

IODP EXP 358 Daily Geomechanics Report

Report #032 20181211 Final 5230

RTG Team

RTG Supervisor(s)	David Castillo / Thomas Finkbeiner / Demian Saffer
RTG Watch Lead (00:00-12:00)	Emily Wisbey
RTG Watch Lead (12:00-24:00)	Toby Colson

Well Status

Site Name:	C0002	Hole Name:	Q
Water Depth:	1,939.0 m	RT-MSL:	28.5 m
Current Depth:	5230.0(5227.0) mBRT(mTVD)	Section TD:	5,667.5 (5,664.5) mBRT mTVD
Section #:	1	CSG Depth/Size:	(4855.0) 11-3/4 mBRT
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:	arcVISION 675: (APWD: 3.71 m, Resistivity: 4.42 m, GR: 4.47 m) TeleScope 675: (Direction + Inclination: 11.94 m)		
Other BHA Offsets from the Bit	8-1/4" Stabilizer: 17.50~19.09 m 8-1/4" x 12-1/4" Z-reamer: 28.51~29.86 m 8-1/8" Stabilizer: 40.04~41.70 m 3 x 8-1/2" Drill Collar: 137.07~164.42 m 10-5/8" Stabilizer: 164.42~165.39 m 6 x 8-1/2" Drill Collar + Jar: 165.3~229.99 m Top of BHA: 343.46 m		
Current Operations:	Washed down 8-1/2" x 12-1/4" MLWD BHA taking surveys as required to 4,922.5mBRT at 0600. Survey's indicated the BHA had entered a unsolicited side track. Pulled BHA back to window and re-entered hole encountering relative increase in SPP and torque at 4915 mMDRT. Attempted to enter underreamed hole, hanging up at ~4,912-4,915mBRT, surveys indicated the BHA continued to enter unsolicited sidetrack. Pulling back to kick off point to underream the sidetrack of preference which has less dogleg.		

Geomechanics Alert

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

Principal Findings

- LWD Resistivity provides supporting evidence that the 8-1/2" BHA is not in a 12-1/4" hole (Figure 5 arcVISION Resistivity Repeat Pass Comparison). Kick off point remains part of hole with most concern in relation to wellbore stability.

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Observations Summary

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

Fracture Gradient	N/A
Pore Pressure	<p>Drilled gas peaks while reaming to bottom of up to 2% occurred during the day. Gas peaks correspond to bit depths > 4,910mBRT. <u>Formation gas is no indication of overpressure.</u></p> <div style="text-align: center;"> </div> <p>Figure 1 Gas Out on the 11th December 2018</p>
Wellbore Breakout	N/A
Tensile Failure	N/A
Drilling Parameters	N/A
Other	N/A

Analysis

Drilling Experience Analysis

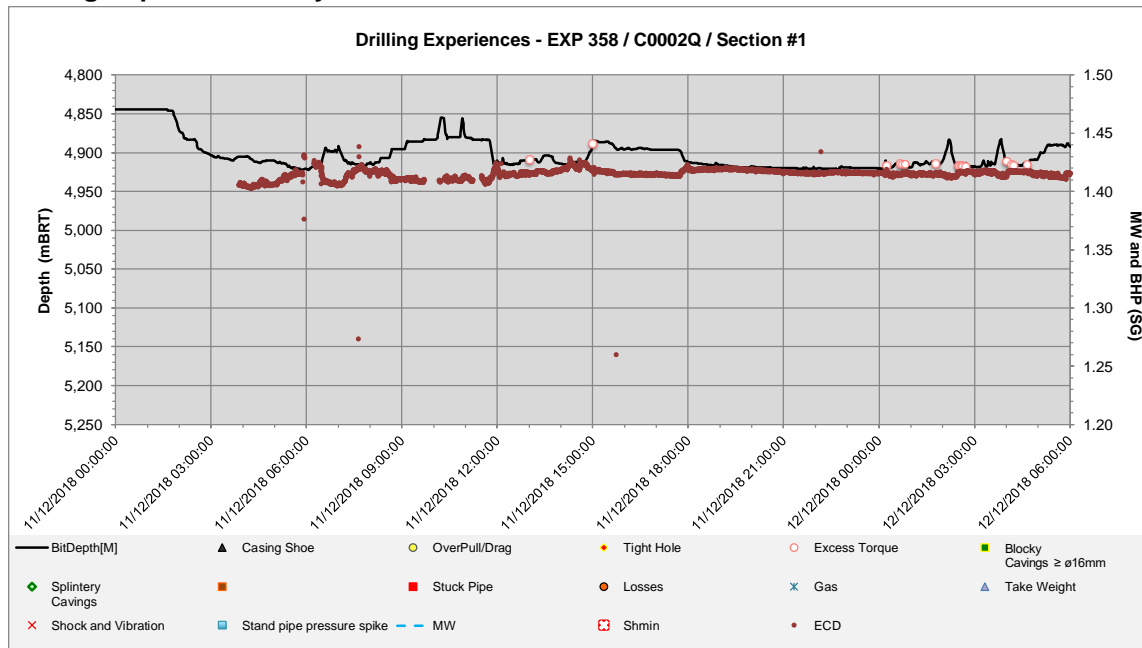


Figure 2 Drilling Experiences over the last 24hrs

The last 24hrs have been spent attempting to run the BHA into the “QB hole” (TS @ 5,230mBRT). There have been multiple high torque events at ~4,912mBRT there the bit cannot get past a tight spot.

Cuttings Analysis

Claystone is dominant, with traces of cement.

The occasional large blocks of cement (~3cm diameter) occur at the shakers indicating that the hole cleaning is capable of lifting large cavings, in the event that extreme hole cleaning is needed.

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Cavings Analysis

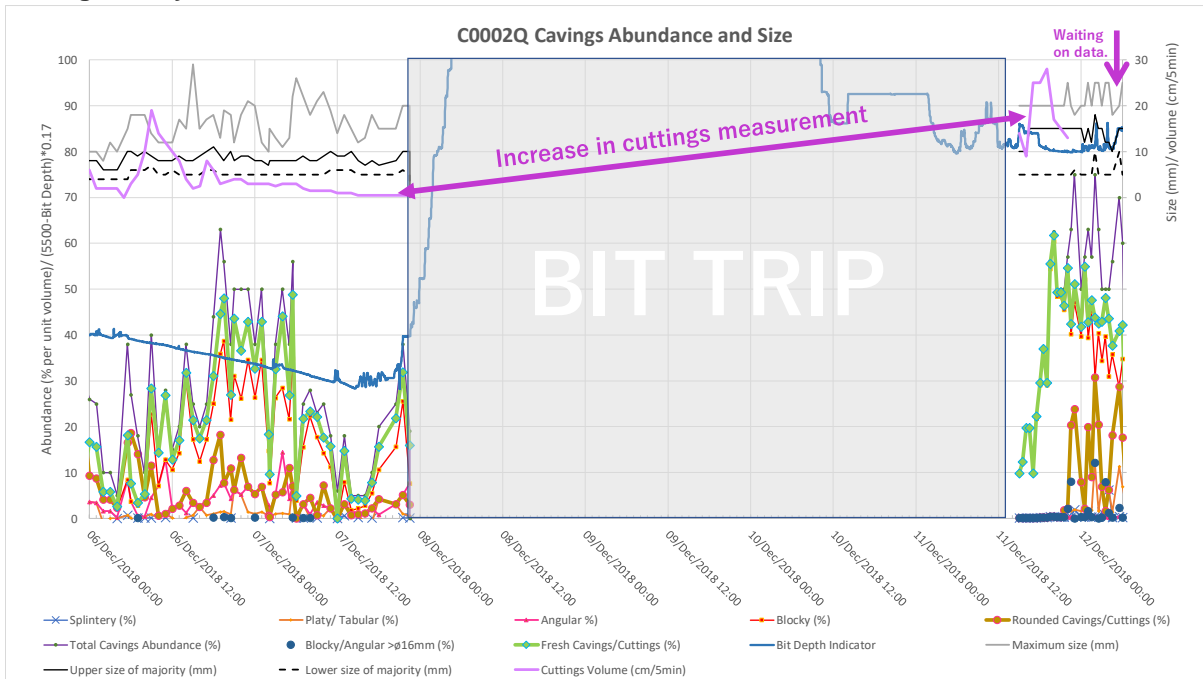


Figure 3 Analysis of cuttings/cavings > ϕ 4mm (taken from 400cc RTG Samples) including previous drilling activities

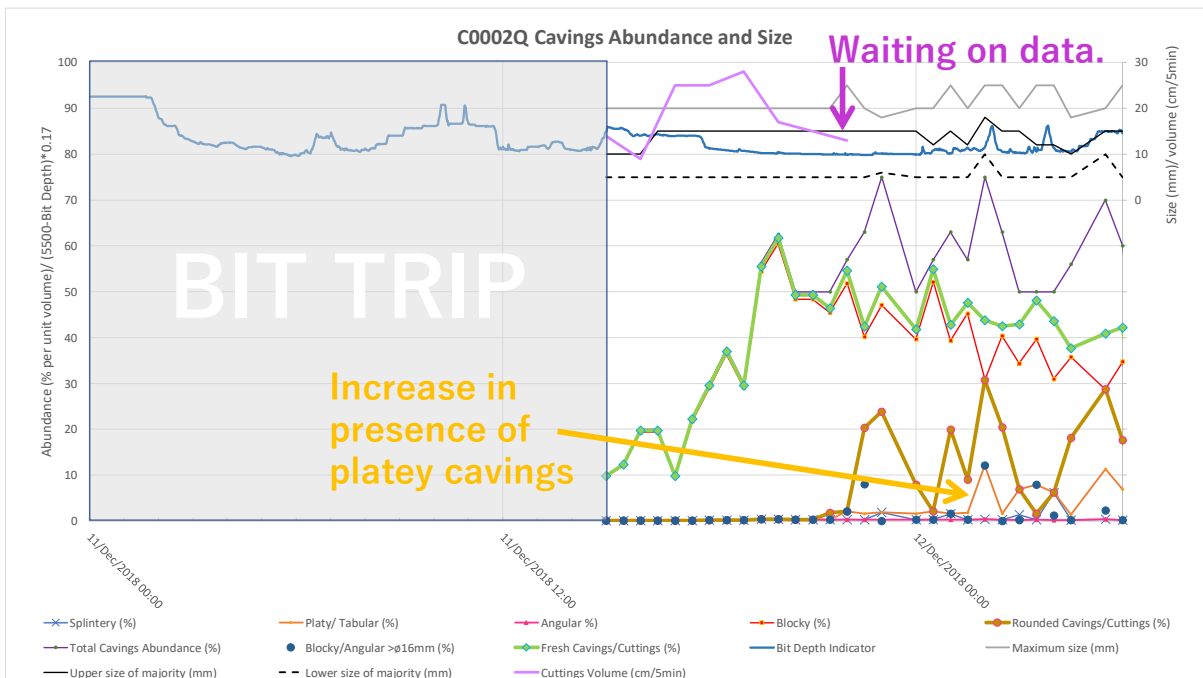


Figure 4 Analysis of cuttings/cavings > ϕ 4mm (taken from 400cc RTG Samples) over last 24hrs

The amount of cuttings/cavings > ϕ 4mm per unit volume and the cuttings volume (cm/5min) both showed higher percentage of cuttings while reaming to bottom in run #5 than during the final drilling days of run #4 (purple curves).

The majority of cuttings/cavings were fresh block/angular, with reworked blocky angular consisting of ~10-30%.

From midnight on the 11th December the presence of fresh platy cavings has increased to ~10%, likely the result of mechanical damage to the formation from reaming / wiping over the same interval for ~24hrs (4,885 to 4,920mBRT)

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LWD Data Analysis

RT resistivity from Run #5 overlays that of Run #2 and Run #4 at 4,912mBRT though hole size at this depth has been enlarged from 8-1/2" to 12-1/4'. A lower resistivity reading would be expected for a 12-1/4" hole with the same formation / BHA as the low resistivity mud constitutes a greater portion of the averaged measurement. The overlaying resistivities indicate either

- The hole size of the current BHA is ~8-1/2" (new sidetrack)
- The hole size prior to underreamed was massively overgauge at ~12-1/2"

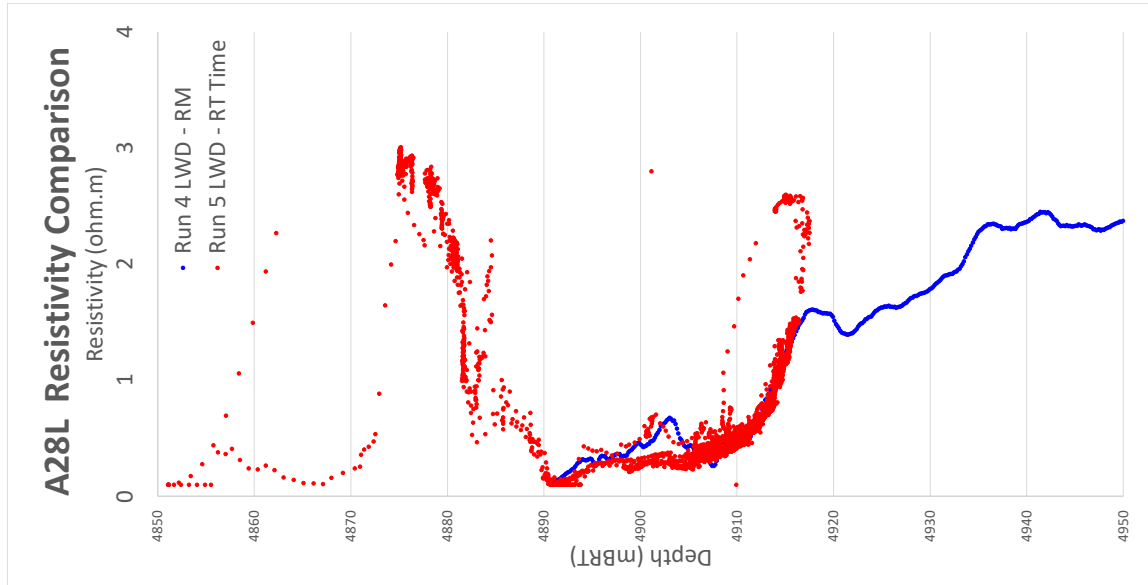


Figure 5 arcVISION Resistivity Repeat Pass Comparison

SFIB Analysis

N/A

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Geomechanical Model Review

No change in the latest stress model. Along with reducing sand and solid content by conditioning mud properties, ECD (APWD) decreased from 1.43 sg to 1.41 sg while drilling down below 5110 mBRT. The current mud condition could keep ECD within the planned MW window.

