

IODP EXP 358 Daily Geomechanics Report

Report #014 20181123 Final 4990

RTG Team

RTG Supervisor(s)	David Castillo / Thomas Finkbeiner / Demian Saffer
RTG Watch Lead (00:00-12:00)	Kan Aoike
RTG Watch Lead (12:00-24:00)	Adam Wspanialy
RTG Office Support	N/A

Well Status (as of 06:00 Nov.24 2018)

Site Name:	C0002	Hole Name:	Q
Water Depth:	1,939.0 m	RT-MSL:	28.5 m
Current Depth:	4,990.0 mBRT (4,988.0) mTVD	Section TD:	4,990 mBRT (4,988.0) mTVD
Section #:	1	CSG Depth / Size:	(4855.0) mBRT 11-3/4 "
Static MW:	1.37 sg	Current ECD:	1.41 sg
FIT/LOT/XLOT:	FIT maximum pressure = 1.45 sg, Possible "LOP" = 1.43 sg @4855 mBRT		
Current formation/lithology:	Shale		
Sensor Offsets from the Bit:	PDC Bit: 0 m MicroScope HD 675: (UHRI: 2.10 m, Resistivity: 3.02 m, GR: 4.50 m) arcVision 675: (APWD: 7.59 m) TeleScope 675: (IWOB: 12.43 m, MWD GR: 15.15 m, D+I: 15.79 m) SonicScope 675: (Sonic: 25.90 m) seismicVISION 675: (Geophone Radial-1: 31.80 m, Geophone Radial-2: 31.84 m, Geophone Axial: 31.94 m, Hydrophone: 32.18 m)		
Current Operations:	Continued RIH 8-1/2" x 12-1/4" LWD BHA. Bit passed the window at 08:15. Took high torque and pressure spike and then encountered stuck pipe at 4888 mBRT at 09:25. Conducted work pipe with jarring and released at 10:25. Continued ream up/down and attempted to go down below 4909 mBRT until 20:45. Large volume of cavings came out from around 13:00. Performed circulation and bottoms-up from 20:45 to 00:15 Nov.24. Conducted work pipe due to stall at around 4904-4987 mBRT until 02:45. Took survey at 4894.5 mBRT. Conducted circulation and bottoms-up (underway as of 06:00 Nov.24)		

Geomechanics Alert

GREEN	Green = Projected model remains accurate White = Unanticipated deviation from model which <i>should not</i> affect drilling Yellow = Unanticipated deviation from model which <i>may</i> affect drilling Red = Imminent requirement to stop drilling
Basis for Alert Level + Recommendations	No issue with 1.37 sg MW for Section 1.

Principal Findings

N/A

Observations Summary

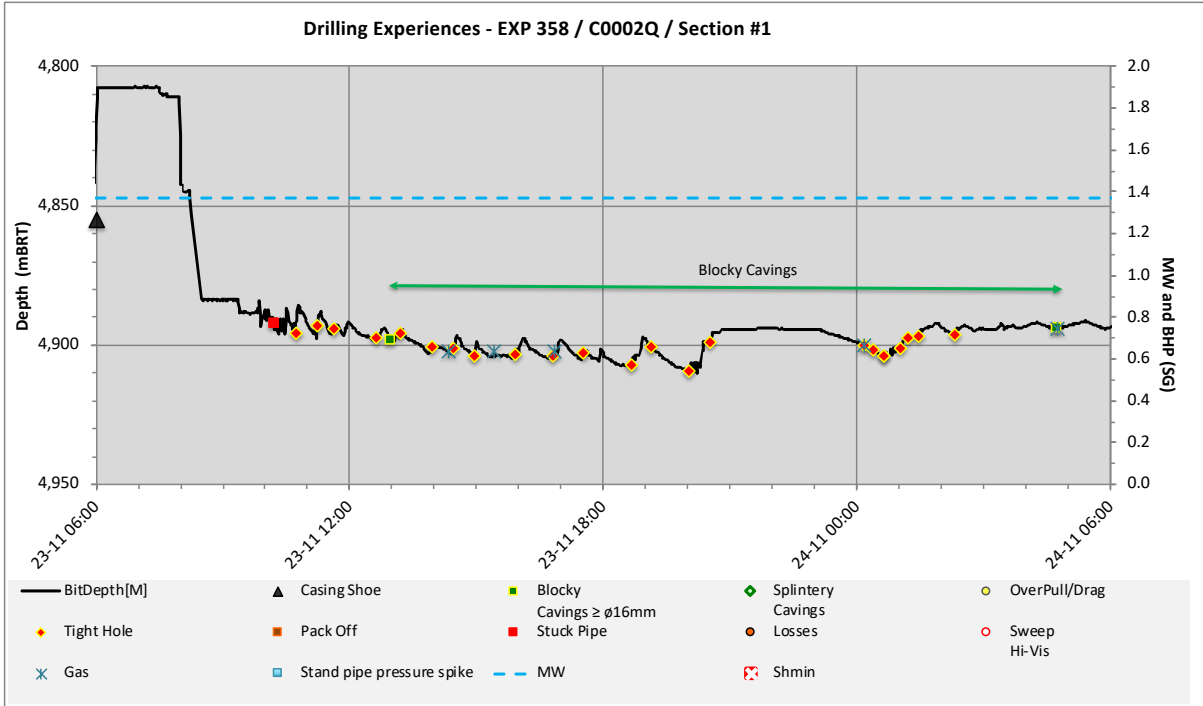
Use this space to discuss any observations while drilling, running casing etc.

Fracture Gradient	N/A
Pore Pressure	Total gas rose up to 1.78 % (13:30~19:00)
Wellbore Breakout	N/A
Tensile Failure	N/A

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Drilling Parameters	Experienced high torque/stall (~22.6kNm) events associated commonly with standpipe pressure spikes (>25 MPa or ~20 MPa) at around 4888 mBRT and 4904 mBRT.
Other	



Analysis

LWD Log Analysis

N/A

Drilling Experience Analysis

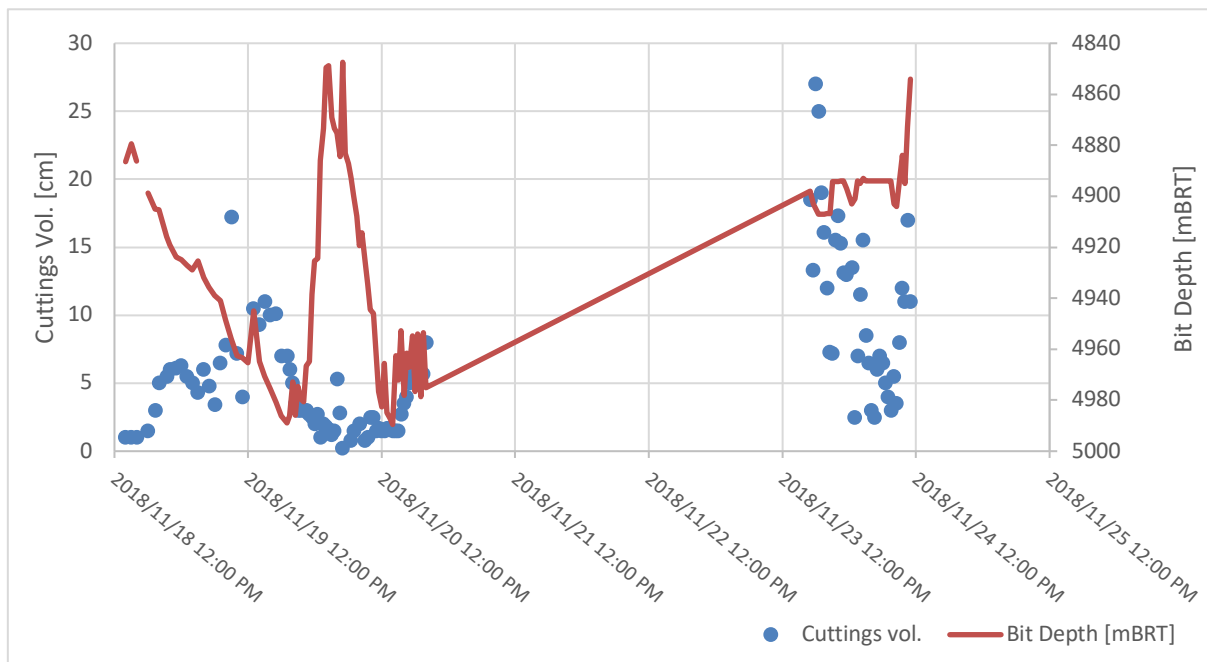
N/A

Cuttings Analysis

Variations in cuttings volumes with time have been measured since the kick-off drilling on the 18th of November and up to 24th of November while attempting to LWD Drill Section #1. (See Figure below). The blue dots show cuttings accumulation amounts (cm / 5 min) generally every 30 minutes. The orange line shows the bit depth in mBRT. It is obvious that the cuttings volumes of the drilling with the 8-1/2" x 12-1/4" LWD BHA are much larger than those of the kick-off drilling. They gradually decreased with time while circulation and bottoms-up which was performed at around 4900 mBRT.

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Cavings Analysis

Large amounts of cavings/cuttings continuously came over to the shakers. Those include blocky cement fragments with sharp edges, comprising about 10~20 % of solids > \varnothing 4 mm in diameter. Majority of shale cavings in the former period show rounded blocky/angular shapes, suggesting that they are reworked preexisting cavings. A few fresh blocky, angular and platy cavings are also contained but at ~5 % as solids > \varnothing 4 mm in diameter. Cavings sizes and volumes gradually decreased with time. In the latter period of cavings or rather hard cuttings are generally small less than \varnothing 1cm in diameter and have slightly sharp edges in general.

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Residues of a 400-cc cuttings sample after washed with 4-mm mesh sieve. Brownish gray blocky grains in the left side are cement fragments.



Residues of a 250-cc cuttings sample after washed with 4-mm mesh sieve. Brownish gray grains are cement fragments.

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SFIB Analysis

N/A

Geomechanical Model Review (a review of the FIT results)

Potentially no changes to the pre-drill geomechanical model because FIT (Formation Integrity Test) does not directly contribute sufficient information for constraining or refining subsurface earth stresses. By design, FIT is intended to determine whether the planned mud weight can be supported by the formation.

The planned mud weight of 1.37 sg with an operational safety upper margin of +0.06 sg (surge pressure), required a formation pressure integrity up to 1.43 sg. The FIT in the C0002Q rat-hole achieved that objective. It is possible that a leak-off pressure of 1.43 sg may have occurred, but a maximum pressure of 1.45 sg was achieved before the pumps were shut-in. If a leak-off pressure of 1.43 sg did occur, this implies a leak-off-test (LOT) had occurred (no longer a FIT). A leak-off-pressure of 1.43 sg may be interpreted as a possible approximation of S3 or Shmin stress magnitudes.

This interpretation would require a pass of the LWD image log across the rat-hole section to identify whether a new tensile was created, or drilling fluids leaked into a pre-existing bedding plane or natural fracture. The former would have direct implications of S3, while the latter would require further information such as bedding plane orientation.

However, since no LWD data acquisition is planned for the rat hole section, we will have no chance to confirm which case occurred. Therefore, we continue to call this test a FIT.

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