft		
Casing for diverter lines	1		
General Oilfield Supplies			
8" Figure 100 hammer unions	6		
6" figure 100 hammer unions	6		
4" figure 100 hammer unions	12		
8" x12" pipe nipples, threaded both ends & collars	6		

6" x 12" pipe nipples, threaded both ends & collars	12		
4" x 12" pipe nipples, threaded both ends & collars	12		
4"wafer type butterfly valves	6		
4" 150# R.F. threaded flange	12		
5/8" x 6 ¼" studs w/ nuts both ends	50		
Tie wire	10 rolls		
3/8" x 15' high test chain w/ grab hooks (Crosby Brand & Load Binders)	20		
2" shackles, pinned	40		
1 ¾" shackles, pinned	40		
1 1/2" shackles, pinned	40		
1 ¼" shackles, pinned	40		
1" shackles, pinned	40		
¾" shackles, pinned	40		
1/2" manila rope	1 roll		
¾" manila rope	1 roll		
200-psi liquid filled gauges	4		
600-psi liquid filled gauges	4		
1,000-psi liquid filled gauges	4		
3,000-psi liquid filled gauges	4		
5,000-psi liquid filled gauges	4		
10,000-psi liquid filled gauges	4		
Shop rags, Cotton Only (No Synthetic)	2 boxes		
Snatch blocks for 1 1/8" cable, shackled not hooked	2		
Heavy duty boards (to support pumps on water levy, scaffolding, etc.)	25		
Structural lumber (2 x 4's) for heat shields, road blocks, etc.			
Awning	1		
Specialised Oilfield Supplies			
Pit liner for fuel tank containment and potential water pits if utilized	1		
Tanks for water storage (frac tanks or the like), 450 bbl	Calculate		
Water pump with suction/discharge hose (one or two 4,000 gpm pumps)			
Mud or cementing pump(s) with hard lines			
SCUF vent tank with generator			
Tanks to store hydrocarbons			
VR plug lubricator			
500 ton travelling blocks (Used for rig removal)	2		
Mud charging pumps (to feed pump truck from frac tanks)	2		
Mud system, complete with mixing and circulating capabilities	1		

Cement			
Board mats	1		
High Pressure tubing, for pumping or cutting operation (to maintain good distance between well and pump trucks) size to be determined per requirement	1000 ft		
6" or 8" Drill Collars (Dead man to skid rig)	20		
Coil Tubing unit	1		
Snubbing Unit	1		
Cables, Slings & Clamps			
1 1/8" - 6 x 36-softlay cable (for rig removal)	2000 ft		
³ ⁄ ₄ " - 6 x 36-softlay cable (slings for debris removal)	1000 ft		
5/8" - 6 x 36-softlay cable (slings for debris removal)	1000 ft		
1 1/8" cable clamps	100		
³ ⁄ ₄ " cable clamps	100		
5/8" cable clamps	100		
1 1/2" x 10' wire rope slings, 6 x 36 soft lay cable	10		
1 ¼" x 10' wire rope slings, 6 x 36 soft lay cable	20		
1 ¼" x 20' wire rope slings, 6 x 36 soft lay cable	20		
1" x 10' wire rope slings, 6 x 36 soft lay cable	20		
1" x 20' wire rope slings, 6 x 36 soft lay cable	20		
³ ⁄ ₄ " x 10' wire rope slings, 6 x 36 soft lay cable	40		
³ ⁄ ₄ " x 20' wire rope slings, 6 x 36 soft lay cable	40		
5/8" x 10' wire rope slings, 6 x 36 soft lay cable	40		
5/8" x 20' wire rope slings, 6 x 36 soft lay cable	40		
Welders, Machining and Associated Equipment			
Structural welders with helper and equipment	6		
Certified Welder with Helper and equipment	1		
Cutting torch complete with large supply of oxygen, acetylene and accessories, 250 ft. of hose per torch, strikers, tip cleaners and spare tips	4		
Long reach cutting torch, complete with large supply of oxygen, acetylene and accessories, 250 ft. of hose per torch, strikers, tip cleaners and spare tips	2		
Machine shop services for fabrication			
HSE			
HSE services (air sampling, heat radiation monitoring, noise monitoring)			

C.13. Water Requirements

The most important step when controlling a level 3 incident is establishing a water supply which is plentiful and consistent. Surface intervention of a blowout requires massive volumes of water. Well Control specialists will determine pumping, volume of water required onsite and ongoing water requirements.

If water cannot be stored in ground pits, water shall be stored on location utilizing multiple manifolded 450 barrel portable frac tank containers. Combined storage capacity up to 2,000,000 million gallons may be required (subject to confirmation). Origin shall consider the requirements for application(s) of any permits required to construct any in earth holding basin or water recovery trenches. It is critical to the safety of the well control crews and ultimate success of the well control mitigation that water supply remain uninterrupted. Water from the storage tanks will be piped to the fire pump(s) and distributed to fire monitor stands and hand lines as deemed appropriate by the well control specialist.

Water volume requirements vary from one blowout to another. For example, only one pump would be required for a minor fire (with backup pump circulating water as a redundant system) for a minor fire, whereas two or more pumps would be required for a major rig fire, thus doubling the water volume required. Typically, a benchmark of 2,000,000 gallons per day (48,000 bbls per day) is used in the Well Control Contingency Plan (WCCP) calculations.

A well on fire requires a tremendous volume of water. For example, the following calculations show how fast 1,000,000 gallon (24,000 bbls) pit would be emptied using various capacity fire pumps:

• 1,000,000 gallons/(4,000 gpm + 4,000 gpm) = 125 minutes

Water Supply Calculations – Using Tankers Only

Before mobilising water storage tanks and water to site, liaise with Boots and Coots to determine likely water requirements. Below are sample calculations only based on a worst case scenario.

The following calculations gives the number of tanker loads needed to replenish the pit with water:

- 1m³= 6.29 bbls
- 24m³ tanker capacity x 6.29 bbls/m³=150 bbls
- 24,000 bbls/150 bbls per load= 160 tanker loads

The following calculation factors in a water recovery rate of 30%:

160 tanker loads x (1.0-.3) = 112 tanker loads.

Using the two minimum 4,000 gpm fire pumps, it would require 61 tanker loads per hour to maintain operations.

With a remote pit containing an additional 1,000,000 gallon capacity for a total of a 2,000,000 gallon capacity (48,000 bbls), operations could be maintained for four (4) hours using two 4,000 gpm pumps. The flowing calculations gives tanker load totals for 10 hours of winter time daylight operations:

- (10 hours operations) (4 hours water supply on hand) = 6 hours additional water supply needed
- (6 hours) x (61 tanker loads per hour) = 366 tanker loads
- (366 tanker loads) / (10 hours) = 37 tanker loads per hour

37 tanker loads per hour, although cumbersome, is far more manageable than 61 tanker loads per hour. However, using the above calculation, at the end of 10 hours the pits will be dry. The following calculation gives the tanker loads per hour to overnight replenish the 2,000,000 gallons (48,000 bbls):

- 48,000 bbls / 150 per load = 320 tanker loads
- 24 hours 10 hours daylight operations = 14 hours to refill pits

320 tanker loads / 14 hours = 23 tanker loads per hour overnight

C.14. Site Safety/Site Control

If a severe level 3 well control incident occurs, the OSC, SERT-L, HSE and Well Control Specialist will develop a Site Safety Plan and enforce it immediately.

The plan will identify the hazards present on site and will define Site Control boundaries, including SAFE AREA and HOT ZONE boundaries, and control access to the incident site. Common hazards to health and safety on a blowout include:

- o Radiant Heat
- Explosive and/or toxic gas concentrations
- Explosive materials (perforating charges, prima cord, etc.)
- o Compressed substances (acetylene, oxygen, aerosols, etc.)
- Hazardous chemicals

- o Dangerous noise levels
- o Structural damage
- o Leaking gas or fluids

Such a plan would only be developed for Level 3 well control incidents where deemed necessary.
Appendix D Site Specific Lease Pads with associated wells

D.1. Location data – Existing Exploration Wells / Lease pads

Permit Area(s)	EP98						
Exploration Well name	Kalala South – 1 (Drilled & Suspended Well)						
Associated Water Bores	N/A						
	-16° 17' 37.7" S / 133° 36' 44.3" E						
Well/Lease location (Lat/Long)	-16.2941, 133.6124 (GDA94)						
	E: 351740, N: 8198023 (MGA Zone 53)						
Nearest Town by Vehicle	Daly Waters						
Nearest Major Road	Carpentaria Highway						
	Daly Waters: 25 min/25km						
Nearest Airports by Vehicle	Elliot: 2hrs / 165 km						
Nearest Hospital by Vehicle	Katherine Hospital 3hrs drive (299km)						
Permit Area(s)	EP117						
	Beetaloo West - 1 (Drilled & Suspended Well)						
Exploration Well name/s	(Kyalla 117 W1) (proposed second well on same lease)						
Associated Wells on location	N/A						
	-17° 7'13.82"S / 133°45'43.63"E						
Well/Lease location (Lat/Long)	-17.12051, 133.7621 (GDA94)						
	E: 368312, N: 8106689 (MGA Zone 53)						
Nearest Town	Elliot						
Nearest Major Road	Stuart Highway						
Nearest Airport by Vehicle	Daly Waters: 1.5hrs/100km Elliot: 1.75hrs,110km						
Nearest Hospital by Vehicle	Katherine Hospital: 4hrs drive (399km)						
Permit Area(s)	EP98						
	Amungee North West-1H (Drilled & Suspended Well)						
Exploration Well name/s	Velkerri 98 N1 (Proposed second well on same lease)						
Associated wells	VEL 98 N1 – CMB-G (RN40894)						
	-16°20'51.034"S / 133°53'4.403"E						
Well/Lease location (Lat/Long)	-16.34751, 133.8846 (GDA94)						
	E: 380859, N: 8192292 (MGA Zone 53)						
Nearest Town by Vehicle	Daly Waters						
Nearest Major Road	Carptentaria Highway						
Nearest Airport by Vehicle	Daly Waters: 1hr /61km Elliot 2.5hrs /202km						
Nearest Hospital by Vehicle	Katherine Hospital: 3.5hrs drive (329km)						
Permit Area(s)	EP117						
Exploration Well name	Kyalla 117 N2 1H						
	Kyalla 117 N2-2H and 3H- Proposed.						
Associated Wells	KYA 117 N2 – CMB - (RN40895)						

	KYA 117 N2 - CMB - AL (RN40896) KYA 117 N2 – CMB - G (RN41132) KYA 117 N2 – IMB - AL (RNxxxxx) - TBC KYA 117 N2 – IMB - G (RNxxxxx) - TBC
Well/Lease location (Lat/Long)	-16°50' 29.01"S; 133°39' 0.16"E -16.84141, 133.6501 (GDA94) E: 356183, N: 8137492 (MGA Zone 53)
Nearest Town by Vehicle	Daly Waters
Nearest Major Road	Stuart Highway
Nearest Airport by Vehicle	Daly Waters: 1hr /92 km Elliot: 1.5hrs /117 km
Nearest Hospital by Vehicle	Katherine Hospital: 4.5hrs drive (365km)

D.2. Location data – Proposed Exploration Wells / Lease pads

Permit Area(s)	EP76					
Exploration Well name	Velkerri 76 S2					
	VEL76 - S2 – CMB – AL (RN41133)					
A	VEL76 – S2 – CMB – G (RN41134)					
Associated vvelis	VEL76 - S2 – IMB – AL (RNxxxxx) - TBC					
	VEL76 – S2 – IMB – G (RNxxxxx) - TBC					
	-16°51' 20.13"S; 134°23' 39.85"E					
Well/Lease location (Lat/Long)	-16.85571, 134.3939 (GDA94)					
	E: 435432, N: 8136301 (MGA Zone 53)					
Nearest Town by Vehicle	Daly Waters					
Nearest Major Road	Stuart Highway					
	Daly Waters: 2.5 hr /190 km					
Nearest Airports by Venicle	Elliot: 3.0 hrs /198 km					
Nearest Hospital by Vehicle	Katherine Hospital: 5.5 hrs drive (442km)					
Permit Area(s)	EP117					
Exploration Well name	Velkerri 117 E1					
Associated Wells	TBD					
Well/Lease location (Lat/Long)	-16°59' 35.50" S, 134°19' 26.21" E					
	-16.993194, 134.323948 (GDA94)					
	E: 428034.8, N: 8121074 (MGA Zone 53)					
Nearest Town by Vehicle	Daly Waters					
Nearest Major Road	Stuart Highway					
Nearest Airports by Vehicle	Daly Waters: 3 hr / 190 km					
	Elliot: 3.0 hrs /194 km					
Nearest Hospital by Vehicle	Katherine Hospital: 5.5 hrs drive (452km)					
Permit Area(s)	EP 76					
Exploration Well name	Velkerri 76 S1					

Associated Wells	TBD
Well/Lease location (Lat/Long)	-17°3' 48.91" S, 134°17' 21.05" E
	-17.063587, 134.28918 (GDA94)
	E: 424362, N: 8113273 (MGA Zone 53)
Nearest Town by Vehicle	Daly Waters
Nearest Major Road	Stuart Highway
Nearest Airports by Vehicle	Daly Waters: 3.15 hr / 194 km
	Elliot: 3.15 hrs /204 km
Nearest Hospital by Vehicle	Katherine Hospital: 6 hr drive (462km)

D.3. Campaign specific information

Exploration campaigns have the following specific information, this information is approximate only and should be utilised to provide guidance on approximate personnel data per exploration campaign activity:

D.3.1 Civil activity

Civil	Various Civil construction activities (Road/track upgrades, lease builds)
Average Personnel #	1-20
Fuel Capacity	Dual walled, self bunded diesel 26.4m3 tank

D.3.2 Drilling activity

Rig	Rig to be contracted for each campaign
Average Personnel #	8-14
Fuel Capacity	Dual walled, self bunded diesel 26.4m3 tank

D.3.3 Hydraulic Fracture Stimulation spread (Fracspread)

Rig name	Fracspread
Average Personnel #	40-60
Fuel Capacity	Dual walled, self bunded diesel 26.4m3 tank

D.3.4 Completion activity specific data

Rig name	Rig to be contracted for each campaign
Average Personnel #	8-12
Fuel Capacity	Dual walled, self bunded diesel 26.4m3 tank

D.3.5 Well Testing spread specific data

Rig name	Extended Production Test – EPT (Well Test)
Average Personnel #	2-6
Fuel Capacity	Dual walled, self bunded diesel 26.4m3 tank

D.4. Emergency Response Locality maps

Overview maps for all existing and proposed Petroleum Wells



D.4.1 Kalala S1 – Emergency Response Planning Map





D.4.2 Beetaloo W1 / Kyalla W1 – Emergency Response Planning Map



D.4.3 Amungee NW 1H / Kyalla 98 N1 – Emergency Response Planning Map



D.4.4 Kyalla 117 N2 – Emergency Response Planning Map

D.4.5 Velkerri 76 S2 – Emergency Response Planning Map





D.4.6 Velkerri 117 E1 – Emergency Response Planning Map



D.4.7 Velkerri 76 S1 – Emergency Response Planning Map

Bushfire Management Plans (BMP) – Wellsites Appendix E

E.1. Kyalla 117 N2 – Bushfire Management Plan



Beetaloo W1 / Kyalla 117 W1 – Bushfire Management Plan E.2.

	Exploration Permit 117		Contact Details		Name		Annual Works Cale						
	Exploration Fermit 117	Origin Fire Officer	Origin Fire Officer mobile : 0467 679 003 F Satellite phone : 0147 612 733			Month	Bushfire	Action	Month	Bushf			
origin	Bushfire Management Plan 2019/202	.0	Robert.Wear@upstream.originenergy.co	om.au			NISK	No fire management activity.		T(I)			
ongin	Kvalla 117 W1 Lease	Properties	Contact Details		Name	Jan	Low	and the second	July	High			
		Amungee Mungee Station	08 8971 1293 Katherine office 0427 825 159 Adrian 08 8975 9599 Amungee homestead	UHF 18 VHF 123600	Adrian Brown	-		Manage vegetation onsite including weeds.					
		Kalala Station	08 8975 9936 Office		Andrew Scott	Feb	Low		Aug	High			
Maderia	And the second se	Hayfield Station	08 8975 9920 Hayfield 0408 802 741 Justin 0417 836 551 Val	UHF 17 VHF 123900	Justin & Sally Dyer	Mar	Low	Planning meeting with neighbour. Manage vegetation onsite including weeds. Manage fire break and fire access trail	Sept	tigh			
	The second se	Beetaloo Station	08 8964 4613 Office 08 8964 4711	UHF 16 VHF 123850	Scotty & Jane Armstron	1		Manage vegetation onsite including weeds					
		Offsite Stakeholders	Gontact Details		Name	Apr	Low	wanage regetation onoice moldaling weede.	Oct	High			
		Volunteer Bushfire Brigades	08 8975 9936		0								
		National Response Centre	1800 076 251		24/7 contract line			Manage vegetation onsite including weeds.					
- a in		Emergency	000 or 112 mobile			May	Low		Nov	Mediu			
	States and the second s	Bushfire NT	08 8973 8873		Troy Munckton	-		Monitor NAFI and visual scan horizon for smoke.					
	The Production of Southern	Katherine office	08 8973 8871		Mark Gardner	June	Medium	 Liaise with neighbour regarding bushfires. IG bushfire preparedness tool to be utilised daily 	Dec	Low			
Property land uses	Location of Kyalla 117 W1	Head office	bushfires.nt@nt.gov.au			_		during periods of fire danger of severe or greater.					
Propenty land uses	Gas exploration and cattle grazing	NAFI North	https://www.firenorth.org.au/nafi3/				Kyalla 11	7 W1 Fire Management Zones	E	REMAN			
Site fire management aim	bushfires, thereby reducing the threat to life, property,	Secure NT (Fire Bans)	https://securent.nt.gov.au/alerts			-	Bushf	ire Management Actions		See.			
	cultural values and the environment.	Fire incident map	https://www.pfes.nt.gov.au/incidentr	nap/		-		Remove all vegetation. Treat emerging vegetation with herbicide.	200	T.			
Site fire management obje	Mitigate the potential impact of unplanned fires on Origin's per assets and operations and neighbouring land uses.	ople,	Eiro Eroquoneu 2000 2010			infr	astructure area	 A permit for open flaring and hot works is req during a declared fire danger period 	uired	1.19			
			Fire management risks					 Open flaring and hot works are not permitted total fire ban days without written approved for 	on				
EP TENEMENT	LOCATION	- Ignitions (humans and lig	htening) on or off site resulting in harm to wo	rkers and loss of e	equipment.			fire control officer or fire warden.		225-2			
Katherine		Fire scar mapping indicat Bullwaddy and Lancewood	Fire scar mapping indicates the exploration area burns approximately every 3 years. Bullwaddy and Lancewood venetation communities occur within the vicinity of the infrastructure area and are				anagement breal	Maintain a 10 m wide bare earth loop road around the infrastructure area.	ad				
AC	HIGHWAY	fire sensitive. Hot fires ha	ave the ability to reduce habitat quality for bo	th flora and fauna	species which utilise			During operations, establish a 40 m wide AP2		1.1			
	ROPER IN INT	Spread of high fuel load g	grassy weeds could increase fire intensity, eq	gamba, grader a	nd buffel grass, adjacent			around the intrastructure area by removing woody understorey vegetation and achieving	a 🔛	100			
111		FIRE FREQUEN	CY 2000 - 2019					grass height of < 100 mm using the methods prescribed in the Origin Generic bushfire asse	et	2.24			
Ft		If of Carpenlaria				Asset	Protection Zone	 protection zone guide. Maintain grass cover to a height < 100 mm. 	ale -	See.			
1 +	La Strand	Dal 1					(APZ)	 Remove vegetation from the 10 m wide fire break around the infrastructure area. Monitor 	for	1.4			
$f \rightarrow f$		Sin /						grassy weeds and control where appropriate.	2	1 2			
t t		Sorroloola						perimeter of the asset protection zone is	for	12.00			
Entrance to Access Track Essting: 335727 Northing: 8107010	Waters Kyalis 117 Wi				N			grassy weeds and control where appropriate.		12.			
(MGA Zane 53) Lat: -17,1155 Long: 133,4059 (GDA 94)	7-EP96 Metring 2010/379 (KRX.2506 53) Lat: 17 1186 Larg: 157.83 Lat: 17 1186 Larg: 157.83		EP117			Fir	e access trails	Create and maintain a 4m wide access trail around the perimeter of the asset protection zone by grading or spraying.	LEG	Existing Acces 4m wide Fire /			
T	Conception of the second secon					Neigh Fire N	bouring Propert	Annual fire management planning meeting wineighbouring properties. Neighbour to advise proponent of planned bu	h ms.	10m wide Fi Asset Protec Neighbourin Managemen			
1	Ellion E		an.					Bushfire Preparedness - refer to	IG Bus	hfire prep			
ALL DOCTOR	P P P76	Access Track					Pre	paredness Planning		Bu			
1 - Carl	t Stock Route Road	12.5	Kyala 117 W1			Mandat	ory for all Severe, E	xtreme and Catastrophic FDI days	The follow	wing sequence er - Remove			
10 10	1	Const.				The followith a k	owing must be review	ed daily. If fire alerts are active or presenting	2. Alarm proces	- Raise the			
and the second						continge	ency plans which nee	d to encompass the following:	3. Gathe	er informatio			
LEGEND Drainage	t z	65. C				Critica	l equipment to be ren	noved / isolated / shut down.	infra	astructure su			
Roads Principal Roads Secondary	the second		States in the local division of			Safe e Comm	vacuation routes from	h site and muster points.	- Fire	Characteria			
Access Track	t					12	Team channels and / Area channels and /	or phone numbers. or phone numbers.	- We	ather - Wind			
O City / Town O Proposed Well	BANN 0 25	50 75km EP Tenement Boundary			1	Close:	st 'Safe Havens' (Con	nmunity or Origin permanent sites).	- Res Lan	downers or E			
EP Tenement Boundary Aircraft Facility	Tennant Creek	Access Track. Proposed Well Proposed Well Ste Skm Radus			- /				- Res - Acc	ponse requi			
Auxiliary Career Fire Statis Emergency Services Fire and Emergency Reso	n Distances from Emergency Service Station: State Highway: Auciliary Career Fire Station: Termant Creek Daly Waters.	32km Number of Years Burnt Since 2000	1 1 1			-			4. Notify	Origin - Fire			
H Hospital P Police Station	Fire and Emergency Response Group. Elliot and Borroloals Katherina. Police Station: Elliot, Tennant Creek and Borroloals Hospital.	39/km 502km rs: 57km			1		M	onitoring Routine	6. Notify	Emergency			
St John Ambulance	Emergency Services. Termant Creek Elicit. Ambulance: Termant Creek Elicit. Termant Creek	81km 4 14 331km 5 15				Provid Monite	te timely advice on ch or team and area com	anges in level of fire risk as available. mon channels for bushfire early warning.	7. Resp	ond - if safe t			
Kyalla 117 W1 exploration lease are Emergency Response Plans for Ori	a. This Plan should be read in conjunction with the overarching Environmental Management Plan pit's operators in the Beetaloo Basin.	and 7 17 17 18 18			2.5k	• Updat	e changes in work loo	ation.	8. Hande Service	over - to the tes on arrival			
Appendix C Site Specific Bushfir	e Management Plan 2019	as autobility for our contracts and diveloping of contractability and	di Tabilita in nationana for ell'espanses, lessa, despanse fonlation infrast con	the tree has (second lefter res	ah midd ha incorrad on a race of aftha data hai		lete in one year and for any second		9. Supp	ort - provide r			

Released on 18/02/2020 – Revision 3 - Status Issued For Use. Document Custodian is: General Manager – Beetaloo & Growth Assets



dness tool

ire First Responder Checklist

e must be followed by the first person responding to a fire: yourself and others from danger is safe to do so. Alarm either on common radio channel or other agreed

- tion from known reference points, eg roads and Origin h as well numbers). and potential) - Life, property and the environment.
- tics Grass or woodlands, flame height, fire front and
- strength and direction.
- reference of the second second

- officer / Supervisor.
- Refer to Property Contacts.
 Services Call "000" or "112" (some mobiles) if Origin and to manage situation.
- o do so in consultation with Pastoralist. Origin On-Scene Commander / Pastoralist of Emergency
- ngoing support to the response as approp

E.3. Velkerri 76 S2 – Bushfire Management Plan

	Exploration Parmit 76		Contact Details		Name			Annual Works	Calenda	ar	
0	Bushfire Management Plan 2019/2020	Origin Fire Officer	mobile : 0467 679 003 Satellite phone : 0147 612 733 Pohet Waar@unstrang grininggerru oon ou		Robert Wear	Month	Bushfire Risk	Action	Month	Bushfire Risk	Action
origin	Velkerri 76 S2 Lease	Properties Amungee Mungee Station	Contact Details 08 8971 1293 Katherine office	UHF 18	Name Adrian Brown	Jan	Low	No fire management activity.	July	High	Monitor NAFI and visual scan horizon for smoke. Liaise with neighbour regarding bushfires. IG bushfire preparedness tool to be utilised daily during periods of fire danger of severe or greater.
		Tanunbirini Station	0427 825 159 Adrian 08 8975 9599 Amungee homestead 08 8975 9929	VHF 123600	Mick Tasker	Feb	Low	Manage vegetation onsite including weeds.	Aug	High	Monitor NAFI and visual scan horizon for smoke. Liaise with neighbour regarding bushfires. IG bushfire preparedness tool to be utilised daily
And		Beetaloo Station	08 89 644 613 Office 08 89 644 711	UHF 16 VHF 123850	Scotty & Jane Armstrong	Mar	(au	Planning meeting with neighbour. Manage vegetation onsite including weeds.	Cant	High	during periods of fire danger of severe or greater. • Monitor NAFI and visual scan horizon for smoke. • Liaise with neighbour regarding bushfires.
State State	- section designed to be a section of	Offsite Stakeholders	Contact Details		Name	IVIC:	200	Manage fire break and fire access trail.	Sept		 IG bushfire preparedness tool to be utilised daily during periods of fire danger of severe or greater.
		Bushfire Brigades National Response Centre	1800 076 251		24/7 contract line	Apr	Low	Manage vegetation onsite including weeds.	Oct	High	Monitor NAFI and visual scan horizon for smoke. Liaise with neighbour regarding bushfires. G bushfire preparedness tool to be utilised daily
122		Emergency Bushfire NT Katherine office	000 or 112 mobile 08 8973 8873 08 8973 8871		Troy Munckton	May	Low	Manage vegetation onsite including weeds.	Nov	Medium	Monitor NAFI and visual scan horizon for smoke. Laise with neighbour regarding bushfires.
and the second		Bushfire NT Head office	08 89/20 08/0 bushfires.nt@nt.gov.au 08 89/20 0844		Mark Gardner	may		Monitor NAFI and visual scan horizon for smoke.	1104	Wediditi	G bushine preparecness too to be utilised daily during periods of fire danger of severe or greater. No fire management activity.
Descent land uses	Location of Velkerri 76 S2	NAFI North	https://www.firenorth.org.au/nafi3/			June	Medium	Laise with heighbour regarding bushines. IG bushfire preparedness tool to be utilised daily during periods of fire danger of severe or greater.	Dec	Low	
Property land uses	Gas exploration and cattle grazing		mups.//securent.nt.gov.au/alens				Velkerri 7	6 S2 Fire Management Zones	F	IRE MANAGE	EMENT ZONES
Site fire management aim	bushfires, thereby reducing the threat to life, property,	Fire incident map	https://www.pfes.nt.gov.au/incidentma	ap/		_	Bushf	ire Management Actions	ġ.		
	cultural values and the environment.		Fire Frequency 2000-2019					Remove all vegetation.			10.0m N 40.0m
Site fire management obj	Mitigate the potential impact of unplanned fires on Origin's people, assets and operations and neighbouring land uses.	Ignitions (humans and light Fire scar mapping indicate Bullwaddy and Lancewood are fire sensitive. Hot fires	Fire management risks tening) on or off site resulting in harm to work s the exploration area burns approximately er l vegetation communities occur to the south a have the ability to reduce habitat quality for t	kers and loss of every 2 years. and west of the i both flora and fa	equipment. Infrastructure area and una species which utilise	Infra	astructure area	 Treat emerging vegetation with herbicide. A permit for open flaring and hot works is req during a declared fire danger period. Open flaring and hot works are not permitted total fire ban days without written approval fro fire control officer or fire warden. 	uired on om a		
Katherine		these vegetation communi • Spread of high fuel load gra- infrastructure score and an	ties. assy weeds could increase fire intensity, eg g	gamba, grader a	and buffel grass, adjacent	Fire ma	anagement break	Maintain a 10 m wide bare earth loop road around the infrastructure area.		- 10 M	
	Villeri 16 527 Satur Villeri 26 522 Satur Villeri 26 522 Satur Sat	FIRE FREQUENC	CY 2000 - 2019	/	*	Asset	Protection Zone (APZ)	 During operations, establish a 40 m wide AP2 around the infrastructure area by removing woody understorey vegetation and achieving grass height of < 100 mm using the methods prescribed in the Origin Generic bushfire asserprotection zone guide. Maintain grass cover to a height < 100 mm. Remove vegetation from the 10 m wide fire break around the infrastructure area. Monitor grassy weeds and control where appropriate. Ensure a 4m wide fire access trail around the perimeter of the asset protection zone is trafficable by fire fighting appliances. Monitor grassy weeds and control where appropriate. 	a et for for	100 200 30	
JEP11	7 - EPSS - EP75 - EP75	- 2.5	EP76			Fire	e access trails	Create and maintain a 4m wide access trail around the perimeter of the asset protection zone by grading or spraying. Annual fire management planning meeting wi	th	Existing Access Track 4m wide Fire Access Trail Infrastructure Area 10m wide Fire Break Access Dratection Zone	
Entrance to Access Track Easting: 332331 Northing: 8135051 (UIG3 700 53)	Newczsile					Fire M	lanagement Zone	neighbouring properties. • Neighbour to advise proponent of planned bu	rns.	Neighbouring Property Fir Management Zone	Existing Access Track
Lat -16.86188							Bree	Busmire Preparedness - refer to	o IG Bus	Ruchfier	Eiset Bospondor Checklint
CODA 94)	en antes Grupe Series Tread Series Tread Series Tread Series Tread Creek Tread Series Tread Creek Tread Series Tread Creek Tread Creek	Access Tr EGEND PF Termed Bondry Access Trid. Propeed Trid Bart Sine 200 Nenter of Twan Bart Size 200 I I I I I I I I I I I I I I I I I I I	velkerri 76 S2	•		Mandatu The folk with a ki continge Proceet Critica Safe e Comm - Comm - Comm - Comm - Provid	ory for all Severe, Ex- owing must be review nown risk (fire in the a ency plans which need dure on identifying ani l equipment to be rem wacuation routes from unication methods: Team channels and / of Area channels and / of Area channels and / Com Must be timely advice on the second te timely advice on the second te tam and area com	there and Catastrophic FDI days ad daily. If fire alerts are active or presenting rea), personnel must execute their to encompass the following: to output of a bushfire. coved / isolated / shut down. is ite and muster points. or phone numbers. r phone numbers. munity or Origin permanent sites). photeoring Routine anges in level of fire risk as available. mon changes to bushfire active warning	The follow 1. Dange 2. Alarm proces 3. Gathe - Loco infra - Imp - Fire dire - Wes - Res Lan - Res - Acc 4. Notify 6. Notify 6. Notify Pastor	wing sequence musi wing sequence musi er - Remove yoursel n - Raise the Alarm e ss. er information cation - Direction from acting action - Direction from acts (actual and pol acts (actual and pol actual and pol actual and pol actual actual and pol actual and pol actual and pol actual actual and pol actual and pol actual and pol actual and pol actual actual and pol actual and pol actual and pol actual and pol actual actual and pol actual and pol actual and pol actual and pol actual actual and pol actual and pol actua	be followed by the first person responding to a fire: and others from danger is safe to do so. ither on common radio channel or other agreed m known reference points, eg roads and Origin ell numbers). ential) – Life, property and the environment. Srass or woodlands, flame height, fire front and h and direction. - What response is underway and by who (Origin, ncy Services). rigin and / or Emergency Services. In degress routes. / Supervisor. r to Property Contacts. es - Call "000" or "112" (some mobiles) if Origin and lage situation.
This Site Specific Bushfire Manage Velkerri 76 S2 exploration lease an Emergency Response Plans for Or Appendix 8 Site Specific Bushfin	ment Flan (this Plan) has been prepared for Origin and its Contractors to manage the risk of bushifter at the ear This Plans hould be read in conjunction with the overarching <i>Environmental Management Plan</i> and ign's operations in the Beetalob Baain. e Management Plan (this plan) / Version 1/5 December 2019	6 16 17 7 17 8 18 9 19				Update	e changes in work loc	ation.	8. Hando Servic 9. Suppo	over - to the Origin C ces on arrival. ort - provide ongoing	On-Scene Commander / Pastoralist of Emergency g support to the response as appropriate.



E.4. Velkerri 76 S1 – Bushfire Management Plan

	Exploration Permit 76		Name		-	Annual Works	Annual Works Calendar				
0	Rushfire Management Plan 2019/2020	Origin Fire Officer	mobile : 0467 679 003 Satellite phone : 0147 612 733	Robert Wear	Month	Bushfire Risk	Action	Month	Bushfire Risk	Action	
origin	origin		Robert.Wear@upstream.originenergy.com.au	Name	Jan	l.	No fire management activity.	1.4.		Monitor NAFI and visual scan horizon for smoke. Liaise with neighbour regarding bushfires.	
	Velkerri 76 S1 Lease	Amungee Mungee Station	08 8971 1293 Katherine office 0427 825 159 Adrian 09 9075 0500 Amage to be a t	Adrian Brown		LOW	Manage vegetation onsite including weeds	July	- odo	IG bushfire preparedness tool to be utilised daily during periods of fire danger of severe or greater. Monitor NAEL and visual scan horizon for smoke	
		Tanunbirini Station	08 8975 9929	Mick Tasker	Feb	Low		Aug	High	Liaise with neighbour regarding bushfires. IG bushfire preparedness tool to be utilised daily	
Arrive to	the second state and second and the second second	Beetaloo Station	08 89 644 613 Office UHF 16 08 89 644 711 UHF 123850	Scotty & Jane Armstrong	-		Planning meeting with neighbour.			during periods of fire danger of severe or greater. • Monitor NAFI and visual scan horizon for smoke.	
	A CARLES AND A CARLES AND A	Offsite Stakeholders	Contact Details	Name	Mar	Low	Manage vegetation onsite including weeds. Manage fire break and fire access trail.	Sept	High	 Liaise with neighbour regarding bushfires. IG bushfire preparedness tool to be utilised daily 	
d water		Volunteer Bushfire Brigades	08 8975 9936				Manage vegetation onsite including weeds.			 during periods of fire danger of severe or greater. Monitor NAFI and visual scan horizon for smoke. 	
Earth and	and the second second	National Response Centre	1800 076 251	24/7 contract line	Apr	Low		Oct		 Liaise with neighbour regarding bushfires. IG bushfire preparedness tool to be utilised daily 	
	The same a second se	Emergency	000 or 112 mobile				Manage vegetation onsite including weeds.			 during periods of fire danger of severe or greater. Monitor NAFI and visual scan horizon for smoke. 	
		Bushfire NT Katherine office	08 8973 8873 08 8973 8871	Troy Munckton	May	Low		Nov	Medium	Liaise with neighbour regarding bushfires. IG bushfire preparedness tool to be utilised daily	
	and a state of the	Bushfire NT Head office	08 8922 0840 bushfires.nt@nt.gov.au	Mark Gardner			Monitor NAFI and visual scan horizon for smoke.	-		during periods of fire danger of severe or greater.	
and the second	an contract	NAFI North	08 8922 0844 https://www.firenorth.org.au/pafi3/		June	Medium	Liaise with neighbour regarding bushfires. IG bushfire preparedness tool to be utilised daily	Dec	Low	• No fire management activity.	
Property land uses	Location of Velkerri 76 S1	Secure NT (Fire Bans)	https://www.incition.org.au/alerts				during periods of fire danger of severe or greater.				
	To reduce the occurrence of and minimise the impact of	Eiro incident man	https://www.pfcc.pt.gov.au/incidentmon/			Velkerri	76 S1 Fire Management Zones		REMANAG		
Site fire management aim	bushfires, thereby reducing the threat to life, property, cultural values and the environment.		Tups.//www.pres.nr.gov.au/incident/nap/			Bush	fire Management Actions	- 20	1.20		
	Mitirate the notential impact of unnlanned fires on Origin's people		Fire management risks				Remove all vegetation. Treat emerging vegetation with herbicide.	and a			
Site fire management obje	assets and operations and neighbouring land uses.	Ignitions (humans and lighte	ning) on or off site resulting in harm to workers and loss of e	equipment.	Infra	astructure area	 A permit for open flaring and hot works is required during a declared fire danger period. 	uired	12.00		
		Fire scar mapping indicates Bullwaddy and Lancewood y	the exploration area burns approximately every 3 years.	structure area and are			 Open flaring and hot works are not permitted total fire ban days without written approval fro 	on ma	1.		
	LOCATION Parent	fire sensitive. Hot fires have	the ability to reduce habitat quality for both flora and fauna	species which utilise	-		fire control officer or fire warden. Maintain a 10 m wide bare earth loop road	100	1.3.63		
Katherine		Spread of high fuel load gras	sy weeds could increase fire intensity, eg gamba, grader a ass tracks	nd buffel grass, adjacent	Fire m	anagement brea	around the infrastructure area.				
2 mg	HIGHNAY WA HT	FIRE FREQUENCY	(2000 - 2019				 During operations, establish a 40 m wide AP2 around the infrastructure area by removing 	1.5	Call Street		
()							grass height of < 100 mm using the methods	a	1111	1 mh L	
F + (attil Depentatio					Destantion Zon	protection zone guide.				
t					Asset	(APZ)	Remove vegetation from the 10 m wide fire break around the infrastructure area. Monitor:	for		40.0	
			e e e e e e e e e e e e e e e e e e e	× 1			grassy weeds and control where appropriate. • Ensure a 4m wide fire access trail around the	1			
t t	Borneoula		110 1008	- X			perimeter of the asset protection zone is trafficable by fire fighting appliances. Monitor	for	1.1		
+ Daly			A A A A A A A A A A A A A A A A A A A				grassy weeds and control where appropriate.	en	500		
EP11			EP76		Fin	e access trails	around the perimeter of the asset protection	LEG	Existing Access Track		
Y					Neigh	bouring Proper	Annual fire management planning meeting wit	h	Infrastructure Area 10m wide Fire Break Asset Protection Zoni	e 0 100 250m	
Entrance to Access Track Easting: 332331	Rewcastle EP117 Valkeri 75 81 Lasting 24262	44	Access Track		Fire M	lanagement Zor	Neighbouring properties. Neighbour to advise proponent of planned bur	ns.	Neighbouring Propert Management Zone	ly Fire	
(MGA Zone 53)	Waters Northing 111273 Elliott	E					Bushfire Preparedness - refer to	IG Busi	hfire prepared	iness tool	
Lang: 133.4261 (GDA 94)	Lar: 17.291 (GDA 94)		þ.		_	Pre	eparedness Planning	The follow	Bushfin	e First Responder Checklist	
ALCONT A	Stock Route Road				Mandat	ory for all Severe, E	Extreme and Catastrophic FDI days	1. Dange	r - Remove yours	elf and others from danger is safe to do so.	
ALC: Y			Velkerri 76 S1		The followith a k	owing must be review nown risk (fire in the	wed daily. If fire alerts are active or presenting area), personnel must execute their	2. Alarm proces	- Raise the Alarm s.	either on common radio channel or other agreed	
LEGEND	t 22				continge Proce	ency plans which nee dure on identifying a	ed to encompass the following: nd notifying of a bushfire.	- Loca	ation - Direction fr	rom known reference points, eg roads and Origin	
Drainage Reads Principal					Critica Safe e	I equipment to be re evacuation routes fro	moved / isolated / shut down. m site and muster points.	- Impa	acts (actual and p	otential) - Life, property and the environment.	
Roads Secondary Roads Minor					• Comm	unication methods: Team channels and	/ or phone numbers.	- Fire direc	ction of travel.	- Grass or woodlands, flame height, fire front and	
O City / Town	EARKLY	LEGEND			Area channels and / or phone numbers. Closest 'Safe Havens' (Community or Origin permanent sites). Area channels and / or phone numbers. Response in Progress - What response is under landowners or Emergency Services)			ss - What response is underway and by who (Origin, ency Services)			
Proposed Well EP Tenement Boundary Aircraft Facility	Ternant Creek	Access Track Proposed Well Pro		- /	Response relief of circles): Response relief of circles and a more suite Response relief of compare suite			Origin and / or Emergency Services.			
Auxiliary Career Fire Statio Emergency Services Fire and Emergency Services	n Distances from Valkerd 76 St to: Distances from Valkerd 76 St to: Start Highway: 118m Ausling Career Fins Station Termant Circle Distances Fins Station Termant Circle Distances Fins Station	Number of Years Burnt Since 2000		1				4. Notify	Origin - Fire office	er / Supervisor.	
H Hospital P Police Station	Fire and Emergency Response Group Ellett and Bornolode Katherine. 455km Poles States: Elied: Terrund Creat and Bornolode Bornolode Strian Hospital Terrund Creat and Bornolode Water: 173km			1		N	Ionitoring Routine	5. Notify 6. Notify	Pastoralists - Re Emergency Serv	erer to Property Contacts. rices - Call "000" or "112" (some mobiles) if Origin and	
St John Ambulance	Farmagnoy Service: Ternart Creek, Eloit Arrobusine: Ternart Creek, Eloit Ternart Creek, Eloit	4 14 5 15 6 16		Provide uniting advice on changes in level of the first as available. Anotic team and area common changes for bushfire early warning. Anotic team and area common changes for bushfire early warning. Anotic team and area common changes for bushfire early warning. Anotic team and area common changes for bushfire early warning. Anotic team and area common changes for bushfire early warning. Anotic team and area common changes for bushfire early warning. Anotic team and area common changes for bushfire early warning. Anotic team and area common changes for bushfire early warning. Anotic team and area common changes for bushfire early warning. Anotic team and area common changes for bushfire early warning. Anotic team and area common changes for bushfire early warning. Anotic team and area common changes for bushfire early warning. Anotic team and area common changes for bushfire early warning. Anotic team and area common changes for bushfire early warning. Anotic team and area common changes for bushfire early warning. Anotic team and area common changes for bushfire early warning. Anotic team and area common changes for bushfire early warning. Anotic team and area common changes for bushfire early warning. Anotic team and area common changes for bushfire early warning.						anage situation. so in consultation with Pastoralist.	
Velkerri 76 S1 exploration lease are Emergency Response Plans for Ori Annendix A Site Specific Rest	ea. This Plan should be read in conjunction with the overarching <i>Environmental Management Plan</i> and gin's operations in the Beetaloo Basin. A Mongement Plan 2010	7 17 8 18 9 9 19		2.5km	• Updat	e changes in work lo	ication.	8. Hando Service	es on arrival.	On-Scene Commander / Pastoralist of Emergency	
Appendix A Site Specific Bushill	e managenron i tali 2013							a. Suppo	ri - provide ongoi	ng support to the response as appropriate.	



Velkerri 117 E1 – Bushfire Management Plan E.5.

Evr	Joration Permit 117		Contact Details	Name	1		Annual Works	Calenda	ır	
	shfire Management Plan 2019/2020	Origin Fire Officer	mobile : 0467 679 003 Satellite phone : 0147 612 733	Robert Wear	Month	Bushfire Risk	Action	Month	Bushfire Risk	Action
origin Vell	kerri 117 E1 Lease	Properties	Robert Wear@upstream.originenergy.com.au Contact Details 08.8074.1003 Ketharina office	Name Advice Deputy	Jan	Low	No fire management activity.	July	High	 Monitor NAFI and visual scan horizon for smoke. Liaise with neighbour regarding bushfires. IG bushfire preparedness tool to be utilised daily
1		Tanunbirini Station	0427 825 159 Adrian VHF 12360 08 8975 9599 Amungee homestead 08 8975 9929	Mick Tasker	Feb	Low	Manage vegetation onsite including weeds.	Aug	High	 Monitor NAFI and visual scan horizon for smoke. Laise with neighbour regarding bushfires.
Parlan or other states	and the second second	Beetaloo Station	08 89 644 613 Office UHF 16 08 89 644 711 VHF 1238	Scotty & Jane Armstrong	-		Planning meeting with neighbour.			 IG bushfire preparedness tool to be utilised daily during periods of fire danger of severe or greater. Monitor NAFI and visual scan horizon for smoke.
in the second	A MARKEN AND	Offsite Stakeholders	Contact Details	Name	Mar	Low	Manage vegetation onsite including weeds. Manage fire break and fire access trail.	Sept	High	 Liaise with neighbour regarding bushfires. IG bushfire preparedness tool to be utilised daily during periods of fire danger of severe or greater.
		Volunteer Bushfire Brigades National Response Centre	08 8975 9936 1800 076 251	24/7 contract line	Apr	Low	Manage vegetation onsite including weeds.	Oct	High	Monitor NAFI and visual scan horizon for smoke. Liaise with neighbour regarding bushfires. IG bushfire preparedness tool to be utilised daily
1 1	The states and	Emergency Bushfire NT	000 or 112 mobile 08 8973 8873	Troy Munckton		low	Manage vegetation onsite including weeds.			 during periods of fire danger of severe or greater. Monitor NAFI and visual scan horizon for smoke. Liaise with neighbour regarding bushfires.
	and the second second	Katherine office Bushfire NT Head office	08 8973 8871 08 8922 0840 bushfires.nt@nt.gov.au	Mark Gardner	May	LOW	Monitor NAFI and visual scan horizon for smoke.	Nov	Medium	IG bushfire preparedness tool to be utilised daily during periods of fire danger of severe or greater. No fire management activity.
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Location of Velkerri 117 E1	NAFI North	08 8922 0844 https://www.firenorth.org.au/nafi3/		June	Medium	 Liaise with neighbour regarding bushfires. IG bushfire preparedness tool to be utilised daily during periods of fire danger of severe or greater. 	Dec	Low	no no managoment douvry.
Property land uses	Gas exploration and cattle grazing	Secure NT (Fire Bans)	https://securent.nt.gov.au/alerts			Velkerri 1	17 E1 Fire Management Zones	FI	RE MANAG	EMENT ZONES
Site fire management aim	To reduce the occurrence of, and minimise the impact of bushfires, thereby reducing the threat to life, property,	Fire incident map	https://www.pfes.nt.gov.au/incidentmap/			Bushfi	ire Management Actions		The second	
Site fire management objectives	cultural values and the environment. Mitigate the potential impact of unplanned fires on Origin's people, assets and operations and neighbouring land uses.	Ignitions (humans and lightenii Fire scar mapping indicates th Bullwaddy and Lancewood vei	Fire Frequency 2000-2019 Fire management risks ing) on or off site resulting in harm to workers and loss of the exploration area burns approximately every 3 years. getation communities occur within the vicinity of the infr	f equipment.	Infra	astructure area	 Remove all vegetation. Treat emerging vegetation with herbicide. A permit for open flaring and hot works is requiduring a declared fire danger period. Open flaring and hot works are not permitted or total fire ban days without written approval foro 	ired n n a		00 400
		fire sensitive. Hot fires have the these vegetation communities.	he ability to reduce habitat quality for both flora and fau	na species which utilise	Fire ma	anagement break	fire control officer or fire warden. • Maintain a 10 m wide bare earth loop road around the infrastructure area		(-	
Day Waters		Fire FREQUENCY	2000 - 2019	and buller grass, aujacent	Asset	Protection Zone (APZ)	 During operations, establish a 40 m wide APZ around the infrastructure area by removing woody understorey vegetation and achieving a grass height of < 100 mm using the methods prescribed in the Origin Generic bushfire asset protection zone guide. Maintain grass cover to a height < 100 mm. Remove vegetation from the 10 m wide fire break around the infrastructure area. Monitor fr grassy weeds and control where appropriate. Ensure a 4m wide fire access trail around the perimeter of the asset protection zone is trafficable by fire fighting appliances. Monitor for grassy weeds and control where appropriate. 	pr	Access In	
		Yee			Fin	e access trails	around the perimeter of the asset protection zone by grading or spraying.		Access Track 4m wide Fine Access Trail Infrastructure Area 10m wide Fine Break	
Entrance to Access Track Earting 33231 Northing 8135051 Waters	EP117 Velkeri 117 E1 Exting 470331 Northing 1202087				Neigh Fire M	bouring Property lanagement Zone	neighbouring properties. • Neighbour to advise proponent of planned burr	IS.	Asset Protection Zone Neighbouring Property Management Zone	0 100 250m
(MGA Zone 53) Lat -16.85188 Long 133.4261			Access Track			Desc	Bushfire Preparedness - refer to	IG Bus	hfire preparedr	ess tool
(GDA 94)					Mandat	ory for all Severe Ex	treme and Catastrophic FDI dave	The follow	ving sequence must	t be followed by the first person responding to a fire:
LEGEND Drarage Road [Principal Road [Secondary Road [Minor Access Track. Rating O City/Town Proposed Well Proposed	BARKLY BARKLY BARKLY BARKLY Barket Creak Barket Creak Bar	EGEND EP Tersmert Boundary Access Task Propued Wal She Bin Radus Number of Years Bane Stees 2000 Dimber of Ware Stees 2000 Dimber of Year Stees 2000	Velkeri 117 E1	P76	The followith a k continge Proce Critica Safe e Comm - Closes	owing must be review, own risk (fire in the ancy plans which need dure on identifying and l equipment to be rem vacuation routes from unication methods: Team channels and / o at 'Safe Havens' (Com	ad daily. If fire alerts are active or presenting rea), personnel must execute their to encompass the following: d notifying of a bushfire. oved / isolated / shut down. site and muster points. or phone numbers. munity or Origin permanent sites).	1. Dange 2. Alarm proces 3. Gathel – Loca infra – Impa – Fire direc – Wea – Resj Lanc – Resj – Acci 4. Notify	er - Remove yoursel - Raise the Alarm es- sites r information ation - Direction fro- structure such as wa acts (actual and po Characteristics - (ction of travel. ther - Wind strengt ponse in Progress Jowners or Emerge ponse required - C ess - Safe access a Origin - Fire officer	f and others from danger is safe to do so. ither on common radio channel or other agreed m known reference points, eg roads and Origin eln umbers). tential) - Life, property and the environment. Grass or woodlands, flame height, fire front and h and direction. - What response is underway and by who (Origin, no's Services). brigin and / or Emergency Services. and egress routes. - / Supervisor.
Hagela Hagela Pake Saturn Study Anh Arebatene This Site Specific Bushfre Management Plan (th Velkeri 117 E1 exploration lesse area. This Plan Emergency Response Plane for Origin's geretato Appendix B Site Specific Bushfire Manageme	Fire and Cremeroy Response Grave. Elist and Bornisola. Paics Batics: Elist Transit Creak and Bornisola. Environment Creak and Bornisola. Elist Transit Creak and Bornisola. Elist Status Creak and Bornisola. Terman Creak Elist Status Creak and Status Creak and Status Creak Terman Creak Elist Status Creak and Status Creak and Status Creak Terman Creak Status Creak and Status Creak and Status Creak and Status Creak and Status Creak and Status Creak and Status Creak and Status Creak Status Creak Status Creak and Status Creak and Status Creak and Status Creak and Status Creak and Status Creak and Status Creak and Status Creak and Status Creak and Status Creak and Status Creak an			1 2.5km	• Provid • Monito • Updat	Mo le timely advice on cha or team and area com e changes in work loc	onitoring Routine anges in level of fire risk as available. mon channels for bushfire early warning. ation.	 Notify Notify Pastori Respo Hando Service Suppo 	Pastoralists - Refe Emergency Servic alists unable to mar and - if safe to do so over - to the Origin (es on arrival. ort - provide ongoing	sr to rroperty Contacts, ces - Call ''000' or "112" (some mobiles) if Origin and lage situation, in consultation with Pastoralist. Dn-Scene Commander / Pastoralist of Emergency g support to the response as appropriate.



Appendix F	Definitions
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Term	Definition
CMP / T	Crisis Management Plan / Team
DPIR	Department of Primary Industry and Resources
DENR	Department of Environment and Natural Resources
EPA	Environmental Protection Agency
SEMT	Site Emergency Management Team
ER/P/T	Emergency Response / Plan / Team
GEMP/T	Group Emergency Management Plan / Team
GEMT-L	Group Emergency Management Team Leader
SEMT-L	Site Emergency Management Team – Leader
OE BU	Origin Energy Business Unit
DA	Development Area
D&C	Drilling and Completions
ECR	Emergency Control Room
ER&S	Emergency Response and Security, Senior Advisor
PC ERT	Primary Contractor Emergency Response Team
PC IMT	Primary Contractor Incident Management Team
FR	First Responder
OE	Origin Energy
OSC	On scene Commander
PC	Primary Contractor

Appendix G Emergency Services Manifest

To be completed within 2 weeks of occupation of Site.

Screen shot of example: Emergency Services Manifest Template.

0	Integrated Gas Emergency Services Manifes
	Insert Site Name
rigin	Concrete and a circle record and
Purpose	A manifest of notifiable quantities of hazardous substances held at this site facility under section 347 of 'Work Health & Safety Regulation 2011, Queensland'
Reference	Hazardous Materials Management - LNG Division - <u>3676149</u> Disk Management Directive - OBC DISK DVE - 04
Records	Hard copy to be housed in the locked 'Hazmat' Red box located at the front of the site facility and electronic copy to be

Section 1 - General Site Information

Occupier of Facility: Origin Energy Pty Ltd Site Address: <a href="https://www.sitestaddress-disert address-disert-address-dis

<insert address>

Section 2 - Emergency Contacts

9

		Contact Details					
Name	Position	Business Hours	Mobile	UHF Radio	After Hours		
					-		
	Linetunam Emannency Dh	one Number (24/7 Atter	Hours) 1800 076 2	51			

Section 3 - Burk Storage Locations

Note: Eluik tiloriege	includes vessels with	a capacity of a	600L Gas lank capac	ity must be in Water Ce	pecity (L) not	ges capacit	y (m)
Location / Equipment ID Number	Туре	Capacity	Tank Diameter (Flammable liquids only)	Correct Shipping Name:	UN Number	DG Class	Quantity
e g T3600-001	Aboveground tank	20,000L		Petroleum	1268	3	20,000L

Section 4 - Package and IBC Storage Locations

Nate: Paolarges include containers with a capacity of <50NL or IBCs of 1 000L capacity. Dyinder quantities must be in Water Capacity (EL no) gas nationally (m²).

Storage Location	Correct Shipping Name	Package	UN no.	Class	Max. Ory
e.g. Warehouse	Hydrochloric Acid	Drum	1789	8	3 000L
			-	-	

Appendix H Site Specific Emergency Response Equipment

To be developed within 2 weeks of site occupation to display the following areas:

- Person in Charge (PIC)
- Muster Areas
- First Aid Treatment Areas
- First Aid Kit locations
- Fixed Fire Extinguishers and Blankets
- Evacuation Routes
- Helicopter Landing Sites
- Emergency Services Meeting Points
- Hazardous / Restricted Areas
- Emergency event PPE Locations
- Spill Kit

Northern Territory – Daly Waters

• Daly Waters Airport

Appendix I Emergency Response Flipcharts

The following scenario responses have been reproduced from the Origin Incident Response Procedures CDN 3676134

Appendix G1 – Bushfire

Appendix G2 – Flood

Appendix G3 – Spill

Appendix G4 – Loss of Containment

I.1. Bushfire

Bushfire

Considerations

- 1. Is there a need to activate the Emergency Response Team (ERT).
- Is there adequate fire fighting capability?
- 3. Is there an adequate water source available?
- Bushfire Is based on a region wide fire event where access roads will directly
 affect evacuation. Refer to <u>Bush Fire Preparedness Tool</u> for response actions, web
 links (i.e. BOM) and evacuation considerations.

First Responders

- 1. Raise the Alarm?
- If there is a casualty provide First Aid (DRSABCD). Continue until either physically unable to do so, relieved or the patient is pronounced deceased by a doctor or paramedic.
- 3. Refer to the Bush Fire Preparedness Tool.
- 4. Be vigilant. Watch for flying embers and small fires starting on site.

On Scene Commander (OSC)

- 1. Mitigate Hazards to ensure personnel safety.
- 2. Contact the Site Emergency Management Team Leader (SEMT-L).
- 3. Activate Emergency Response Team (ERT) response.
- Muster personnel and evacuate as required.
- Contact Emergency Services if required.
- 6. Prepare for the arrival and briefing of Emergency Services.

Site Emergency Management Team Leader (SEMT-L)

- 1. Notify Origin Site Representative of emergency in the region.
- 2. Australia Call 000 or 112 Mob or Fire Agencies (if available).
- 3. Identify available fire fighting assets (aerial, ground, mutual aid).
- 4. Conduct planning for evacuation and determine triggers.
- 5. Coordinate whole of site actions.
 - 1. Give preparatory orders for securing the site against the bushfire.
 - 2. Isolate hazardous energy and make equipment safe.
 - 3. Provide support to the OSC.
 - 4. Coordinate Emergency Services.
 - Ensure isolation of hazardous energy and make safe (e.g. Central Control Room).
 - Consider mobilization of Civil Maintenance to assist with fire break preparation, asset protection/earthen barriers.
- Notify Group Emergency Management Team Leader (GEMT-L)?
- 7. Confirm incident terminated use Incident Termination Checklist
- 8. Confirm incident investigation and gathering of facts initiated
- Mobilise counselling services and support by the Employer Assistance Program (EAP) if required.
- 10. Don't return to work until all facilities and damage have been declared as safe.



Bushfire

I.2. Flood

Flood

Notification

Level 1

 Once a creek starts to flow over any of the access roads.

Level 2 (Consider Evacuation)

- Creek level reaches 100mm for unsealed roads, or
- Creek level reaches 200mm for sealed roads.

Level 3 (Consider Evacuation and/or Demobilising)

- Creek level reaches 300mm for unsealed roads, or
- Creek level reaches 400mm for sealed roads.
- Consider duration of weather event and prolonged effects on site.

Considerations

Level 1

- Commence prep of site for shut down and evacuation.
- Secure chemicals and toxins.
- Check supplies of food and water.

Level 2

- Non-essential personnel evacuated.
- Track personnel movements and account for all staff at all times.
- Prepare to secure / isolate infrastructure.
- Maintain communications at all times.
- Ensure sufficient food and water available on site if personnel are stranded.

Level 3

- Shut down, secure and evacuate.
- Track personnel movements and account for all staff at all times.

Don't put yourself at risk.

AVOID DRIVING OVER ROADS THAT HAVE MORE THAN 100mm OF WATER OVER THEM.

Driving over flooded roads in an emergency must be risk assessed by the Site Emergency Management Team Leader (SEMT-L).

Prior to Flood Waters Reaching Site:

- Refer to these tools to identify assets and roads that will flood to certain levels: a. Flood Plan,
 - b. Flood Mapping, and
 - c. Hazard visualiser.
- Closely monitor weather reports and flood predictions from the Bureau Of Meteorology (BOM).
- Confirm triggers, evacuation plans and routes. What preparatory actions are required at site? Construction of protective banks takes time and may require additional equipment (plant) to be transported and deployed.
- Whenever possible, mitigate environmental damage by undertaking appropriate action.
- 5. Evacuate mobile worksites as early as practicable?.



I.3. Spill

Spill

Considerations

- 1. Activate the Emergency Response Team (ERT).
- A pollutant spill may be on permeable ground and encompass a wide array of substances, some of which will be toxic and very harmful to the environment.

First Responder

- 1. Raise the Alarm?
- 2. Is there a need to activate the Emergency Response Team (ERT)?
- 3. Always pay attention to fire, fumes, electrical, ignition and other health risks.
- Activate containment operations immediately to prevent spill from reaching a surface watercourse or ground water.
- 5. Do not flush the spill down clean drains or other inlets.

On Scene Commander (OSC)

- 1. Mitigate Hazards to ensure personnel safety.
- 2. Consider the effects of toxic spills refer to Safety Data Sheets (SDS).
- 3. Use appropriate spill kits.
- Consider type of spill, type of ground and what is the most effective method of containing with the minimum impact on personnel and the environment.
- 5. Consider how to prevent entry to area and spread of contamination.
- Engage the Origin Site Representative to help assess the impact and determine appropriate actions for complex or remote incidents.
- Some chemicals are incompatible and have the potential to increase or alter the hazard – refer to the Chemical Compatibility Chart in the Hazmat section of the site Emergency Response Plan (ERP).
- For Water Treatment Facilities only Disposal of diluted material to the ponds is permissible in an emergency but must be approved by the Water Treatment Facility (WTF) Supervisor.

Site Emergency Management Team Leader (SEMT-L)

- Consider use of Civil Maintenance team for installation of earthen bunds / diversion systems.
- Consider early engagement with the Origin Site Representative and external agencies through Compliance Team.
- Consider nature of spill and any decontamination requirements to personnel and or equipment.
- 4. Consider any logistics that will be required for rapid clean up and /or remediation.
- 5. Consider advising local land owners and councils as appropriate.
- Ensure all spills are managed and that environmental impacts are reported correctly within mandated time frames.
- 7. Consider future prevention measures and better clean up practices.



I.4. Loss of Well Control

Loss of Well Control

Considerations

- 1. Activate the Emergency Response Team (ERT).
- 2. Determine wind direction.
- 3. Determine leak location; subsurface and and type.
- 4. Well Control Contractor requirement.
- Consider Emergency Shutdown Device (ESD) (e.g. Central Control Room (CCR)).

First Responder

- 1. Raise the Alarm?
- Always pay attention to Fire, fumes, electrical, ignition and Health Risks.
- 3. Muster and evacuate.
- 4. Secure the scene / Cordon off area.
- Provide full details to On Scene Commander (OSC) and Site Emergency Management Team Leader (SEMT-L) – particularly:
 - Where is it originating from?; and
 - What is the wind direction?
- 5. Consider ignition sources as vapour could be flammable.

On Scene Commander (OSC)

- 1. Mitigate Hazards to ensure personnel safety.
- 2. What is the type of Leak and source? What is the wind direction?
- Shutdown all potential ignition sources (liaise with Central Control Room (CCR)).
- Monitor bleed down of leak and keep all non-essential personnel and ignition sources away from the hazardous area.
- 5. Make a decision whether a full site evacuation is required.

Site Emergency Management Team Leader (SEMT-L)

- 1. Consider environmental impacts and reporting requirements.
- 2. Consider early engagement with the Origin Site Representative.
- Activate and monitor Well Control Contractor deployment and progress.
- 4. Consider nature of incident and method of repair and recovery to personnel and or equipment.
- Consider any logistics that will be required for rapid clean up and or remediation.



Appendix J Camp Isolation Checklist

Screen shot of Camp Isolation Readiness Checklist. For original version go to: the IG ER&S Flood Source Page

Purpose	This checklist to be used to verify sustainability of camps in preparation for emergency events such as floods.
Reference	Area Flood Preparedness and Response Plans - http://source.originenergy.com.au/Business/Ing/safety/emergency/Pages/FloodMgmt.aspx
Records	This checklist will be completed in October each year in preparation for the flood season. Additional requirements for completion will include forecasted severe storm or flood conditions.
Notes for use:	 To be completed by the Camp Manager. Additional sections critical supply items can be added in Sections 3 & 4 as required.

ŧ

Date Checklist Completed	Click here to enter a date. Prepared by
Camp Name	
Location	
Type of Access	e.g. Dirt/Sealed Road Access or Single Point of access
Camp Size	e.g. No of beds at full capacity
Planning Assumptions	e.g. No of beds as the basis for determining supply/sustainment levels
Camp Fire Fighting System	Choose an item.

Section 1 - Food

Non Perishable		Perishables			
Current Holdings	Choose an item.	Current Holdings	Choose an item.		
Frequency of Delivery	e.g. Twice Weekly - Mon & Thu	Frequency of Delivery			

Section 2 - Water & Waste Water

Water	Days' Supply	Storage Capacity	Current Holdings	Frequency of Delivery
		e.g. 90,000 Lt	Choose an item.	e.g. 2 Weekly - Mon/Thu
Waste Water	Days' Supply	Storage Capacity	Current Holdings	Frequency of Delivery
			Choose an item.	

Section 3 - Fuels & Chemicals

Diesel	Days' Supply	Storage Capacity	Current Holdings	Frequency of Delivery
			Choose an item.	
Other	Days' Supply	Storage Capacity	Current Holdings	Frequency of Delivery
			Choose an item.	

Section 4 - Other

Linen	Days' Supply	Storage Capacity	Current Holdings	Frequency of Delivery
			Choose an item.	
Other	Days' Supply	Storage Capacity	Current Holdings	Frequency of Delivery
			Choose an item.	

Section 5 - Exceptions/Comments