Well Completion Report
OzAlpha-1
South Georgina Basin
Northern Territory, Australia

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Statoil

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Document: Well Completion Report

Well: OzAlpha-1 Date: 20 July 2014

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Table of contents

1 General Data

1.1 Well Objective

The OzAlpha-1 exploration well was drilled to de-risk the unconventional play in the middle Cambrian Arthur Creek Hot Shale and Thorntonia Limestone (dolomitized) in the southern part of EP 104. Permeabilities were expected to be so low that the formations would have to be stimulated through hydraulic fracturing in order to produce any hydrocarbons. No commercial production rates were possible with the chosen well design; the aim being to prove movable hydrocarbons, obtain samples of the hydrocarbons and to derive enough data to optimize future well designs and completion strategies.

The objectives of exploration well OzAlpha -1 were to utilise a two casing string design, where the upper section was designed to be cased and cemented to surface to isolate the aquifers, achieve kick tolerance and maintain well integrity towards underlying potential hydrocarbon bearing zones. 12 ¼" hole was to be drilled and 9 5/8" surface casing run and cemented. The lower 7 7/8" hole section was designed to obtain continuous core through the target basal Arthur Creek Hot Shale and underlying Thorntonia Limestone at an undisturbed location to assess presence of hydrocarbons. Wireline logging was part of the objective in order to evaluate the hydrocarbon potential. The final objective of the drilling phase was to run and cement 4 1'2" production casing from TD to surface, providing isolation for the hydraulic stimulation and testing planned in the next phase of operations.

1.2 Well results

12 ¼" hole was drilled to 507.5 m MD RKB and 9 5/8" surface casing run to 507 m MD RKB and cemented to surface. Hence the aquifers were isolated and kick tolerance and well integrity were achieved with a leak-off at 11.4 ppg EMW. 7 $^{7}/_{8}$" production hole was then drilled to the coring point at 926 m MD RKB. 3.5" wireline retrieved coring was conducted using 9m core barrels. 100% recovery was achieved through the lower Arthur Creek Formation and the Arthur Creek Hot Shale. The coring of the Thorntonia Limestone was more challenging, with broken core packing off the core barrels, resulting in 0.5 m to 2 m of recovered core per run. In an attaempt to pass the broken up zone, 12.8 m of the Thorntonia was rotary drilled with a drill bit insert in the coring BHA. Hence, no core was obtained from the middle parts of Thorntonia. Oring resumed through the lower portion of the Thorntonia and continued 17 m into granite basement where TD was called at 1250 m MD RKB. The formation tops were encountered within the uncertainties of the prognos depths. Red Heart Dolomite was penetrated instead of the prognosed Sun Hill Arkose. Wireline logging was conducted and the production casing was run and cemented to surface to provide isolation for the hydraulic stimulation planned in the completions phase.

Because the OzAlpha-1 play consists of very low permeable rocks, only minor hydrocarbon indications were observed during drilling. Very low gas while drilling measurements were recorded (~1%) and visible signs of hydrocarbons and shows were few and scattered. The petrophysical analysis indicates potential zones of interest in the lower parts of the Arthur Creek Hot Shale and in parts of the Thorntonia Limestone. Recoverable hydrocarbons can only be proved when the well is hydraulically stimulated and tested in the next phase of operations.

OzAlpha-1 was temporarily suspended awaiting further operations; stimulation and production testing for potential hydrocarbon production.

1.3 Well Summary Table

WELL SUMMARY			
	WELL NAME	OzAlpha-1	
	OFFSET WELLS	Owen-2, Owen 3, Hacking 1	
	WELL CLASS	Exploration	
LOCATION DETAILS			
BASIN	Southern Georgina Basin	NORTHING	768840 mN
LICENCE	EP 104	EASTING	7518300 mE
LOCATION	Northern Territory	ZONE	53 S
SEISMIC SURVEY	GBE-10-18	LATITUDE	22° 25' 13.49 S
SEISMIC REF.	Trace 3012 / / CDP 2112 / SP 250292	LONGITUDE	137° 36 '41.89 E
ELEVATIONS	189 mAHD (GL), 193.2 mAHD (KB), 4.2 m (KB)	GRID	GDA'94
OPERATION DETAILS			
OPERATOR	Statoil Australia Theta B. V.	DRILLING RIG /	EDA Rig # 2
PRIMARY OBJECTIVE	Arthur Creek Formation 'Hot Shale' and Thorntonia Limestone	SPUD DATE	01/04/2014
STRUCTURE	Unconventional Stratigraphic	RIG RELEASE	22/04/2014
WELL TYPE	Vertical	TD DATE OzAlpha-1	19/04/2014
DRILLER TD OzAlpha-1	1250.3 m MD	OPERATION DAYS	19

HOLE SUMMARY OzAlpha-1				
HOLE SIZE	**HOLE DEPTH**	**CASING SIZE**	**SHOE DEPTH**	**CASING TYPE**
17 ½" (445mm)	7.7 mMD	14"	6.7 mMD	Conductor
12 ¼" (316mm)	507.0 mMD	9 5/8" (244mm)	507.5 mMD	36 ppf J-55 BTC
7 7/8" (200mm)	1250.3 mMD	4 ½"	1240 mMD	13.5 ppf L-80 Tenaris Blue

FORMATION TOPS OzAlpha-1					
AGE	**FORMATION**	**MDKB (m)**	**TVDKB (m)**	**TVDSS (m)**	**TVT (m)**
Late Cambrian	Ninmaroo Formation	4.2	5.1	-189	
	Arrinthrunga Formation	267	262.8	74	
Mid Cambrian	Upper Arthur Creek Formation / Steamboat Sandstone	728	723.8	535	400
	Base Steamboat Sandstone	775	770.8	582	
	Lower Arthur Creek Formation	963	958.8	770	
	Arthur Creek Formation Hot Shale	1137	1132.8	944	
	Thorntonia Formation	1159.5	1155.3	966.5	578
	Red Heart Dolomite	1225	1220.8	1032	
	Basement	1233	1228.8	1040	
	Total Depth	1250	1245.8	1057	

MWD-LWD & LOGGING SUMMARY OzAlpha-1				
RUN	**IN (mMD)**	**OUT (mMD)**	**TOOLS STRING**	**REMARKS**
1	1250 507.0	507.0 Surface	MCG-SGS-MDN-MPD-MLE-MMR MCG only	Wireline Run 1: Max. BHT 49° at 1250mMD.
2	1250	1040	MCG-CMI (image log)-DXD (sonic)	Wireline Run 2. Image log run separately
3	1250	480	MCG-CMI (image log)-DXD (sonic)	Wireline Run 3. RIH to TD and run sonic to csg shoe

CORING: OzAlpha-1			
RUN	**INTERVAL (mMDKB)**	**RECOVERY m (%)**	**COMMENT**
1-23	1040 – 1175.5	100%	Wireline retrieved coring
24 -30	1188 – 1249.9	100%	Started wireline coring again after 11.5 m of drilling with insert bit

FORMATION TESTS	Will be covered in Final Completion Report for Stimulation and Testing Operations

The well is located in the Southeastern part of the Southern Georgina Basin; see the map on the next page.

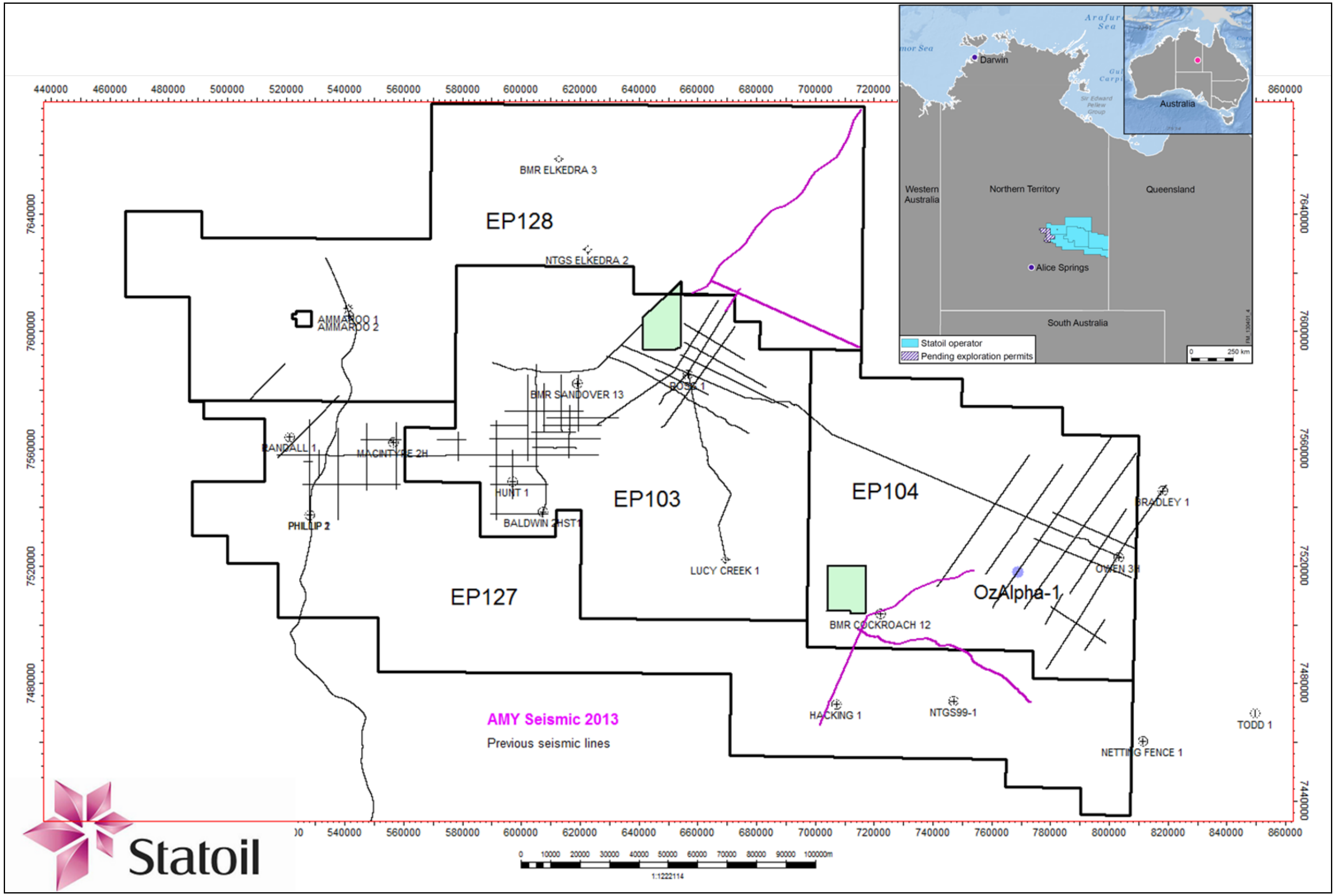


Figure 1-1 Map of the Statoil licences are and position of the OzAlpha-1 well location in EP104

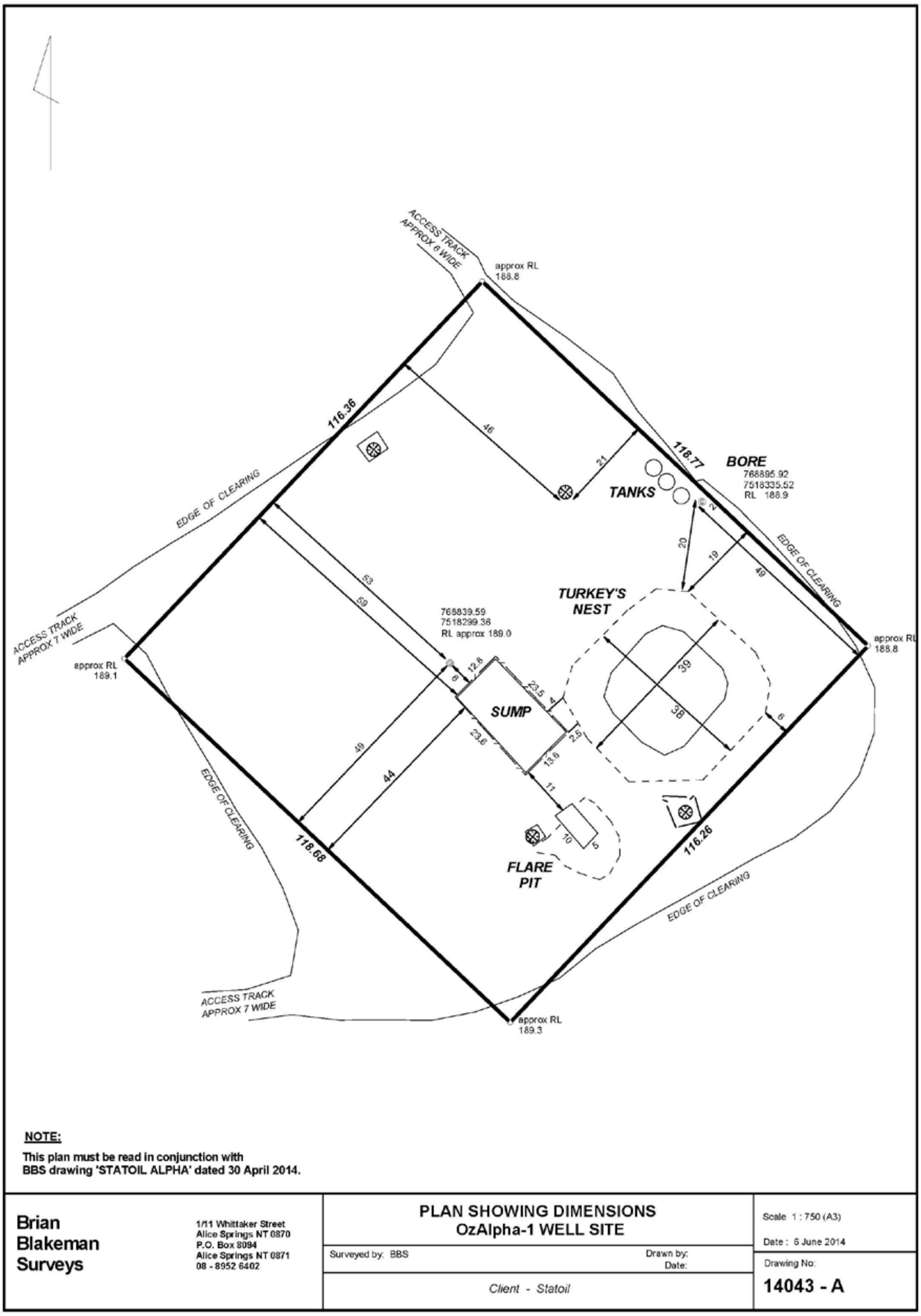


Figure 1-2 Survey certificate

2 Drilling

All depths in this report are measured depths related to kelly bushing height (4.2 m MD KB), if not otherwise stated.

2.1 Drilling Summary

OzAlpha-1 was spudded April 1st 2014 and took a total of 20 days to complete drilling, logging and cementing. The well was temporarily suspended awaiting stimulation and testing operations.

Very hard suface rock resulted in the 14" conductor being preset at 6.7 m depth m only 2.5 meters below ground level.

12 ¼" hole was drilled from 7.7 m to 507.5 m. Due to the shallow set conductor, the cellar washed out around the conductor. LCM was pumped and the washout was reduced. At 224 m a bit trip was performed to open up bit nozzles and improve hydraulics. ROP then increased and section TD was reached in the Arrinthrunga Formation. During the drilling of the surface hole the mud weight increased due to large amounts of rock flour in the mud as the mud pit was a too small for settling out the cuttings. The increased mud weight resulted in partial lost circulation through the entire section, but was hard to quantify due to the washout under the conductor and the mud pit situation. During flow checking at section TD, the losses were estimated to 20 bph static. A lost circulation (LCM) pill was spotted and losses reduced to 10 bhp before tripping out of the hole.

9 5/8" casing was run to 507 m and cemented to surface. Difficulties were encountered installing the wellhead, resulting in 16.75 hours of non-productive time, mainly caused by over 14 hours waiting on a welder to weld on the well head.

The FIT at the surface casing shoe leaked off at 11.4 ppg, still within kick tolerance for the production hole.

7 $^7/_8$" production hole was drilled to 926 m. It was decided to trip early to pick up the CorPro wireline retrieved coring system. Drilling continued to the pre-determined core point at 1040 m utilising the coring assembly with a drill bit insert. The drill bit insert was recovered after trying for 7 hours to retrieve with wireline. Coring commenced and 9 m lengths were cored on each coring run. The core recovery was 100% in the lower Arthur Creek Formation and the Arthur Creek Hot Shale. After encountering the Thorntonia Limestone the coring runs became very short; 1-2 m, due to brittle rock, interconnected vugs or weak zones in the formation that caused the coring barrel to pack off and unseat the inner core barrel. After numerous short core runs, 12.8 m was drilled with the insert bit in order to pass the zone of brittleness. Coring was resumed at 1189.3 m MD KB until TD 17 m into the granite basement. The well was flow checked prior to pulling out and static losses were recorded at 2.4 bph.

Wireline logging was performed with two logging strings in 3 runs.

4 ½" Blue Tenaris casing was run to 1240 m MD KB and cemented to surface. Casing slips were installed and seated, the BOP was nippled down, the well head adapter was installed and nippled up and the seals were pressure tested.

The well was temporarily suspended and the rig was released April 21st 2014.

A time overview for the OzAlpha-1 activities can be seen in Table 2-1.

Table 2-1 Summary of operations for OzAlpha-1

Section	Start time	End time	Rig name
AU OZALPHA-1 Move-In, Rig Up	01.Apr.2014 00:00	01.Apr.2014 16:00	EDA 2
AU OZALPHA-1 Drilling, Surface	01.Apr.2014 16:00	05.Apr.2014 08:00	EDA 2
AU OZALPHA-1 Casing, Surface	05.Apr.2014 08:00	08.Apr.2014 16:00	EDA 2
AU OZALPHA-1 Drilling, Production	08.Apr.2014 16:00	19.Apr.2014 15:30	EDA 2
AU OZALPHA-1 Formation evaluation, Production	19.Apr.2014 15:30	20.Apr.2014 04:30	EDA 2
AU OZALPHA-1 Casing, Production	20.Apr.2014 04:30	21.Apr.2014 03:30	EDA 2
AU OZALPHA-1 Rig Down	21.Apr.2014 03:30	21.Apr.2014 17:30	EDA 2

2.1.1 Non productive time summary

A summary of the non productive time for OzAlpha-1 drilling operation can be seen in the table below.

Table 2-2 Summary of the non productive time for OzAlpha-1

Hours	Depth	Description	Company
1	76	Cellar washed	Statoil
8	224	POOH to open up bit nozzles due to hydraulic limits	Statoil
2	251	Replaced 1 liner and 2 piston swabs in pump	EDA
0.5	507	Changed seal rings on cementing head manifold	Halliburton
14.25	507	Wait on welder	Statoil
2	507	Casing pressure gauge not installed on wellhead	EDA
7	1040	Unable to retrieve drilling insert in core assembly	Corpro
1.25	1085	Replaced radiator belt on wireline unit	Corpro
5	1176	Problems seating drilling insert in core assembly	Corpro
6.5	1208	Leak at test plug seal when testing blind rams	Statoil

2.1.2 Time versus Depth Curve

The time versus depth illustration with explanatory remarks can be seen in the figure below.

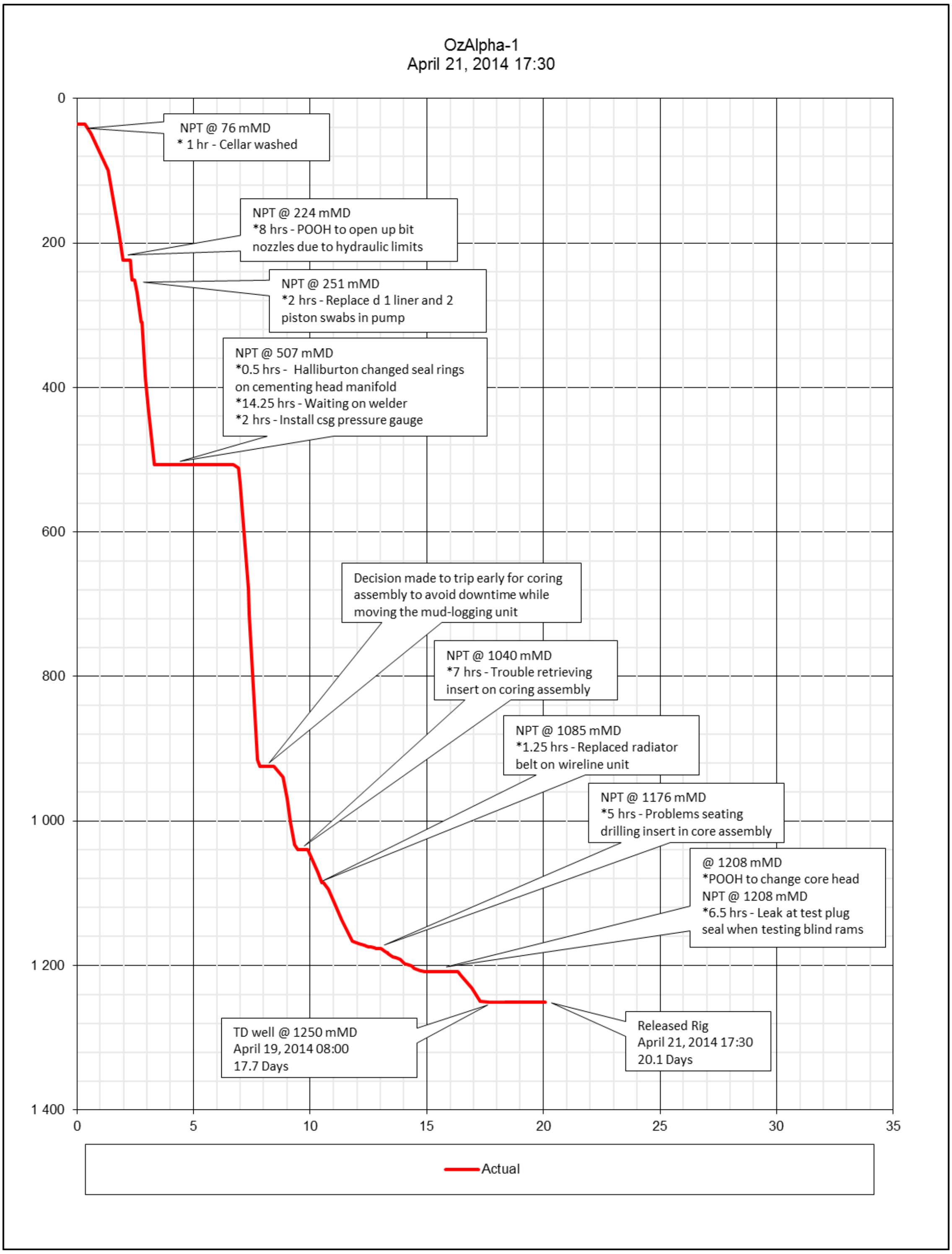


Figure 2-1 Time versus depth curve for OzAlpha-1

2.2 Casings

The overview of the run casings in OzAlpha-1 is presented in the table below.

Table 2-3 Casing summary for OzAlpha-1

Hole Size	Depth m MD KB	Casing Diameter	Casing Depth m MD KB	Type	Test FIT/LOT	Test Date	Test Result (ppg)	Test Depth m MD KB
17 1/2"	7.7	14"	6.7	Conductor				
12 1/4"	507.5	9 5/8"	505	36 ppf J-55 BTC	LOT	08.04.2014	11.4	511
7 7/8"	1250.3	4 1/2"	1240	13.5 ppf L-80 Tenaris Blue				

2.3 Well Path - Directional Data

The well inclination was monitored with single shot surveys. App A for inclination measured from the single shot surveys and the verticality analysis from the dipole sonic run showing that the well was turning towards an azimuth of 149 deg.

2.4 BHA Records

All the bottom hole assemblies utilized in the OzAlpha-1 can be viewed on the next pages.

BHA NO: 1 **RUN TYPE:** Drilling run **DESCRIPTION:** BHA #1 – Surface **RUN NAME:** 1

String component	OD in	ID in	Length m	Acc length m
BIT	12,250	2,750	0,32	0,32
BIT SUB	8,000	2,000	0,92	1,24
SHOCK SUB	8,125	2,313	2,92	4,16
DRILL COLLAR	8,000	3,000	9,05	13,21
STABILIZER	12,250	2,625	1,47	14,68
DRILL COLLAR	8,000	3,000	9,05	23,73
X-OVER	8,000	2,875	0,25	23,98
X-OVER	7,000	2,313	0,37	24,35
DRILL COLLAR	6,250	2,250	92,51	116,86
HW DRILL PIPE	6,375	2,870	57,29	174,15
X-OVER	7,500	2,500	0,88	175,03

BHA NO: 2 **RUN TYPE:** Drilling run **DESCRIPTION:** BHA #2 - Surface (same bit as BHA #1) **RUN NAME:** 2

String component	OD in	ID in	Length m	Acc length m
BIT	12,250	2,750	0,33	0,33
BIT SUB	8,000	2,000	0,92	1,25
SHOCK SUB	8,125	2,313	2,92	4,17
DRILL COLLAR	8,000	3,000	9,05	13,22
STABILIZER	12,250	2,625	1,47	14,69
DRILL COLLAR	8,000	3,000	9,05	23,74
X-OVER	8,000	2,875	0,25	23,99
X-OVER	7,000	2,313	0,37	24,36
DRILL COLLAR	6,250	2,250	92,51	116,87
HW DRILL PIPE	6,375	2,870	57,29	174,16
X-OVER	7,500	2,500	0,88	175,04

BHA NO: 3 **RUN TYPE:** Drilling run **DESCRIPTION:** BHA #3 – Production **RUN NAME:** 3

String component	OD in	ID in	Length m	Acc length m
BIT	7,875	2,250	0,26	0,26
MUD MOTOR	6,750	1,500	8,16	8,42
DRILL COLLAR	6,250	2,250	9,38	17,80
STABILIZER	6,250	2,750	1,71	19,51
DRILL COLLAR	6,250	2,250	92,73	112,24
JAR	6,250	2,870	9,07	121,31
X-OVER	6,250	2,870	0,80	122,11

BHA NO: 4 **RUN TYPE:** Drilling run **DESCRIPTION:** BHA #4 - Core Assembly #1 **RUN NAME:** 4

String component	OD in	ID in	Length m	Acc length m
BIT	7,875	3,500	0,46	0,46
CORE BARREL	6,500	4,600	8,25	8,71
STABILIZER	6,500	4,600	0,91	9,62
CORE BARREL	6,500	4,600	8,24	17,86
STABILIZER	6,500	4,600	0,91	18,77
COREBARREL	6,250	4,600	0,74	19,51
COREBARREL	6,250	4,600	0,74	20,25
DRILL COLLAR	6,250	4,600	94,09	114,34

BHA NO: 5 **RUN TYPE:** Drilling run **DESCRIPTION:** BHA #5 - Core Assembly #2 **RUN NAME:** 5

String component	OD in	ID in	Length m	Acc length m
BIT	7,875		0,46	0,46
CORE BARREL	6,500	4,600	8,25	8,71
STABILIZER	6,500	4,600	0,91	9,62
CORE BARREL	6,500	4,600	8,24	17,86
STABILIZER	6,500	4,600	0,91	18,77
COREBARREL	6,250	4,600	0,74	19,51
COREBARREL	6,250	4,600	0,74	20,25
DRILL COLLAR	6,250	4,600	94,09	114,34

2.5 Cementing Summary

Cementing of the 9 $^5/_8$" surface casing:

Operation summary: Pumped 5.4 bbl (total 18.3 bbl) water. Pressure tested surface lines 600/247 psi. Pumped 9.9 bbl (total 28.2 bbl) spacer. Dropped bottom plug, pumped 1.8 (total 30 bbl) spacer. Mixed and pumped 149.4 bbl x 13.5 ppg cement slurry @ 3.5/6.5 bpm. Dropped top plug and displaced cement with 123.5 bbl of mud @6/2 bpm. Cement was displaced by 123.5 bbl drilling fluid. Bumped with 360 psi. Pressured casing to 860 psi. Held static for 5 min. Bled back 0.75 bbl and confirmed static. Total of 51.5 bbl cement circulated to surface. Good returns throught the cement job.

Table 2-4 Cementing summary for OzAlpha-1 surface casing

OzAlpha-1, Casing size: 9 $^5/_8$"						
Fluids pumped	**Type**	**Density (ppg)**	**Volume (bbl)**	**Pump Rate (gal/min)**	**Pump Pressure (psi)**	**Return**
Preflush	Fresh Water	8,40	30,0	8		Full
Tail	Blended Cement	13,50	149,4	7		Full
Displacement	Drilling Mud	9,20	123,5	6	350	Full

Cementing of the 4 ½" production casing:

Operation summary: Pumped 5 bbl of 8.3 ppg fresh water spacer, Pressure test surface lines 250/3000 psi, pump 25 bbl water spacer behind, Drop bottom plug, Mixed and pumped 185.1 bbl (413 sx) x 11.9 ppg Lead cement slurry, 5 bbl/min. Mixed and pumped 47 bbl (198 sx) x 14.8 ppg Tail cement slurry, 2/4 bbl/min. Full returns observed. Dropped top plug. Displaced cement with 60.3 bbl of freshwater/biocide, @ 4.2 bbl/min for 45 bbls, Water spacer identified after 18.2 bbl of displacement, Cement traces identified after 41.4bbl of displacement, good quality cmt identified from 42.7 bbl, with 17.6 bbls good quality returned to surface, reduced rate to 1.5 bbl/min from 50 bbls, reduced to 0.5 bbl/min from 60 bbl w/final circ pressure of 1267 psi, Pressure tested casing to 2000 psi x 10 minutes. Good test. Bleed off 0.5 bbl and confirm floats holding.

Table 2-5 Cementing summary for OzAlpha-1 production casing

OzAlpha-1, Casing size 4 ½"						
Fluids pumped	**Type**	**Density (ppg)**	**Volume (bbl)**	**Pump Rate (gal/min)**	**Pump Pressure (Psi)**	**Return**
Spacer before	Fresh Water	8,33	30,0	5	60	Full
Lead	Cement Slurry	11,90	185,0	5	350	Full
Tail	Cement Slurry	14,80	47,0	3	317	Full
Displacement	Fresh Water	8,30	60,0	1	1267	Full

2.6 Bit Records

OzAlpha-1 bit records can be seen in the tables below.

Tables 2-6 Bit records for OzAlpha-1 bit runs

Run no	Bit size	Bit no	BHA no	Bit type	IADC code	Bit manufacturer
1	12 1/4"	1	1	TD507X		Baker Hughes
2	12 1/4"	1	2	TD507X		Baker Hughes
3	7 7/8"	2	3	DSH616M-T1		NOV
4	7 7/8"	3	4	DC613Q		Corpro
5	7 7/8"	4	5	DC813Q		Corpro

					Nozzles (n/32")				
Run no	Bit size	Bit no	BHA no	Serial no	no x n	no x n	no x n	no x n	Flow area in2
1	12 1/4"	1	1	7149857	7 x 12	x	x	x	0.7740
2	12 1/4"	1	2	7149857	7 x 20	x	x	x	2.1480
3	7 7/8"	2	3	A154444	6 x 18	x	x	x	1.4920
4	7 7/8"	3	4	1520	6 x 12	x	x	x	0.6140
5	7 7/8"	4	5	1528	8 x 10	x	x	x	0.6140

Run no	Bit size	Pump rate gal/min	Pump press psi	Depth in mMD	Depth out mMD	Form drld m	Total drld m	Drld hrs	Circ hrs	ROP m/hr
1	12 1/4"	242.3	450.0	7.70	224.20	216.50	208.80	44.5	2.5	4.9
2	12 1/4"	725.0	1023.0	224.20	507.50	283.30	283.30	21.5	3.5	13.2
3	7 7/8"	550.0	1450.0	507.50	924.60	417.10	417.10	9.5	11.5	43.9
4	7 7/8"	332.7	440.8	924.60	1208.20	283.60	283.60	131.5	18.8	2.2
5	7 7/8"	331.0	900.0	1208.20	1250.30	42.10	41.70	12.8	0	3.3

Run no	Bit size	I	O	DC	L	B	G	OC	RP
1	12 1/4"	1	2	CT	S	X	I	NO	PP

Run no	Bit size	I	O	DC	L	B	G	OC	RP
2	12 1/4"	2	2	BT	S	X	0	CT	TD
3	7 7/8"	0	1	WT	G	X	I	NO	CP
4	7 7/8"	5	1	LT	N	X	I	BT	PR
5	7 7/8"	8	2	LT	N	X	I	CT	TD

2.7 Drilling Fluids

The OzAlpha-1 well was drilled with water based mud. The water was supplied from the No. 5 bore from April 1st to April 10th. From this date, the water source filling the turkeys nest was from the Alpha water bore on the OzAlpha-1 well site location. The end of well report from the drilling fluids company can be seen in App F. A short summary is given in the table below:

Table 2-7 Drilling fluids summary

Hole Section	Fluid Type	Mud Weight (ppg)	Viscosity (sec/qt)	PV (cp)	YP (lb/100 ft^2)	Fluid Loss (ml/30 min)	pH
Surface	Spud Mud	8.7-10.2	27-68	2-13	3-28	20	8.0 – 9.0
Production	LSND	8.5-9.0	35-36	10-12	15 - 20	15	9.0 – 9.5

3 Formation Evaluation

The overall objective is to remove uncertainties associated with the parameters required to make a proper evaluation of the potential for the presence of unconventional hydrocarbons and their mobility.

See Figure 3-1 for an overview of the data acquisition program.

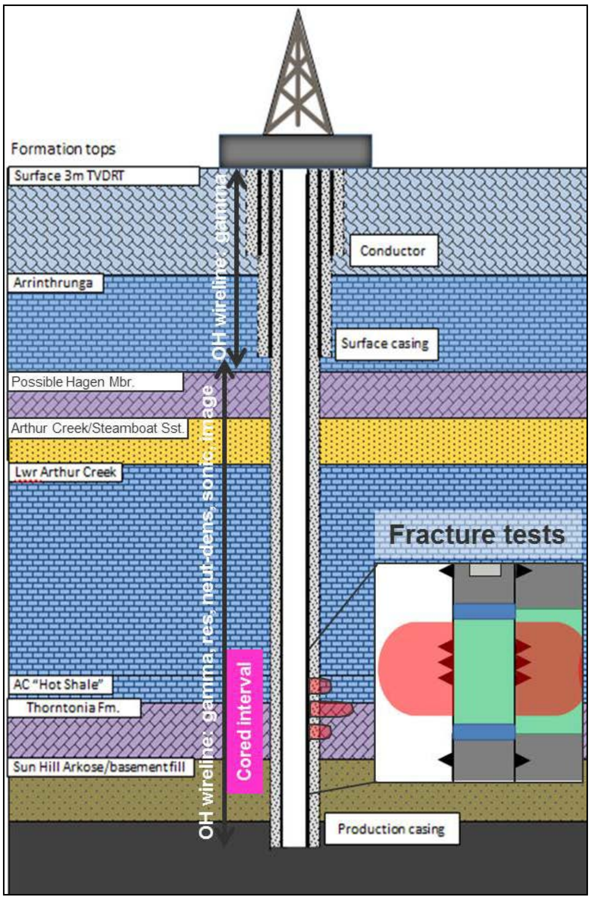


Figure 3-1 Summary of the data acquisition program from OzAlpha-1

3.1 Cuttings, biostratigraphy and mud samples

Cuttings samples were collected at 10m intervals from surface to the 9-5/8" casing shoe and at 5m and 10m intervals depending on ROP from the surface casing shoe to core point and from cessation of coring to TD. The detailed cuttings description can be seen in App I.

No biostratigraphy interpretation was performed on OzAlpha-1.

Mud samples were taken at TD of the well prior to running in with openhole wireline logs.

3.2 Coring

The coring intervals planned were aimed to cover the Lower Arthur Creek Hot Shale and the Thornonia Limestone. No logging while drilling (LWD) was performed because there are insufficient formation markers above the target intervals, and coring was commenced on a pre-defined depth. For OzAlpha-1 the selected core point was 100 m above the prognosed top Arthur Creek Hot Shale to allow for variances in seismic depth conversion. As the play targeted is an unconventional play, core material from the zones bounding the target interval is also important for rock mechanical testing. The bounding zones in an unconventional play will be the intervals that restrict the hydraulically stimulated fractures growing in height.

Because up to 230 m of coring was planned, a wireline retrieved coring system was utilized. Coring commenced at the set depth of 1040 m MD and 9 m intervals of 3.5" core were retrieved by wireline through the the lower portion of the Arthur Creek, the Hot Shale and the top Thorntonia Limestone.

The upper meters of the Thorntonian Limestone were very difficult to core because of vugginess and fracturing. The core barrel repeatedly packed off after 0.5 – 2 m of coring. 10 core runs averaged only 1 m each, and the cores retrieved were 2 - 10 cm discs and gravel sized pieces. After 15 meters of Thorntonia and 8 unsuccessful core runs, 12.8 meters were drilled with the insert bit in place in order to pass the weak zone and enter a more homogeneous interval. An additional 4 runs were then performed with the same coring bit, before the decision was made to pull out of hole and suspend coring due to very low rate of penetration, (0.5 – 1 m/hrs).

An 18 m core barrel was run for the new coring assembly and the new coring bit achieved better coring rates (3-10 m/hrs). Basement was seen at 1233 m MD, in a coring run that retrieved core down to 1249.9 m. The drill bit insert was run, but due to very low rate of penetration, TD was declared at 1250 m.

20 – 30 cm long preserved samples were taken every 9m above the Arthur Creek Hot Shale, and every 4.5 m in the Arthur Creek Hot Shale and in the Thorntonia, where core competency was sufficient to enable collection of a suitable sample. As the preserved samples had to be chosen prior to receiving any logs or interpretation of potential target zones, not all preserved samples were analyzed for core analyses.

The list of cored intervals and the samples preserved for core analyses are presented in Table 3-1. A full core description can be seen in App H.

183.2 m of the 197.5 m of available core were slabbed and photographed in both normal- and fluorescence light. The slabbed and photographed intervals are: 1040.0-1175.3 m and 1188.1-1236m. The bottom 14.m of core was not slabbed because it was all basement granite.

The core depths were tied to the wireline log depths by recording core Gamma Ray over 2 intervals and correlating with the wireline log High Resoltion GR data. The core was found to be 0.89m deep to wireline log depth.

Table 3-1 Coring summary for OzAlpha-1

Core nr	Bit no	Formation	Interval from MD [m]	Interval to MD [m]	Recovery [m]	Recovery %	Barrel length [m]	Barrel utilization %	Barrel type	Core company	Preserv. method	Preserved Samples* (m)
1	4	Lwr Arthur Crk	1040.0	1049.0	8.94	99,30	9,00	99,30	Aluminium	Corepro	Mylar	
2	4	Lwr Arthur Crk	1049.0	1057.0	9.14	114,30	9,00	101,60	Aluminium	Corepro	Mylar	1056.69 - 1056.91
3	4	Lwr Arthur Crk	1057.0	1067.0	9.05	90,50	9,00	100,60	Aluminium	Corepro	Mylar	
4	4	Lwr Arthur Crk	1067.0	1076.0	8.94	99,30	9,00	99,30	Aluminium	Corepro	Mylar	1075.30 - 1075.60
4	4	Lwr Arthur Crk	1067.0	1076.0	8.94	99,30	9,00	99,30	Aluminium	Corepro	Mylar	
5	4	Lwr Arthur Crk	1076.0	1085.0	9.00	100	9,00	100	Aluminium	Corepro	Mylar	1084.40 - 1084.68
6	4	Lwr Arthur Crk	1085.0	1094.0	8.94	99,30	9,00	99,30	Aluminium	Corepro	Mylar	1093.44 - 1093.69
7	4	Lwr Arthur Crk	1094.0	1103.0	9.00	100	9,00	100	Aluminium	Corepro	Mylar	1102.42 - 1102.61
8	4	Lwr Arthur Crk	1103.0	1112.0	8.90	98,90	9,00	98,90	Aluminium	Corepro	Mylar	1109.49 - 1109.69
9	4	Lwr Arthur Crk	1112.0	1121.0	9.10	101,10	9,00	101,10	Aluminium	Corepro	Mylar	1118.66 - 1118.92
10	4	Lwr Arthur Crk	1121.0	1130.0	8.98	99,80	9,00	99,80	Aluminium	Corepro	Mylar	1129.38 - 1129.63
11	4	Lwr Arthur Crk	1130.0	1139.0	9.00	100	9,00	100	Aluminium	Corepro	Mylar	1137.57 - 1137.80
12	4	Lwr Arthur Crk	1139.0	1148.0	9.00	100	9,00	100	Aluminium	Corepro	Mylar	1140.48 - 1140.75
13	4	Arthur Crk Hot Shale	1148.0	1157.0	8.93	99,20	9,00	99,20	Aluminium	Corepro	Mylar	1149.61 - 1149.82 1155.07 - 1155.42
14	4	Arthur Crk Hot Shale	1157.0	1166.0	9.00	100	9,00	100	Aluminium	Corepro	Mylar	1159.30 - 1159.53 1161.45 - 1161.64 1165.40 - 1165.73
15	4	Thorntonia	1166.0	1166.8	0.80	100	9,00	8,90	Aluminium	Corepro	None	No preserved samples
16	4	Thorntonia	1166.8	1169.0	2.20	100	9,00	24,40	Aluminium	Corepro	None	No preserved samples
17	4	Thorntonia	1169.0	1169.5	0.50	100	9,00	5,60	Aluminium	Corepro	None	No preserved samples
18	4	Thorntonia	1169.5	1170.4	0.90	100	9,00	10,00	Aluminium	Corepro	None	No preserved samples

Core nr	Bit no	Formation	Interval from MD [m]	Interval to MD [m]	Recovery [m]	Recovery %	Barrel length [m]	Barrel utilization %	Barrel type	Core company	Preserv. method	Preserved Samples* (m)
19	4	Thorntonia	1170.4	1171.5	1.10	100	9,00	12,20	Aluminium	Corepro	None	No preserved samples
20	4	Thorntonia	1171.5	1173.0	1.50	100	9,00	16,70	Aluminium	Corepro	None	No preserved samples
21	4	Thorntonia	1173.0	1173.8	0.80	100	9,00	8,90	Aluminium	Corepro	None	No preserved samples
22	4	Thorntonia	1173.8	1174.9	1.10	100	9,00	12,20	Aluminium	Corepro	None	No preserved samples
23	4	Thorntonia	1174.9	1175.9	0.50	45	9,00	5,00	Aluminium	Corepro	None	No preserved samples
24	4	Thorntonia	1188.0	1189.2	1.2	100,0	9,0	13,3	Aluminium	Corepro	None	No preserved samples
25	4	Thorntonia	1189.2	1198.2	8.8	97,2	9,0	97,2	Aluminium	Corepro	Mylar	1192.62 – 1192.90 1197.7 - 1197.95
26	4	Thorntonia	1198.2	1207.2	8.8	98,0	9,0	98,0	Aluminium	Corepro	Mylar	1201.38 - 1201.74 1206.37 - 1206.73
27	4	Thorntonia	1207.2	1208.2	1.1	110,0	9,0	12,2	Aluminium	Corepro	None	No preserved samples
28	5	Thorntonia	1208.5	1213.9	5.2	99	18	28,9	Aluminium	Corepro	Mylar	1211.83 – 1212.05
29	5	Thorntonia	1213.9	1231.9	18.3	101.7	18	101.7	Aluminium	Corepro	Mylar	1216.21-1216.44 1222.41-1222.74 1230.18-1230.42
30	5	Thorntonia/basement	1231.9	1249.9	17.6	97.8	18	97.8	Aluminium	Corepro	Mylar	1248.43 – 1248.73

*Some preserved samples may be shifted 1-10 cm in this report compared to the slabbed core photographs as the cores were re-stacked in core trays after slabbing.

3.3 Wireline logging

Openhole logging was carried out to provide information on lithology, rock properties (por/perm), fluid content, parameters to develop stress models, selection of stress test depths and perforation intervals, and imaging of stress directions (breakouts, drilling induced fractures) and natural fracturing.

Lithology and fluid identification tools:

- Spectral-GR
- High Resolution Resistivity
- Density
- Neutron

These logs will provide measurements for clay volume estimation, porosity and saturation calculation and identifying the TOC level (SGR).

The following logs will provide input for stress modelling, stress direction and for the seismic tie/calibration:

- Multiple P&S (waveforms) sonic tool
- Image Scanning Tool combined with Multi-arm caliper for bore hole ovality to estimate the direction of the minimum horizontal stress (σmin)

Table 3-2 Logging runs with Weatherford's open hole wireline tools

Run no	Logging Company	Logged Interval (m MD)	Tools	Temp tool (m MD)	Remarks
1	Weatherford	1250 - 0	MCG-SGS-MDN-MPD-MLE-MMR	49	SuperCombo: spontaneous potential, gamma, spectral gamma, neutron, density, laterolog, microres
2	Weatherford	1250 - 1040	MCG-CMI-CXD	49	Image(CMI) and sonic (CXD) on same tool string, but CMI run first, then down to TD to log CXD
3	Weatherford	1250 - 480	MCG-CMI-CXD	50	Sonic (CXD) from TD to casing shoe

4 Geology

4.1 Geological setting and results

During the Middle and Early Cambrian the South Georgina Basin was part of the greater Central Australian Super Basin that remained more or less intact until the final break up in the Alice Spring Orogeny. Local structuring had major impact on the sedimentary development in the area. The direction of sediment input has varied through time and time equivalent formations have been given different names across the region. Lithological properties also vary within the same formation classification. In the Toko Syncline area the seismic data shows southwesterly prograding units in the Upper Arthur Creek; this seems to be related to the position of the seismic lines in relation to the prograding direction, from northeast towards southwest.

The Cambrian depositional system was carbonate dominated, with minor periods of subsidence resulting in deep water anoxic deposits. Please see the stratigraphic framework in Table 4-1, based on a simplification of the lithostratigraphy from Ambrose et al., 2001 and Dunster et al, 2007.

Table 4-1 Lithostratigraphic framework utilized for the OzAlpha-1 well formation tops

Age	**Major lithology**	**Group**	**Formation**	**West** **Dulcie Domain/Syncline**	**East** **Atjawarra Toko Syncline**	***Structuring***
Devonian	Sandstone			Dulcie Sandstone	Cravens Beds	*Alice Springs orogeny*
Ordovician	Siliciclastic rocks	Cockroach Gp		Tomahawk Beds	Ninmaroo Fm.	*Delamerian orogeny*
Late Cambrian	Carbonates Siliciclastic	Narpa Gp	Arrinthrunga Fm.	Eurowie Sst Mbr	Eurowie Sst Mbr	*
				Chabalowe Fm		
				Hagen Mbr		
Middle Cambrian	Carbonates Silisiclastic		Arthur Creek Fm	Upper Arthur Creek	Steamboat Sst	**
					Upper Arthur Creek	
	Carbonates			Lower Arthur Creek	Lower Arthur Creek	***
	Org. rich siltst/carbonate			Arthur Creek “Hot Shale”	Arthur Creek “Hot Shale”	
	Carbonates			Thorntonian Limestone****	Thorntonian Limestone ****	*Sequence boundary*
Early Cambrian	Carbonates Basement wash	Shadow Gp		Red Heart Dolomite		*Unconformity*
	Siliciclastic			Mount Baldwin Fm	Adam Shale	*Petermann orogeny*
Neo-proterozoic	Glacial wash	Keepera Gp		Sun Hill Arkose		
Proterozoic	Granites/Gneiss			Basement	Basement	*****

* Seismic interpretable reflectors

Both during and after the deposition of the Cambrian, Ordovician and Devonian sediments, the Southern Georgina Basin has undergone multiple deformation phases with notable extensional and compressional regimes. The basin has a NW-SE trend defined by strike-slip/compressional bounding basin margin faults. Two major troughs, the Dulcie and Toko synclines, are present in the southern part of the basin. The OzAlpha-1 is situated on the north limb of the Toko Syncline.

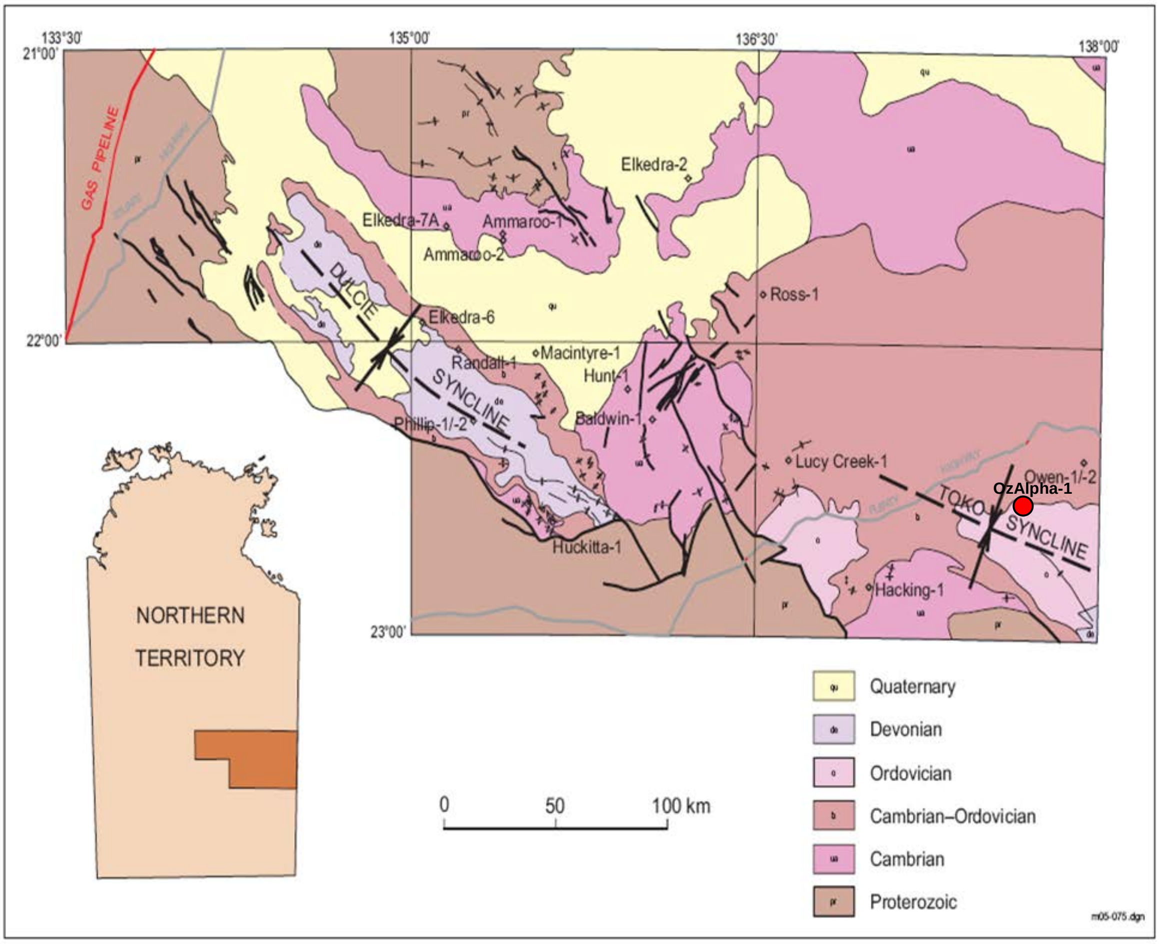


Figure 4-1 Structural elements in the South Georgina Basin (from Ambrose et al., 2001)

4.2 Stratigraphy

The prognosed versus actual formation can be seen in Table 2-2. The differences are relatively minor and well within the proposed uncertainty.

Table 4-2 Prognosed versus actual formation tops for OzAlpha-1

Formation Planned	Planned Top MD [m]	Planned Top TVD [m]	Actual Top MD [m]	Actual Top TVD [m]	Difference in tops prognose vs actual
Ninmaroo Fm	4	4	4	4	0
Arrinthrunga Fm	213	213	267	267	54
Steamboat Sst	753	753	728	728	-25
base Steamboat Sst	783	783	775	775	-8
Lower Arthur Creek	972	972	963	963	-9
Arthur Creek Hot Shale	1139	1139	1137	1137	-2
Thorntonia Limestone	1167	1167	1159.5	1159.5	-7.5
Red Heart Dolomite*	1258	1258	1225	1225	-33
Basement	1268	1268	1233	1233	-35
TD	1288	1288	1250	1250	-38

* Sun Hill Arkose was anticipated, but not seen in OzAlpha-1, probably due to erosion.

4.3 Well correlation

The OzAlpha-1 logs have been correlated with logs from Hacking 1 and Owen 2/3. The Cockroach well does not have any digital logs. See Figure 4-2.

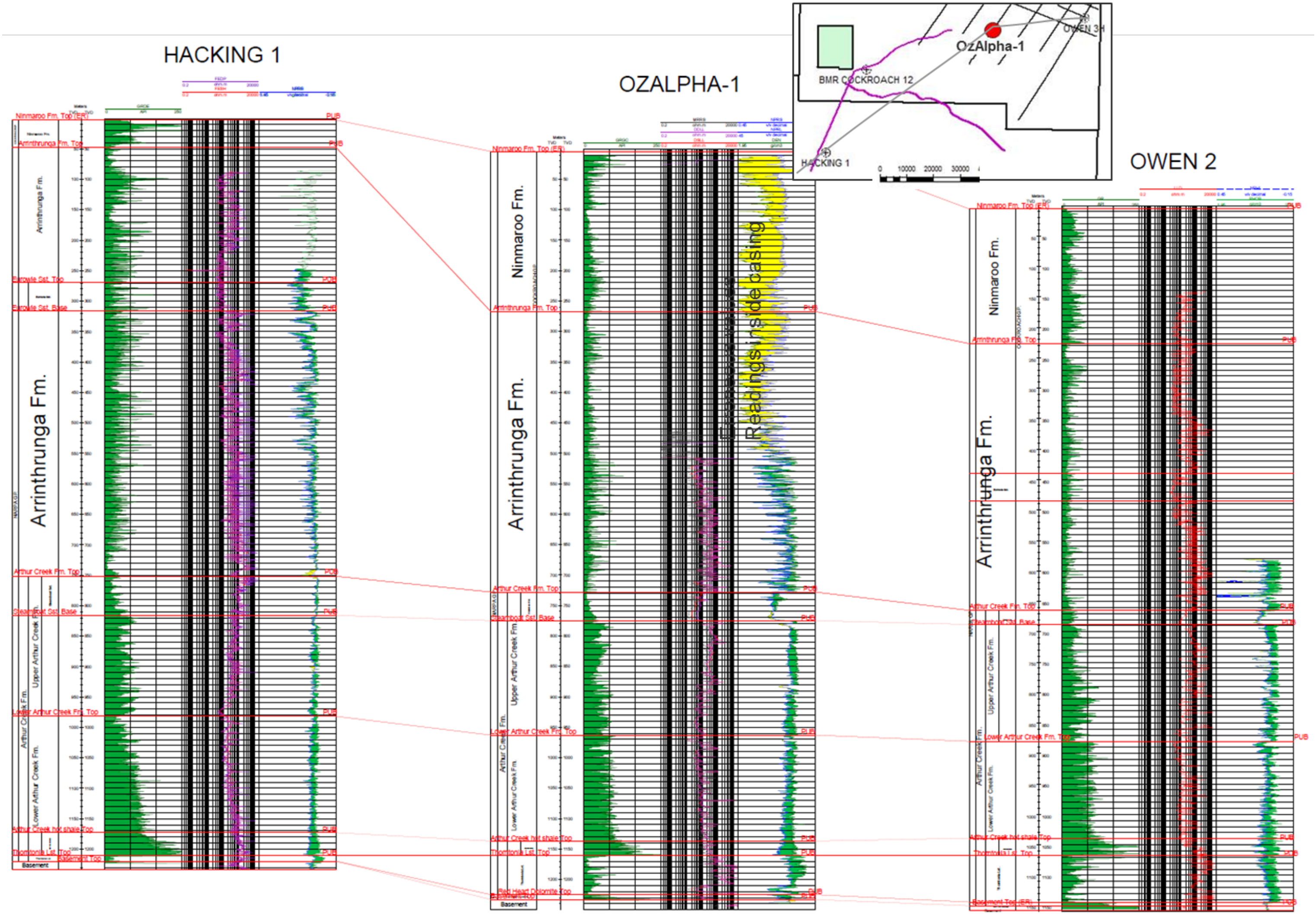


Figure 4-2 Well correlation of OzAlpha-1 with Hacking 1 towards southwest and Owen 2 towards northeast, flattened on the top Thorntonia Fm.

5 Prospect description

5.1 General description

The Unconventional play in this context is a low permeability rock, outside structural closure, that will require unconventional completion methods (i.e. horizontal well completions with multistage hydraulic stimulation) for commercial production of any reservoired petroleum. Sweet spots will be characterized by high organic matter occurring within the gas or oil maturity window and with sufficient permeability and at a sufficient depth (pressure) to allow production from hydraulically stimulated fractures.

Most of the previous petroleum exploration wells in the South Georgina Basin have been drilled on structural highs in the search for conventional traps, however none have been successful. All production tests (DSTs) in earlier wells have produced water with minor oil shows, proving that existing fracture network systems with access to formation water is a major risk in this area. The structural highs are associated with extensive faulting and in this brittle carbonate rock environment, large faults have a high potential for creating open fractures reaching into shallower water bearing formations or fracture systems. The PetroFrontier Corporation's wells drilled in 2011 – 2012 were also placed in the structural highs with pre-existing faults. Although targeting the low permeability formations with unconventional completion methods, the two wells tested in PetroFrontier's campaign (MacIntyre 2H and Owen 3H), both produced water containing H_2S and no hydrocarbons.

The OzAlpha-1 exploration well was carefully located in an area wherethe seismic data indicated no significant fracturing. The vertical well was designed to enablesmall scale hydraulical fracture stimulation of the the low permeability carbonates to release any generated and trapped hydrocarbons. The probability of connecting to any pre-existing faults or fracture networks during the stimulation job is low as the well has been placed in a location that has no visible existing faults from seismic or outcrops in the close proximity.

5.2 Unconventional target formations

The target formations identified are the **Arthur Creek Hot Shale** and the underlying **Thorntonia Limestone**. They are both characterized as organic rich and can function as both source and reservoir. The Arthur Creek Hot Shale is known to be organic rich based on other wells in the area. Thin organic-rich intervals have also been observed in the Thorntonia Limestone interval. Both formations can function as the reservoir with sourcing from the Arthur Creek Hot Shale and – probably more locally – the organic-rich layers in the Thorntonia Limestone.

- The **Thorntonia Limestone** is dominantly a dolomite with minor chert nodules and common organic rich algal laminae. It could have the potential to be sourced from within itself or from the Arthur Creek Hot Shale above.
- **The Arthur Creek Hot Shale** is an organic rich finely interlaminated siltstone, claystone, limestone and dolomite. The lower portion of the "hot shale" has elevated gamma ray values, mostly due to thin layers of organic rich deposits, but also due to moderately increasing clay content towards the base. The combination of high organic content, maturity, potential for interbedded porosity and suitable conditions for hydraulic stimulation gives this interval its prospectivity as a shale oil play.

Both the Thorntonia Limestone and the Arthur Creek "Hot Shale" were encountered almost as expected. The characteristics can easily be correlated from offset wells, and the thicknesses of the intervals were also within the prognosed ranges.

5.3 Source rock properties

The source rock analytical data from the existing wells in the South Georgina Basin, is available through the Northern Territory geological survey's database. Total Organic Carbon (TOC) values from several offset wells show the presence of good source rocks for oil, with TOC>2%, in many Arthur Creek – particularly the hot shale – and Thorntonia samples.

The regional maturity of the Arthur Creek Hot Shale/Thorntonia interval shows an overall trend of increasing maturity from Northeast to Southwest with most of the South Georgina Basin within the oil window or the gas/condensate window. The existence of a (dry/wet) gas-mature area in the horst area between the Dulcie Syncline and the Toko Syncline, i.e. around the Baldwin wells, is uncertain. Changes in pressure and temperature during later uplift (exact magnitude and timing unknown, but estimated to be more than 1.5 km), can have significantly altered the oil-gas composition since the time of initial charge.

The results of the source rock analyses performed on the OzAlpha-1 well can be seen in Appendix J.4. The analyses were performed on the preserved core intervals and are not biased towards "light" or "dark" intervals. The results clearly show the elevated organic carbon content in the basal part of the Arthur Creek Hot Shale (3.38 and 1.25%). No other intervals with high organic carbon content are revealed in the sample set. Rock Eval pyrolysis of the samples with TOC>0.5% indicates that the richer samples have a moderate potential for oil generation (HI 250-270). The thermal maturity level indicated by the Tmax values (432-434) indicates that the rocks are in the early oil generation window, which is somewhat lower than was expected based on our regional work.

It should be stressed that the data set is rather small, while the core displays a good deal of vertical variability. It is very likely that a more detailed sampling and analysis approach can give a better picture of the presence, quality and thickness of layers with elevated organic matter content.

5.4 Structure

A stratigraphic unconventional hydrocarbon play does not require a structural trap as conventional prospects do.

Unconventional resources usually cover very large areas of undisturbed strata with similar facies deposited. Strong signs of intense faulting, i.e. open faults reaching into the overlying layers, can be negative for such plays. Small micro fractures caused by gentle folding, may be positive for an unconventional prospects of this type, however such fractures were not identified in the image log from OzAlpha-1.

The location where the OzAlpha-1 exploration well has been placed is basin centered and structurally down-dip of the interpreted depositional highs. There are no visible existing faults identified from seismic or outcrop in the close proximity to the OzAlpha-1 well location. The nearest known fault is 3 km towards the northeast. See the updated seismic line and structural map on the next page.

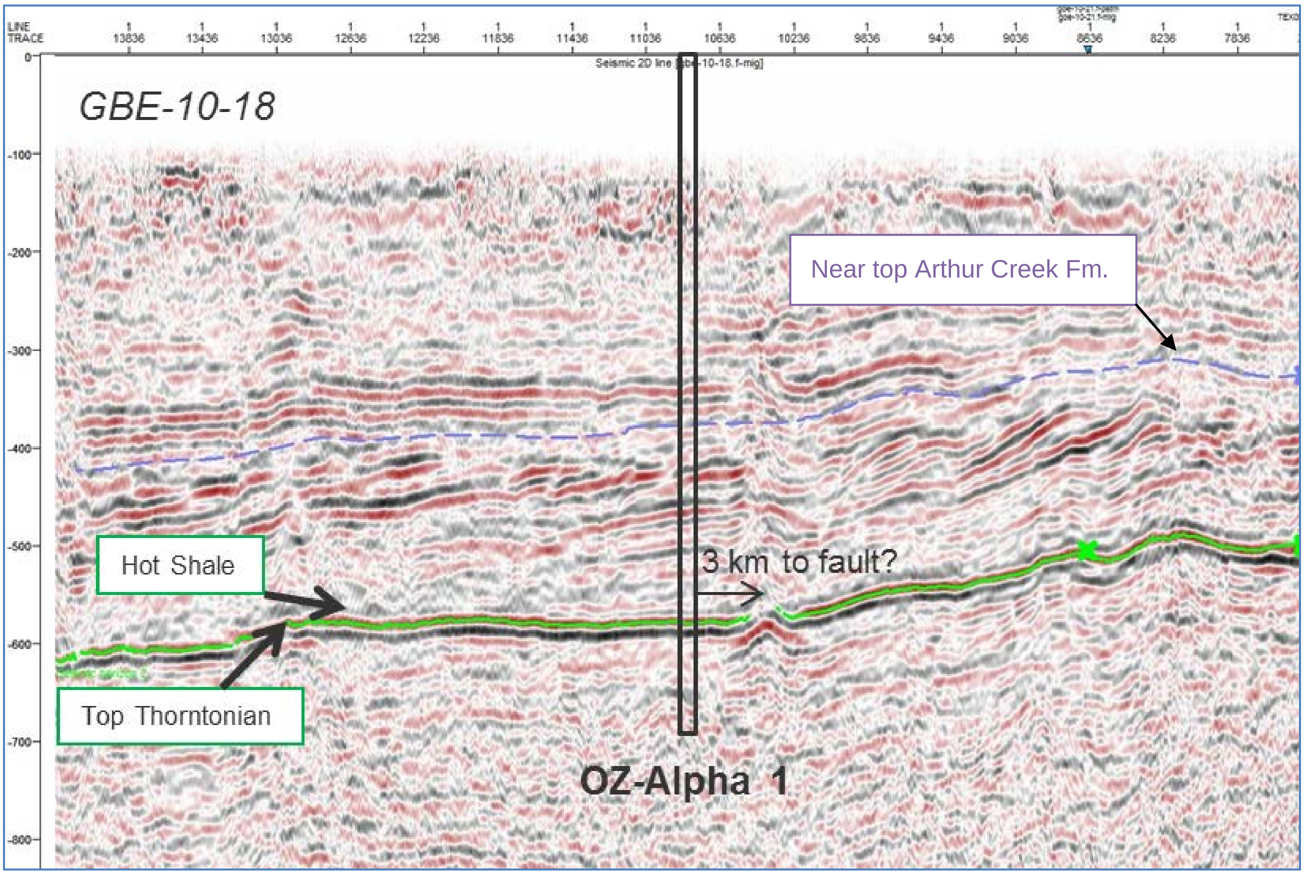


Figure 5-1 No changes were made to the seismic interpretation after the geological results from OzAlpha-1

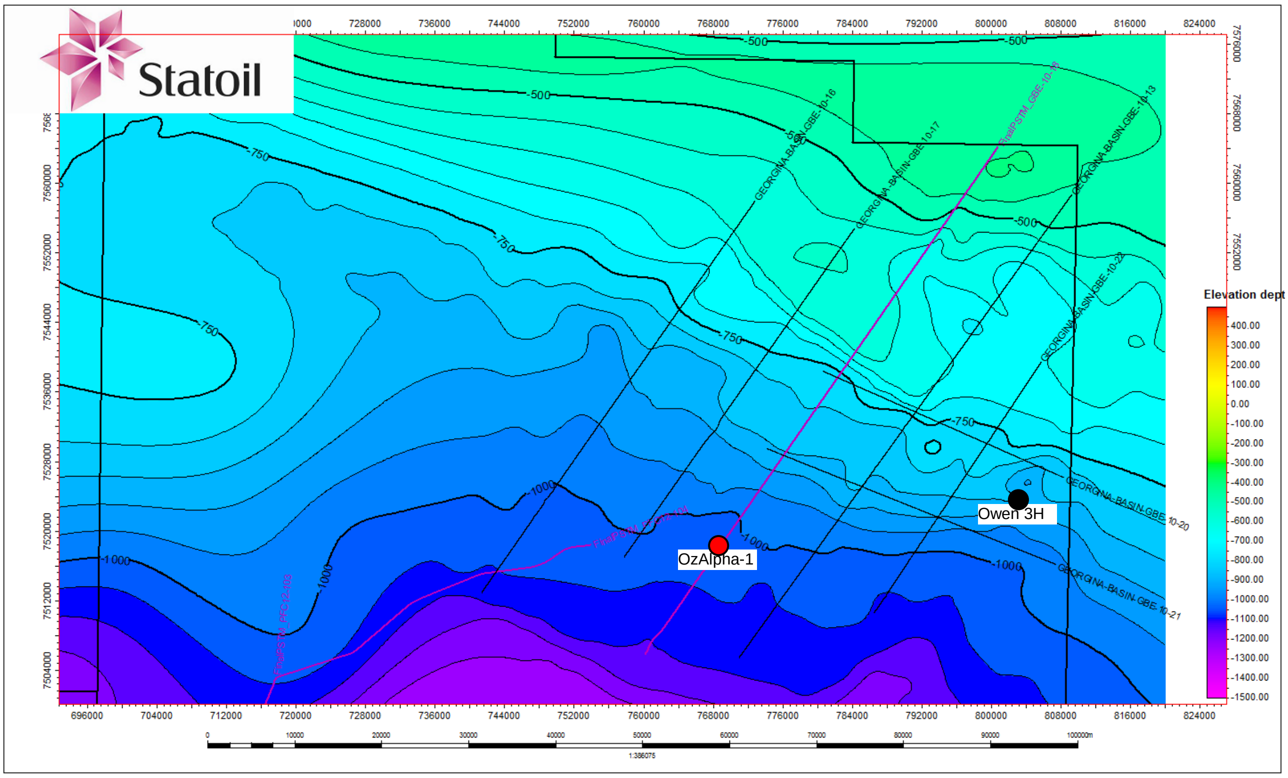


Figure 5-2 No changes were made to the depth map after the geological results from OzAlpha-1

6 Hydrocarbon indications

6.1 Shallow gas

There were no indications of shallow gas in the OzAlpha-1 well.

6.2 Gas data

During mobilization to the wellsite for OzAlpha-1, the mudlogging unit was damaged during the transit. The rough transport damaged the electrical transformers within the unit. Geoservices onsite staff investigated the unit and concluded that the unit had suffered a power transformer failure and was restricted to cuttings sample processing and description whilst the transformer was being repaired. Lithology descriptions were hence still possible.

The Department of Mines and Energy (DME) was notified of the situation and Statoil decided to spud without a fully operational mudlogging unit and monitor the well with the Pason system. The Pason system was acceptable with regards to general well control surveillance; i.e. monitor gas levels and composition, as well as pit levels, flow rates and drilling parameters. However, this system is not as reliable and accurate as the mudlogging system with regards to gas sensors. The entire surface hole was drilled without the Geoservices gas sensors in function, but the unit was repaired in time for the production hole. Hence the gas levels detected from the surface hole were less accurate than from the production hole, the Pason data showing higher values than the Geoservices sensors.

Whilst coring parts of the main target intervals, the rates of penetration were oftenvery low; 0.5 – 0.7 m/hr, and the gas levels never exceeded 1%. See the gas summary in Table 6-1.

Table 6-1 Gas Data Summary

Depth [m] MD RT	Depth [m] TVD RT	Gas content ppm	BG	C1	C2	C3	iC4	nC4	C5	nC5	Type of gas	Comment
31,0	31,0	11200*									Background gas	Pason Gas
231,0	231,0	11200*									Background gas	Pason Gas
685,0	685,0	7500		108	35	23	0	0	10		Drilled gas	GeoServices
913,0	913,0	22000		888	262	163	21	55	10		Drilled gas	GeoServices
1058,0	1058,0	53000		2136	991	20	54	218	47	50	Drilled gas	GeoServices
1072,0	1072,0	97000		2417	1424	1261	111	495	115	131	Drilled gas	GeoServices
1140,0	1140,0	54000		658	430	705	86	402	79	135	Drilled gas	GeoServices
1174,0	1174,0	21000		712	245	221	19	79	23	39	Drilled gas	GeoServices
1199,0	1199,0	11000		237	101	93	12	63	27	36	Drilled gas	GeoServices
1208,0	1208,0	13000		420	134	119	21	56	45	47	Drilled gas	GeoServices

*Pason system showed constantly higher gas levels than the Geoservices' sensors. From surface to TD only Pason data was recorded, due to a damaged Geoservices unit.

6.3 Shows

Hydrocarbon indicators or shows were recorded during cuttings descriptions and core descriptions. A summary of the visible hydrocarbon indications can be seen in Table 6-2.

Table 6-2 OzAlpha-1 hydrocarbon indication summary

Top depth MD [m]	Bottom depth MD [m]	Type	Remarks
1070,5	1070,6	Fluorescence	v mnr oil bleed, dom gold fluor, mnr yel, bluish wh on margin, mnr yel fluor in op fracs, assoc strong petroliferous odour, minor gas peak. Wk inst wh bl slow cut, instant wk wh bl crsh cut, mod strg thick ring wh bl residue.
1082.02	1082.04	Cut fluorescence	dll gold fluor, v slw bld cut, pl yel resid ring.
1099.34	1099.36	Cut fluorescence	bri grn yel fluor, slw stmg mod yel cut, thn pl yel res ring.
1109.94	1109.96	Cut fluorescence	mod dll yel grn fluor, inst flsh mlky bri yel cut, thn bri yel res ring
1149.18	1149.22	Cut fluorescence	pl yel grn fluor, v slw wk yel grn strm.
1156.63	1156.65	Cut fluorescence	pl yel grn fluor, v slw wk wh strm.
1160.41	1160.43	Cut fluorescence	pl yel grn fluor, v slw wk wh strm, v thn pl yel res ring.
1165.5	1165.55	Cut fluorescence	oil bleed, pn pnt pal wh yel, v slw wh strm, thk pl yel res ring
1188.0	1189.9	Cut fluorescence	com ptchy dl gld mod bri yel fluor, v slw blu wh bld cut, thn wh yel res ring.
1202.1	1204.5	Cut fluorescence	pch – sptd, pa – mod blsh gn 10-20% fluor, slw strmg blsh wh cut, pr res thn res rng, blmg blsh wh crsh cut, gd res stn.
1210.2	1210.3	Cut fluorescence	mod-wk grn yel whh fluor, slw – inst v wk yel grn cut
1221.5	1222.2	Cut fluorescence	spttd – ptchy dl yel – or fluor, inst strm mlky blsh wh cut, thn rng res, pa gnsh bl res stn, wk – mod strng inst strm mlky blsh wh crush cut, strng mod wh bl rng res, strng mod whsh bl res stn.

7 Pore Pressures and Temperature

See the update pore pressure and stress plot in parts per gallon (ppg) in App E.

7.1 Pore pressure and stress

No indications on pore pressure were given during the drilling of the well as the well was drilled in overbalance.

The formation integrity test at the surface casing shoe leaked off at 11.4 ppg, equivalent 0.59 psi/ft or 1.37 g/cm3. New kick tolerance calculations were performed and the formation integrity at the shoe was still within acceptance for the remaining of the well.

7.2 Formation temperature

Formation temperature was obtained whilst openhole wireline logging, and the temperature measured 49 ^{o}C at 1249.6 m MD, which equals a temperature gradient of 39 ^{o}C/km.

8 Petrophysical Evaluation

8.1 Input log data

No LWD logs acquired

Weatherford performed the open hole wireline logging operations.

Wireline logging tools gathered:

- MCG-SGS-MDN-MPD-MLE-MMR: Specdtral GR, density, neutron and resistivity log curves for petrophysical evaluation of clay content, porosity, saturation and Net Res/Net Pay calculations
- DXD tool (full waveform sonic) for rock mechanics and an independent Porosity interpretation.
- CMI (image tool) for fracture analysis and stress diretion interpretation.

8.1.1 Depth corrections

None performed. Comparing the wireline gamma ray and the core gamma ray, the best match was achieved when shifting the wireline logs 0.8 m deeper. The Image logs also achieved a best match with the core photos with a + 0.95 m shift.

8.1.2 Log quality and corrections

The caliper (and density correction) log curves indicated a smooth and in gauge borehole.

8.1.3 Depth shifts, splicing and editing

Neither depth shifts nor splicing were performed.

The DTC (compressional sonic) curve was processed to remove the cycle skips.

The DTSX (shear sonic) curve was processed to remove the cycle skips and to manually double-check the signal picking from the raw sonic log display.

8.2 Evaluation method and input parameters

Clay content was calculated from the Spectral GR Potassium curve, calibrated to the XRD results.

Total porosity (PHIT), was interpreted from both the density and the sonic log curves. The sonic derived porosity showed the best match to the conventional (plug) core analysis results. Please see App M.

Total water saturation (SWT) was interpreted by means of the Archie's equation; the percentage of clay volume is low, as shown from CoreLab's XRD analysis. Average clay content <5% in the Thorntonia Limestone and approximately 20% in the Arthur Creek Hot Shale.

Routine Core Analyses (RCAL) water saturation (SW) values gave a fair match to the log interpreted SWT results.

CoreLab GRI (Gas Research Institute) measurements of Porosity, Permeability and Saturation values were not yet available when this report was written.

Please see App M for input and result curves.

8.3 Preliminary results

Because this is an unconventional play, the interpretation of potential pay zones from traditional methods, is attached with a large range of uncertainties. The petrophysical analysis highlights the zones of interest, where the probability for movable hydrocarbons is highest. Preliminary results based on the petrophysical analysis are listed below:

- Interpreted potential Net Pay is 6 & 12 metres in the Arthur Creek Hot Shale and the Thorntonia Limestone respectively
- Average computed total porosity (PHIT) of 3,5 and 4% in the Arthur Creek Hot Shale and the Thorntonia Limestone respectively
- Average SWT= 60 & 50% in the Arthur Creek Hot Shale and the Thorntonia Limestone respectively

9 Core Analyses

Core analyses were designed to determine pay zones boundaries and define any barriers to fracture height growth. Data from the core has been used to determine mineralogy, geochemistry, geomechanical properties, frac fluid sensitivity, petrophysical properties and sedimentology.

24 preserved samples where taken directly after they were extracted from the core barrel, wrapped in aluminum foil, cling wrap, and sealed in air tight Mylar bags. Most of the core analyses have been performed on these preserved samples, except for geochemistry sampling which can be sampleded from dry core.

9.1 Porosity, permeability and saturation

Porosity, permeability and saturation analyses have been performed by Core Laboratories (Core Lab).Two different measuring methods have been used to analyse porosity, permeability and hydrocarbon saturation;

- plug measurements with 800 psi and 3000 psi confining pressure (Appendix J.1)
- GRI analyses on crushed core.

Porosities vary from less than 1% to a maximum of 20%, most of the samples within the target zones are in the range 2 - 6 %. Porosities higher than 4% are acceptable for an unconventional play.

The permeabilities are in the range 0.0001 – 0.716 mD. Unfortunately the highest permeability is measured in an interval where water has been identified from core analyses and wireline log interpretation.

The water saturation varies from 16 – 95%. The sample with 95% Sw was taken from the water filled interval around 1216 m MD. Water saturations below 60% are positive for the play, and many of the measurements are in the range 20 - 60 %. There is no consistent trend in the saturation and the hydrocarbon saturation is patchy.

9.2 Mineralogy

X-ray diffraction to determin mineralogy was performed on 13 samples. Within the interval classified as Arthur Creek Hot Shale, the clay content were the highest, varying from 5 - 27% of the total rock, while the samples analysed from the Thorntonia, were dominated by dolomite 40 – 90%, with an average dolomite percentage throughout the interval of 63%.

The XRD results can be seen in Appendix J.3. Thin sections can be seen in App K.

9.3 Geochemistry

The geochemistry analysed by Corelab were total organic carbon (TOC) and RockEval. The results can be viewd in Appendix 0.

9.4 Rock Mechanics

For the rock mechanical analyses we include the analyses for bore hole stability and rock versus fluid sensitivity. CoreLab also performed these analyses. The results can be seen in App L.

App A Directional Data – surveys

Depth m MD RKB	Inclination (deg)	Survey Instrument
108	0.00	Single Shot
297	0.75	Single Shot
500	0.75	Single Shot
685	0.75	Single Shot
884	0.80	Single Shot
1032	0.90	Single Shot
1222	1.70	Single Shot

Verticality data from the dipole sonic is attached in the next pages.

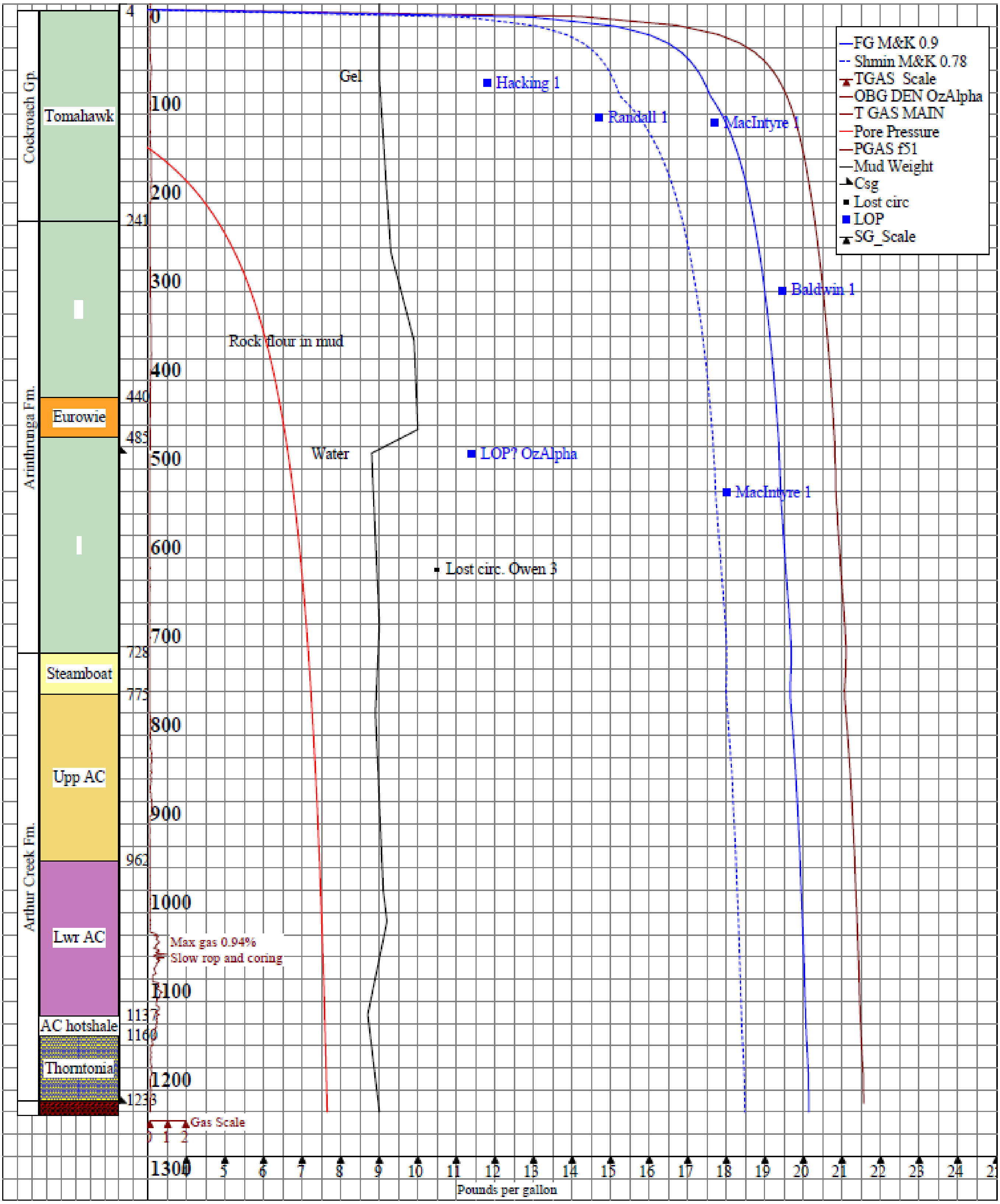
A.1 Verticality Log OzAlpha-1 (enclosed)

App B Well Schematics (enclosed)

App C Wellhead (enclosed)

App D Well Barriers (enclsed)

App E Pore Pressure and Fracture Gradient Plot



App F End of Well Report Drilling fluids (enclosed)

App G End of Well Report Cementing (enclosed)

App H Core chip descriptions

Top	Base	Lithology from OzAlpha-1 core chip descriptions
1040.00	1042.69	Ls, olv gry, f - crs xln, hd, <1mm - cm flat lam, rr styl, mnr calc sltst/clst lam, nil vis por, n/s.
1042.69	1043.08	Sltst, v drk gry blk, mic, dol cmt, hd, lam, nil vis por.
1043.08	1043.87	Ls, gry ol grn - l gry - dk gry - blk gry occ brn gry, crs - f xln, sb mm l gry lam, occ abd mica, spln occ, hd, no vis por, n/s.
1043.87	1046.03	Ls, l gry, f xln, hd, sub mm lam, no vis por.
1046.03	1046.03	Ls, dk gry, c - fxln, hd, lam, no vis por
1046.03	1049.75	Ls, dk gry, lam, hd, no vis por
1049.75	1051.70	Ls, dk gry- blk gry, f xln, f lam ip [<1mm], hd, spln to blky brk, no vis por, n/s.
1051.70	1051.90	Ls, dk gry- dk brn gry, f xln, altg lams [<1mm] dk gry to dk brn, hd.
1051.90	1052.70	Calc Sltst, blk gry- blk brn, arg, micromic, mod hd-hd, sbfis.
1052.70	1053.45	Ls, dk gn gry, f xln, sbconch frac- spln brk, v hd.
1053.45	1054.45	Calc Sltst, olv gry, v calc, micromic, hd, lam, sbfis-fiss.
1054.45	1059.08	Ls, dk gry- gry blk, f xln- crypxln, pred mass w/ occ-r med gry lams [<2mm], tr wh blebs occ, tr-r dissem pyr, v hd, blky - spln brk ip.
1059.08	1059.35	Ls w/ Calc Sltst lams: Ls, dk gn gry, f xln, sbconch frac, spln, hd; Calc Sltst, blk gry-brn blk,v calc, arg, micromic, mod hd, sbfis-fis.
1059.35	1071.08	Ls, blk gry-brn blk to dk gry lams [<2mm], f xln, hde, irreg blk Calc Slst lams, sb fis, no vis por, n/s.
1071.08	1072.25	Ls w/ thn Calc Sltst interlams: Ls, olv gry, fxln, sbconch frac, spln, hd, no por, n.s.; Calc Sltst lam [0.5-2cm], v dk gry,v calc, arg, micromic, mod hd, sbfis-fis, no vis por, ptchy flour, w/ minor oil stain & oil bleed @ 1071.55m and very strong petroliferrous odour 1070.4m to 1070.6m in fresh breaks.
1072.25	1076.00	Ls, dk gry, fxln, sb mm flat lam, hd, no vis por, n/s
1076.00	1080.01	Ls, dk gry, fxln, hd, sb mm lam, no vis por, n/s

Top	Base	Lithology from OzAlpha-1 core chip descriptions
1080.01	1080.38	Ls, lt olv gry, dk gry, f xln, flat lam, no vis por, n/s.
1080.38	1081.15	Ls, dk gry, fxln, hd, sb mm lam, no vis por, n/s
1081.15	1082.57	Ls, lt olv gry, f xln, hd, sb mm lam, r cht bnds, mnr sft sed dfm, nil vis por, wk dll yel gld fluor.
1082.57	1085.00	Ls, dk gry, m gry, fxln, sb mm flat lam, hd, no vis por, n/s.
1085.00	1094.00	Ls, lt olv gry, f xln, hd, sb mm lam, mnr dk gry - blk arg sltst, v mnr cht bnds, mnr sft sed dfm, no vis por, ab wk dll yel gld fluor, no cut.
1094.00	1103.00	Ls, lt olv gry, f xln, hd, sb mm lam, mnr dk gry - blk Sltst, arg, mnr sft sed dfm, no vis por, ab wk dll yel gld fluor.
1103.00	1109.52	Ls, lt olv gry, f xln, hd, sb mm lam, dk gry - blk arg sltst, no vis por, ab wk dll yel gld fluor, no cut .
1109.52	1110.59	Ls, lt gry, fxln, hd, mm-sbmm flat lams, mnr cm - sb mm blk sltst lams, v mnr 4cm vugs, anhy fld with ab chrt wth poss macro foss (chrt rplcd), pr vis por, brt yel grn fluro ip.
1110.59	1120.00	Ls, lt olv gry, fxln, hd, sb mm flat lams; ab dk gry - blk arg Sltst interlams, sft sed dfm , rr blk cht nod, no vis por, ab wk dll yel gold fluor, no cut, mod strg pet odour @ 1113.4m, 1114.05m, 1120.5m on frsh frac.
1120.00	1133.00	Ls, brn - brn blk, fxln, hd-v hd, lam, com l olv gry 1cm crpxln bands, tr chrt nod, no vis por, n/s. Sltst, dk gry - blk - dsky yel brn, hd, f lam, calc I p, com micromic, no vis por, n/s.
1133.00	1134.00	Ls, dk gry- dk olv gry, f - microxln, hd-v hd, sb mm lams, no vis por. Mnr Dol, dk brn gry, v hd, as interlams, no vis por, n/s. Slst/Clst, blk brn, arg-v arg, dol cmt, no vis por, n/s.
1134.00	1138.00	Ls, dk gry-blk, f xln, hd, slty, n mr Dol,no vis por, n/s.
1138.00	1139.60	Ls, brn blk, f - micro xln, hd-v hd, sbconch frac, flat lam sb 1mm, r sft sed defm, tr chert nod & mm lams, no vis por, n/s.
1139.60	1141.18	Clyst, blk, hd, fis, noncalc, mic, sl petrf odour, nil vis por, n/s.

Top	Base	Lithology from OzAlpha-1 core chip descriptions
1141.18	1142.40	Ls, dk gry, f -micr xln, hd, r sft sed defm, tr chert nod, mnr Dol interlam, brn gry, v hd, ab slt,no vis por, n/s
1142.40	1143.10	Dol, gn blk - tr sptd lt gry, micro-f xln, hd-v hd, sl arg, no vis por, n/s.
1143.10		Dol, olv gry, fxln, conch frac, mm flt lams, no vis por, n/s. interlam w/ Sltst, gry blk, hd, fis-sbfis, sl calc, sl mic, no vis por, n/s
0.00	1146.00	Dol, grn blk, f xln, hd-v hd, fis-sbfis, no vis por, n/s.
1146.00	1148.03	Dol a/a
1148.03	1148.42	Dol, lt olv gry, micro-vfxln, hd, sb mm fl lam. Mnr Sltst, drk gry sltst, hd, dol cmt, fis, tr pyr, no vis por, cmn dl gld fluor, no cut.
1148.42	1149.29	Dol, dk olv gry, f-mxln, hd, r mic, r pyr, sb mm fl lam. Cmn Sltst interlams, dk gry, hd, fis, dol cmt, pr interxln por, cmn dl gld fluor, cut fluor.
1149.29	1149.41	Calc Slst, drk brn gry - blk, arg, mn mic, calc cmt, hd, mm-cm vugs, anhy fld, fr vugy por, mnr dl gld fluor on anhy, petrfs odr, cut fluor.
1149.41	1160.32	Dol, lt olv gry, fxln, hd, sub mm flat lams, r mic, r pyr, no vis por, cmn dl gld fluor, r pl yel grn fluro, no cut. Ab Calc Sltst interlams, dk brn gry - blk, arg, hd, mic, calc cmt, no vis por, mnr dl gld fluor, cut fluor, petrfs odr.
1160.32	1163.42	Dol, m olv gry, fxln, hd, ab mm-cm vugs fld anhy, cmn chrt nod, r bit on frac srfc, mnr intr xln por, mnr dull yel fluor, v slw cut
1163.42	1169.00	Dol, pl yel brn, fxln, hd, com mm-cm vug anhy and calc fld, r anhyd & calc filled discont vert fracsf, cmn bit stn vugs, fr-good vugy por, r mod yel grn fluor.
1169.00	1173.80	Dol, pl yel brn, fxln, com vug anhy fld, r O blds frac surf, cmn bit stn vugs, no vis por grad to fr vis por @ bse, r mod yel grn fluor.
1173.80	1175.90	Dol, pl yel brn, microxln-vfxln bcm xln/depth, hd, r cren styl, com vug anhy fld, r pin-pt non-flour O on frac surf, cmn bit stn vugs, no vis por grad to fr vis por @ bse, r mod yel grn fluor, no cut.
		Break in coring for rotary drilling 1175.90m-1189.00m
1189.00	1189.20	Dol, m olv gry, f-cxln, hd, com anhy fld vugs, r styl, cmn chrt, cmn bit on fracs, rr hor frac, fair vugy por, com dl gld fluor.

Top	Base	Lithology from OzAlpha-1 core chip descriptions
1189.20	1189.75	Dol, dk olv gry - blk gry, fxln, v hd, rbl intvls,mnr styl, tr calc, tr crs xln & fibr xln anhyd, cmm anhyd fld vugs, fair-good vugy por, n/s
1189.75	1192.65	Dol, dk-med gry, f-m xln, hd-v hd, com anhyd fld vugs 1-2cm, com styl w/ thn bit fill, rr calc, fair vugy por, com dl gld fluor, n/s.
1192.65	1194.55	Dol, med gry, hd-v hd, f xln, com styl r bit fill, tr anhyd, rr calc, poor vis por, com dl gld fluor, n/s.
1194.55	1196.15	Dol, dk gry - blk gry, f -m xln, v hd, cmn styl, com dk gry chrt nod, com mm-cm anhyd fld vugs - xln & fibr, com dl gld fluor, n/s .
1196.15	1196.55	Dol, med gry - brn gry, f xln, hd, com rbl intvl, com styl, com dk gry chrt nod, sl calc, tr anhyd fil vug, fair vugy por , com pchy yel fluor, dll or fluor bnds 1cm, n/s.
1196.55	1197.95	Ls, mdst, hd, v calc, no vis por, sps dl gld fluor, n/s.
1197.95	1208.30	Ls, mdst, drk gry, m gry, stylo nod bdg, rexlzd ip, v hd, sb cnch fra, cmn mm calc vns, r cm vugs anhy fld, mnr mm lam, no vis por, cmn dl gld & brt blsh gn fluor, cut,
1208.30	1208.85	Ls, mdst, drk gry, m gry, tr-com calc,stylo nod bdg, mxln, v hd, r mm calc vns, r mm-cm vugs anhy fld, com styl, pr vugy por, no vis intxln por,sps dl gld fluor, no cut.
1208.85	1209.90	Ls, mdst, drk gry, m gry, tr calc, stylo nod bdg, f-mxln, v hd, mm calc vns, r mm-cm vugs pt anhy fld, r styl, no vis por, .
1209.90	1214.00	Dol, mdst, olv gry, brn gry, v hd, tr-rr calc, mxln, mnr stylonod incr @ bse, r mm calc vns, mnr mm-cm vugs anhy fld, pr vugy por, nil vis intxln por.
1214.00	1220.97	Dol, mdst, lt olv gry, tr calc, fxln, v hd, com mm-cm vugs prt opn-prt anhy fld, poss shl frag, mnr micro fracs calc fld, mnr styl, gd vis por, no fluor, no cut,
1220.97	1221.71	Dol, mdst, dk gry, fxln, hd, r calc, com cm mdst wvy lam, r cm vugs anhy fld, stylonod bdg, pr vugys por, ptchy dl yel - mod bri or yel flour, cut.
1221.71	1224.86	Dol, mdst, v drk gry-blk, mic, fxln, com cm lam drk gry dol clst, com cm vugs @ bse, anhy fld frac, pr-nil vis por,dl-br yel fluor, cut.
1224.86	1228.13	Dol, mdst, lt gry, lt grysh bl, mic, fxln, v hd, prly wispy lam, com cm blsh gry wxy ?dol clyst lam, rr mm vugs anhy fld, no vis por, no fluor, no cut,
1228.13	1229.54	Dol, mdst, lt brn, olv brn, f-m xln, v hd, ab sb mm faint wispy lam, com cm vugs & fracs anhy fld, no fluor, no cut,

Top	Base	Lithology from OzAlpha-1 core chip descriptions
1229.54	1231.58	Dol, mdst, lt gry, lt grysh bl, fxln, v hd, cmn dissem qtz, rr mm vugs anhy fld, nil vis por, n/s.
1231.58	1232.60	Dol,mdst, lt brn, fxln, v hd, cmn dissem f-m qtz snd, ab sb mm faint lam, com cm vugs & fracs anhy fld, tr sb mm blk clyst lams, nil vis por, n/s
1232.60	1232.90	Dol, mdst, med blsh gry, ab f-crs dissem qtz, mnr gran clast, mnr pyr nod, nil vis por, n/s,
1232.90	1232.94	Granite, weathered, med gry, qtz, m xln, no vis por.
1232.94	1233.20	Granite, lt pnk gry, fspr, qtz, c xln, v hd, wthd zn @ tp grad w/dpth to frsh, nil vis por, n/s,

App I Cuttings descriptions

From	To	OzAlpha-1 Cuttings Description	Fluorescence
0	10	70% Sst, or brn, qtz, trnsl, m-cs, pr srt, sb ang-sb rnd, fri, fr vis por, n/s. 20% Cht, or wh, crpxln, v hd, n/s. 10% Dol, wh, v hd, nil vis por, n/s.	N/S
10	20	60% Sst, or brn, qtz, trnsl, m-f, pr srt, sb ang-sb rnd, calc cmt, pr vis por, n/s. 40% Cht, or wh, cprxln, v hd, r bit stn.	N/S
20	30	80% Sst, or brn, qtz, trnsl, m-f, sb ng-sb rnd, pr srt, gr mtrx, sil cmt, pr vis por, n/s. 20% Cht, or wh, crplxn, hrd, r bit stn.	N/S
30	40	70% Sst, or brn, qtz, trnsl, m-f, sb ang-sb rnd, pr srt, gy mtrx, sil cmt, pr vis por, n/s. 30% Cht, or wh, crpxln, hrd, r bit stn.	N/S
40	50	80% Sst, wh gy, qtz,trnsl, m-f, sb ang sb rdd, pr srt, strg sil cmt-mnr dol cmt, pr vis por. 20% Cht, or wh, calc, crpxln, hrd.	N/S
50	60	60% Sst, wh gy, qtz, trnsp-fros, m-f, ang sb rnd, mod srt, l gy mtrx, sil cmt, hd-fri, pr-fr vis por, r bit stn. 30% Dol, l gy, fn xln, hd, pr vis por, n/s. 10% Cht, l gy wh, crpxln, hd, n/s.	N/S
60	70	60% Sst, l gy, qtz, trnsp-fros, m-f, sb rnd-rnd, mod-pr srt, l gy mtrx, dom dol cmt, hd, pr-fr vis por, r bit stn. 40% Dol, l gy, microxln-fxln, hd, pr vis por, n/s.	N/S
70	80	70% Dol, l gy wh, qtz, fxln-microxln, hrd, pr vis por, r bit stn, n/s. 30% Sst, wh gy, qrtz, trnsp-fros, m-f, sb rnd-rnd, mod -pr srt, l gy mtrx, dom dol cmt-sub sil cmt, hd, pr-fr vis por, n/s.	N/S
80	90	80% Dol, l gy wh, qtz, fxln-microxln, hd, pr vis por, n/s. 20% Sst, wh gy, qtz, trnspt-fros, m-f, sb rnd-rnd, mod-pr srt, l gy mtrx, dom dol cmt-sub sil cmt, hd, pr-fr vis por, n/s.	N/S
90	100	70% Dol, l gy to wh, qtz, fxln-microxln, hrd, pr vis por, n/s. 30% Sst, wh-gy, qtz, trnsl-op, vf, sb rnd, wl srt, wh mtrx, dom dol cmt, hd, pr vis por, n/s.	N/S
100	110	80% Dol, l gy - wh, f-microxln, calc, hd, pr vis por, n/s. 20% Sst, wh gy, qrtz, trnsl-op, vf, sb rnd, wl srt, wh mtrx, dom dol cmt, hd, pr vis por, n/s.	N/S
110	120	80% Dol, l gy, f-microxln, hd, pr vis por, n/s. 20% Sst, wh-gy, qrtz, trnsl-op, vf, sb rnd, wl srt, wh mtrx, dom dol cmt, hd, pr vis por, n/s.	N/S
120	130	80% Dol, l gy wh, f-microxln, hd, pr vis por, n/s. 20% Sst, wh gy, qtz, trnsl-op, vf, sb rnd, wl srt, wh mtrx, hd, pr vis por, n/s.	N/S
130	140	100% Dol, l gy wh, f-microxln, calc, hd, pr vis por, n/s.	N/S
140	150	100% Dol, l gy wh, f-microxln, calc, hd, pr vis por, n/s.	N/S
150	160	100% Dol, l gy wh, f-microxln, calc, hd, pr vis por, n/s.	N/S
160	170	100% Dol, l gy wh, f-microxln, calc, hd, pr vis por, n/s.	N/S
170	180	100% Dol, l gy wh, f-microxln, calc, hd, pr vis por, n/s.	N/S
180	190	100% Dol, l gy wh, f-microxln, calc, hd, pr vis por, n/s.	N/S
190	200	100% Dol, l gy wh, f-microxln, calc, hd, pr vis por, n/s.	N/S
200	210	100% Dol, l gy wh, f-microxln, calc, hd, pr vis por, n/s.	N/S

From	To	OzAlpha-1 Cuttings Description	Fluorescence
210	220	80% Dol, l gy wh, f-microxln, hd, pr vis por, n/s. 20% Ls, dk gy, fxln, acc pyr, hd, pr vis por, n/s.	N/S
220	230	80% Dol, l gy wh, f-microxln, hd, pr vis por, n/s. 20% Ls, dk gy, fxln, acc pyr, hd, pr vis por, n/s.	N/S
230	240	80% Dol, l gy wh, f-microxln, hd, pr vis por, n/s. 20% Ls, dk gy, fxln, acc pyr, hd, pr vis por, n/s.	N/S
240	250	80% Dol, l gy wh, f-microxln, hd, pr vis por, n/s. 20% Ls, dk gy, fxln, acc pyr, hd, pr vis por, n/s.	N/S
250	260	60% Dol, l gry wh, f-microxln, hd, nil vis por, n/s. 40% Ls, wh gry, vf-fxln, hd, nil vis por, n/s.	N/S
260	270	50% Dol, l gry wh, f-microxln, hd, nil vis por, n/s. 50% Ls, wh gry, vf-fxln, hd, nil vis por, n/s.	N/S
270	280	50% Dol, l gry wh, f-microxln, hd, nil vis por, n/s. 50% Ls, wh gry, vf-fxln, hd, nil vis por, n/s.	N/S
280	290	70% Dol, l gry wh, f-microxln, hd, nil vis por, n/s. 30% Ls, wh gry, vf-fxln, hd, nil vis por, n/s.	N/S
290	300	60% Dol, l gry wh, f-microxln, hd, nil vis por, n/s. 40% Ls, wh gry, vf-fxln, hd, nil vis por, n/s.	N/S
300	310	60% Dol, l gry wh, f-microxln, hd, nil vis por, n/s. 40% Ls, wh gry, vf-fxln, hd, nil vis por, n/s.	N/S
310	320	60% Ls, wh, crpxln, hd, n/s. 30% Dol, med gry, f-microxln, hd, nil vis por, n/s. 10% Sltst,br rd, arg, hd, nil vis por, n/s.	N/S
320	330	60% Ls, wh, crpxln, hd, n/s. 30% Dol, med gry, f-microxln, hd, nil vis por, n/s. 10% Sltst,br rd, arg, hd, nil vis por, n/s.	N/S
330	340	60% Dol, med gry, f-microxln, hd, nil vis por, n/s. 20% Ls, wh, crpxln, hd, nil vis por, n/s. 10% Sltst, br rd, arg, hd, nil vis por, n/s. 10% Clst, gn, calc, micromic, hd, nil vis por, n/s.	N/S
340	350	40% Sltst,br rd, arg, hd, nil vis por, n/s. 20% Dol, med gry, f-microxln, hd, nil vis por, n/s. 20% Ls, wh, crpxln, hd, nil vis por, n/s. 20% Clst, gn, calc, micromic, hd, nil vis por, n/s.	N/S
350	360	80% Ls, wh, crpxln, hd, nil vis por, n/s. 10% Sltst, br rd, arg, hd, nil vis por, n/s. 10% Clst, gn, calc, micromic, hd, nil vis por, n/s.	N/S
360	370	70% Dol, l br gry, f-vfxln, hd, nil vis por, n/s. 30% Ls, wh, fxln, calc, hd, nil vis por, n/s.	N/S
370	380	80% Ls, wh, vf-mircoxln, hd, nil vis por, n/s. 20% Dol, l br gry, f-vfxln, hd, nil vis por, n/s.	N/S
380	390	80% Ls, wh, vf-mircoxln, hd, nil vis por, n/s. 20% Dol, l br gry, f-vfxln, hd, nil vis por, n/s.	N/S
390	400	80% Ls, wh, vf-mircoxln, hd, nil vis por, n/s. 20% Dol, l br gry, f-vfxln, hd, nil vis por, n/s.	N/S
400	410	80% Ls, wh, vf-mircoxln, hd, nil vis por, n/s. 20% Dol, l br gry, f-vfxln, hd, nil vis por, n/s.	N/S
410	420	70% Ls, wh, microxln, hd, nil vis por, n/s. 20% Dol, l br gry, hd, nil vis por, n/s. 10% Sst, wh, qtz, trnsl, vf, rnd, wl srt, wh mtrx, dol cmt, hd, nil vis por, n/s.	No test

From	To	OzAlpha-1 Cuttings Description	Fluorescence
420	430	60% Ls, wh, microxln, hd, nil vis por, n/s. 30% Dol, l br gry, hd, nil vis por, n/s. 10% Sst, wh, qtz, trnsl, vf, rnd, wl srt, wh mtrx, dol cmt, hd, nil vis por, n/s.	No test
430	440	70% Ls, wh, crpxln, hd, nil vis por, n/s. 30% Dol, l br gry, f-vfxln, hd, nil vis por, n/s.	No test
440	450	60% Dol, wh l gry, micro-vfxln, hd, nil vis por, n/s. 40% Sltst, d gry, aren, mod calc, occ arg, hd, nil vis por, n/s	No test
450	460	60% Slst, d gry, aren, mod calc, occ arg, hd, nil vis por, n/s. 40% Dol, lt gry, micro-vfxln, hd, nil vis por, n/s.	No test
460	470	100% Dol, lt gry, micro-vfxln, hd, nil vis por, n/s.	No test
470	480	60% Dol, lt gry, microxln-vfxln, hd, nil vis por, n/s. 20% Clst, med br, aren, hd, n/s. 20% Slst, d gry, aren, mod calc, occ arg, hd, nil vis por, n/s.	No test
480	490	70% Dol, lt gry, microxln-vfxln, hd, nil vis por, n/s. 20% Clst, med br, aren, hd, n/s. 10% Slst, d gry, aren, mod calc, occ arg, hd, nil vis por, n/s.	No test
490	500	70% Dol, lt gry, microxln-vfxln, hd, nil vis por, n/s. 20% Clst, med br, aren, hd, n/s. 10% Slst, d gry, aren, mod calc, occ arg, hd, nil vis por, n/s.	No test
500	507	70% Dol, lt gry, microxln-vfxln, hd, nil vis por, n/s. 20% Clst, med br, aren, hd, n/s. 10% Slst, d gry, aren, mod calc, occ arg, hd, nil vis por, n/s.	No test
510	515	100% Ls, lt gry, c - fxln, r acc calc, hd, pr vis por, n/s.	No show
515	520	70% Ls, lt gry, c - fxln, r acc calc, hd, pr vis por, n/s. 20% Slst, rd brn, aren, lith, hd, nil vis por, n/s. 10% Dol, l gry, microxln, hd, nil vis por, n/s.	No show
520	525	60% Ls, lt gry, c - fxln, r acc calc, hd, pr vis por, n/s. 30% Slst, rd brn, aren, lith, hd, nil vis por, n/s. 10% Dol, l gry, microxln, hd, nil vis por, n/s.	No show
525	530	60% Ls, lt gry, c - fxln, r acc calc, hd, pr vis por, n/s. 30% Slst, rd brn, aren, lith, hd, nil vis por, n/s 10% Dol, l gry, microxln, hd, nil vis por, n/s.	No show
530	535	80% Ls, lt gry, c - fxln, r acc calc, hd, pr vis por, n/s. 10% Slst, rd brn, aren, lith, hd, nil vis por, n/s. 10% Dol, l gry, microxln, hd, nil vis por, n/s.	No show
535	540	40% Ls, lt gry, c - fxln, r acc calc, hd, pr vis por, n/s. 30% Slst, rd brn, aren, lith, hd, nil vis por, n/s. 20% Dol, l gry, microxln, hd, nil vis por, n/s.	No show
540	545	80% Ls, lt gry, c - fxln, r acc calc, hd, pr vis por, n/s. 10% Slst, rd brn, aren, lith, hd, nil vis por, n/s. 10% Dol, l gry, microxln, hd, nil vis por, n/s.	No show
545	550	80% Ls, lt gry, c - fxln, r acc calc, hd, pr vis por, n/s. 10% Slst, rd brn, aren, lith, hd, nil vis por, n/s. 10% Dol, l gry, microxln, hd, nil vis por, n/s.	No show
550	555	80% Ls, lt gry, c - fxln, r acc calc, hd, pr vis por, n/s. 20% Slst, rd brn, aren, lith, hd, nil vis por, n/s.	No show
555	560	90% Ls, lt gry, c - fxln, r acc calc, hd, pr vis por, n/s. 10% Slst, rd brn, aren, lith, hd, nil vis por, n/s.	No show
560	565	90% Ls, lt gry, c - fxln, r acc calc, hd, pr vis por, n/s. 10% Slst, rd brn, aren, lith, hd, nil vis por, n/s.	No show
565	570	90% Ls, lt gry, c - fxln, r acc calc, hd, pr vis por, n/s. 10% Slst, rd brn, aren, lith, hd, nil vis por, n/s.	No show

From	To	OzAlpha-1 Cuttings Description	Fluorescence
570	575	60% Ls, lt gry, c - fxln, r acc calc, hd, pr vis por, n/s. 30% Slst, rd brn, aren, lith, hd, nil vis por, n/s. 10% Dol, l gry, microxln, hd, nil vis por, n/s.	No show
575	580	50% Ls, lt gry, c - fxln, r acc calc, hd, pr vis por, n/s. 50% Dol, l gry, microxln, hd, nil vis por, n/s.	No show
580	585	60% Ls, lt gry, c - fxln, r acc calc, hd, pr vis por, n/s. 30% Slst, rd brn, aren, lith, hd, nil vis por, n/s. 10% Dol, l gry, microxln, hd, nil vis por, n/s.	No show
585	590	60% Ls, lt gry, c - fxln, r acc calc, hd, pr vis por, n/s. 30% Slst, rd brn, aren, lith, hd, nil vis por, n/s. 10% Dol, l gry, microxln, hd, nil vis por, n/s.	No show
590	595	60% Ls, lt gry, c - fxln, r acc calc, hd, pr vis por, n/s. 30% Slst, rd brn, aren, lith, hd, nil vis por, n/s. 10% Dol, l gry, microxln, hd, nil vis por, n/s.	No show
595	600	60% Ls, lt gry, c - fxln, r acc calc, hd, pr vis por, n/s. 30% Slst, rd brn, aren, lith, hd, nil vis por, n/s. 10% Dol, l gry, microxln, hd, nil vis por, n/s.	No show
600	605	60% Ls, lt gry, c - fxln, r acc calc, hd, pr vis por, n/s. 30% Slst, rd brn, aren, lith, hd, nil vis por, n/s. 10% Dol, l gry, microxln, hd, nil vis por, n/s.	No show
605	610	60% Ls, lt gry, c - fxln, r acc calc, hd, pr vis por, n/s. 30% Slst, rd brn, aren, lith, hd, nil vis por, n/s. 10% Dol, l gry, microxln, hd, nil vis por, n/s.	No show
610	615	60% Ls, lt gry, c - fxln, r acc calc, hd, pr vis por, n/s. 30% Slst, rd brn, aren, lith, hd, nil vis por, n/s. 10% Dol, l gry, microxln, hd, nil vis por, n/s.	No show
615	620	80% Dol, lt gry, crpxln, v hd, pr vis por, n/s. 20% Slst, gry, aren, lith, hd, nil vis por, n/s.	No show
620	625	80% Dol, lt gry, crpxln, v hd, pr vis por, n/s. 20% Slst, gry, aren, lith, hd, nil vis por, n/s.	No show
625	630	100% Dol, lt gry, crpxln, v hd, pr vis por, n/s.	No show
630	635	100% Dol, lt gry, crpxln, v hd, pr vis por, n/s.	No show
635	655	100% Dol, lt gry, crpxln, v hd, pr vis por, n/s.	No show
655	660	60% Dol, lt gry, crpxln, v hd, pr vis por, n/s. 30% Ls, lt brn, cxln, hd, pr vis por, n/s. 10% Slst, gry, aren, lith, hd, nil vis por, n/s.	No show
660	665	60% Dol, wh gry, lut, fxln, calc ip, brit. 30% Ls, lt brn, crpxln, calc, brit. 10% Slst,gry, aren, lith, fis.	No show
665	670	60% Dol, wh gry, lut, fxln, calc ip, brit. 30% Ls, lt brn, crpxln, calc, brit. 10% Slst,gry, aren, lith, fis.	No show
670	675	60% Dol, wh gry, lut, fxln, calc ip, brit. 30% Ls, lt brn, crpxln, calc, brit. 10% Slst,gry, aren, lith, fis.	No show
675	680	60% Dol, wh gry, lut, fxln, calc ip, brit. 30% Ls, lt brn, crpxln, calc, brit. 10% Slst,gry, aren, lith, fis.	No show
680	685	70% Dol, wh gry, lut, fxln, calc ip, brit. 20% Ls, lt brn, crpxln, calc, brit. 10% Slst,gry, aren, lith, fis.	No show
685	690	80% Dol, wh gry, lut, fxln, calc ip, brit. 10% Ls, lt brn, crpxln, calc, brit. 10% Slst,gry, aren, lith, fis.	No show
690	695	80% Dol, wh gry, mxln, hd, nil vis por, n/s. 20% Sst, clr wh, f.q.g, vf, sb rnd, wl srt, dol cmt, prtl rexlzd, hd, pr vis por, n/s.	No show
695	700	60% Dol, wh gry, mxln, hd, nil vis por, n/s. 30% Slst ,gry, aren, lith, hd, nil vis por, n/s. 10% Sst, clr wh, f.q.g, vf, sb rnd, wl srt, dol cmt, prtl rexlzd, hd, pr vis por, n/s.	No show

From	To	OzAlpha-1 Cuttings Description	Fluorescence
700	705	80% Dol, wh gry, mxln, hd, nil vis por, n/s. 20% Slst, gry, aren, lith, hd, nil vis por, n/s.	No show
705	710	70% Dol, wh gry, mxln, hd, nil vis por, n/s. 20% Slst ,gry, aren, lith, hd, nil vis por, n/s. 10% Sst, clr wh, f.q.g, vf, sb rnd, wl srt, dol cmt, prtl rexlzd, hd, pr vis por, n/s.	No show
710	715	90% Dol, wh gry, mxln, hd, nil vis por, n/s. 10% Slst, gry, aren, lith, hd, nil vis por, n/s.	No show
715	720	90% Dol, wh gry, mxln, hd, nil vis por, n/s. 10% Slst, gry, aren, lith, hd, nil vis por, n/s.	No show
720	725	80% Dol, wh gry, mxln, hd, nil vis por, n/s. 20% Sst, clr wh, f.q.g, vf, sb rnd, wl srt, dol cmt, prtl rexlzd, hd, pr vis por, n/s.	No show
725	730	80% Dol, wh gry, mxln, hd, nil vis por, n/s. 20% Sst, clr wh, f.q.g, vf, sb rnd, wl srt, dol cmt, prtl rexlzd, hd, pr vis por, n/s.	No show
730	735	80% Dol, wh gry, mxln, hd, nil vis por, n/s. 20% Sst, clr wh, trnsl, vf, sb rnd, wl srt, dol cmt, prtl rexlzd, hd, pr vis por, n/s.	No show
735	740	80% Dol, wh gry, mxln, hd, nil vis por, n/s. 20% Sst, clr wh, trnsl, vf, sb rnd, wl srt, dol cmt, prtl rexlzd, hd, pr vis por, n/s.	No show
740	745	60% Sst, clr wh, trnsl, vf, sb rnd, wl srt, dol cmt, prtl rexlzd, hd, pr vis por, n/s. 40% Dol, wh gry, mxln, hd, nil vis por, n/s.	No show
745	750	60% Sst, clr wh, trnsl, vf, sb rnd, wl srt, dol cmt, prtl rexlzd, hd, pr vis por, n/s. 40% Dol, wh gry, mxln, hd, nil vis por, n/s.	No show
750	755	80% Sst, clr wh, trnsl, vf, sb rnd, wl srt, dol cmt, prtl rexlzd, hd, pr vis por, n/s. 20% Dol, wh gry, mxln, hd, nil vis por, n/s.	No show
755	760	80% Sst, clr wh, trnsl, vf, sb rnd, wl srt, dol cmt, prtl rexlzd, hd, pr vis por, n/s. 20% Dol, pa yel-gry, mxln, hd, nil vis por, n/s.	No show
760	765	80% Sst, clr wh, trnsl, vf, sb rnd, wl srt, dol cmt, prtl rexlzd, hd, pr vis por, n/s. 20% Dol, pa yel-gry, mxln, hd, nil vis por, n/s.	No show
765	770	80% Sst, clr wh, trnsl, vf, sb rnd, wl srt, dol cmt, prtl rexlzd, hd, pr vis por, n/s. 20% Dol, pa yel-gry, mxln, hd, nil vis por, n/s.	No show
770	775	50% Sst, l gry, qtz, trnsl, f, rnd, wl srt, gry mtrx, dol cmt, hd, pr vis por, n/s 40% Sst, clr wh, trnsl, vf c, sb rnd, pr srtd, dol cmt, hd, nil vis por, n/s. 10% Dol, pa l yel brn, mxln crpxln, calc ip, brit, acc chrt.	No show
775	780	50% Sst, l gry, qtz, trnsl, f, rnd, wl srt, gry mtrx, dol cmt, hd, pr vis por, n/s 40% Sst, clr wh, trnsl, vf c, sb rnd, pr srtd, dol cmt, hd, nil vis por, n/s. 10% Dol, pa yel-gry, mxln, hd, nil vis por, n/s.	No show
780	785	50% Sst, l gry, qtz, trnsl, f, rnd, wl srt, gry mtrx, dol cmt, hd, pr vis por, n/s 40% Sst, clr wh, trnsl, vf c, sb rnd, pr srtd, dol cmt, hd, nil vis por, n/s.10% Dol, pa yel-gry, mxln, hd, nil vis por, n/s.	No show
785	790	50% Sst, l gry, qtz, trnsl, f, rnd, wl srt, gry mtrx, dol cmt, hd, pr vis por, n/s 40% Sst, clr wh, trnsl, vf c, sb rnd, pr srtd, dol cmt, hd, nil vis por, n/s. 10% Dol, pa yel-gry, mxln, hd, nil vis por, n/s.	No show
790	795	50% Sst, clr wh, trnsl, vf c, sb rnd, pr srtd, dol cmt, hd, nil vis por, n/s. 40% Dol, pa l yel brn, mxln crpxln, calc ip, brit, acc chrt. 10% Slst, aren, mnr lmn vis, sil cmt, sb blky.	No show

From	To	OzAlpha-1 Cuttings Description	Fluorescence
795	800	50%Sst, clr wh, trnsl, vf c, sb rnd, pr srtd, dol cmt, hd, nil vis por, n/s. 40% Dol, pa yel-gry, mxln, hd, nil vis por, n/s. 10% Slst, aren, hd, nil vis por, n/s.	No show
800	805	80% Dol, pa yel-gry, mxln, hd, nil vis por, n/s. 20% Slst, aren, hd, nil vis por, n/s.	No show
805	810	80% Dol, pa yel-gry, mxln, hd, nil vis por, n/s. 20% Slst, aren, hd, nil vis por, n/s.	No show
810	815	70% Dol, pa yel-gry, mxln, hd, nil vis por, n/s. 20% Slst, aren, hd, nil vis por, n/s. 10% Sst, clr wh, trnsl, vf c, sb rnd, pr srtd, dol cmt, hd, nil vis por, n/s.	No show
815	820	70% Dol, pa yel-gry, mxln, hd, nil vis por, n/s. 20% Slst, aren, hd, nil vis por, n/s. 10% Sst, clr wh, trnsl, vf c, sb rnd, pr srtd, dol cmt, hd, nil vis por, n/s.	No show
820	825	50% Slst, aren, hd, nil vis por, n/s. 40% Dol, pa yel-gry, mxln, hd, nil vis por, n/s. 10% Sst, clr wh, trnsl, vf c, sb rnd, pr srtd, dol cmt, hd, nil vis por, n/s.	No show
825	830	50% Slst, aren, hd, nil vis por, n/s. 40% Dol, pa yel-gry, mxln, hd, nil vis por, n/s. 10% Sst, clr wh, trnsl, vf c, sb rnd, pr srtd, dol cmt, hd, nil vis por, n/s.	No show
830	835	50% Slst, aren, hd, nil vis por, n/s. 40% Dol, pa yel-gry, mxln, hd, nil vis por, n/s. 10% Sst, clr wh, trnsl, vf c, sb rnd, pr srtd, dol cmt, hd, nil vis por, n/s.	No show
835	840	50% Slst, aren, hd, nil vis por, n/s. 40% Dol, pa yel-gry, mxln, hd, nil vis por, n/s. 10% Sst, clr wh, trnsl, vf c, sb rnd, pr srtd, dol cmt, hd, nil vis por, n/s.	No show
840	845	60% Slst, aren, hd, nil vis por, n/s. 40% Dol, pa yel-gry, mxln, hd, nil vis por, n/s.	No show
845	850	60% Slst, aren, hd, nil vis por, n/s. 40% Dol, pa yel-gry, mxln, hd, nil vis por, n/s.	No show
850	855	60% Slst, aren, mnr lmn vis, sil cmt, sb blky. 30% Dol, pa l yel brn, mxln crpxln, calc ip, brit, acc chrt. 10% Ls, lt brn, crpxln, acc chrt, hrd.	No show
855	860	60% Slst, aren, hd, nil vis por, n/s. 30% Dol, pa yel-gry, mxln, hd, nil vis por, n/s. 10% Ls, lt brn, microxln, acc chrt, hd, nil vis por, n/s.	No show
860	865	60% Slst, aren, hd, nil vis por, n/s. 30% Dol, pa yel-gry, mxln, hd, nil vis por, n/s. 10% Ls, lt brn, microxln, acc chrt, hd, nil vis por, n/s.	No show
865	870	70% Slst, aren, hd, nil vis por, n/s. 30% Dol, pa yel-gry, mxln, hd, nil vis por, n/s. 10% Ls, lt brn, microxln, acc chrt, hd, nil vis por, n/s.	No show
870	875	60% Slst, aren, hd, nil vis por, n/s. 30% Dol, pa yel-gry, mxln, hd, nil vis por, n/s. 10% Ls, lt brn, microxln, acc chrt, hd, nil vis por, n/s.	No show
875	880	60% Slst, aren, hd, nil vis por, n/s. 30% Dol, pa yel-gry, mxln, hd, nil vis por, n/s. 10% Ls, lt brn, microxln, acc chrt, hd, nil vis por, n/s.	No show
880	885	90% Dol, pa yel-gry, mxln, hd, nil vis por, n/s. 10% Slst, aren, hd, nil vis por, n/s.	No show
885	890	90% Dol, pa yel-gry, mxln, hd, nil vis por, n/s. 10% Slst, aren, hd, nil vis por, n/s.	No show

From	To	OzAlpha-1 Cuttings Description	Fluorescence
890	900	60% Dol, pa yel-gry, mxln, hd, nil vis por, n/s. 30% Ls, lt brn, microxln, acc chrt, hd, nil vis por, n/s. 10% Slst, aren, hd, nil vis por, n/s.	No show
900	905	60% Dol, pa yel-gry, mxln, hd, nil vis por, n/s. 30% Ls, lt brn, microxln, acc chrt, hd, nil vis por, n/s. 10% Slst, aren, hd, nil vis por, n/s.	No show
905	910	60% Dol, pa yel-gry, mxln, hd, nil vis por, n/s. 30% Ls, lt brn, microxln, acc chrt, hd, nil vis por, n/s. 10% Slst, aren, hd, nil vis por, n/s.	No show
910	925	No sample - mudlogging unit offline	
925	935	70% Sst, wh - lt gry, trnsl, vf, rnd, wl srt, calc cmt, hd, pr vis por, n/s. 20% Sst, l gry, qtz, trnsp, vf, rnd, wl srt, dol cmt, fri-hd, pr vis por, n/s. 10% Dol, yel - brn, crpxln, hd, no vis por, n/s, .	Poor
935	945	60% Sst, wh - l gry, trnsl, vf, rnd, wl srt, calc cmt, fri-hd, pr vis por, n/s. 30% Sst, l gry, qtz, trnsp, vf, rnd, wl srt, dol cmt, fri-hd, pr vis por, n/s. 10% Slst, d gry - grn, aren, vf qtz, hd, n/s.	Poor
945	950	30% Sst, wh - lt gry, trnsl, vf, rnd, wl srt, calc cmt, fri-hd, pr vis por, n/s. 30% Sst, lt gry, qtz, trnsp, vf, rnd, wl srt, dol cmt, fri-hd, pr vis por, n/s. 20% Slst, dk gry - gn, aren, r vf qtz, hd, nil vis por, n/s. 20% Dol , yel - brn, crpxln, mod hd, nil vis por, n/s.	No show
950	955	70% Dol , yel - brn, crpxln, mod hrt, nil vis por, n/s. 20% Sst, wh - l gry, trnsl, vf, rdd, wl srt, calc cmt, mod hrt, pr vis por, n/s. 30% Sst, lt gry, qtz, trnsp, vf, rdd, wl srt, dol cmt, mod hd, pr vis por, n/s. 10% Slst, dk gry - gn, aren, r vf qtz, mod hd blky, n/s.	No show
955	960	60% Ls, wh-gry, micro-cxln, hd, nil vis por. 20% Dol, yel - brn gry, microxln, hd, nil vis por, n/s. 20% Sltst, dk gry, aren, micromic, dol cmt, hd, nil vis por, n/s.	No show
960	965	60% Ls, wh-gry, micro-cxln, hd, nil vis por, n/s. 30% Dol, yel - brn gry, microxln, hd, nil vis por. 10% Sltst, d gry, aren, micromic, dol cmt, hd, nil vis por, n/s.	No show
965	970	60% Ls, wh-gry, microxln, hd, nil vis por, n/s. 30% Dol, yel - brn gry, microxn, hd, nil vis por, n/s. 10% Sltst, d gry, aren, micromic, dol cmt, hd, nil vis por, n/s.	No show
970	975	60% Ls, wh-gry, microxln, hd, nil vis por, n/s. 30% Sst, wh, - lt gry, vf, sb rnd, wl srt, calc/dol cmt, hd, nil vis por, n/s. 10% Sltst, dk gry, aren, micromic, dol cmt, hd, nil vis por, n/s.	No show
975	980	80% Ls, wh-gry, microxln, hd, nil vis por, n/s. 20% Sltst, dk gry, aren, micromic, dol cmt, hd, nil vis por, n/s.	No show
980	985	80% Ls, wh-gry, microxln, hd, nil vis por, n/s. 20% Sltst, dk gry, aren, micromic, dol cmt, hd, nil vis por, n/s.	No show
985	990	70% Ls, wh-gry, microxln, hd, nil vis por, n/s. 20% Sltst, dk gry, aren, micromic, dol cmt, hd, nil vis por, n/s. 10% Sst, clss -wh - lt gry, vf, wl srt, ang-sbrnd, calc cmt, tr pyr, hd, pr vis por, n/s.	No show
990	995	60% Ls, wh-gry, microxln, hd, nil vis por, n/s. 40% Sltst, dk gry, aren, micromic, dol cmt, hd, nil vis por, n/s.	No show
995	1000	70% Ls, wh-gry, microxln, hd, nil vis por, n/s. 20% Sltst, dk gry, aren, micromic, dol cmt, hd, nil vis por, n/s. 10% Sst, clss -wh - lt gry, vf, wl srt, ang-sbrnd, calc cmt, tr pyr, hd, pr vis por, n/s.	No show

From	To	OzAlpha-1 Cuttings Description	Fluorescence
1000	1005	70% Ls, wh-gry, microxln, hd, nil vis por, n/s. 20% Sltst, dk gry, aren, micromic, dol cmt, hd, nil vis por, n/s. 10% Sst, clss -wh - lt gry, vf, wl srt, ang-sbrnd, calc cmt, tr pyr, hd, pr vis por, n/s.	No show
1005	1010	50% Ls, wh-gry, microxln, hd, nil vis por, n/s. 40% Sltst, dk gry, aren, micromic, dol cmt, hd, nil vis por, n/s. 10% Sst, clss -wh - lt gry, vf, wl srt, ang-sbrnd, calc cmt, tr pyr, hd, pr vis por, n/s.	No show
1010	1015	50% Ls, wh-gry, microxln, hd, nil vis por, n/s. 40% Sltst, dk gry, aren, micromic, dol cmt, hd, nil vis por, n/s. 10% Sst, clss -wh - lt gry, vf, wl srt, ang-sbrnd, calc cmt, tr pyr, hd, pr vis por, n/s.	No show
1015	1020	60% Ls, wh-gry, microxln, hd, nil vis por, n/s. 30% Sltst, dk gry, aren, micromic, dol cmt, hd, nil vis por, n/s. 10% Sst, clss -wh - lt gry, vf, wl srt, ang-sbrnd, calc cmt, tr pyr, hd, pr vis por, n/s.	No show
1020	1025	90% Ls, pa yel brn - yel brn, lt - dk gry, mott, hd, microxln, hd, nil vis por, n/s. 10% Sltst, dk brn - gry, sl dol, sl micromic, sl aren, hd, nil vis por, n/s.	No show
1025	1030	40% Sst, wh - clr, vf, wl srt, sbrnd, com wh arg mtx, com calc cmt, tr dol cmt ip, hd, pr vis por, n/s. 40% Ls, pa yel brn - yel brn, lt - dk gry, mott, hd, microxln, hd, nil vis por, n/s. 20% Sltst, dk brn - gry, mnr dol, mnr micromic, hd, nil vis por, n/s.	No show
1176	1180	Dol, pl yel brn to med gry, med-f xln, hd-v hd, sbconch-flt plty brk, com calc, tr anhy, rr pyr, pr vis por, n/s.	No Show
1180	1185	Dol, dk gry, dk brn gry-pa brn, f-med xln mnr micrxln, hd, brit, tr-com calc,tr bit mat, rr pyr, pr vis por, n/s. Dol [2] brn blk-blk gry, microxln, nil vis por, n/s. Calc slst, dk gry, arg - calc ip, hd, mnr bit stn, r sb mm lam vis, nil vis por, no fluor, n/s.	No Show
1185	1186	Calc Dol, yel brn, f-med xln, hd, brit, com-v calc calc, rr pyr, poor vis por, n/s	No Show
1186	1189	Calc Dol, yel brn, f-med xln, hd, brit, com vf-c lse euhd calc xls, tr bit frags, tr bit ctd calc xls, poor vis por, n/s	No Show

App J Core Analyses

J.1 Porosity, Permeability and Water Saturation Measurements

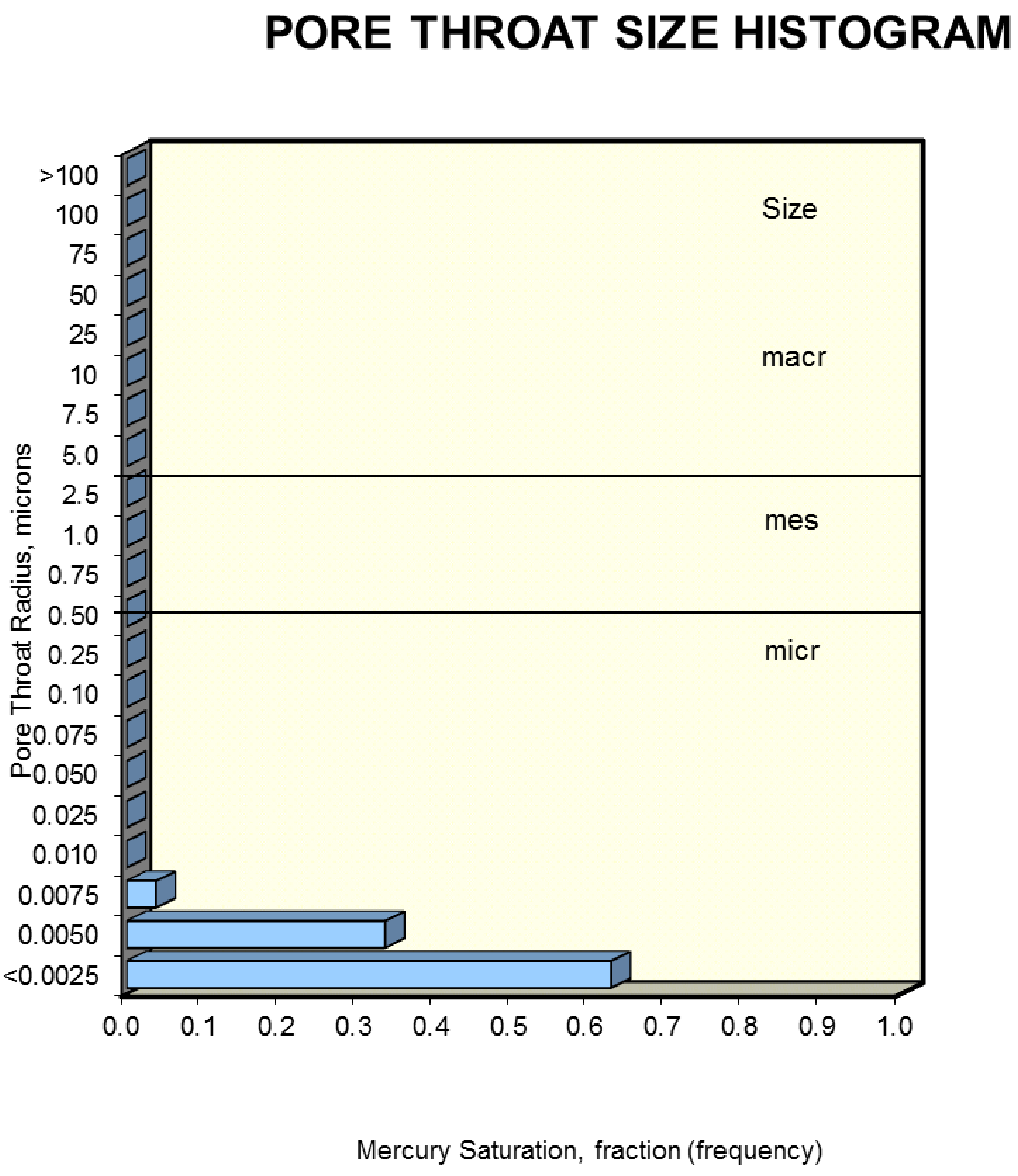
Porosity, Permeability and Water Saturation Measurements at 800 and 3000 psi confining pressure

PRELIMINARY POROSITY, PERMEABILITY, and GRAIN DENSITY

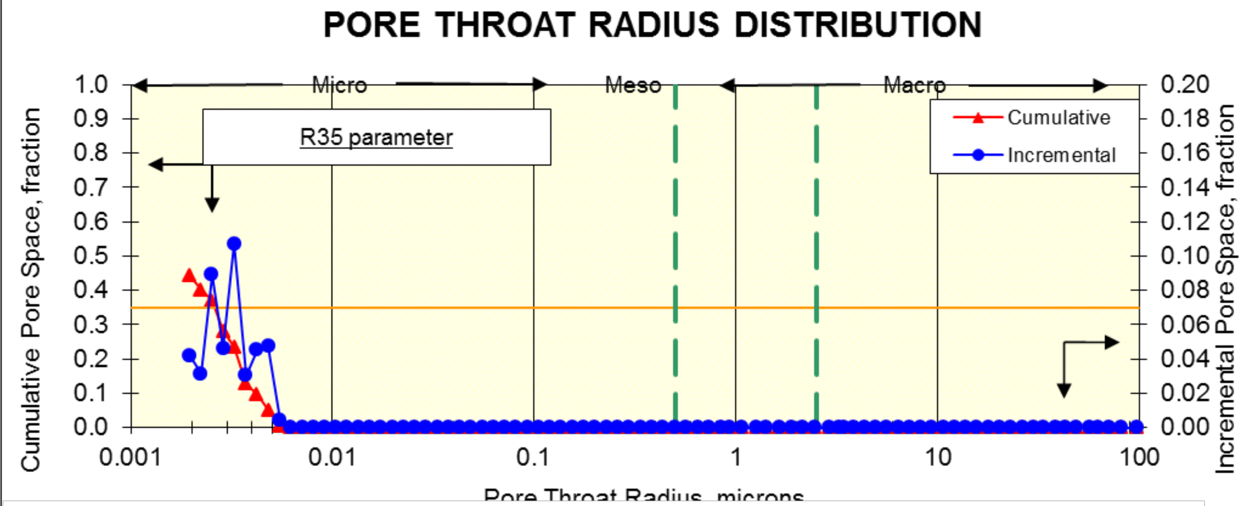
		CMS 300 CONFINING STRESS (800psi)				CMS 300 CONFINING STRESS (3000psi)				
SAMPLE NUMBER	SAMPLE DEPTH (m)	Kinf (md)	Kair (md)	PORO (%)	Swi (%)	Kinf (md)	Kair (md)	PORO (%)	GRAIN DENSITY (g/cc)	COMMENTS
1A	1109.65	-	-	2.9	21.2	-	-	-	2.754	Fractured
2	1137.58	0.0003	0.0017	3.4	54.0	-	-	-	2.708	
3A	1149.77	-	-	1.7	67.1	-	-	-	2.709	Fractured
4A	1155.13	-	-	3.4	74.6	-	-	-	2.647	Fractured
5	1159.32	-	-	3.5	30.0	-	-	-	2.704	Fractured
6A	1162.55	-	-	6.6	81.3	-	-	-	2.826	Fractured
7A	1165.47	0.0009	0.0045	4.0	63.8	0.0003	0.0021	3.5	2.854	
8	1192.65	0.0001	0.0006	0.8	43.1	-	-	-	2.843	
9A	1201.44	0.0001	0.0008	2.0	40.7	-	-	-	2.720	
10A	1206.43	-	-	0.78	54.3	-	-	-	2.703	Fractured
11A	1211.60	0.003	0.013	6.4	56.2	0.002	0.009	6.0	2.783	Vugs Present
12A	1216.17	0.716	1.03	20.4	95.6	0.602	0.865	20.1	2.775	
13A	1222.49	-	-	2.9	16.4	-	-	-	2.753	Fractured

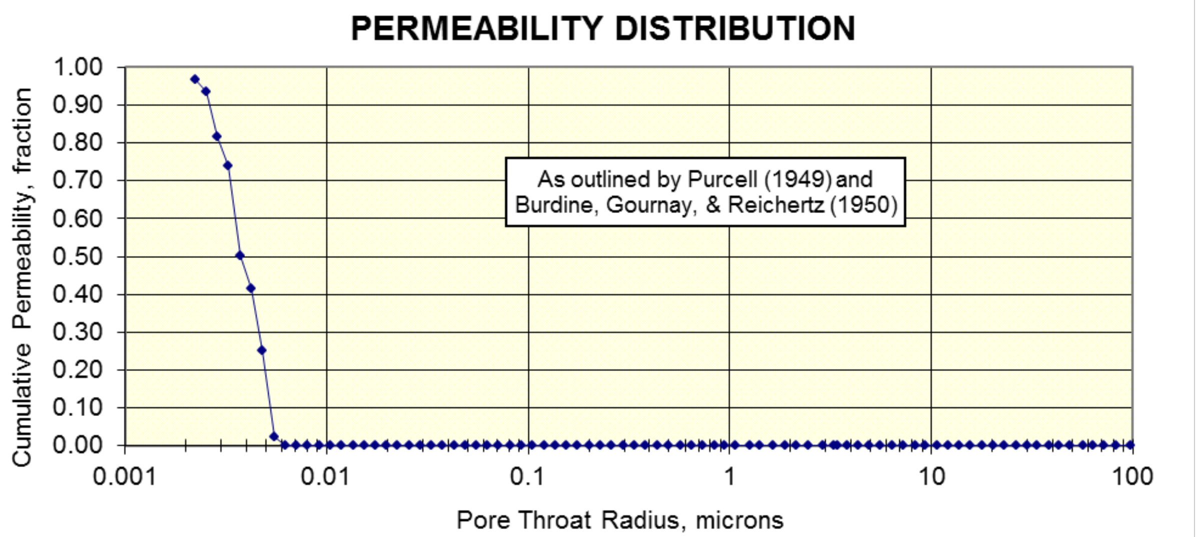
J.2 Mercery Injection Capillary Pressure

Company:	STATOIL			**Sample:**		**4A**	un-	
Well:	OZAlpha 1			Depth, meters:		1155.13	stressed	
Field:	-			Klinkenberg Permeability, md:			n/a	
Formation:	-			Permeability to Air, md:			n/a	
Location:	Australia			Swanson Permeability, md:			1.1E-06	
File:	14039			Porosity, fraction:			0.010	
				maximum Sb/Pc, fraction:			0.0000	
				R35, microns:			0.0036	
				R50 (median pore throat radius):			0.0033	



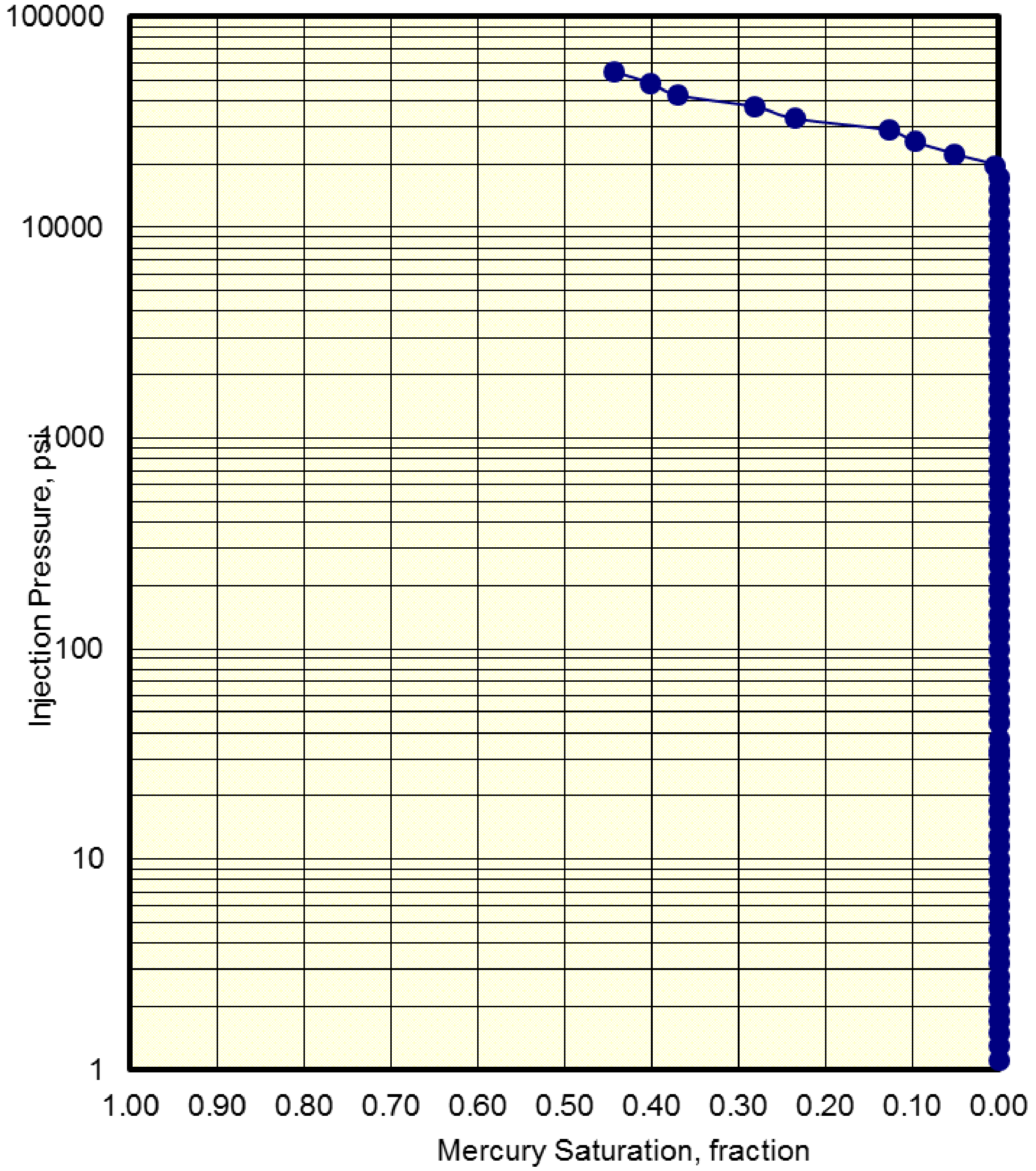
Company:	STATOIL		**Sample:**		**4A**	un-stressed
Well:	OZAlpha 1		Depth, meters:		1155.13	
Field:	-		Klinkenberg Permeability, md:			n/a
Formation:	-		Permeability to Air, md:			n/a
Location:	Australia		Swanson Permeability, md:			1.1E-06
File:	14039		Porosity, fraction:			0.010
			maximum Sb/Pc, fraction:			0.0000
			R35, microns:			0.0036
			R50 (median pore throat radius):			0.0033





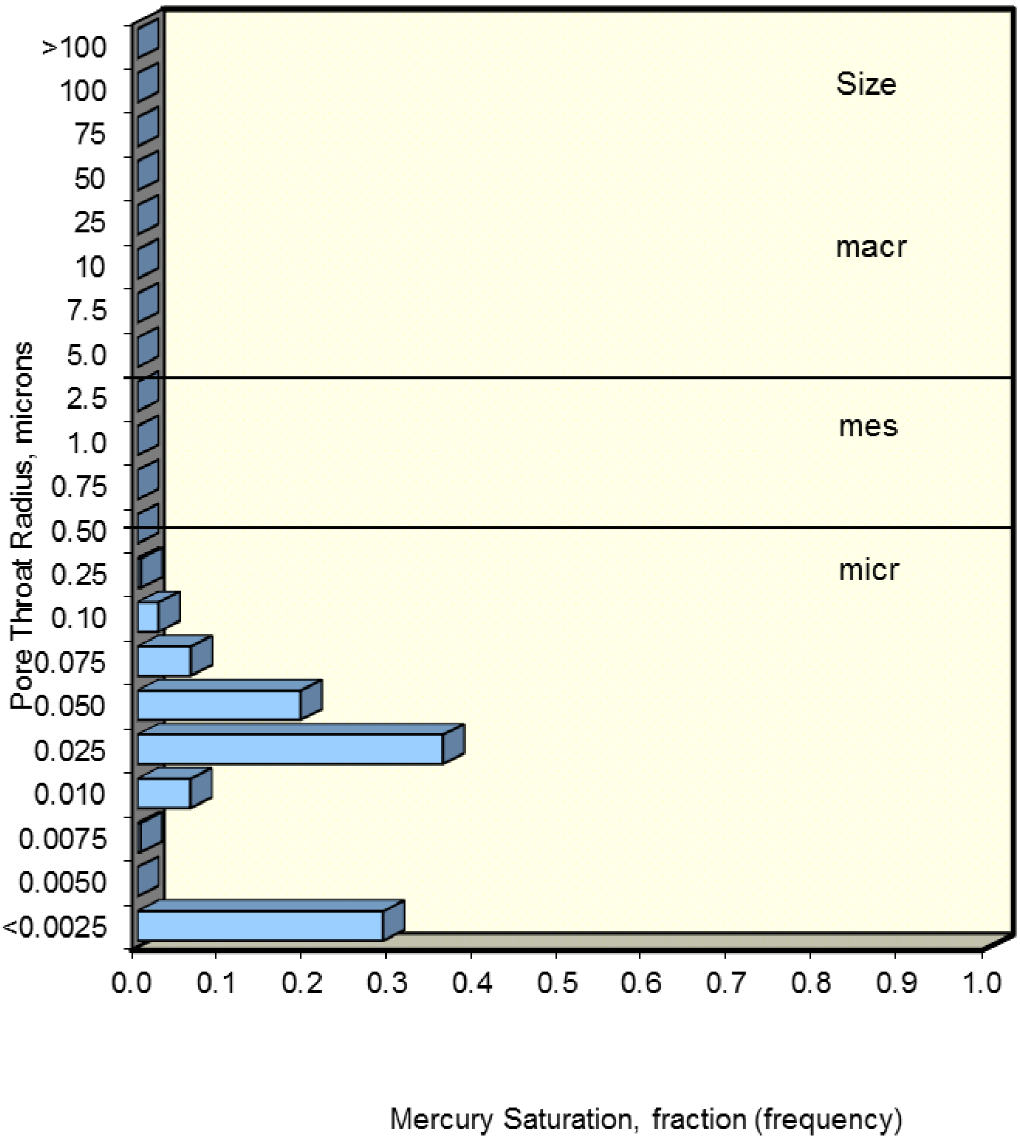
Company:	STATOIL	**Sample:**		**4A**	un-stressed
Well:	OZAlpha 1	Depth, meters:		1155.13	
Field:	-	Klinkenberg Permeability, md:			n/a
Formation:	-	Permeability to Air, md:			n/a
Location:	Australia	Swanson Permeability, md:			1.1E-06
File:	14039	Porosity, fraction:			0.010
		maximum Sb/Pc, fraction:			0.0000
		R35, microns:			0.0036
		R50 (median pore throat radius):			0.0033

MERCURY INJECTION

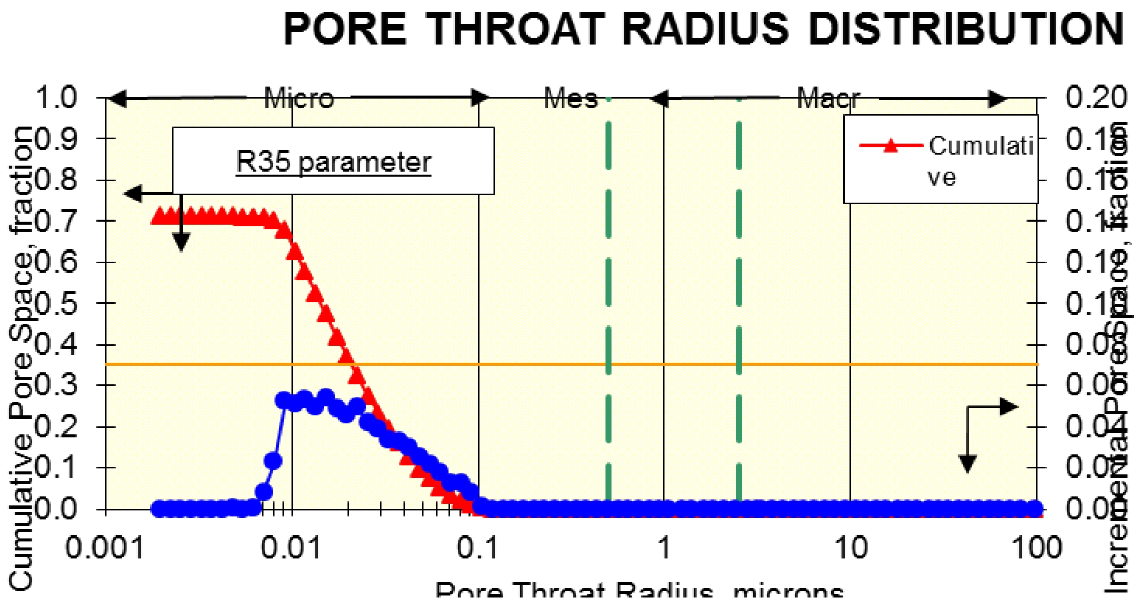


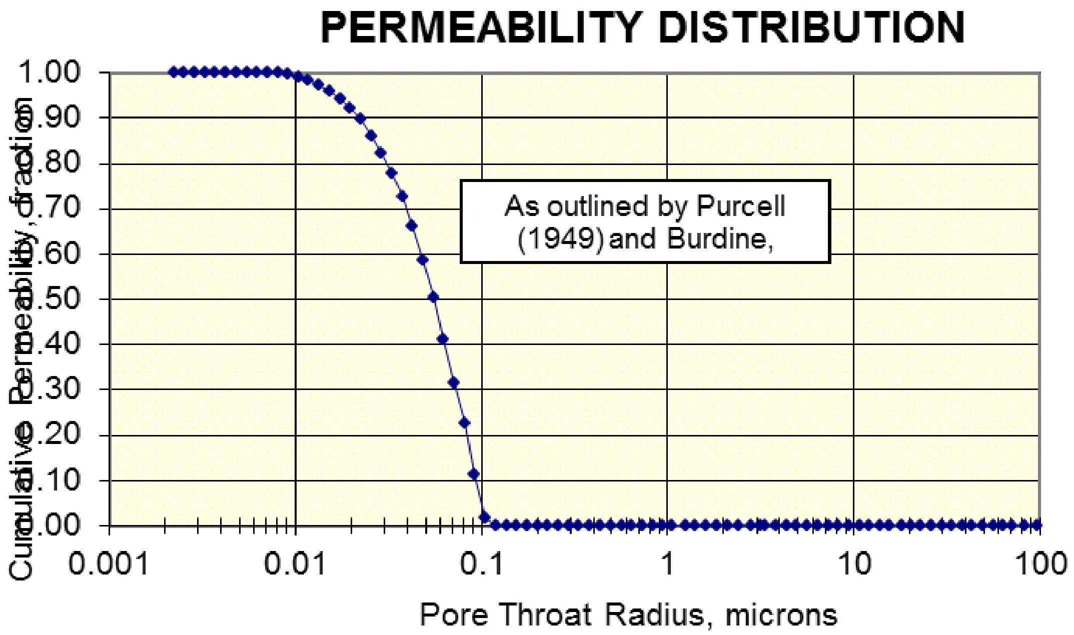
Company:	STATOIL	**Sample:** 7A	un-stressed
Well:	OZAlpha 1	Depth, meters: 1165.47	
Field:	-	Klinkenberg Permeability, md:	n/a
Formation:	-	Permeability to Air, md:	n/a
Location:	Australia	Swanson Permeability, md:	0.0003
File:	14039	Porosity, fraction:	0.038
		maximum Sb/Pc, fraction:	0.000
		R35, microns:	0.028
		R50 (median pore throat radius):	0.021

PORE THROAT SIZE HISTOGRAM



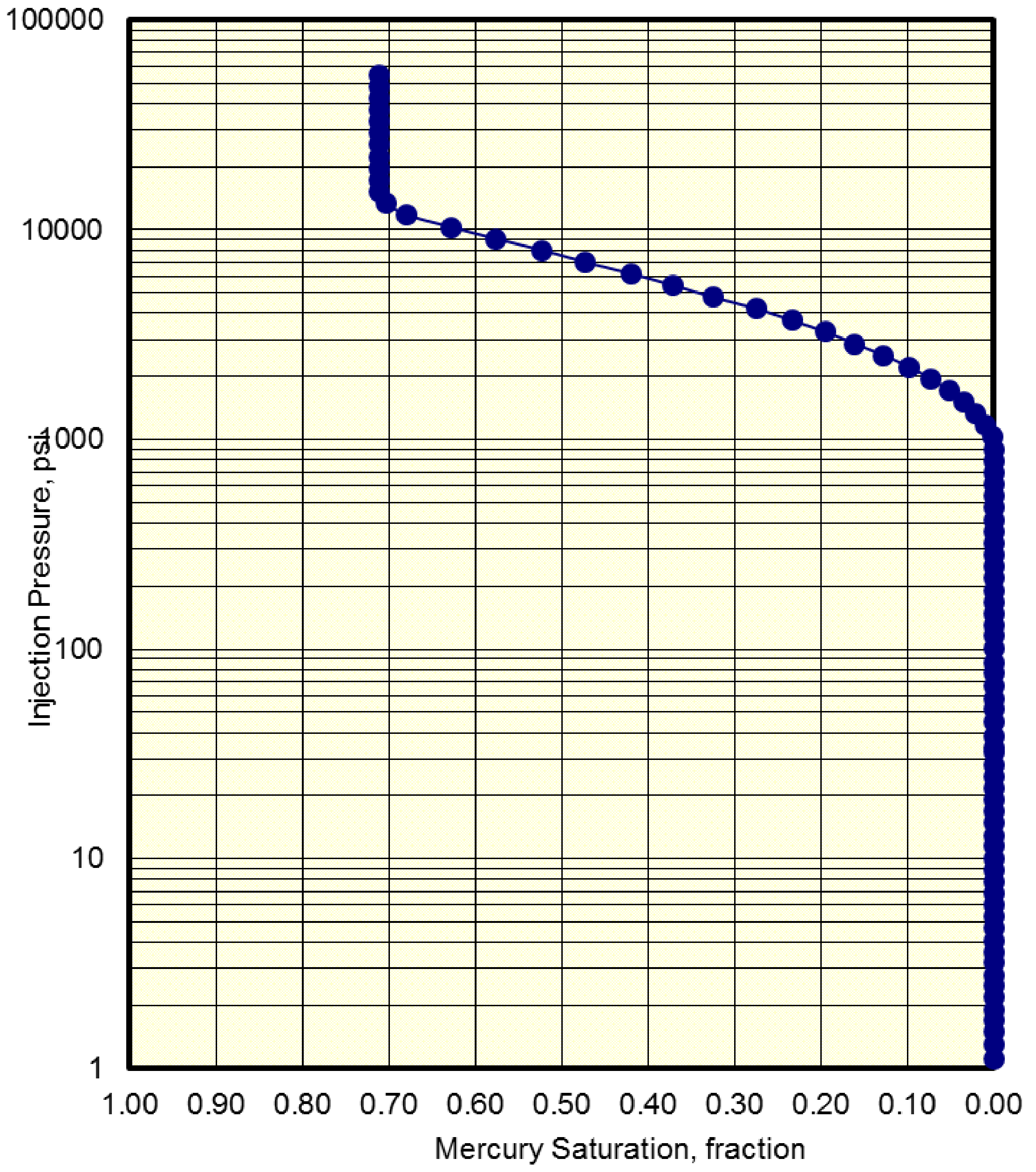
Company:	STATOIL	Sample:		7A	un-
Well:	OZAlpha 1	Depth, meters:		1165.47	stressed
Field:	-	Klinkenberg Permeability, md:			n/a
Formation:	-	Permeability to Air, md:			n/a
Location:	Australia	Swanson Permeability, md:			0.0003
File:	14039	Porosity, fraction:			0.038
		maximum Sb/Pc, fraction:			0.000
		R35, microns:			0.028
		R50 (median pore throat radius):			0.021





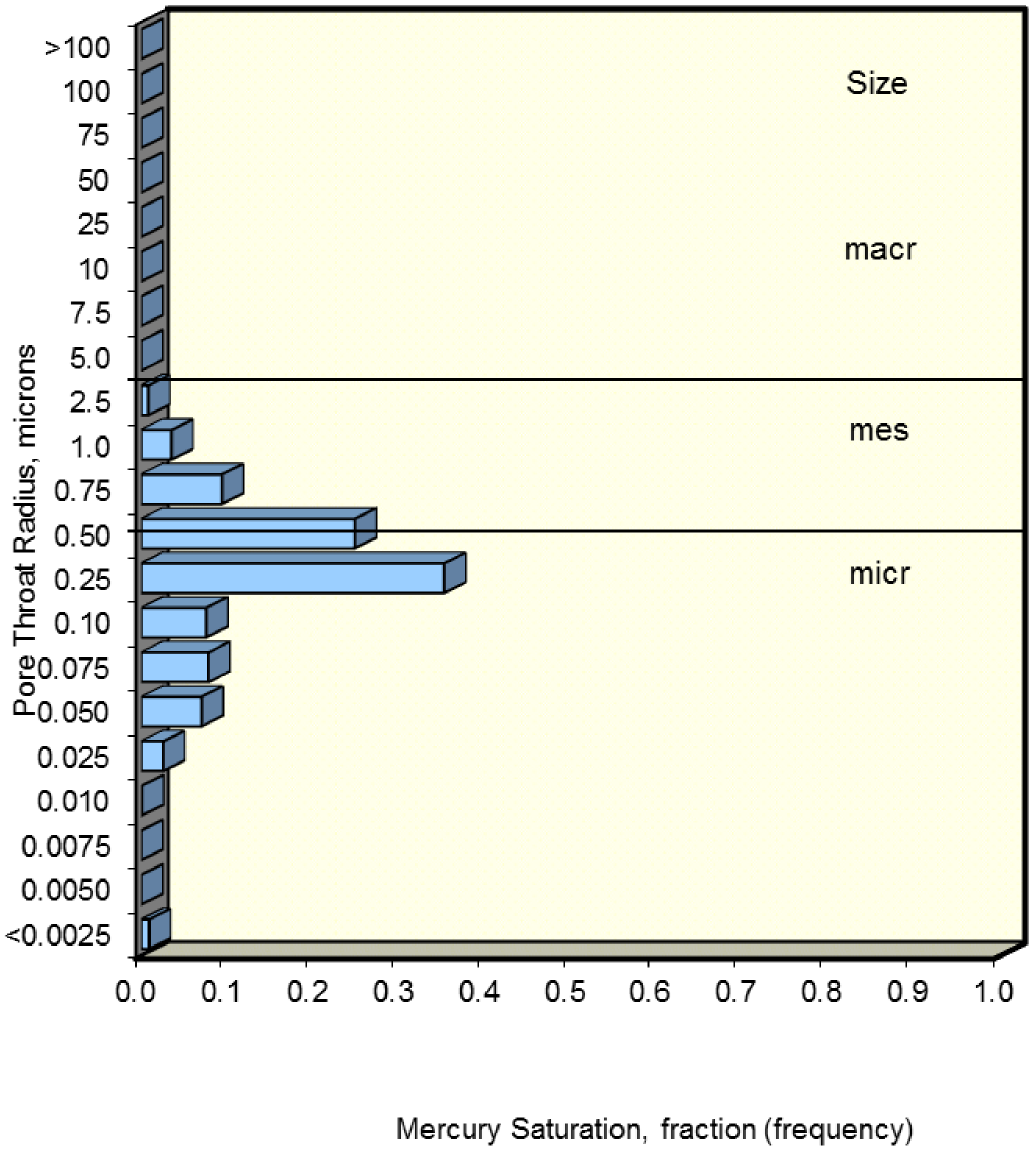
Company:	STATOIL	**Sample:**	**7A**	un-
Well:	OZAlpha 1	Depth, meters:	1165.47	stressed
Field:	-	Klinkenberg Permeability, md:		n/a
Formation:	-	Permeability to Air, md:		n/a
Location:	Australia	Swanson Permeability, md:		0.0003
File:	14039	Porosity, fraction:		0.038
		maximum Sb/Pc, fraction:		0.000
		R35, microns:		0.028
		R50 (median pore throat radius):		0.021

MERCURY INJECTION

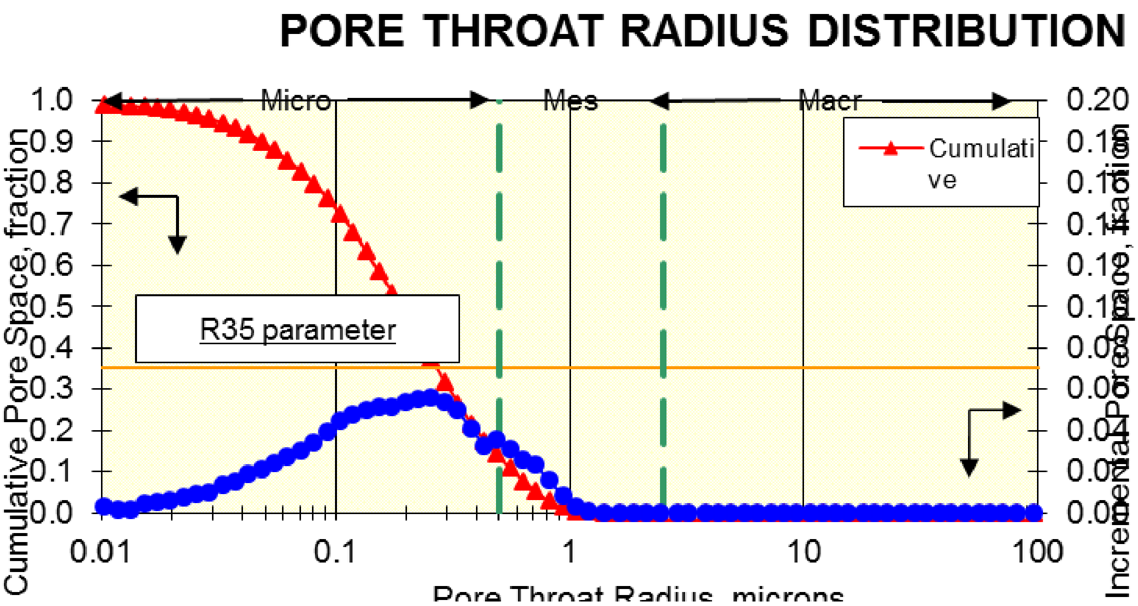


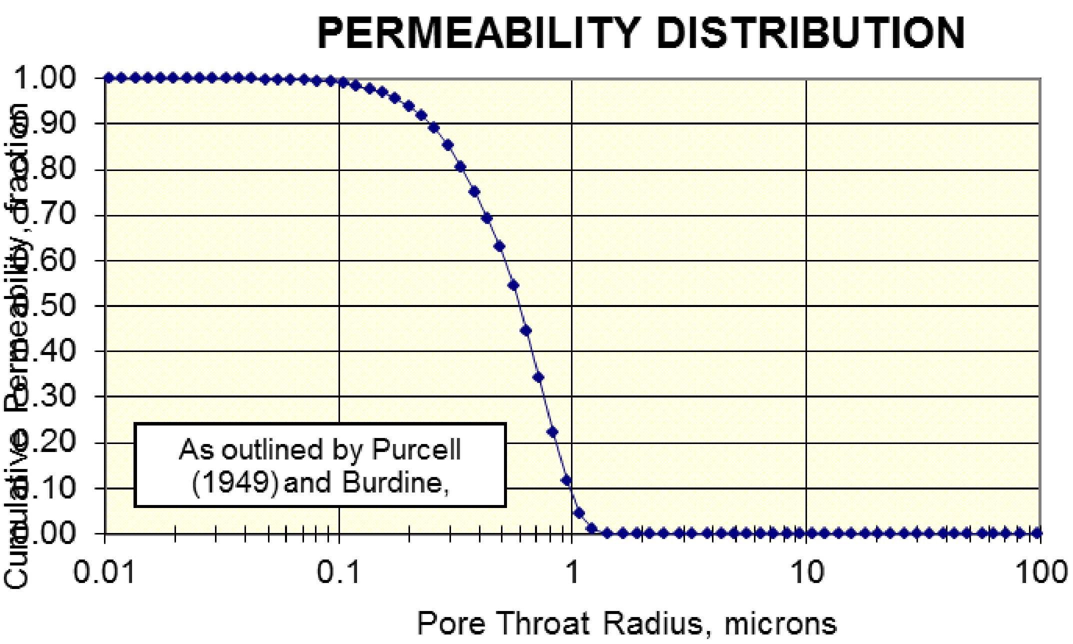
Company:	STATOIL	**Sample:**		**12A**	un-
Well:	OZAlpha 1	Depth, meters:		1216.17	stressed
Field:	-	Klinkenberg Permeability, md:			n/a
Formation:	-	Permeability to Air, md:			n/a
Location:	Australia	Swanson Permeability, md:			0.34409
File:	14039	Porosity, fraction:			0.171
		maximum Sb/Pc, fraction:			0.015
		R35, microns:			0.27
		R50 (median pore throat radius):			0.19

PORE THROAT SIZE HISTOGRAM



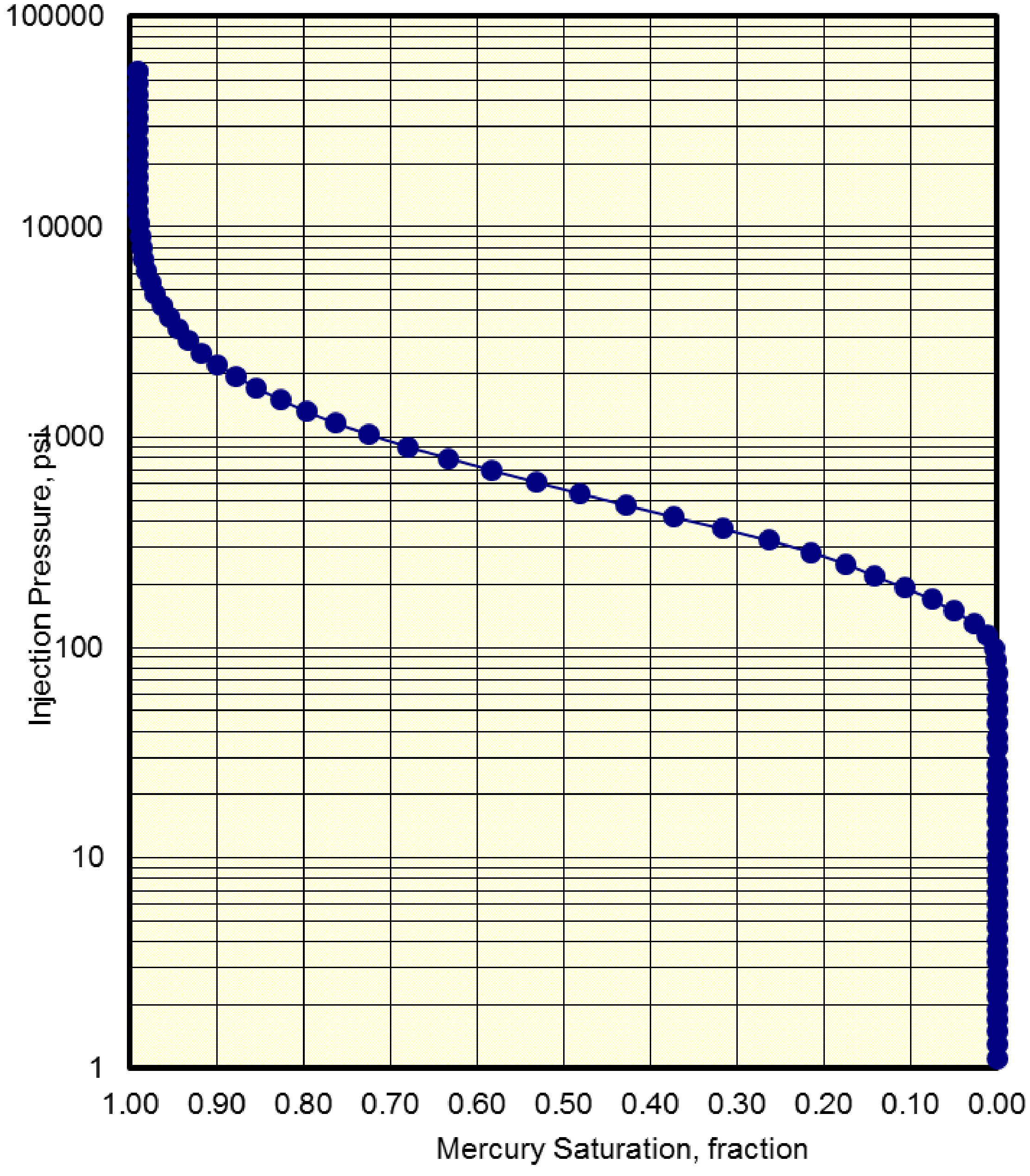
Company:	STATOIL			**Sample:**		**12A**	un-	
Well:	OZAlpha 1			Depth, meters:		1216.17	stressed	
Field:	-			Klinkenberg Permeability, md:			n/a	
Formation:	-			Permeability to Air, md:			n/a	
Location:	Australia			Swanson Permeability, md:			0.34409	
File:	14039			Porosity, fraction:			0.171	
				maximum Sb/Pc, fraction:			0.015	
				R35, microns:			0.27	
				R50 (median pore throat radius):			0.19	





Company:	STATOIL		**Sample:**		**12A**	un-
Well:	OZAlpha 1		Depth, meters:		1216.17	stressed
Field:	-		Klinkenberg Permeability, md:			n/a
Formation:	-		Permeability to Air, md:			n/a
Location:	Australia		Swanson Permeability, md:			0.34409
File:	14039		Porosity, fraction:			0.171
			maximum Sb/Pc, fraction:			0.015
			R35, microns:			0.27
			R50 (median pore throat radius):			0.19

MERCURY INJECTION



J.3 XRD Analyses

X-RAY DIFFRACTION DATA OZALPHA-1

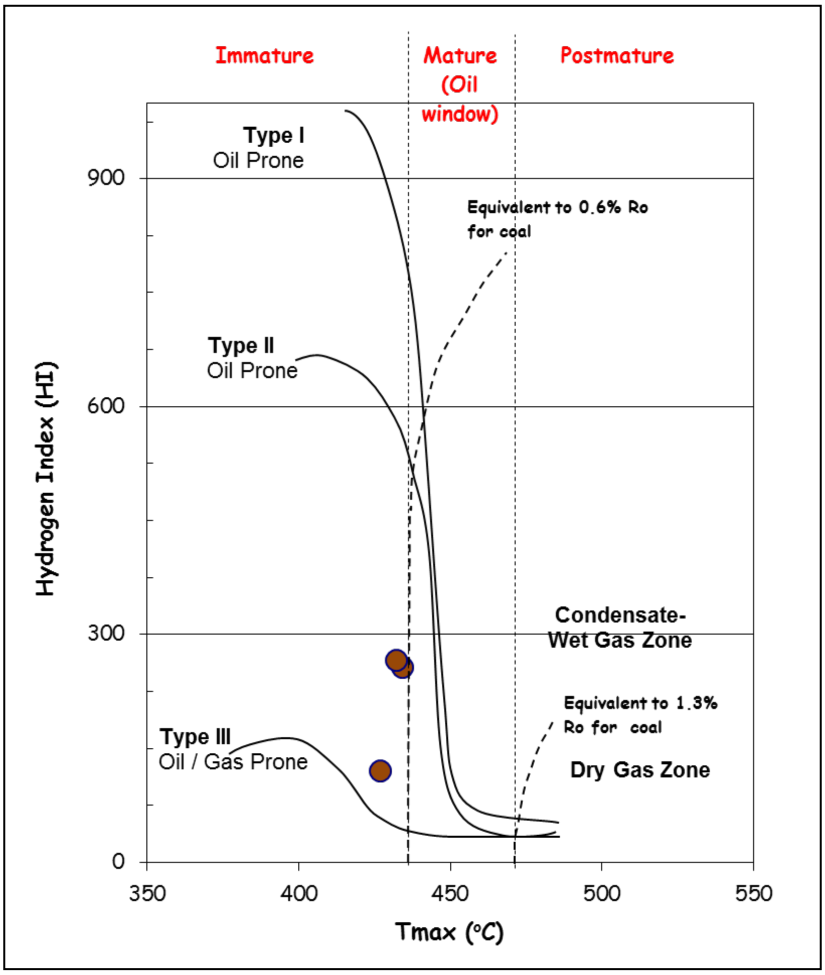
Depth	(Weight %)																% Smect in I/S
	CALCULATED WHOLE ROCK COMPOSITION										CLAY MINERALOGY						
															Mixed-Layer		
(m)	Quartz	K-Feldspar	Plagioclase	Fluorite	Calcite	Dolomite	Siderite	Pyrite	Marcasite	Total Clay	Illite & Mica	Kaolinite	Chlorite	Smectite	Illite/ Smectite	Chlorite/ Smectite	
1109.62	2.0	0.0	0.7	0.0	91.3	0.7	0.0	0.0	0.0	5.4	1.7	1.3	0.7	0.0	1.7	0.0	50-60
1137.60	34.1	4.9	4.6	0.0	9.0	23.0	0.2	1.2	1.1	21.9	9.3	0.2	8.8	0.0	0.0	3.6	30-40
1149.62	25.0	2.9	2.6	0.0	0.8	43.6	0.5	1.2	1.6	21.8	9.7	0.0	7.3	0.9	3.9	0.0	15-25
1155.09	36.0	6.2	4.3	0.0	1.9	21.3	0.4	2.9	0.0	26.9	10.1	2.9	8.2	1.6	4.2	0.0	5-10
1159.39	22.6	4.1	1.5	0.0	0.2	53.9	0.0	2.3	0.0	15.4	7.2	0.1	5.8	2.3	0.0	0.0	
1162.50	2.7	1.2	0.0	8.4	19.6	63.0	0.9	1.4	0.0	2.7	2.5	0.0	0.0	0.0	0.2	0.0	5-10
1165.42	1.3	0.0	0.0	0.0	0.2	96.3	0.0	0.0	0.0	2.2	2.2	0.0	0.0	0.0	0.0	0.0	
1192.68	5.1	1.0	0.0	0.0	0.0	90.6	0.0	0.7	0.0	2.6	2.6	0.0	0.0	0.0	0.0	0.0	
1201.41	7.7	1.1	0.6	0.0	44.5	37.3	0.9	1.2	0.9	5.8	5.8	0.0	0.0	0.0	0.0	0.0	
1206.40	3.9	0.0	0.0	0.0	85.1	7.6	0.2	0.6	0.0	2.6	2.6	0.0	0.0	0.0	0.0	0.0	
1211.56	5.7	0.0	0.0	0.0	21.3	69.6	0.4	0.7	0.0	2.3	2.3	0.0	0.0	0.0	0.0	0.0	
1216.13	9.2	0.0	0.0	0.0	0.6	87.2	0.3	0.4	0.0	2.3	2.3	0.0	0.0	0.0	0.0	0.0	
1222.45	4.6	0.0	0.0	0.0	39.5	55.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

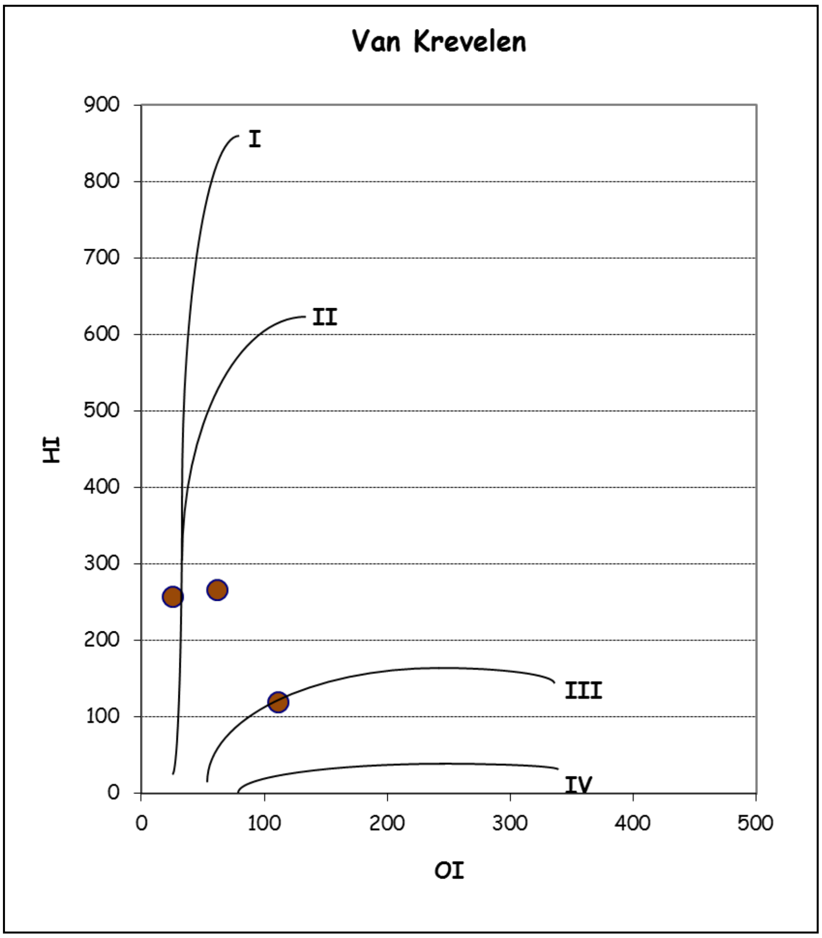
J.4 Geochemistry Analyses

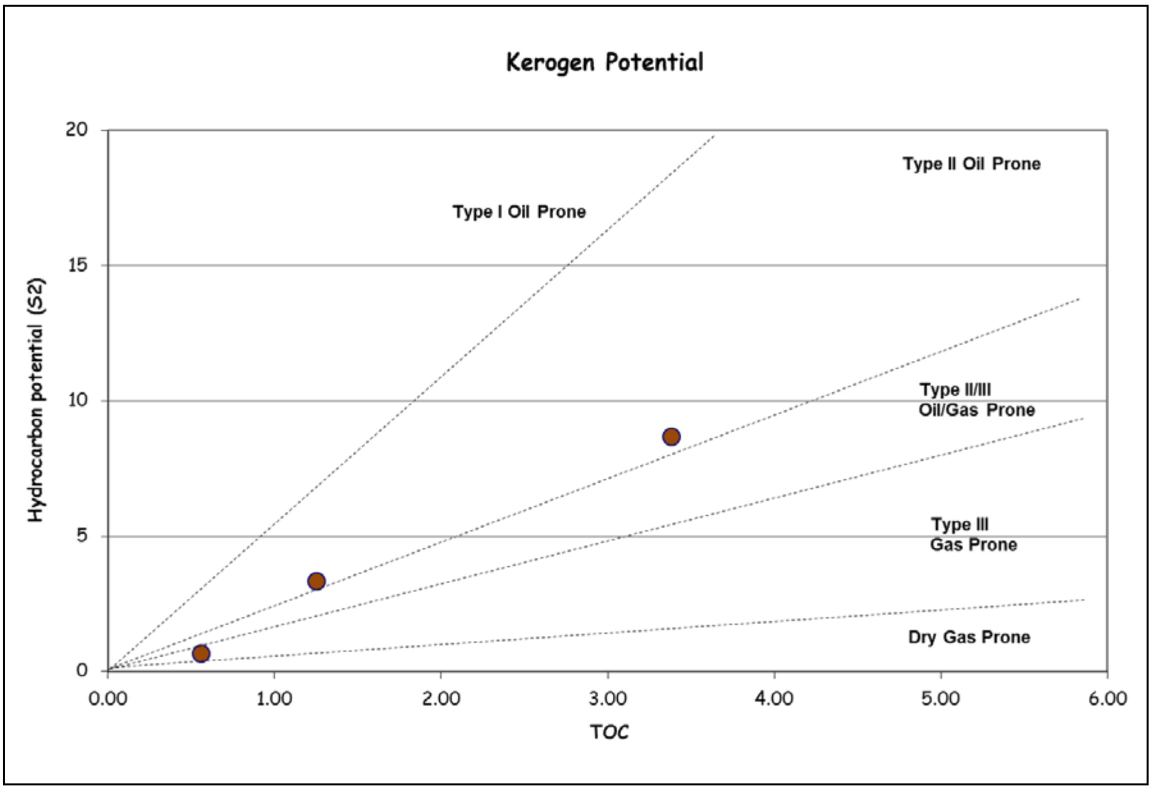
OzAlpha-1 Total Organic Carbon (TOC) and RockEval results

GHG ID	Sample Type	depth m	TOC Wt. %	S1 mg/g	S2 mg/g	S3 mg/g	HI	OI	PI	Tmax °C	S1 / TOC	DEPTH FORMAT
3130-1	ACHS	1109.62	0.09									
3130-2	ACHS	1137.6	0.46									
3130-3	ACHS	1149.62	0.56	0.10	0.67	0.62	120	111	0.13	427	17.86	
3130-4	ACHS	1155.09	3.38	0.29	8.67	0.87	257	26	0.03	434	8.58	
3130-5	ACHS	1159.39	1.25	0.23	3.32	0.78	266	62	0.06	432	18.40	
3130-6	TH	1162.5	0.33									
3130-7	TH	1165.42	0.11									
3130-8	TH	1192.68	0.29									
3130-9	TH	1201.41	0.44									
3130-10	TH	1206.4	0.10									
3130-11	TH	1211.56	0.02									
3130-12	TH	1216.13	0.10									
3130-13	TH	1222.45	0.15									

ACHS = Arthur Creek Hot Shale, TH = Thorntonia




Van Krevelen
HI
OI
I
II
III
IV
900
800
700
600
500
400
300
200
100
0
0
100
200
300
400
500


Kerogen Potential
Hydrocarbon potential (S2)
TOC
Type I Oil Prone
Type II Oil Prone
Type II/III
Oil/Gas Prone
Type III
Gas Prone
Dry Gas Prone
20
15
10
5
0
0.00
1.00
2.00
3.00
4.00
5.00
6.00

App K Thin Sections (enclosed)

App L Rock Mechanical Analyses

UNCONFINED COMPRESSIVE TEST RESULTS

Company:	**IRS Redhill**	Date:	**May, 2014**
Well:	**OzAlpha-1**	File:	**HOU-140472**
Field:	**South Georgina Basin**	Saturation Fluid:	**As Received**
Location:	**Australia**	Rock Type:	**Carbonates**

Static Young's Modulus, Poisson's Ratio and UCS

Sample Number	Depth (m)	Confining Pressure (psi)	Bulk Density (g/cm^3)	UCS (psi)	Young's Modulus (10^6 psi)	Poisson's Ratio
1V	1109.69	0	2.62	13822	3.46	0.29
2V	1155.14	0	2.64	17771	2.14	0.29
3V	1165.68	0	2.77	21876	7.58	0.32
4V	1206.73	0	2.66	21984	5.19	0.29
5V	1216.34	0	2.40	4307	1.69	0.25

PROPPANT EMBEDMENT

Company	**IRS Redhill**	Date	**May, 2014**
Well Name	**OzAlpha-1**	Job No.	**HOU-140472**
Field Name	**South Georgina Basin**	Proppant Type	**20/40 Econoprop**
Location	**Australia**	Rock Type	**Shale**

Sample Number	Well Name	Temp. (F)	Depth (m)	Saturation Condition	Embedment at 10,000 psi (mm)
2V	OzAlpha-1	70	1155.14	n/a	0.19

L.1 Sensitivity to Completions Fluids: Sample #1

This report summarizes the results of a series of Capillary Suction Time (CST) and Roller Oven (RO) tests on one sample from Ozalpha 1.The results of these findings are shown in Figures below. Selected sample was from depth 1155.42m. Fluids examined were 7% KCl, 3% KCl, 5% NH4Cl, 3% NaCl and fresh (distilled) water for the CST. The same fluids plus diesel oil were used for the RO tests.

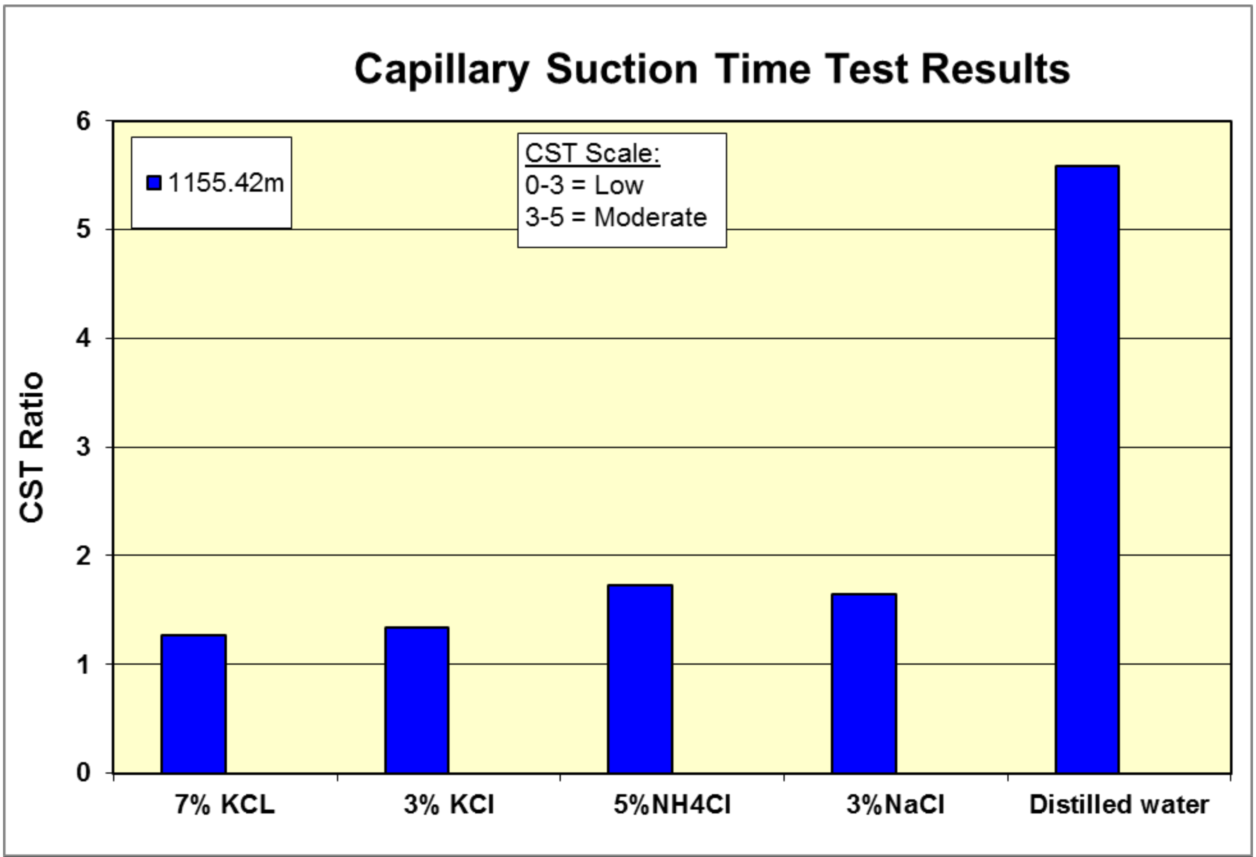
For the CST tests, the sample demonstrated high sensitivity (swelling potential) with fresh water but low sensitivity to the other solutions. It is also observed that there is not much change in the CST sensitivity between the solutions.

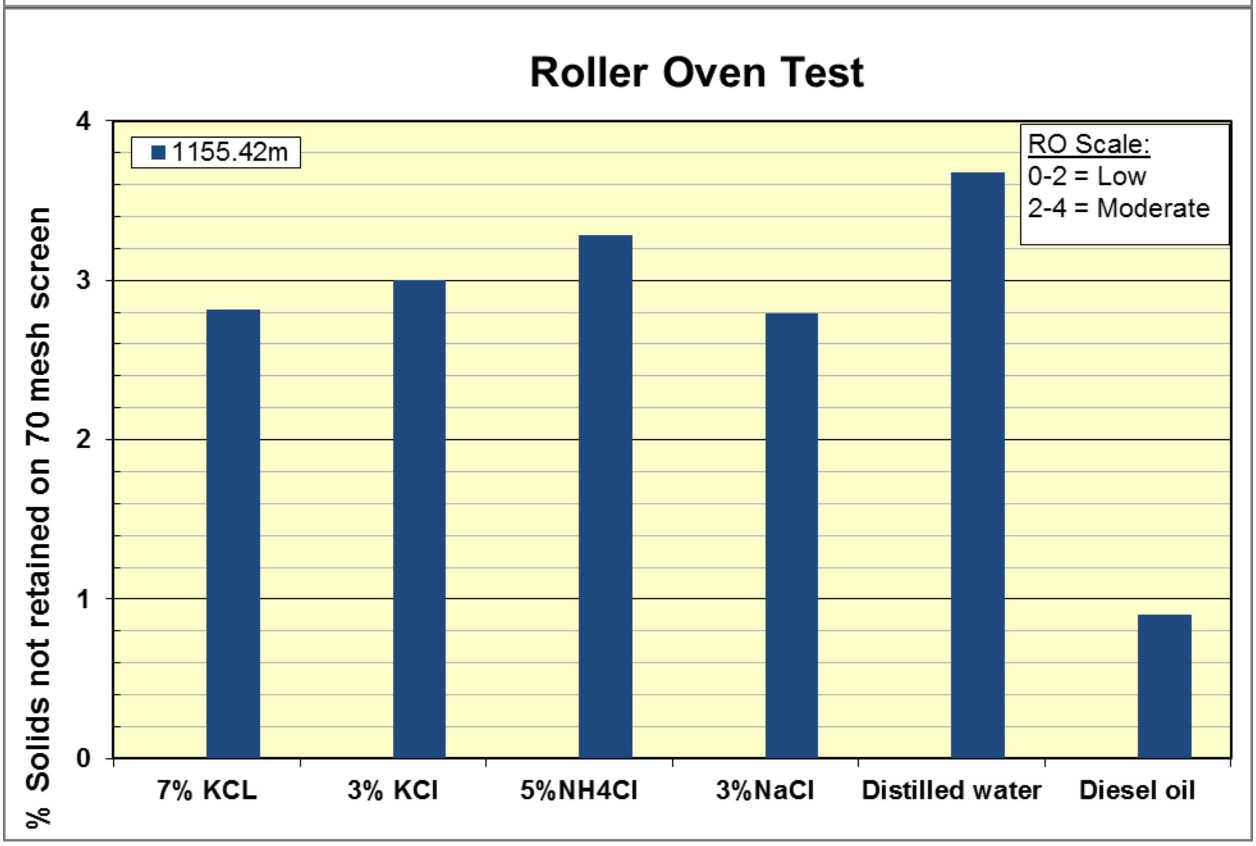
For the Roller Oven tests, the tendency for erosion to diesel was negligible (as expected from this control fluid). The other fluids demonstrated a moderate erosion.

Table 1 - Results of tests

Capillary Suction Test	
Fluid	Sample 1155.42m CST ratio
7% KCL	1.27
3% KCl	1.34
5%NH4Cl	1.73
3%NaCl	1.65
Distilled water	5.59

Roller Oven Test	
Fluid	Sample 1155.42m Mass lost (%)
7% KCL	2.82
3% KCl	3.00
5%NH4Cl	3.28
3%NaCl	2.79
Distilled water	3.68
Diesel oil	0.90





Capillary Suction Time Test Discussion

Sensitivity to Completions Fluids: Sample #2 and #3

This report summarizes the results of a series of Capillary Suction Time (CST) and Roller Oven (RO) tests on two samples from OzAlpha-1.The results of these findings are set out below. Selected samples were from depths 1140.48-1140.75m and 1161.45-1161.64m. Fluids examined were 7% KCl, 3% KCl, 3% NaCl, 2% KCl,1% KCl and fresh (distilled) water for the CST. The same fluids, plus diesel oil, were used for the RO tests.

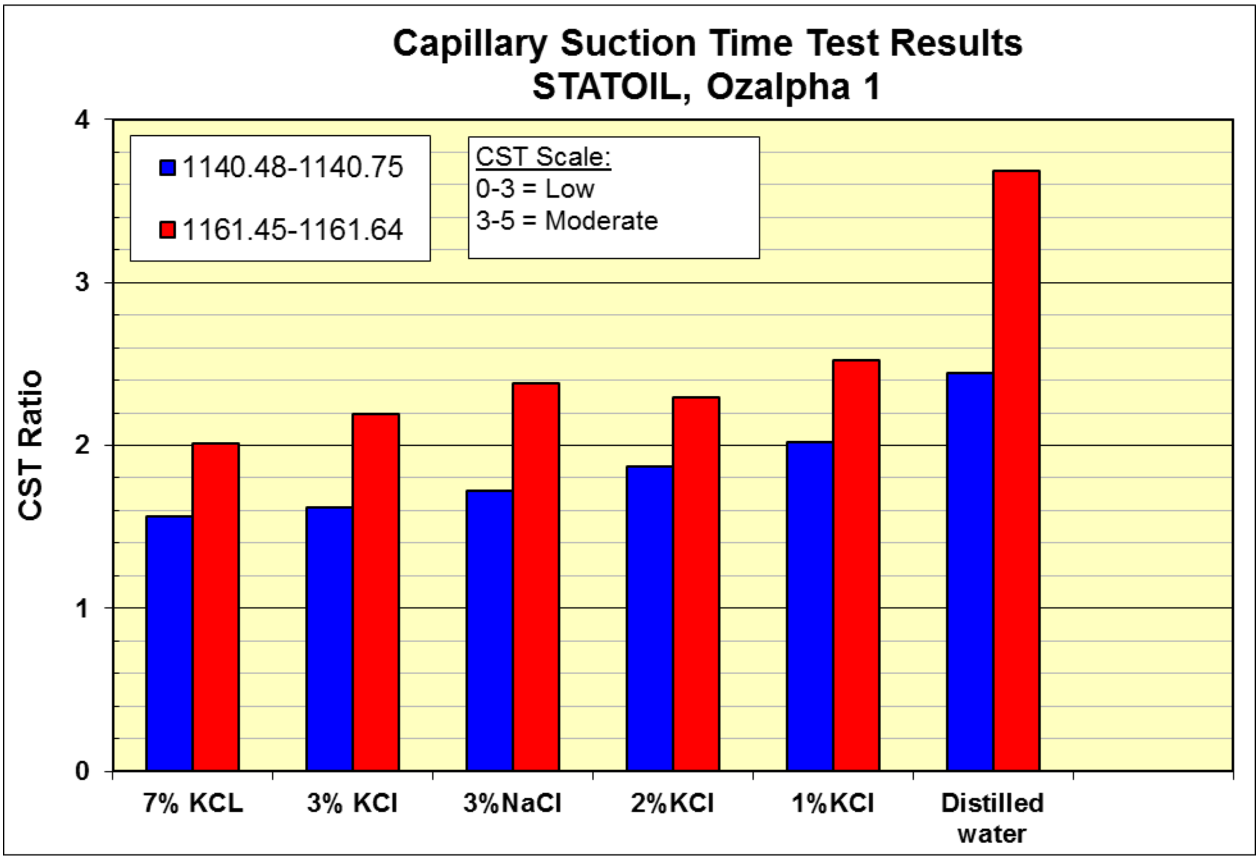
For the CST tests, the samples demonstrated moderate sensitivity (swelling potential) with fresh water but low sensitivity to the other solutions. It is also observed that there is not much change in the CST sensitivity between the solutions.

For the Roller Oven tests, the tendency for erosion to diesel was negligible (as expected from this control fluid). The other fluids demonstrated a low erosion for sample 1140.48-1140.75m while the second sample from 1161.45-1161.64m showed moderate to high erosion.

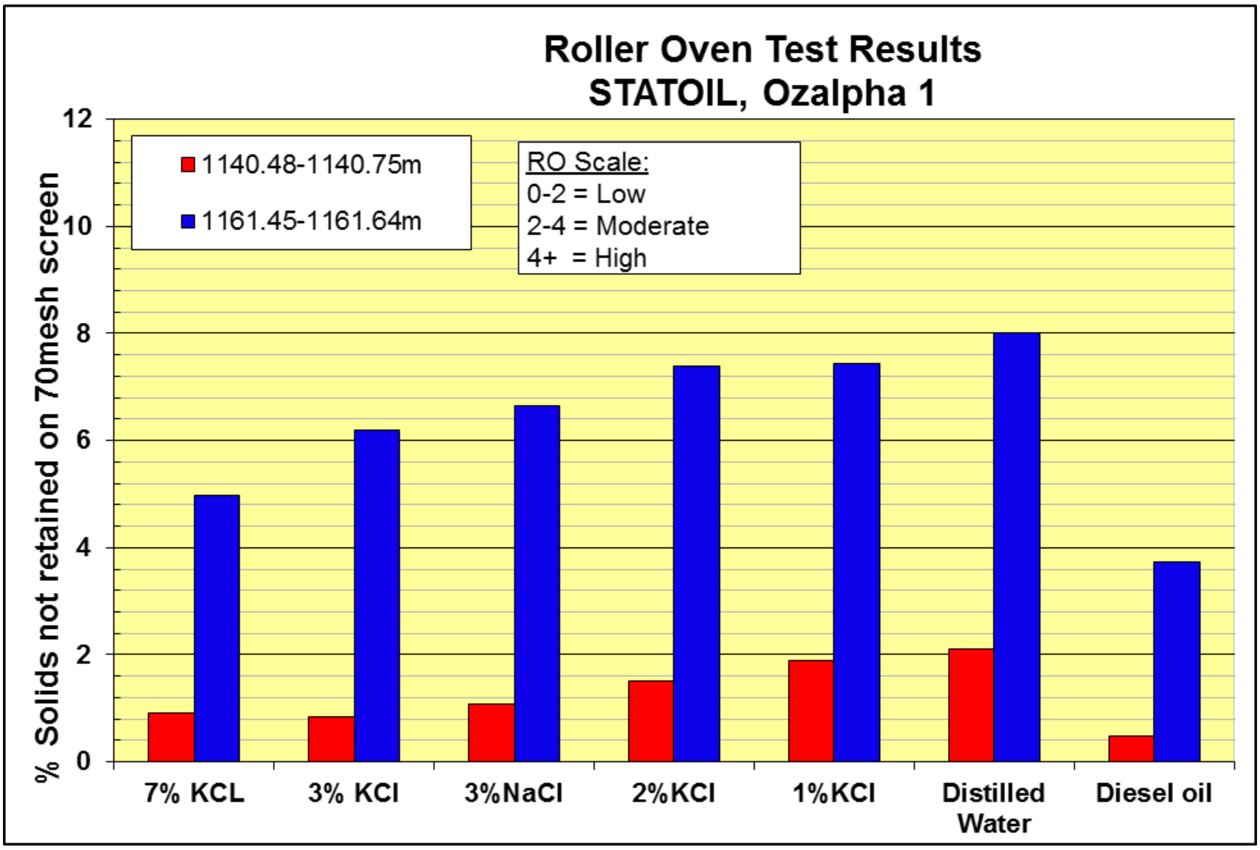
Capillary suction time (CST) tests are performed using the Fann model 440 CST timer. CST tests measure the retention of fluid by a slurry of the ground formation rock in the fluid to be evaluated. The slurry is placed in a funnel atop a chromatography paper. The timer measures the time for the fluid to be extracted from the slurry by adsorption into the chromatography paper. Sensors start the timer when the fluid reaches approximately 0.25" from the funnel and stop the timer at a distance of 1" from the funnel. Fluids that disperse clays in the formation slurry form a clay colloid (mud), which resists extraction of the fluid, and give long CST times. Fluids that do not form a colloid are easily extracted and give short CST times. A correction is made in the measurement for the viscosity of the fluid and fluid/paper interactions for comparison of fluids with the same core material. This is called the blank time. Three CST times are measured for each rock/fluid combination and averaged. The data is presented as a ratio of the CST time minus the blank time divided by the blank time. High CST ratios indicate increased colloid formation and more potential formation damage. Value differences for CST ratio of less than about 0.5 are usually within experimental error and are not considered significant. Magnitude of the value for CST ratio will vary depending on grain size distribution and the amount of clay and silt within the rock sample. Therefore, the values cannot be compared between rock samples except in relative terms to two control fluids. These are usually a high saline solution and fresh water.

Results of tests

Capillary Suction Test		
Fluid	Sample 1140.48-1140.75m CST ratio	Sample 1161.45-1161.64m CST ratio
7% KCL	1.56	2.01
3% KCl	1.62	2.19
3%NaCl	1.72	2.38
2%KCl	1.87	2.30
1%KCl	2.02	2.52
Distilled Water	2.45	3.69



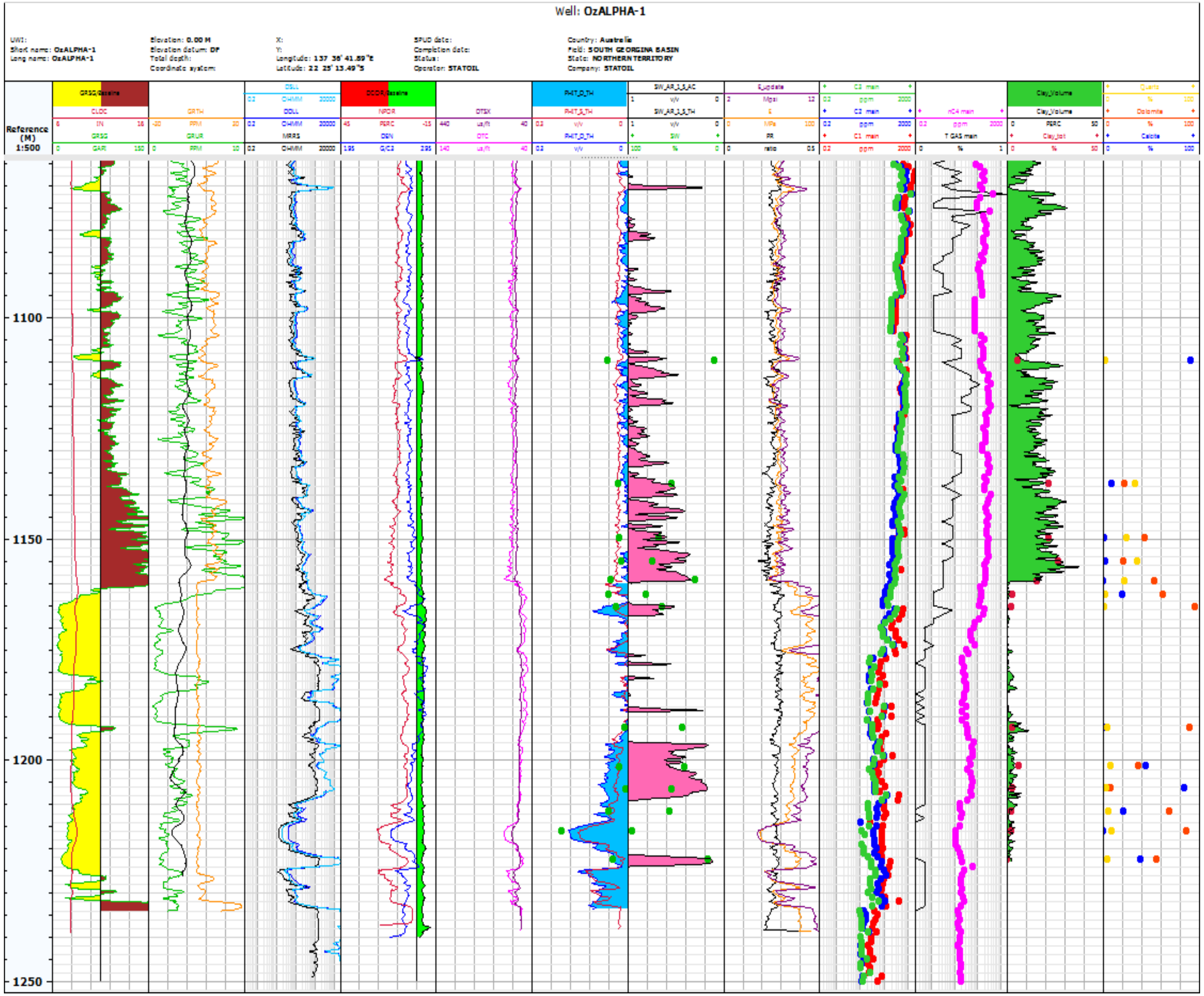
Roller Oven Test		
Fluid	Sample 1140.48-1140.75m Mass lost (%)	Sample 1161.45-1161.64m Mass lost (%)
7% KCL	0.91	4.98
3% KCl	0.84	6.20
3%NaCl	1.09	6.65
2%KCl	1.50	7.39
1%KCl	1.90	7.43
Distilled Water	2.10	8.00
Diesel oil	0.49	3.72



Roller Oven Test Discussion

The roller oven shale stability test simulates the circulation of frac fluid across a newly created fracture. In the modified API RP 13i procedure used in these studies, the shale is ground to a particle size less than 2 mm (10 mesh) and larger than 0.425 mm (40 mesh). These particles are split equally using a sample splitter then distributed equally into 10 gm samples. The weighed sample is placed in a bottle along with 50 ml of fluid and allowed to roll in a roller oven at 150degrees F temperature. Following the aging, the samples are screened through 70 mesh screen (0.269 mm) and washed with fresh water prior to drying and reweighing. The amount of sample pass through the 70 mesh screen is the measure of instability of the shale. The higher the percentage of solids passed through the 70 mesh screen, the lesser is the stability of the shale in that particular fluid.The mass of sample passed through 70 mesh screen (0.269 mm) is expressed as a mass fraction in percent.

App M CPI log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Long name: OzALPHA-1
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Y:
Longitude: 137 38' 41.89"E
Latitude: 22 25' 13.49"S
SPUD date:
Completion date:
Status:
Operator: STATOIL
Country: Australia
Field: SOUTH GEORGINA BASIN
State: NORTHERN TERRITORY
Company: STATOIL
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1100
1150
1200
1250

App N Composite log (enclosed)