

Schlumberger
Drilling & Measurements

Santos



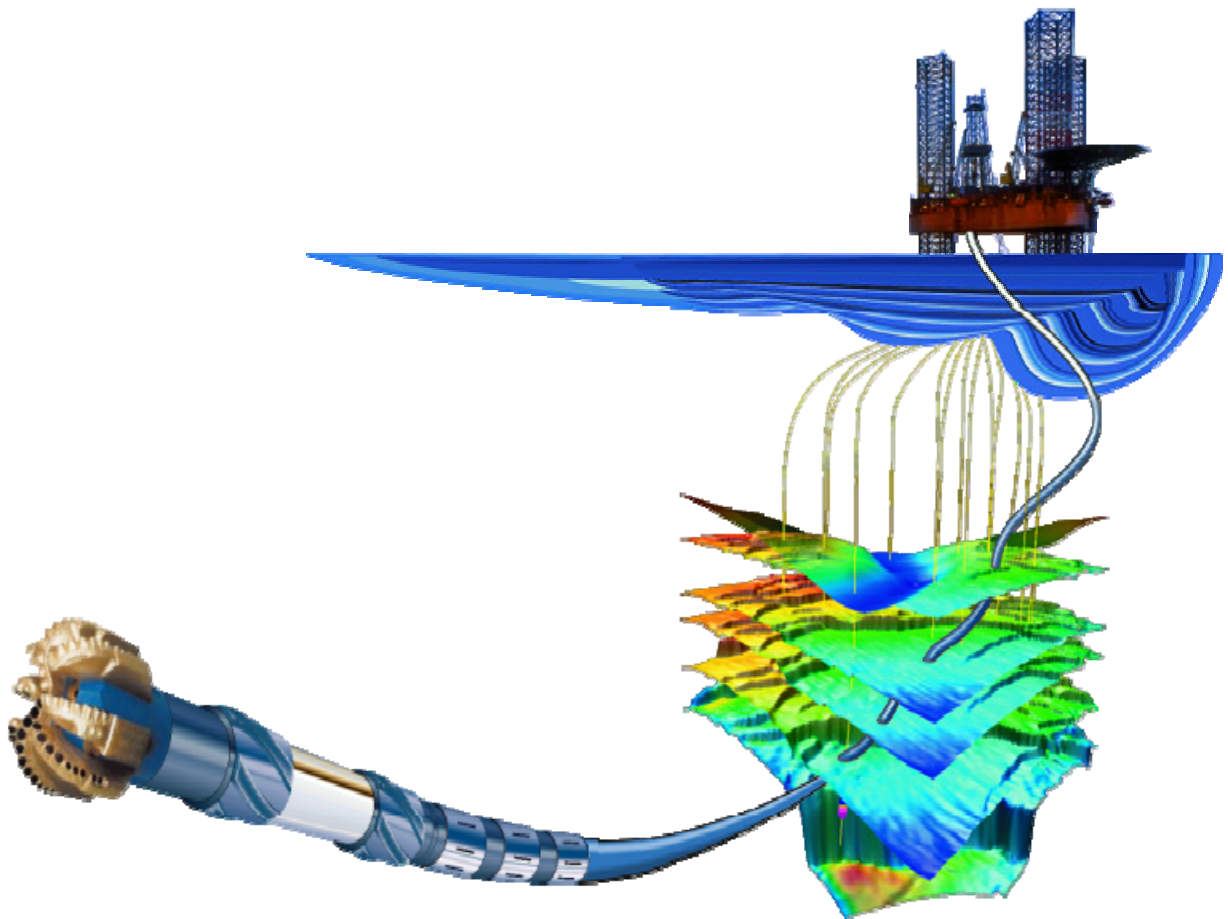
Pecten East-1

End of Well Report

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2. Definitive Survey
3. Drilling & MWD/LWD Run Summary

1. General Information



General Information

Well Name:	Pecten East-1	
Rig:	Ocean Patriot	
Field:	Otway	
Location:	Bass Strait	
Country:	Australia	
Cell Members:	John Oldridge Aimee Bayly	MWD/LWD Engineer MWD/LWD Engineer
Town Contacts:	David Rapp Michael McDermott Khin Maung	Operations Manager Field Services Manager R&M Supervisor Sale
Company Representatives:	Peter Devine Rohan Richardson Nathan Peri John Pitman	Senior Drilling Supervisor Drilling Supervisor Drilling Supervisor Well Site Geologist

Geomagnetic and Survey Reference Criteria

Pecten East-1

Geomagnetic Data

Magnetic Model:	BGGM version 2007
Magnetic Date:	1 st July 2008
Magnetic Field Strength:	60,737.0 nT
Magnetic Declination:	10.802 degrees
Magnetic Dip:	-69.83 degrees

Survey Reference Criteria

Reference G:	1000.06 mg
Reference H:	1214.74 HCNT
Reference Dip:	-69.83 degrees
G value Tolerance:	2.50 mg
H value Tolerance:	6.00 HCNT
Dip Tolerance:	0.45 degrees

Survey Corrections Applied

Reference North:	Grid North
Magnetic Declination:	10.802 degrees
Grid Convergence:	-1.069 degrees
Total Azimuth Correction:	11.871 degrees
Vertical Section Azimuth:	0 degrees

Survey Reference Location

Pecten East-1 Surface Coordinates:

Latitude: 38° 38' 42.5683" South

Longitude: 142° 42' 44.6493" East

Northing: 5 721 208.5 meters

Easting: 649 022.6 meters

Datum: GDA94/MGA94 Zone 54

Vertical Datum: Australian Height Datum

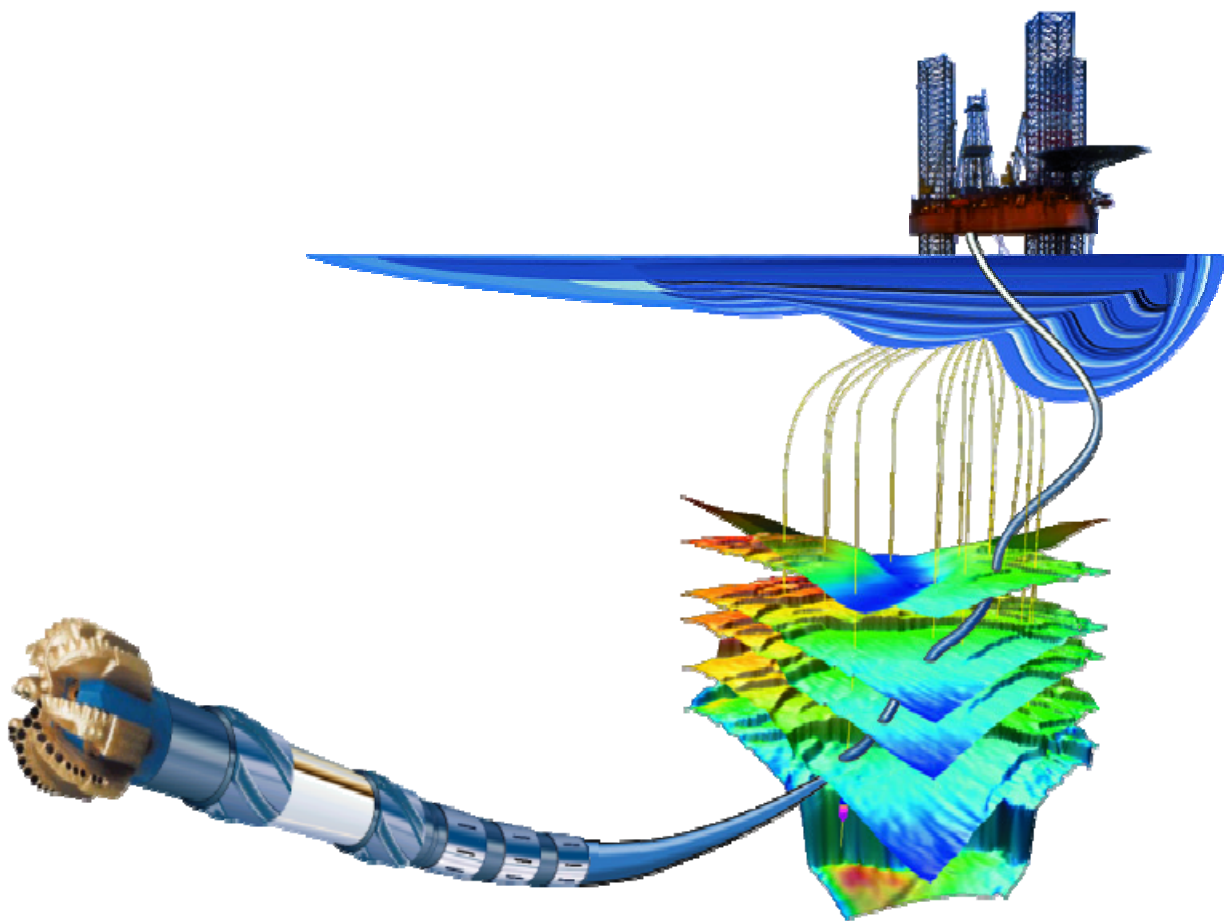
Rotary Table Elevation: 20.8 m above AHD

Health, Safety and Environment

Schlumberger Drilling and Measurements personnel actively participated in the Diamond Drilling STOP safety initiative, and attended pre-tour and weekly safety meetings.

Schlumberger Drilling and Measurements personnel were not involved in any safety incidents while on board the Ocean Patriot.

2. Definitive Survey



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Survey report

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Client..... Santos Ltd
 Field..... Otway
 Well..... Pecten East-1
 API number.....
 Engineer..... J. Oldridge / A. Bayly
 RIG..... Ocean Patriot
 STATE..... Victoria

Spud date..... 23-Jun-08
 Last survey date..... 06-Jul-08
 Total accepted surveys... 55
 MD of first survey..... 0.00 m
 MD of last survey..... 1993.00 m

----- Survey calculation methods-----
 Method for positions..... Minimum curvature
 Method for DLS..... Mason & Taylor

----- Depth reference -----
 Permanent datum..... Australian Height Datum
 Depth reference..... Driller's Depth
 GL above permanent..... 59.70 m
 KB above permanent..... Top Drive
 DF above permanent..... 20.80 m

----- Vertical section origin-----
 Latitude (+N/S-)..... 0.00 m
 Departure (+E/W-)..... 0.00 m

----- Platform reference point-----
 Latitude (+N/S-)..... ---
 Departure (+E/W-)..... ---

Azimuth from Vsect Origin to target: 0.00 degrees

----- Geomagnetic data -----
 Magnetic model..... BGGM version 2007
 Magnetic date..... 29-Jun-2008
 Magnetic field strength... 1214.73 HCNT
 Magnetic dec (+E/W-)..... 10.80 degrees
 Magnetic dip..... -69.83 degrees

----- MWD survey Reference Criteria -----
 Reference G..... 1000.06 mGal
 Reference H..... 1214.74 HCNT
 Reference Dip..... -69.83 degrees
 Tolerance of G..... (+/-) 2.50 mGal
 Tolerance of H..... (+/-) 6.00 HCNT
 Tolerance of Dip..... (+/-) 0.45 degrees

----- Corrections -----
 Magnetic dec (+E/W-)..... 10.80 degrees
 Grid convergence (+E/W-).. -1.07 degrees
 Total az corr (+E/W-)..... 11.87 degrees
 (Total az corr = magnetic dec - grid conv)
 Survey Correction Type ...:
 I=Sag Corrected Inclination
 M=Schlumberger Magnetic Correction
 S=Shell Magnetic Correction
 F=Failed Axis Correction
 R=Magnetic Resonance Tool Correction
 D=Dmag Magnetic Correction

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Seq #	Measured depth (m)	Incl angle (deg)	Azimuth angle (deg)	Course length (m)	TVD depth (m)	Vertical section (m)	Displ +N/S- (m)	Displ +E/W- (m)	Total displ (m)	At Azim (deg)	DLS (deg/100f)	Srvy tool type	Tool Corr (deg)
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	TIP	None
2	80.50	0.00	0.00	80.50	80.50	0.00	0.00	0.00	0.00	0.00	0.00	SB	None
3	100.22	0.31	192.19	19.72	100.22	-0.05	-0.05	-0.01	0.05	192.19	0.48	MS	None
4	129.23	0.72	126.87	29.01	129.23	-0.24	-0.24	0.12	0.27	153.65	0.69	MS	None
5	158.47	0.93	153.25	29.24	158.47	-0.56	-0.56	0.37	0.67	146.44	0.45	MS	None
6	186.57	0.37	216.94	28.10	186.56	-0.84	-0.84	0.42	0.94	153.35	0.91	MS	None
7	214.65	0.39	95.93	28.08	214.64	-0.92	-0.92	0.46	1.03	153.38	0.72	MS	None
8	242.72	0.08	107.95	28.07	242.71	-0.93	-0.93	0.57	1.10	148.44	0.34	MS	None
9	270.58	0.13	47.49	27.86	270.57	-0.92	-0.92	0.62	1.11	146.18	0.12	MS	None
10	279.92	0.21	93.74	9.34	279.91	-0.91	-0.91	0.64	1.12	144.95	0.50	MS	None
11	308.81	0.70	190.12	28.89	308.80	-1.09	-1.09	0.66	1.28	148.72	0.79	MS	None
12	337.67	0.63	187.60	28.86	337.66	-1.42	-1.42	0.61	1.55	156.75	0.08	MS	None
13	366.59	0.68	185.93	28.92	366.58	-1.75	-1.75	0.57	1.84	161.90	0.06	MS	None
14	395.33	0.68	19.42	28.74	395.32	-1.76	-1.76	0.61	1.86	160.84	1.43	MS	None
15	424.18	0.62	192.55	28.85	424.17	-1.75	-1.75	0.63	1.86	160.08	1.37	MS	None
16	453.01	0.59	200.09	28.83	453.00	-2.04	-2.04	0.55	2.11	164.94	0.09	MS	None
17	481.91	0.66	180.35	28.90	481.89	-2.35	-2.35	0.50	2.40	168.04	0.24	MS	None
18	510.72	0.65	195.28	28.81	510.70	-2.67	-2.67	0.45	2.71	170.38	0.18	MS	None
19	539.63	0.70	195.89	28.91	539.61	-3.00	-3.00	0.36	3.02	173.13	0.05	MS	None
20	568.40	0.54	206.41	28.77	568.38	-3.29	-3.29	0.25	3.30	175.60	0.21	MS	None
21	597.28	0.59	205.80	28.88	597.26	-3.54	-3.54	0.13	3.55	177.94	0.05	MS	None
22	616.42	0.40	109.32	19.14	616.40	-3.66	-3.66	0.15	3.66	177.68	1.19	MS	None
23	678.32	0.27	62.01	61.90	678.30	-3.66	-3.66	0.48	3.69	172.52	0.14	PUP	None
24	764.17	0.40	151.54	85.85	764.14	-3.83	-3.83	0.80	3.91	168.17	0.17	PUP	None
25	880.73	0.59	217.65	116.56	880.70	-4.66	-4.66	0.63	4.70	172.31	0.15	PUP	None
26	909.85	1.97	252.45	29.12	909.81	-4.93	-4.93	0.06	4.93	179.30	1.59	PUP	None
27	991.51	2.15	267.80	81.66	991.42	-5.41	-5.41	-2.81	6.10	207.43	0.22	PUP	None
28	1109.66	1.30	255.86	118.15	1109.52	-5.82	-5.82	-6.32	8.60	227.35	0.24	PUP	None
29	1197.14	1.38	257.72	87.48	1196.97	-6.29	-6.29	-8.31	10.43	232.89	0.03	PUP	None
30	1254.68	1.42	257.96	57.54	1254.50	-6.59	-6.59	-9.69	11.72	235.79	0.02	PUP	None

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 SCHLUMBERGER Survey Report

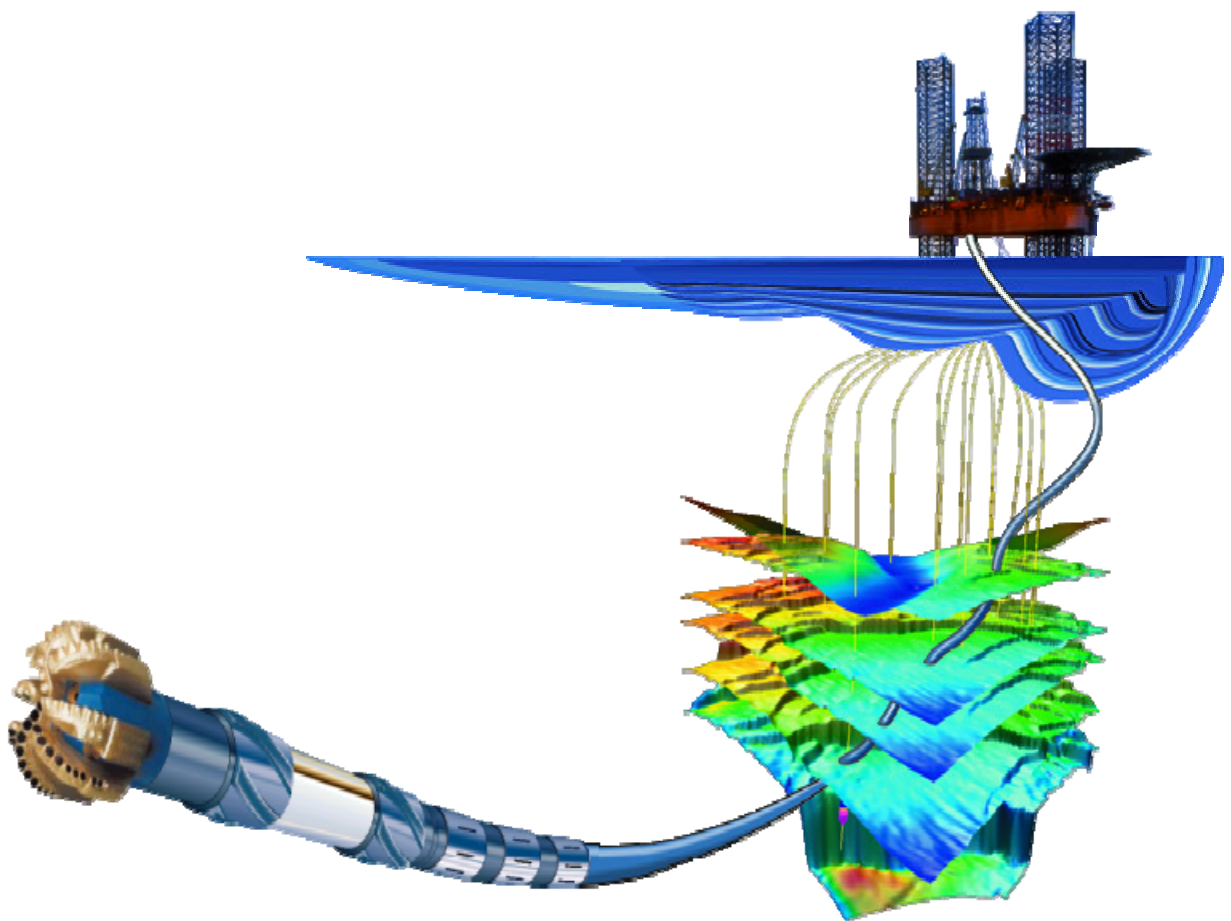
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Seq #	Measured depth (m)	Incl angle (deg)	Azimuth angle (deg)	Course length (m)	TVD depth (m)	Vertical section (m)	Displ +N/S- (m)	Displ +E/W- (m)	Total displ (m)	At Azim (deg)	DLS (deg/100f)	Srvy tool type	Tool Corr (deg)
31	1285.95	1.48	259.75	31.27	1285.76	-6.74	-6.74	-10.46	12.45	237.22	0.07	PUP	None
32	1314.65	1.50	257.02	28.70	1314.45	-6.89	-6.89	-11.20	13.15	238.39	0.08	PUP	None
33	1343.08	1.43	249.34	28.43	1342.87	-7.10	-7.10	-11.89	13.85	239.16	0.22	PUP	None
34	1400.23	1.28	247.24	57.15	1400.00	-7.60	-7.60	-13.15	15.18	239.98	0.08	PUP	None
35	1428.81	1.37	244.58	28.58	1428.57	-7.87	-7.87	-13.75	15.84	240.22	0.12	PUP	None
36	1458.68	1.51	240.58	29.87	1458.43	-8.21	-8.21	-14.41	16.59	240.32	0.18	PUP	None

37	1487.10	1.65	235.19	28.42	1486.84	-8.63	-8.63	-15.08	17.37	240.21	0.22	PUP	None
38	1515.81	1.83	234.00	28.71	1515.54	-9.14	-9.14	-15.79	18.24	239.94	0.19	PUP	None
39	1545.03	1.95	232.90	29.22	1544.74	-9.71	-9.71	-16.56	19.20	239.61	0.13	PUP	None
40	1573.43	2.06	237.88	28.40	1573.13	-10.27	-10.27	-17.38	20.19	239.41	0.22	PUP	None
41	1601.32	2.20	234.44	27.89	1601.00	-10.85	-10.85	-18.24	21.22	239.25	0.21	PUP	None
42	1630.42	2.54	236.15	29.10	1630.07	-11.54	-11.54	-19.23	22.42	239.04	0.36	PUP	None
43	1659.81	3.11	236.63	29.39	1659.43	-12.34	-12.34	-20.43	23.87	238.88	0.59	PUP	None
44	1687.83	3.45	240.78	28.02	1687.40	-13.17	-13.17	-21.81	25.47	238.88	0.45	PUP	None
45	1716.74	3.96	241.10	28.91	1716.25	-14.07	-14.07	-23.44	27.34	239.02	0.54	PUP	None
46	1746.86	4.10	241.06	30.12	1746.30	-15.10	-15.10	-25.29	29.45	239.17	0.14	PUP	None
47	1775.20	4.48	242.79	28.34	1774.56	-16.09	-16.09	-27.16	31.57	239.35	0.43	PUP	None
48	1803.10	4.37	240.10	27.90	1802.37	-17.12	-17.12	-29.05	33.72	239.49	0.26	PUP	None
49	1832.76	4.84	243.68	29.66	1831.94	-18.24	-18.24	-31.15	36.10	239.65	0.57	PUP	None
50	1862.61	4.80	242.85	29.85	1861.68	-19.37	-19.37	-33.39	38.60	239.89	0.08	PUP	None
51	1889.75	5.24	243.63	27.14	1888.72	-20.44	-20.44	-35.51	40.98	240.08	0.50	PUP	None
52	1919.69	5.61	241.98	29.94	1918.52	-21.73	-21.73	-38.03	43.80	240.26	0.41	PUP	None
53	1947.74	5.93	242.04	28.05	1946.43	-23.06	-23.06	-40.52	46.62	240.36	0.35	PUP	None
54	1972.25	6.25	238.30	24.51	1970.80	-24.35	-24.35	-42.78	49.22	240.35	0.63	PUP	None
55	1993.00	6.25	238.30	20.75	1991.43	-25.54	-25.54	-44.70	51.48	240.26	0.00	Projection to TD	

3. Drilling & MWD/LWD Run Summary



End of Well Drilling Summary

24th June 2008 to 6th July 2008

Pecten East-1 Objectives:

Pecten East-1 will be drilled by the semi-submersible mobile offshore drilling unit (MODU)

Ocean Patriot, which is operated by Diamond Offshore (DOGC).

Logistical support for drilling operations will be from the Portland Supply Base.

The objective of this well is to establish the existence of a gas column within the Pecten East Waarre A (1812m RT) and Waarre C (1863m RT) reservoirs.

BHA # 1: Rotary Assembly**914.4mm – 17 ½” Hole Section (114m MD – 630m MD)**

The following Rotary Assembly was made up and run in :-

- 17 ½ ” Milled Tooth Rock Bit (Type: Hughes, Jets: 4 x 20)
- 17 ¼” Stabilizer w/float
- 9 5/8” Anderdrift
- 17 ¼” Stabilizer w/totco
- 9 ½” Non Mag DC
- 17 ¼” Stabilizer
- 2 x 9 ½” DC
- Crossover
- 9 x 8” DC
- 8” Jars
- 2 x 8” DC
- Crossover
- 15 x 5” HWDP
- 5” DP to surface

Drilling Summary

The 17 ½” section was drilled vertically using the above rotary BHA. Top of cement was tagged and drilling proceeded uninterrupted to a section TD of 630m.

MWD/LWD Summary

The 17 ½” section of Pecten East-1 was drilled without the use of Schlumberger MWD/LWD tools. On completion of drilling, however, an Electronic Multi Shot was dropped down the drillstring to sit on top of the Totco ring. While tripping out, inclination surveys were recorded every one stand of drillpipe up to the 30” casing shoe.

The EMS performed as expected. Survey data was successfully dumped upon arrival at the surface and provided to the client.

BHA # 2: Rotary Assembly**311.15mm – 12 ¼" Hole Section (630m MD – 1305m MD)**

The following Rotary Assembly was made up and run in: -

- 12 ¼" Milled Tooth Rock Bit (Type: Hughes, Jets: 3 x 20)
- 12 ¼" NB Stabilizer w/float
- 8" Pony Drill Collar
- 12 1/8" String Stabilizer
- 8 ¼" Lower Saver Sub
- 8 ¼" ARC
- 8" Lower Saver Sub w/12 1/8" Stabilizer
- 8 ¼" TeleScope HF MWD
- 8 ¼" Upper Saver Sub
- 8" Non Mag DC
- 12 ¼" String Stabilizer
- 7 x 8" DC
- 8" Jar
- 2 x 8" DC
- Crossover
- 15 x 5" HWDP
- 5" DP to surface

Drilling Summary

The above BHA was made up and ran in hole. Top of cement was tagged at 585m, before drilling into new formation from 630m onwards.

Shortly after performing LOT, drilling was suspended due to weather. After weather calmed down drilling resumed until at 1305m an expected formation change occurred and decision was made to POOH for a bit trip.

Due to the severe shocks observed by the arcVISION* and TeleScope* tools, both were changed out for backups as a precaution for the next run.

The bit had a grading of 1 – 8 – BT – G – 0 – 1 – WT – FM.

MWD/LWD Summary

The 12 ¼" hole was drilled with a TeleScope* MWD tool to provide D&I surveying services (azimuth and inclination). The TeleScope* was programmed with a 12Hz/6bps QPSK telemetry configuration, to enable the transmission of real-time data uphole.

The arcVISION* LWD tool acquired Formation Gamma Ray and Induction Resistivity Formation Evaluation measurements with 6 second record rates.

A successful shallow hole test was conducted prior to RIH to principally test the LTB (low speed tool bus) connectivity and tool functionality.

During drilling, level 2 and 3 shock risk was observed on both TeleScope* and arcVISION* tools. Attempts to mitigate shocks were only partially successful and the TeleScope* shock total eventually reached 200,000 total shocks over the 50G threshold. Periods of difficulty obtaining surveys within Tool G FAC were put down to the aforementioned shocks, as well as the large rig heave.

MWD signal was lost at 1034mMD. Decision was made to drill ahead by client on the assumption the MWD tool was dead due to the shocks. However, at 1092mMD a full signal returned and the TeleScope* continued transmitting all RT data for the continuation of the run.

At 1305m the decision was made to POOH for bit trip. The primary MWD/LWD tools were laid out and the onboard memory of each was downloaded. Recorded mode data was processed and provided to the client.

BHA # 3: Rotary Assembly**311.15mm – 12 ¼" Hole Section (1305m MD – 1940m MD)**

The following Rotary Assembly was made up and run in: -

12 ¼" PDC Bit (Type: Smith, Jets: 7 x 14)

12 ¼" NB Stabilizer w/float

8" Pony Drill Collar

12 1/8" String Stabilizer

8 ¼" Lower Saver Sub

8 ¼" ARC

8" Lower Saver Sub

8 ¼" TeleScope HF MWD

8 ¼" Upper Saver Sub

8" Non Mag DC

12 ¼" String Stabilizer

7 x 8" DC

8" Jar

2 x 8" DC

Crossover

15 x 5" HWDP

5" DP to surface

Drilling Summary

After the MWD and LWD tools were changed out to the backup tools, the new bit was connected. The BHA was RIH, tagged bottom and drilling resumed from 1305mMD.

During drilling, moderate stick slip was observed due to hard formations, however very little shocks were observed. Drilling continued until 1940mMD where the ROP had decreased to around 2m/hr, at which time a bit trip was called for.

The bit had a grading of 1 – 4 – WT – S – X – I – ER – PR.

MWD/LWD Summary

The 12 ¼" hole was drilled with a TeleScope* MWD tool to provide D&I surveying services (azimuth and inclination). The TeleScope was programmed with a 12Hz/6bps QPSK telemetry configuration, to enable the transmission of real-time data uphole.

The arcVISION* LWD tool acquired Formation Gamma Ray and Induction Resistivity Formation Evaluation measurements with 6 second record rates.

A successful shallow hole test was conducted prior to RIH to principally test the LTB (low speed tool bus) connectivity and tool functionality.

LWD data had to be reamed from 1883mMD to 1911mMD due to geolograph line snapping whilst making a connection.

Both MWD/LWD tools performed as expected for the run. Once at surface the arcVISION* recorded mode data was downloaded, techlogs were analyzed and tool was deemed satisfactory to run back in hole. Recorded mode data was processed and provided to the client.

BHA # 4: Rotary Assembly**311.15mm – 12 ¼" Hole Section (1940m MD – 1993m MD)**

The following Steerable Assembly was made up and run in: -

12 ¼" PDC Bit (Type: Reed, Jets: 3 x 20)

12 ¼" NB Stabilizer w/float

8" Pony Drill Collar

12 1/8" String Stabilizer

8 ¼" Lower Saver Sub

8 ¼" ARC

8" Lower Saver Sub

8 ¼" TeleScope HF MWD

8 ¼" Upper Saver Sub

8" Non Mag DC

12 ¼" String Stabilizer

7 x 8" DC

8" Jar

2 x 8" DC

Crossover

15 x 5" HWDP

5" DP to surface

Drilling Summary

After the new bit was made up the BHA was run in hole resumed drilling from 1940m for an extra 53m to ensure a deep enough rathole for Wireline logging tools.

There were no significant shocks or stick and slip observed during the run.

At 1993mMD, well TD was called and decision was made to circulate before POOH. At the surface the BHA was laid out and the bit was graded as 0 – 0 – NO – A – 0 – I – NO.

MWD/LWD Summary

The 12 ¼" hole was drilled with a TeleScope* MWD tool to provide D&I surveying services (azimuth and inclination). The TeleScope was programmed with a 12Hz/6bps QPSK telemetry configuration, to enable the transmission of real-time data uphole.

The arcVISION* LWD tool acquired Formation Gamma Ray and Induction Resistivity Formation Evaluation measurements with 6 second record rates.

No Shallow Hole Test was conducted due to the connection between the MWD and LWD tools not being broken out while changing out the bit.

All tools performed as expected throughout the run. Well TD was called at 1993mMD, all tools were laid out and downloaded on deck. Recorded mode data was processed and provided to the client.

MWD/LWD Run Summary

Run	Hole Size (in)	MWD/LWD Services	Start Depth (m)	End Depth (m)	Distance (m)	Run Start Date	Run End Date
1	17 ½"	Electronic Multi Shot	114.00	630.00	516.00	24-Jun-08	25-Jun-08
2	12 ¼"	VISION Resistivity	630.00	1305.00	675.00	30-Jun-08	04-Jul-08
3	12 ¼"	VISION Resistivity	1305.00	1940.00	635.00	04-Jul-08	06-Jul-08
4	12 ¼"	VISION Resistivity	1940.00	1993.00	53.00	06-Jul-08	06-Jul-08

Run	BRT Hours	Drilling Hours	Circulating Hours	Max Temp (degC)	Trip for MWD	Failure type
1	n/a	n/a	n/a	n/a	n/a	n/a
2	76.25	25.8	43.6	52.00	No	Temporary MWD signal lost
3	44.00	13.8	19.8	58.00	No	n/a
4	23.75	6.5	10.1	39.3	No	n/a