Carpentaria-1

BASIC

Well Completion Report

EP187

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1.4 List of Abbreviations

bbl/s	Barrel/s
BHA	Bottom Hole Assembly
BOP	Blow Out Preventer
BOPE	Blow Out Preventer Equipment
BPV	Back-Pressure Valve
BTC	Buttress Thread Casing
CBL	Cement Bond Log
CCL	Casing Collar Locator
CMR	Combinable Magnetic Resonance
CRT	Casing Running Tool
DFIT	Diagnostic Fracture Injection Test
DTH	Depth
EMW	Equivalent Mud Weight
EP	Exploration Permit
FMI	Formation Micro Imager
GL	Ground Level
GR	Gamma Ray
GRS80	Geodetic Reference System 1980
HNGS	Hostile Environment Natural Gamma Ray Sonde
HRLA	High Resolution Laterolog Array
IADC	International Association of Drilling Contractors
ID	Inside Diameter
JFE	Japanese Steel Manufacturer
KCl	Potassium Chloride
kft	Thousand Feet
L	Litres
lbs	Pounds
LCM	Lost Circulation Material
LOT	Leak of Test
LTH	Length
mAHD	metres Australian Height Datum
MBU	Multi Build Up
MGA	Map Grid Australia
mGL	Metres Ground Level
mMD	Metres Measured Depth
mRT	Metres Rotary Table
mTVD	Metres True Vertical Depth
MW	Mud Weight
MWD	Measurement While Drilling
NEXT	Compensated Magnetic Resonance
NPT	Non Productive Time
NTDITT	Northern Territory Department of Industry, Tourism and Trade
NTDME	Northern Territory Department of Mines and Energy (now NT DITT)
OD	Outside Diameter

PDC	Polycrystalline Diamond Cutters
PDM	Positive Displacement Motor
PEX	Platform Express
POOH	Pull Out Of Hole
ppf	Pounds per Foot
ppg	Pounds Per Gallon
psi	Pounds Per Square Inch
R U/D	Rig Up / Rig Down
RIH	Run in Hole
ROP	Rate of Penetration
RPM	Rotations Per Minute
RT	Rotary Table
SLR	Schlumberger Land Rigs
SP	Spontaneous Potential
SSCAN	Sonic Scanner
SWC	Sidewall Cores
TCI	Tungsten Carbide Insert
TD	Total Depth
TDS	Total Dissolved Solids
TFA	Total Flow Area
TQ	Torque
TRS	Tubular Running Service
VDL	Variable Density Log
VR	Valve Removal
WECATT	Wireless Torque Sub
WOB	Weight on Bit
Wt	Weight
XL	Extra Large
YP	Yield Point

2. Summary

2.1 Carpentaria-1 Well Summary

Carpentaria 1 was the first well drilled in Exploration Permit (EP) 187 for Imperial Oil and Gas, a wholly owned Subsidiary of Empire Energy Group Limited (Figure 3). Carpentaria 1 is located approximately 85 km south-west of Borroloola within the Beetaloo Sub-basin and McArthur Basin in the Northern Territory. The well was designed as an exploration well to evaluate the unconventional hydrocarbon potential of the Amungee Member shales (Shale A, Shale B & Shale C), within the Velkerri Formation as the primary target and the shales of the Kyalla Formation as a secondary target.

The well was drilled on line 2019-04 (Figure 1, Figure 2), which is part of the 223-kilometre six-line 2D seismic survey acquired by Imperial Oil and Gas in 2019. The seismic survey was the first over EP187 and along with the drilling of Carpentaria-1 confirmed the eastern extension of the Beetaloo Sub-basin.

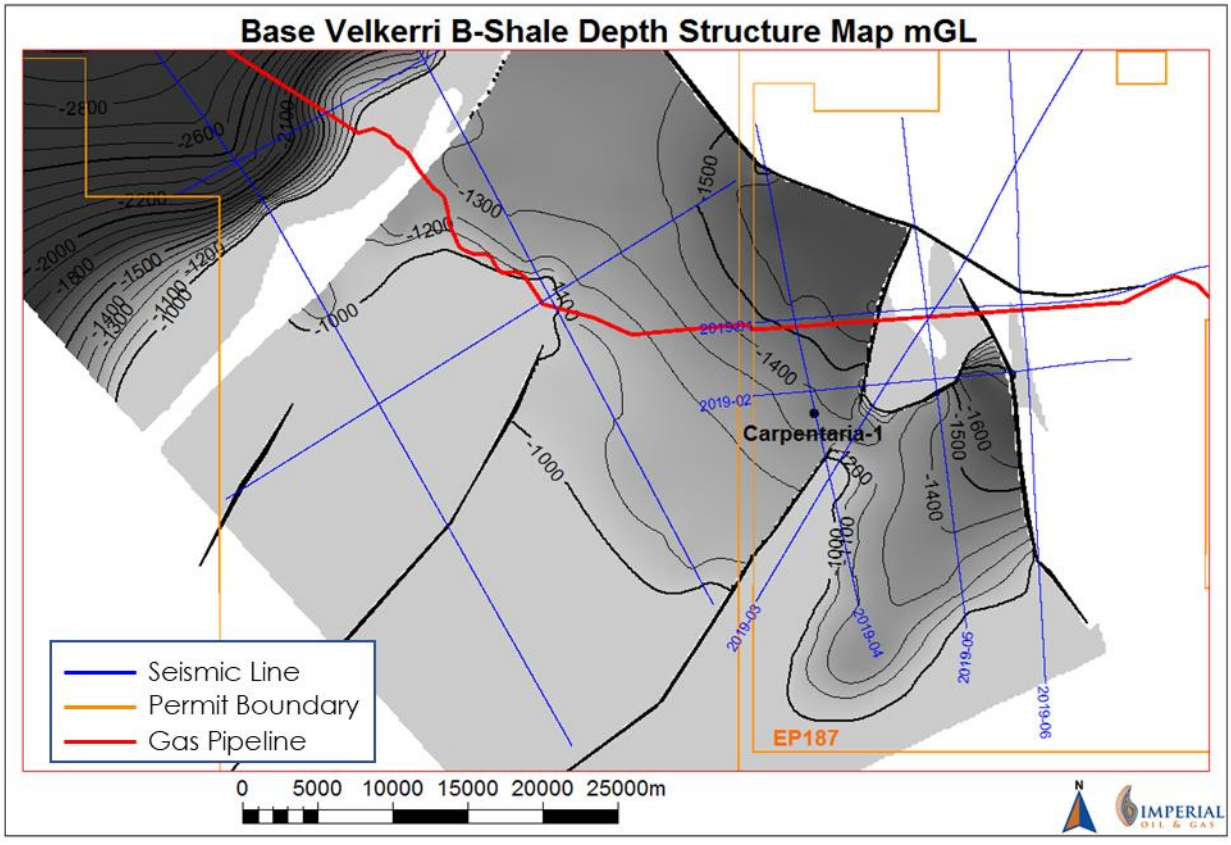


Figure 1. Base Velkerri B-Shale post-drill depth structure map (mGL)

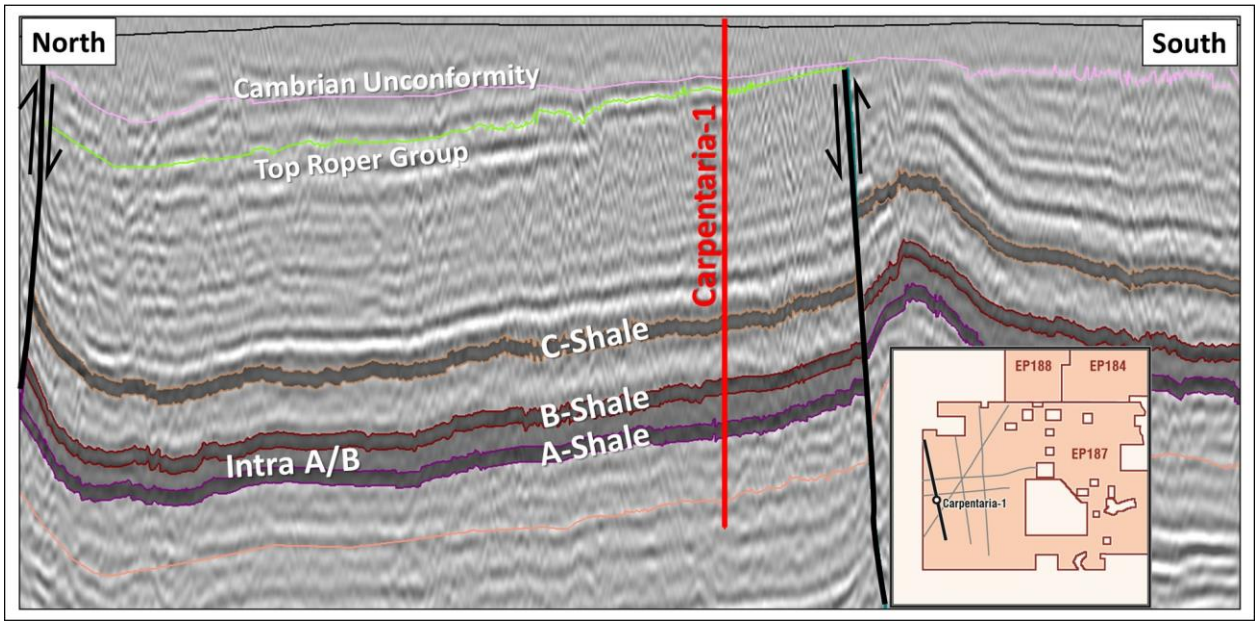


Figure 2. 2D Seismic Line 2019-04 with Carpentaria-1

The Carpentaria-1 well objectives and the degree to which they were met are summarised below:

- To assess and prove presence, depth and thickness of the target shales (Velkerri and Kyalla Formations) in Imperial's EP187 permit.
    - Both the Velkerri and Kyalla formations were successfully intersected and evaluated.
- To understand rock properties, hydrocarbon content, formation permeability and reservoir pressure as they relate to the ability of the shales to produce.
    - The planned formation evaluation program was successfully and fully undertaken.
- To gather data to be used for hydraulic stimulation planning and execution; and subsequent production test of the Velkerri Formation.
    - The planned formation evaluation program was successfully and fully undertaken.
    - Hydraulic stimulation and production testing is planned on the basis of the Carpentaria-1 drilling results.
- To 'high-grade' the target shales, for vertical or lateral well hydraulic stimulation planning and execution.
    - Four target intervals within the Amungee Member, Velkerri Formation were high-graded, these are the A-Shale, B-Shale, Intra A/B and C-Shale.
- To refine the seismic interpretation and further determine prospective hydrocarbon resource estimates.
    - The seismic to Carpentaria-1 well tie is accurate for shale target mapping and has aided permit mapping for prospectivity.
- To provide a basis for future seismic acquisition planning, to be used in resource definition and future well planning.
    - Based on the drilling results, the intersected shale targets and their depths has facilitated the design of future 2D seismic.
- To execute the drilling on best technical limit incorporating learnings from offset wells in the basin.

    - The well was drilled faster than planned, this may be attributed to the shallower target depths and ROP being much higher than predicted pre-drill.
    - Basin specific learnings were incorporated, such as drilling surface hole with casing.
- Enhance Imperial's credentials as a competent operator in the Northern Territory.
    - The well was drilled without any recordable or lost time incidents.
    - All technical objectives were achieved without integrity issues.

A secondary objective of the well was to allow for a future side-track into the Velkerri B formation, or subsequent high graded interval.

The well was spudded at 15:45 hours on 23 September 2020 with SLR Rig 183. The 17-1/2" conductor hole was drilled utilising 13-3/8'' casing vertically to 53.4mRT. Total losses were encountered, and casing drilling continued blind to 97.8mRT, at which point casing drilling was discontinued due to slow ROP and instances of stuck pipe. The 13-3/8" casing drilling string was pulled out of hole where it was confirmed that one centraliser was sheared off and lost down hole.

Fishing operations were performed to retrieve the centraliser/centraliser debris, recovering approximately 6.027 kg of metal centraliser material. During fishing operations, the 17-1/2" hole was extended from 97.8m to 104mRT. Post fishing operations a 17-1/2" rotary drilling assembly was run in hole and drilling continued to the section TD of 138mRT.

The 13-3/8" hole was circulated and conditioned and the 17-1/2" drilling assembly was pulled out of hole. 13-3/8" was run in hole to a shoe depth of 137.04mRT and casing cemented in place with 116.5bbls of 15.0 ppg cement slurry with no fluid returns to surface throughout the entirety of the cement job. Post the 13-3/8" cement job while drilling the 12-1/4" hole section a total of five offline cement top-up jobs were performed, pumping a total of 110 bbl. Cement was recorded at surface during the last top-up job.

A12-1/4" packed rotary drilling assembly was made up, run in hole and the 13-3/8" shoe track drilled out, drilling continued to a depth of 331.9mRT. The 12-1/4" drilling assembly was pulled out of hole for a bit change. Drilling continued with a 12-1/4" tricone rotary assembly from 331.9mRT to 352.8mRT. Due to slow ROP the tricone assembly was pulled out of hole. A 12-1/4" PDC rotary assembly was made up and run in hole. Drilling continued ahead, drilling to the 12-1/4" section TD of 853mRT.

The 12-1/4" hole was circulated and conditioned. A wiper trip was conducted while treating seepage losses by spotting a 25bbls LCM/Viscous pill at section TD. The 12-1/4" drilling assembly was pulled out of hole and laid out. The 13-3/8" riser was removed and 9-5/8" casing prepared for installation. A 24" x 9-5/8" base plate was installed.

9-5/8" casing was run in hole to a shoe depth of 848.13mRT. A 11" 5K wellhead was made up to the top of a casing and landed out via a running tool and landing joint. The 9-5/8" casing was then cemented in place with 170bbls of 13.5ppg lead cement slurry and 64bbls of 15.8ppg tail cement slurry, 65.5bbls of cement was recorded at surface. Casing pumping equipment and landing joint was laid out and BOPE equipment installed and pressure tested.

An 8-1/2" motor assembly was made up (6-3/4" 7/8 lobe 5-stage PDM) and run in hole. The 9-5/8" casing shoe track was drilled out and 8-1/2" hole was drilled to 856mRT prior to conducting a leak-off test. Leak-off test was conducted with an equivalent mud weight of 23.8ppg recorded.

8-1/2" hole was drilled to a depth of 1851mRT. Due to slow ROP the 8-1/2" motor assembly was pulled out of hole for a bit/BHA change. A new 8-1/2" PDC bit was made up and the drilling assembly run back in hole. 8-1/2" drilling continued to a final well TD of 1915.5mRT. The hole was circulated

and conditioned prior to the 8-1/2" drilling assembly being pulled out of hole. An 8-1/2" wiper assembly was made up and a wiper trip to well TD conducted prior to logging operations.

The logging program was executed successfully by Schlumberger wireline services. Three logging runs were executed before the DFIT program was carried out by Pro-test. A total of 4 DFIT tests were conducted targeting Velkerri A and B formations and the overburden above the Velkerri B formation. A wiper trip was conducted in the 8 ½'' production hole section prior to logging operations continuing. Post wiper trip a further two runs were performed, including rotary sidewall cores.

A wiper trip was conducted, and the hole circulated and conditioned at TD prior to the installation of the 7" production casing. The 7" casing was run in hole with a casing shoe at 1909.01mRT. The production casing was then cemented with 187bbls of 14.5ppg slurry, with 12 bbls of cement returns observed at surface. The 7" casing was pressure tested to 4590psi successfully prior to rigging down the cementing and casing running equipment.

A cement bond log (CBL) was conducted over the 7" production casing interval approximately 24 hours post cementing. The well was suspended by installation and testing of a tubing hanger and production tree.

The drilling rig was released from Carpentaria-1 at 18:00hrs on 23 October 2020.

The well is to be fracture stimulated and production tested in the future. The shales of the Amungee Member of the Velkerri Formation are to be targeted. They are termed the A Shale, Intra A/B Shale, B Shale and C Shale.

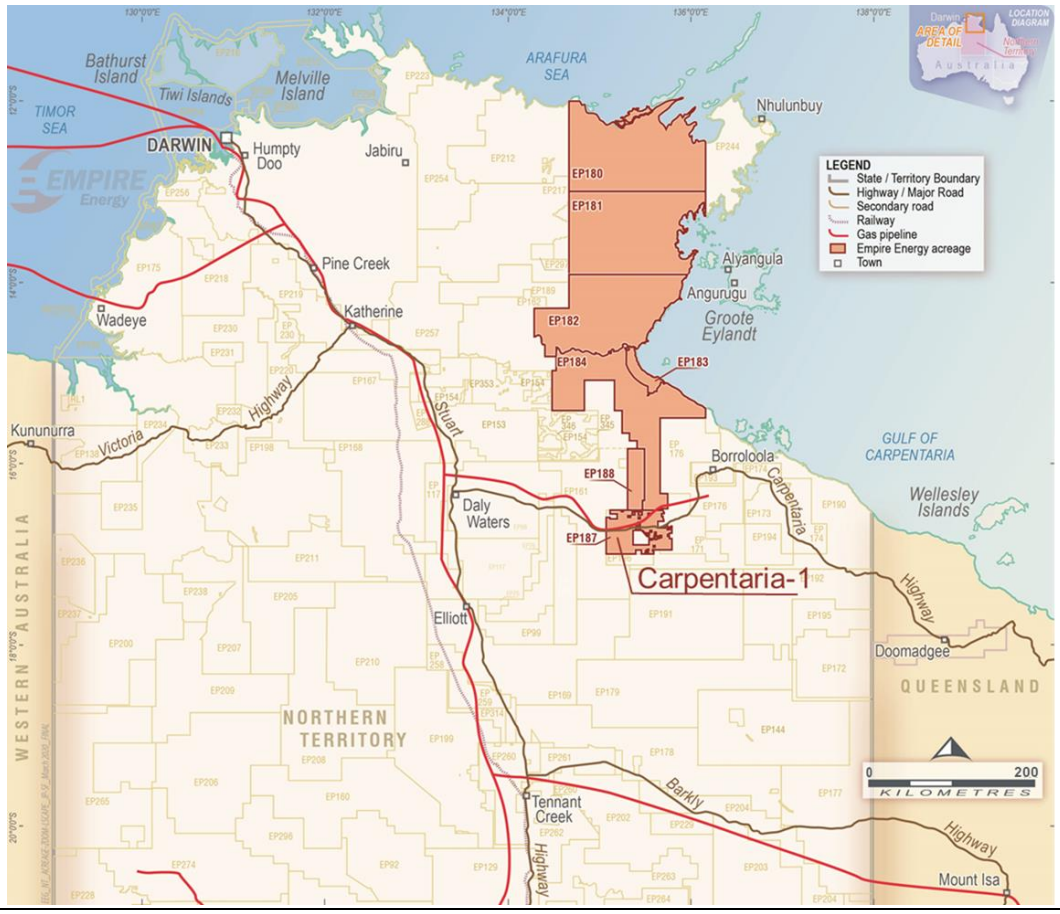


Figure 3: Carpentaria-1 location map – EP187

2.2 Well Card

The following pages contain well card (Table 1), casing and cement details (Table 3), directional survey listing (Table 4); and operations team listing (Table 5).

<table>
<tr><td>Well Name</td><td>Carpentaria-1</td><td>Petroleum Title</td><td>EP187</td><td>Basin</td><td>Beetaloo Sub-basin</td></tr>
<tr><td>Well Purpose</td><td>Vertical Exploration</td><td>Status</td><td>Cased and Suspended</td><td>Parent Well Name, if any</td><td>Nil</td></tr>
<tr><td>Spud Date</td><td>23/09/2020 15:45</td><td>TD Date</td><td>12/10/2020 7:15</td><td>Rig Release Date</td><td>23/10/2020 18:00</td></tr>
<tr><td>Primary Objective</td><td colspan="3">Velkerri Formation
Middle Shale Sequence</td><td>Rig(s) Name</td><td>SLR Rig 183</td></tr>
<tr><td>Secondary Objective</td><td colspan="3">Kyalla Formation</td><td>100K Map Sheet</td><td>OT Downs</td></tr>
<tr><td rowspan="4">Total Depth</td><td></td><td>mMD</td><td>mTVD</td><td rowspan="2">Side-Track Kick-off Depth, if applicable</td><td rowspan="2">Nil</td></tr>
<tr><td>Driller</td><td>1915.5</td><td rowspan="2">1915.5</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>Logger</td><td>1917.5</td><td>1917.5</td><td>Elevation Datum:</td><td>Sea Level</td></tr>
<tr><td rowspan="4">Location (GDA94 Datum with GRS80 Ellipsoid using MGA94 Grid)</td><td>Coordinates</td><td>Surface</td><td>Bottom Hole</td><td>GL Elevation:</td><td>230.4 m</td></tr>
<tr><td>Latitude</td><td>16°47'40.20"S</td><td>16° 47' 42.35" S</td><td>Drill Datum Elevation:</td><td>5.2 m (Rotary Table)</td></tr>
<tr><td rowspan="2">Longitude</td><td rowspan="2">135°07'22.98"E</td><td rowspan="2">135° 07' 21.53" E</td><td rowspan="3">Seismic Station, if applicable</td><td>Survey</td></tr>
<tr><td>Zone</td><td>Easting</td><td>513 112m</td><td>513 069m</td><td rowspan="2">Empire EP187 Seismic Line 2019-04
SP 760</td></tr>
<tr><td>53</td><td>Northing</td><td>8 143 174m</td><td>8 143 108</td></tr>
</table>

Well Summary

The well was spudded at 15:45 hours on 23 of September 2020 ,17-1/2" conductor hole was drilled to section TD of 138mRT, 13-3/8" conductor casing shoe was set at 137.04 mRT. A 12-1/4" surface hole was drilled to section TD of 853mRT and ran 9-5/8" 36ppf K55 BTC surface casing to 848.13mRT, installed Cactus wellhead and cemented 9-5/8" casing in place. Installed 11" 5M BOPE and pressure tested BOPE to 5000psi.

Picked up 8-1/2" BHA and drilled out shoe track, and new formation to 856m and conducted LOT; continued drilling 8-1/2" production hole to well TD of 1915.50mRT.

The logging programme was executed successfully by Schlumberger wireline, the first three logging runs were executed before the DFIT program was carried out by Pro-test, a total of 4 DFIT tests were conducted targeting Velkerri A and B formations and the overburden above the Velkerri B formation. A wiper trip was conducted in the 8-1/2'' production hole section prior to the fourth wireline logging run, thereafter, rigged up and RIH with the XL-Rock SWC-GR tools, cut 50 core samples and recovered 49 samples. The final logging run was the FMI-GR which was carried out post coring.

Rigged up CRT & WECATT for 7" casing run, and ran 7" 29ppf P110 JFE production casing setting casing shoe at 1909.01mRT. The production casing was cemented with 187 bbl of 14.5ppg slurry, with 12 bbl of cement returns observed on surface, Halliburton unit performed 7" casing integrity test to 4590psi before rigging down the cementing and casing running equipment.

The cement bod log (CBL) was conducted over the 7" production casing interval approximately 24 hours post cementing, the 2⅞" tubing hanger was installed and pressure tested to 5,000 psi followed by installing a 2-1/2" BPV in the tubing hanger to suspended the well.

Hole and Casing Design (Drillers Depths)						Drilling Fluid	
Type	Hole Size	Depth (mMD)	Casing Size	Shoe mMD	Shoe mTVD	Hole Size	Type
Stove Pipe	Pre-Set		20"	31.00	31.00	20" Stove Pipe Pre-Set	
Conductor Casing	17 ½"	138.00	13 ⅜"	137.04	137.04	17 ½'	KCl/Polymer 8.50ppg – 9.10ppg
Surface Casing	12 ¼"	853.00	9 ⅝"	848.13	848.13	12 ¼"	KCl/Polymer 8.50ppg – 9.10ppg
Production Casing	8 ½"	1915.50	7"	1909.01	1909.01	8 ½"	KCl/Polymer 8.70ppg – 9.20ppg

Stratigraphy – Formation Tops (Loggers Depths)				Formation Evaluation			
Formation	Depth			Run	Measurement	Depth Interval	
	mMD	mTVDRT	mTVDSS			From (mMD)	To (mMD)
Alluvium	5.2	-5.2	230.4	Suite 1 - Run 1	HRLA-PEX-HNGS-SP-GR	1915.50	848 GR to surface
Gum Ridge Formation	52.7	-52.7	183.1				
Bukalara Sandstone	115.0	-115.0	120.6	Suite 1 - Run 2	SSCAN-FMI-GR	1915.50	848
Kyalla Formation	240.5	-240.5	-4.9				
Moroak Sandstone	316.5	-316.5	-80.9	Suite 1 - Run 3	CMR-NEXT-GR	1915.50	848
Wyworrie Member	591.6	-591.6	-356.0				
Amungee Member	979.9	-979.6	-744	Suite 2 - Run 1	XL-ROCK-GR	1915.50	848
C Shale	1092.4	-1091.6	-856				
B Shale	1323.5	-1322.6	-1087	Suite 2 - Run 2	FMI-GR	1915.50	848
A Shale	1493.3	-1491.6	-1256				
Kalala Member	1552.8	-1551.6	-1316	Suite 3 - Run 1	CBL-VDL-GR-CCL	1872	5
Bessie Creek Sandstone	1831.5	-1829.6	-1594				

Mud Logging	Formation Testing (DST)	DFIT	Yes	No
The mud logging program was executed successfully with no issues for the duration of the program. Refer to Appendix H for the Schlumberger Mud Logging Reports.	Nil	HF	Yes	No X
Coring	**Hydrocarbon Shows**			
Large Diameter Rotary wireline coring (50 zones, 49 recovered)	Various			
Completion				
The well is cased and suspended for future completion				

Table 1: Well Details

Formation	Depth			Coordinates	
	mMD	mTVDRT	mTVDSS	Easting	Northing
Middle Velkerri	979.9	-979.6	-744	513100.8	8143147.0
C Shale	1092.4	-1091.6	-856	513099.5	8143142.4
B Shale	1323.5	-1322.6	-1087	513093.8	8143133.3
A Shale	1493.3	-1491.6	-1256	513087.6	8143126.1

Table 2: Reservoir Intersections

Hole Details			
Type	Surface	Intermediate	Production
Size	17 ½"	12 ¼"	8 ½"
Depth (m MDRT)	138	853	1915.5
Casing Details			
Interval	Conductor	Surface	Production
OD	13 ⅜"	9 ⅝"	7"
Shoe (m MDRT)	137.04	848.13	1909.01
Wt	61 ppf	36 ppf	29 / 26 ppf 29ppf: 0 – 1872.19m 26ppf: 1872.19 - 1909.01m
Grade	K55	K55	P110 (29ppf) /P110(26ppf)
Thread	BTC	BTC	JFE BEAR (29ppf)
Cement Details			
Type	Conductor (13 ⅜ ")	Surface (9 ⅝")	Production (7")
Spacer (bbls)	Flocheck reactive spacer, 20 bbls & Tuned Spacer V,40 bbl	Flocheck reactive spacer, 27 bbls & Tuned Spacer V,50 bbl	Tuned Spacer V, 40 bbls
Displacement Water Volume (bbls)	62.5 bbls	210.5 bbls	231.9 bbls
Cement Returns Volume (bbls)	No cement returns	65.50	12.00
Comments	No cement returns recorded to surface on the primary cement job, Total top-up cement pumped was 110bbls with 10 bbls of cement returns to surface.	Full returns observed throughout the job.	Full returns observed throughout job.
Cemented By	Halliburton	Halliburton	Halliburton
Plugs bumped	Yes	Yes	Yes
Lead Stage Details			
Class	N/A	ExpandaCem, Lafarge Class G	HalCem,Lafarge Class G
Slurry Volume (bbls)		170 bbl	187 bbl
Weight (ppg)		13.5ppg	14.5ppg
Additives		Econolite Liquid, Halad-344, Halad-413 D-Air 3500L	GasCon 469, Halad-344, Halad-413, CFR-3, SCR-100, Microbond HT, D-Air 3500L
Tail Stage Details			
Class	GP	HalCem,Lafarge Class G	N/A
Slurry Volume (bbls)	116.5 bbl	64.0 bbl	
Weight (ppg)	15.0ppg	15.8ppg	
Additives	Standard Cement GP-SL,Econolite Liquid,D-Air 3500L	Halad-344, Halad-413, D-Air 3500L	

Table 3: Casing and Cement Details

Easting	Northing	Z	mMD	Inclination	Azimuth GN
513112	8143174	235.6	0	0	0
513102.25	8143151.1	-654.1	890.18	3.2	203.1
513101.19	8143148.4	-711.9	948	2.7	198.3
513100.45	8143145.9	-769.0	1005.2	2.5	194.8
513100.24	8143145.1	-788.1	1024.3	2.5	195.1
513100.01	8143144.2	-808.5	1044.7	2.4	195
513099.81	8143143.5	-827.1	1063.4	2.3	195.1
513099.6	8143142.7	-846.6	1082.9	2.3	196.4
513099.38	8143142	-866.0	1102.3	2.2	197.2
513099.18	8143141.3	-885.0	1121.3	2.2	194.7
513098.97	8143140.6	-904.6	1140.9	2.3	196.6
513098.05	8143138.3	-962.4	1198.8	2.5	207.7
513097.55	8143137.6	-981.9	1218.3	3	216.7
513096.9	8143136.7	-1001.5	1237.9	3.2	219.6
513096.24	8143135.9	-1021.0	1257.4	3	217.7
513095.55	8143135.1	-1040.3	1276.8	3.2	224
513094.83	8143134.4	-1059.1	1295.6	3.2	222.4
513094.13	8143133.6	-1078.2	1314.7	3	223.4
513093.41	8143132.9	-1097.2	1333.8	3.1	226.9
513092.65	8143132.1	-1116.4	1353	3.2	224.6
513091.91	8143131.3	-1136.0	1372.6	3.2	221.1
513091.2	8143130.5	-1155.5	1392.1	3.2	221
513090.5	8143129.7	-1174.2	1410.9	3.3	220.6
513089.78	8143128.9	-1193.7	1430.4	3.3	219.3
513088.42	8143127.1	-1232.2	1469	3.2	217.3
513087.76	8143126.3	-1251.9	1488.7	3.2	216.9
513087.12	8143125.4	-1271.1	1507.9	3.2	216.5
513085.86	8143123.7	-1309.2	1546.1	3.2	216.2
513085.22	8143122.8	-1328.8	1565.7	3.2	215.7
513083.77	8143120.8	-1367.2	1604.2	4.1	216.3
513082.8	8143119.6	-1386.9	1624	5	220.2
513081.68	8143118.5	-1405.4	1642.5	4.9	229.5
513080.34	8143117.3	-1425.0	1662.2	5.3	230.4
513078.92	8143116.2	-1444.0	1681.3	5.7	230.6
513077.53	8143115	-1463.4	1700.8	5	229.9
513076.29	8143114	-1482.5	1719.9	4.7	229.8
513074.99	8143113	-1501.9	1739.4	4.9	236
513072.64	8143111.5	-1540.4	1778	3.4	239.6
513071.73	8143110.9	-1559.9	1797.5	2.9	236.4
513071.02	8143110.4	-1578.6	1816.3	2.6	228
513070.66	8143109.7	-1596.5	1834.2	2.4	188.8
513069.53	8143108.3	-1645.3	1883	2.5	245.5
513069.2	8143108.1	-1654.1	1891.8	2.3	245
513068.34	8143107.7	-1677.7	1915.5	2.3	245

Table 4. Directional Survey Listing

2.3 Carpentaria-1 Operations Team

Empire Energy CEO	Alex Underwood	Empire Energy
Empire Energy COO	David Evans	Empire Energy
Chief Geoscientist	Alex Bruce	Empire Energy
Drilling Manager	Jordan Bunning	InGauge
Wellsite Geologist	Paul Elliott	InGauge
Senior Well Engineer	John Grehan	InGauge
Project Manager	Jon Bennett	InGauge
Wellsite Engineer	Latif Shareef	InGauge
Drilling Supervisor(s)	Mick Marshall / Scott Hobday	InGauge
General Manager Operations	Muhammad Yasir Nisar	SLR
Rig Superintendent	Justin Shooter	SLR
Rig HSE Team Leader	Jason Bosnjak	SLR
Rig Managers	Sean Pollock/Kirran Blake	SLR

Table 5: Operations Team

3. Geological

3.1 Summary

The stratigraphic prognosis for Carpentaria-1 was undertaken using the results from petroleum exploration wells within the Beetaloo Sub-basin and the interpretation of EP187 Seismic 2019 Survey. The pre- and post-drill (post wireline) prognosis is shown in Table 6. Reservoir Horizon coordinates are listed in Table 7.

3.2 Formation Tops

Formation Top	Actual		Prognosed		Difference
	mRT	mTVDss	mRT	mTVDss	mRT
Alluvium	5.2	230	5.2	230	0
Gum Ridge Formation	53	182.2	53	182.2	0
Bukalara Sandstone	120	120	114.8	120	0
Hayfield Formation	Absent		483.2	-248	
Jamison Sandstone	Absent		943.2	-708	
Kyalla Formation	243	-7.8	1052.2	-817	809.2H
Intra Kyalla Sandstone	Absent		1380.2	-1145	
Lower Kyalla Shale	243	-7.8	1446.2	-1211	1203.2H
Moroak Sandstone	307	-71.8	1556.2	-1321	1249.2H
Upper Velkerri	589	-353.8	1796.2	-1561	1207.2H
Middle Velkerri	1007	-771.8	2322.2	-2087	1315.2H
C Shale	1098	-862.8	2322.2	-2087	1224.2H
Base C	1162	-926.8	2423.2	-2188	1261.2H
B Shale	1323	-1087.8	2606.2	-2371	1283.2H
Base B	1378	-1142.8	2676.2	-2441	1298.2H
A Shale	1493	-1257.8	2716.2	-2481	1223.2H
Base A	1549	-1313.8	2764.2	-2529	1215.2H
Lower Velkerri	1550	-1314.8	2782.2	-2547	1232.2H
Bessie Creek	1831	-1595.8	NP	NP	
TD of well	1915.5	-1680.3	2839.2	-2603.8	

Table 6: Formation Tops

Reservoir Horizon	mTVDSS	mMD	Easting	Northing
C Shale	-862	1092.4	513101	8143143
B Shale	-1093	1323.5	513095	8143133
Intra A / B	-1148	1378.9	513093	8143131
A Shale	-1262	1493.3	513089	8143126

Table 7: Reservoir Horizon Coordinates

3.3 Hydrocarbon Indicators and Flow Potential

No oil shows observed during the drilling of the well.

Gas peaks were observed and are tabulated in Table 8.

Due to the formations that had gas peaks being shales, the flow potential is to be determined by future hydraulic stimulation and extended production testing.

Gas Peaks (Liberated)										
Formation	**mMDRT**	**Peaks (u)**	**Back-ground (u)**	**C1**	**C2**	**C3**	**iC4**	**nC4**	**iC5**	**nC5**
D -Shale	1014	3807	380-600	141724	83179	40002	2298	11444	1659	2455
C Shale	1124	5000	2200	209703	119544	43422	2243	11369	1353	2432
B Shale	1349	3820	500	285363	74254	10150	618	1237	221	172
Intra A/B	1397	3247	500	251606	61588	9826	729	1236	237	155
Intra A/B	1418-1422	3694	500	285423	66525	8666	627	1004	198	119
Intra A/B	1430	2882	500	231106	51706	7076	559	863	180	112
A Shale	1497	4231	1000-1500	336051	73950	6762	385	556	92	57
Kalala Organic Unit	1715	40	204786	**204786**	10520	460	13	26	19	11

Table 8. Gas Peaks

3.4 Cuttings Summary

Refer to The Geological Daily Reports in Appendix D for cuttings descriptions.

Cuttings were collected as summarised in Table 9. Samples were collected and packed plastic bags supplied by Schlumberger and annotated with foil tags. Isotube and isojar samples were acquired as per Table 10. Dispatch of samples was as summarised in Table 11.

Sample	Interval	Collection Photograph Frequency	Description/Preserved Sample	Quantity / Type
10m	30 – 600m	NA	Washed & Dried: NTDME Empire Energy	250gm 200gm
5m	600 – 1050m	NA	Washed & Dried: NTDME Empire Energy	250gm 200gm
10m	1050 – 1850m	NA	Washed & Dried: NTDME Empire Energy	250gm 200gm
5m	1850 – 1915m	NA	Washed & Dried: NTDME Empire Energy	250gm 200gm

Table 9: Sampling Intervals

Depth Interval (mRT)	Isotubes	Isojars	Peak Gas Sampling
360m to 600m	Every 60m	Every 30m	At gas peaks ~ 10 times background
600m to TD	Every 25m	Every 25 m	At gas peaks ~ 5 times background

Table 10: Isotube and Isojar Sampling Intervals

The sample sets, types, and final destinations are listed below:

Sample Set	Volume	Treatment	Delivery
Northern Territory Government	250-500g	Washed and Dried (W & D)	Core Facility Manager, Darwin Department of Primary Industry and Resources 38 Farrell Crescent, Winnellie NT 0820 Ph: +61 8 8984 3036 Email: darryl.stacey@nt.gov.au
Imperial Energy	200g Zip locked plastic bag	Washed and Dried (W & D)	Alex Bruce Empire Energy Level 19, 20 Bond St Sydney, NSW, 2000 Ph: 0424 362 897 Email: abruce@empiregp.net
Chemostrat	20+g Zip locked plastic bag	Washed and Dried (W & D)	Alex Bruce Empire Energy Level 19, 20 Bond St Sydney, NSW, 2000 Ph: 0424 362 897 Email: abruce@empiregp.net
Isotubes & Isojars			Alex Bruce Empire Energy Level 19, 20 Bond St Sydney, NSW, 2000 Ph: 0424 362 897 Email: abruce@empiregp.net

Table 11: Distribution of Samples

3.5 Wireline Logging Summary

The open-hole logging tools were run in the 8 ½" hole section only (Table 12)

Suite	Services	Hole Size	Depth Intervals (From - To mRT)
Suite 1	Run 1: HRLA-PEX-HNGS-SP-GR	8 ½" OH	TD to Casing Shoe w/ GR to surface
	Run 2: SSCAN-FMI-GR		TD to Casing Shoe
	Run 3: CMR-NEXT-GR		Intervals & Fluid Typing Stations advised by Wellsite Geo
Suite 2	Run 1: XL-ROCK-GR		Stations advised by Wellsite Geo
	Run 2: FMI-GR		TD to 848m
Suite 3	Run 1: CBL-VDL-GR-CCL	7" Casing	Casing Shoe to Surface

Table 12: Wireline Summary

3.6 Mud Logging Summary

Schlumberger mud logging was contracted for the duration of the well program. The following parameters and information were recorded at the wellsite by the 24-hour mud logging crew;

- Weight on Bit
- ROP
- Total Gas
- Gas Chromatography
- Well Measured Depth
- Lithology %
- Interpreted Lithology
- Formation Details
- BHA data

The mud logging program was executed successfully with no issues for the duration of the program. Refer to Appendix H for the Schlumberger Mud Logging Reports.

3.7 Side Wall Rotary Coring Summary

Schlumberger wireline was contracted to provide XL rock sidewall rotary coring services in the 8½" section, as part of wireline operations.

- Total Recovery was 49 cores: with one empty, one Partial Core, and four fractured cores.

3.8 DFIT Summary

A total of 4 DFIT tests were conducted targeting Velkerri A, and B formations and the overburden above the Velkerri B formation. DFIT data is tabulated below:

DFIT No.	Top (mRT)	Base (mRT)	Interval Length (m)	Comment
1	1500	1504.27	4.27	Velkerri A
2	1356	1360.27	4.27	Velkerri B
3	1350	1354.27	4.27	Velkerri B
4	1205	1209.27	4.27	Overburden

Table 13: DFIT data per interval

4. Drilling Data

4.1 Primary Contractors and Service Providers

Service	Provider
Drilling Rig	Schlumberger- SLR (Rig 183)
Rig Camp	OICS
Rig Transport	ECS
Well Engineering, Project Management & Site Supervision	InGauge Energy
Wireline logging (Open Hole)	Schlumberger
Mud Engineering & Mud material Supply	Halliburton
Cementing	Halliburton
Casing Accessories	GPOT
Drilling tools, stabilisers, etc.	Tasman Oil Tools/HOFCO/NOV
Drill bits	Ulterra/Smiths/Baker Hughes
Mud Logging	Schlumberger
Coring	Schlumberger
Tubular Make-Up (TRS)	DrillQuip
Wellhead	Cactus Wellheads
Casing Supply	MITO/Sinopec
Rig and Camp Waste Disposal (Solids / Sewerage)	Cleanaway
Potable Water Supply	MS Contracting
Transport / Logistics	Neil Mansell Transport
Water Cartage and Pre-Well Logistics	SDH/Neil Mansell Transport

Table 14: Primary Contractors

4.2 Operational Summary

4.2.1 Main Reports

- Cuttings Descriptions Reports are included in Appendix A
- Rig SLR 183 Specs are included in Appendix B.
- Daily Drilling Reports for Carpentaria-1 are included in Appendix C.
- Daily Geologic Reports are included in Appendix D.
- The Cementing Reports and Casing Tallies (13 ⅜'',9⅝" & 7") are included in Appendix E.
- The Mud Recap is included in Appendix F.
- The Tubular Running Services is included in Appendix G.
- The Mud Logging Reports are included in Appendix H.
- The Coring Report is included in in Appendix I.
- The Samples Manifest included in Appendix J.
- The MWD Report is included in Appendix K.
- The Survey Report is included in Appendix L.

4.2.2 Drilling

4.2.2.1 Mobilisation/Rig Move

The SLR Rig 183 carrier was mobilized from South Australia to the Carpentaria-1 well site. The first loads began arriving on 14 September 2020, transported by ECS Transport. The full specifications of Rig 183 and camp can be found in Appendix B. The full drilling crew was mobilized to the site, and an Icebreaker was conducted on the 22 September 2020 at the rig site with both sets of crews.

4.2.2.2 Stove Pipe

The 20" stove pipe was pre-installed together with the cellar during lease preparations by the civil contractor in September 2020. The 20" stove pipe was run to 31mRT and grouted in place. The cellar and conductor were surveyed prior to spud.

4.2.2.3 17-1/2'' Conductor Hole

After undergoing rig pre-acceptance, Carpentaria-1 was spudded at 15:45 hrs on 23 September 2020.

17-1/2" conductor hole was drilled with 13-3/8'' casing vertically using Drillquip CRT to 53.4mRT when total losses were encountered. Casing drilling continued blind to a depth of 97.8mRT; where

drilling ahead became difficult and the drilling assembly became stuck while observing full circulation at normal SPP. After working the stuck pipe and pumping high yield sweeps, the casing drilling assembly was worked free. The casing drilling assembly was pulled out of hole to surface.

At surface it was observed that one centraliser was lost in hole. Fishing operations commenced, and a 12-1/4'' rotary drilling BHA was made up and run in hole, 12-1/4" hole was drilled blind from 97.8m to 104mRT. The 12-1/4" pilot drilling assembly was pulled out of hole and laid out. A 12-1/4'' junk sub assembly was then run in hole, recovering ~ 6.0 kg of metal debris on several runs. Post the several runs with the 12-1/4" junk sub assembly a 11-1/2" magnet assembly was run in hole and worked the interval from 90m to 104mRT. The 11-1/2" magnet assembly was pulled out of hole.

A 17-1/2" mill tooth tricone bit and junk sub assembly was then run in hole. The open hole was reamed from 90m to 98.6mRT with no signs of junk. The 12-1/4" hole was reamed/opened to 17-1/2" from 97.6m to 100.0mRT with no indications of any junk in the wellbore and no metal in the junk sub upon return to surface. Picked up and ran in hole a 11-1/2" magnet assembly to section TD and recovered ~27 g of metal debris.

Picked up and ran in hole 17-1/2" rotary drilling assembly with a milled tooth bit. Reamed to bottom and opened hole (12-1/4" to 17-1/2") from 100m to 104mRT. Drilled 17-1/2" conductor hole from 104m to 111mRT. Pulled out of hole with the 17-1/2" tricone assembly and changed out the 17-1/2" milled tooth tricone to a 17-1/2" PDC. RIH and drilled 17-1/2" hole from 111m to section TD at 138mRT. Circulated and swept hole clean. Pulled out of hole and laid out 17-1/2" rotary drilling assembly, prior to installing the 13-3/8" casing.

4.2.2.4 Conductor Casing and Cementing

Rigged up to run 13-3/8" casing. The 13-3/8" conductor was run in hole with a shoe depth of 137.04mRT, casing was landed out in a landing base. The hole was circulated and condition prior to pumping of the primary cement job. A total of 116.5bbls of 15.0ppg A-class cement was pumped. No fluid or cement returns were recorded during the pre-circulation or primary cement placement. Post primary cementation the landing joint was removed, and riser installed.

During drilling of the 12-1/4" hole a total of four offline cement top-up jobs where performed, pumping cement from surface down the 17-1/2" x 13-3/8" annulus. In total 100bbls of cement was pumped across the four top-up jobs, no cement to surface was recorded. A fifth and final 10bbl top-up job was performed during the 9-5/8" casing primary job which recorded cement to surface.

4.2.2.5 Surface Hole

A 12-1/4" SPL616 Ulterra PDC bit with a TFA of 0.7060in^2 was picked up and drilled with a packed BHA assembly utilizing 12-1/4" near bit and string stabilizers with 8" drill collars to 331.9mRT. Very hard stringer was encountered during drilling between 316.9m to 317.3m and generally hard formation from 316m which caused reduced ROP and severe vibration.

Due to the low ROP the 12-1/4" assembly was pulled out of hole for inspection and bit change. At surface the PDC bit was found to be severely worn. Based on the condition of the PDC a 12-1/4" tricone assembly was chosen, picked up and made-up TCI tri-cone X30GFSJ IADC 537 bit and ran in hole. Drilling continued with new hole drilled from 331.9m to 352.8mRT. Again, due to slow ROP the tricone assembly was pulled out of hole for inspection and a bit change.

At surface the 12-1/4" TCI bit was changed to a 12-1/4" Ulterra CF716M - U02822 PDC. The assembly was run in hole and drilling continued to a depth of 486mRT. The hole was circulated, and the assembly pulled out of hole for a bit change. A new Ulterra 12-1/4" CF713 PDC was made up and additional drill collars added to the assembly. The new assembly was run in hole and drilling continued to section TD at 853mRT.

12-1/4" section TD was called at 853mRT (80 m into the Jamison Sandstone) and was reached at 4:30 hrs on 4 October 2020. The hole was circulated and conditioned and a wiper trip conducted, treating seepage losses via spotting 25bbls LCM/Viscous pill.

4.2.2.6 Surface Casing and Cementing

Prior to installation of the 9-5/8" casing the 13-3/8" riser was removed, dressed and a 24" x 9-5/8" base plate installed. Rigged up to run 9-5/8" casing. Made up a 2 joint shoe track (see surface casing tally in Appendix E) and tested floats.

The 9-5/8" 36ppf K55 surface casing was run in hole to 848mRT by the rig crew using a Volant casing running tool. Casing was run to setting depth via a work joint, well was circulated and condition prior to pulling back, removing work joint and making up the Cactus MBU-Q wellhead with running tool and landing joint. Casing was landed out on the landing base and secured. Final shoe depth was 848.13mRT.

The 9-5/8" casing was circulated with no losses. Pumped 20bbls Flow check reactive spacer, followed by 40bbls Turned spacer V at 5 bbls/min using rig pumps.

Installed Halliburton double plug and cement head, flushed lines, and pressure tested same successfully to 3800psi. Halliburton mixed and pumped 170bbls of 13.5ppg lead cement slurry & 64bbls of 15.8ppg tail cement slurry. Launched top plug & displaced cement into annulus with a total of 210.5bbls drill mud, pressure increased to +/- 1100psi before the plug was bumped. Casing was pressure tested to 2800psi for 10mins. Full returns were recorded throughout the cementing operation. Approximately 65.5bbls of cement returns were recorded at surface. Refer to the Halliburton Cementing End of Well Report for details in Appendix D.

The cement head and surface lines were rigged down while preparing the wellhead with a Cactus Wellhead technician on hand. The casing running tool and landing joint were laid out, and the DrillQuip CRT was then rigged down. The Cactus MBU-Q wellhead valves were installed and pressure tested.

4.2.2.7 Nipple Up BOPs

Installed 11" 5M BOP equipment onto the Cactus MBU-Q wellhead and pressure tested same to 300psi low / 5000psi high.

The test plug was removed and installed the wear bushing in the wellhead. Pressure tested surface lines & performed accumulator draw-down test. Dressed floor to run 8-1/2" drilling assembly.

4.2.2.8 Production Hole

Picked up and made-up 8-1/2" U713 PDC bit, 6-3/4" 7/8 lobe 5-stage PDM, 8-3/8" string stab, UBHO sub, 6-1/2" pony NMDC, 8-3/8" string stab drilling assembly. Ran assembly in hole.

Prior to tagging cement, emergency drills were conducted with the crew, covering BOP and muster drills. Continued to run in hole and tagged top of cement at 824.3mRT. Rigged up and conducted dummy FIT to 2800psi with Halliburton, pressure tested surface lines to 3800psi.

Lined up and drilled cement, plugs, float collar, shoe track, float shoe, and rathole to 853mRT. Drilled new formation to 856mRT. The 9-5/8" shoe track was drilled out to 853m in approximately 2 hours. The drilling fluid was circulated to 8.9ppg even density in and out prior to the leak-off test. The leak-off test was conducted successfully per program with 8.9ppg fluid to 2150psi of surface pressure, giving an equivalent mud weight of 23.9ppg.

Continued drilling 8-1/2" hole from 856m to 1851mRT. Due to slow ROP the assembly was pulled out of hole for inspection and bit change. PDC bit was changed out and the assembly run back in hole. 8-1/2" hole drilling continued to a final well TD of 1915.5mRT. Hole was circulated and conditioned prior to pulling out of hole with the drilling assembly. Picked up wiper trip BHA and conducted wiper trip to well TD. Circulated and conditioned wellbore and spotted Hi-YP pill into the annulus prior to pulling out of hole with the wiper assembly. Pulled out of hole from 1914.5m to surface with no overpull noted, and the well static. Rigged up Schlumberger wireline unit to conduct the wireline logging program.

4.2.2.9 8 ½'' Open Hole Logging

Wireline logging operations commenced at 18:35 hrs on 14 October 2020. Schlumberger logged the 8-1/2" open hole with the following program:

- Suite #1:
  - Run #1: HRLA-PEX-HNGS-SP-GR
  - Run #2: GR-FMI-SSCAN-TLD
  - Run #3: CMR-NEXT-HGNS-GR

- Suite #2
  - Run #1: GR-XLROCK
  - Run #2: GR-FMI

- Suite #3
  - Run #1: GR-CBL

Suite #1, Run #1 was run in hole with the following tools; HRLA-PEX-HNGS-SP-GR. The logging string was run to TD and logged back to the casing shoe with the GR logged to surface. The logging string reached the surface at 05:27 hrs on 15 October 2020.

Suite #1, Run #2 was rigged up with the GR-FMI-SSCAN-TLD tool. The string was run in the hole at 09:15 hrs on 15 October 2020 to TD and logged up to the casing shoe. It was back at surface by 21:00 hrs on 15 October 2020.

Suite #1 Run #3 tool string, the CMR-NEXT-HGNS-GR, was run in the hole at 03:00 hrs on 16 October 2020 and run from TD to casing shoe with no hole problems. It was back on the surface at 21:00 hrs on 16 October 2020.

The DFIT program was then run prior the rigging up the Wireline sheaves and making up the GR-XLROCK tools for Suite #2, Run #1. The tools were run in the hole at 14:15 hrs on 19 October 2020. At 03:27 hrs, a tool jam on Core #17 caused the tool to be pulled to the surface, checked, and redressed with a new core bit before running back in the hole and resuming coring at 08:17 hrs. Core #17 was recut, and the program was completed by 02:16 hrs on 21 October 2020 before coming out of the hole at 04:11 hrs.

The FMI-GR was made up for Suite #2 Run #2 and run-in hole at 06:01 hrs on 21 October 2020. It was run from TD to casing shoe by 09:20 hrs and pulled out of the hole and rigged down. The sheaves were then rigged down, with logging operations completed at 10:12 hrs on 21 October 2020. (See Appendix K for the Wireline Operations Diary).

4.2.2.10 Production Casing and Cementing

The rig floor was dressed and rigged up CRT & WECATT in preparation to install the 7" P110 29ppf JFE Bear production casing. Made up, and thread-locked shoe, shoe track, float collar & tested floats. Ran in hole 7" P110 29ppf JFE Bear production casing washing to bottom, and landing out casing with a shoe depth of 1909.01mRT. Pumped 5bbls fresh water and pressure tested surface lines to 550psi low for 5min / 5560psi high for 10min. Launched bottom plug, mixed, and pumped 187bbls of 14.5ppg single-stage frac grade cement slurry. Launched top plug and displaced with 231.9 bbls inhibited 9.4 ppg suspension brine. Returns observed after 220bbls of displacement pumped with 12 bbls of 14.5ppg cement slurry pH checked and weighed upon return to the surface. Full returns were observed throughout the job. Performed 7" casing integrity test to 4,590psi. Floats held with cement in place at 11:38 hrs 22 October 2020.

4.2.2.11 Well Suspension and Rig Release

Rigged down cementing head, Volant CRT and casing handling equipment, flushed wellhead and BOP equipment of cement. Installed, pressure tested, and pull tested to 40Klbs Cactus pack-off seal assembly. Nippled down BOPE and conducted cement bond logging (CBL) over the 7" production casing interval. Installed 2⅞" EUE tubing hanger and successfully pressure tested to 5000psi. Installed 2-1/2" BPV, engaged hanger lockdown ring, and pull tested hanger to 25Klbs.

The rig was released from Carpentaria-1 at 18:00 hrs on 23 October 2020.

4.3 Time Depth Curve

The Carpentaria-1 drilling scope took 30.094 days from spud to rig release. A total of 100.0 hours of Non-Productive Time (NPT) were incurred as detailed below. Approximately 70.0 hours were attributed to centralizer failure and recovery operations.

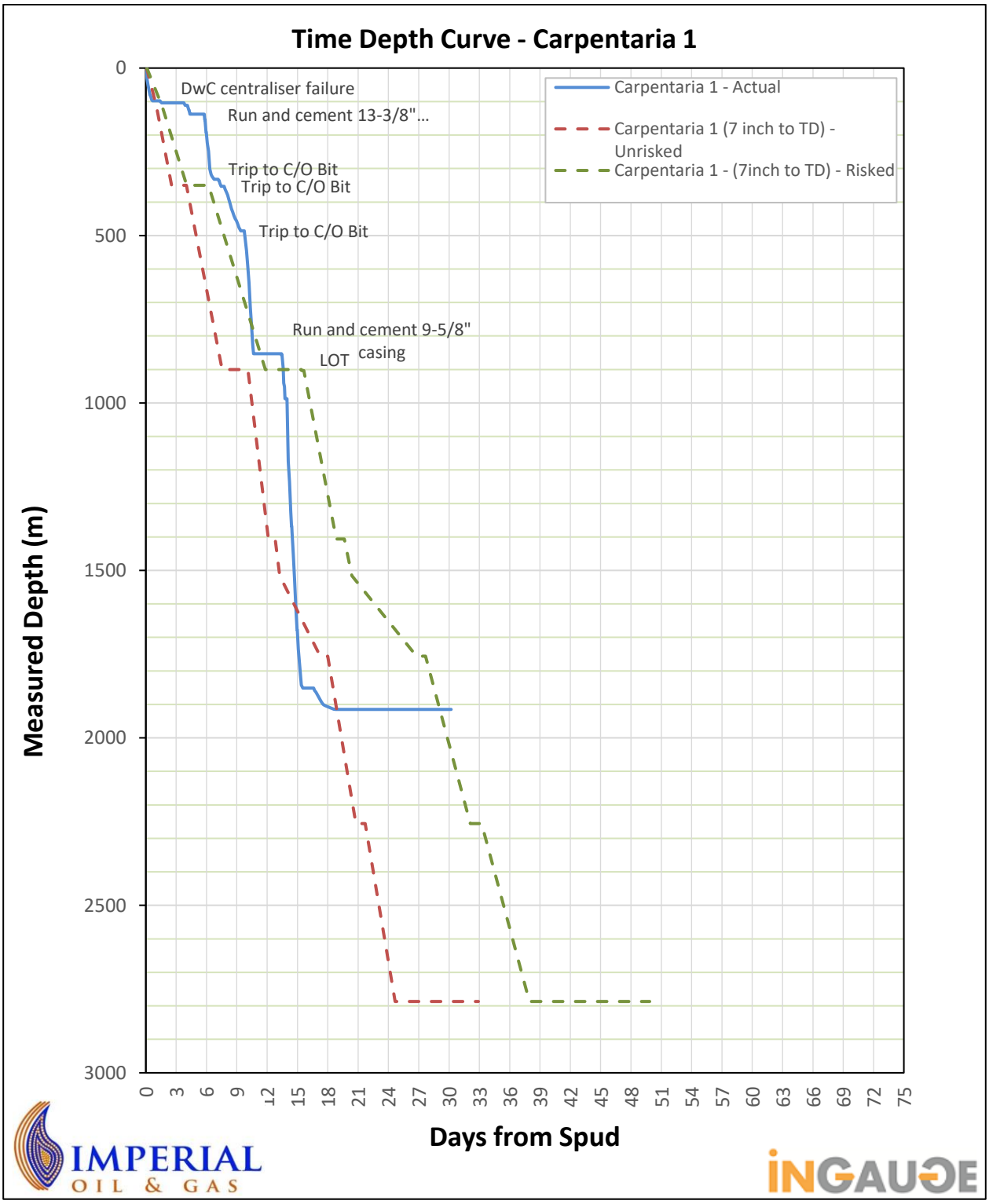


Figure 4: Carpentaria-1 Time Depth Curve

4.3.1 Time Breakdown

The time breakdown for Carpentaria-1 is as follows;

Item	Total Time (Hrs)	Total Time (Days)	Percentage (%)
BHA Handling	61.50	2.56	8.48%
BOP - R U/D	8.00	0.33	1.10%
BOP Drill	0.50	0.02	0.07%
Casing R U/D equip	14.00	0.58	1.93%
Casing Running	30.00	1.25	4.14%
Cementing	11.50	0.48	1.59%
Circulating	15.50	0.65	2.14%
Drill Cement	5.75	0.24	0.79%
Drilling	215.00	8.96	29.66%
Flow check	4.25	0.18	0.59%
Logging	106.50	4.44	14.69%
LOT / FIT / DST / DFIT	15.75	0.66	2.17%
Other - Stuck pipe	0.50	0.02	0.07%
Pressure Test	13.50	0.56	1.86%
Repair rig	15.00	0.62	2.07%
Rig Service	3.75	0.16	0.52%
Rig up/down	4.50	0.19	0.62%
Safety Meeting	2.25	0.09	0.31%
Slip & cut	0.75	0.03	0.10%
Standby	6.00	0.25	0.83%
NPT	85.25	3.55	11.76%
Tripping	89.25	3.72	12.31%
Wash / Ream	5.50	0.23	0.76%
Wellhead	10.50	0.44	1.45%
Total	**725.00**	**30.21**	

Table 15: Time Breakdown

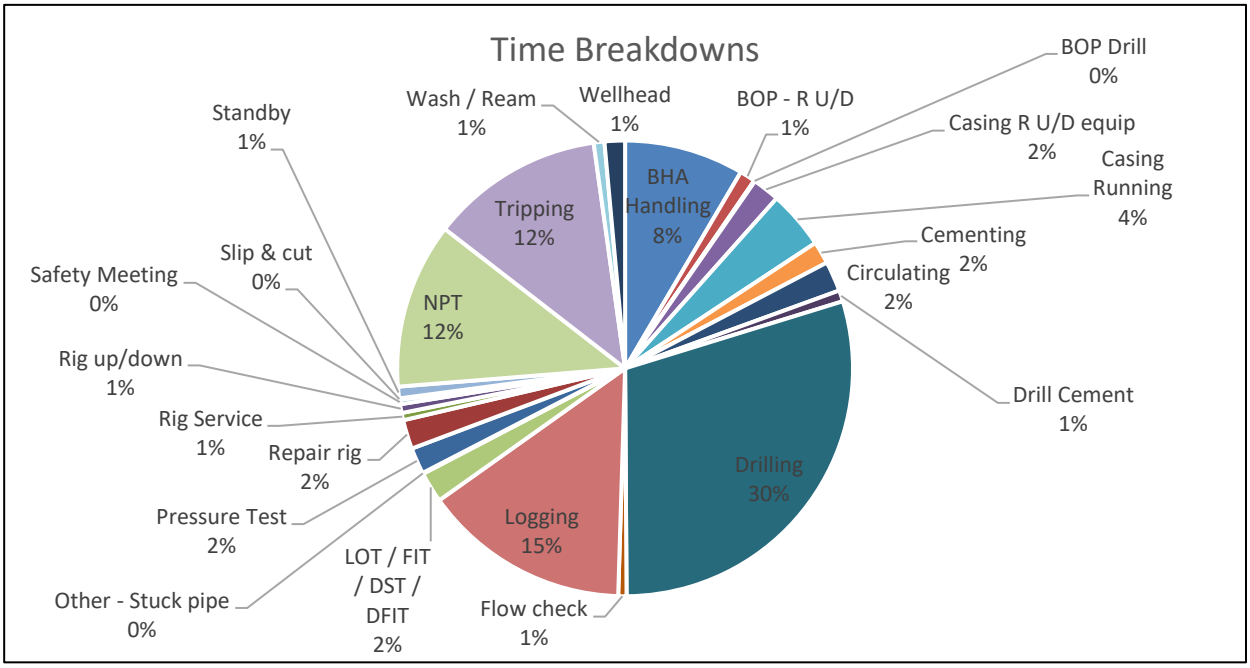


Figure 5: Carpentaria-1 Time Breakdown

4.3.2 NPT Breakdown

The NPT breakdown is as follows;

Item	Time (Hours)	Time (Days)
Stuck pipe	3.00	0.13
Safety Meeting	0.75	0.03
Tripping	16.00	0.67
Standby	1.00	0.04
Casing R U/D equip	1.00	0.04
BHA Handling	23.25	0.97
Wash / Ream	2.25	0.09
Circulating	1.00	0.04
Wait on Fish Tools	17.50	0.73
Fishing	3.00	0.13
Milling/Hole Opening	1.25	0.05
MWD Comms Issues	11.50	0.48
Wait on XL Rock mob	3.50	0.15
Replace Bell Nipple	5.00	0.21
TDS Encoder	0.50	0.02
Replace ST-80 Hose	2.00	0.08
Flowline Air Union	0.50	0.02
Accumulator 4-way block	6.00	0.25
Iron Roughneck, hose replacement	1.00	0.04
Rig repair/NPT Total:	**100.00**	**4.17**

Table 16: NPT Breakdown

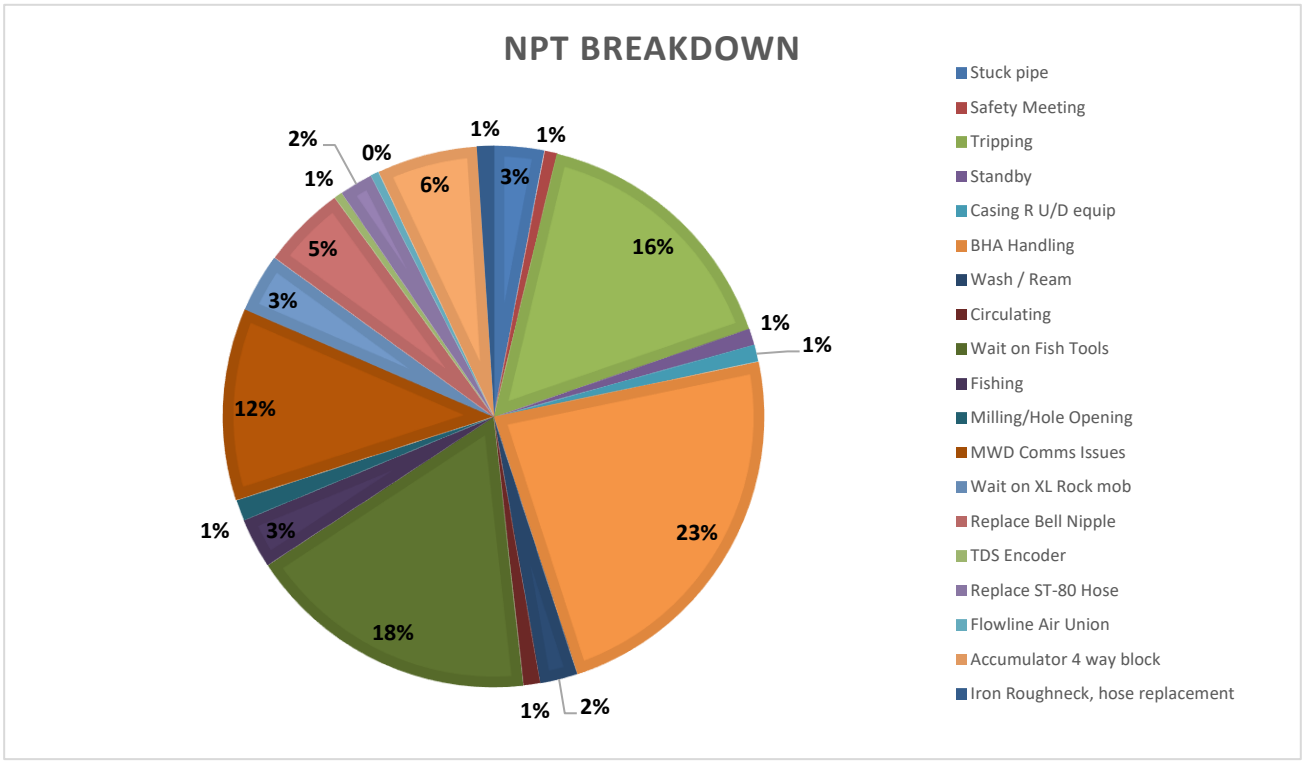


Figure 6: Carpentaria-1 NPT Breakdown

4.4 Bit Run Data

Bit run data for both drilling and coring is presented below.

NUMBER	1	2	3	4	3 RR
SIZE, in.	17 ½"	12¼"	17 ½"	17 ½"	17 ½"
TYPE	HCI- EZC506THD	Ulterra SS-TMG (117)	ST - XRTCPS (length 0.44m)	Ulterra U03263	ST - XRTCPS (length 0.44m)
SERIAL No.	5300802	95734-T	PW8724	43203	PW8724
TFA	0.880	0.745	0.920	0.835 (9 x 11/32)	0.92 (3 x 20/32)
W.O.B., Klbs.	2 - 5	5-10	2 - 5	10-18	10-18
R.P.M.	30-70	50-60	50	25-60	20-60
DEPTH OUT, m	97.8	104	100	138	111
DEPTH IN, m	31	97.8	97.8	111	100
METERAGE	66.8	6.2	2.2	27	11
HOURS on btm	10.50	4.00	0.75	3.90	3.00
ROP (m/hr)	6.42	1.55	2.93	6.92	3.60
CONDITION	1/1/WT/A/X/I/N/DSF	2/2/JD/M-G/E/I/CD/BHA	As NEW	1/1/BT/S,T/X/I/CT/TD	As NEW

Table 17: Bit Run History – Part 1

NUMBER	3 RR	5	6	7	8
SIZE, in.	17 ½"	12 ¼"	12 ¼"	12 ¼"	12 ¼"
TYPE	ST - XRTCPS (length 0.44m)	Ulterra SPL616 U03332	X30GFSJ - 537	Ulterra CF716	Ulterra CF713
SERIAL No.	PW8724	47074	94604-T	48936	47724
TFA	0.92 (3 x 20/32)	0.706	0.746	0.703	0.703
W.O.B., Klbs.	10-18	15.000	20-32	20-25	25-35
R.P.M.	20-60	100-150	40-90	80-100	60-100
DEPTH OUT, m	111	331	352.8	486	853
DEPTH IN, m	100	138	331	352.8	486
METERAGE	11	193	21.8	133.2	367
HOURS on btm	3.00	18.50	7.50	37.60	18.50
ROP (m/hr)	3.60	10.43	2.90	3.60	19.84
CONDITION	As NEW	2-8-RO-N-X-I-NR, BT-PR	1/6/BT.LT/G/E/I/CT/PR	2/1/CT/C/X/I/WT/PR	2/1/CT/C/X/I/WT/TD

Table 18: Bit Run History – Part 2

NUMBER	9	10	10RR	10RR1
SIZE, in.	8½"	8½"	8½"	8½"
TYPE	Ulterra U713 UO3201	Smith Z616	Smith Z616	Smith Z616
SERIAL No.	39969	NQF2285	NQF2285	NQF2285
TFA	0.537	0.663	0.663	0.663
W.O.B., Klbs.	17-38	25-48	1-11	1-3
R.P.M.	125-204	80-240	100	20
DEPTH OUT, m	1851	1915.5	1915.5	1915.5
DEPTH IN, m	853	1851	1915.5	1915.5
METERAGE	998	64.5	Wiper trip	Wiper trip
HOURS on btm	38.1	47.60	0	0
ROP (m/hr)	26.20	1.35	n/a	n/a
CONDITION	1,1, WT, C, X, I, RR, PR	1/2/CT/G, S, /X/I/WT/TD	1/2/CT/G, S, /X/I/WT/TD	1/2/CT/G, S, /X/I/WT/TD

Table 19: Bit Run History – Part 3

Date	Avg. ROP (m/hr)	Avg. RPM	Avg. WOB (klbs)	Avg. TQ (kft-lbs)
23/09/2020	6.06	50	3.5	1.6
24/09/2020	2.91	52.5	3.5	5.5
25/09/2020	1.6	52.5	7.5	4
27/09/2020	4.12	40	14	6
29/09/2020	12.14	125	15	4.5
30/09/2020	2.7	42	19.6	30.9
1/10/2020	4	39	15.3	4.6
3/10/2020	19.4	97	22	7.5
4/10/2020	20.1	99	23	7.52
8/10/2020	27.6	193	22	5.12
10/10/2020	26.2	178	36.1	2.9
11/10/2020	26.2	174	41.3	3.05
12/10/2020	1.3	176	41.1	2.88

Table 20: Drilling Parameters

5. Well Integrity

5.1 Conductor Casing and Cement

The 13-3/8'' 61ppf K55 BTC conductor casing was run by the rig and DrillQuip crew utilizing Volant CRT tool. Casing was cemented in place with casing shoe set 137.04mRT. No cement return to surface was recorded during the primary cementing operation. Casing was successfully pressured tested to 2,400psi. A total of five offline top-up jobs (110bbls pumped in total) were conducted with cement recorded at surface on the final top-up job.

5.2 Surface Casing and Cement

The 9-5/8'' 36ppf K55 BTC surface casing was run by the rig and DrillQuip crew utilizing Volant CRT tool. It was cemented back to the surface and successfully pressured tested to 2,800psi prior to drilling out. It was estimated that 65.5 bbls of cement returns came back to the surface. No losses were experienced while the cement was pumped around the annulus. The job was considered to have successfully isolated the formation behind the casing. Conducted LOT with 2150psi surface pressure applied, resulting in a 23.9ppg EMW.

5.3 Production Casing

The production casing was cemented with 187 bbls of 14.5ppg single-stage frac grade cement slurry. The GasCon-469 provides control of fluid migration and cement feedback. The micro bond additive was mixed in the cement to provide superior bonding properties to the casing and formation. The Microband provides a post set crystalline growth expansion of the cement sheath. The cement job was conducted with no losses, and full returns were recorded throughout the cement job.

Centralizers were run, giving a calculated standoff >80% across the cemented section. A 12.50ppg tuned spacer was pumped with lab-tested rheological properties to ensure displacement of mud ahead, verified in Halliburton's pre-job displacement modeling. The spacer was tested for compatibility with the mud system and pumped before the cement to aid in removing remnant drilling mud and filter cake. Top and bottom plugs were run to provide separation between cement and fluids ahead and behind.

The casing was pressure tested to 4,590 psi for 10 minutes after bumping the plug. The cement pressure chart in Appendix D indicates a pressure build as expected for the designed cement job.

A CBL of the cemented 7" casing was completed approximately 24 hours post cementing job; The CBL result confirmed the cement sheath integrity. These results provide confidence of excellent integrity in the well construction.

Cementing details are included in the Cementing EOWR in APPENDIX E.

5.4 Wellhead Pressure Testing

The wellhead provided by Cactus Group was rated and tested to 5,000 psi.

#	Test	Pressure (psi)	Time (S)
1	Casing Head Companion Flange against VR Plug	5000	690
2	11" x 7" Mandrel Pack off Void Lower	5000	690
3	11" x 7" Mandrel Packoff Void Upper	5000	900
4	6-3/4'' x 2-7/8'' EU, MBU-LR-UPR-SN Tubing Hanger Void	5000	900
5	Xmas tree assembly full body	5000	900

Table 21: Wellhead Pressure Testing

5.5 HSE Overview

There were no accidents or incidents and no recorded first aid incidents.

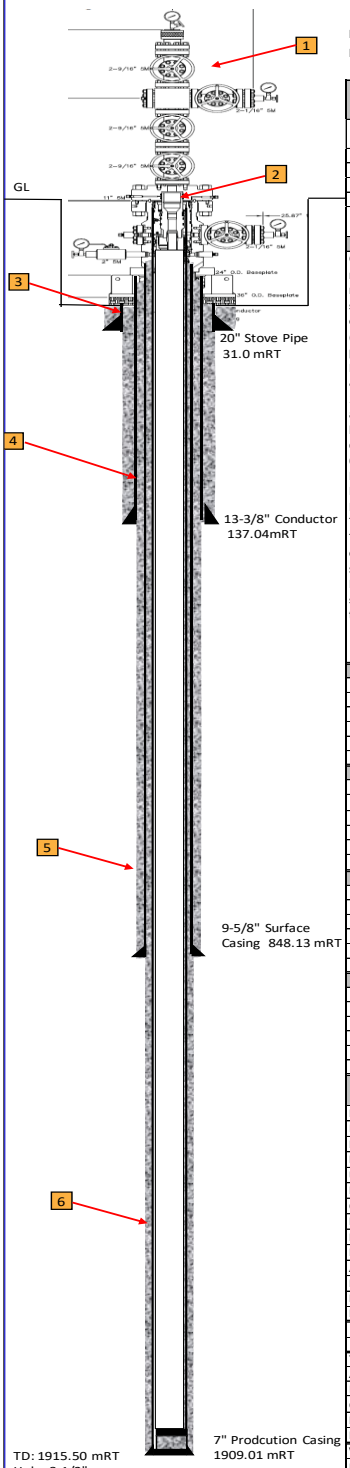
Using the daily rig POB, there was approximately 13,668man-hours recorded during the drilling phase of the project.

5.6 Downhole Diagram

EMPIRE Energy

Carpentaria 1

INGAUGE



NOT TO SCALE

Latitude: 16°47'40.20"S
Longitude: 135°07'22.98"E

Well Spudded: 23/09/2020
Rig Released: 23/10/2020

Ground Level: 230.40 mAHD
RT elevation: 5.20 mGL

ITEM No	DESCRIPTION	LTH (m)	DTH (mRT)	MIN I.D.	MAX O.D.
1	13-3/8" x 9-5/8" x 7" x (4-1/2") x 2-7/8" 5M MBU-Q Wellhead System With SN Tubing Head Adapter				
2	Tubing Hanger with 2 ½" BPV				
3	20" Stove Pipe	25.80	31.00		
4	13-3/8", 61ppf, K55, BTC	131.84	137.04	12.52	13.375
5	9 5/8", 36ppf, K55, BTC	842.93	848.13	8.921	9.625
6	7", 29ppf, P110, JFE BEAR from surface to 1872.19mRT & 26ppf, K55, BTC, 3 joint shoe track from 1872.19 to 1909.01mRT	1903.81	1909.01	6.184	7

BRIEF HISTORY OF WELL

Carpentaria 1 was spudded on 23/09/ 2020 with SLR Rig 183.17 ½" conductor hole was drilled with 13- ⅜'' casing vertically using Drillquip CRT to 53.4 mRT when total losses encountered and continued drilling blind to 97.8mRT; the drilling casing got stuck due to losing a centralizer in the hole, but the rig managed to managed to free and fish out the centralizer (shaved meatal/debris) utilizing different BHAs and drilled the conductor hole section successfully to TD of 138mRT. Rigged up Volant CRT & Ran and cemented 13 ⅜" conductor casing to 137.04 mRT with 15.0 ppg cement slurry and no cement returns. Installed bell nipple and flow box and welded riser to 13⅜" 61ppf K55 BTC conductor casing. Performed four offline cement top-up jobs (whilst drilling the surface hole section) total of 100 bbl but no returns to surface; shortly after cementing the 9 ⅝" casing a fifth 10 bbl top-up cement was pumped with cement returns to surface. Total top-up cement volumes were 110 bbl.
RIH with 12¼" BHA and drilled out shoe track and drilled 12¼" surface hole to 331.9mRT, hard stringer intersected between 316.9m to 317.3mRT. POOH & laid out 12 ¼'' PDC bit and picked up 12 ¼'' TCI tri-cone bit, RIH and drilled 12¼" surface hole to 352.8mRT. POOH and changed out 12¼" TCI bit to 12¼" 12¼" PDC bit. RIH and drilled 12¼" surface hole to 486m before POOH and changed bit to Ulterra 12¼" CF713 PDC. RIH 12¼" packed rotary BHA and drilled ahead 12¼" surface hole to 853mRT. Circulated well clean and conducted a wiper trip; treated seepage losses and spotted 25bbls LCM/Viscous pill. POOH /laid out BHA. Rough cut and laid out 13-3/8" riser and installed 24" x 13-3/8" base plate ring. RIH 9 ⅝" 36ppf K55 BTC surface casing to 848.13mRT using Volant CRT and installed Cactus Wellhead, and cemented casing in place; cement returned to surface was calculated at 65.5bbls, installed 11" BOP stack and pressure tested BOPE to 5000psi.
RIH with 8½" BHA and drilled shoe track and new formation to 856m. Conducted LOT & drilled 8½" production hole to 1851.00mRT with motor BHA. POOH and changed bit and BHA to 8½" PDM-Shock sub-MWD BHA. RIH and drilled ahead 8½" production hole to well TD of 1915.50mRT. POOH & RIH with 8½" wiper BHA, conducted a wiper trip from TD to 9-5/8" casing shoe, circulated well clean and spotted Hi-YP pill.
The logging program was executed successfully by Schlumberger wireline,the first run was PEX-HRLA-SP-GR-HNGS, the second run was FMI-SSCAN-TLD-GR and the third run was CMR-NEXT-GR. A 4 x DFIT tests program was carried out by Protest after the third logging run, and a Wiper trip was conducted in the 8 ½'' hole section, thereafter, conducted Suite #2 logging utilising the XL Rock SWC with GR, cutting 50 core samples but recovered 49 samples. Before RIH with FMI-GR and conducted the second FMI logging run.
Rigged up CRT & WECATT, ran 7" production casing to 1909.01mRT. Cemented production casing with 14.5ppg slurry with 12 bbl of cement return to surface. P/T casing to 4600psi. Nippled down BOPE, conducted CBL over the 7" production casing interval, installed the 2⅛" tubing hanger and pressure tested successfully to 5,000psi. The well was suspended with a 2 ½" BPV in the tubing hanger and rig released at 18:00 on 23 Oct 2020.

STOVE PIPE

CASING DETAILS		CEMENTING DETAILS:
Size:	20"	Installed and Grouted in place by civil contractor
Weight:		
Grade:		
Range:		
Depth Set:	31.0	

CONDUCTOR

CASING DETAILS		CEMENTING DETAILS:
Size:	13-3/8"	Tail: 91.95bbl 15.0ppg GP-SL slurry (100% Gauge OH excess), No cement returns recorded to surface on the primary cement job
Weight:	61ppf	Top up: Total top-up cement pumped was 110bbls with 10 bbls of cement returns to surface.
Grade:	K55	
Range:	3	
Depth Set:	137.0	

SURFACE

CASING DETAILS		CEMENTING DETAILS:
Size:	9-5/8"	Lead: 170.0bbl, 13.5ppg Lafarge Class G slurry (50% Gauge OH excess)
Weight:	36ppf	Tail: 64.0bbl 15.8ppg Lafarge Class G slurry (50% Gauge OH excess)
Grade:	K55	65.50bbls of Cement returns recorded to surface
Range:	3	
Depth Set:	848.13	

PRODUCTION

CASING DETAILS		CEMENTING DETAILS:
Size:	7"	Lead: 187.00bbl, 14.5ppg Lafarge Class G (GasCon 469) slurry based on 20% Gauge OH Excess
Weight:	29ppf	
Grade:	JFE Bear	
Range:	3	
Depth Set:	1909.01	

FORMATION	FORMATION INTERVAL (mRT)	GUN: SIZE	GUN: TYPE	CHARGES: SPF	CHARGES: TYPE	CHARGES: WT(g)
Kyalla Formation	Absent					
Intra Kyalla Sandstone	Absent					
Lower Kyalla Shale	460.00					
Moroak Sandstone	733.00					
Upper Velkerri	833.00					
Middle Velkerri	1105.00					
C Shale	1105.00					
Base C	1160.00					
B Shale	1320.00					
Base B	1372.00					
A Shale	1490.00					
Base A	1544.00					
Lower Velkerri	1710.00					
Bessie Creek	1831					
PRESSURE	Not measured					
TEMPERATURE	89.91 deg C					

TAGGED DEPTHS:	
ANNULUS FLUID:	
INDICATED STRING WEIGHT:	
CALCULATED STRING WEIGHT:	
LANDED WEIGHT:	
REMARKS:	

WELLSITE SUPERVISORS:	Scott Hobday / Mick Marshall		
DRAFTED BY:	Latif Shareef	DATE:	10 November 2020
REVISED BY:		DATE:	
CHECKED BY:	Jordan Bunning	DATE:	12 November 2020

Figure 7: Downhole Diagram

5.7 Post Drilling Wellhead Diagram

Refer to Cactus IP1161-R1 for a full list of wellhead components. The well was suspended with the “C” section installed and Tubing Hanger with 2-1/2” BPV.

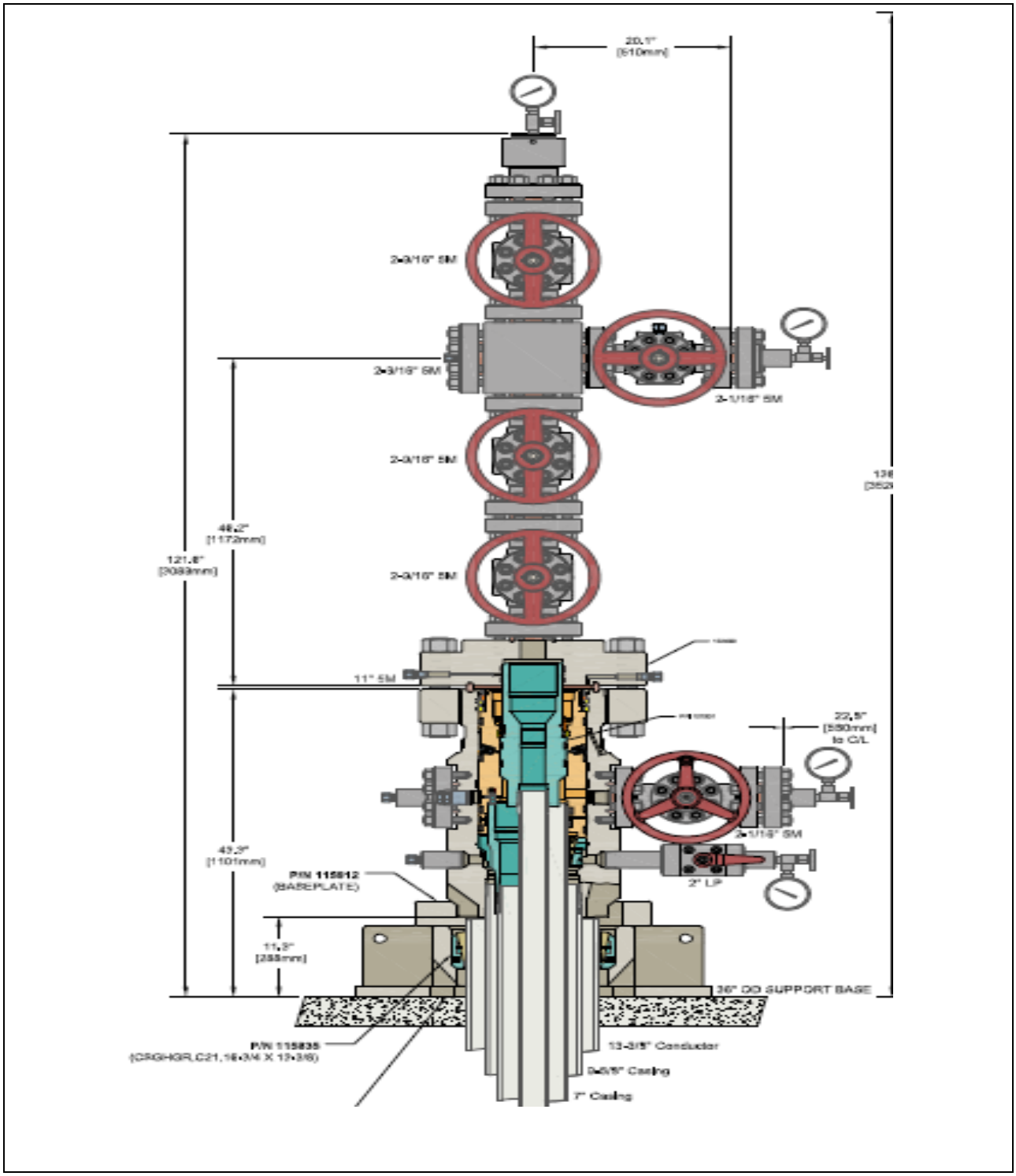


Figure 8: Wellhead Diagram

6. Appendices and Enclosures

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A. Cuttings Descriptions

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B. Rig 183 Specs

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C. Daily Drilling Reports

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D. Daily Geological Reports

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E. Casing and Cementing Reports

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F. Mud Recap

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G. Tubular Running Services

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H. Mud Logging Reports

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I. Coring Reports

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J. Sample Manifest

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K. MWD Report

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L. Survey Report

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M. Enclosure 1

Wireline Logs

ENCLOSURE 1.01 Carpentaria-1_WLS1R1_HNGS-GR_200_Main_Final.Pdf
ENCLOSURE 1.02 Carpentaria-1_WLS1R1_HNGS-GR_500_Main_Final.Pdf
ENCLOSURE 1.03 Carpentaria-1_WLS1R2_FMI-GR_40_Main_Final.Pdf
ENCLOSURE 1.04 Carpentaria-1_WLS1R2_SonicLog_200_Main_Final.Pdf
ENCLOSURE 1.05 Carpentaria-1_WLS1R2_SonicLog_500_Main_Final.Pdf
ENCLOSURE 1.06 Carpentaria-1_WLS1R3_CMR-GR_200_Main_Final.Pdf
ENCLOSURE 1.07 Carpentaria-1_WLS1R3_CMR-GR_500_Main_Final.Pdf
ENCLOSURE 1.08 Carpentaria-1_WLS1R3_NEXT-GR_200_Main_Final.Pdf
ENCLOSURE 1.09 Carpentaria-1_WLS1R3_NEXT-GR_500_Main_Final.Pdf
ENCLOSURE 1.10 Carpentaria-1_WLS2R1-R1A_XLR-GR_Main_Final.Pdf
ENCLOSURE 1.11 Carpentaria-1_WLS2R2_FMI-GR_40_Main_Final.Pdf
ENCLOSURE 1.12 Carpentaria-1_WLS3R1_CBL-VDL-GR-CCL_200_Main_Final.Pdf
ENCLOSURE 1.13 Carpentaria-1_WLS3R1_CBL-VDL-GR-CCL_500_Main_Final.Pdf
ENCLOSURE 1.14 Carpentaria-1_WLS1R1_HRLA-SSCAN-PEX-SP-GR_200_Main-Composite_Final.Pdf
ENCLOSURE 1.15 Carpentaria-1_WLS1R1_HRLA-PEX-SP-GR_500_Main_Final

N. Enclosure 2

ENCLOSURE 2.01 Carpentaria 1_Mudlog_1-200.pdf
ENCLOSURE 2.02 Carpentaria 1_Mudlog_1-500.pdf
ENCLOSURE 2.03 Carpentaria-1_Timelog_Mudlog.zip
ENCLOSURE 2.04 Carpentaria 1_Drilling Parameters Log.pdf

O. Wireline Logs, Mudlogging Data

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