



PANGAEA
RESOURCES PTY Ltd.

BASIC WELL COMPLETION REPORT

NT EP-167 – Manbulloo-S1

Prepared For: Department of Natural Resources and Mines
Date: 02-Mar-15
Revision No: B



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Operator:	Pangaea (NT) Pty Ltd	Representative:	Joel Alnes
Title:	Basic Well Completion Report_EP-167_Manbulloo-S1		

REVISIONS

Revision B	<i>02/03/15</i>	Added Information	G&G and Engineering	DL /Ops.
Revision A	<i>05/01/15</i>	Initial Document	G&G and Engineering	G&G/Ops.
Rev	Date	Reason For Revision	Author	Initial

THIS REVISION

Geology By:		Engineering By:	
Name	Initial/Date	Name	Initial/Date
D Levy	DL	CGC/SM	CGC/01-Jan-15
Approved For Submission By:	Joel Alnes		

APPROVALS

Name	Position	Signature	Date
Dan Levy	Operations Geology		
Todd Hoffman	Geoscientists	<i>[Signature]</i>	<i>02/03/15</i>
Cesar Gonzalez Cruz	Operations Coordinator	<i>[Signature]</i>	<i>02/02/15</i>
Steve Miller	Engineering Team Leader		
Joel Alnes	Vice-President of Exploration	<i>[Signature]</i>	<i>02/03/15</i>


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ENCLOSURES

- ENCLOSURE 1. WIRELINE LOGS**
- ENCLOSURE 2. MUD LOG**
- ENCLOSURE 3. CORE PHOTOGRAPHY**

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1 WELL CARD (DATA SUMMARY SHEET)

GENERAL WELL INFORMATION	
Well Name and Number:	Manbulloo-S1
Designation:	Petroleum stratigraphic core well
Permit:	EP-167
Basin:	McArthur Basin
Mapsheet (1:100K):	Manbulloo
Graticular Block No:	[2524] (5 minute blocks)
Surveyed Location: (MGA94, Zone 53)	Latitude 14° 55' 39.59"S (GDA94) Longitude 132° 16' 06.32"E (GDA94) Easting 206,139.45mE (MGA94, Z53) Northing 8,347,868.99mN (MGA94, Z53)
Pastoral lease holder:	Consolidated Pastoral Co "Manbulloo" 3627 Victoria Hwy Manbulloo NT
Property Description:	Parcel 1604 & Plan Number CP 5051 – "Manbulloo"
Seismic Reference:	Hidden Valley PB13 (2013), Line PB13-09, Offset 73m east of shotpoint 6601
Nearest Well:	Sever-1 (1990), 71 km South-east
Surveyed Elevation:	144.8 mAMSL
Well Total Depth (TD):	1236.22 mRT (Driller)
Spud Date:	17-Jul-2014
Reach TD Date:	14-Aug-2014
Rig Release Date:	19-Aug-2014
Well Status/Result:	Plugged and Abandoned/Oil Shows
OPERATOR AND DRILLING CONTRACTOR	
Operator and Titleholder:	Pangaea Galilee Pty Ltd (100%)
Operator Postal Address:	Locked Bag 1, 1 Farrer Place Sydney, NSW, 2000
Drilling Contractor:	DDH1 Drilling Pty Ltd
Rig Name and Type:	Rig-31 (UDR-5000)
Height of RT above GL:	1.3 m
RT Elevation:	146.1 mAMSL



CORED INTERVAL			
From	To	Total Interval	Core Recovery
[mRT]	[mRT]	[m]	[%]
423.3	1236.22	813.52	99.9

FINAL WELL CONSTRUCTION									
Interval	Hole Specifications			Casing Specifications					
	Hole Size	From	To	OD	Weight	Grade	Thread	Casing Top	Shoe Depth
	[in]	[mRT]	[mRT]	[in]	[lb/ft]			[mRT]	[mRT]
Conductor	12-1/4	1.3	21.7	9-5/8	36.0	J-55	BTC	1.3	21.7
Surface	8-1/2	21.7	243.3	7	23.0	J-55	BTC	1.3	240.3
Intermediate	6-1/8	243.3	423.3	4-1/2	11.6	J-55	BTC	1.3	420.3
Test Hole	3.78 (HQ)	423.3	1236.2	Open Hole (Cement Plugged)					

DRILLING MEDIUM				
Interval	Hole Size	From	To	Fluid System
	[in]	[mRT]	[mRT]	
Conductor	12-1/4	1.3	21.7	Water – Spud Mud
Surface	8-1/2	21.7	243.3	Dry Air, Mist, Stiff Foam and WBM – KCl & PAC
Intermediate	6-1/8	243.3	423.3	WBM – KCl & PAC
Test Hole	3.78 (HQ)	423.3	1236.2	WBM – KCl & PAC

WIRELINE LOGS	
Logging Run	Logging Suite
Run #1 (Inside Drill Pipe)	Compact Gamma Ray/Temp (MCG)
Run #2 (Logged from Hang Up Depth)	Compact Gamma Ray/Temp (MCG)
	Compact Dual Neutron (MDN)
	Compact Photo Density (MPD)
	Compact Dual Laterlog (MDL)
	Compact Micro Resistivity (MMR)
	Compact Micro Imager (CMI)



	Compact Sonic (MSS)
Run #3 (Logged from Hang Up Depth)	Velocity Check Shots (VCS)
WELL EVALUATION LOGS	
Log Name	
Field generated basic mud log	
Interpreted mud log	

CEMENT PLUGS				
Number	From	To	Length	Excess
	[mRT]	[mRT]	[m]	[%]
1 – Stage 1 (Hole Collapsed)	1236.2	1185.0	51.2	15.0
1 – Stage 2	934.0	822.0	112.0	15.0
1 – Stage 3	822.0	672.0	150.0	15.0
1 – Stage 4	672.0	520.0	152.0	15.0
1 – Stage 5	520.0	373.0	147.0	15.0 (Open Hole Only)
2 – Surface	20.0	1.3	18.7	0.0

FORMATION TOPS						
Formation	Predicted Depth	Actual Depth	Actual Depth	Actual Depth	Actual Depth	Thickness
	(mRT)	(mRT)	(mGL)	(mTVD)	(mSS)	
Surficial Sediments	1	1.3	0	0	-145	5
Undifferentiated Cretaceous	6	6	5	6	-140	77
Tindal Limestone	-	83	82	83	-63	151
Antrim Plateau Volcanics	136	234	233	234	88	102
Base Cambrian Sandstone	-	336	335	336	190	29
Base Cambrian Unconformity	262	365	364	365	219	0
Undifferentiated Upper McArthur	-	365	364	365	219	148
Reward Dolomite Equiv.	-	513	512	510	367	196
Fraynes Form. (Barney)	-	709	707	699	562	163
Campbell Springs Dolomite	-	871	870	857	725	122
Blue Hole Formation	-	994	992	976	847	69
Kunja Siltstone	-	1063	1061	1043	916	121
Mallabah Dolostone	-	1184	1183	1161	1038	21



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Amos Knob Formation	-	1205	1204	1181	1059	-
TD	1800	1236	1235	1213	1068	-

2 WELL SCHEMATIC

Plug & Abandon Diagram

Well: **MANBULLOO - S1**
Type: **Stratigraphic Core Well**

Item No.	Description	Length (m)	Depth				
			Top (mRT)	Bottom (mRT)			
1	Steel Cap (Welded)	0.02					
2	Surface Cement Plug	20.00	0.00	20.00			
3	Abandonment Fluid (KCl, Biocide)	353.00	20.00	373.00			
4	Class A Cement (14.5ppg)	561.00	373.00	934.00			
5	Fill (comprised predominantly of Dolostone)	251.00	934.0	1185.0			
6	Class A Cement (14.5ppg)	51.22	1185.0	1236.2			
TOC Tagged at 373mRT with 8,000lbs weight test See below for casing setting depths							
PERFORATIONS							
Formation		Interval (m RT)	Gun Size	Charges Type	SPF	Ph	gm
Well Not Perforated							
Surface Casing		7" J55 23 lbs/ft SET @ 240.3mRT					
Intermediate Casing		4-1/2" J55 11.6lbs/ft SET @ 420.3 mRT					
Open Hole		3.78" HQ Core Hole From 423.26mRT-TD (Open Hole filled w/ cement)					
Cementing Details		Intermediate Casing Cemented to Surface - Lead 11.6ppg, Tail 14.8ppg					
Remarks:		TOC Tagged at 373m - Cement Plug tested with 8,000lbs weight					
Total Well Depth		1236.22 (mRT)	Plugged & Abandoned				
DESIGN				INSTALLATION			
Drafted by:		Steve Miller		Rig Supervisor:		Dryden Strange	
Date of Draft:		16/08/14		Date of Installation:		17/08/14	

TD: 1236.22mRT
Not to Scale

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3 CEMENTING

3.1 Surface Casing Cement

The 8-1/2" surface hole was drilled to 243.26 mRT and 7" casing was run to 240.3mRT. The casing was cemented by pumping 35bbl slurry of 13.5ppg Class A cement w/FR-100 and CaCl additives and displaced with 29.5bbl water. Bump plug with 1100psi and held for 10min. Cement returns were seen at surface. A top up cement job was performed by pumping 4bbl slurry of 14.5ppg Class A cement.

Surface Casing Cement	
Parameters	
Casing Section:	Surface
Casing Details:	7" 23 lb/ft J-55 BTC
Annulus:	8-1/2" Open Hole
Casing Shoe Depth:	240.3 mRT
Cement Type:	Class A
Cement Weight:	13.5 ppg
Cement Excess Pumped:	100%
Top of Cement Depth:	Cement returns seen at surface Top-up cement job

3.2 Intermediate Casing Cement

The 6-1/8" intermediate hole was drilled to 422.7mRT and 4-1/2" casing was run to 420.3mRT. The casing was cemented by pumping 24bbl of 11.6ppg Lead slurry and 6.7bbl 14.8ppg Tail slurry. The plug was dropped and cement displaced with 21.45bbl water. Cement returns were seen at surface. Plug did not bump; shutin pressure 250psi and held for 10min (plug holding).

Intermediate Casing Cement	
Parameters	
Casing Section:	Intermediate
Casing Details:	4-1/2" 11.6 lb/ft J-55 BTC
Annulus:	6-1/8" Open Hole
Casing Shoe Depth:	420.3 mRT
Cement Type:	Class A
Cement Weight:	Lead: 11.6 ppg, Tail: 14.8 ppg
Cement Excess Pumped:	50%
Top of Cement Depth:	Surface

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3.3 Cement Plug P&A

Cement Plug			
Parameters			
Plug Type:	Cement	Drilling Mud Type:	WBM
Plugged Sections:	TD – 1185.0mRT 934.0 – 373.0mRT 20.0 – 0m	Drilling Mud Density:	8.7 ppg
Specifications			
Cement Type:	PlugCem (Class A)		
Cement Density:	14.5 ppg		
Cementing Stages			
N°	Bottom	Top	Length
	[mRT]	[mRT]	[m]
1	1236.22	1185.0	51.2
2	934.0	822.0	112.0
3	822.0	672.0	150.0
4	672.0	520.0	152.0
5	522.0	373.0	149.0
373.0 – 20.0m (Abandonment Fluid)			
6	20.0	0.0	20.0

4 CORES AND SAMPLING

Please see **Appendix 1** for details of cores and samples taken.

5 EVALUATION LOGS

Please see **Enclosure 1** for digital wireline log data.

Please see **Enclosure 2** for graphical mud log.

No measurement, logging or pressure while drilling logs were performed in.

6 WELL TESTING

No formation fluid samples or productions tests were performed.

7 CORE PHOTOGRAPHY

Please see **Enclosure 3** for core photography.

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8 WELL TRAJECTORY

Please see **Appendix 2** for deviation survey results.

9 BIT RECORD

Please see **Appendix 3** for bit record.

10 MUD RECORD

Please see **Appendix 4** for mud record.



APPENDIX 1. CORES AND SAMPLES DETAILS

CORE RUN DETAILS

Pangaea Resources Manbulloo-S2 Core run details						
Run No.	Top Depth	Bottom Depth	Drilled/Cored	Recovery	Loss/Gain	Recovery
	mRT	mRT	m	m	m	%
1	422.70	425.51	2.81	2.73	-0.08	97.15
2	425.51	427.26	1.75	1.77	0.02	101.14
3	427.26	433.26	6.00	6.00	0.00	100.00
4	433.26	439.26	6.00	6.09	0.09	101.50
5	439.26	445.26	6.00	6.01	0.01	100.17
6	445.26	451.26	6.00	6.03	0.03	100.50
7	451.26	457.26	6.00	6.11	0.11	101.83
8	457.26	463.26	6.00	5.81	-0.19	96.83
9	463.26	469.26	6.00	6.05	0.05	100.83
10	469.26	475.26	6.00	6.00	0.00	100.00
11	475.26	481.26	6.00	6.01	0.01	100.17
12	481.26	487.26	6.00	6.00	0.00	100.00
13	487.26	493.26	6.00	6.00	0.00	100.00
14	493.26	499.22	5.96	6.06	0.10	101.68
15	499.22	505.32	6.10	6.00	-0.10	98.36
16	505.32	511.22	6.00	5.89	-0.11	98.17
17	511.22	517.22	6.00	6.09	0.09	101.50
18	517.22	523.22	6.00	6.00	0.00	100.00
19	523.22	529.22	6.00	6.06	0.06	101.00
20	529.22	531.12	1.90	1.92	0.02	101.05
21	531.12	531.26	0.14	0.10	-0.04	71.43
22	531.26	532.06	0.80	0.80	0.00	100.00
23	532.06	532.16	0.10	0.12	0.02	120.00
24	532.16	532.26	0.10	0.00	-0.10	0.00
25	532.26	532.97	0.71	0.72	0.01	101.41
26	532.97	535.22	2.25	2.28	0.03	101.33
27	535.22	538.27	3.05	2.80	-0.25	91.80
28	538.27	539.92	1.65	1.47	-0.18	89.09
29	539.92	541.22	1.30	1.34	0.04	103.08
30	541.22	547.22	6.00	6.13	0.13	102.17
31	547.22	549.32	2.10	2.27	0.17	108.10
32	549.32	549.52	0.20	0.22	0.02	110.00
33	549.52	549.72	0.20	0.17	-0.03	85.00
34	549.72	553.22	3.50	3.37	-0.13	96.29
35	553.22	559.22	6.00	6.02	0.02	100.33
36	559.22	565.22	6.00	6.00	0.00	100.00
37	565.22	571.22	6.00	6.00	0.00	100.00
38	571.22	571.52	0.30	0.10	-0.20	33.33



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39	571.52	571.62	0.10	0.10	0.00	100.00
40	571.62	571.72	0.10	0.07	-0.03	70.00
41	571.72	572.09	0.37	0.50	0.13	135.14
42	572.09	572.82	0.73	0.73	0.00	100.00
43	572.82	577.22	4.40	4.34	-0.06	98.64
44	577.22	583.22	6.00	6.01	0.01	100.17
45	583.22	589.32	6.10	6.13	0.03	100.49
46	589.32	595.22	5.90	5.83	-0.07	98.81
47	595.22	601.22	6.00	6.00	0.00	100.00
48	601.22	607.22	6.00	6.01	0.01	100.17
49	607.22	613.22	6.00	6.21	0.21	103.50
50	613.22	619.22	6.00	5.71	-0.29	95.17
51	619.22	625.22	6.00	6.04	0.04	100.67
52	625.22	631.22	6.00	6.08	0.08	101.33
53	631.22	637.22	6.00	5.79	-0.21	96.50
54	637.22	643.22	6.00	6.00	0.00	100.00
55	643.22	649.22	6.00	6.00	0.00	100.00
56	649.22	649.95	0.73	0.76	0.03	104.11
57	649.95	650.00	0.05	0.04	-0.01	80.00
58	650.00	655.22	5.22	5.25	0.03	100.57
59	655.22	655.64	0.42	0.40	-0.02	95.24
60	655.64	661.22	5.58	5.67	0.09	101.61
61	661.22	667.22	6.00	6.02	0.02	100.33
62	667.22	673.22	6.00	6.02	0.02	100.33
63	673.22	679.22	6.00	5.99	-0.01	99.83
64	679.22	685.22	6.00	6.02	0.02	100.33
65	685.22	691.22	6.00	6.01	0.01	100.17
66	691.22	697.22	6.00	6.00	0.00	100.00
67	697.22	703.22	6.00	6.00	0.00	100.00
68	703.22	709.22	6.00	6.00	0.00	100.00
69	709.22	715.22	6.00	6.02	0.02	100.33
70	715.22	721.22	6.00	6.08	0.08	101.33
71	721.22	727.22	6.00	6.00	0.00	100.00
72	727.22	733.22	6.00	6.01	0.01	100.17
73	733.22	739.22	6.00	6.05	0.05	100.83
74	739.22	745.22	6.00	5.96	-0.04	99.33
75	745.22	751.22	6.00	6.00	0.00	100.00
76	751.22	757.22	6.00	6.00	0.00	100.00
77	757.22	763.22	6.00	6.10	0.10	101.67
78	763.22	769.22	6.00	5.94	-0.06	99.00
79	769.22	775.22	6.00	5.98	-0.02	99.67
80	775.22	781.22	6.00	6.01	0.01	100.17
81	781.22	787.22	6.00	6.00	0.00	100.00



82	787.22	793.22	6.00	6.00	0.00	100.00
83	793.22	799.22	6.00	6.00	0.00	100.00
84	799.22	805.22	6.00	6.00	0.00	100.00
85	805.22	811.22	6.00	5.99	-0.01	99.83
86	811.22	817.22	6.00	6.02	0.02	100.33
87	817.22	823.22	6.00	6.00	0.00	100.00
88	823.22	829.22	6.00	6.01	0.01	100.17
89	829.22	835.22	6.00	5.98	-0.02	99.67
90	835.22	841.22	6.00	6.00	0.00	100.00
91	841.22	847.22	6.00	6.08	0.08	101.33
92	847.22	853.22	6.00	5.92	-0.08	98.67
93	853.22	859.22	6.00	6.03	0.03	100.50
94	859.22	865.22	6.00	6.00	0.00	100.00
95	865.22	871.22	6.00	6.00	0.00	100.00
96	871.22	877.22	6.00	6.00	0.00	100.00
97	877.22	883.22	6.00	5.97	-0.03	99.50
98	883.22	889.22	6.00	6.05	0.05	100.83
99	889.22	895.22	6.00	5.97	-0.03	99.50
100	895.22	901.22	6.00	6.00	0.00	100.00
101	901.22	907.22	6.00	5.97	-0.03	99.50
102	907.22	913.22	6.00	6.03	0.03	100.50
103	913.22	919.22	6.00	5.95	-0.05	99.17
104	919.22	925.22	6.00	6.03	0.03	100.50
105	925.22	925.78	0.56	0.63	0.07	112.50
106	925.78	931.22	5.44	5.37	-0.07	98.71
107	931.22	937.22	6.00	6.00	0.00	100.00
108	937.22	943.22	6.00	6.00	0.00	100.00
109	943.22	949.22	6.00	6.00	0.00	100.00
110	949.22	953.69	4.47	4.35	-0.12	97.32
111	953.69	955.22	1.53	1.65	0.12	107.84
112	955.22	961.22	6.00	6.00	0.00	100.00
113	961.22	967.22	6.00	6.00	0.00	100.00
114	967.22	973.22	6.00	6.00	0.00	100.00
115	973.22	979.22	6.00	6.00	0.00	100.00
116	979.22	983.55	4.33	4.33	0.00	100.00
117	983.55	986.62	3.07	3.07	0.00	100.00
118	986.62	991.22	4.60	4.60	0.00	100.00
119	991.22	996.82	5.60	5.69	0.09	101.61
120	996.82	1002.92	6.10	6.07	-0.03	99.51
121	1002.92	1006.62	3.70	3.77	0.07	101.89
122	1006.62	1009.22	2.60	2.57	-0.03	98.85
123	1009.22	1015.22	6.00	6.00	0.00	100.00
124	1015.22	1021.22	6.00	6.00	0.00	100.00
125	1021.22	1024.65	3.43	3.47	0.04	101.17
126	1024.65	1029.08	4.43	4.40	-0.03	99.32
127	1029.08	1031.85	2.77	2.72	-0.05	98.19
128	1031.85	1036.09	4.24	4.25	0.01	100.24



129	1036.09	1039.14	3.05	3.10	0.05	101.64
130	1039.14	1044.30	5.16	5.18	0.02	100.39
131	1044.30	1047.92	3.62	3.61	-0.01	99.72
132	1047.92	1053.32	5.40	5.40	0.00	100.00
133	1053.32	1057.22	3.90	3.90	0.00	100.00
134	1057.22	1061.47	4.25	4.10	-0.15	96.47
135	1061.47	1064.88	3.41	3.50	0.09	102.64
136	1064.88	1067.22	2.34	2.37	0.03	101.28
137	1067.22	1072.16	4.94	4.62	-0.32	93.52
138	1072.16	1073.77	1.61	1.96	0.35	121.74
139	1073.77	1074.67	0.90	0.88	-0.02	97.78
140	1074.67	1078.12	3.45	3.45	0.00	100.00
141	1078.12	1080.82	2.70	2.74	0.04	101.48
142	1080.82	1086.92	6.10	6.10	0.00	100.00
143	1086.92	1093.02	6.10	6.13	0.03	100.49
144	1093.02	1099.12	6.10	6.13	0.03	100.49
145	1099.12	1105.22	6.10	6.08	-0.02	99.67
146	1105.22	1111.22	6.00	5.97	-0.03	99.50
147	1111.22	1117.22	6.00	6.12	0.12	102.00
148	1117.22	1123.22	6.00	6.04	0.04	100.67
149	1123.22	1129.22	6.00	5.99	-0.01	99.83
150	1129.22	1135.22	6.00	5.97	-0.03	99.50
151	1135.22	1141.22	6.00	5.96	-0.04	99.33
152	1141.22	1147.22	6.00	6.02	0.02	100.33
153	1147.22	1153.22	6.00	6.03	0.03	100.50
154	1153.22	1158.72	5.50	5.50	0.00	100.00
155	1158.72	1164.72	6.00	5.93	-0.07	98.83
156	1164.72	1165.22	0.50	0.46	-0.04	92.00
157	1165.22	1168.82	3.60	3.57	-0.03	99.17
158	1168.82	1171.22	2.40	2.05	-0.35	85.42
159	1171.22	1174.17	2.95	3.36	0.41	113.90
160	1174.17	1180.22	6.05	4.82	-1.23	79.67
161	1180.22	1183.22	3.00	3.86	0.86	128.67
162	1183.22	1189.22	6.00	6.10	0.10	101.67
163	1189.22	1194.97	5.75	5.64	-0.11	98.09
164	1194.97	1197.12	2.15	2.27	0.12	105.58
165	1197.12	1201.22	4.10	4.10	0.00	100.00
166	1201.22	1207.22	6.00	6.03	0.03	100.50
167	1207.22	1213.22	6.00	5.98	-0.02	99.67
168	1213.22	1219.22	6.00	6.08	0.08	101.33
169	1219.22	1222.72	3.50	3.46	-0.04	98.86
170	1222.72	1228.22	5.50	4.23	-1.27	76.91
171	1228.22	1233.52	5.30	6.15	0.85	116.04
172	1233.52	1235.77	2.25	2.35	0.10	104.44
173	1235.77	1236.22	0.45	0.28	-0.17	62.22
					Total Recovery	99.9%



SAMPLE DETAILS

Pangaea Resources Manbuloo-S2 Sampling Log				
Sample Type	Storage	Cuttings Top Depth	Cuttings Bottom Depth	Core Chip Depth
Cuttings	Plastic Samplex Tray	22.00	28.00	
Cuttings	Plastic Samplex Tray	28.00	34.00	
Cuttings	Plastic Samplex Tray	34.00	40.00	
Cuttings	Plastic Samplex Tray	40.00	46.00	
Cuttings	Plastic Samplex Tray	46.00	52.00	
Cuttings	Plastic Samplex Tray	52.00	58.00	
Cuttings	Plastic Samplex Tray	58.00	64.00	
Cuttings	Plastic Samplex Tray	64.00	70.00	
Cuttings	Plastic Samplex Tray	70.00	76.00	
Cuttings	Plastic Samplex Tray	76	82	
Cuttings	Plastic Samplex Tray	82	88	
Cuttings	Plastic Samplex Tray	88	94	
Cuttings	Plastic Samplex Tray	94	100	
Cuttings	Plastic Samplex Tray	100	106	
Cuttings	Plastic Samplex Tray	106	112	
Cuttings	Plastic Samplex Tray	112	118	
Cuttings	Plastic Samplex Tray	118	124	
Cuttings	Plastic Samplex Tray	124	130	
Cuttings	Plastic Samplex Tray	130	136	
Cuttings	Plastic Samplex Tray	136	194	
Cuttings	Plastic Samplex Tray	194	200	
Cuttings	Plastic Samplex Tray	200	206	
Cuttings	Plastic Samplex Tray	206	212	
Cuttings	Plastic Samplex Tray	212	218	
Cuttings	Plastic Samplex Tray	218	224	
Cuttings	Plastic Samplex Tray	224	230	
Cuttings	Plastic Samplex Tray	230	236	
Cuttings	Plastic Samplex Tray	236	242	
Cuttings	Plastic Samplex Tray	242	248	
Cuttings	Plastic Samplex Tray	248	254	
Cuttings	Plastic Samplex Tray	254	260	
Cuttings	Plastic Samplex Tray	260	266	
Cuttings	Plastic Samplex Tray	266	272	
Cuttings	Plastic Samplex Tray	272	278	
Cuttings	Plastic Samplex Tray	278	284	
Cuttings	Plastic Samplex Tray	284	290	
Cuttings	Plastic Samplex Tray	290	296	
Cuttings	Plastic Samplex Tray	296	302	
Cuttings	Plastic Samplex Tray	302	308	



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Cuttings	Plastic Samplex Tray	308	314	
Cuttings	Plastic Samplex Tray	314	320	
Cuttings	Plastic Samplex Tray	320	326	
Cuttings	Plastic Samplex Tray	326	332	
Cuttings	Plastic Samplex Tray	332	338	
Cuttings	Plastic Samplex Tray	338	344	
Cuttings	Plastic Samplex Tray	344	350	
Cuttings	Plastic Samplex Tray	350	356	
Cuttings	Plastic Samplex Tray	356	362	
Cuttings	Plastic Samplex Tray	362	368	
Cuttings	Plastic Samplex Tray	368	374	
Cuttings	Plastic Samplex Tray	374	380	
Cuttings	Plastic Samplex Tray	380	386	
Cuttings	Plastic Samplex Tray	386	392	
Cuttings	Plastic Samplex Tray	392	398	
Cuttings	Plastic Samplex Tray	398	404	
Cuttings	Plastic Samplex Tray	404	410	
Cuttings	Plastic Samplex Tray	410	416	
Cuttings	Plastic Samplex Tray	416	422	
Core Chips	Plastic Samplex Tray			423.50
Core Chips	Plastic Samplex Tray			424.50
Core Chips	Plastic Samplex Tray			425.51
Core Chips	Plastic Samplex Tray			426.35
Core Chips	Plastic Samplex Tray			427.71
Core Chips	Plastic Samplex Tray			428.51
Core Chips	Plastic Samplex Tray			429.50
Core Chips	Plastic Samplex Tray			430.49
Core Chips	Plastic Samplex Tray			431.50
Core Chips	Plastic Samplex Tray			432.54
Core Chips	Plastic Samplex Tray			433.45
Core Chips	Plastic Samplex Tray			434.51
Core Chips	Plastic Samplex Tray			435.40
Core Chips	Plastic Samplex Tray			436.28
Core Chips	Plastic Samplex Tray			437.45
Core Chips	Plastic Samplex Tray			438.51
Core Chips	Plastic Samplex Tray			439.29
Core Chips	Plastic Samplex Tray			440.50
Core Chips	Plastic Samplex Tray			441.46
Core Chips	Plastic Samplex Tray			442.51
Core Chips	Plastic Samplex Tray			443.41
Core Chips	Plastic Samplex Tray			444.60
Core Chips	Plastic Samplex Tray			445.66
Core Chips	Plastic Samplex Tray			446.56



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Core Chips	Plastic Samplex Tray		447.65
Core Chips	Plastic Samplex Tray		448.38
Core Chips	Plastic Samplex Tray		449.53
Core Chips	Plastic Samplex Tray		450.60
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Core Chips	Plastic Samplex Tray		483.45
Core Chips	Plastic Samplex Tray		484.45
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Core Chips	Plastic Samplex Tray		486.59
Core Chips	Plastic Samplex Tray		487.50
Core Chips	Plastic Samplex Tray		488.50
Core Chips	Plastic Samplex Tray		489.51



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Core Chips	Plastic Samplex Tray		490.50
Core Chips	Plastic Samplex Tray		491.63
Core Chips	Plastic Samplex Tray		492.45
Core Chips	Plastic Samplex Tray		493.58
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Core Chips	Plastic Samplex Tray		565.53



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Core Chips	Plastic Samplex Tray		645.37
Core Chips	Plastic Samplex Tray		646.57
Core Chips	Plastic Samplex Tray		647.42



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Core Chips	Plastic Samplex Tray		648.46
Core Chips	Plastic Samplex Tray		649.43
Core Chips	Plastic Samplex Tray		650.61
Core Chips	Plastic Samplex Tray		651.33
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Core Chips	Plastic Samplex Tray		688.50
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Core Chips	Plastic Samplex Tray		690.62



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Core Chips	Plastic Samplex Tray		771.49
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Core Chips	Plastic Samplex Tray			535.80
Core Chips	Plastic Samplex Tray			539.37
Core Chips	Plastic Samplex Tray			542.63
Core Chips	Plastic Samplex Tray			545.89
Core Chips	Plastic Samplex Tray			549.01
Core Chips	Plastic Samplex Tray			552.44
Core Chips	Plastic Samplex Tray			1179.5
Core Chips	Plastic Samplex Tray			1180.48
Core Chips	Plastic Samplex Tray			1181.48
Core Chips	Plastic Samplex Tray			1182.41
Core Chips	Plastic Samplex Tray			1183.56
Core Chips	Plastic Samplex Tray			1184.54
Core Chips	Plastic Samplex Tray			1185.55
Core Chips	Plastic Samplex Tray			1186.58
Core Chips	Plastic Samplex Tray			1187.48
Core Chips	Plastic Samplex Tray			1188.5
Core Chips	Plastic Samplex Tray			1189.5
Core Chips	Plastic Samplex Tray			1190.5
Core Chips	Plastic Samplex Tray			1191.5
Core Chips	Plastic Samplex Tray			1192.42
Core Chips	Plastic Samplex Tray			1,193.44
Core Chips	Plastic Samplex Tray			1,194.42
Core Chips	Plastic Samplex Tray			1,195.37



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Core Chips	Plastic Samplex Tray			1,196.54
Core Chips	Plastic Samplex Tray			1,197.59
Core Chips	Plastic Samplex Tray			1,198.54
Core Chips	Plastic Samplex Tray			1,199.56
Core Chips	Plastic Samplex Tray			1,200.44
Core Chips	Plastic Samplex Tray			1,201.55
Core Chips	Plastic Samplex Tray			1,202.36
Core Chips	Plastic Samplex Tray			1,203.54
Core Chips	Plastic Samplex Tray			1,204.55
Core Chips	Plastic Samplex Tray			1,205.47
Core Chips	Plastic Samplex Tray			1,206.52
Core Chips	Plastic Samplex Tray			1,207.60
Core Chips	Plastic Samplex Tray			1,208.53
Core Chips	Plastic Samplex Tray			1,209.53
Core Chips	Plastic Samplex Tray			1,210.55
Core Chips	Plastic Samplex Tray			1,211.56
Core Chips	Plastic Samplex Tray			1212.55
Core Chips	Plastic Samplex Tray			1213.62
Core Chips	Plastic Samplex Tray			1214.54
Core Chips	Plastic Samplex Tray			1215.5
Core Chips	Plastic Samplex Tray			1216.6
Core Chips	Plastic Samplex Tray			1217.4
Core Chips	Plastic Samplex Tray			1218.5
Core Chips	Plastic Samplex Tray			1219.43
Core Chips	Plastic Samplex Tray			1220.5
Core Chips	Plastic Samplex Tray			1221.45
Core Chips	Plastic Samplex Tray			1222.5
Core Chips	Plastic Samplex Tray			1223.49
Core Chips	Plastic Samplex Tray			1224.49
Core Chips	Plastic Samplex Tray			1225.5
Core Chips	Plastic Samplex Tray			1226.5
Core Chips	Plastic Samplex Tray			12275
Core Chips	Plastic Samplex Tray			1228.53
Core Chips	Plastic Samplex Tray			1229.5
Core Chips	Plastic Samplex Tray			1230.52
Core Chips	Plastic Samplex Tray			1231.5
Core Chips	Plastic Samplex Tray			1,232.47
Core Chips	Plastic Samplex Tray			1,233.43
Core Chips	Plastic Samplex Tray			1,234.51
Core Chips	Plastic Samplex Tray			1,235.56



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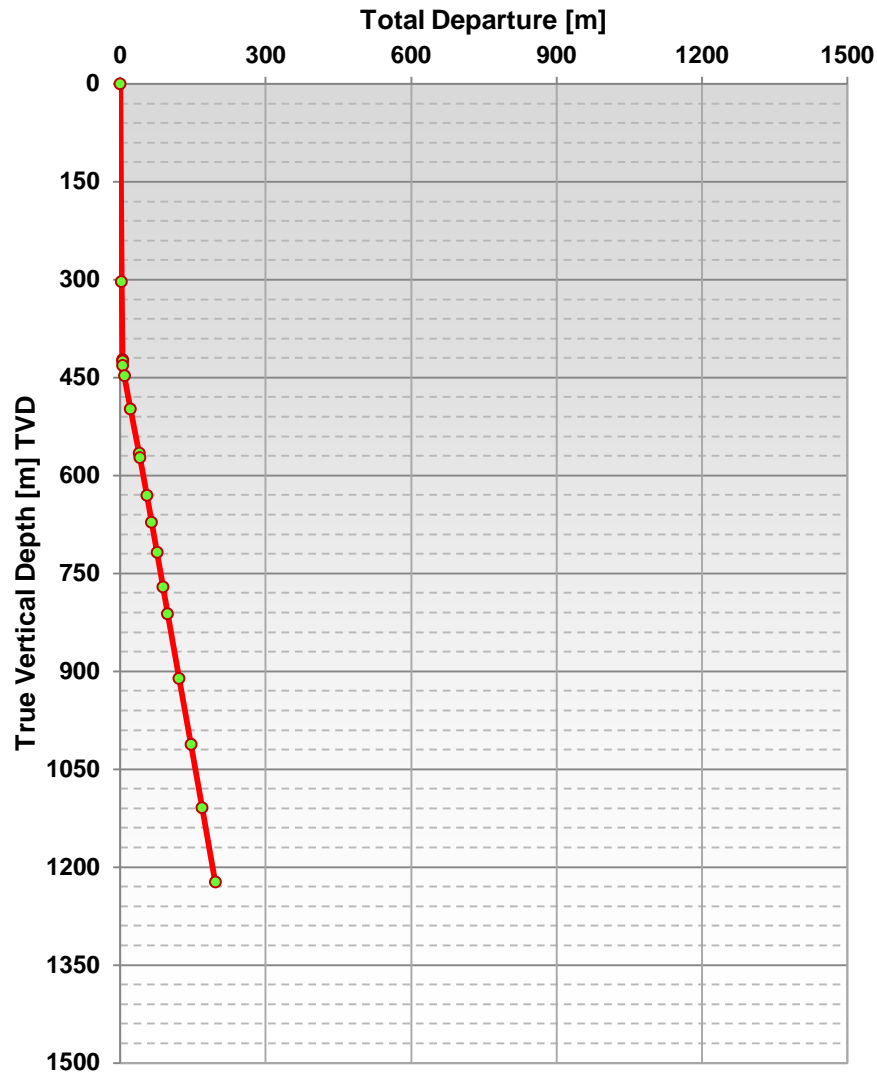
APPENDIX 2. DEVIATION SURVEY

Data obtained from the Single Shot Deviation Surveys and projected to the Total Depth (TD) using the Minimum Curvature Method.

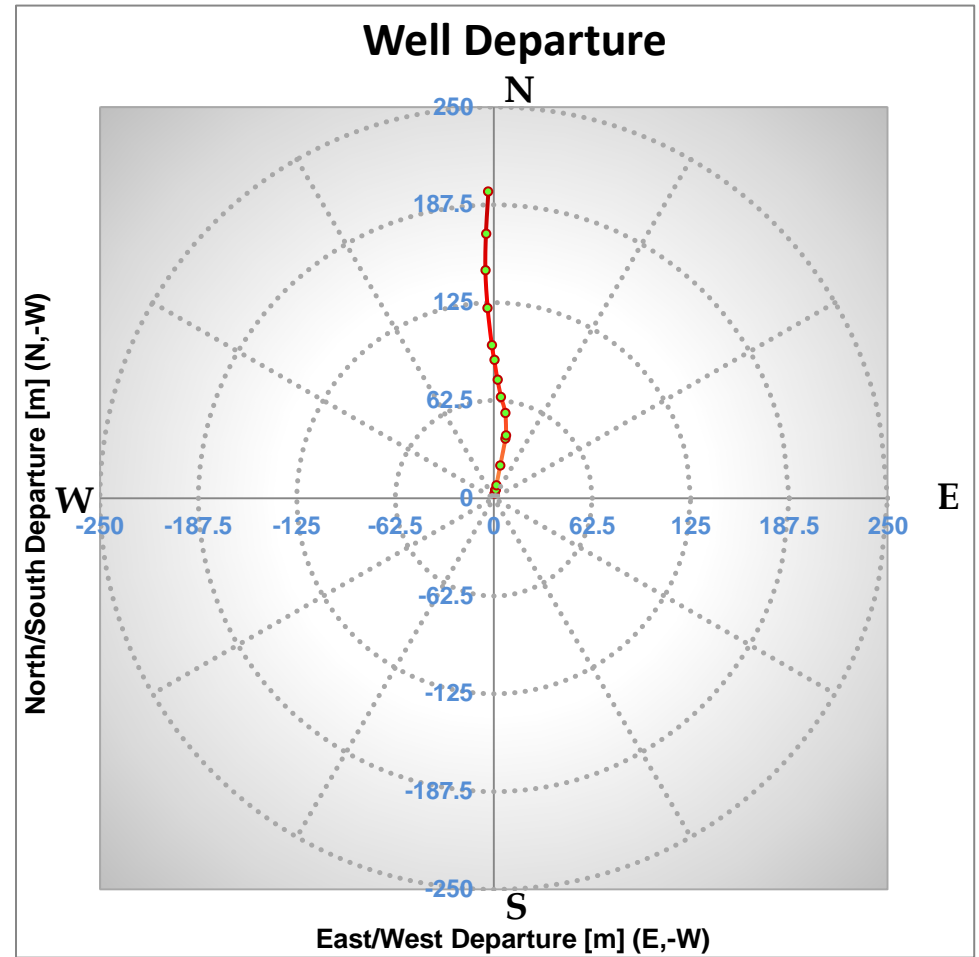
Well Trajectory Calculation from Deviation Surveys (Projection - Minimum Curvature Method)													
Survey Data				Vertical Depth Calculations			Departure Calculations						
Measured Depth	Inclination	Azimuth	Direction	Course M. Length	Course V. Depth	True Vertical Depth	Course Coordinates		Total Coordinates		Total Departure	Departure Azimuth	Departure Direction
[m] MD	[deg]	[deg]		[m]	[m]	[m] TVD	[m] (N,-S)	[m] (E,-W)	[m] (N,-S)	[m] (E,-W)	[m]	[deg]	
0.0	0.0	0.0	0	0.0	0.0	0.0	0	0	0	0	0	0.0	0
303.0	1.1	11.0	N11E	303.0	303.0	303.0	2.9	0.6	2.9	0.6	2.9	11.0	N11E
422.7	0.7	11.0	N11E	119.7	119.7	422.7	1.8	0.4	4.7	0.9	4.8	11.0	N11E
425.0	1.4	11.0	N11E	2.3	2.3	425.0	0.0	0.0	4.7	0.9	4.8	11.0	N11E
432.0	8.2	11.0	N11E	7.0	7.0	431.9	0.6	0.1	5.3	1.0	5.4	11.0	N11E
448.0	13.5	11.0	N11E	16.0	15.7	447.6	3.0	0.6	8.3	1.6	8.4	11.0	N11E
500.0	14.7	11.0	N11E	52.0	50.4	498.1	12.4	2.4	20.7	4.0	21.1	11.0	N11E
570.0	14.7	11.0	N11E	70.0	67.7	565.8	17.4	3.4	38.1	7.4	38.9	11.0	N11E
577.0	14.5	11.0	N11E	7.0	6.8	572.6	1.7	0.3	39.9	7.8	40.6	11.0	N11E
637.0	14.5	344.8	N15W	60.0	58.2	630.7	14.6	-0.5	54.5	7.2	55.0	7.5	N8E
679.2	14.1	345.4	N15W	42.2	40.9	671.6	10.1	-2.7	64.6	4.5	64.7	4.0	N4E
727.2	13.6	351.7	N8W	48.0	46.6	718.2	11.2	-2.3	75.8	2.2	75.9	1.7	N2E
781.2	13.3	349.7	N10W	54.0	52.5	770.8	12.4	-2.0	88.2	0.2	88.2	0.1	N0E
823.2	13.4	352.2	N8W	42.0	40.9	811.6	9.6	-1.5	97.8	-1.3	97.8	359.2	N1W
925.2	13.5	354.8	N5W	102.0	99.2	910.8	23.6	-2.7	121.4	-4.0	121.4	358.1	N2W
1029.0	13.6	358.5	N2W	103.8	100.9	1011.7	24.3	-1.4	145.6	-5.4	145.7	357.9	N2W
1129.0	13.3	3.3	N3E	100.0	97.3	1109.0	23.2	0.4	168.9	-5.1	168.9	358.3	N2W
1236.2	13.3	3.3	N3E	107.2	104.3	1213.3	24.6	1.4	193.5	-3.6	193.5	358.9	N1W

A Wireline Logging Deviation Survey using the Borehole Navigator Tool was performed from the hang up depth to surface. Data can be found in Enclosure 1. From this survey at the hang up depth of 910.0 m (MD) and 894.1 m (TVD) the Axial Coordinates (N/-S, E/-W) are (121.85, -16.46) from the target origin at (0, 0).

Well Deviation



Well Departure





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APPENDIX 3. BIT RECORD

MANBULLOO-S1 BIT RECORD

Bit Number	Size (in)	Make	Type	IADC Code	Serial Number	Nozzles	Depth In (m)	Depth Out (m)	Total Meters	Total Hours
1	8-1/2	HALCO	Hammer	n/a	n/a	3 x 1.25"	4.0	22.0	18.0	3.8
2	12-1/4	Smith	Tri-cone	n/a	PT3306	2 x 18, 1 x 16	4.0	22.0	18.0	6.5
3	8-1/2	HALCO	Hammer	n/a	n/a	n/a	22.0	142.6	120.6	13.8
4	8-1/2	Smith	Tri-cone	617	RA7292	3 x 18	142.6	243.3	100.7	15.5
5	6-1/8	Smith	Tri-cone	617	PX5415	3 x 16	243.3	423.3	180.0	27.5
6	HQ (3.78")	Hayden	Impreg-7	n/a	HA27483/2	n/a	422.7	532.3	109.6	32.0
7	HQ (3.78")	Hayden	KS5	n/a	HA34663/25	n/a	532.3	553.2	21.0	14.0
8	HQ (3.78")	Hardcore	Impreg 8-10	n/a	133221	n/a	553.2	1164.7	611.5	239.3
9	HQ (3.78")	Hardcore	Impreg 8-10	n/a	133220	n/a	1164.2	1236.2	72.0	37.6



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APPENDIX 4. FLUID RECORD

MANBULLOO-S1 FLUID PROPERTIES SUMMARY							
DATE	DEPTH (M)	WEIGHT (PPG)	Vis (sec)	pH	Fluid Loss (mls)	OPERATION	MUD USED
17/07/14	21.95	8.35	32	n/a	n/a	Air Drilling, WBM Drilling	Air, Pac-R, Calcium Chloride
18/07/14	82.14	n/a	n/a	n/a	n/a	Air Drilling	Air, Super Foam
19/07/14	171.09	8.35	28	n/a	n/a	Air Drilling, WBM Drilling	Air, Super Foam, Pac-R
20/07/14	243.26	8.35	27	7.5	n/a	WBM Drilling	Pac-R
23/07/14	368.48	8.4	34	10.5	20	WBM Drilling	Pac-R
24/07/14	423.26	8.4	36	10	20	WBM Drilling	Pac-R
26/07/14	473.19	8.6	34	10	16	Coring	Pac-R, KCl, Clay Doctor, Penetrol Xtra, Deep Drill 5000
27/07/14	532.97	8.5	40	9.5	16	Coring	Pac-R, KCl, Clay Doctor, Penetrol Xtra, Deep Drill 5000
28/07/14	559.22	8.55	41	9	16	Coring	Deepdrill 5000, Penetrol Xtra, Cellplug
29/07/14	589.33	8.6	39	9	12.5	Coring	Pac-R, KCl, Clay Doctor, Penetrol Xtra, Cellplug
30/07/14	643.22	8.55	38	9.5	12	Coring	Pac-R, Clay Doctor, Penetrol Xtra, Cellplug, Soda Ash
31/07/14	697.22	8.55	40	9.5	12.5	Coring	Pac-R, KCl, Penetrol Xtra, Cellplug, Soda Ash
01/08/14	757.22	8.55	39	8.5	12	Coring	Pac-R, KCl, Penetrol Xtra, Aus-plug, Clay Doctor
02/08/14	823.22	8.55	38	8.5	12.5	Coring	Pac-R, KCl, Penetrol Xtra, Soda Ash, Clay Doctor
03/08/14	883.22	8.6	39	8.5	12.0	Coring	Pac-R, KCl, Penetrol Xtra, Clay Doctor
04/08/14	937.22	8.6	39	9	12.0	Coring	Pac-R, KCl, Penetrol Xtra, Soda Ash, Clay Doctor
05/08/14	979.22	8.65	39	8.5	11.0	Coring	Pac-R, KCl, Penetrol Xtra, Soda Ash, Clay Doctor
06/08/14	1024.65	8.65	38	8.5	10.5	Coring	Pac-R, KCl, Penetrol Xtra, Fracseal, Clay Doctor
07/08/14	1037.77	8.65	38	9	10.5	Coring	Pac-R, KCl, Penetrol Xtra, Clay Doctor
08/08/14	1123.22	8.65	39	9	10.0	Coring	Pac-R, KCl, Penetrol Xtra, Soda Ash
09/08/14	1158.72	8.7	38	9	10.0	Coring	Pac-R, KCl, Penetrol Xtra, Soda Ash, Clay Doctor
10/08/14	1164.22	8.65	39	9	9.0	Coring	KCl, Pac-R
11/08/14	1180.22	8.7	39	8.5	9.0	Coring	Pac-R, KCl, Penetrol Xtra
12/08/14	1201.22	8.7	41	8.5	9.0	Coring	Pac-R, Soda Ash



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13/08/14	1235.77	8.75	39	8.5	8.5	Coring	
14/08/14	1236.22	8.75	39	8.5	8.5	Logging	