UT-GOM2-1 Hydrate Pressure Coring Expedition

Chapter 1. Expedition Summary[1]

[1]Flemings, P.B., Phillips, S.C, Collett, T., Cook, A., Boswell, R., and the UT-GOM2-1 Expedition Scientists, 2018. UT-GOM2-1 Hydrate Pressure Coring Expedition Summary. In Flemings, P.B., Phillips, S.C, Collett, T., Cook, A., Boswell, R., and the UT-GOM2-1 Expedition Scientists, UT-GOM2-1 Hydrate Pressure Coring Expedition Report: Austin, TX (University of Texas Institute for Geophysics, TX). https://ig.utexas.edu/energy/genesis-of-methane-hydrate-in-coarse-grained-systems/expedition-ut-gom2-1/reports/

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Chapter 1. Expedition Summary

Abstract

From 2-May-2017 to 22-May-2017, the UT-GOM2-1 Hydrate Pressure Coring Expedition drilled two wells in Green Canyon Block 955 (GC 955) in the deepwater Gulf of Mexico: Hole GC 955 H002 (H002) and Hole GC 955 H005 (H005). 21 10 ft (3.05 m) pressure cores were attempted in and near the methane hydrate reservoir. In the first hole, H002, 1 of the 8 cores were recovered under pressure and there was 34% recovery of sediment (both pressurized and depressurized). In the second hole, H005, 12 of the 13 cores were recovered under pressure and there was 72% recovery of sediment. The pressure cores were imaged and logged under pressure. Samples were quantitatively degassed either on-board or on-shore to determine the hydrate concentration and the gas composition. Pore water analyses were performed on depressurized samples, and sediment samples were collected to enable characterization of the microbial community. 21 3.3 ft (1 m) vessels containing pressure core sections were returned to the University of Texas for storage, distribution, and further analysis. These cores will provide a foundation for scientific exploration by the greater hydrate research community.

1.1 Background and Objectives

1.1.1 Expedition Background

The UT-GOM2-1 Hydrate Pressure Coring Expedition is part of the Deepwater Methane Hydrate Characterization & Scientific Assessment project DE-FE0023919, funded by the Department of Energy and advised by the United States Geological Survey (USGS) and the Bureau of Ocean Energy Management (BOEM). It was designed to evaluate the ability of the DOE pressure coring tool with ball valve (PCTB) to effectively and consistently capture, collect, and recover hydrate-bearing coarse-grained sediment pressure core, under hydrate-stable conditions, to the drilling vessel deck. This test was also designed to demonstrate the ability to perform preliminary characterization of pressure cores and transfer the cores to pressurized storage devices in a manner that will enable the cores to be stored and analyzed onshore after the conclusion of the deep stratigraphic tests. The successful transportation of pressure core samples would demonstrate the capability of the UT Pressure Core Center (PCC) to receive, store, and analyze pressure core and provide opportunity for scientific exploration by UT and the greater hydrate community through access to the PCC and/or through recovered cores. The expedition was also designed to complement prior logging while drilling (LWD) data acquisition with sediment, gas and water samples that could enable further evaluation of the nature and genesis of the GC 955 hydrate accumulation.

1.1.2 Expedition Objectives

The primary objective of UT-GOM2-1 was to demonstrate the engineering capability of the PCTB to effectively and consistently capture, collect, and recover hydrate-bearing sand sediment pressure core. These tests were in preparation for more extensive expeditions in the Gulf of Mexico. The PCTB has a cutting shoe (PCTB-CS) and a face bit (PCTB-FB) configuration. In 2015, both the PCTB-CS and the PCTB-FB were tested on land in lithologies not typical of hydrate-bearing systems. However, while versions of

the PCTB-CS have been used for hydrate pressure coring, the PCTB-FB has not. The PCTB arose from tools described as the Hybrid Pressure Coring System. It was initially deployed with the cutting-shoe configuration in the Nankai Trough (Yamamoto et al., 2012) and versions of this tool were subsequently deployed in the South China Sea (Yang et al., 2017; Yang et al., 2015), the Japan Sea (Matsumoto et al., 2017), and offshore India (Kumar et al., 2016).

UT-GOM2-1 was primarily an engineering test. However, the underlying goal of this effort was to increase our understanding of the production potential of hydrate-bearing sands. Logging while drilling has documented the occurrence and estimated the concentration of hydrate-bearing sands in the Gulf of Mexico. To better understand the production potential of these reservoirs, samples need to be recovered and petrophysical analyses performed. We wish to illuminate questions that range from what is the compressibility and permeability of both the reservoir and its bounding units to what is the concentration and chemistry of the hydrate and the pore water (Boswell and Collett, 2016). Drilling studies have only recently begun to focus on hydrate bearing reservoirs in sands to address these issues. Examples include efforts in offshore japan (Suzuki et al., 2015) and offshore India (Kumar et al., 2016).

To achieve these scientific objectives, UT-GOM2-1 planned to demonstrate the ability to (1) acquire, log and image pressure cores, (2) subsample pressure cores and store subsamples in pressure vessels, (3) obtain geochemical and petrophysical data from pressure cores; and (4) transport these cores to shore-based laboratories. The specific steps to achieve these goals included the following.

1. Physically locate the 2009 JIP well drilled in approximately 6670 ft (2033 m) of water in the offshore Gulf of Mexico in Green Canyon Block 955
2. Drill/core two vertical wells within 200 ft of the previously drilled Hole GC 955 H001 (H001).
3. Take ten, 10 ft (~3.0 m) long, pressure cores in each hole (20 total cores) using the PCTB-CS in the first hole and the PCTB-FB in the second hole.
4. Wireline log the PCTB-CS hole.
5. Use the Pressure Core Analysis and Transfer System (PCATS) from Geotek Limited to characterize cores and transfer the samples to pressurized storage devices while on the drilling vessel or on land.
6. Use PCATS to:
    - Collect 2D, 100 um resolution, X-ray imaging under pressure
    - Collect P-wave Velocity and bulk density logging under pressure
    - Perform controlled degassing experiments
    - Subsample cores and store them in pressure chambers to shore-based laboratories
    - Pull, cut and transport PCs from the PCTB autoclaves into temporary storage chambers, degassing chambers, or storage chambers for shipping
    - Collect released gas and liquid during quantitative degassing (2 manifolds)
7. Transport and store up to twenty 3.3 to 3.9 ft (1.0 to 1.2 m) in length and 2.0 inches (5.08 cm) in diameter subsamples of pressure cores by road transport to the UT Pressure Core Center (PCC) for storage, further analysis, and distribution.
8. Transfer depressurized pressure cores and other samples to external R&D partners for transport institutions for further analysis.

1.2 UT-GOM2-1 Expedition: Pre-Drill Operational Planning

1.2.1 Project Development and Structure

In spring 2014, the U. S. Department of Energy Office of Fossil Energy National Energy Technology Laboratory released Funding Opportunity Number DE-FOA-0001023, which included a targeted Technical Topic Area requesting applications to investigate the occurrence and nature of methane hydrates on the U.S. Outer Continental Shelf to better characterize naturally-occurring gas hydrate deposits via multi-site deepwater marine drilling, logging, and/or sampling program. The University of Texas, in combination with partners from Ohio State University, Columbia University, and the Consortium for Ocean Leadership responded to this Funding Opportunity Announcement. The UT application was selected for funding and a Cooperative Agreement project was initiated in October of 2014. The project is titled "DE-FE0023919: Deepwater Methane Hydrate Characterization and Scientific Assessment." A three-phase (6 year) program was designed. In Phase 1, technology would be developed and tested, and the offshore engineering test planned. In Phase 2, the engineering test and its associated science would be executed and the 2nd research expedition planned. The second expedition would be executed in Phase 3.

This report describes the planning, execution, and results of the offshore Marine Test entitled "Expedition UT-GOM2-1." UT-GOM2-1 targeted sand-rich deposits containing high concentrations of methane hydrate (as interpreted from existing logging-while-drilling data) in Green Canyon Block 955 in Hole GC 955 H001 (H001) of the Chevron Joint Industry Project in 2009. The report is modeled after ocean drilling program expedition reports and includes 4 chapters: 1) Expedition Summary, 2) Methods, 3) Site H002 results and 4) Site H005 results.

1.2.2 GC 955 Site Characterization and Selection

Geologic Conditions

Green Canyon 955 (GC 955) is located 232 kilometers south of Port Fourchon, Louisiana, USA, at the base of the Sigsbee Escarpment in the northern Gulf of Mexico abyssal plain, in approximately 2 km water depth (Figure 1.2.1 A). Nearby, Green Knoll shows the expression of salt rising toward the seafloor. GC 955 is at the mouth of Green Canyon, where sediment transported across the continental shelf and slope enters the abyssal plain (Figure 1.2.1 B). Due to the rapid change in slope at the base of the Sigsbee escarpment, extensive turbidite and mass transport deposits are common in and near GC 955. Mass wasting is common, and the seafloor morphology indicates recent sediment transport.

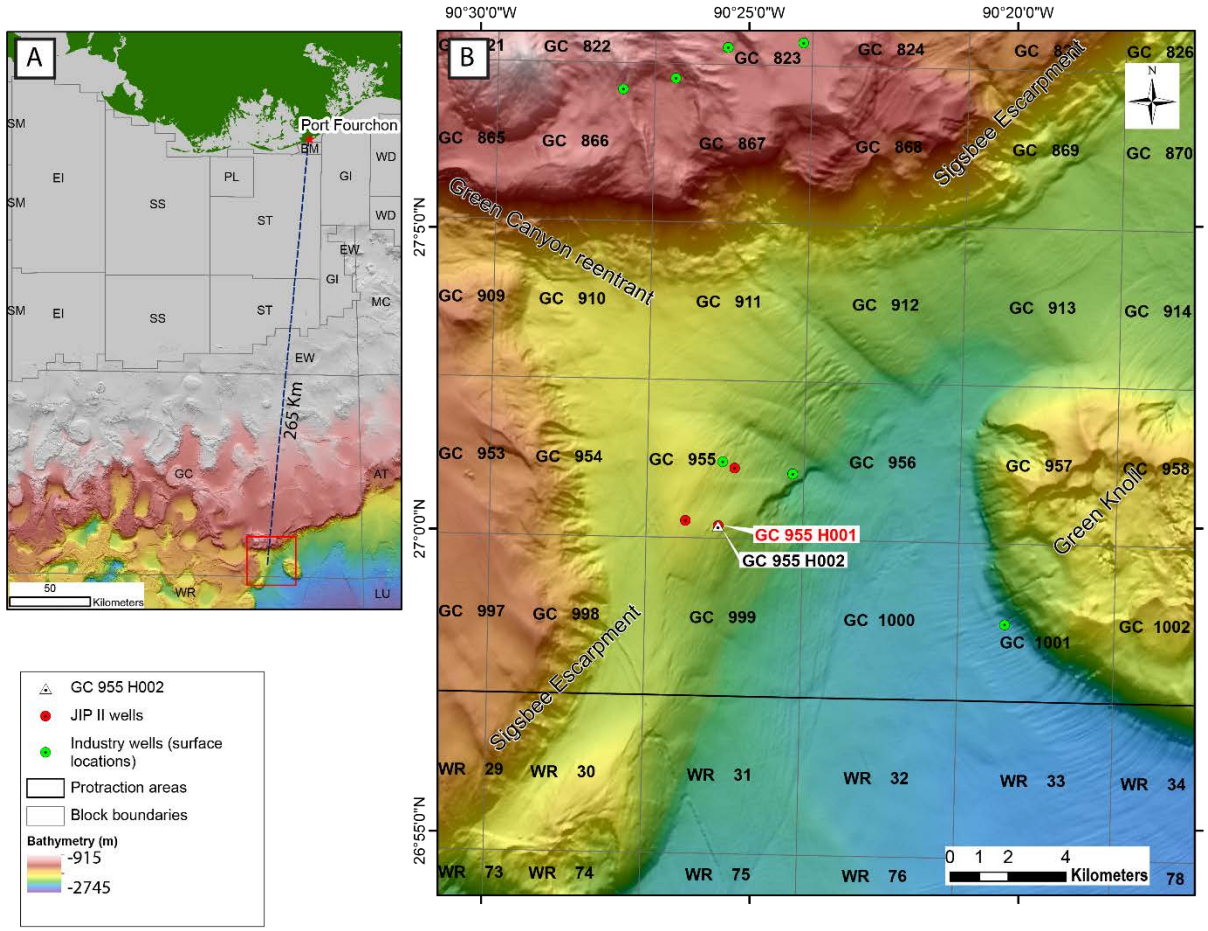


Figure 1.2.1 GC 955 Location. (A) GC 955 is located 232 km south-south-west of Port Fourchon, LA., at the foot of the Sigsbee Escarpment. (B) The UT-GOM2-1 Expedition drilled 2 holes at Green Canyon 955 within 30 meters of the previously drilled Hole GC 955 H001. GC Block 955 is at the toe of the Sigsbee Escarpment adjacent to the Green Canyon reentrant. Bathymetry data from the BOEM Northern Gulf Of Mexico Deepwater Bathymetry Grid (https://www.boem.gov/Gulf-of-Mexico-Deepwater-Bathymetry/).

The Green Canyon 955 region has been study area for methane hydrates since it was first described by McConnell (2000) and Heggland (2004). These studies described geophysical indications for gas sourcing, gas migration pathways into the shallow sediments afforded by extensive faulting, and the presence of thick sand reservoirs associated with a large and persistent Pleistocene channel-levee complex (McConnell et al., 2010). McConnell et al. (2010) review the GC-955 location and summarize the geophysical and geological evidence for methane hydrate at this location. They describe the erratic occurrence of strong positive and negative polarity reflections within the structural crest.

Based on these positive indicators for the presence of methane hydrates, the Chevron Joint Industry Project II (JIP II), drilled H001, I001, and Q001 at GC 955 (Figure 1.2.2) using LWD technology. The presence of hydrate was confirmed at each location. A range of publications describe the operations

(Collett et al., 2009), the geological context (Boswell et al., 2012a; Boswell et al., 2012b; McConnell et al., 2010) and the specific logging results (Collett et al., 2012; Cook et al., 2012).

The methane hydrates inferred to be present at Block GC 955 overlie a salt-cored anticline that is seaward of the Sigsbee Escarpment. The anticline is cut by numerous faults that generally do not reach the seafloor (Figure 1.2.3). Some faults extend to the underlying salt. Bright amplitudes are present at the crest of the anticline. Muted imaging beneath these amplitudes may record the presence of gas.

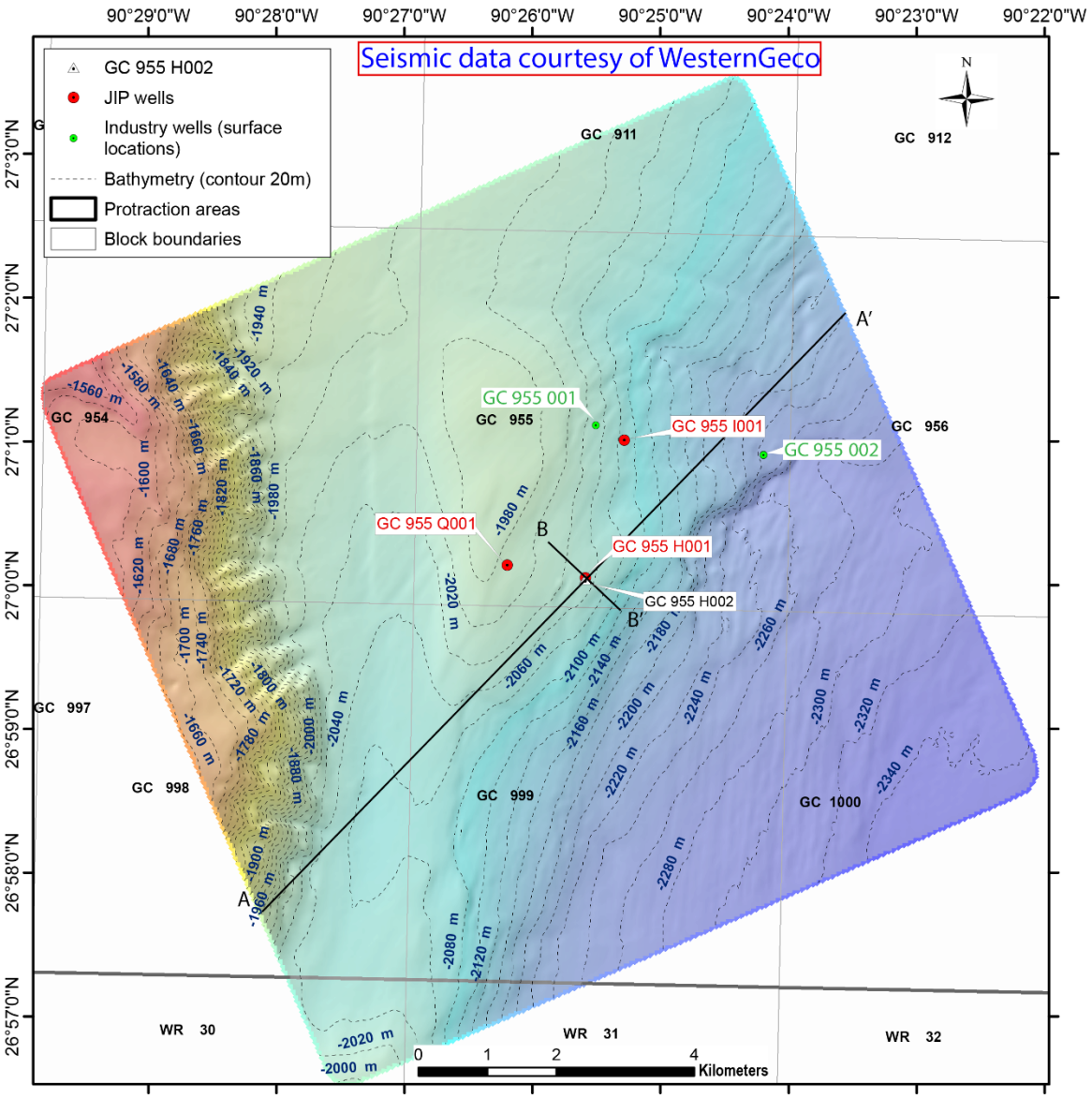


Figure 1.2.2 Bathymetry data from the BOEM Northern Gulf Of Mexico Deepwater Bathymetry Grid over Green Canyon Block 955. The Gas Hydrates JIP Leg II LWD program drilled H001, I001, and Q001 in 2009. Two industry wells (green dots) are located by their API #: the 60811402710000 well was drilled in 1999, and the 60811404770000 well (and its sidetrack) was drilled in 2006-2007. During Expedition UT-GOM2, H002 and H005 were drilled adjacent to H001. Seismic data courtesy of WesternGeco.

We mapped seven seismic horizons (Horizon 100 through Horizon 600 and the seafloor) across this structure (Figure 1.2.3, Figure 1.2.4). Horizon 100 and Horizon 300 bound a stacked channel-levee complex oriented NNW to SSE that is just to the east of the anticline (Figure 1.2.3). H001, lies on the western levee of this channel system (Figure 1.2.3). At the reservoir level, there is a strong peak-over-trough amplitude (black over red) present (Figure 1.2.4). In H001, the peak correlates to the top of a high resistivity and high velocity section at 414 mbsf that is inferred to record a sand-rich reservoir with methane hydrate in the pore space (Figure 1.2.5, Figure 1.2.6).

At H001, the section is mud-prone to a depth of 1270 feet below seafloor (fbsf) or 387 meters below seafloor (mbsf) (Figure 1.2.5). A 330 ft (101 m) thick sand or silt-rich interval lies between 1270 and 1600 fbsf (387 to 488 mbsf) based on the interpretation of the gamma ray, caliper, and resistivity data (Figure 1.2.5, Figure 1.2.6). The upper 50 ft (15 m) of this interval may become more mud prone upward because the gamma ray values increase upward as the borehole washout decreases. Within this 330 ft (101 m) sand-rich interval, there are three zones of high resistivity and high velocity where hydrate is interpreted to be present (green in Lithologic Units, Figure 1.2.6). The uppermost zone is 86 ft (26 m) thick and 63 ft of gas hydrate-bearing units thinly interbedded with mud-rich units. Where hydrate is not present in this sand-rich interval, significant borehole washout is present as is indicated from the enlarged borehole (caliper) and low density values. Based on the review of the 2012 LWD data (Boswell et al., 2012a; Boswell et al., 2012b; Collett et al., 2012), the entire 330 ft (101 m) sand-rich interval is composed of interbedded sand/silt and mud; the gas hydrate most likely occurs as pore-fill within thin-bedded sands within this sequence (Figure 1.2.6).

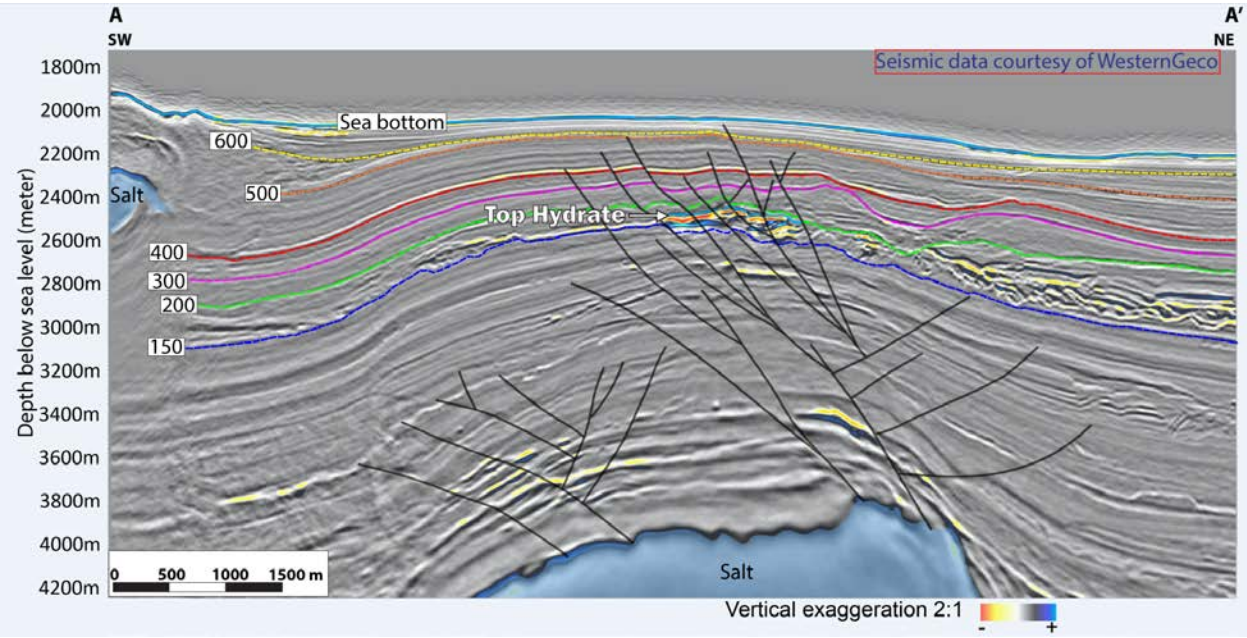


Figure 1.2.3 Interpreted seismic cross sections of the GC 955 area. Image courtesy of WesternGeco. The A-A' cross section is shown in Figure 1.2.2.

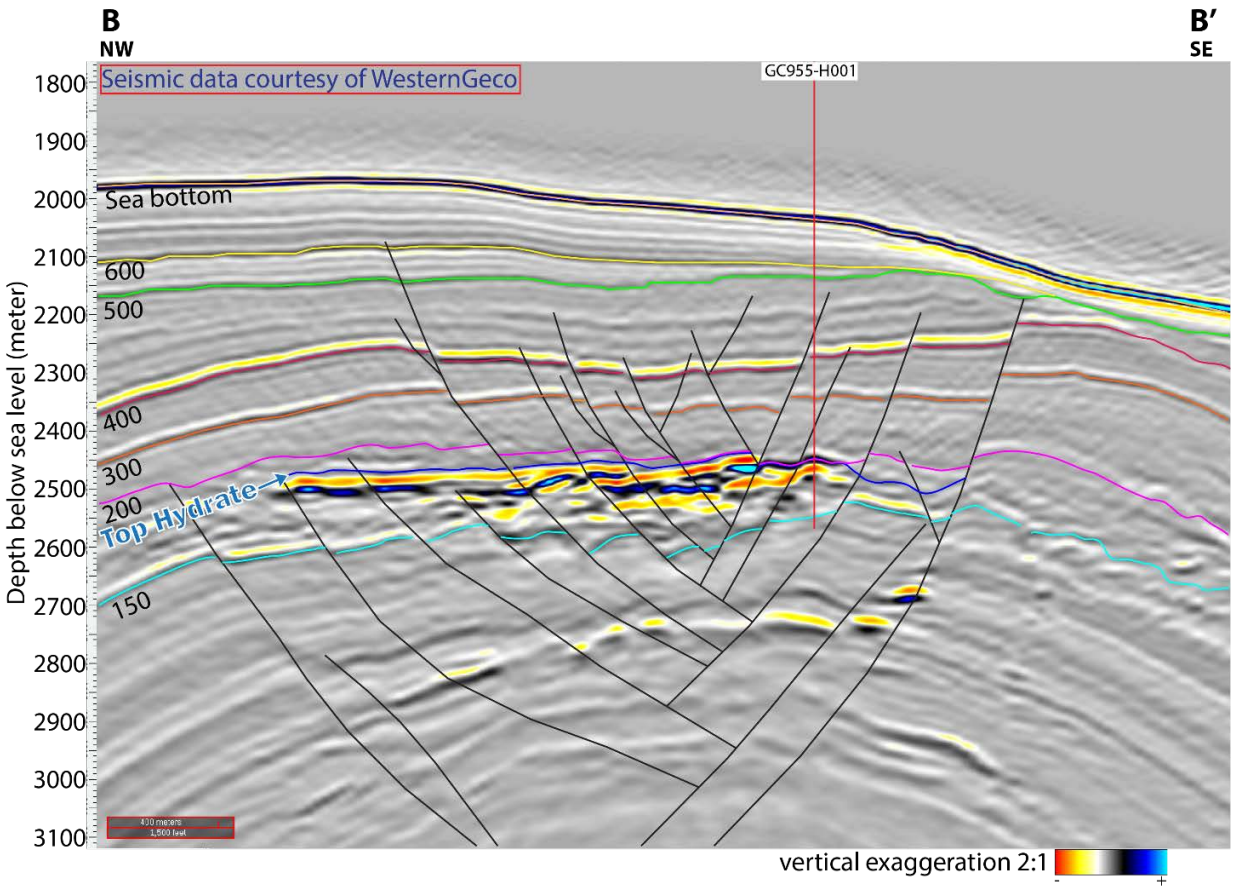


Figure 1.2.4 Expanded view of Hole GC 955 H001 location. Image courtesy of WesternGeco. The B-B' cross section is shown in Figure. 1.2.2.

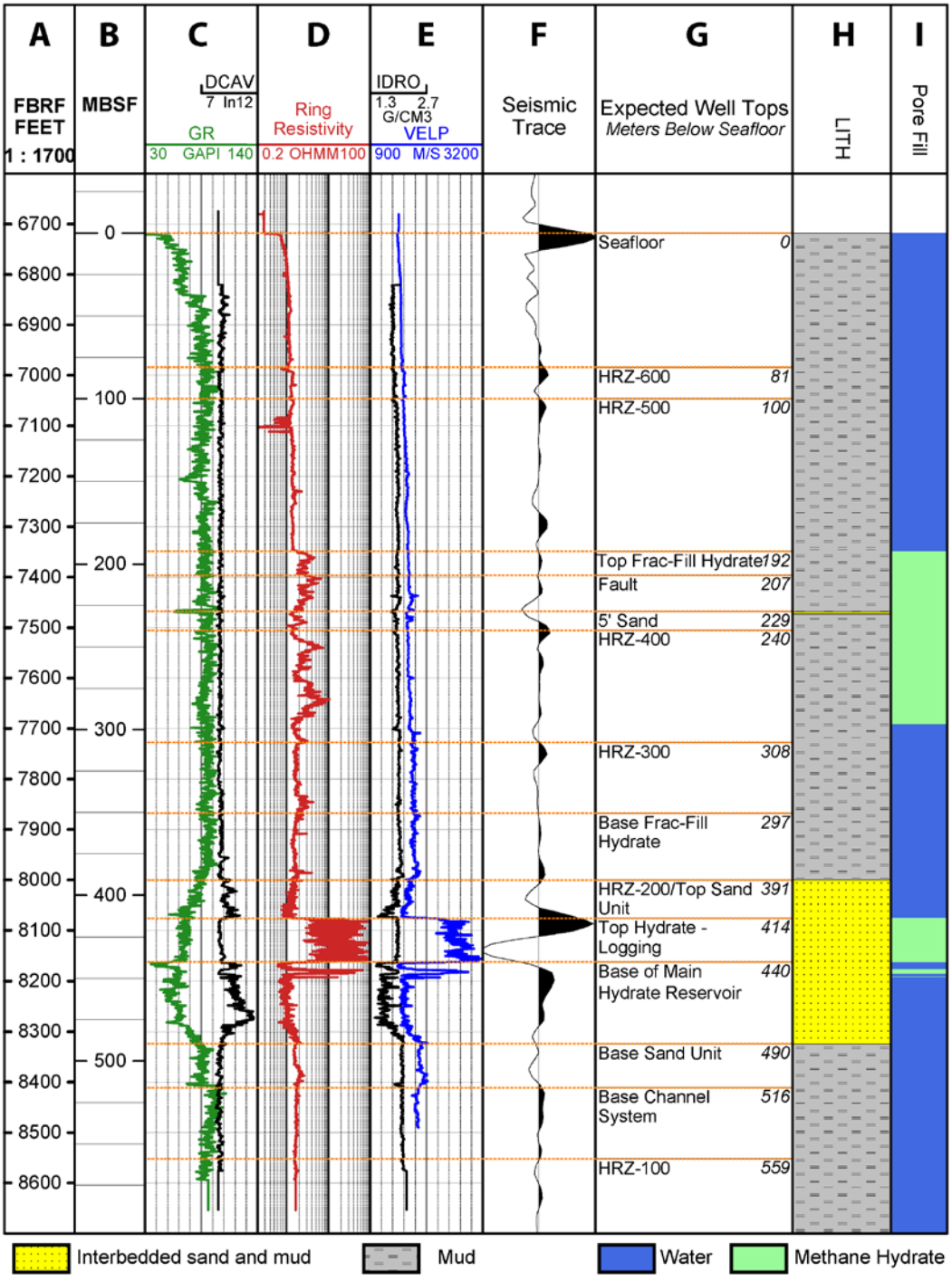


Figure 1.2.5 Columns C, D, and E illustrate logging while drilling (LWD) data for Hole GC 955 H001. GR-Gamma Ray, DCAV-calipers, IDRHO-bulk density, VELP-compressional velocity. F) Seismic trace at the GC 955 location (courtesy of WesternGeco). G) Interpreted stratigraphic surfaces. H) Interpreted Lithology. I) Pore Fill documents whether the rock is 100% water saturated (blue) or contains hydrate (green). H001 results have been discussed in detail (Boswell et al., 2012a; Collett et al., 2010; Collett et al., 2012).

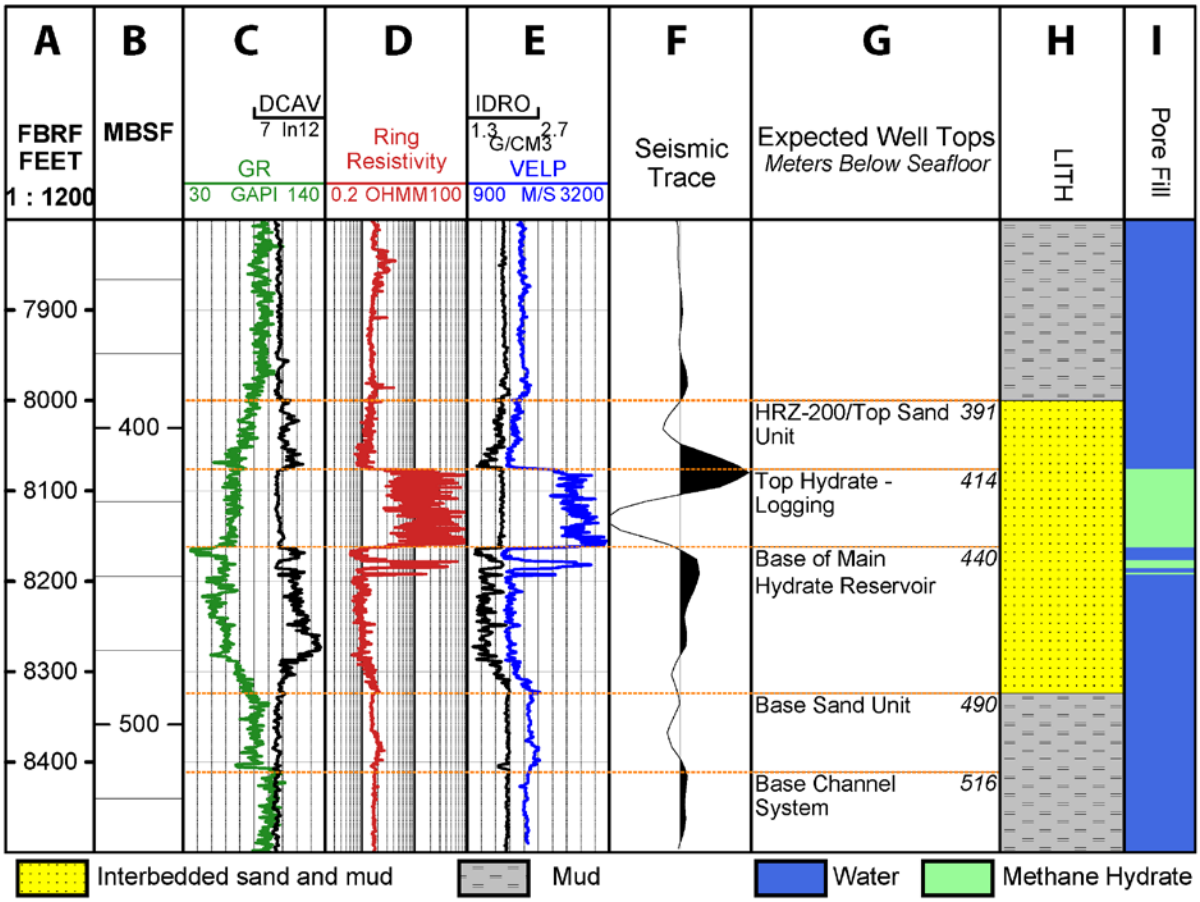


Figure 1.2.6 Expanded view of the hydrate-bearing section in Hole GC 955 H001. Columns C, D, and E illustrate LWD data for H001. GR-Gamma Ray, DCAV-calipers, IDRHO-bulk density, VELP-compressional velocity. F) Seismic trace at the GC 955 location (courtesy of WesternGeco). G) Interpreted stratigraphic surfaces. H) Interpreted Lithology. I) Pore Fill documents whether the rock is 100% water saturated (blue) or contains hydrate (green). H001 results have been discussed in detail previously (Boswell et al., 2012a; Collett et al., 2010; Collett et al., 2012).

Event	Depth below Rig Floor	Depth below Sea Level	Depth Below Seafloor	Seismic Reference Depth
unit	fbrf	fbsl	fbsf	ft
Sea floor	6,718	6,667	-	6,672
Top Fracture Filling Hydrates	7,349	7,298	631	7,303
Fault	7,396	7,345	678	7,350
5' thick sand	7,468	7,417	750	7,422
Base Fracture Filling Hydrates	7,692	7,641	974	7,646
Top Sand - rich section	8,000	7,949	1,282	7,954
Top Hydrate - Log based	8,076	8,025	1,358	8,030
Top Hydrate- Seismic Peak	8,081	8,030	1,363	8,035
Base of Main Hydrate Reservoir - Log Response	8,162	8,111	1,444	8,116
Base of Sand Unit	8,324	8,273	1,606	8,278
Base of Channel System	8,411	8,360	1,693	8,365

Table 1.2.1 Mapped horizons at H001. H001 distance from the rig floor to the sea level was 51 ft.

Geothermal Gradient and Thermodynamic Conditions

No direct temperature measurements exist at GC 955 to determine the temperature gradient. Therefore, a theoretical approach was applied, based on the thermodynamic properties of gas hydrate. The water depth is 6667 fbsl (2032.1 mbsl) at H001 (Table 1.2.1). The base of the methane hydrate stability zone was interpreted from 2- and 3-D seismic data to lie at 8202 fbsl (467.9 mbsf). The deepest occurrence of hydrate within the main reservoir was interpreted from H001 LWD data to lie at approximately 8162 fbrf (440 mbsf).

We estimate the three-phase equilibrium curve for pure methane hydrates employing the model developed by Flemings and Liu (2007). The three-phase equilibrium condition is obtained from the intersection of two pressure-temperature-salinity dependent methane solubility curves: 1) methane solubility in water when methane hydrate and water phases are in equilibrium, described by the model of (Henry et al., 1999); and 2) methane solubility in water when methane gas and water phases are in equilibrium, described by the model of (Duan et al., 1992). Seawater salinity (3.5 wt%) and hydrostatic pressure were assumed. At the depth of BSR (1535 fbsf, 467.9 mbsf), the water pressure is 3661 psi (25.24 MPA). A bottom water temperature 4.2 °C (NODC, 2013) was assumed. The temperature should be 20.4 ^{o}C to achieve three-phase conditions at the observed BSR.

With these conditions, the geothermal gradient equals 34.7 °C/km (Figure 1.2.7). The base of the sand rich hydrate bearing section lies at the inferred base of the hydrate stability zone (green line, Figure 1.2.7). In a pressure versus temperature plot, the base of the sand-rich hydrate bearing zone lies exactly at the stability boundary for seawater salinity (green line, Figure 1.2.8).

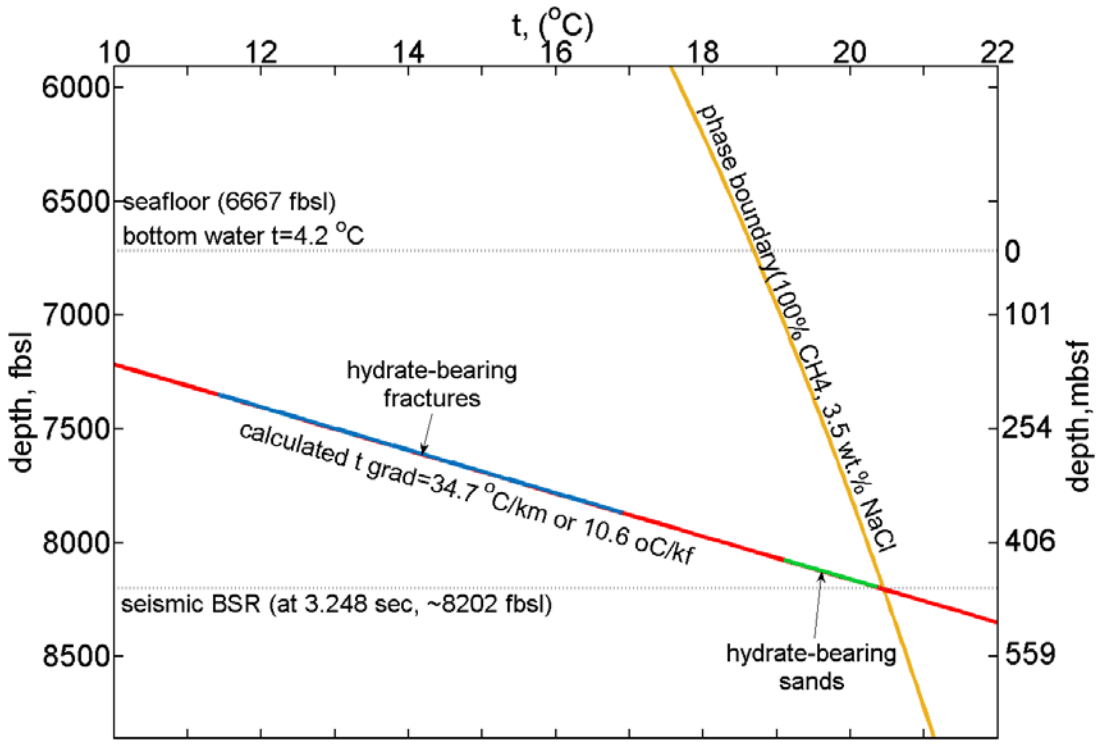


Figure 1.2.7 Temperature-depth diagram, showing gas hydrate phase boundary within the study area. Seismic BSR was used as a reference for GHSZ lower boundary in temperature gradient calculation experiment.

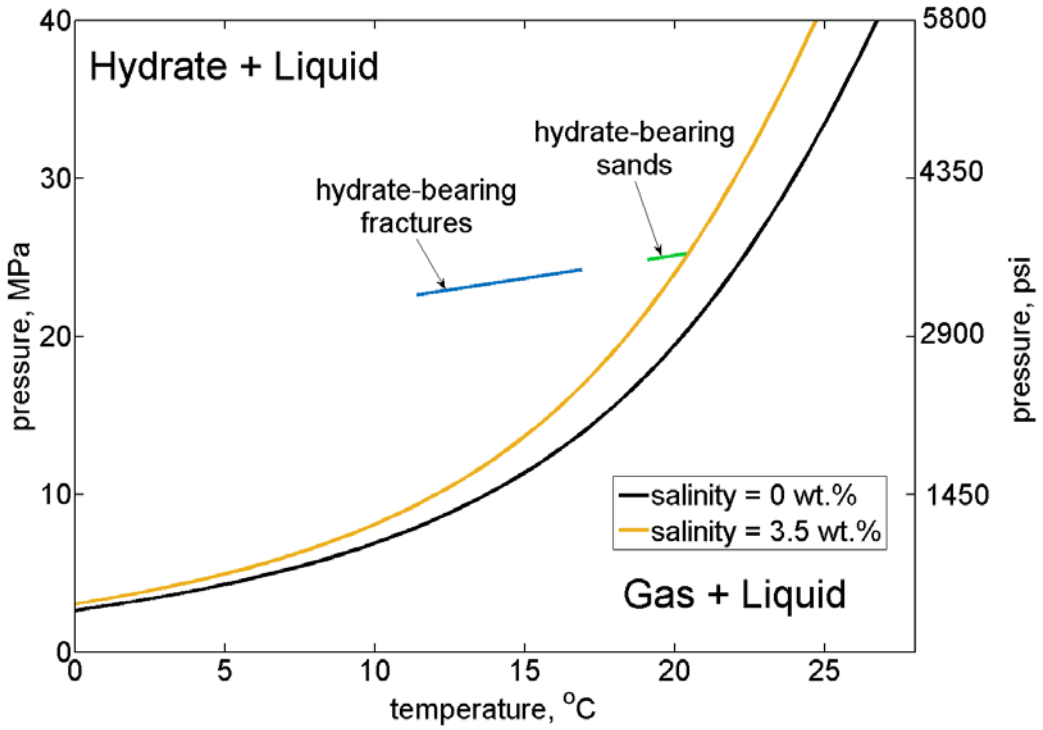


Figure 1.2.8 Pressure vs. temperature diagram for hydrate-bearing intervals at H001.

Gas Hazards

GC 955 has a high concentration of shallow gassy sediments over the faulted structure, especially in the southwestern quadrant of the block (Boswell et al., 2012b). The upward migration of the gas is interpreted to be hindered by gas hydrate formation at and above the base of the methane hydrate stability zone. Seismic and well data record the presence of only hydrate at H001 (Boswell et al., 2012b), but free gas is likely at GC 955 Q. McConnell et al., (2012) assess the occurrence of free gas associated with gas hydrate in the area.

Based on offset observations at the previously drilled H001 and Q001 wells, the following gas flow risks were interpreted. First, there is a low risk for gas flow due to dissociation of hydrate cuttings while drilling the hydrate bearing-interval (1363-1449 fbsf or 415-442 mbsf). Second, beneath the hydrate-bearing zone, there is a low risk for gas flow in sands and silts due to the observed lack of free gas in H001. Although penetration of a permeable gas-rich zone beneath the hydrate could result in a continuous gas flow if not hydrostatically controlled, free gas is not expected at H002 based on drilling H001. The free-gas risk was mitigated by careful review of seismic data to ensure that the two wells were drilled within the same fault block as H001.

H001 was drilled and completed without any significant problems and without any special measures other than the precautionary use of drilling fluid effective cuttings removal and wellbore stability (Collett et al., 2009). However, high amplitudes and, particularly, the strong positive reflector that is regionally present, may record the base of a gas cap beneath the hydrate in some locations (other fault blocks than were targeted with the GOM-Expedition-1 program). In Q001 (Figure 1.2.2), a gas bubble was observed at 1,516 fbsf during a connection. The hole was displaced with 13 ppg mud and observed for an hour with no flow. While pulling the string out of the hole, a small, continous flow was observed. The flow was possibly due to borehole swabbing while pulling out of the hole or the use of heavy mud may have fractured sedients at the bottom of the hole into a fee-gas zone below the gas-bearing hydrate zone (Hutchinson et al., 2010). The well was ultimately plugged with a 16 ppg cement.

The following lessons were learned from drilling the Q well. It is important to follow good drilling practices to prevent swabbing or fracturing the formation. To minimize the likelihood for swabbing, the mud properties should be maintained throughout the drilling to minimize bit and bottom hole assembly (BHA) balling. Prior to starting out of the hole, a bottoms-up circulation should be completed to provide a clean annulus. Prior to starting out of the hole an extended flow check should be performed. When pulling out of the hole, keep the drill string full of weighted mud to maintain the drill pipe-to-annulus U-tube effect. Pull the drill string at a slow rate and monitor for evidence of overpull or changes in string weight. If swabbing is suspected, run the drill string back to bottom and the circulate at least a hole volume and observe for flow. If flow persists after circulating, pump kill mud in increasingly heavier weights to control the well. To avoid fracturing the formation, increase the kill mud weight in no-more-than 0.5 ppg stages and perform flow checks in between each stage. The maximum kill mud weight should not exceed fracture gradient.

Observations made during the Chevron JIP drilling indicate that when drilling highly concentrated gas hydrate sections, hydrate cuttings and perhaps gas can be released as the formation is cut. The size and intensity of the cut-gas release can be controlled to some extent by reducing the rate of penetration,

but gas should be expected in the annular fluid; much as it is when drilling through other gas-ladened formations.

Worst Case Discharge

As part of the permitting process, a worst-case discharge analysis was performed. The H001 well encountered one zone of methane-hydrate bearing sandstone, did not encounter any free gas, and did not flow gas or water. Based on extrapolation of seismic data the short distance to the proposed well bores, a similar stratigraphy was expected at H005 and H002. Thus, we did not predict that we would encounter any free gas for the H005 or H002 wells. Despite the fact that no gas was predicted, we constructed two worst case scenarios. In Scenario 1, we estimated the largest potential volume of gas that could be trapped within the GC-955 anticlinal structure beneath the base of the hydrate stability zone and above a regional gas-water contact that was imaged with seismic data. This gas-water contact was not present at the H001, H005, or H002 locations. In Scenario 2, we estimated the total volume of methane trapped within the hydrate based on the presence of a strong positive reflection above and an assumed reservoir thickness of 100 feet.

The maximum volume of gas that could be released from trapped gas (Scenario 1) is about 20 times greater than that released from hydrate destabilization (Scenario 2). This is because the mapped volume of possible free gas is larger than the mapped volume of possible hydrate. The maximum volume of gas that could flow from the trapped gas (Scenario 1) is estimated to be 2.79×10^6 ft^3. The release would occur over 20 days for a 1 Darcy reservoir and over 50 years for a 1 mD reservoir (the time scale is linearly proportional to the permeability). No logical reason was found for the hydrate to destabilize (Scenario 2) because temperatures and pressures expected in the well would keep the hydrate as a stable (solid) phase throughout the drilling and coring program. None the less, if all of the hydrate dissociated, 1.25×10^5 ft^3 of gas would be released over 2 days for a 1D reservoir and 2000 days for a 1 mD reservoir.

Shallow Water Flow

There are only two sand-prone zones: 1) a 5 ft (1.5 m) sand at 750 fbsf (229 mbsf) (brine) and the 325 ft (99 m) thick sand-rich interval within which hydrate is present (Figure 1.2.6). The risk for shallow water flow was assessed as low in these two intervals and negligible risk was inferred for the remainder of the section. There was no evidence of any shallow water flow in H001 (Collett et al., 2009). A water flow was observed at Hole GC 955 I001 (I001) well after the drill string was pulled out of the hole from a total depth of 9,027 fbrf with 10.5 ppg mud in the hole (Collett et al., 2009). A cement plug was placed in that well.

Human Obstructions

The nearest existing wells are three wells that were drilled at this location during the 2009 Gas Hydrates JIP Leg II LWD program (GC 955 I001, Q001, and H001) and two industry wells (OSC-G 20114 #1 and OCS-G 20114 #2). No other man-made features or other potentially hazardous seafloor conditions are identified in the vicinity of the proposed well site.

Pore Pressure & Fracture Gradient

We generated pore pressure and fracture gradient plots (Figure 1.2.9) and pressure/stress plot (and Figure 1.2.10) for H002 and H005.

H002 and H005 were drilled riserless without casing. The plots are based on the following assumptions. 1) The overburden curve was generated by integrating the density log from the LWD data acquired in H001. In zones where there were washouts and the density values recorded values near the density of water, density values were interpolated from the overlying and underlying zones to more effectively determine the overburden. 2) Pore pressure was assumed to be hydrostatic because there was no evidence of any elevated pore pressures during previous drilling of H001. Hydrostatic pore pressures are expressed with a pore pressure gradient of 8.3 ppg, or seawater gradient of 0.46 psi/ft. 3) The least principle stress (σ_{hmin}) was calculated using the following equation:

$$\sigma_{hmin} = K_0 * (\sigma_v - u_h) + u_h. \qquad \text{Eq. x}$$

u_h is the hydrostatic pressure. Eaton (1969) and Matthews and Kelly (Matthews and Kelly, 1967) suggest K_0 = ~0.4 within the first 1,000 fbsf. However, these estimates were based on either wells on land or in very shallow water. In contrast, it is commonly observed in deepwater wells that in the shallow section (e.g. 1,000 feet below mud line), K_0 values are much higher and can approach 1.0. An upper bound of K_0 = 0.9 and a lower bound of K_0 = 0.7 was assumed.

The program called for increasing the mud weight to 10.5 ppg at the depth of the hydrate-bearing interval (~1350 fbsf). When the mud weight is increased, this will expose the upper part of the borehole to elevated pressures. The program considered an 11.5 ppg mud at the completion of drilling, as illustrated.

Based on seismic interpretation and offset well information from H001, formations penetrated at the proposed location are expected to be normally pressured. There is a possible gas cap beneath the hydrate in the region (although not interpreted to be present at H001), the pressure associated with the gas cap is illustrated with the red solid line (Figure 1.2.9 and Figure 1.2.10).

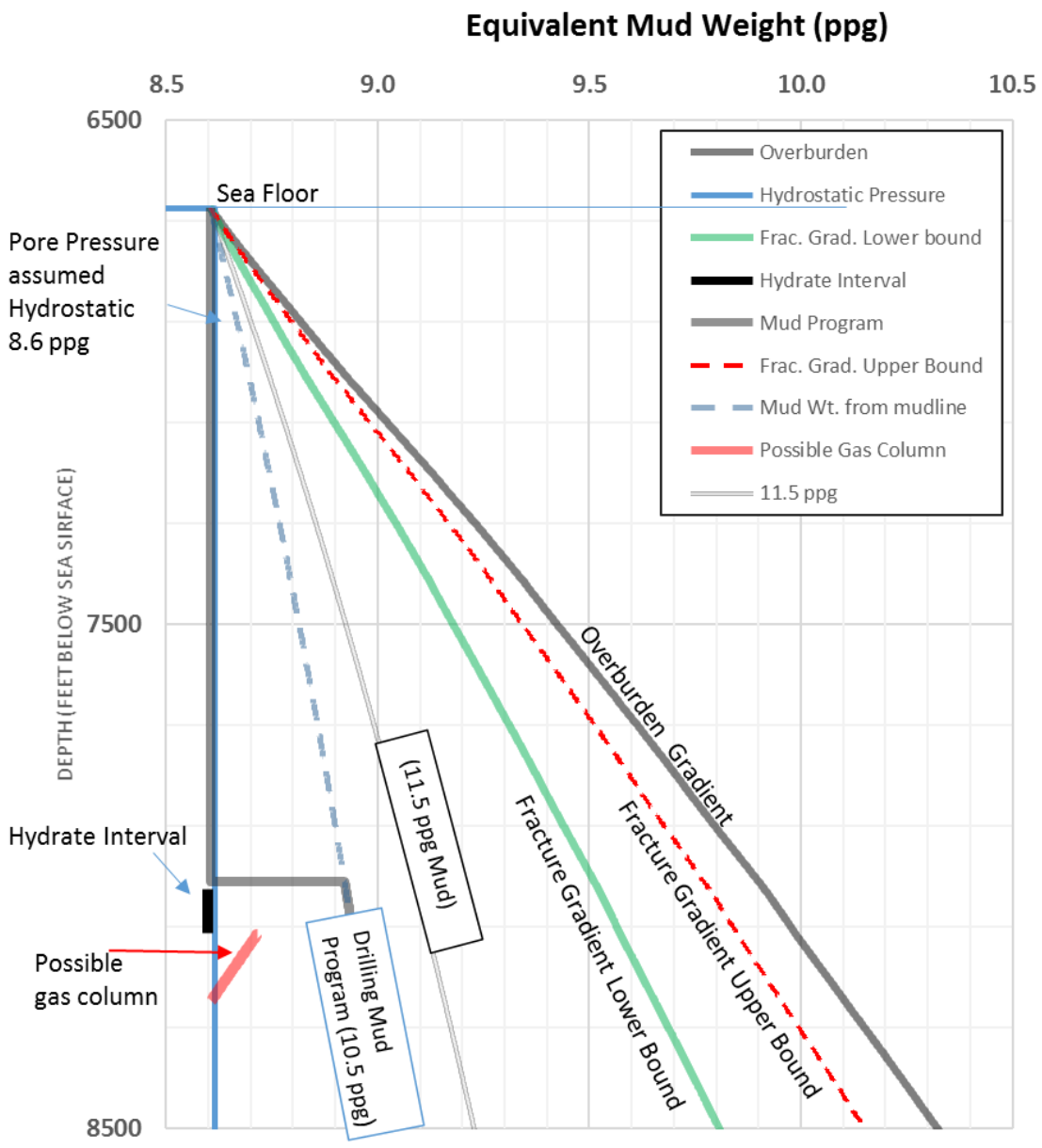


Figure 1.2.9 Pore pressure and fracture gradient plot for H001. See text for discussion. This well will be drilled without a riser. An upper bound and lower bound fracture gradient are shown. The current drilling plan is to increase the mud weight to 10.5 ppg 15 feet above the hydrate-bearing interval as shown by the thick grey line. This will expose the upper part of the borehole to elevated pressures as illustrated with the light blue dotted line. At the completion of the drilling, an 11.5 ppg pad mud will be placed in the well. There is a possible gas column beneath the hydrate layer. The possible gas pressure is shown with the red line.

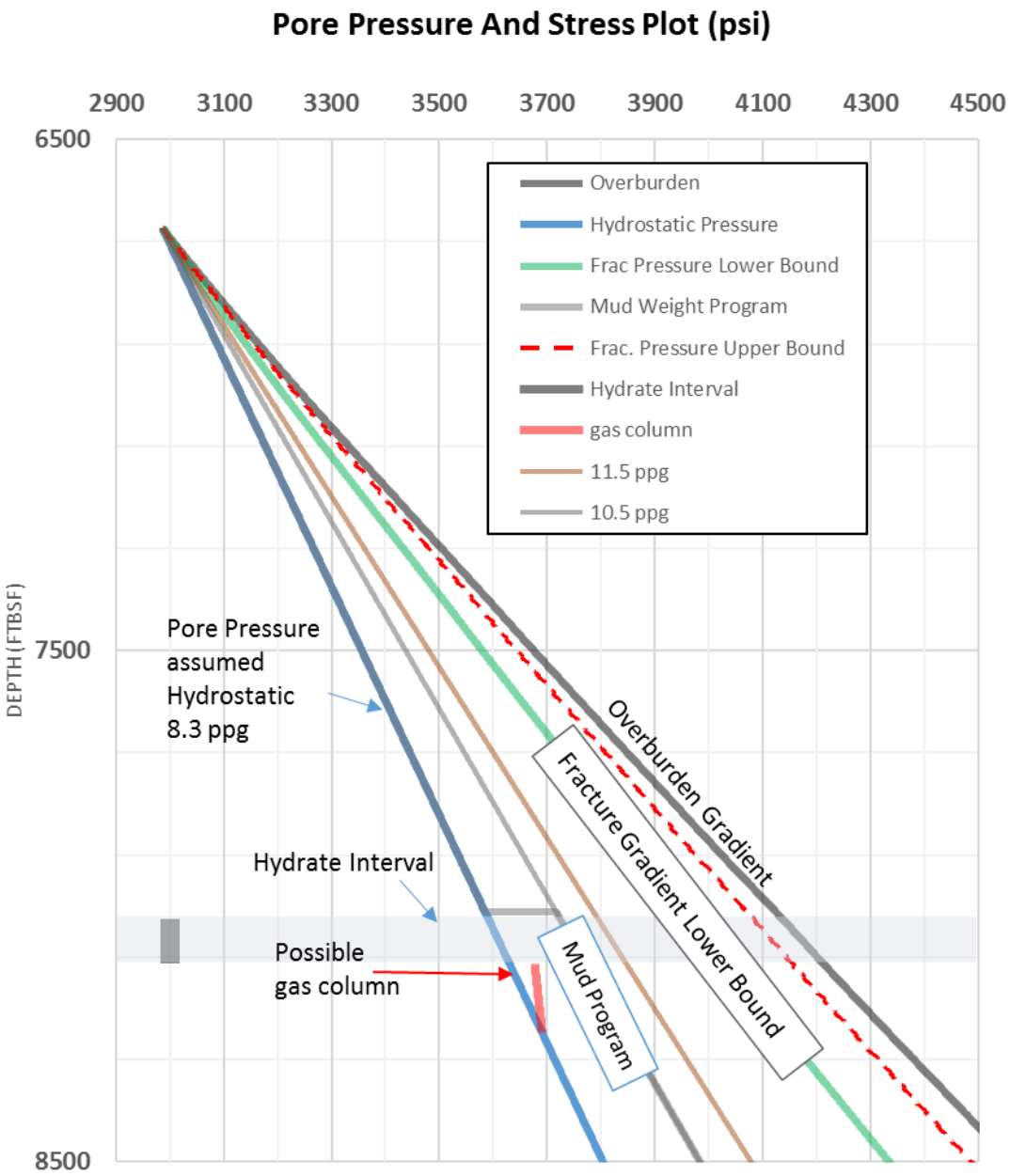


Figure 1.2.10 Total Pore pressure and least principal stress plot, measured from the sea surface, proposed for the proposed H002 and H005 wells. See text for discussion. This well will be drilled without a riser. Thus, the pore pressure and stress increase from the hydrostatic pressure at the seafloor. The current drilling plan is to increase the mud weight to 10.5 ppg 15 feet above the depth of the hydrate-bearing interval.

1.2.3 Drilling Platform Review and Selection

Vessel Selection - Bidding & Evaluation Process

A high-level statement-of-requirements was developed and requests for proposals were sent to prospective vessel contractors. In December 2015, returned proposals were pre-screened to ensure the offered vessel was capable of meeting equipment requirements. A number of follow-up clarification meetings were held, as well as requests made for additional information. The details of the proposals and each vessel's capability were documented in a summary spreadsheet for ease of comparison. Each vessel and company capability was evaluated vs. project requirements. A scorecard was developed, weighted to reflect perceived importance of individual items on overall success of the project. The scorecard included a combination of rig equipment capability and soft issues such as coring/drilling experience; plans for management of subcontractors, logistics, and mobilization; cost; risk exposure; vessel availability within the operating window; and client space. Each proposal was evaluated and scored by a panel consisting of geological, operational, and management expertise. In April 2016, after scoring and discussion, the deepwater well intervention vessel Helix D/V Q4000 was unanimously selected.

Vessel contracting strategy

Due to the complexities of setting-up and managing University contracts, the vessel contractor was asked to contract and to manage logistical support and all third-party contractors (excluding coring) as part of the vessel contract. Environmental compliance oversight was managed by the third-party drilling fluid provider. Third-party services ultimately provided for UT-GOM2-1 and sub-contracted by the vessel contractor included: mud, cement, slickline, electric-line logging, gyro survey tools, drill pipe rental, PE certification of the P&A design, drilling-parameter recorder system, enhanced communication system, ROVs, installation of grating for single-elevation work surfaces, and full logistical support (helicopters, crew boat, and supply boats).

Contracting of a US-flagged intervention vessel which routinely operates in deepwater Gulf of Mexico, simplified project planning and execution for the University. The University was able to take advantage of procedures, systems, and third-party alliances already established and provided by the contractor. Most notable, was the ability for the University to operate under the vessel contractor's Safety and Environmental Management System (SEMS). Additionally, requirements for vessels operating in the Gulf of Mexico had already been addressed by the contractor and thus, not a work front to be managed by the University (i.e. USCG Certificate of Inspection, Certificate of Class, vessel Oil Spill Response Plan, US Certificate of Financial Responsibility, vessel NPDES permit, etc.).

1.2.4 Liability Obligations

Regulatory Liability

To assure that the University was able to meet the financial obligations to cover the liabilities outlined by the federal regulations (Title 30 CFR 250, 251, 550, and 551), the University was required to qualify as an operator in the Gulf of Mexico. Because of the uniqueness of being a public academic institution, the University had to work closely with the BOEM - Adjudication Section to modify the established qualification process. Ultimately, the following documents were provided for review:

1. Certificate of Formation – Letter stating that the University is a public entity created under Texas Constitution of 1876 and an excerpt from the Texas Higher Education Coordinating Board - "Education Code Title 3 - Higher Education, Subtitle C - The University of Texas System, Chapter 65 - Administration of the University of Texas System, Subchapter A - General Provisions, Subchapter B – Administrative Provisions, and Subchapter C - Powers and Duties of Board" which includes discussion of the powers related to the issuance of bonds and notes.
2. Resolution Certification - Certificate issued by a member of the Board of Regents of The University of Texas that the University is authorized to hold mineral leases, permits and rights-of-way on the Outer Continental Shelf.
3. Incumbency Certification – Authority from the Board of Regents that the named delegate is empowered to bind the University and enter into contracts and other documents, including those related to Federal lands or minerals, use of land for research, permits, rights-of-use-and-easement, financial assurance, bonds, and applications.

On 3/21/2017, the University was recognized as qualified to bid and acquire leases at a BOEM lease sale, to receive and hold leases (including record title interest or operating rights), as a leasee, to be designated operator of a lease or portion of a lease, and to receive and hold pipeline rights-of-way and rights-of-use and easement on the OCS. The qualification was applicable to the entire OCS.

Determination of Liability, Indemnification, and Insurance – Between Contracted Parties

During contract negotiations, the determination and acceptance of various liabilities was risk-based and project specific. A full understanding of the well control aspects of the formations to be penetrated and methane-hydrate behavior, as well as a recognition of which party controlled various aspects of the activity, drove the mutual agreement of liability between primary parties.

A knock-for-knock indemnification was agreed to the extent authorized by the constitution and laws of the state of Texas.

Each party carried Insurance to cover agreed liability and associated financial responsibility. The primary parties named each other as additional insureds where appropriate. The University carried the following additional insurance during project execution: Maritime Employers' Liability Insurance, Control of Well, Commercial General Liability, Excess Liability, and Lost-in-Hole Downhole Equipment Coverage.

1.2.5 Permit and Reporting Requirements

As an operator in the Gulf of Mexico, the University of Texas was required to comply with all applicable permitting and reporting requirements promulgated by state and federal regulatory agencies, including the United States Environmental Protection Agency (US EPA), Bureau of Ocean Energy Management (BOEM), and Bureau of Safety and Environmental Enforcement (BSEE) and Louisiana Department of Natural Resources (LDNR).

A summary of the permits that the University of Texas was required to obtain is presented as Table 1.2.2; a summary of the regulatory reporting and notification requirements that the University of Texas was obligated to fulfill is presented as Table 1.2.3.

Permits and Approvals	Regulatory Agency	Reference No.	Date Approved
NEPA Environmental Questionnaire /Categorical Exclusion Designation	DOE-NETL	DE-FE0023919	03/06/17
Qualified Operator Status for OCS Right-of-Use-and-Easement	BOEM	GoM Operator # 3487	03/21/17
Exploration Plan	BOEM	N-9978	04/28/17
Right of Use and Easement	BOEM	RUE OCS-G 30344	04/28/17
Permit for Geological Exploration for Mineral Resources or Scientific Research on the Outer Continental Shelf	BOEM	L17-001	05/05/17
Coastal Zone Management Federal Consistency Determination	LDNR	C20170064	04/21/17
CZM public comment waiver	LDNR	C20170064	04/20/17
Application for Permit to Drill – H002	BSEE	API # 608114068600	05/05/2017
Application for Permit to Drill – H005	BSEE	API # 608114068700	05/05/2017
Application for Permit to Modify (P&A) – H002 & H005	BSEE		05/17/2017 05/20/2017 05/23/2017
USCG Letter of Determination for foreign nationals	USCG	160881 160971	02/13/17 04/14/17
NPDES General Permit for New & Existing Sources and New Discharges in the Offshore Subcategory of the Oil & Gas Extraction Point Source Category for the Western Portion of the Outer Continental Shelf of the Gulf of Mexico - Notice of Intent	US EPA	GMG290609	05/02/17

Table 1.2.2 UT-GOM2-1 related regulatory permits and approvals.

Regulatory, Reports, & Notifications	Regulatory Agency	Form	Date Submitted
Notification of Commencement – BOEM Resource Evaluation.	BOEM	Email Comm.	05/07/17
Notification of Commencement – BOEM G&G Permitting	BOEM	Email Comm.	05/08/17
Notification of Completion (use of RUE has ceased)	BOEM	Email Comm.	05/26/17
Monthly records of annual fuel consumption	BOEM	Email comm.	Feb 1, Annually
Rig Move Notification – Arrival on location	BSEE	BSEE-0144	05/04/17
Rig Move Notification – From H002 to H005	BSEE	BSEE-0144	05/14/17
Rig Move Notification – Departure from location	BSEE	BSEE-0144	05/21/17
Dropped Rigging Notification (NSS # 750191)	BSEE	E-Mail Comm.	05/7/17
Open Hole Data Report – H002	BSEE	BSEE-0133S	05/12/17
Open Hole Data Report – H002	BSEE	BSEE-0133S	05/17/17
Open Hole Data Report – H005	BSEE	BSEE-0133S	05/24/17
Well Activity Report – H002	BSEE	BSEE-0133	05/12/17
Well Activity Report (Final) – H002	BSEE	BSEE-0133	05/17/17
Well Activity Report (Final) – H005	BSEE	BSEE-0133	05/24/17
Well Activity Report (Final) – H005 (Rev.)	BSEE	BSEE-0133	07/27/17
Notification APM: Site Clearance – H002	BSEE	BSEE-0124	05/31/17
Notification APM: Site Clearance – H005	BSEE	BSEE-0124	05/31/17
End of Operations Report – H002	BSEE	BSEE-0125	05/31/17
End of Operations Report – H005	BSEE	BSEE-0125	05/31/17
Notification of ROV As-found Survey results – H002	BSEE	Email Comm.	05/08/17
Notification of ROV As-found Survey results – H005	BSEE	Email Comm.	05/08/17
Site Clearance ROV dive video – H002/H005	BSEE	Electronic	07/24/17
As-Found & As-Left Survey Reports – H002	BSEE	12817-GC-WOP-PR	05/23/17
As-Found & As-Left Survey Reports – H005	BSEE	12817-GC-WOP-PR	05/23/17
Directional survey data – H002/H005	BSEE	Courier	08/09/17
Well Log data	BSEE	Courier	08/24/17
Notice of Intent for US EPA Region 6 Offshore General Permit	US EPA	Electronic	05/02/17
Discharge Monitoring Report (Period ending 6/30/17)	US EPA	Electronic	07/06/17
Discharge Monitoring Report (Period ending 9/30/17)	US EPA	Electronic	07/06/17
NPDES Notice of Termination	US EPA	Electronic	07/31/17

Table 1.2.3 UT-GOM2-1 related regulatory planning documents, reports, and notifications.

1.3 UT-GOM2-1 Expedition: Operational Overview

Expedition UT-GOM2-01 is divided into five phases: (1) Planning; (2) Mobilization; (3) Execution; (4) Demobilization; and (5) Shore-Based Science (Table 1.3.1).

Date	Activity	Planning	Mobilization	Execution	Demobilization	Dockside Analysis
9/7/2016	Kick-off Contractor Meeting					
4/15/2017	Mobilization					
5/11/2017	Execution					
5/23/2017	Begin Demobilization					
5/24/2017	Scientists leave vessel					
5/26/2017	Establish shore-based Lab, Port Fourchon					
6/3/2017	Complete Dockside Analysis					

Table 1.3.1 Phases of Planning and Execution for UT-GOM2-01 Expedition.

Planning accelerated with the kick-off contractor meeting in October-2016. This is, perhaps, the first time that an academic institution has acted as an Operator for drilling deepwater wells. Preparing for this endeavor included a myriad of tasks including the following: (1) performing basic geology and geophysics studies to optimize drilling location; (2) contracting a drilling vessel; (3) establishing appropriate project insurance; (4) developing a safe drilling program and a plug and abandonment program; (5) Applying for permits to meet regulatory requirements. These operator responsibilities were in addition to the tasks that are more common to a university including the development of a detailed scientific program.

The *D/V Q4000* was in dry-dock in Brownsville, Texas prior to the project. Mobilization included delivery of equipment to Port Fourchon, Louisiana, for delivery by boat and delivery to Brownsville to onboard equipment directly. Mobilization began with the first movement of equipment on 25-April-2017. Operations in Brownsville included boarding Geotek equipment, the sand-line, Geotek personnel, and part of the science team. The *D/V Q4000* sailed from Brownsville on 01-May-2017. Mobilization continued after the *D/V Q-4000* left dock in Brownsville. It included bringing the service vans online, making up the BHA, and flow testing of the PCTB within the water column prior to the spudding.

Project execution formally began on 11-May-2017 with the spudding of H002. The execution phase lasted only 12 days during which H002 and H005 were drilled (Table 1.3.2 and Table 1.3.3). When the BHA was pulled from the hole on 23-May-2017, demobilization began. Scientists were offloaded by helicopter to Houma, Louisiana on 24-May-2017. The pressure cores were transported by boat to Port

Fourchon, LA. Other activities included cleaning the mud pits on the vessel, and ultimately cleaning the tanks on the mud boat.

Synchronous with demobilization was a shore-based core analysis phase. In our planning phase, it was determined that there would not be enough time to process cores taken during the latter half of the execution phase while on the vessel. To properly analyze the core, Geotek's PCATS and UT's sampling lab were re-established on shore at the InterMoor yard in Port Fourchon, LA.

The UT-GOM2-1 Post-Drill Operation Report and Daily Log (executed activities, drilling and coring statistics, and an event drilling-log) can be found in Appendix A. Post-Drill Operation Report and Daily Log of this report, which includes a listing of completed operational activities during UT-GOM2-1 and a daily log of the major project activities.

UT DOE GOM^2 PCTB Marine Test Hole H002 Planned v. Actual Timeline

Revision: 0 Date: 11 July 2017

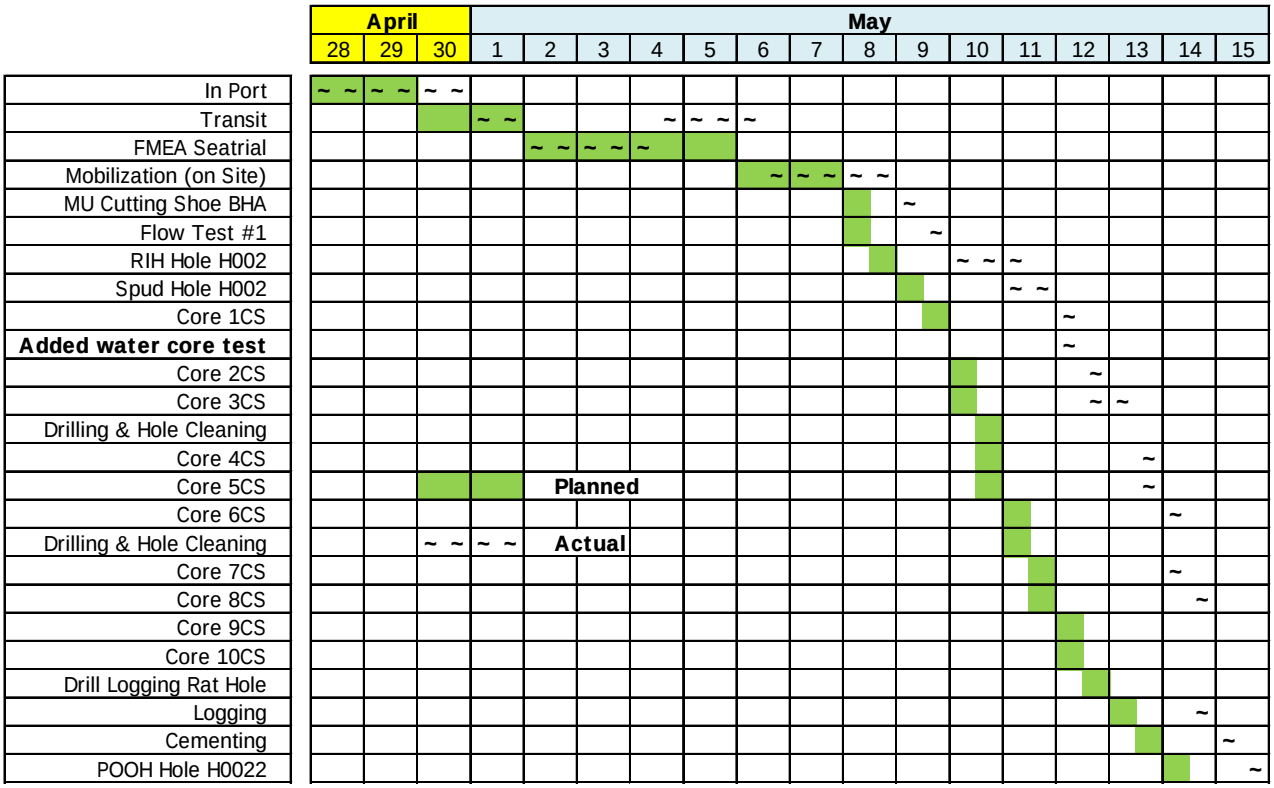


Table 1.3.2 Operational flow chart of H002 planned and actual UT-GOM2-01 drilling and coring operations.

UT DOE GOM^2 PCTB Marine Test Hole H005 Planned v. Actual Timeline

Revision: 0 Date: 11 July 2017

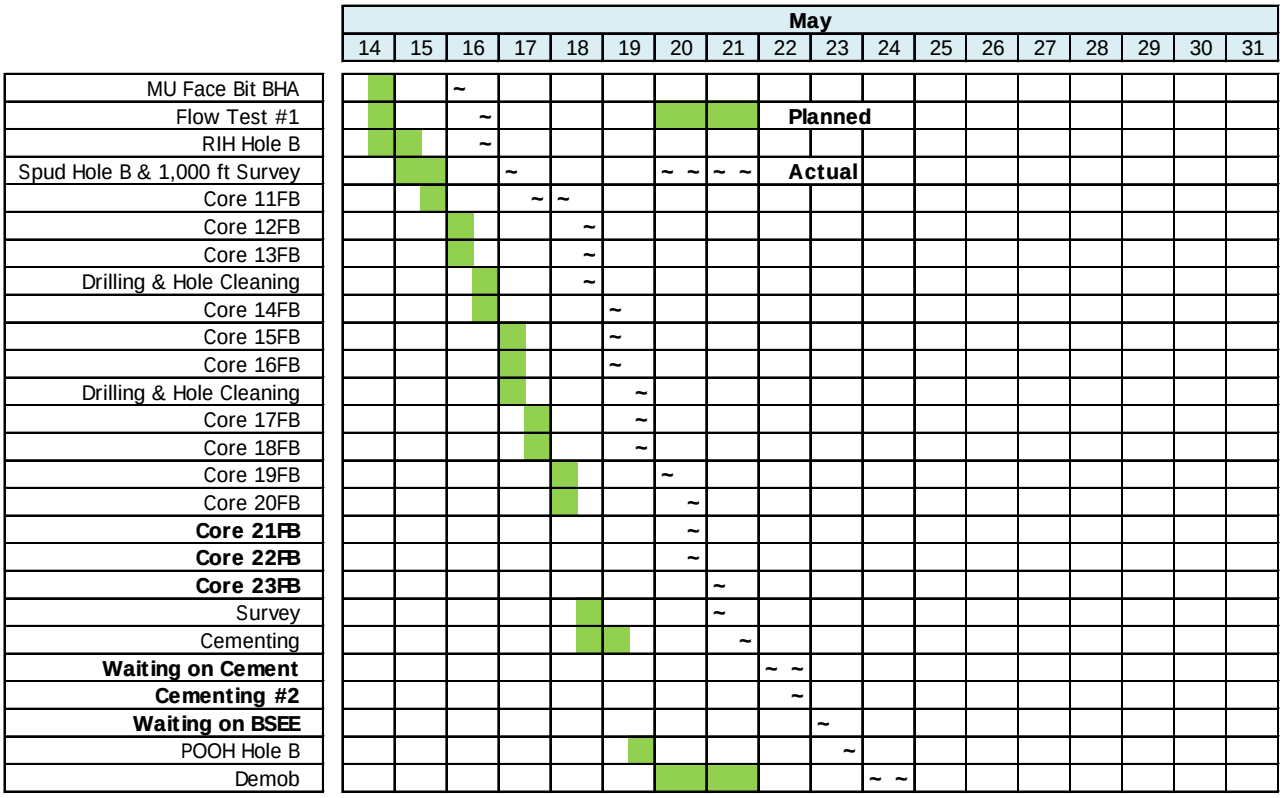


Table 1.3.3 Operational flow chart of H005 planned and actual UT-GOM2-01 drilling and coring operations.

1.3.1 Mobilization

Before mobilization, the PCTB underwent testing and modification. Ownership of the PCTB was transferred from DOE to the University of Texas Austin. UT Austin then contracted with Aumann Engineering to test and modify this tool to prepare it for use in the offshore. Over two years, UT worked with Aumann Engineering (in 2016, Aumann Engineering was purchased by Geotek Limited and it is now termed Geotek Coring, USA) to perform and test engineering modifications. Throughout this phase, two configurations of the tool were developed: the face bit configuration and the cutting shoe configuration. The cutting shoe configuration is compatible with other Integrated Ocean Discovery Program (IODP) coring tools. However the face bit configuration was thought to have the potential to minimize core disturbance. New parts for the tool were machined and the configurations were successfully tested at Geotek Coring in Salt Lake City and at Schlumberger's Cameron, TX testing facility. After field testing at Cameron, modifications to the tool were made to implement a flow diverter to reduce the pressure on the coring liner during coring and minimize the possibility of casing collapse. It was intended to test this capability on a vessel of opportunity prior to Expedition UT-GOM2-1. However, further testing was not accomplished prior to UT-GOM2-1.

Extensive planning for core acquisition, core analysis, and sample transport was also conducted during this time. Invitations were sent out to members of the science team and a first pass look at sample and data requests from the members of the greater hydrate community was used in the identification and gathering of supplies to support the science goals beyond the test of the coring tools.

Mobilization, not including Helix subcontractor mobilization, was worked by UT with Geotek Ltd., Geotek Coring, Prolog, and Tiger Rentals. Five service vans/containers and three baskets of heavy equipment were delivered to Keppel AmFELS, Brownsville for loading onto the *D/V Q-4000*. Geotek containers purposefully arrived several days ahead of transfer to the rig in order to set up test equipment after the trip overseas. Mobilization of equipment began in the US with the first movement of equipment on 25-April-2017. The *D/V Q-4000* set sail from Brownsville on 01-May-2017.

During transit to the drill site, Geotek brought the service vans online connecting them to air, water, and power. Make-up of the BHA and flow testing of the PCTB within the water column were completed prior to spudding H002.

A final container, specially modified for depressurized core sampling operations on the rig, was delivered to InterMoor Port Fourchon. This container along with other Helix sub-contractor supplies were then transferred by supply ship to the *D/V Q-4000* at the drill site.

Mobilization of personnel also occurred in two waves. About half of the members of the University group including all of the members from Geotek completed final boarding of the *D/V Q-4000* on April 30. The remainder of the personnel including members of the science and videography teams boarded the D/V *Q-4000* by helicopter from Houma, LA on 09-May-2017.

Several crew changes occurred during operations, one by personnel boat from Brownsville and rest by helicopter from Houma, LA.

During drilling and coring operations supply boats brought additional needed equipment and consumables including a second delivery of mud.

1.3.2 Execution

Project execution occurred from 5/11/2017 to 5/23/2017. During this time, H002 and H005 were drilled, cored, plugged and abandoned. In addition, wireline logging was performed at H002. A summary of the timing of major events is provided in Table 1.3.4. Detailed descriptions are given in Daily Reports (Appendix B.) and the UT-GOM2-1 Post-Drill Operation Report and Daily Log (Appendix A., mentioned above).

The UT-GOM2-1 Pre-Drill Operation Report and Daily Log (executed activities, drilling and coring statistics, and an event drilling-log) can be found in Appendix C. of this report, which includes a listing of proposed operational activities during UT-GOM2-1.

Event	Time	Date
Spud H002	08:53	11-May-17
Begin Coring H002	07:30	12-May-17
End Coring H002	14:00	14-May-17
Begin Logging H002	16:30	14-May-17
End Logging	01:30	15-May-17
Begin P&A	01:30	15-May-17
End P&A	12:30	15-May-17
Spud H005	02:30	17-May-17
Begin Coring H005	22:30	17-May-17
End Coring H005	02:20	21-May-17
Begin logging H005	03:50	21-May-17
End Logging H005	08:00	21-May-17
Begin P&A	08:00	21-May-17
End P&A	03:45	23-May-17
End Execution	00:00	25-May-17

Table 1.3.4 Major Events during Execution of UT-GOM2-01.

Hole Locations

When the *D/V Q4000* arrived at location, the remotely operated underwater vehicles (ROVs) were deployed and H001 was identified. H001 was extraordinarily preserved 8 years after it had been drilled (Figure 1.3.1). The position of the hole was identified through the WinFrog system on the vessel by locating the position of the ROV while sitting over H001. The position of H001 ('as found') was not exactly the published position of H001 (Table 1.3.5, Figure 1.3.2). This difference is interpreted to be due to the limited accuracy of both positioning systems, which was estimated to be 14 m. H002 and H005 were located relative to the as found location of H001.

Name	Latitude WGS84 (decimal min.)	Longitude WGS84 (decimal min.)
GC 955 H005	**27° 0.04665' N**	**-90° 25.59125' W**
GC 955 H002	**27° 0.04154' N**	**-90° 25.58715' W**
GC 955 H001-as found	**27° 0.05126' N**	**-90° 25.58367' W**
GC 955 H001-published	**27° 0.05166' N**	**-90° 25.58759' W**

Table 1.3.5 Location information for the H wells drilled at GC-955.
H001 is shown as found during this drilling expedition and as published previously by BOEM.

Figure 1.3.1 Hole GC 955 H001, drilled in 2009 during the Chevron JIP was found at the start of the UT-GOM2-01 Expedition.

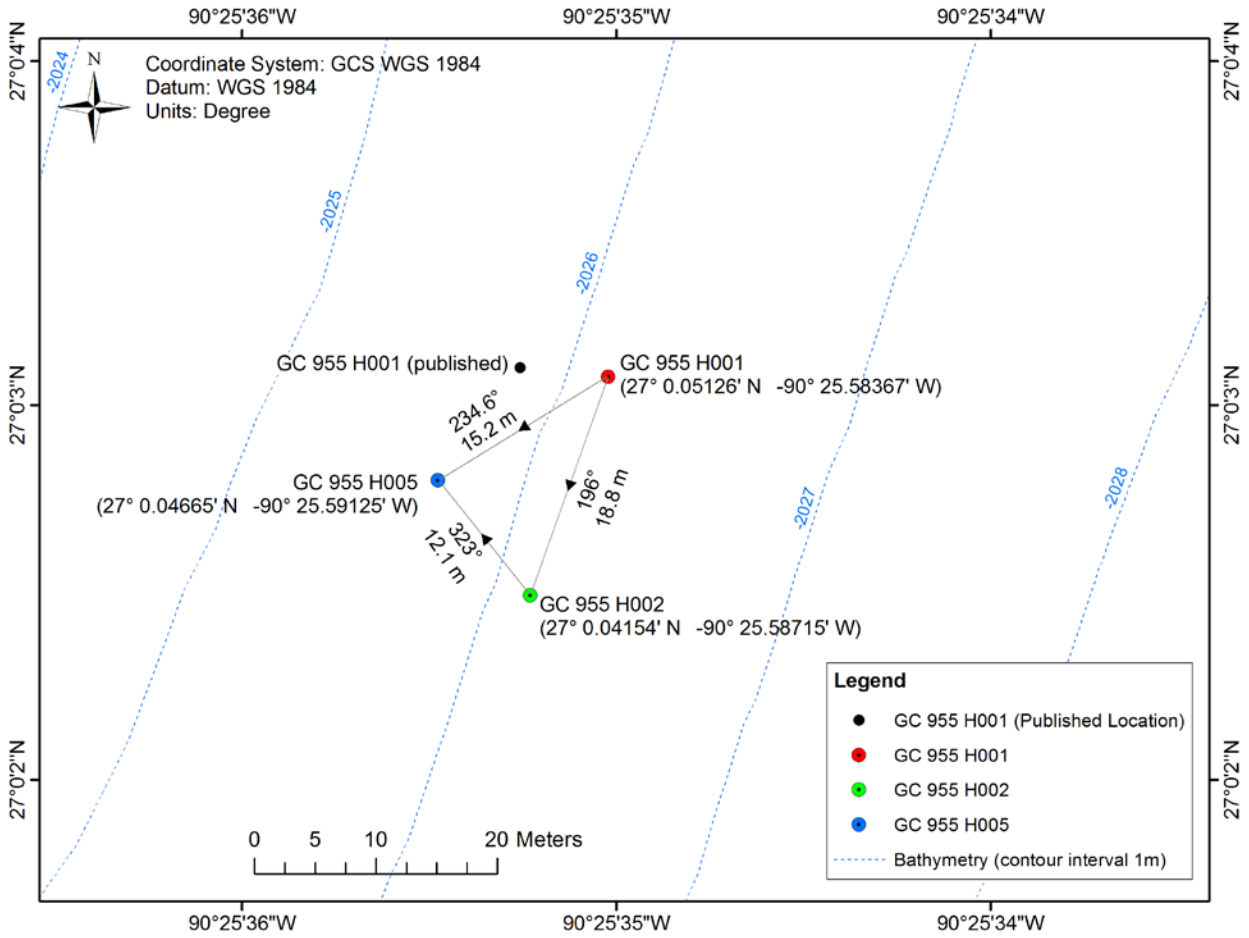


Figure 1.3.2 The locations, distances, and azimuths between GC 955 H Holes. H001 as located by BOEM (published location), the position of H001 as found in Expedition UT-GOM2-1 (as found), and H002. The locations of the wells relative to each other is very accurate because it was measured by the ROV. However, the absolute position of any of these wells is limited to the accuracy of the shipboard navigation system used for both drilling programs, which is a 14m radius circle.

	Seafloor fbrf	Water Depth (ft)	Water Depth (m)
H001	6718	6667	2032.1
H002	6719	6667	2032.1
H005	6718	6666	2031.8

Table 1.3.6 Depth of seafloor for three GC 955 site H holes.

The seafloor depth at H002 and H005 was determined through observation of the ROV as to when the BHA tagged seafloor with a drill pipe measured depth of 6719 fbrf (Table 1.3.6). H005 was spudded at 6666.0 ft (6718.0 fbrf). H001 tag depth was estimated from the depth on the LWD log where there was a shift in the ring resistivity recording the seafloor.

Pre-drill calculated top of the hydrate-bearing sand interval for H002, and H005, and logged top in H001.

Well	fbrf[1] (ft)	fbsl[1] (ft)	fbsf[1] (ft)	SRD[3] (ft)
H001	8076	8025	1358	8030
H002	8077	8025	1358	8027
H005	8076	8024	1358	8030

Table 1.3.7 Estimated depth to the top of the hydrate-bearing interval. fbrf = feet below rig floor, fbsl = feet below sea level, fbsf = feet below seafloor, SRD = seismic reference depth. Please see Chapter 2 Methods, Section 2.1.3 Depth References for more information.

The depth of the top of the hydrate-bearing interval was determined from the seismic data given the known seafloor depth (Table 1.3.7). The peak seismic reflection was mapped at the top of the hydrate-bearing interval to H002 and H005. Because these holes were drilled so close (closer than horizontal sampling in seismic data) to each other, it was assumed that the top of hydrate at H002 and H005 would be at the same depth below the seafloor as that in H001. The discrepancy in predicted depths of reservoir below SRD and below sea level (fbsl in Table 1.3.7) is the result of the difference between the depth of sea floor predicted from seismic and that observed by the ROV at each hole location.

H002 and H005 Coring Operations and Recovery

One 1.4 m (4.6 ft) of pressure core (Core H002-4CS) was recovered within the methane hydrate stability zone at H002. 16.1 m (69.9 ft) of pressure core where the material has stayed within the methane hydrate stability zone are available and in storage vessels from H005 (Cores H005-1FB, -6FB, -9FB and -12FB have been excluded). In addition, 4.2 m of pressure core from H005 that likely temporarily left methane hydrate stability during recovery and processing are available. All but one of the cores (H005-1FB) are from the sand-bearing hydrate reservoir. Little core was acquired from the material that bounds the reservoir and none of this material was recovered under pressure; it is unclear whether Core H005-13FB penetrates material below the hydrate reservoir. The poor recovery was interpreted to mean that the material above and below the reservoir is so poorly consolidated that they could not be readily recovered during coring.

Hole GC 955 H002

Figure 1.3.3 shows the coring intervals and core recovered from H002 compared to the ring resistivity log acquired at H001. Only one core from H002 was recovered at pressure. Seven cores were recovered at atmospheric pressure after the coring tool ball valve failed to close properly before the core was pulled out of the methane hydrate stability zone. These cores were sampled for interstitial water, microbiology, physical property, and head space gas samples with additional core sections remaining for archive and later description and sampling. A single pressure core, H002-04CS, was recovered at pressure and was cut into two sections for degassing and one section was transferred to a storage chamber and transported to the UT Pressure Core Center.

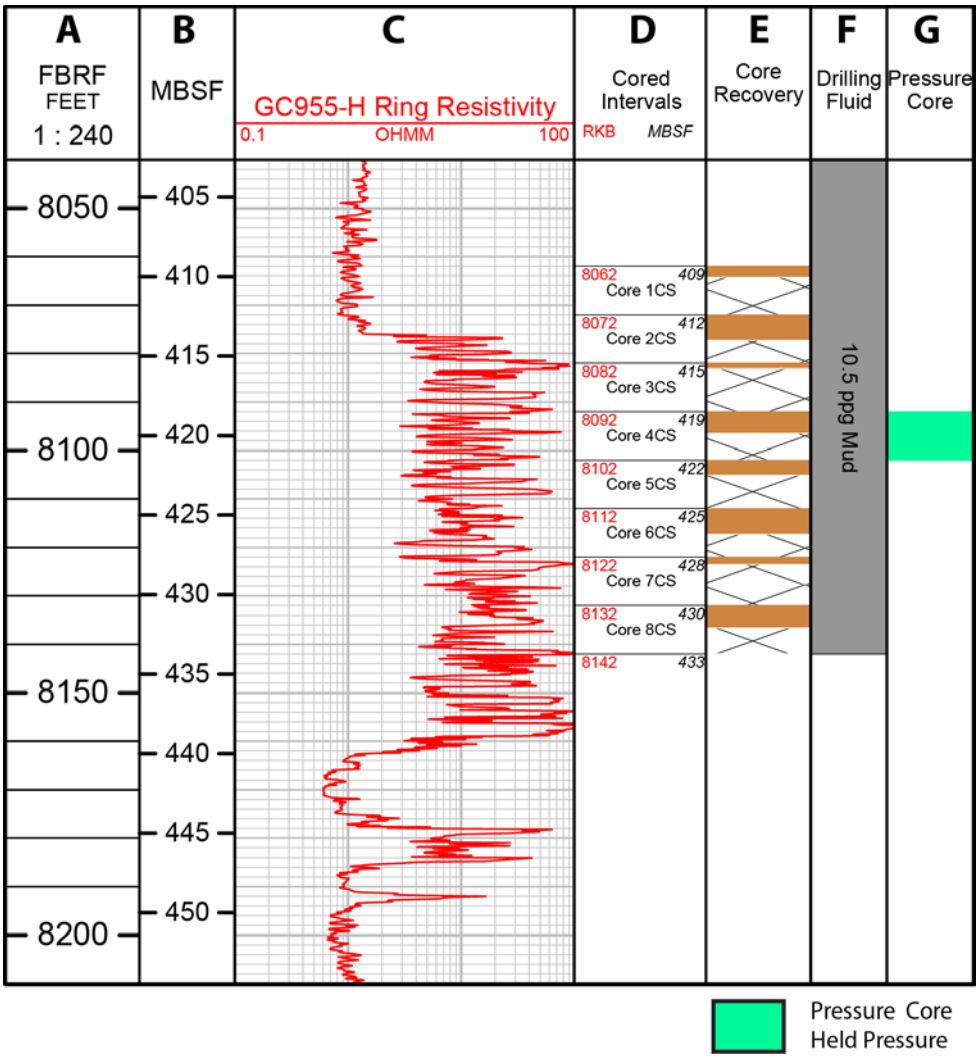


Figure 1.3.3 Cored intervals and core recovery from H002 compared to H001 LWD resistivity log.

Hole GC 955 H005

Figure 1.3.4 and Figure 1.3.5 show the cored intervals and the core recovered from H005 compared to H001 resistivity log. 11 cores (Cores H005-1FB to -8FB, H005-10FB to -11FB, and H005-13FB) were recovered at pressure and without leaving the methane hydrate stability zone. H005-9FB was recovered at pressure but left the methane hydrate stability zone and began to dissociate, creating voids filled with gas. Data storage tag (DST) data from within the PCTB suggest that the tool may have barely touched the phase boundary during coring runs H005-2FB, -3FB, and -4FB, however, the excellent core quality suggests the core material remained at hydrate stable conditions. H005-12FB was recovered at atmospheric pressure after the coring tool ball valve failed to close properly. Cores H005-1FB Section 3 and all of -6FB, while recovered within the methane hydrate stability zone, lost pressure temporarily during cutting due to seal problems in PCATS (purple zone Figure 1.3.4 and Figure 1.3.5).

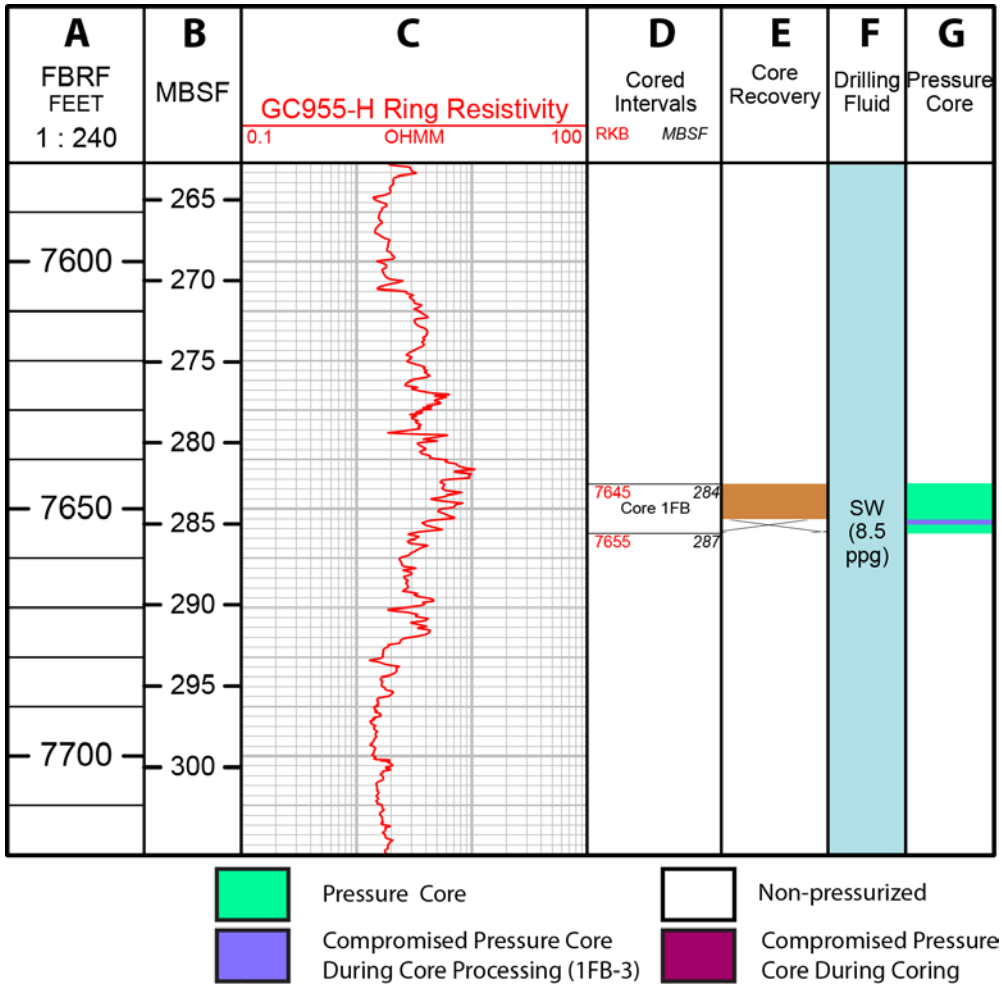


Figure 1.3.4 Cored intervals and core recovery from H005 compared to H001 LWD resistivity log. The amount of recovered material is indicated by the brown box.

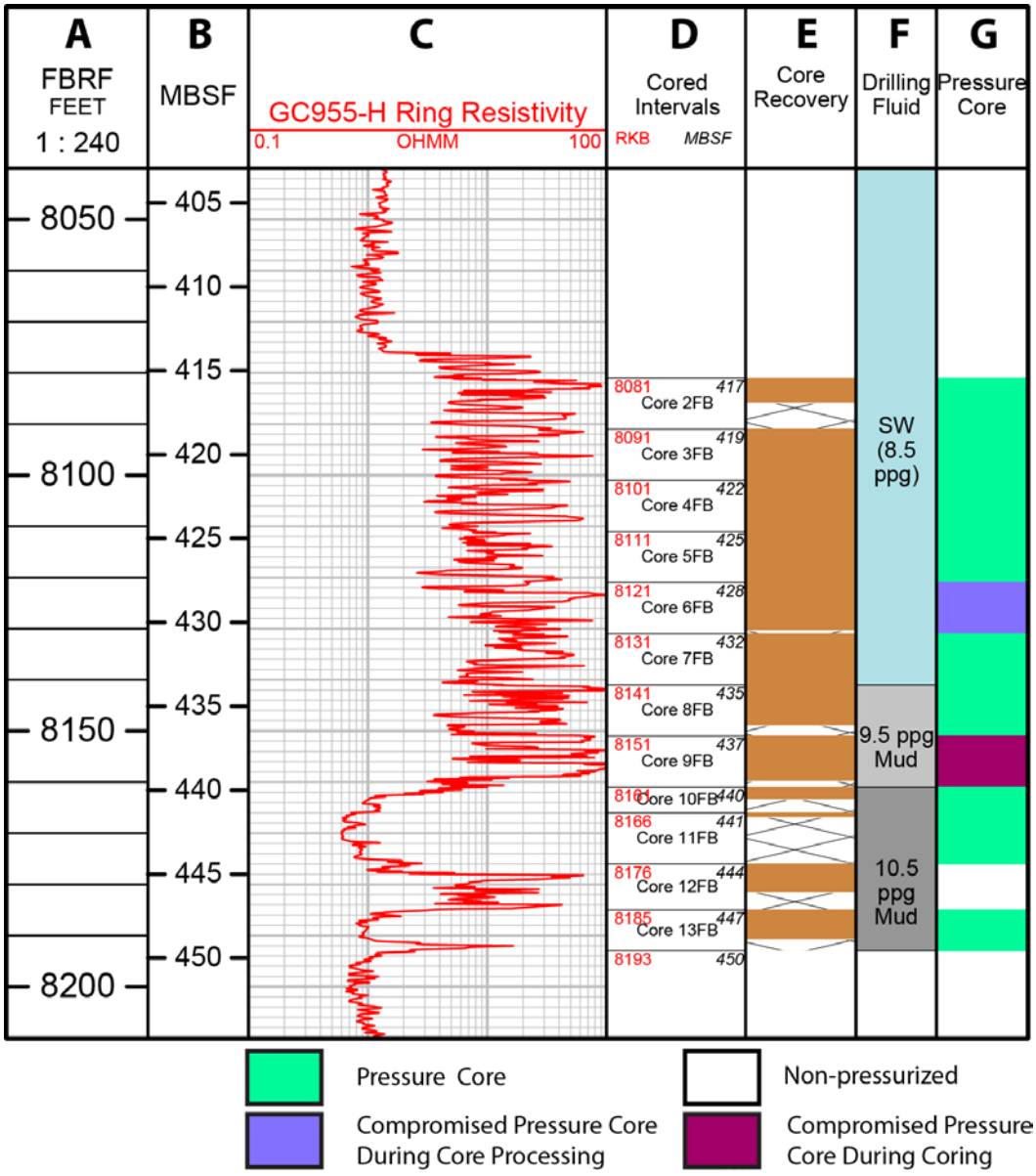


Figure 1.3.5 Cored intervals and core recovery from H005 compared to H001 resistivity log. The recovery is indicated by the brown box. Cores 2-7 were drilled with seawater, cores 8-9 were drilled with 9.5 ppg mud, and cores 10-13 were drilled with 10.5 ppg mud.

Pressure Coring Performance

At H002, 8 pressure cores were attempted but only one pressure core was recovered to the rig floor at a pressure and temperature that was within the methane hydrate stability zone (Figure 1.3.3). A single root cause was not identified for the failed pressure cores. However, a number of problems were identified that contributed to the lack of pressure in the 7 unsuccessful pressure cores (Figure 1.3.6). After Core 01CS, it was recognized that there was a design oversight that caused a hydraulic lock to occur as a result of a metal to metal seal. This metal-on-metal seal resulted from modifications made to the tool to incorporate a flow-diverter. The flow-diverter reduces the pressure differential between the

inside and the outside of the core liner during coring. This pressure differential had previously caused liners to sometimes collapse at high pump rates. The change in flow path also avoids problems with clogging the upper valve from pipe scale and other debris during pumping. Unfortunately, there was no opportunity to field test these design changes prior to this expedition and hence the oversight was only recognized at this point.

To address this while in the midst of coring H002, the seals that allow the flow diverter to operate were removed, which eliminated the possibility of a hydraulic lock. However, as illustrated in Figure 1.3.6, 6 more pressure cores were taken in H002 and only one of them retained pressure. A number of problems caused these other failures including the following: 1) displacement of the ball valve seal; 2) the ball valve not firing correctly; 3) the inner tool barrel failing to unlatch within the BHA (with the result that an emergency retrieval tool had to be deployed which necessarily resulted in pressure not being retained); and 4) the seal at the top of the autoclave failing.

While plugging and abandoning H002 and while drilling to the coring depth at H005, several modifications were made to the PCTB. First, to reinstate the flow diverter function but eliminate the possibility of a hydraulic lock, grooves were ground into a component that restricted flow of high pressure fluid and the flow diverter seal itself was replaced. Second, to reduce the likelihood of seal displacement during ball valve closure, the ball valve seal was replaced with a newer seal to achieve a better fit after the ball valve snapped shut. Third, small tabs were welded onto the ball release sleeve collets, ensuring the sleeve was always correctly connected to the operating mechanics higher up in the tool thus ensuring the ball valve closing mechanism was triggered more reliably.

In addition, two new procedures were implemented during pressure coring at H005. First, while retrieving the tool from core point depth, the tool was held for approximately 15 minutes at the seafloor to allow time for pressure to equilibrate inside the tool. This was done to ensure that any delays moving components would be allowed the time to actuate. This approach was implemented during coring runs H005--06FB, -07FB, -08FB, -09FB, -11FB, -12FB & -13FB.

Second, the set pressure on the regulator of the core tool accumulator was reduced to a value below the in situ pressure for cores H005-7FB, -8FB, -10FB, -11FB, and -12FB. This change was made as a strategy to ensure that the autoclave sealed and core remained at a pressure well inside the methane hydrate stability zone, even if it was not at in situ pressure or above. The normal operation is to have the set pressure at a value greater than the in situ pressure such that when the initial closure of the ball valve is complete, the pressure is released as a fast boost. Fluid is forced via the set pressure into the autoclave to help seat the seals (especially the ball valve), preventing leakage and pressure loss during recovery. Because this function was not working correctly, with the result that the fast boost fluid injection was being lost (presumably because the ball valve was not fully sealed when it was applied), a change in strategy was deemed appropriate.

Setting the regulator to a lower pressure than the in situ pressure enables fluid from the core tool accumulator to be forced into the autoclave as a slow boost. In this case, if the autoclave does not seal at in situ pressure at the base of the hole, then the as the tool is raised and the borehole pressure reduced to the set pressure, the slow boost will initiate. If the slow boost is activated, then the recovery pressure will be less than the in situ pressure. If on examination of the DST records, the autoclave

appears to seal at a value above the set pressure then one concludes that the system sealed on initial activation of the tool and that the slow boost mechanism was not required. If, on examination of the DST records, the autoclave appears to seal at or just below the set pressure, then one concludes that the system failed to seal on initial activation of the tool and that the slow boost mechanism was applied. From an examination of the DST records it was concluded that the slow boost occurred for cores H005-7FB, -8FB and possibly -11B. Core H005-10FB sealed close to the in situ pressure and hence it was concluded that it sealed during or soon after the tool was retracted from the BHA.

Pressure coring at H005 was much more successful than at H002. 11 cores were recovered on the rig floor at pressures and temperatures within the methane hydrate stability zone as interpreted from the rabbit DST records (Figure 1.3.7). However, during recovery, cores 2FB and 9FB left the methane hydrate stability zone for several minutes and cores 3FB and 4FB approached the methane hydrate stability boundary very briefly (e.g. seconds). X-ray scans of 9FB showed that voids had formed, possibly formed by dissociation and gas expansion when the core left the methane hydrate stability zone. In addition, P-wave velocities are relatively low, and no lithofacies were discernable in 9FB, consistent with disturbance of the recovered sediments due to dissociation of hydrate. No voids were observed in X-ray images from 2FB, 3FB, or 4FB. High P-wave velocities and interbedded lithofacies were observed in Cores 2FB, 3FB, and 4FB, suggesting that any hydrate dissociation was not severe enough to alter the physical properties.

Although more successful, the PCTB-FB did not seal at the depth that the core was acquired in every case except Cores 1FB and 6FB (Figure 1.3.7, where red triangle overlies the blue circle). The depth where the pressure in the autoclave begins to differ from the borehole pressure (recorded in the pulling tool) is used to determine at what depth the autoclave sealed (red triangles, Figure 1.3.6 and Figure 1.3.7).

We qualitatively compared images of the single pressure core recovered at H002 with those recovered at H005 (Figure 1.3.8). Core biscuits represent coherent sections of the core that lie between zones where there was rotation of one part of the core relative to the other. The coherent sections of core at H002 average ~5cm length. In contrast, the PCTB-FB has many much larger lengths of undisturbed core. In fact, one of the striking successes at H005 was the extraordinary length of coherent sections of the core. The 40 cm length of perfectly intact core illustrated in Figure 1.3.8 is not uncommon. Because only one pressure core was recovered with the PCTB-CS, it is challenging to do a rigorous comparison of tool performance. Nonetheless, the quality of the core recovered by the PCTB-FB are remarkable and generally less deformed than those recovered by the PCTB-CS.

The difference in core quality may be due to the fact that here is a fundamental difference in how the cores are cut between the PCTB-CS and the PCTB-FB. In the PCTB-CS, the inner core barrel is locked in the BHA to provide the rotation of the cutting shoe itself whereas the liner inside the inner barrel is free to not rotate during the coring process. In contrast, in the PCTB-FB, neither the inner core barrel nor the liner are locked to the rotation of the BHA. Biscuits and spiral gouges created by the core catcher record rotation of the core, which is not desirable. Qualitative evidence suggests that more biscuits and more spiral gouges are present in the PCTB-CS than in the PCTB-FB. We interpret that there may be more friction in the PCTB-CS than in the PCTB-FB and thus the core is more likely to rotate with the BHA with the PCTB-CS. The PCTB_FB was also more successful at recovering core at pressure than the PCTB-CS at our land test in Cameron (Flemings et al.)The potential for increased performance of the PCTB-FB

relative to the PCTB-CS must be weighed against the fact that the PCTB-CS has the operational advantage that it can be used with other downhole tools during drilling without removing the BHA. For example, conventional corers and wireline logging devices can be used with the PCTB-CS but not with the current version of the PCTB-FB.

Ultimately, the difference in pressure coring performance between H002 and H005 reflect a combination of incremental improvements in design and process over the evolution of the expedition and, perhaps, differences between the PCTB-CS used in H002 and PCTB-FB used in H005. It is challenging to determine the relative role of these factors. H002 was drilled first with the PCTB-CS and H005 was drilled second with the PCTB-FB. None of the failure modes encountered in either well are related specifically to the unique components of the separate tool designs. For example, the problem with the hydraulic lock discovered early in H002 in the CS configuration would have equally limited the face bit deployment; furthermore, all of the iterative changes made between H002 and H005 would have contributed to the performance at H005. In addition, the drilling rig (and its newly installed equipment) and pump gear were being commissioned and optimized during Hole H002 and some of H005. Thus, the rig began operating more smoothly and the PCTB coring team was far more experienced when they cored H005. While it is difficult to untangle the factors that contributed to the PCTB-FB and PCTB-CS performance, the very limited data suggest that the core quality is higher in the face bit than in the cutting shoe. This is primarily due to the reduced internal core deformation demonstrated with the FB design.

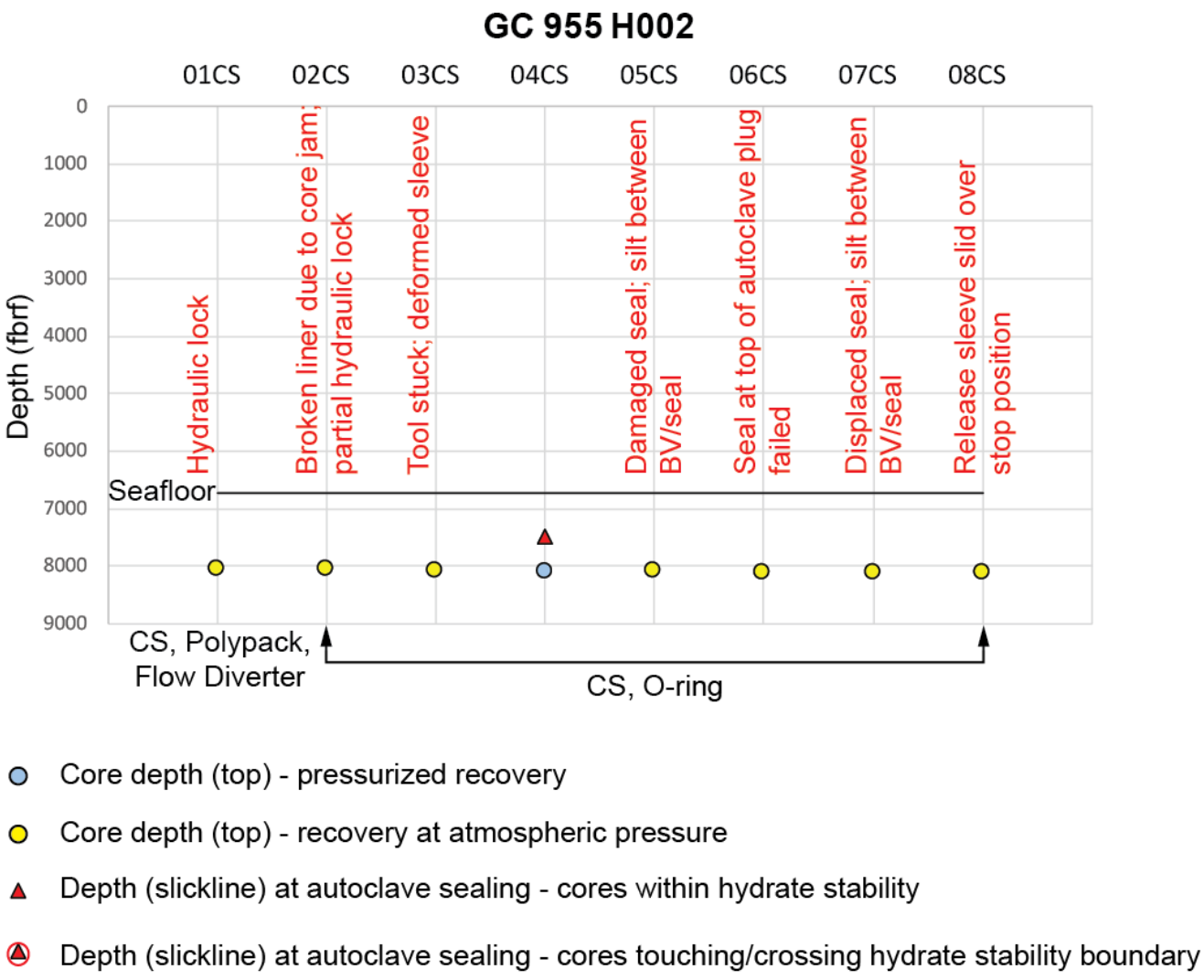


Figure 1.3.6 Tool configuration and failure mechanism for pressure cores at H002. 8 pressure cores were taken. Only one pressure core held pressure.

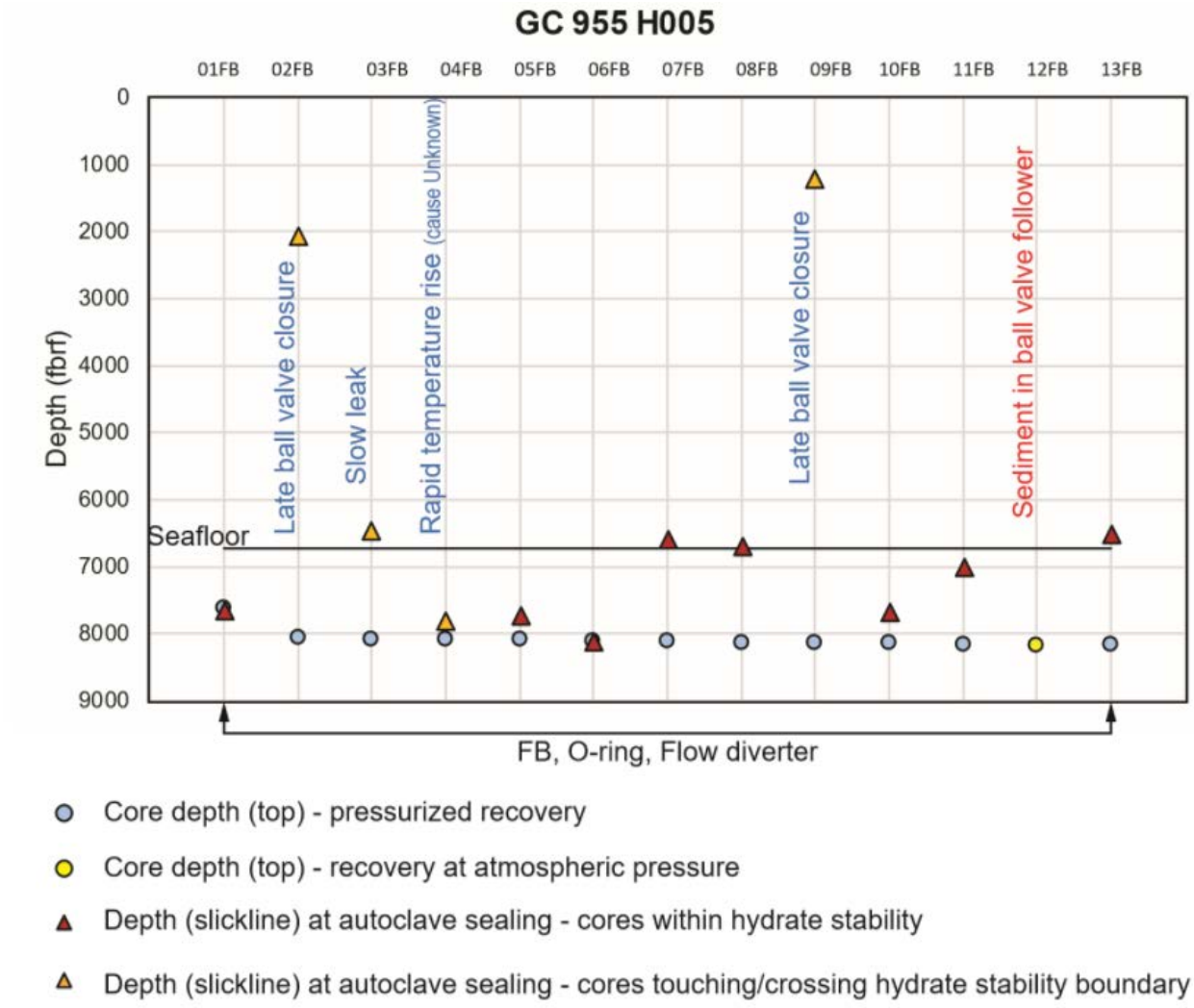


Figure 1.3.7 Tool configuration and failure mechanism for pressure cores at H005. 13 pressure cores were taken.

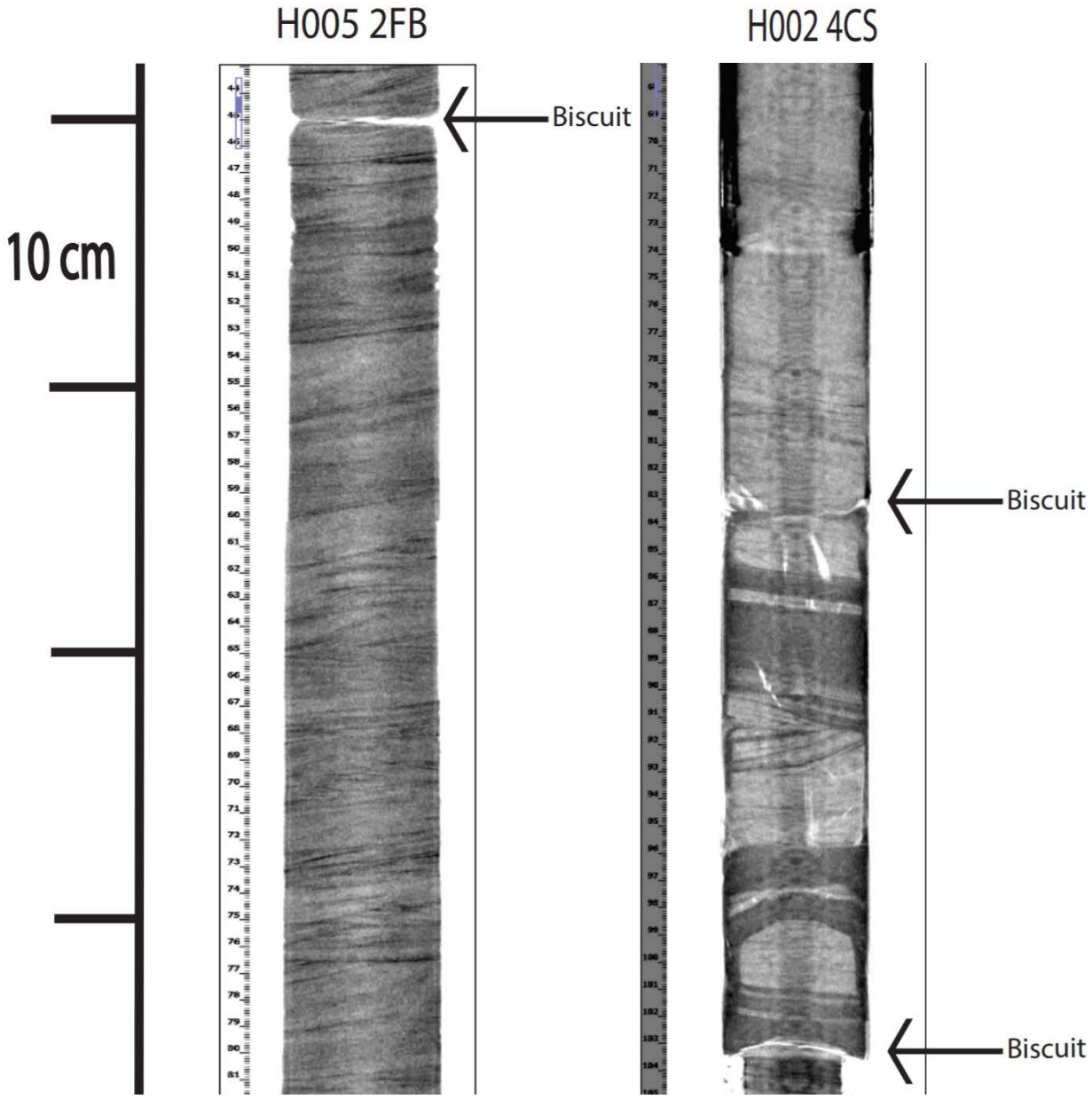


Figure 1.3.8 X-ray image of face bit core (left) and cutting shoe core (right). The cutting shoe core shows more severe disturbance with shearing and spiral cutting.

1.3.3 Demobilization

Demobilization occurred in phases. First, demobilization occurred from the vessel while simultaneously establishing analysis capabilities at Port Fourchon, LA. Then the Port Fourchon facilities were demobilized at the completion of shore-based activities.

After drilling and coring operations were completed on 23-May-2017, container baskets were repacked with heavy service items and extra supplies packed in service vans and containers for transport. Service vans were decommissioned and prepped for transport using special protocols to ensure that all core samples were kept cold. Power was disconnected on the *D/V Q-4000* in a specific order and the power outage minimized before the vans were reconnected on the supply boat. All containers, vans, and baskets were transported in a single supply boat, modified to provide power to the vans, to InterMoor Port Fourchon were the second mobilization, or recommissioning, of the core analysis equipment began.

All members of the University group were transported off the *D/V Q-4000* by helicopter to Houma, LA. Members of the group participating in the shore-based core analysis operation left Houma for Port-Fourchon where several new members of the science party joined them.

From the supply vessel, Geotek and UT containers were unloaded using a special protocol to ensure the depressurized and pressure cores were kept cold. Air compressors, generators, and fuel bowsers were brought in while InterMoor provided water hook-up. The service vans and containers were arranged to minimize/optimize movement of the long pressure cores. The service vans were connected to air, power, and water and the equipment retested before core analysis and cutting was restarted.

Sections of pressure core were identified, cut, placed in storage chambers, and then transported over land to the UT Pressure Core Center. Three trips were made in all with a Geotek specially designed, Department of Transportation approved, overpack system inside a refrigerated van. Also, the PCTB service was cleaned and all parts prepped for long-term storage at UT.

Once operations were complete at InterMoor, all depressurized core, gas samples, and water samples were packed and shipped using dry ice and other methods as necessary. All equipment and service vans were decommissioned and picked up for transport over land and sea and all rented equipment was picked up and returned.

The PCTB service van and the three baskets of heavy parts were brought to UT for long-term storage. The baskets were unloaded and returned to Tiger Rentals. The Geotek service vans were shipped back to the UK. The mud lab for core processing was returned to Prolog. All pressure cores arrived at UT and are currently being stored under a high-pressure maintenance and relief system in a room controlled to 4°C. All depressurized core, as well as gas and water samples, were shipped to their designated destinations.

1.4 UT-GOM2-1 Expedition: Scientific Results

1.4.1 Lithostratigraphy and Physical Properties:

Three lithofacies were identified at the cm-scale using PCATS P-wave velocity, gamma density, and 2D X-ray bulk property data and confirmed by grain size measurements. Lithofacies 1 was only recovered in Core H005-1FB and is characterized by high density (2-2.1 g/cm^3) and low P-wave velocity (~1500-1700 m/s). Lithofacies 2 and 3 are interbedded in the hydrate-bearing interval (Figure 1.4.1). Lithofacies 2 is composed of low density (1.7 to 1.9 g/ cm^3) and high velocity (3000-3250 m/s) beds. Ripple laminations and/or cross-laminations were observed in X-ray images (Figure 1.4.2). Lithofacies 2 contains the most continuous un-deformed samples. Lithofacies 3 is composed of high density (~1.9-2.1g/ cm^3) and low velocity (~1700 m/s) beds. In X-ray images, it is generally more deformed than lithofacies 2. It was noted that this section is very finely-interbedded and that each designated lithofacies incorporates a mix of lithologies. As a result, the characteristics described above are the bulk properties averaged over larger intervals (cm to tens of cm scale) that may contain multiple individual lithologies.

Core H005-1FB contains lithofacies 1, while cores H002-4CS, H005-2FB to -11FB, and H005- 13FB contain lithofacies 2 and 3. Preliminary grain size analyses by laser diffraction indicate distinct differences between each lithofacies (Figure 1.4.3). Lithofacies 1 is the finest, composed of silty clay and is from the section well above the hydrate reservoir. Lithofacies 2 is coarsest with a bulk composition of sandy silt. The bulk composition of lithofacies 3 is clayey silt, although it may be composed of both mudstone and siltstone layers (e.g. Figure 1.4.1, beneath 422.5 mbsf). Because lithofacies 3 may be composed of interbedded lithologies, the average (bulk) properties (density or P-wave velocity) may not record the properties at the scale of the finer beds. During the expedition, we did not differentiate lithofacies at a finer scale. Furthermore, logging tools may not be able to resolve the very thin beds observed at the core scale.

Lithofacies 2 is generally less disturbed and provides longer, more intact sections within the liner with only minor biscuiting, rotation, and barreling (Figure 1.4.2). Lithofacies 3 is generally more disturbed with more frequent shearing and often flows around adjacent sections of lithofacies 2.

A summary of the grain size results from laser diffraction are shown in Figure 1.4.4.

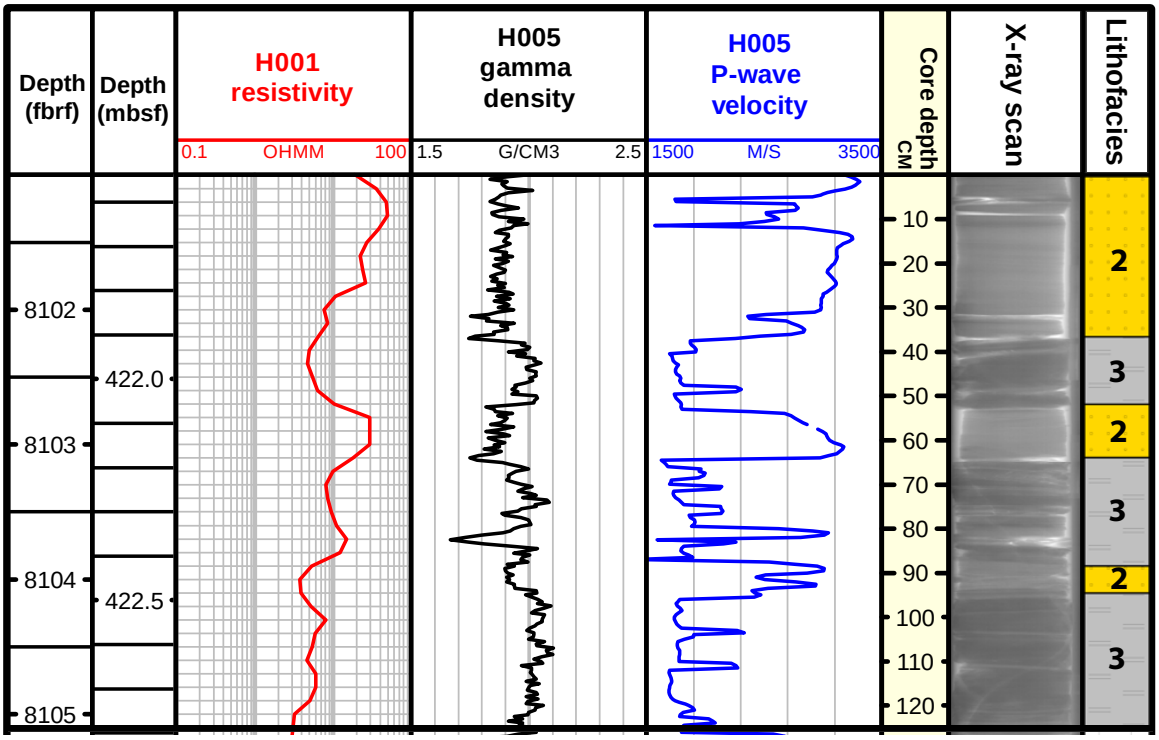


Figure 1.4.1 Example of interbedded lithofacies 2 and 3 from Core UT-GOM2-1-H005-4FB. The data shown here are downhole ring resistivity from GC955-H compared to the gamma density, P-wave velocity, and 2D X-ray scan from PCATS. Interpreted lithofacies on the right. Lighter intervals in the X-ray correspond to lower density and higher P-wave velocity. See Chapters 3 and 4, Section 2 Physical Properties and Core Transfer and Section 6 Lithostratigraphy for more information.

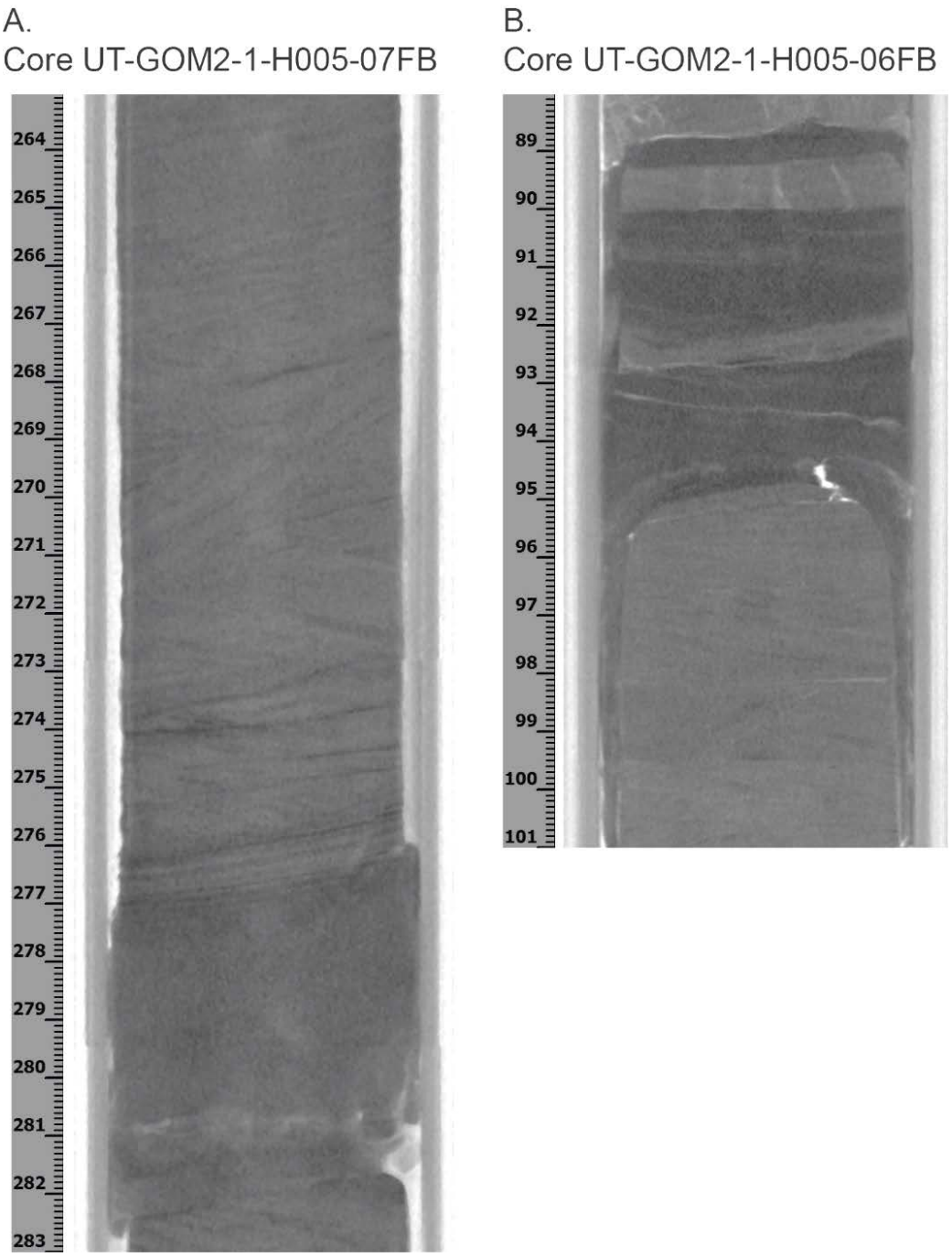


Figure 1.4.2 Two X-ray CT slab images from PCATS logging. A: Core UT-GOM2-1-H005-7FB showing lithofacies 2 (263-276 cm) with rippled cross-laminations and lithofacies 3 (276-283 cm). B: Core UT-GOM2-1-H005-6FB showing interbedded lithofacies 2 and 3. Lithofacies 2 shows a crisp cut of the formation with often a slight gap between the core and core liner, while lithofacies 3 often fills the entire core liner and flows around the edges of adjacent lithofacies 2 intervals. See Chapters 3 and 4, Section 2 Physical Properties and Core Transfer for more information. All H005 CT data can be found in the expedition data directory under H005 / Physical Properties.

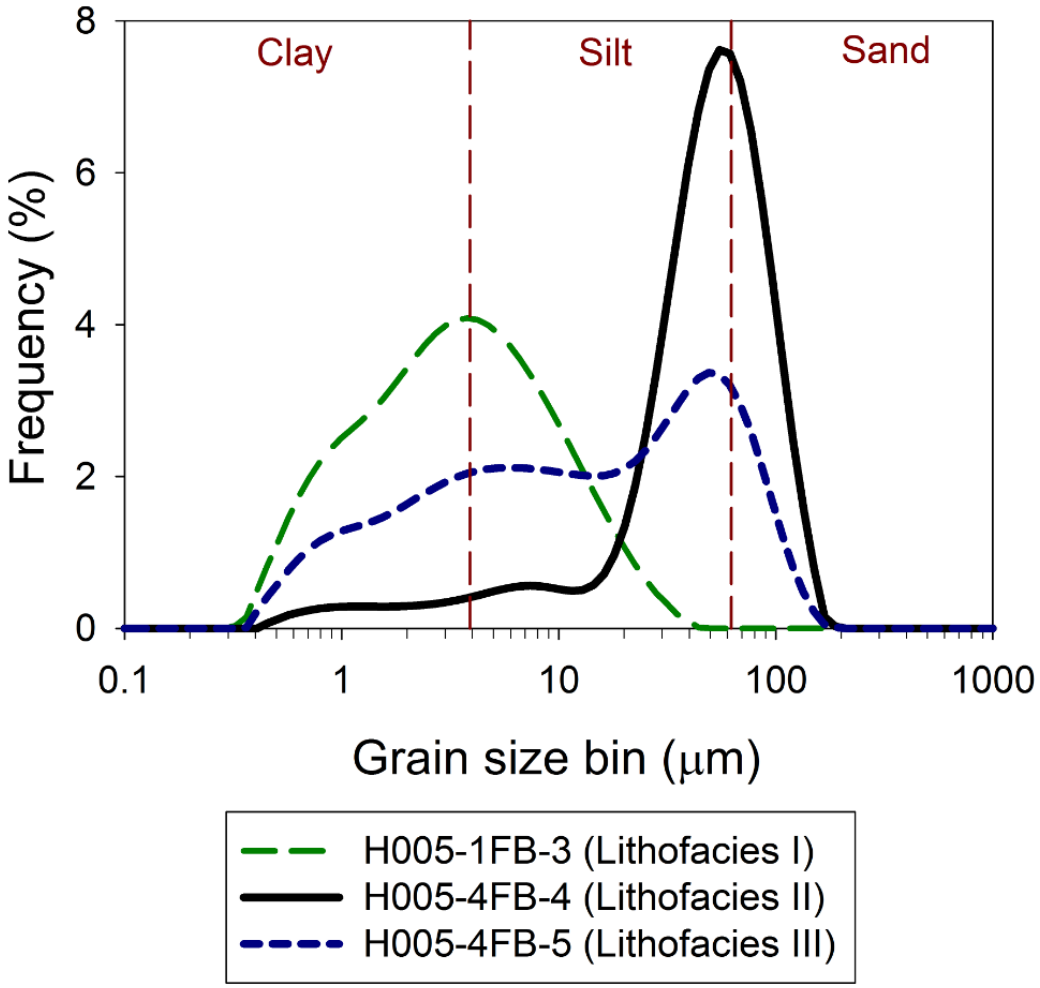


Figure 1.4.3 Grain size distributions analyzed with laser particle size analysis from samples from lithofacies 1, 2, and 3. See Chapters 3 and 4, Section 6 Lithostratigraphy for more information. All H005 Laser Diffraction Particle size data can be found in the expedition data directory under H005 / Lithostratigraphy / Grain size.

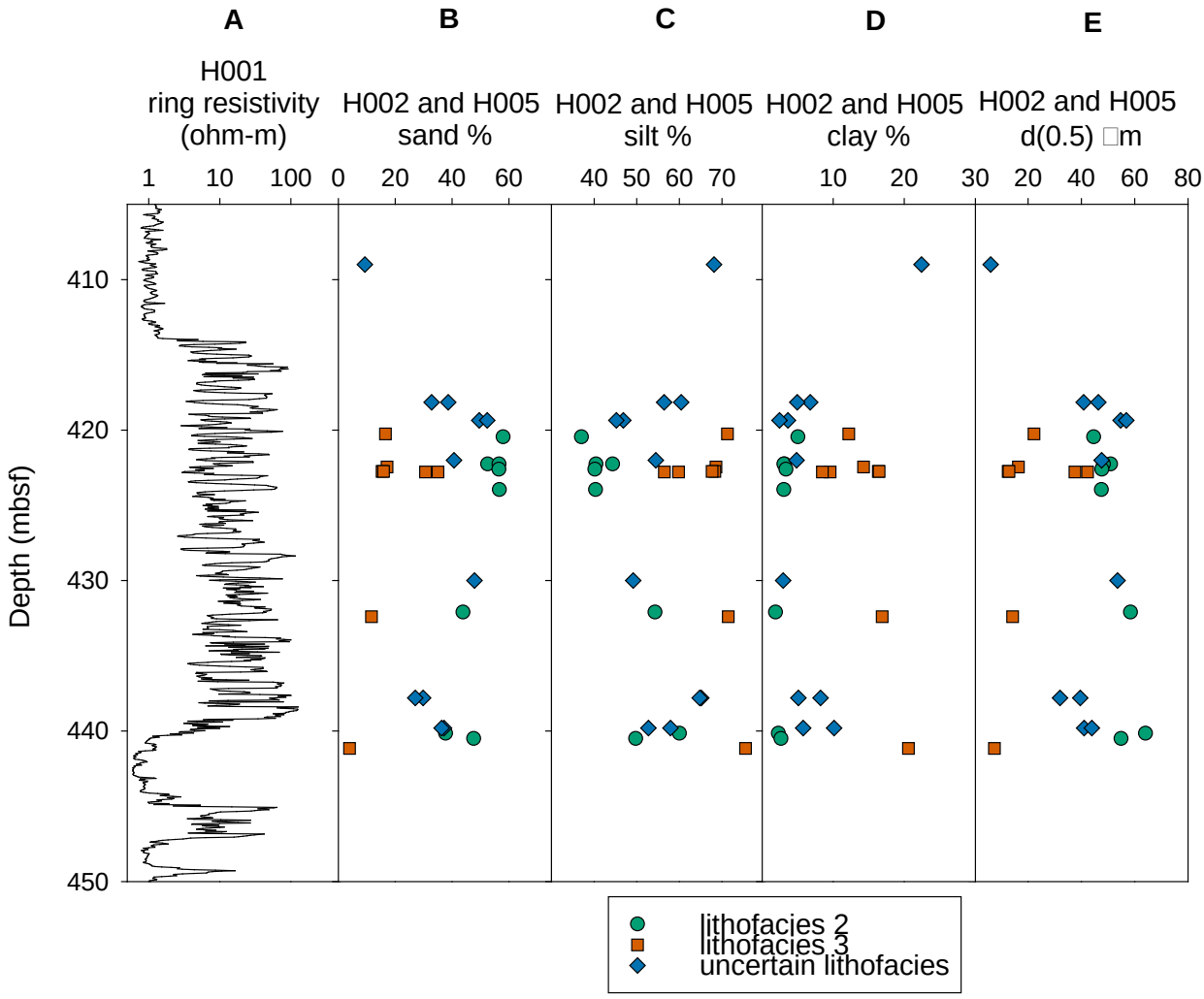


Figure 1.4.4 Grain size results from laser diffraction analysis in the hydrate-bearing interval at holes H002 and H005. Data from lithofacies 2, lithofacies 3, and unknown lithofacies samples. A) resistivity from H001 showing the hydrate-bearing interval, B) sand %, C) silt %, D) clay %, and E) median grain size d (0.5). See Chapters 3 and 4, Section 6 Lithostratigraphy for more information. All H005 Laser Diffraction Particle size data can be found in the expedition data directory under H002 / Lithostratigraphy / Grain size and H005 / Lithostratigraphy / Grain size.

1.4.2 Quantitative Degassing

Quantitative degassing experiments were performed separately on samples containing lithofacies 1, 2, and 3 (11 to 27 cm sections), as well as sections that contained mixtures of these lithofacies (10 to 120 cm sections). The total amount of gas and liquid released was recorded and the pressure continuously monitored. Between 0.3 and 123 L of gas was recovered during individual degassing experiments (Figure 1.4.5). Gas samples were analyzed over the course of each experiment and were composed of primarily methane with an average of 94 ppm ethane and detectable, but not quantifiable propane (< 10 ppm).

Hydrate saturations were calculated from the methane content, an assumption of 40% porosity based on LWD data (Collett et al., 2012), and an assumption that the core volume equals the internal volume of the core liner. Lithofacies 1 contains very low to no bulk hydrate saturation (<3%), lithofacies 2 contains very high bulk hydrate saturation (66-87%), and Lithofacies 3 contains moderately low hydrate bulk saturation (0.5-30%) (Figure 1.4.6 and Figure 1.4.7). As discussed, lithofacies 3 may contain interbedded thin sands/silts and muds. Thus, the local saturations in lithofacies 3 may differ from the bulk saturation. In particular, the sand/silt layers may contain a higher hydrate saturation and the mudstone may contain a lower (or no) hydrate saturation than the bulk saturation. Other degassing experiments contained multiple lithofacies (within cores UT-GOM2-1-H005-7FB, and -10FB) or uncertain facies (cores UT-GOM2-1-H005-9FB and -11FB). These mixed or uncertain lithofacies sections exhibit high hydrate saturations (47-77%).

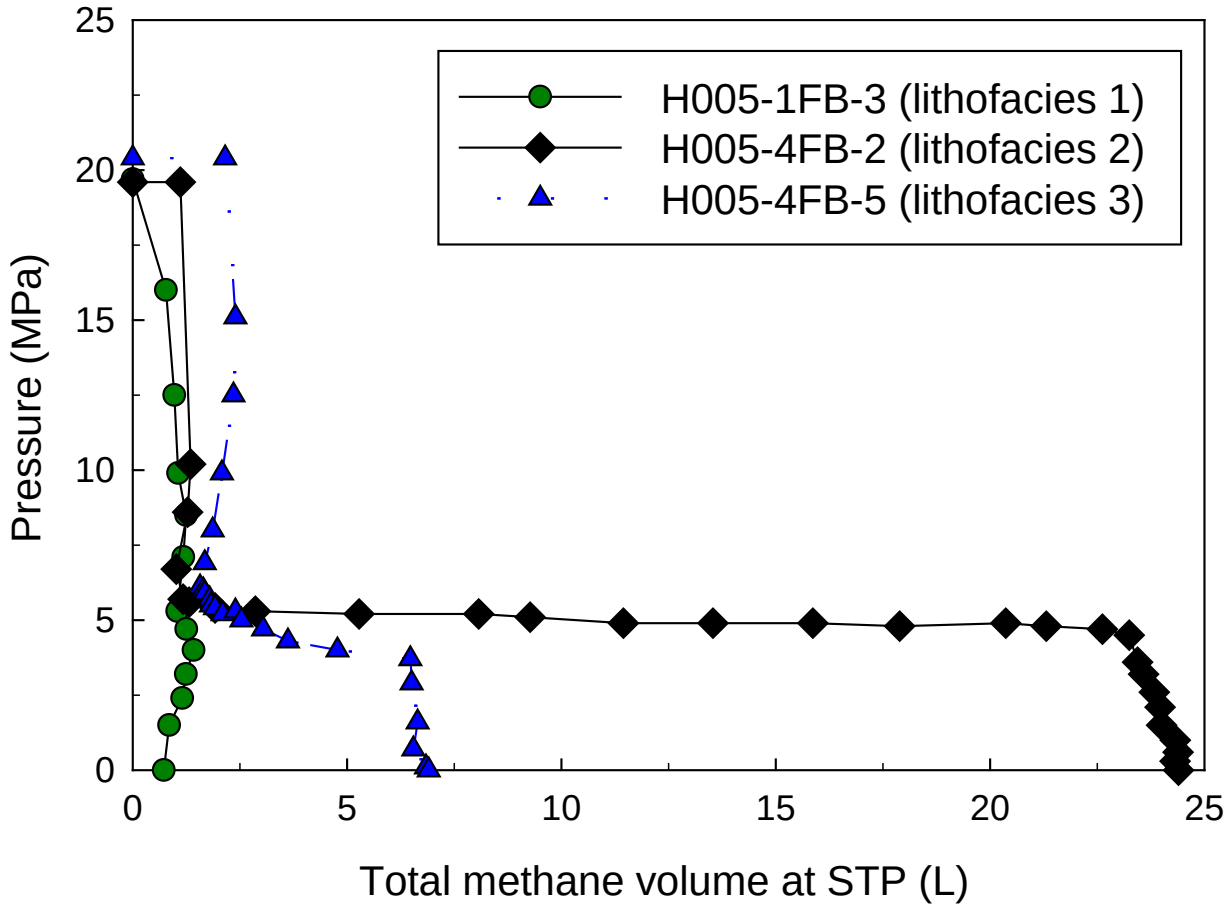


Figure 1.4.5 Example of methane volume versus pressure from three quantitative degassing experiments, each representing lithofacies 1, 2, and 3. Lithofacies 2 generally produced the most gas, followed by lithofacies 3, and the least in lithofacies 1. See Chapters 3 and 4, Section 5 Quantitative Degassing for more information. All H005 Quantitative Degassing data can be found in the expedition data directory under H005 / Quantitative Degassing.

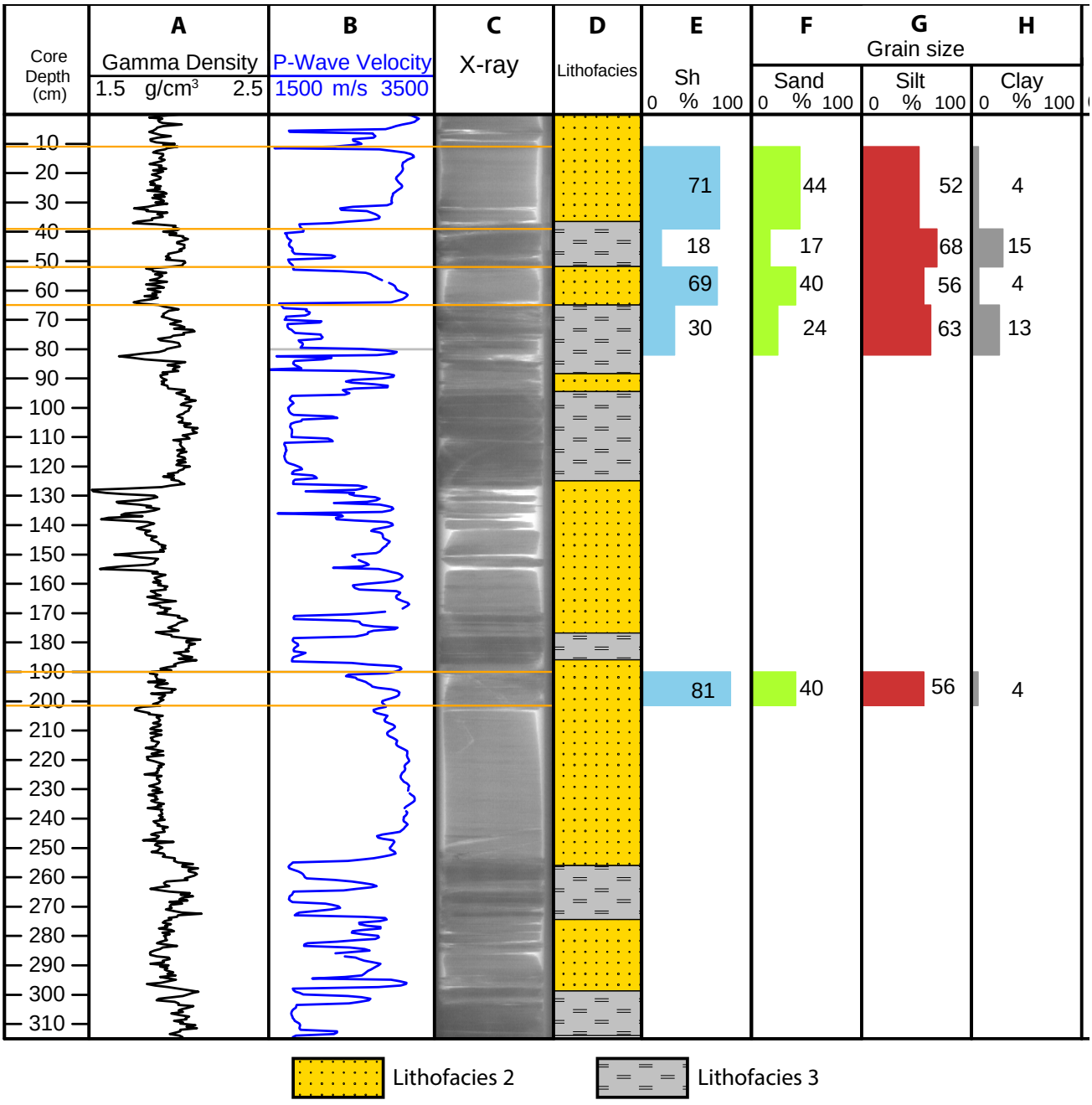


Figure 1.4.6 PCATS results with lithofacies-specific hydrate saturation (S_h) for core UT-GOM2-1-H005-4FB. See Chapters 3 and 4, Section 2 Physical Properties and Core Transfer and Section 6 Lithostratigraphy for more information. All H005 Physical property data can be found in the expedition data directory under H005 / Physical Properties.

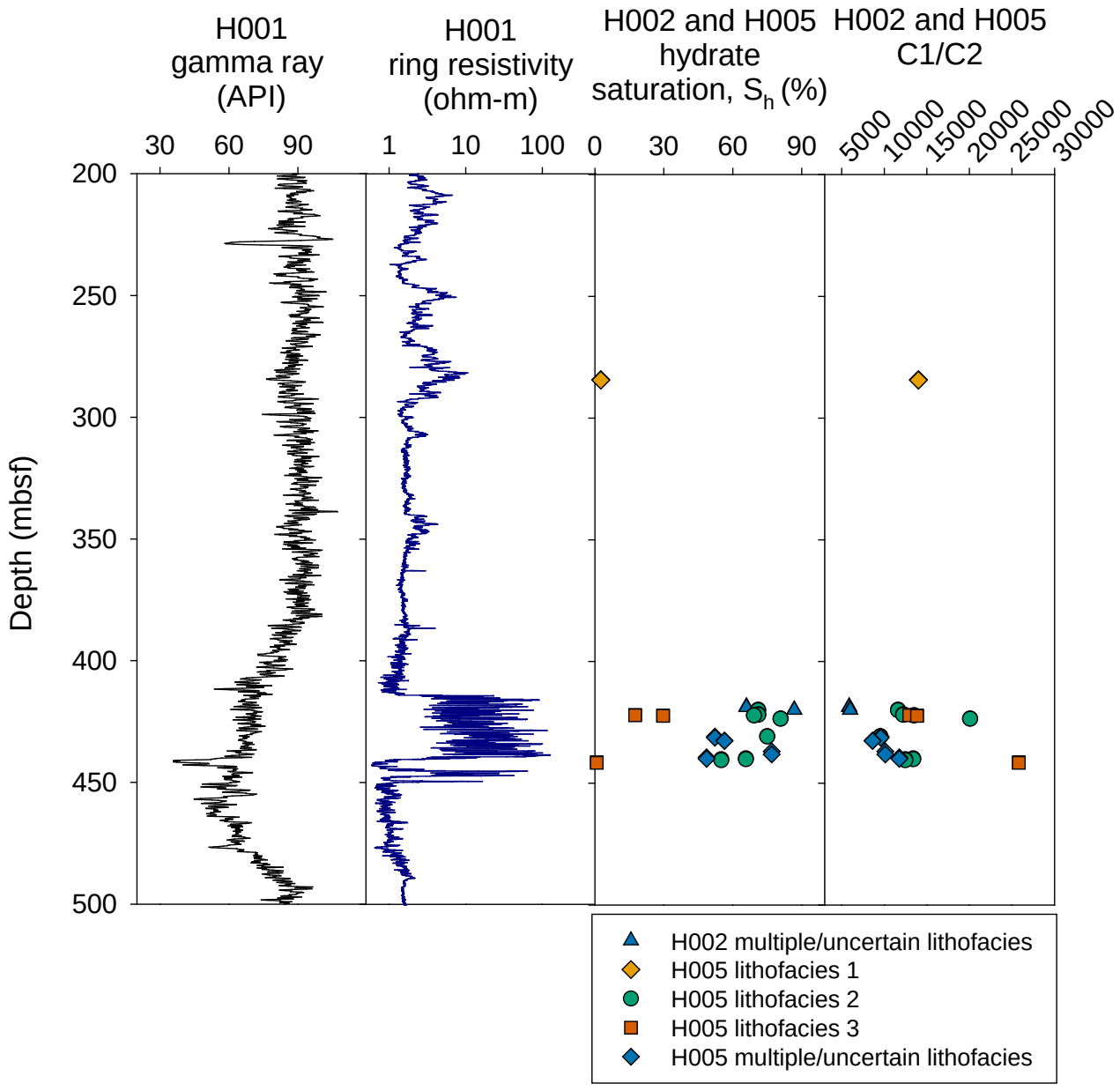


Figure 1.4.7 Down core variation in methane hydrate saturation (S_h) and the methane:ethane ratio (C1/C2) from H002 and H005 along with the gamma ray and ring resistivity data from H001 indicating the depth of the hydrate-bearing interval (Collett et al., 2012; Boswell et al., 2012). See Chapters 3 and 4 Section 5 Quantitative Degassing and Section 7 Geochemistry and Microbiology for more information. All H005 Gas Analysis data can be found in the expedition data directory under H005 / Geochemistry / Gas.

1.4.3 Geochemistry and Microbiology

Gases generated during quantitative degassing experiments were measured for C1 to C5 hydrocarbons. Methane was the primary hydrocarbon in all samples, with an average of 84 ppm ethane and detectable, but not quantifiable, propane. The amount of ethane in each sample varies as demonstrated by down core variation in the methane:ethane ratio (C1/C2) (Figure 1.4.7). Each sample contained on average 2.5 and 0.5% nitrogen and oxygen respectively from atmospheric contamination. Additional gas samples were collected for on shore stable isotopic and noble gas analysis.

Ten whole round core samples were collected for pore water chemistry and microbiological analyses. The pore water samples have been measured for salinity and major anions. Additional major and minor ions, water $\delta^{18}O$ and δD, ammonia, and dissolved organic carbon will be later analyzed. The microbial community will be characterized via 16S rRNA and DNA analyses. Drilling fluid and PCATS water samples were collected to characterize potential contamination. PCATS fluid was spiked with 10 ppm Cs to trace contamination from samples processed in PCATS and stored in storage vessels.

Within the main hydrate-bearing interval, the measured salinity is 8 to 54% of seawater, and chlorinity is similarly below seawater values (Figure 1.4.8). The presence of sulfate (11 to 42% of seawater) in pore waters from the main hydrate-bearing interval, at depths likely far below the sulfate-methane transition zone, suggests a moderate amount of contamination from the seawater-based drilling fluids in the silt-rich sediments (Figure 1.4.8). Salinity and chlorinity are closer to seawater values (80 and 92% respectively) in a pore water sample from lithofacies 1 sediments well above the hydrate-bearing interval (Figure 1.4.8). Sulfate in this sample is much lower (<2% of seawater) suggesting minimal drilling fluid contamination in these fine-grained sediments.

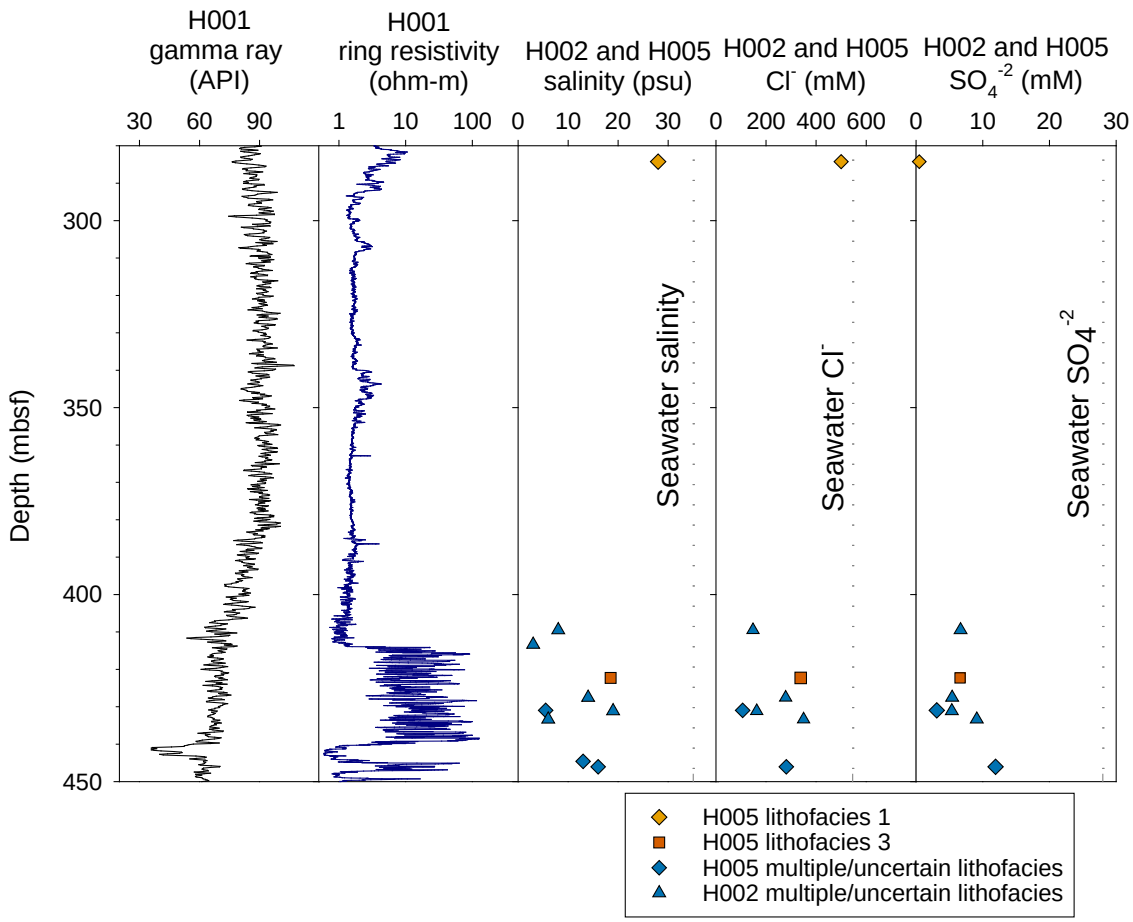


Figure 1.4.8 Down core variation in salinity, chloride concentration, and sulfate concentration from H002 and H005 along with the gamma ray and ring resistivity data from H001 indicating the depth of the hydrate-bearing interval See Chapters 3 and 4, Section 7 Geochemistry and Microbiology, for more information. All H005 Gas Analysis data can be found in the expedition data directory under H005 / Geochemistry / Gas.

1.4.4 Wireline logging

H002 was logged from 7680 to 8057 fbrf. Gamma ray and resistivity logs were generated for the logged interval. A potential bridge in the hole prevented logging below 8057 fbrf and therefore no logs were acquired through the hydrate-bearing coarse-grained section.

1.5 UT-GOM2-1 Expedition: Reporting

1.5.1 On-board Contractor and Scientific Daily Reports

Daily on-board contractor reporting during UT-GOM2-1 consisted of (1) Helix Drilling Reports, (2) *D/V Q4000* Bridge Reports – including POB report, (3) Weatherford Drilling/Coring Performance Reports, (4) Geotek Coring Reports, (5) Swaco Daily Drilling Fluids Report, (6) Schlumberger Services Completions (cementing) Report, (7) Schlumberger Wireline Services Daily Report, and the (8) UT Daily Operational and Science Reports (Appendix C.).

1.5.2 UT-GOM2-1 Expedition Report

UT-GOM2-1 participants have prepared additional chapters of this expedition report (Methods, H002, and H005) that have been released to the UT-GOM2-1 science party and will be released to the general public after the end of the moratorium on Oct 1, 2018. The chapters will include details on pressure coring, physical properties, quantitative degassing, Lithostratigraphy, geochemistry and wireline logging for each of the two holes. Additional findings are anticipated to be published together in a special journal of peer-reviewed papers as feasible.

References

Boswell, R., and Collett, T., 2016, Emerging Issues in the Development of Geologic Models for Gas Hydrate Numerical Simulation, Fire in the Ice, 16(1), 18-21.

Boswell, R., Collett, T. S., Frye, M., Shedd, W., McConnell, D. R., and Shelander, D., 2012a, Subsurface gas hydrates in the northern Gulf of Mexico: Marine and Petroleum Geology, v. 34, no. 1, p. 4-30.

Boswell, R., Frye, M., Shelander, D., Shedd, W., McConnell, D. R., and Cook, A., 2012b, Architecture of gas-hydrate-bearing sands from Walker Ridge 313, Green Canyon 955, and Alaminos Canyon 21: Northern deepwater Gulf of Mexico: Marine and Petroleum Geology, v. 34, no. 1, p. 134-149.

Collett, T., Boswell, R., Mrozewski, S. A., Guerin, G., Cook, A., Frye, M., Shedd, W., and McConnell, D., 2009, Gulf of Mexico Gas Hydrate Joint Industry Project Leg II — Operational Summary.

Collett, T. S., Boswell, R., Frye, M., Shedd, W. W., Godfriaux, P. D., Dufrene, R. S., McConnell, D. R., Mrozewski, S., Guerin, G., Cook, A., Jones, E., and Roy, R., 2010, Gulf of Mexico Gas Hydrate Joint Industry Project Leg II: Logging-While-Drilling Operations and Challenges, Offshore Technology Conference.

Collett, T. S., Lee, M. W., Zyrianova, M. V., Mrozewski, S. A., Guerin, G., Cook, A. E., and Goldberg, D. S., 2012, Gulf of Mexico Gas Hydrate Joint Industry Project Leg II logging-while-drilling data acquisition and analysis: Marine and Petroleum Geology, v. 34, no. 1, p. 41-61.

Cook, A. E., Anderson, B. I., Rasmus, J., Sun, K., Li, Q., Collett, T. S., and Goldberg, D. S., 2012, Electrical anisotropy of gas hydrate-bearing sand reservoirs in the Gulf of Mexico: Marine and Petroleum Geology, v. 34, no. 1, p. 72-84.

Duan, Z., Møller, N., Greenberg, J., and Weare, J. H., 1992, The prediction of methane solubility in natural waters to high ionic strength from 0 to 250°C and from 0 to 1600 bar: Geochimica et Cosmochimica Acta, v. 56, no. 4, p. 1451-1460.

Eaton, B. A., 1969, Fracture gradient prediction and its application in oil field operations: Journal of Petroleum Technology, v. 21, no. 10, p. 1353-1360.

Flemings, P. B., and Liu, X., 2007, The Methane Hydrate Reservoir System, Abstract OS22A-01, Eos Trans. AGU, 88(52), Fall Meet. Suppl.: San Francisco, CA.

Flemings, P. B., Phillips, S. C., Pettigrew, T., and Green, T., 2016, GOM2 Pressure Coring Tool with Ball Valve (PCTB) Land Test Intitial Report.

Heggland, D. R., 2004, Definition of geohazards in exploration 3-D seismic data using attributes and neural-network analysis: AAPG Bulletin, v. 88, no. 6, p. 857-868.

Henry, P., Thomas, M., and Ben Clennell, M., 1999, Formation of natural gas hydrates in marine sediments 2. Thermodynamic calculations of stability conditions in porous sediments: Journal of Geophysical Research, v. 104, no. B10, p. 23005-23022.

Hutchinson, D., Boswell, R., Collett, T., Chun Dai, J., Dugan, B., Frye, M., Jones, E., McConnell, D., Rose, K., Ruppel, C., Shedd, W., Shelander, D., and Wood, W. T., 2010, Gulf of Mexico Gas Hydrate Joint Industry Project Leg II: Green Canyon 781 Site Selection.

Kumar, P., Collett, T. S., Vishwanath, K., Shukla, K. M., Nagalingam, J., Lall, M. V., Yamada, Y., Schultheiss, P., and Holland, M., 2016, Gas Hydrate-Bearing Sand Reservoir Systems in the Offshore of India: Results of the India National Gas Hydrate Program Expedition 02, Fire in the Ice, 16(1), 1-7.

Matsumoto, R., Tanahashi, M., Kakuwa, Y., G., S., Ohkawa, S., H., T., and Morita, S., 2017, Recovery of Thick Deposits of Massive Gas Hydrates from Gas Chimney Structures, Eastern Margin of Japan Sea: Japan Sea Shallow Gas Hydrate Project, Fire in the Ice, 17 (1), 1-6.

Matthews, W. R., and Kelly, J., 1967, How to Predict Formation Pressure and Fracture Gradient: Oil and Gas Journal, v. 20, no. February, p. 92-106.

McConnell, D., Boswell, R., Collett, T., Frye, M., Shedd, W., Guerin, G., Cook, A., Mrozewski, S., Dufrene, R. S., and Godfriaux, P., 2010, Gulf of Mexico Gas Hydrate Joint Industry Project Leg II: Green Canyon 955 Site Summary.

McConnell, D. R., Optimizing deepwater well locations to reduce the risk of shallow-water-flow using high resolution 2-D and 3-D seismic data, *in* Proceedings Offshore Technology Conference, Houston, 2000, Volume 11973.

Suzuki, K., Schultheiss, P., Nakatsuka, Y., Ito, T., Egawa, K., Holland, M., and Yamamoto, K., 2015, Physical properties and sedimentological features of hydrate-bearing samples recovered from the first gas hydrate production test site on Daini-Atsumi Knoll around eastern Nankai Trough: Marine and Petroleum Geology, v. 66, Part 2, p. 346-357.

Yamamoto, K., Inada, N., Kubo, S., Fujii, T., Suzuki, K., and Konno, Y., 2012, Pressure core sampling in the Eastern Nankai Trough: DOE/NETL Fire in the Ice Newsletter, 12(2).

Yang, S., Liang, J., Lei, Y., Gong, Y., Xu, H., Wang, H., J., L., Holland, M., Schultheiss, P., Wei, J., and Team, G. S., 2017, GMGS4 Gas Hydrate Drilling Expedition in the South China Sea: Fire in the Ice, 17(1), 7-11.

Yang, S., Zhang, M., Liang, J., Lu, J., Zhang, Z., Holland, M., Schultheiss, P., Fu, S., Sha, Z., and Team, G. S., 2015, Preliminary Results of China's Third Gas Hydrate Drilling Expedition: A Critical Step From Discovery to Development in the South China Sea, Fire in the Ice, 15(1), 1-5.

Appendix A. Post-Drill Operation Report and Daily Log

UT/DOE GOM^2 Marine Test Daily Log

Revision: 0 Date: 6 June 2017

Date	Time	Activity Description	Daily Log
20-Apr-17		UT representative arrives at Keppel AmFELS Shipyard in Brownsville, TX.	Shipyard work continued on the vessel (Q4000) in dry dock. Tom Pettigrew (Pettigrew Engineering/UT), Quentin Huggett (Geotek), Sally Huggett (Geotek, not sailing), Mike Mimitz (Geotek), Allan Bakken (Geotek), and Matt Selman (Geotek) arrived at the Kepple AmFELS shipyard in Brownsville, Texas. A shipyard briefing was given and then identification and gangway passes were issued. Vish Subramani (Helix) escorted the group to the Q4000 where a shipboard safety briefing was given as well as a tour of the vessel. Positions for the Geotek PCATS containers were laid out on deck. Electrical and air connections were located. Water connections are yet to be defined. Required lengths of utility hoses and cables was measured. The rig floor was inspected as well as the mouse hole locations, tuggers, etc. While sitting on the dock, the PCTB service van was opened and inspected, all was found to be as shipped. The DNV frame was located in another part of the shipyard and requested to be moved dockside.
21-Apr-17		Q4000 in dry dock, shipyard work continues.	Shipyard work continued on the vessel in dry dock. No shipments were received.
22-Apr-17		PCATS, PCTB, BHA components arrive dockside in Brownsville, TX	Shipyard work continued on the vessel in dry dock. All of the Geotek Pressure Core Analysis and Transfer System (PCATS) containers and all three lifting baskets, one from Austin and two from Houston arrived and were offloaded from their trucks to dockside. Helix requested a change in the PCATS container layout on deck. Geotek personnel boarded the Q4000 to confer on the changes.
23-Apr-17		Chillers, cold shuck arrive dockside in Brownsville, TX, chillers installed in DNV frame.	Shipyard work continued on the vessel in dry dock. Lifting basket contents were inventoried and required tubulars and subs were present. The chillers arrived late afternoon and were offload from the truck dockside.
24-Apr-17		Q4000 moved out of dry dock and tied up dockside.	Shipyard work continued on the vessel in dry dock. The chillers were installed in the DNV frame. Nitrogen bottles were secured in a rack. The revised deck layout for the PCATS containers was approved by both Helix and Geotek. At 0930 hrs. the dry dock began flooding in preparations for moving the Q4000 alongside the dock. The Q4000 was tied up dockside at 1700 hrs.
25-Apr-17		Q4000 shipyard work continues.	Shipyard work continued on the vessel dock side. Loading of the Geotek and UT equipment was discussed with Rig Superintendent.
26-Apr-17		Q4000 shipyard work continues.	Shipyard work continued on the vessel dock side.
27-Apr-17		Q4000 shipyard work continues.	Shipyard work continued on the vessel dock side. All Geotek personnel completed the SafeGulf course. Peter Polito (University of Texas at Austin (UT)), Steve Phillips (UT), Kevin Meazell (UT), and Tiannong Dong (UT) arrived.
28-Apr-17		Q4000 shipyard work continues.	Shipyard work continued on the vessel dock side. Additional UT personnel that arrived Thursday were given the shipyard safety briefing and issued identification and gangway passes. Peter Flemings (UT) arrived.
29-Apr-17		UT personnel board Q4000.	Shipyard work continued on the vessel dock side. Peter Flemings was given the shipyard safety briefing and issued identification and a gangway pass. All Geotek PCATS containers were loaded on board and positioned on deck. The lifting baskets from Houston were unloaded dockside and the contents loaded onboard the Q4000. All UT personnel move on board the Q4000 at 1600 hrs. and given the shipboard safety briefing.
30-Apr-17		Geotek personnel board Q4000.	UT and Geotek staff boarded the Q4000. All Geotek containers were loaded onto the vessel. Phone and internet connected to company man and the 3rd party offices. Representatives from UT, Geotek, Helix, Schlumberger, and Weatherford met to discuss the status/plans for rig floor and container operations going forward. These plans include utility connections to Geotek containers, grating installation, Schlumberger wireline rig up through the top drive, Weatherford instrumentation, and mouse-hole installation/modification. The current priority is for Helix to finish loading and load-testing before the above operations can continue.
1-May-17	0750	Begin transit to FMEA site.	At 0750hr the Q4000 left the dock at Brownsville, TX and was guided by the harbor pilot through the channel towards South Padre Island. At 1020hr the vessel entered the Gulf of Mexico, and continued offshore at 1105hr after the pilot disembarked. At 1300hr conducted fire drill. Geotek Coring gained access to clean freshwater for their core lab containers. Helix began required vessel sea trials by 2200hr.
	2200	Arrive FMEA site.	
2-May-17		Conduct sea trials, FMEA.	Helix continued to conduct required vessel sea trials. Geotek-Coring continued to prepare core lab containers (PCATS) for operations.
		Assemble and test PCATS.	
3-May-17		Conduct sea trials, FMEA.	Helix continued to conduct required vessel sea trials. Geotek-Coring continued to prepare core lab containers (PCATS) for operations.
		Assemble and test PCATS.	
4-May-17	1800	1 nmi off FMEA site, begin transit and lump sum mobilization.	Helix completed a crew change through the morning and afternoon with three helicopter flights. After transfers were complete, the Q4000 was de-ballasted and began to transit towards GC955. Helix began installing the grating around Geotek-Coring (PCATS) containers. Geotek-Coring continued to prepare core lab containers (PCATS) for operations.
		Rig Movement Notification submitted.	
		Geotek continued to organize and inventory their equipment.	
5-May-17		Underway for H002 site.	The Q4000 continued transit towards GC955 throughout the day. Grating was installed around Geotek Coring (PCATS) containers. UT, Helix, Geotek-Coring and all third parties participated in a pre-spud meeting to discuss the expedition objectives and the operational plan. Schlumberger and Helix worked on rigging up the wireline equipment through the top drive.
		Pre-spud meeting held.	
		Grating installed around Geotek's containers.	
		Geotek continuing to set up their equipment.	
		Rig up wireline equipment to/through top drive.	

6-May-17	1600	1 nmi off operations site.	The Q4000 arrived within 1 nmi of location of the GC955-H001 well at 1600hr after a 307 nmi transit. Schlumberger and Helix complete the rigging up the wireline equipment through the top drive. Geotek-Coring continued to prepare Geotek Coring (PCATS) containers and PCTB pressure core systems. The ROV was launched at 2040he to deploy four Compact transponders and survey the site area. The GC955-H001 well was found at 2247hr at a location of 27° 00.05126' N, 090° 25.58367' W in a WGS84 coordinate system. The borehole well head at the seafloor was intact and in good condition.
		Geotek continued to prepare their equipment.	
		Launch ROV, deploy transponders, conduct as-found survey.	
		Locate Hole H001 at 27° 00.05126' N, 090° 25.58367' W (WGS84).	
7-May-17	0230	M/V HOS Crockett arrived on site with equipment and mud from Fourchon, LA, begin offload.	Helix conducted a partial crew change via three helicopter flights. The supply boat *M/V HOS Crockett* was offloaded over most of the day; drilling mud, gel, and the mud lab were brought on board. The as-found ROV survey of the seafloor was completed. Geotek-Coring conducted trial PCTB core system runs in the Geotek Coring (PCATS) labs. Helix worked on installing the HVAC system for the mud pumps. Weatherford installed a new interface and software to monitor and record drilling and coring parameters.
		Crew change occurred via three helicopter flights.	
		Mud lab offloaded.	
		Completed as-found survey with the ROV.	
		Weatherford installed interface and software to record drilling parameters.	
8-May-17	1227	The M/V HOS Crockett departed.	Conducted fire/abandon ship drill at 0819hr. The supply boat M/V HOS Crockett materials transfer was completed and departed at 1227hr. The UT mud lab was placed into location on the deck of the Q4000 and hooked up to utilities. Helix finished installing the duct work for the mud pumps. Made up ~2300 ft of drill pipe between 1400-1930hr and then between 1940-2200hr pilled up and laid down pipe in doubles. Starting at 2015hr, Weatherford software began logging top drive data; allowing for the recording of all drilling parameters, except the stroke counter on the mud pumps. Helix performed pressure testing of the upper and lower IBOP valves and the wireline night cap starting at 2315hr.
		Spot mud lab, connect utilities.	
	1400-2200	Make up ~2300 ft of drill pipe and lay out in doubles.	
	2315	Begin pressure testing upper and lower IBOP valves and wireline night cap.	
9-May-17	0800	Complete pressure testing upper and lower IBOP valves and wireline night cap.	Conducted a series of three Shallow Flow Tests of the PCTB-CS pressure core system with the BHA hanging just below the sea surface. Preliminary analysis of data from Geotek instrumented core liner shows only small pressure differentials across the core liner during each of the three Shallow Flow Tests of the PCTB-CS. The instrumented core liner upon visual inspection did not exhibit any damage or deformation. The PCTB-CS Surface Pump Test revealed a potential problem associated with the use of the shipboard Hex mud pumps in that the pumps could not effectively work below a flow rate of about 125 GPM. It has been shown in the past that high mudflow rates, exceeding about 30 GPM, can cause severe borehole washouts and adversely affect core recovery. A decision was made to also test the use of the Schlumberger cement pumps to determine if lower mud pump rates could be established and maintained. As shown above, the cement pumps used during Surface Pump Test 3 was able to establish and maintain low flow rates in the range of 21-40 GPM. The current operational plan has been modified to include the use of the onboard cement pumps during planned pressure coring operations. There were three helicopter flights for crew change, and the remainder of the UT Science Party arrived at 1445hr and went through the safety orientation.
	0800	MU PCTB-CS OCBA for flow test.	
	1145	UT personnel board via helicopter from Houma, LA.	
	1230-1300	Space out with PCTB and instrumented core barrel	
	1621-1646 hr	Surface Pump Test 1 PCTB-CS	
	1653-1710 hr	Surface Pump Test 2 PCTB-CS	
	1953-2022 hr	Surface Pump Test 3 (cement pump) PCTB-CS	
	2130-2400	Space out cementing liner, center bit and PCTB-CS.	
10-May-17	0000-0215	MU PCTB-CS BHA.	Made-up and ran to the seafloor the BHA with drill collars and pipe reaching near the seafloor (6716 ft MD) at 2110hr and the Geotek instrumented core barrel was deployed in preparation for conducting a series of seafloor level flow tests. The first attempted Deep Flow Test was not completed because of an electrical problem associated with one of the ship's mud pumps. However, two additional seafloor pump tests were completed without any concerns. The flow tests also allowed for the analysis of the performance of all three pump units on the platform (i.e., Hex Pumps 1 and 2; and the Schlumberger cement pump). Analysis of data obtained from both the sea surface and seafloor flow tests documented only small pressure differentials across the core liner for all of the completed tests. In addition, the instrumented core liner was not damaged during any of the completed pump test. Modifications to the drilling fluid flow paths through the PCTB-CS appear to have significantly reduced the internal pressure conditions that have in the past resulted in the collapse of core liners within the PCTB-CS system. The pump tests also represented an excellent opportunity for Geotek-Coring and the Q4000 rig crew to become more familiar with operations and handling of the PCTB-CS pressure core system as deployed on this expedition.
	0215-1630	RIH w/ bit on drill pipe.	
	1630-1930	Change bails on TDS, stage PCTB-CS, RU wireline.	
	1930-2110	RIH w/ instrumented core barrel.	
	2110-2230	Seafloor Pump Test X PCTB-CS (incomplete test)	
		Using Hex Pump 2 switched to Hex Pump 1 (circulating seawater)	
	2230-2315	Seafloor Pump Test 1 PCTB-CS	
	2315-2400	Seafloor Pump Test 2 (cement pump) PCTB-CS	
	0912-1647	USCG inspection.	
11-May-17	0000-0100	Complete Seafloor Pump Test 2 (cement pump) PCTB-CS	At 0830hr spudded Hole UT-GOM2-1-H002 at 6667.0 ft (6719.0 ft RKB) and advanced hole to a depth of 8032.0 ft RKB (1313.0 fbsf) by midnight without any significant problems. Geotek-Coring completed preparations for coring operations and developed plans for simulated core runs to be conducted before reaching core point as planned for the morning of 12-May-17. The UT Scientific Party refined and finalized the Hole UT-GOM2-1-H002 core plan. The UT Scientific Party also continued to develop the core handling and processing plan. Based on (1) lateral correlation with seismic data from Hole GC955-H as drilled under the Gulf of Mexico Gas Hydrate Joint Industry Project Leg II (GOM JIP Leg II) in 2009 to the Hole UT-GOM2-1-H002 and (2) the seafloor depth at UT-GOM2-1-H002, the first pressure core point (Core UT-GOM2-1-H002-01) was set at 8062.0 ft RKB (1343.0 fbsf).
	0100-0500	POOH w/ instrumented core barrel.	
		RIH w/ center bit.	
	0500-0530	Test wireline night cap on TDS to 5000 psi	
	0530-0600	Held Spud meeting with all personnel involved	
	0600-0830	RIH w/ bit.	
	0630-0730	Move rig over H002 location.	
	0730-0830	Tag mudline at 6719.0 ft.	
	0830-2300	Spud Hole H002.	
		Drill 6719.0 ft to 8032.0 ft.	
	0856-1215	BSEE inspection (Inspectors Campo, Boudreaux, Fry, Shedd)	
	2300-2400	Circulate hole clean with 8.6 ppg mud	

12-May-17	0000-0030	Fill hole w/ 10.5 ppg WBM.	Performed a series of three simulated coring drill downs with the bit just off the bottom of the hole. Hole UT-GOM2-1-H002 was advanced from 8062 ft MD to 8092 ft MD with 3 PCTB-CS pressure cores (Core UT-GOM2-1-H002-01-CS, Core UT-GOM2-1-H002-02-CS, and Core UT-GOM2-1-H002-02-CS). **Conducted core run: Core UT-GOM2-1-H002-01CS.** Core barrel recovered on deck with ball valve closed but with little to no pressure in the autoclave. Core UT-GOM2-1-H002-01CS, which was the first core acquired during this expedition, recovered 2.3 ft (69 cm) of core in poor condition and failed to retain pressure. The deployment, cutting, and recovery of the core appeared to be conducted without any problems. We did not see any trouble with the latching of the tool or it's deployment in the pipe. But it took more than 6,000 lbs of pull to unlatch the tool from the BHA. The cutting of the core on bottom also appeared to be good with somewhat variable penetration rates and weight on bit. Upon recovery, the ball valve was closed but the pressure boost appeared not to have pressurized the autoclave below the new flow diverter set above the upper autoclave seal (polypack seals). Two additional PCTB-CS operational tests were conducted in the open drillpipe (while not in contact with the sediment) that appeared to confirm that there was some form of pressure block in the tool. **Conducted core run: Core UT-GOM2-1-H002-02CS.** When the tool was recovered on deck the ball valve was not closed; core liner visible through ball valve (no pressure). Core did not retract into the autoclave. The upper threaded connection of the liner to the top of the core plug was broken and the core catcher was damage indicating that the core likely jammed, which caused core milling and the breaking of the liner. It also took about a 6000 lb pull to unlatch the inner core barrel from with the BHA during the recovery of the core. A total of 5.3 ft (162 cm) of sediment was recovered. **Conducted core run: Core UT-GOM2-1-H002-03CS.** Upon recovery this core failed to hold pressure; however, it did return core to the surface. This failure of the core system to retain pressure was attributed to the fact that the retrieval of the inner core-barrel required a special procedure to release it form the latches in the BHA. We did not see any trouble with the deployment and latching of the tool before coring. The actual core cut event appeared to be good with somewhat variable penetration rates and weight on bit. However, at the end of the test the inner core-barrel was stuck in the BHA. The rig crew and Geotek staff core team managers worked with the Schlumberger wireline engineer for nearly four hours to unlatch the core barrel from the BHA. Eventually, the decision was made to use a special emergency release procedure that was successful but also prevents the ball-valve on the tool from closing. A total of 1.1 ft (33 cm) was recovered. The 'conventionalized' core material from each core was transferred to the UT mud lab whole rounds were subsampled and preserved for shore-based geochemistry, microbiology, and physical properties. Head space gas samples were sampled for shore-based analyses.
	0230-0330	Circulate hole clean.	
	0330-0730	POOH w/ center bit.	
		RIH w/ PCTB-CS.	
	0730-0900	Core H002-01, F/ 8062 ft T/ 8072 ft.	
	0900-0930	POOH w/ PCTB-CS (recovered 2.3 ft, 0 psi).	
	0930-1010	RIH w/ PCTB-CS for water core test 1.	
		POOH PCTB-CS (0 psi, boost failed).	
	1010-1230	RIH w/ PCTB-CS for water core test 2.	
		POOH w/ PCTB-CS (0 psi, boost failed).	
	1230-1830	RIH w/ PCTB-CS.	
		Circulate hole clean.	
	1830-1900	Core H002-02, F/ 8072 ft T/ 8082 ft.	
	1900-1945	POOH w/ PCTB-CS (recovered 5.3 ft, 0 psi) (liner did not retract preventing ball valve from closing.	
	1945-2230	RIH w/ PCTB-CS.	
		Circulate hole clean.	
	2230-2330	Core H002-03, F/ 8082 ft T/ 8092 ft.	
	2330-2400	RIH w/ pulling tool.	
13-May-17	0000-0400	PCTB-CS would not unlatch from the BHA.	Hole UT-GOM2-1-H002 was advanced from 8092 ft MD to 8112 ft MD with 2 PCTB-CS pressure cores (Core UT-GOM2-1-H002-04CS and Core UT-GOM2-1-H002-05CS). **Conducted core run: Core UT-GOM2-1-H002-04CS.** Core UT-GOM2-1-H002-04CS was recovered on deck with ball valve closed and at an internal autoclave pressure of 3372 psi, which was the first core acquired during this expedition at pressure. The deployment and recovery of the PCTB-CS core barrel was conducted without any problems. The cutting of the core at the bottom of the hole also appeared to be good with almost constant core penetration rates and weight on bit. Upon recovery, the PCTB-CS core barrel was placed in the vertical ice-shuck on the rig floor. The internal pressure of the PCTB-CS autoclave when received in the Geotech Coring Service Van measured 3372 psi, which is slightly less than the expected hydrostatic pressure at the depth of the cored reservoir section at this site. In the PCATS lab, an X-ray scan of the PCTB-CS autoclave revealed 4.6 ft (140 cm) section of sediment core and 4.0 ft (123 cm) sediment fill above the core rabbit, which indicates that formation sediment had been fluidized during coring and flowed up into the core liner through the small ports in the rabbit. **Conducted core run: Core UT-GOM2-1-H002-05CS.** For Core UT-GOM2-1-H002-05, the ball-valve failed to close or hold pressure; however, it did return core to the surface. For Core UT-GOM2-1-H002-05CS the tool was recovered to the rig floor with the ball-valve closed but not sealed. Silt and sand was found packed between the ball valve and seal; and the seal appeared to be damaged. We also had significant trouble unlatching this tool from the BHA during recovery, which may also have been caused by the impact of silt/sand on the operation of the latch system within the PCTB-CS BHA. Core UT-GOM2-1-H002-05CS did recover 3.1 ft (94 cm) of non-pressurized core that was transferred and processed through the onboard UT core processing lab.
		POOH w/ pulling tool, RIH w/ emergency pulling tool.	
	0345	POOH w/ PCTB-CS (recovered 1.1 ft, 0 psi).	
	0400-0630	RIH w/ PCTB-CS.	
	0630-0900	Pulling tool shear released PCTB.	
		POOH w/ pulling tool, RIH w/ emergency pulling tool.	
		POOH w/ PCTB-CS.	
	0900-1300	RIH w/ PCTB-CS.	
	1300-1330	Core H002-04, F/ 8092 ft T/ 8102 ft. MD: Recovered 4.6 ft, 3372 psi	
	1330-1530	POOH w/ PCTB-CS (recovered 4.6 ft, 3372 psi)	
	1530-1930	RIH w/ PCTB-CS.	
	1930-2000	Core H002-05, F/ 8102 ft T/ 8112 ft. MD: Recovered 3.1 ft, 0 psi	
	2000-2400	POOH w/ PCTB-CS (recovered 3.1 ft, 0 psi)	
	0540-1130	M/V Mr Steven arrive/departed location.	

14-May-17	0000-0200	RIH w/ PCTB-CS.	Hole UT-GOM2-1-H002 was advanced from 8112 ft RKB to 8142 ft RKB with 3 PCTB-CS pressure cores (Core UT-GOM2-1-H002-06CS, Core UT-GOM2-1-H002-07CS, Core UT-GOM2-1-H002-08CS). All three of the recovered PCTB-CS cores failed to hold pressure. **Conducted core run: Core UT-GOM2-1-H002-06CS**. For Core UT-GOM2-1-H002-06CS, the ball-valve closed, seal at top end of autoclave plug failed; however, it did return core to the surface. For Core UT-GOM2-1-H002-06 the tool was recovered to the rig floor with the ball-valve partially closed (not sealed). Silt and sand was found packed between the ball valve and seal. Core UT-GOM2-1-H002-06 recovered 5.2 ft (158 cm) of non-pressurized core that was transferred and processed through the onboard UT core processing lab. **Conducted core run: Core UT-GOM2-1-H002-07CS.** For Core UT-GOM2-1-H002-07CS, the ball-valve failed to close or hold pressure (displaced BV seal); however, it did return core to the surface. For Core UT-GOM2-1-H002-07 the tool was recovered to the rig floor with the ball-valve partially closed (not sealed). Silt and sand was found packed between the ball valve and seal. In addition, sediment was also found above the core rabbit in the PCTB-CS autoclave, indicating that formation sediment had been fluidized during coring and flowed up into the core liner through the small ports in the rabbit. Core UT-GOM2-1-H002-07 did recover 1.5 ft (46 cm) of non-pressurized core that was transferred and processed through the onboard UT core processing lab. **Conducted core run: Core UT-GOM2-1-H002-08CS.** For Core UT-GOM2-1-H002-08CS, the ball-valve failed to actuate or hold pressure. The ball-valve release sleeve (collett) failed by sliding over stop position, which resulted in the failure of the ball-valve to actuate. Core UT-GOM2-1-H002-08 did recover 4.6 ft (140 cm) of non-pressurized core that was transferred and processed through the onboard UT core processing lab. Hole UT-GOM2-1-H002 reached a TD of 8142 ft RKB (1423 fbsf) at 1630 hr with the recovery of Core UT-GOM2-1-H002-08, after which the hole was swept with 280 bbls of 10.5 ppg water-based mud in preparation for downhole wireline logging. The wireline logging tool string (including EDTC-HRLA-GPIT) was lowered to bottom of the hole, and two up hole log runs from 8045 ft RKB to 7680 ft RKB (Main Pass and Repeat Pass) were acquired without any problems. Because of borehole blockages, the wireline logging tool string could not pass below 8045 ft RKB and the BHA had been set back to a depth of 7680 ft RKB. **Wireline Logs: EDTC-HRLA-GPIT F/ 7680 ft RKB T/ 8045 ft RKB (Main Pass)**
	0200-0230	Core H002-06, F/ 8112 ft T/ 8122 ft. MD: Recovered 5.2 ft, 0 psi	
	0230-0315	POOH w/ PCTB-CS (recovered 5.2 ft, 0 psi).	
	0315-0730	RIH w/ PCTB-CS.	
	0730-0830	Core H002-07, F/ 8122 ft T/ 8132 ft. MD: Recovered 1.5 ft, 0	
	0830-0920	POOH w/ PCTB-CS (recovered 1.5 ft, 0 psi).	
	0920-1330	RIH w/ PCTB-CS.	
	1330-1400	Core H002-08, F/ 8132 ft T/ 8142 ft.	
	1400-1530	POOH w/ PCTB-CS (recovered 4.6 ft, 0 psi) (ball valve did not actuate).	
	1530-1630	Decision made to TD Hole H002 at 8142 ft.	
		Pumped 280 bbls of 10.5 ppg to sweep hole clean.	
	1630-1730	Rig up logging sheaves.	
	1730-1830	POOH w/ bit F/ 8142 ft T/ 7680 ft.	
	1830-2040	RU logging wireline through travel block and TDS	
		MU logging wireline packoff in TD	
		Terminate logging wireline cable head	
		MU logging tool string.	
	2040-2400	RIH w/ EDTC-HRLA-GPIT (logging tool string includes Induction Inclinometer).	
		Unable to pass 8045 ft.	
		Log up F/ 8045 ft T/ 7680 ft.	
		RIH w/ EDTC-HRLA-GPIT F/ 7680 ft T/ 8045 ft.	
		Log up F/ 8045 ft T/ 7680 ft.	
		Continue up hole log run to obtain seafloor log depth at 6704 ft.	
		POOH w/ logging tool string.	
15-May-17	0000-0130	Continue POOH w/ logging tool string.	Logging program in Hole UT-GOM2-1-H002 was completed with the acquisition of a main pass and repeat pass surveys (EDTC-HRLA-GPIT) over the depth interval from 7680 ft RKB to 8045 ft RKB. Hole UT-GOM2-1-H002 was abandoned with the emplacement of a 500 ft cement plug that was set above the hydrate interval to avoid any potential problem associated with hydrate dissociation that may be caused by the heat generated by cement hydration. The last half of the day dealt with preparations to move onto the location of Hole UT-GOM2-1-H005. Prepared and set cement plug in Hole UT-GOM2-1-H002 from a depth of 7900 ft RKB to 7400 ft RKB. Recovered PCTB-CS BHA to the ship and prepared to run the PCTB-FB version of the PCTB pressure core system.
		RD logging tools, wireline, and wireline sheaves	
	0130-0430	RIH w/ bit F/ 7680 ft T/ 8142 ft.	
		Spot 25 bbls 11.5 ppg Gel pad mud.	
		POOH w/ bit BHA F/ 8142 ft T/ 7900 ft.	
		Pump 200 bbls of 10.5 ppg WBM.	
		Drop cementing liner.	
	0430-1230	Pump 17 bbls gel spacer.	
		Drop Nerf ball, pump 3 bbls of 10.5 ppg spacer.	
		Pump 77 bbls 16.4 ppg cement.	
		Pump 17 bbls of gel spacer.	
		Displace drill string w/ 171 bbls of seawater.	
		POOH w/ bit F/ 7900 ft T/ 6611 ft.	
		Flush drill string w/ 350 bbls seawater and 2 nerf balls.	
		POOH w/ cementing liner.	
		Flush DS w/ 245 bbls of seawater.	
	1230-1825	POOH w/ bit	
		BO BHA (5 drill collars, 2 stabilizers, bit sub, bit) inspect for residual cement.	
	1825-2400	MU face bit OCBA.	
		Space out center bit, PCTB-FB, cementing liner.	
	2132	M/V Gerry Bordelon on location.	
16-May-17	0000-0330	Complete space out center bit, PCTB-FB, cementing liner.	Conducted three full function (water) tool tests of the PCTB-FB in the drill pipe as it was being deployed in preparation for drilling the next test hole in the project (Hole UT-GOM2-1-H005). To further test the engineering capability of the "face-bit" version of the PCTB pressure-coring tool, it was tested in three successive tests in which the configuration of the tool was not changed between each tests and the coring and core handling procedures were conducted in a similar fashion in each test. The tools as tested were all the face-bit cutting version of the PCTB, which is also known as the PCTB-FB. In each case the "flow diverter" in the pressure core barrel was sealed with an O-ring. These tests were all full function tests in that the PCTB-FB inner barrel was lowered into drill pipe on a slick line wire, (2) the PCTB-FB inner barrel was locked into the BHA, (3) the wireline "running in" tool was used to deploy the PCTB-FB inner barrel and the wireline "pulling" tool was used to recover the PCTB-FB inner barrel to the deck of the ship. Under normal operations, the pulling tool is deployed and latches into the PCTB-FB inner barrel in the BHA and when pulled by the slick line the ball-valve at the bottom of the PCTB-FB inner barrel closes, the upper valve on the tool closes, the entire inner core barrel unlatches from the BHA, and the onboard pressure boost system activates to maintain internal tool pressures during recovery.
	0210	Begin transferring 881 bbls 16.0 ppg WBM from M/V Gerry Bordelon.	
	0719	M/V Gerry Bordelon depart location.	
	0330-0800	MU PCTB-FB BHA	
		RIH w/ bit T/ 1090 ft.	
	0800-1000	RIH w/ PCTB-FB for water core test 3.	
		Circulate seawater at 2 bpm using Hex Pump 2	
		POOH w/ PCTB-FB.	
	1000-1200	RIH w/PCTB-FB for water core test 4.	
		Circulate seawater at 2 bpm using Hex Pump 2	
		POOH w/ PCTB-FB.	
	1200-1630	RIH w/ PCTB-FB for water core test 5.	
		Circulate seawater at 1.75 bpm using Hex Pump 2	
		POOH w/ PCTB-FB.	
	1630-1800	RIH w/ center bit.	
	1800-2400	RIH w/ bit F/ 1090 ft T/ 6700 (18 ft above sea floor).	
		Backload equipment to M/V Gerry Bordelon.	

17-May-17	0000-0124	Move rig over Hole H002.	Re-entered Hole UT-GOM2-1-H002 to tag and test cement plug, tagged top of cement plug at 6839 ft RKB. Set down 11000lbs on top of cement plug. D/S Q4000 was moved over proposed location of Hole UT-GOM2-1-H005. Hole UT-GOM2-1-H005 was spud at 6666.0 ft (6718.0 ft RKB) at 0230hr and advanced to the first core point at 7645 ft RKB. Acquired pressure core from a known fracture dominated hydrate-bearing section that overlies the hydrate-bearing sand-rich reservoir section that is the primary coring target at the Green Canyon 955 test site. **Conducted core run: Core UT-GOM2-1-H005-01FB.** The core throw for the 01 core was 10ft, but from drilling performance data it appeared that the core only cut about 5-6 ft of formation. On recovery, the ball valve was closed and the autoclave was conditioned in the cold shuck for 20 minutes before a pressure of 4115 psi was measured in the service van, indicating that the pressure boost had been retained. The autoclave was moved to PCATS for core handling and processing. The target depth for Core UT-GOM2-1-H005-01 was specifically selected to test the impact of mud-rich sediments on the PCTB-FB core system. A total of 7.1 ft (217 cm) of sediment was recovered.
		Reenter Hole H002.	
		RIH w/ bit, tag top of cement at 6839 ft, apply 11,000 lb WOB.	
		POOH w/ bit F/ 6839 ft T/ 6690 ft.	
		Weekly activity report end submitted.	
	0124-0230	Move rig over proposed Hole H005 location.	
		RIH w/ bit, tag mudline at 6718.0 ft.	
	0230-1330	Spud Hole H005.	
		Drill to 7654 ft.	
	1330-2230	POOH w/ center bit.	
		RIH w/ PCTB-FB.	
		PCTB-FB failed to land in BHA.	
		POOH w/PCTB-FB.	
		RIH w/ PCTB-FB.	
	2230-2330	Core H005-01, F/ 7645 ft T/ 7655 ft.	
		POOH w/ PCTB-FB (recovered 7.1 ft, 4115 psi).	
	2330-2400	RIH w/ center bit.	
18-May-17	0000-0625	Drill F/ 7655 ft T/ 8081 ft, w/ seawater and Hi vis sweeps every 2 doubles.	Continued drilling Hole UT-GOM2-1-H005 from 7655 ft RKB to 8081 ft RKB the depth of the next core point in the hole. Acquired and logged in PCATS Core UT-GOM2-1-H005-02FB and Core UT-GOM2-1-H005-03FB. These scans indicated high P-wave velocities consistent with hydrate at high-saturations. C**onducted core run: Core UT-GOM2-1-H005-02FB.** Successful coring run with clean pick up from BHA. On recovery the ball valve was closed and the autoclave was left in the cold shuck for 45 mins before a pressure of 2834 psi was measured in the service van, indicating that there was a very slight leak which was located around the ball valve. The autoclave pressure was increased to 4000 psi before being transferred to PCATS. A total of 4.9 ft (150 cm) of sediment was recovered. **Conducted core run: Core UT-GOM2-1-H005-03FB.** Another good coring run with clean pick up from BHA. On recovery the ball valve was closed and the autoclave was left in the cold shuck for 45 mins before a pressure of 1780 psi was measured in the service van indicating that there might be a slow leak. The autoclave was transferred to PCATS where pressure was increased to 4000 psi before core handling and processing. DST record showed that autoclave had fully sealed during recovery. A total of 10.0 ft (304 cm) of sediment was recovered.
	0625-1130	POOH w/ center bit.	
	1130-1200	RIH w/ PCTB-FB.	
	1200-1240	Core H005-02, F/ 8081 ft T/ 8091 ft.	
		POOH w/ PCTB-FB (recovered 4.9 ft, 2834 psi).	
	1240-1545	RIH w/ PCTB-FB.	
		Tag fill at 8086 ft.	
		POOH w/ PCTB-FB.	
	1545-1700	Pump 25 bbls gel sweep followed by 280 bbls seawater.	
	1700-1930	RIH with core barrel.	
	1930-2120	Core H005-03, F/ 8091 ft T/ 8101 ft.	
		POOH w/ PCTB-FB (recovered 10 ft, 1780 psi).	
	2120-2230	Circulated 25 bbls gel sweep followed by 128 bbls seawater.	
	2230-2400	Prepare to take core UT-GOM2-1-H005-04	
19-May-17	0000-0130	RIH w/ PCTB-FB.	Advanced Hole UT-GOM2-1-H005 from 8101 ft RKB to 8151 ft RKB with the acquisition of five pressure cores. **Conducted core run: Core UT-GOM2-1-H005-04FB.** On recovery the ball valve was closed and the autoclave was left in the cold shuck for 43 mins before a pressure of 3477 psi was measured in the service van indicating that the autoclave had sealed at in situ pressures. The autoclave was transferred to PCATS for core handling and processing. DST record showed that autoclave had fully sealed as it was lifted from the BHA. Core recovery 10.5 ft (321 cm) as measured by X-ray image in PCATS. **Conducted core run: Core UT-GOM2-1-H005-05FB.** On recovery the ball valve was closed and the autoclave was left in the cold shuck for 35 mins before a pressure of 3242 psi was measured in the service van indicating that the autoclave had sealed around the in situ pressure. The autoclave was transferred to PCATS for core handling and processing. Core recovery was 9.7 ft (296 cm) as measured by X-ray image in PCATS. **Conducted core run: Core UT-GOM2-1-H005-06FB.** Good coring run with clean pick up from BHA and a sea floor 'cooling stop' for 15 mins. On recovery the ball valve was closed and the autoclave was left in the cold shuck for 35 mins before a pressure of 3250 psi was measured in the service van indicating that the autoclave had sealed around the in situ pressure. The autoclave was transferred to PCATS for core handling and processing. Core recovery was 9.4 ft (286 cm) as measured by X-ray image in PCATS. **Conducted core run: Core UT-GOM2-1-H005-07FB.** Good coring run with clean pick up from BHA and a sea floor 'cooling stop' for 15 mins. On recovery the ball valve was closed and the autoclave was left in the cold shuck for 46 mins before a pressure of 3164 psi was measured in the service van indicating that the autoclave had sealed around the in situ pressure. The set pressure for this deployment was made at 3000 psi and consequently there was no boost. The autoclave was transferred to PCATS for core handling and processing. Core recovery was 10.5 ft (321 cm) as measured by X-ray image in PCATS. **Conducted core run: Core UT-GOM2-1-H005-08FB.** Switched from drilling with seawater to drilling with 9.5 lb/gal mud. Good coring run but the pick up from BHA took multiple efforts before it cane free. The tool was stopped at the sea floor (cooling stop) for 15 mins. On recovery the ball valve was closed and the autoclave was left in the cold shuck for 77 mins before a pressure of 3016 psi was measured in the service van indicating that the autoclave had sealed around the set pressure indicating that the accumulator boost may have assisted sealing the autoclave. The autoclave was transferred to PCATS for core handling and processing. Core recovery was 8.2 ft (250 cm) as measured by X-ray image in PCATS.
	0130-0330	Core H005-04, F/ 8101 ft T/ 8111 ft.	
		POOH w/ PCTB-FB (recovered 10.5 ft, 3477 psi).	
	0330-0400	Gel sweep followed by seawater.	
	0400-0630	RIH w/ PCTB-FB.	
	0630-0800	Core H005-05, F/ 8111 ft T/ 8121 ft.	
		POOH w/ PCTB-FB (recovered 9.7 ft, 3242 psi).	
	0800-0900	Gel sweep followed by seawater	
	0900-1100	RIH w/ PCTB-FB.	
	1100-1230	Core H005-06, F/ 8121 ft T/ 8131 ft.	
		POOH w/ PCTB-FB (recovered 9.4 ft, 3250 psi).	
	1230-1300	Gel sweep followed by seawater	
	1300-1500	RIH w/ PCTB-FB.	
	1500-1700	Core H005-07, F/ 8131 ft T/ 8141 ft.	
		POOH w/ PCTB-FB (recovered 10.5 ft, 3164 psi).	
	1700-1830	Displaced hole w/ 9.5 ppg WBM, begin pump and dump w/ 9.5 ppg WBM.	
	1830-2000	RIH w/ PCTB-FB.	
	2000-2400	Core H005-08, F/ 8141 ft T/ 8151 ft.	
		POOH w/ PCTB-FB (recovered 8.2 ft, 3016 psi).	

20-May-17	0000-0230	Re-headed slick line.	Advanced Hole UT-GOM2-1-H005 from 8151 ft RKB to 8185 ft RKB with the acquisition of four pressure cores. **Conducted core run: Core UT-GOM2-1-H005-09FB.** Good coring run with a clean pick-up from the BHA with a 15 minutes autoclave cooling stop at the sea bed to experiment with further cooling of the autoclave. On recovery the ball valve was closed and the autoclave was left in the cold shuck for 55 minutes before a pressure of only 746 psi was measured in the service van. On this occasion the set pressure was 4015 psi and hence the boost did not function as expected and there was no accumulator function. The pressure was pumped up to 3250 psi before being transferred to PCATS. The DST recordings showed that autoclave did not seal until it close at the surface and was probably aided by at least partial dissociation of gas hydrates. Core recovery was 8.9 ft (270 cm) as measured by the X-ray image in PCATS (includes a number of voids). **Conducted core run: Core UT-GOM2-1-H005-10FB.** During the coring the cement pumps (mud pumps) stopped temporarily (~30 sec). At approximately 5 ft into formation bit reached very high torque (as much as 30 klbs) and released, causing the drill string to spin in reverse momentarily. Coring was discontinued immediately at this point. On recovery, the ball valve was closed but there was an indication there may be a slight leak (which proved to be wrong) and hence the tool was moved quickly out of the cold shuck to the service van where the pressure was found to be 3255 psi. It was then placed in the cold bath before being transferred to PCATS. A total of 1.4 ft (44 cm) of sediment was recovered. **Conducted core run: Core UT-GOM2-1-H005-11FB.** After the difficulties experienced during the last coring run, the main objective of Core UT-GOM2-1-H005-11FB was to advance through what is interpreted on the logs as a water bearing zone before another short gas hydrate interval beneath it. Consequently the pump rates were increased significantly at the expense of the core quality to ensure that a clean hole was developed for the next core (Core UT-GOM2-1-H005-12FB) which is back in a gas hydrate interval. The tool was deployed in the BHA before a core was cut using the 10.5 lb/gal mud. After picking up from BHA and retrieving to the rig floor the ball valve was closed and the autoclave was left in the cold shuck for 45 minutes before a pressure of 3002 psi was measured in the service van. The autoclave was placed in the cold bath while PCATS was being prepared. A total of 0.9 ft (26 cm) of sediment was recovered. **Conducted core run: Core UT-GOM2-1-H005-12FB.** The tool was deployed in the BHA before a core was cut using the 10.5 lb/gal mud. Weight and torque came on bit 1 ft early (above core point) hence the run was stopped after a 9 ft advance. Generally a good coring run with clean a pick up from BHA, however on recovery the ball valve was only half closed trapping sediment in the ball follower and hence having zero pressure. Core barrel was over-filled, with rabbit against top plug and core material across the ball valve. Recovery was 5.4 ft (165 cm).
		RIH w/ PCTB-FB.	
	0230-0630	Core H005-09, F/ 8151 ft T/ 8161 ft.	
		POOH w/ PCTB-FB (recovered 8.9 ft, 746 psi).	
		Fill/sweep hole with 10.5 ppg mud, begin pump and dump w/ 10.5 ppg WBM.	
	0630-1030	RIH w/ PCTB-FB.	
		Failed to latch in BHA.	
		POOH w/ PCTB-FB, remove broken latch pin.	
		RIH w/ PCTB-FB.	
	1030-1200	Core H005-010, F/ 8161 ft T/ 8166 ft.	
		POOH w/ PCTB-FB (recovered 1.4 ft, 3255 psi).	
		Sweep hole with 10.5 ppg mud.	
	1501-1811	M/V Mr Steven arrive/departed location.	
	1200-1600	RIH w/ PCTB-FB.	
	1600-1730	Core H005-011, F/ 8166 ft T/ 8176 ft.	
		POOH w/ PCTB-FB (recovered 0.9 ft, 3002 psi).	
		Sweep hole with 10.5 ppg WBM.	
	1730-2000	RIH w/ PCTB-FB.	
	2000-2400	Core H005-012, F/ 8176 ft T/ 8185 ft (partial core to accommodate for fill).	
		POOH w/ PCTB-FB (recovered 5.4 ft, 0 psi).	
		Sweep hole with 10.5 ppg WBM.	
21-May-17	0000-0030	RIH w/ PCTB-FB.	Advanced Hole UT-GOM2-1-H005 to the total depth of the hole at 8193 ft with the acquisition of pressure core Core UT-GOM2-1-H005-13-FB. **Conducted core run: Core UT-GOM2-1-H005-13FB.** Before the deployment of the PCTB-FB inner core barrel, a 3/8 inch hole was drilled in the middle barrel and the set boost pressure was raised above the in situ pressure to ~4000 psi. This modification was designed to test whether the additional flow path would help create a boost pressure. Good coring run with a clean pick-up from the BHA with a 15 minutes autoclave cooling stop at the sea bed to experiment with further cooling of the autoclave. After picking up from BHA and retrieving to the rig floor the ball valve was closed and an autoclave pressure of 2806 psi was measured in the service van. The autoclave was placed in the cold bath while PCATS was being prepared. Core recovery was 5.8 ft (175 cm) as measured by the X-ray image in PCATS. Conduct two uphole directional gyroscopic surveys from the 8100 ft RKB to the seafloor. **Wireline Log: Gyroscopic directional survey F/ 8100 ft RKB T/ surface (Run-1)** **Wireline Log: Gyroscopic directional survey F/ 8100 ft RKB T/ surface (Run-2)** Hole UT-GOM2-1-H005 was abandoned with the emplacement of a 500 ft cement plug that was set above the hydrate interval to avoid any potential problem associated with hydrate dissociation. Prepared and set cement plug in Hole UT-GOM2-1-H005 from a depth of 7900 ft RKB to 7400 ft RKB.
	0030-0230	Core H005-013FB, F/ 8185 ft T/ 8193 ft (partial core to accommodate for fill).	
		POOH w/ PCTB-FB (recovered 5.8 ft, 2806 psi).	
	0230-0800	RIH w/ gyroscopic survey tool.	
		Conduct up hole survey F/ 8100 ft T/ seafloor.	
		POOH w/ gyroscopic survey tool.	
		Review data, determine 2nd run required.	
		RIH w/ gyroscopic survey tool.	
		Conduct up hole survey F/8100 ft T/ seafloor.	
		POOH w/ gyroscopic survey tool.	
	0800-0930	Spot 28 bbls 11.5 ppg high-viscosity pad mud in bottom of hole.	
		POOH w/ bit T/ 7900 ft.	
	0930-1230	Pump 17 bbls of 10.5 ppg gel spacer.	
		BO cement head and load nerf ball.	
		Pump 3 bbl of 10.5 ppg spacer.	
		Pump 54.7 bbls of 16.4 ppg cement.	
		Pump 6.7 bbl of 10.5 ppg gel spacer.	
		Displace drill string with 180.7 bbls of seawater.	
	1230-1830	POOH w/ bit F/ 7900 ft T/ 6600 ft.	
		Flush drill string w/ 350 bbls of seawater and 2 nerf balls.	
		Waiting on cement.	
	1830-2230	RIH w/ bit T/ 7621 ft, unable to tag cement.	
	2230-2400	POOH w/ bit T/ 6800 ft.	
		Waiting on cement	
		Rig Movement Notification submitted.	
22-May-17	0000-0900	POOH w/ bit T/ 6600 ft (above mudline).	Re-entered Hole UT-GOM2-1-H005 to tag and test cement plug, tagged top of cement plug at 7691 ft RKB. Set down 15000lbs on top of cement plug. Began to backload project equipment to the supply vessel *HOS Red Rock.* Decision was made to set additional cement ontop of existing cement plug in Hole UT-GOM2-1-H005; with BHA at 1691 ft RKB, pumped 58 bbls cement slurry and bbls tail spacer.
		Waiting on cement	
		Flush DP with 250 bbls of seawater.	
	0900-1100	RIH w/ bit, tag top of cement at 7691 ft, apply 15,000 lbs WOB.	
	1004	M/V Red Rock on location.	
	1100-1200	POOH w/ bit T/ 7172 ft.	
	1200-1230	POOH w/ bit T/ 6868 ft.	
	1230-1330	Circulate 300 bbls 10.5 ppg WBM.	
	1330-1600	Backload project equipment to HOS Red Rock	
	1600-1730	RIH w/ bit T/ 7691 ft, tag cement, POOH to 7686 ft.	
	1730-2130	Backload project equipment to HOS Red Rock	
	2130-2400	Pump 96 bbls of 10.5 ppg WBM.	
		Pump 17 bbls of 10.5 ppg spacer.	
		Drop Nerf ball, pump 3 bbls of 10.5 ppg spacer.	
		Pump 58 bbls 16.4 ppg cement.	
		Pump 17 bbls 10.5 ppg spacer.	

23-May-17	0000-0100	Continue pumping spacer.	Demobilization operations continued throughout the day with the transferee of equipment to to the supply vessel *HOS Red Rock*. Borehole cementing operations in Hole UT-GOM2-1-H005 was completed and the drill string was was recovered and laid down as singles.
	0100-0345	POOH w/ bit to 5976 ft.	
		Flush drill string w/ 400 bbls seawater.	
	0345-1140	RIH w/ bit to 6674 ft.	
		Waiting on approval from BSEE to abandoned hole w/o tagging cement.	
		Transfer 340 bbls of 16.0 ppg WBM to M/V Red Rock.	
		Backload equipment to M/V Red Rock.	
		Receive approval.	
	1200-1300	POOH w/ bit to 6100 ft laying down singles.	
	1300-1330	WOW (lightning in area).	
	1330-2400	POOH to BHA laying down singles.	
		Break down BHA.	
		Conduct as-left site survey w/ ROV.	
24-May-17	0000-1200	Continue breaking down BHA.	Demobilization operations continued throughout the day with the transferee of equipment to to the supply vessel HOS Red Rock, which departed location 2337hr. The drill string was was recovered and laid down as singles. Geotek personnel and UT representative depart rig via helicopter. Q4000 Rig moved 1 nmi off location by midnight, end of lump sum demobilization.
		Backload BHA and DP.	
	0730	UT personnel depart rig via helicopter.	
	1200-2200	Backload project equipment.	
		Recover transponders.	
	1330	Geotek personnel and UT representative depart rig via helicopter.	
	2200-2400	Rig 1 nmi off location, end of lump sum demobilization.	
	2337	M/V HOS Red Rock departed location.	
25-May-17	0000-1230	M/V HOS Red Rock transiting from GG955 to Port of Fourchon, LA.	In the last 24 hours, completed UT-GOM2-1 demobilization operations with the arrival and offloading of the *M/V HOS Red Rock* in the Port of Fourchon, LA (Intermoor facilities). The pressure core storage van was offloaded by 1500 hr. From power disconnect to power hookhoop the transfer of the pressure core sample van took only 15 minutes. Also today, the UT and Geotek technical team meant to review and finalize the pressure core-cut, sampling, and degassing plans to be conducted at the PCATS/UT labs in Fourchon.
	1230-1300	M/V HOS Red Rock arrives InterMoor dock/facilities.	
	1300-1500	Offload project equipment.	
		PCATS system transfer, with pressure cores.	
		UT core processing lab transfer.	
	1500-2400	Setup PCATS and UT core labs.	
		Weekly activity report submitted.	
26-May-17	0000-1100	Setup PCATS and UT core labs.	Setup of Geotek and UT labs at Intermoor were completed. UT continued to work on the expedition report, planning degassing activities, and preparing to ship geochemistry and microbiology samples. Geotek began PCATS scanning and cutting of Core UT-GOM2-1-H005-10FB.
	1100-2400	PCATS operation.	
27-May-17	0000-2400	PCATS and degassing operations.	Geotek worked on scanning and cutting of Cores UT-GOM2-1-H005-11FB and 04FB. Geotek/UT began quantitative degassing of two sections from Core UT-GOM2-1-H005-10FB.
	1000	Delivery of over pack container.	
28-May-17	0000-2400	PCATS and degassing operations	Geotek worked on scanning and cutting of Core UT-GOM2-1-H005-4FB and Core UT-GOM2-1-H005-5FB. Geotek worked on preparing the overpack unit for the first shipment of 1.2 m storage vessels to UT. UT finished quantitative degassing of two sections from Core UT-GOM2-1-H005-10FB and began quantitative degassing of 5 sections from Core UT-GOM2-1-H005-4FB, and completed one of these sections. Gases were sampled for post-cruise analysis and the remaining sediment after degassing was processed through the mud lab.
29-May-17	0000-2400	PCATS and degassing operations	Geotek worked on scanning and cutting of Core Core UT-GOM2-1-H005-5FB. It was determined that seals need to be purchased and replaced in PCATS and PCATS operation was paused. Geotek worked on preparing the overpack unit for the first of three shipments of storage vessels to Austin. The truck arrived and began transport with an expected arrival the next day 30 May 2017. UT finished quantitative degassing of two sections from Core UT-GOM2-1-H005-4FB and continued degassing two additional sections. Gases were sampled for post-cruise analysis and remaining sediment after degassing was processed through the mud lab.
	0000-1100	Preparation of over pack for shipping	
	1115	Over pack departure	
	1115-2400	PCATS and degassing operations	
30-May-17			
31-May-17		H002 and H005 end of operations reports submitted.	

Appendix B. UT Daily Operational and Science Reports

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 30-May-2017, 0000-2400hr

2. LOCATION:
0000-2400
Intermoor, Port Fourchon
540 Dudley Bernard Road
Fourchon, LA 70357

3. DESCRIPTION OF OPERATIONS:
0600-1200 Locate seals for PCATS in New Orleans
1400-1800 Replace seals in PCATS
1800-2400 PCATS operations
0000-2400 Ongoing degassing experiments

4. OPERATIONAL PLAN (Next 24 Hours):
Continue PCATS and degassing activities. Visit of DOE and UT personnel.

5. DOWNHOLE LOGGING OPERATIONS:
No additional log data were acquired over the last 24 hr.

6. CORE DATA:
No additional cores were acquired over the last 24 hr.

7. Science Activities
Geotek worked on obtaining and replacing seals for PCATS. UT continued quantitative degassing of two core sections UT-GOM2-1-H005-4FB-3 and -4, and began to measure samples for grain size analysis. UT continued to work on the expedition report. Back at UT, the first batch of pressure core storage vessels arrived at the UT Pressure Core Center at 0800 hr.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 31-May-2017, 0000-2400hr

2. LOCATION:
0000-2400
Intermoor, Port Fourchon
540 Dudley Bernard Road
Fourchon, LA 70357

3. DESCRIPTION OF OPERATIONS:
0000-2400 PCATS and degassing operations

4. OPERATIONAL PLAN (Next 24 Hours):
Continue PCATS and degassing activities. Loading and departure of the second batch of pressure core storage vessels.

5. DOWNHOLE LOGGING OPERATIONS:
No additional log data were acquired over the last 24 hr.

6. CORE DATA:
No additional cores were acquired over the last 24 hr.

7. Science Activities
Geotek worked on scanning and cutting of Cores UT-GOM2-1-H005-7FB and -8FB. The overpack unit was returned to Fouchon from Austin after the first delivery of cores. Geotek worked on preparing the overpack unit for the second of three shipments of storage vessels to Austin. UT continued quantitative degassing of core sections UT-GOM2-1-H005-4FB-3 and -4, and made additional grain size measurements. UT continued to work on the expedition report. DOE and UT personnel arrived today for a tour of the labs and a discussion of expedition results. Junbong Jang from the USGS arrived and joined the science party.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 23-May-2017, 0000-2400hr

2. LOCATION:

0000 – 2400 hr, 23-May-2017
Hole UT-GOM2-1-H005
Location: Lat: 27° 00.04665', Long: -90° 25.59125' (WGS 84)
Water depth: 6666.0 ft (6718.0 ft RKB)
Per Datum: RKB 52.0 ft above SL

3. DESCRIPTION OF OPERATIONS:

0000-0100	At Hole UT-GOM2-1-H005 Continue borehole cementing operations Cementer continued pumping 171.4 bbl of seawater
0100-0345	Cement in place ETOC 7391 ft RKB POOH F/7685 ft RKB T/5976 ft RKB BHA clear of seafloor Flushed drillstring with 400 bbls seawater
0345-11:39	RIH BHA F/5976 ft RKB T/6674 ft RKB Standby at 6674 ft RKB waiting on BSEE approval
11:39	Received BSEE approval to abandon Site 005 without tagging cement as per revised APM.
1200-1300	JSA with personnel involved in POOH POOH F/6674 ft RKB T/6100 ft RKB
1300-1330	Waiting on weather due to lightning
1330-2400	POOH F/6100 ft RKB T/203 ft RKB JSA for personnel involved in breaking down the BHA Continue to breakdown BHA

4. OPERATIONAL PLAN (Next 24 Hours):

Continue demobilization of project equipment and people from *D/V Q4000.*

5. DOWNHOLE LOGGING OPERATIONS:

No additional log data were acquired over the last 24 hr.

6. CORE DATA:

No additional cores were acquired over the last 24 hr.

7. Science Activities

Demobilization operations continued throughout the last 24 hours with the transfer of equipment to the *HOS Red Rock.* Borehole cementing operations in Hole UT-GOM2-1-H005 was completed.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 24-May-2017, 0000-2400hr

2. LOCATION:
0000 – 2400 hr, 24-May-2017
Hole UT-GOM2-1-H005
Location: Lat: 27° 00.04665', Long: -90° 25.59125' (WGS 84)
Water depth: 6666.0 ft (6718.0 ft RKB)
Per Datum: RKB 52.0 ft above SL

3. DESCRIPTION OF OPERATIONS:
0000-1200 At Hole UT-GOM2-1-H005
JSA for personnel involved in breaking down the BHA
Continue to breakdown BHA
Backload BHA and DP
1200-2200 Backload project equipment to the *M/V HOS Red Rock*
Recover compatts
2200-2400 D/V Q4000 moved to one mile off location
M/V HOS Red Rock depart location
2400 hrs - End of Lump sum demobilization

4. OPERATIONAL PLAN (Next 24 Hours):
Transfer project equipment and cores to the Port of Fourchon, LA via *M/V Red Rock*, ETA 1430 hrs on 5/25/17

5. DOWNHOLE LOGGING OPERATIONS:
No additional log data were acquired over the last 24 hr.

6. CORE DATA:
No additional cores were acquired over the last 24 hr.

7. Science Activities
Demobilization operations continued throughout the last 24 hours with the transfer of equipment to the *HOS Red Rock*, which departed location 2337hr.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 25-May-2017, 0000-2400hr

2. LOCATION:

0000 – 1330 hr, 25-May-2017
***M/V HOS Red Rock* transiting from GG985 to the Port of Fourchon, LA**
1330 – 2400 hr, 25-May-2017
Intermoor, Port of Fourchon
540 Dudley Bernard Road
Fourchon, LA 70357

3. DESCRIPTION OF OPERATIONS:

0000-1230 *M/V HOS Red Rock* transiting from GG985 to Port of Fourchon, LA
1230-1300 Arrive Intermoor dock/facilities
1300-1500 Offload project equipment
PCATS system transfer, with pressure cores
UT core processing lab transfer
1500-2400 Setup PCATS and UT core labs

4. OPERATIONAL PLAN (Next 24 Hours):

Complete setup and PCATS/UT lab setup at Intermoor, begin processing pressure cores by about 1300 hr. Complete offloading of HOS Red Rock mud boat. Move HOS Red Rock to Francis Drilling Fluids (FDF) to offload the excess mud & cement followed by tank cleaning operations.

5. DOWNHOLE LOGGING OPERATIONS:

No additional log data were acquired over the last 24 hr.

6. CORE DATA:

No additional cores were acquired over the last 24 hr.

7. Science Activities

In the last 24 hours, completed UT-GOM2-1 demobilization operations with the arrival and offloading of the *M/V HOS Red Rock* in the Port of Fourchon, LA (Intermoor facilities). The pressure core storage van was offloaded by 1500 hr. From power disconnect to power hookhoop the transfer of the pressure core sample van took only 15 minutes. Also today, the UT and Geotek technical team met to review and finalize the pressure core cut, sampling, and degassing plans to be conducted at the PCATS/UT labs in Fourchon.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 26-May-2017, 0000-2400hr

2. LOCATION:
0000-2400
Intermoor, Port of Fourchon
540 Dudley Bernard Road
Fourchon, LA 70357

3. DESCRIPTION OF OPERATIONS:
0000-1100 Setup PCATS and UT core labs
1100-2400 PCATS operation

4. OPERATIONAL PLAN (Next 24 Hours):
Continue PCATS and degassing activities.

5. DOWNHOLE LOGGING OPERATIONS:
No additional log data were acquired over the last 24 hr.

6. CORE DATA:
No additional cores were acquired over the last 24 hr.

7. Science Activities
Setup of Geotek and UT labs at Intermoor were completed. UT continued to work on the expedition report, planning degassing activities, and preparing to ship geochemistry and microbiology samples. Geotek began PCATS scanning and cutting of Core UT-GOM2-1-H005-10FB.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 27-May-2017, 0000-2400hr

2. LOCATION:
0000-2400
Intermoor, Port of Fourchon
540 Dudley Bernard Road
Fourchon, LA 70357

3. DESCRIPTION OF OPERATIONS:
0000-2400 PCATS and degassing operations
1000 Delivery of overpack container

4. OPERATIONAL PLAN (Next 24 Hours):
Continue PCATS and degassing activities.

5. DOWNHOLE LOGGING OPERATIONS:
No additional log data were acquired over the last 24 hr.

6. CORE DATA:
No additional cores were acquired over the last 24 hr.

7. Science Activities
Geotek worked on scanning and cutting of Cores UT-GOM2-1-H005-11FB and 04FB. Geotek/UT began quantitative degassing of two sections from Core UT-GOM2-1-H005-10FB. UT continued to work on the expedition report.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 28-May-2017, 0000-2400hr

2. LOCATION:
0000-2400
Intermoor, Port Fourchon
540 Dudley Bernard Road
Fourchon, LA 70357

3. DESCRIPTION OF OPERATIONS:
0000-2400 PCATS and degassing operations

4. OPERATIONAL PLAN (Next 24 Hours):
Continue PCATS and degassing activities.

5. DOWNHOLE LOGGING OPERATIONS:
No additional log data were acquired over the last 24 hr.

6. CORE DATA:
No additional cores were acquired over the last 24 hr.

7. Science Activities
Geotek worked on scanning and cutting of Cores UT-GOM2-1-H005-4FB and -5FB. Geotek worked on preparing the overpack unit for the first shipment of 1.2 m storage vessels to UT. UT finished quantitative degassing of core sections UT-GOM2-1-H005-10FB-2 and -3, and began quantitative degassing core sections UT-GOM2-1-H005-4FB-2, -3, -4, -5, and -7, completing section UT-GOM2-1-H005-4FB-5. Gases were sampled for post-cruise analysis and the remaining sediment after degassing was processed through the mud lab. UT continued to work on the expedition report.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 29-May-2017, 0000-2400hr

2. LOCATION:
0000-2400
Intermoor, Port Fourchon
540 Dudley Bernard Road
Fourchon, LA 70357

3. DESCRIPTION OF OPERATIONS:
0000-2400 PCATS and degassing operations
0000-1100 Preparation of overpack for shipping
1115 Overpack departure

4. OPERATIONAL PLAN (Next 24 Hours):
Continue PCATS and degassing activities.

5. DOWNHOLE LOGGING OPERATIONS:
No additional log data were acquired over the last 24 hr.

6. CORE DATA:
No additional cores were acquired over the last 24 hr.

7. Science Activities
Geotek worked on scanning and cutting of Core UT-GOM2-1-H005-5FB. It was determined that seals need to be purchased and replaced in PCATS and PCATS operation was paused. Geotek worked on preparing the overpack unit for the first of three shipments of storage vessels to Austin. The truck arrived in Fourchon and began transport with an expected arrival in Austin the next day 30 May 2017. UT finished quantitative degassing of core sections UT-GOM2-1-H005-4FB-2 and -7, while continuing to degas core sections UT-GOM2-1-H005-4FB-3 and -4. Gases were sampled for post-cruise analysis and remaining sediment after degassing was processed through the mud lab. UT continued to work on the expedition report.

2230-2400 POOH BHA F/7621 ft RKB T/6800 ft RKB
Waiting on cement

4. OPERATIONAL PLAN (Next 24 Hours):
Complete P&A operations in Hole UT-GOM2-1-H005. Begin demobilization of project equipment and people from *D/V Q4000.*

5. DOWNHOLE LOGGING OPERATIONS:
Wireline Log: Gyroscopic directional survey F/8100 ft RKB T/surface (Run-1)
Wireline Log: Gyroscopic directional survey F/8100 ft RKB T/surface (Run-2)

6. CORE DATA:
PCTB-FB Coring (pressure coring) Totals: 1 core, 8 ft cored; 5.8 ft recovery.

Core UT-GOM2-1-H005-13FB
F/8185 ft RKB T/8193 ft RKB: Recovered: 5.8 ft, 2806 psi
Performed coring operations F/8185 ft RKB T/8193 ft RKB
Drilling/Coring Parameters: 60 RPM w/2-5 K lb torque and Cement Pump circulating 10.5 ppg WBM at 61-105 gpm, ROP 34 ft/hr, WOB 4 tons, with O-ring seals in the diverter.
Before the deployment of the PCTB-FB inner core barrel, a 3/8 inch hole was drilled in the middle barrel and the set boost pressure was raised above the in situ pressure to ~4000 psi. This modification was designed to test whether the additional flow path would help create a boost pressure. Good coring run with a clean pick-up from the BHA with a 15 minutes autoclave cooling stop at the sea bed to experiment with further cooling of the autoclave. After picking up from BHA and retrieving to the rig floor the ball valve was closed and an autoclave pressure of 2806 psi was measured in the service van. The autoclave was placed in the cold bath while PCATS was being prepared. Core recovery was 5.8 ft (177 cm) as measured by the X-ray image in PCATS.

7. Science Activities
The onboard Scientific Party continued to process data and write reports from Holes UT-GOM2-1-H002 and UT-GOM2-1-H005. In the Geotek degassing lab, the controlled degassing of Sections 1 and 3 from Core UT-GOM2-1-H005-09FB were completed, chambers were emptied and cleaned, and the sediment residues were provided to UT for curation. Conventionalized core from UT-GOM2-1H005-12FB was sampled by UT for geochemistry, microbiology, and physical properties. After the early difficulties extracting Core UT-GOM2-1-H005-10FB from the autoclave in PCATS, a core 'fishing tool' was manufactured and the core was recovered with a length of 2.4 ft (72 cm). This included 2 pieces of core which are interpreted as gas hydrate rich with P-wave velocities over 3000 m/s; this sample was stored in a storage chamber. Core UT-GOM2-1-H005-13FB, after waiting for a while in the cold bath, the core was extracted in PCATS where the recorded recovery was 5.8 ft (176 cm); this core also produced some high quality samples consisting of what is interpreted as interbedded gas hydrate saturated sandy intervals with P-wave velocities up to 3300 m/s. PCATS scans of Core UT-GOM2-1-H005-11FB revealed only 0.9

(27 cm) of washed sediments, which is not a surprise considering the high pump rates required to safely penetrate this apparent unconsolidated water-wet stratigraphic section.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 22-May-2017, 0000-2400hr

2. LOCATION:

0000 – 2400 hr, 22-May-2017
Hole UT-GOM2-1-H005
Location: Lat: 27° 00.04665', Long: -90° 25.59125' (WGS 84)
Water depth: 6666.0 ft (6718.0 ft RKB)
Per Datum: RKB 52.0 ft above SL

3. DESCRIPTION OF OPERATIONS:

0000-0900	At Hole UT-GOM2-1-H005
	Continue borehole cementing operation
	POOH BHA above mudline F/6800 ft RKB T/6600 ft RKB
	Waiting on cement
	Flush DP with 250 bbls of seawater
0900-1100	RIH BHA F/6600 ft RKB T/7691 ft RKB
	Tagged Top of Cement and set down at 15K WOB
1100-1200	POOH BHA F/7691 ft RKB T/7172 ft RKB
1200-1230	POOH BHA F/7172 ft RKB T/6868 ft RKB
1230-1330	Circulate 10.5 ppg WBM – 300 bbls
1330-1600	Backload project equipment to HOS Red Rock
1600-1730	RIH BHA F/6868 ft RKB T/7691 ft RKB
	Tagged Top of Cement and PU 5 ft
1730-2130	Backload project equipment to HOS Red Rock
2130-2200	JSA with personnel involved with performing cement job
2200-2400	Pumped 96 bbls of 10.5 ppg WBM
	Cementer performed pressure test of deck iron to 3,000 psi visual
	Cementer pumped 17 bbls of 10.5 ppg spacer at 4 bpm
	Nerf ball in DP and cementer pumped 3 bbls of 10.5 ppg spacer
	Cementer cleaned cement unit and caught mix water
	Cementer mixed 16.4 ppg class H cement
	Cementer pumped 58 bbls cement slurry
	Cementer pumped 17 bbls tail spacer

4. OPERATIONAL PLAN (Next 24 Hours):

Complete P&A operations in Hole UT-GOM2-1-H005. Continue demobilization of project equipment and people from *D/V Q4000.*

5. DOWNHOLE LOGGING OPERATIONS:

No additional log data were acquired over the last 24 hr.

6. CORE DATA:

No additional cores were acquired over the last 24 hr.

7. Science Activities

The boarding of University of Texas scientists on the *D/V Q4000* more than 23 days ago in Brownsville, Texas not only marked the start of the "UT-GOM2-1: Hydrate Pressure Coring Expedition," it also represented a critical milestone in the engineering and scientific research needed to understanding the role that gas hydrates map play as a potential energy resource, as a geohazard, or as an agent of climate change. The primary goal of UT-GOM2-1 expedition is to conduct a systematic and rigorous field marine test of the DOE Pressure Coring Tool with Ball Valve (PCTB) system. The UT-GOM2-1 expedition has featured the test of two unique designs of the PCTB system, often referred to the cutting shoe (CS) and face bit (FB) versions. Hole UT-GOM2-1-H002, which was spud on 11-May-17 and completed on 17-May-17, featured the test of the PCTB-CS tool through a series of flow and full-function tests in the drill pipe as it was suspended from the drilling vessel. PCTB-CS tool was also deployed a total of 8 times with only one of the deployments returning a pressurized core to the ship. However, all 8 of the PCTB-CS deployments recovered sediment cores (see below the composite well log and core recovery display for Hole UT-GOM2-1-H002). Hole UT-GOM2-1-H005, which was spud on 17-May-17 and completed on 23-May-17, featured the test of the PCTB-FB tool. The testing plan for Hole UT-GOM2-1-H005 also included a series of full-function tests of the PCTB-FB tool in the drill pipe. The PCTB-FB was deployed a total of 13 times and returned to the ship 12 cores under pressurized conditions. As shown below in the composite well log and core recovery displays for Hole UT-GOM2-1-H005, the core recovery for most of the runs was very high and for the most part the entire gas hydrate-bearing reservoir section was sampled with the PCTB-FB pressure core system.

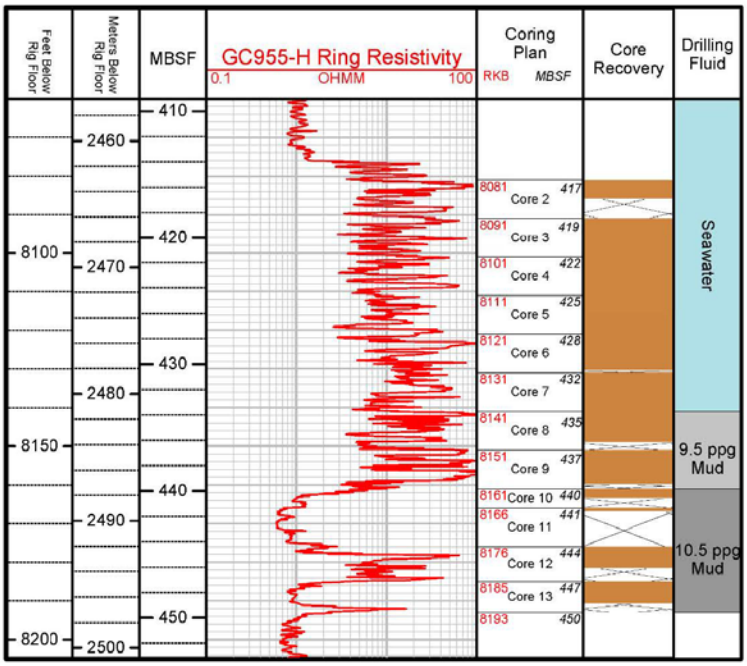
All of the cores recovered at pressure during UT-GOM2 have been processed through the onboard Geotek Pressure Core Analysis and Transfer System (PCATS) lab to perform a preliminary characterization of the cores. These core studies have included core logging of physical properties and X-ray imaging of the recovered cores. The PCATS has also been used to subsample a portion of the recovered pressure cores under conditions where hydrates are stable. The PCATS system has also been used to transfer some number of samples to pressurized storage chambers. A limited number of subsamples have undergone quantitative degassing to determine hydrate concentrations.

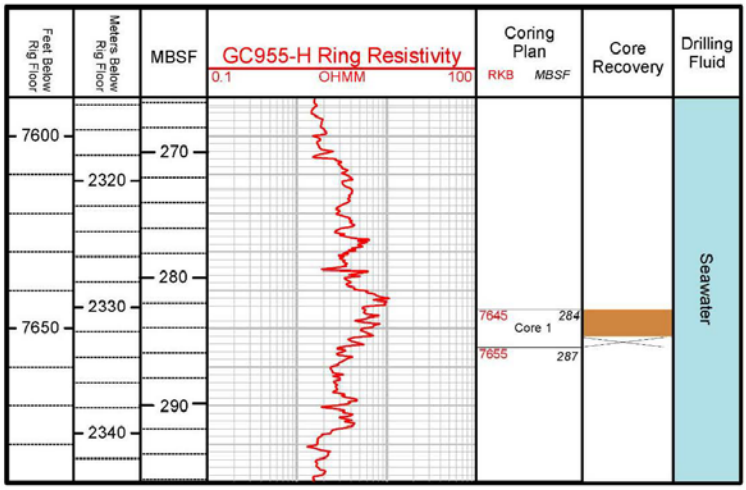
With the approaching end of the UT-GOM2-1 expedition, we now see the transition to the next and equally challenging stage of this project with the transfer of recovered and preserved pressure core samples to the UT shore-based pressure core laboratory that will be established in the Port Fourchon, Louisiana. PCATS data is now being interpreted in preparation for generating core cut plans for the work at the port. It is expected that the pressure core processing laboratory in Port Fourchon will be operational for about two weeks, after which approximately 20 (1.2-m-long) pressure core samples and an unprecedented number of conventionalized core samples will be transferred to University of Texas at Austin (UT). We will analyze these cores at the UT Pressure Core Center (PCC) and distribute them to the USGS Woods Hole, the National Energy Technology Laboratory, and others. Additional CT scans and quantitative degassing experiments are planned for Port

Fourchon. Depressurized (conventionalized) cores will be shipped to Ohio State University, University of Washington, Oregon State University, ExxonMobil, USGS Woods Hole, UT and other institutions.

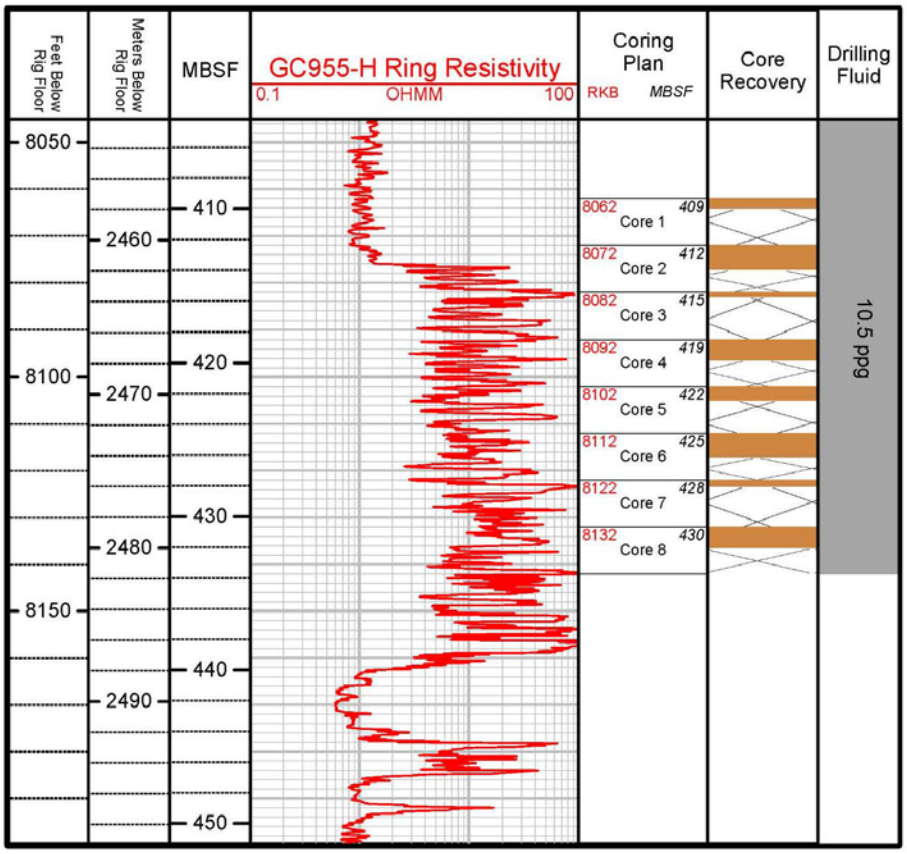
Special thanks are extended to the crew of the Helix *D/V Q4000* for their unyielding support of this project and for their commitment to running a safe and efficient scientific expedition.

Hole UT-GOM2-1-H005





Hole UT-GOM2-1-H002



Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 20-May-2017, 0000-2400hr

2. LOCATION:

0000 – 2400 hr, 20-May-2017
Hole UT-GOM2-1-H005
Location: Lat: 27° 00.04665', Long: -90° 25.59125' (WGS 84)
Water depth: 6666.0 ft (6718.0 ft RKB)
Per Datum: RKB 52.0 ft above SL

3. DESCRIPTION OF OPERATIONS:

0000-0230 At Hole UT-GOM2-1-H005
Prepare for coring operations Core UT-GOM2-1-H005-09
Re-headed slick line
MU PCTB-FB core barrel
RIH with core barrel
POOH running tool
RIH pulling tool

0230-0630 **Core UT-GOM2-1-H005-09, F/8151 T/8161 ft MD: Recovered 10.5 ft, 746 psi**
POOH pulling tool with PCTB-FB inner barrel
Upon recovery stabbed into vertical cold shuck
Upon inspection of core barrel was confirmed to be pressurized (low pressure)
Sweep hole with 10.5 ppg mud using Hex Pump 2

0630-1030 Prepare for coring operations Core UT-GOM2-1-H005-10
Change out PCTB pressure control system
MU PCTB-FB core barrel
RIH with core barrel
Unable to latch PCTB-FB inner core barrel in BHA
POOH PCTB-FB inner core barrel
Remove broken latch pin
RIH with core barrel
POOH running tool
RIH pulling tool

1030-1200 **Core UT-GOM2-1-H005-010, F/8161 T/8166 ft MD: Recovered NA ft, 3255 psi**
BHA experienced high torque, stalled, and limited spring-back rotation
POOH pulling tool with PCTB-FB inner barrel
Upon recovery stabbed into vertical cold shuck
Upon inspection of core barrel was confirmed to be pressurized
Sweep hole with 10.5 ppg mud using Hex Pump 2

1200-1600 Prepare for coring operations Core UT-GOM2-1-H005-11
MU PCTB-FB core barrel
RIH with core barrel
POOH running tool
RIH pulling tool

1600-1730 **Core UT-GOM2-1-H005-011, F/8166 T/8176 ft MD: Recovered NA ft, 3002 psi**
POOH pulling tool with PCTB-FB inner barrel
Upon recovery stabbed into vertical cold shuck
Upon inspection of core barrel was confirmed to be pressurized
Sweep hole with 10.5 ppg mud using Hex Pump 2
1730-2000 Prepare for coring operations Core UT-GOM2-1-H005-12
MU PCTB-FB core barrel
RIH with core barrel
POOH running tool
RIH pulling tool
2000-2400 **Core UT-GOM2-1-H005-012, F/8176 T/8185ft MD: Recovered 5.7 ft, 0 psi**
Partial core throw to accommodate for borehole fill
POOH pulling tool with PCTB-FB inner barrel
Upon recovery stabbed into vertical cold shuck
Upon inspection of core barrel was confirmed not to be pressurized
Sweep hole with 10.5 ppg mud using Hex Pump 2

4. OPERATIONAL PLAN (Next 24 Hours):

Continue coring to the next core point at 8185 ft RKB and ultimately acquire up to 13 cores to the bottom of Hole UT-GOM2-1-H005. Complete directional survey and P&A Hole UT-GOM2-1-H005.

5. DOWNHOLE LOGGING OPERATIONS:

No additional log data acquired over the last 24 hr.

6. CORE DATA:

PCTB-FB Coring (pressure coring) Totals: 4 cores, 39 ft cored; [pending] ft recovery.

Core UT-GOM2-1-H005-09FB
F/8151 ft RKB T/8161 ft RKB: Recovered: 10.5 ft, 746 psi
Performed coring operations F/8151 ft MD T/8161 ft MD
Drilling/Coring Parameters: 60 RPM w/5-6 K lb torque and Cement Pump circulating 9.5 ppg WBM at 84 gpm, ROP 40 ft/hr, WOB 5 tons, with O-ring seals in the diverter.
Good coring run with a clean pick-up from the BHA with a 15 minutes autoclave cooling stop at the sea bed to experiment with further cooling of the autoclave. On recovery the ball valve was closed and the autoclave was left in the cold shuck for 55 minutes before a pressure of only 746 psi was measured in the service van. On this occasion the set pressure was 4015 psi and hence the boost did not function as expected and there was no accumulator function. The pressure was pumped up to 3250 psi before being transferred to PCATS. The DST recordings showed that autoclave did not seal until it close at the surface and was probably aided by at least partial dissociation of gas hydrates. Core recovery was 321 cm as measured by the X-ray image in PCATS (includes a number of voids).

Core UT-GOM2-1-H005-10FB
F/8161 ft RKB T/8166 ft RKB: Recovered: [pending] ft, 3255 psi
Performed coring operations F/8161 ft MD T/8166 ft MD
Drilling/Coring Parameters: 60 RPM w/2-5 K lb torque and Cement Pump circulating 10.5 ppg WBM at 42-80 gpm, ROP 33 ft/hr, WOB 10 tons, with O-ring seals in the diverter.
During the coring the cement pumps (mud pumps) stopped temporarily (~30 sec). At approximately 5 ft into formation bit reached very high torque (as much as 30 klbs) and released, causing the drill string to spin in reverse momentarily. Coring was discontinued immediately at this point. On recovery, the ball valve was closed but there was an indication there may be a slight leak (which proved to be wrong) and hence the tool was moved quickly out of the cold shuck to the service van where the pressure was found to be 3255 psi. It was then placed in the cold bath before being transferred to PCATS.

Core UT-GOM2-1-H005-11FB
F/8166 ft RKB T/8176 ft RKB: Recovered: Recovered [pending] ft, 3002 psi
Performed coring operations F/8166 ft MD T/8176 ft MD
Drilling/Coring Parameters: 60 RPM w/2-5 K lb torque and Cement Pump circulating 10.5 ppg WBM at 210 gpm, ROP 22-46 ft/hr, WOB 5 tons, with O-ring seals in the diverter.
After the difficulties experience during the last core the main objective of Core UT-GOM2-1-H005-11FB was to advance through what is interpreted on the logs as a water bearing zone before another short gas hydrate interval beneath it. Consequently the pump rates were increased significantly at the expense of the core quality to ensure that a clean hole was developed for the next core (Core UT-GOM2-1-H005-12FB) which is back in a gas hydrate interval. The tool was deployed in the BHA before a core was cut using the 10.5 lb/gal mud. After picking up from BHA and retrieving to the rig floor the ball valve was closed and the autoclave was left in the cold shuck for 45 minutes before a pressure of 3002 psi was measured in the service van. The autoclave was placed in the cold bath while PCATS was being prepared.

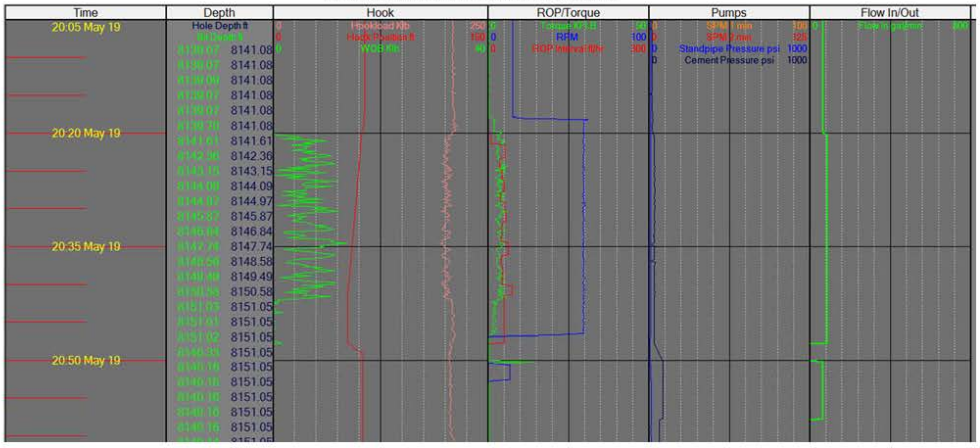
Core UT-GOM2-1-H005-12FB
F/8176 ft RKB T/8185 ft RKB: Recovered: Recovered 5.7 ft, 0 psi
Performed coring operations F/8176 ft MD T/8185 ft MD
Drilling/Coring Parameters: 60 RPM w/2-5 K lb torque and Cement Pump circulating 10.5 ppg WBM at 61-122 gpm, ROP 22 ft/hr, WOB 5 tons, with O-ring seals in the diverter.
The tool was deployed in the BHA before a core was cut using the 10.5 lb/gal mud. Weight and torque came on bit 1 ft early (above core point) hence the run was stopped after a 9 ft advance. Generally a good coring run with clean a pick up from BHA, however on recovery the ball valve was only half closed trapping sediment in the ball follower and hence having zero pressure. Core barrel was over-filled, with rabbit against top plug and core material across the ball valve. Recovery was 1.75 m.

7. Science Activities

The onboard Scientific Party continued to process data and write reports from Holes UT-GOM2-1-H002 and UT-GOM2-1-H005. Conventionalized core samples from Core UT-GOM2-1-H005-12FB were transferred to the onboard UT core lab for processing and subsampling. Core UT-GOM2-1-H005-09FB was logged in PCATS at a total length 321 cm but including voids created during partial gas hydrate dissociation. This core was cut into 4 sections with one transferred to a 1.2 m storage chamber. Sections 2 and 4 were put on degassing manifolds and Section 3 was kept for long term storage as a possible experimental core for transport to UT. Despite partial dissociation, the degassing experiments have produced large volumes of gas, and gas samples have been collected for onboard and onshore analyses. PCATS and drilling fluid samples have continued to be collected for contamination control.

Rotary coring is accomplished by the manipulation of numerous drilling parameters that are designed to maintain safe operations and to yield in this expedition high quality pressure cores. To help visualize how the rotary core process works, the computer capture of the "real-time" Weatherford generated drillers displays of the acquisition of the Core UT-GOM2-1-H005-08 (cored from 8141 to 8151 ft MD, yielded a 8.2 ft long core at a pressure of 3016 psi) has been shown below in this report. As shown the core cutting event started at about 2020 hr ended about 23 minutes later at about 2043 hr. In this case, the flow rate of the drilling fluid (which was sea water) being pumped down the drill pipe was set at 65 gpm. The driller, by regulating the amount of weight that is applied to the drill bit (WOB) at the bottom of hole and the drilling fluid (mud) flow rate they can control rate of which the hole is advanced (ROP) and how much torque the formation transfers back onto the drill bit. In the example below we see a relatively uniform ROP and weight on bit that generally will yield a high quality core.

Core UT-GOM2-1-H005-08



Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 21-May-2017, 0000-2400hr

2. LOCATION:

0000 – 2400 hr, 21-May-2017
Hole UT-GOM2-1-H005
Location: Lat: 27° 00.04665', Long: -90° 25.59125' (WGS 84)
Water depth: 6666.0 ft (6718.0 ft RKB)
Per Datum: RKB 52.0 ft above SL

3. DESCRIPTION OF OPERATIONS:

0000-0030 At Hole UT-GOM2-1-H005
Prepare for coring operations for Core UT-GOM2-1-H005-13FB
MU PCTB-FB core barrel
RIH with core barrel
POOH running tool
RIH pulling tool

0030-0230 **Core UT-GOM2-1-H005-013FB, F/8185 T/8193ft RKB: Recovered 5.8 ft, 2806 psi**
Partial core throw to accommodate for borehole fill
POOH pulling tool with PCTB-FB inner barrel
Upon recovery stabbed into vertical cold shuck
Upon inspection of core barrel was confirmed to be pressurized

0230-0800 MU gyroscopic directional survey logging tool
RIH gyroscopic survey tool F/6718 ft RKB T/8100 ft RKB (in DP)
Conduct uphole gyroscopic survey F/8100 ft RKB T/surface (Run-1)
RIH gyroscopic survey tool F/6718 ft RKB T/8100 ft RKB
Conduct uphole gyroscopic survey F/8100 ft RKB T/surface (Run-2)
RD slickline

0800-0930 Prepare to set cement plug in Hole UT-GOM2-1-H005
Pump and spot 11.5 ppg high-viscosity mud at bottom of hole
POOH BHA F/8193 ft RKB T/7900 ft RKB
JSA with personnel involved in performing cement job

0930-1230 Set cement plug in Hole UT-GOM2-1-H005
Conduct pressure test of surface equipment
Pump 17 bbls of 10.5 ppg gel spacer
BO cement head and load nerf ball
Pump 3 bbl of 10.5 ppg spacer
Mix and pump 54.7 bbls of 16.4 ppg cement
Set cement plug F/7400 ft RKB T/7900 ft RKB
Pump 6.7 bbl of 10.5 ppg gel spacer
Pump 180.7 bbls of seawater

1230-1830 POOH BHA F/7900 ft RKB T/6600 ft RKB
Flush DP with 350 bbls of seawater and 2 nerf balls

1830-2230 RIH BHA F/6600 ft RKB T/7621 ft RKB unable to tag cement

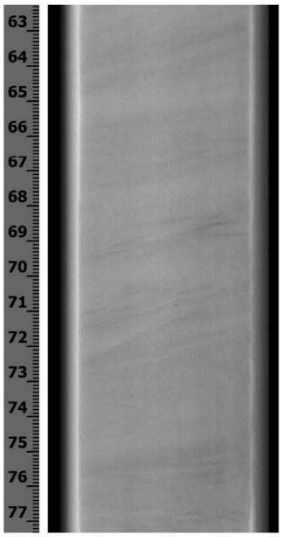


Figure 1. Example PCATS X-ray image from Core UT-GOM2-1-H005-2FB.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 19-May-2017, 0000-2400hr

2. LOCATION:

0000 – 2400 hr, 19-May-2017
Hole UT-GOM2-1-H005
Location: Lat: 27° 00.04665', Long: -90° 25.59125' (WGS 84)
Water depth: 6666.0 ft (6718.0 ft RKB)
Per Datum: RKB 52.0 ft above SL

3. DESCRIPTION OF OPERATIONS:

0000-0130 Prepare for coring operations UT-GOM2-1-H005-04
MU PCTB-FB core barrel
RIH with core barrel
RIH with pulling tool
0130-0330 **Core UT-GOM2-1-H005-04, F/8101 T/8111 ft MD: Recovered 10.5 ft, 3477 psi**
Upon recovery stabbed into vertical cold shuck
Upon inspection of core barrel was confirmed to be pressurized
0330-0400 Gel sweep followed by seawater
0400-0630 Prepare for coring operations UT-GOM2-1-H005-05
MU PCTB-FB core barrel
RIH with core barrel
RIH with pulling tool
0630-0800 **Core UT-GOM2-1-H005-05, F/8111 T/8121 ft MD: Recovered 9.7 ft, 3242 psi**
Upon recovery stabbed into vertical cold shuck
Upon inspection of core barrel was confirmed to be pressurized
0800-0900 Gel sweep followed by seawater
0900-1100 Prepare for coring operations UT-GOM2-1-H005-06
MU PCTB-FB core barrel
RIH with core barrel
RIH with pulling tool
1100-1230 **Core UT-GOM2-1-H005-06, F/8121 T/8131 ft MD: Recovered 9.4 ft, 3250 psi**
Upon recovery stabbed into vertical cold shuck
Upon inspection of core barrel was confirmed to be pressurized
1230-1300 Gel sweep followed by seawater
1300-1500 Prepare for coring operations UT-GOM2-1-H005-07
MU PCTB-FB core barrel
RIH with core barrel
RIH with pulling tool
1500-1700 **Core UT-GOM2-1-H005-07, F/8131 T/8141 ft MD: Recovered 10.5 ft, 3164 psi**
Upon recovery stabbed into vertical cold shuck
Upon inspection of core barrel was confirmed to be pressurized
1700-1830 Displaced well to 9.5 ppg WBM
1830-2000 Prepare for coring operations UT-GOM2-1-H005-08

MU PCTB-FB core barrel
RIH with core barrel
RIH with pulling tool

2000-2300 **Core UT-GOM2-1-H005-08, F/8141 T/8151 ft MD: Recovered 8.2 ft, 3016 psi**
Upon recovery stabbed into vertical cold shuck
Upon inspection of core barrel was confirmed to be pressurized

2300-2400 Prepare for coring operations UT-GOM2-1-H005-09
MU PCTB-FB core barrel

4. OPERATIONAL PLAN (Next 24 Hours):

Continue coring to the next core point at 8161 ft RKB and ultimately acquire up to 13 cores to the bottom of Hole UT-GOM2-1-H005.

5. DOWNHOLE LOGGING OPERATIONS:

No additional log data acquired over the last 24 hr.

6. CORE DATA:

PCTB-FB Coring (pressure coring) Totals: 5 cores, 50.0 ft cored; 48.4 ft recovery.

Core UT-GOM2-1-H005-04FB
F/8101 ft RKB T/8111 ft RKB: Recovered: 10.5 ft, 3477 psi
Performed coring operations F/8101 ft MD T/8111 ft MD
Drilling/Coring Parameters: 60 RPM w/2-5 K lb torque and Cement Pump circulating sea water at 80 gpm, ROP 50 ft/hr, WOB 2.5-5 tons, with O-ring seals in the diverter.
Good coring run with clean pick up from BHA. On recovery the ball valve was closed and the autoclave was left in the cold shuck for 43 mins before a pressure of 3477 psi was measured in the service van indicating that the autoclave had sealed at in situ pressures. The autoclave was transferred to PCATS for core handling and processing. DST record showed that autoclave had fully sealed as it was lifted from the BHA. Core recovery 321 cm as measured by X-ray image in PCATS

Core UT-GOM2-1-H005-05FB
F/8111 ft RKB T/8121 ft RKB: Recovered: 9.7 ft, 3242 psi
Performed coring operations F/8111 ft MD T/8121 ft MD
Drilling/Coring Parameters: 60 RPM w/2-5 K lb torque and Cement Pump circulating sea water at 80 gpm, ROP 60 ft/hr, WOB 5 tons, with O-ring seals in the diverter.
Clean pick up from BHA. On recovery the ball valve was closed and the autoclave was left in the cold shuck for 35 mins before a pressure of 3242 psi was measured in the service van indicating that the autoclave had sealed around the in situ pressure. The autoclave was transferred to PCATS for core handling and processing. Core recovery was 296 cm as measured by X-ray image in PCATS.

Core UT-GOM2-1-H005-06FB
F/8121 ft RKB T/8131 ft RKB: Recovered: Recovered 9.4 ft, 3250 psi
Performed coring operations F/8121 ft MD T/8131 ft MD
Drilling/Coring Parameters: 60 RPM w/2-5 K lb torque and Cement Pump circulating sea water at 80 gpm, ROP 55 ft/hr, WOB 8 tons, with O-ring seals in the diverter.
Good coring run with clean pick up from BHA and a sea floor 'cooling stop' for 15 mins. On recovery the ball valve was closed and the autoclave was left in the cold shuck for 35 mins before a pressure of 3250 psi was measured in the service van indicating that the autoclave had sealed around the in situ pressure. The autoclave was transferred to PCATS for core handling and processing. Core recovery was 286 cm as measured by X-ray image in PCATS.

Core UT-GOM2-1-H005-07FB
F/8131 ft RKB T/8141 ft RKB: Recovered: Recovered 10.5 ft, 3164 psi
Performed coring operations F/8131 ft MD T/8141 ft MD
Drilling/Coring Parameters: 60 RPM w/2-5 K lb torque and Cement Pump circulating sea water at 70-80 gpm, ROP 27 ft/hr, WOB 10 tons, with O-ring seals in the diverter.
General coring parameters: ROP=27 ft/hr, 60 RPM, WOB=10 tons, SW flow rate = 70-80 gpm. Good coring run with clean pick up from BHA and a sea floor 'cooling stop' for 15 mins. On recovery the ball valve was closed and the autoclave was left in the cold shuck for 46 mins before a pressure of 3164 psi was measured in the service van indicating that the autoclave had sealed around the in situ pressure. The set pressure for this deployment was made at 3000 psi and consequently there was no boost. The autoclave was transferred to PCATS for core handling and processing. Core recovery was 321 cm as measured by X-ray image in PCATS.

Core UT-GOM2-1-H005-08FB
F/8141 ft RKB T/8151 ft RKB: Recovered: Recovered 8.2 ft, 3016 psi
Performed coring operations F/8141 ft MD T/8151 ft MD
Drilling/Coring Parameters: 60 RPM w/2-5 K lb torque and Cement Pump circulating sea water at 65 gpm, ROP 26 ft/hr, WOB 5 tons, with O-ring seals in the diverter.
Switched from drilling with seawater to drilling with 9.5 lb/gal mud. Good coring run but the pick up from BHA took multiple efforts before it cane free. The tool was stopped at the sea floor (cooling stop) for 15 mins. On recovery the ball valve was closed and the autoclave was left in the cold shuck for 77 mins before a pressure of 3016 psi was measured in the service van indicating that the autoclave had sealed around the set pressure indicating that the accumulator boost may have assisted sealing the autoclave. The autoclave was transferred to PCATS for core handling and processing. Core recovery was 250 cm as measured by X-ray image in PCATS.

7. Science Activities

Core UT-GOM2-1-H005-04FB, -05FB, 06FB, 07FB, and 08FB were logged in PCATS. These scans indicated interbedded intervals with high P-wave velocities (up to 3500 m/s) consistent with hydrate at high-saturations and produced X-ray images clearly revealing bedding and sedimentary structures (see Figure 1 below). The Scientific Party continued to process data and write reports from Holes UT-GOM2-1-H002 and UT-GOM2-1-H005.

Sediment from the last degassing experiment from UT-GOM2-1-H002-4CS was collected from the storage chamber.

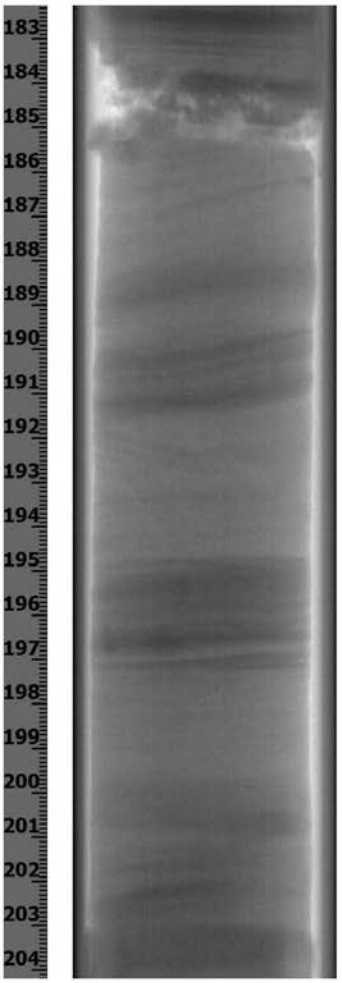


Figure 1. Example PCATS X-ray image from Core UT-GOM2-1-H005-05FB.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 17-May-2017, 0000-2400 hr

2. LOCATION:

0000 - 2400 hr, 17-May-2017
Green Canyon 955

Location from 0000 – 0338 hr
Hole UT-GOM2-1-H002
Corrected Location: Lat: 27° 00.04154', Long: -90° 25.58715' (WGS 84)
Water depth: 6667.0 ft (6719.0 ft RKB)
Per Datum: RKB 52.0 ft above SL

Location from 0338 – 2400 hr
Hole UT-GOM2-1-H005
Corrected Location: Lat: 27° 00.04665', Long: -90° 25.59125' (WGS 84)
Water depth: 6666.0 ft (6718.0 ft RKB)
Per Datum: RKB 52.0 ft above SL

3. DESCRIPTION OF OPERATIONS:

0000-0124	At Hole UT-GOM2-1-H002
	Re-enter Hole UT-GOM2-1-H002 to tag and test cement plug
	Move *D/V Q4000* over Hole UT-GOM2-1-H002
	Stab drillstring into H002
	RIH F/6700 ft RKB and tag top of cement plug at 6839 ft RKB
	Set down 5000lbs on top of cement plug
	POOH F/6839 ft RKB T/6690 ft RKB
0124-0230	Prepare to spud Hole UT-GOM2-1-H005
	D/S Q4000 DP moved over proposed drill site, ROV used to position DS
	RIH and tagged mudline at 6718.0 ft RKB
	Pull clear of mudline a reset data loggers
	Held shallow gas well control drill
	Held spud meeting
0230-0338	Spud Hole UT-GOM2-1-H005 at 6666.0 ft (6718.0 ft RKB).
	Advance hole F/6718 ft RKB T/6778 ft RKB
0338-1330	Advance hole F/6778 ft RKB T/7645 ft RKB
1330-2230	Prepare to acquire Core UT-GOM2-1-H005-01
	JSA to review wireline operations
	RU slick line for coring operations
	MU PCTB-FB inner core barrel at surface
	RIH PCTB-FB inner core barrel F/surface T/7665 ft RKB
	Unsuccessful core barrel failed to land in the BHA
	POOH PCTB-FB inner core barrel F/7665 ft RKB T/surface
	RD upper section of the PCTB-FB core barrel and move to Geotek Service Van

	Geotek clean and repair upper section of PCTB-FB core barrel
	MU PCTB-FB core barrel
	RIH PCTB-FB core barrel F/surface T/7663 ft RKB
2230-2330	**Core UT-GOM2-1-H005-01, F/7645 T/7655 ft MD: Recovered 6.7 ft, 4115 psi**
	POOH PCTB-FB core barrel F/7655 ft RKB T/surface
	Move recovered core sample to chiller for 20 minutes
2330-2400	RIH PCTB-FM center bit F/surface T/7665 ft RKB

4. OPERATIONAL PLAN (Next 24 Hours):

Continue to advance hole by drilling to second core point at 8081 ft RKB and acquire up to 9 cores to the bottom of the hole. The table below contains a detailed listing of the proposed core plan for Hole UT-GOM2-1-H005.

5. DOWNHOLE LOGGING OPERATIONS:

No additional log data acquired over the last 24 hr.

6. CORE DATA:

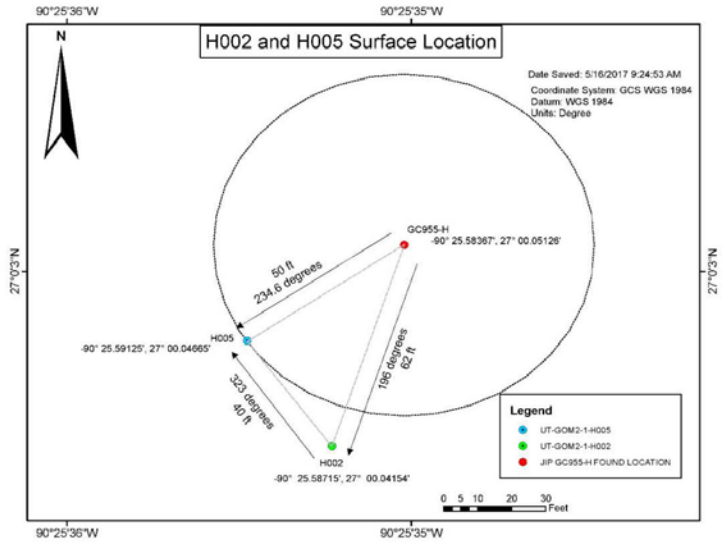
PCTB-FB Coring (pressure coring) Totals: 1 core, 10.0 ft cored; 6.7 ft recovery

Core UT-GOM2-1-H005-01
F/7645 ft RKB T/7655 ft RKB: Recovered 6.7 ft, 4115 psi
Performed coring operations F/7645 ft MD T/7655 ft MD
Drilling/Coring Parameters: 60 RPM w/4.6 K lb torque and Cement Pump circulating sea water at 85 gpm and standpipe pressure of 12 psi, ROP 67 ft/hr, WOB 5 tons, with O-ring seals in the diverter.

The UT-GOM2-1-H005-01 coring run was possibly compromised because of a depth discrepency between the driller-calculated tag depth and the Weatherford sensor-derived well depths. It was determined that the driller-calculated tag depth was accurate and Core UT-GOM2-1-H005-01 was acquired assuming a core point depth of 7645 ft MD. The core throw for the 01 core was 10ft, but from drilling performance data it appeared that the core only cut about 5-6 ft of formation. The slick line deployment and retrieval of Core UT-GOM2-1-H005-01 was completed without any problems. On recovery, the ball valve was closed and the autoclave was conditioned in the cold shuck for 20 minutes before a pressure of 4115 psi was measured in the service van, indicating that the pressure boost had been retained. The autoclave was moved to PCATS for core handling and processing.

7. Science Activities

Operations and science activities over the last 24-hours featured the abandonment of Hole UT-GOM2-1-H002 and the spudding of Hole UT-GOM2-1-H005 along with the acquisition of a successful pressure core from a known fracture dominated hydrate-bearing section that overlies the hydrate-bearing sand-rich reservoir section that is the primary coring target at the Green Canyon 955 test site. The map below shows the location of the two holes drilled and cored during this expedition, along with the location of the JIP Leg II GC955-H hole that was LWD logged on 2009. The target depth for Core UT-GOM2-1-H005-01 was specifically selected to test the impact of mud-rich sediments on the PCTB-FB core system.



The UT Scientific Party also continued to develop the core plan for Hole UT-GOM2-1-H005, which is posted below in this report. The pressure core from Hole UT-GOM2-1-H002 (Core 4) and the conventionalized core material from other cores collected from Hole UT-GOM2-1-H002, obtained from earlier in the expedition, are being processed through their respective labs on the ship. Quantitative pressure core degassing experiments have been completed on one of the two sections from Core UT-GOM2-1-H005-4CS selected for degassing. The other section continues to be degassed, producing large volumes of methane. Additional gas samples were collected for onshore analysis.

Hole UT-GOM2-1-H005 Core Plan

GC955H-005 Coring Plan	
Water Depth (tvdss)	6666
Rig Floor elevation above sl. (ft)	52
Mud line depth RKB	6718
Hydrate Top (fbsf)	1358
Hydrate top (RKB)	8076
Core length (ft)	10

Core #	Top (fbsf)	Bottom (fbsf)	Top (RKB)	Bottom (RKB)
1	927	937	7645	7655
2	1363	1373	8081	8091
3	1373	1383	8091	8101
4	1383	1393	8101	8111
5	1393	1403	8111	8121
6	1403	1413	8121	8131
7	1413	1423	8131	8141
8	1423	1433	8141	8151
9	1433	1443	8151	8161
10	1443	1453	8161	8171

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 18-May-2017, 0000-2400hr

2. LOCATION:

0000 – 2400 hr, 18-May-2017
Hole UT-GOM2-1-H005
Location: Lat: 27° 00.04665', Long: -90° 25.59125' (WGS 84)
Water depth: 6666.0 ft (6718.0 ft RKB)
Per Datum: RKB 52.0 ft above SL

3. DESCRIPTION OF OPERATIONS:

0000-0625 At Hole UT-GOM2-1-H005
Continued drilling hole F/7655 ft RKB T/8081 ft RKB at 110 RPM, 12 - 20 klbs WOB, 3-5 K torque, 150 - 250 fph ROP while pumping 8.6 ppg S/W w/ HEX #2 @ 336 gpm w/340 psi. Pumping 25 bbl Hi vis sweeps every 2 doubles drilled.

0625-1130 POOH PCTB-FB center bit
JSA for RU slickline and recovering center bit from BHA
RU slickline and recover center bit

1130-1200 Prepare for coring operations UT-GOM2-1-H005-02
MU PCTB-FB core barrel
RIH with core barrel
RIH with pulling tool

1200-1240 **Core UT-GOM2-1-H005-02, F/8081 T/8091 ft MD: Recovered 4.9 ft, 2834 psi**
ROP 29 ft/hr, 60 RPM, WOB 3-7 tons, flow rate 40-90 GPM
Upon recovery stabbed into vertical cold shuck
Upon inspection of core barrel was confirmed to be pressurized

1240-1545 Prepare to take core UT-GOM2-1-H005-03
MU PCTB-FB core barrel
RIH with core barrel
DS tagged bottom of the hole at 8086 ft RKB – borehole fill
POOH PCTB-FB and inspect core barrel
Fall in material recovered in liner and saved

1545-1700 Pump 25 bbls gel sweep followed by 280 bbls seawater using HEX Pump 2

1700-1930 Prepare to take core UT-GOM2-1-H005-03
Tagged bottom of the hole confirming no fill
M/U PCTB-FB core barrel
RIH with core barrel

1930-2120 **Core UT-GOM2-1-H005-03, F/8091 T/8101 ft MD: Recovered 10 ft, 1780 psi**
ROP 12 ft/hr, 60 RPM, WOB 2.5-5 tons, flow rate 70-120 Gpm
Upon recovery stabbed into vertical cold shuck
Upon inspection core barrel confirmed to be pressurized, possible slow leak

2120-2230 Circulated 25 bbls gel sweep followed by 128 bbls seawater spotting sweep in drill string using HEX #2 at 220 gpm w/ 53 psi.

2230-2400 Prepare to take core UT-GOM2-1-H005-04

4. OPERATIONAL PLAN (Next 24 Hours):

Continue coring to the next core point at 8111 ft RKB and ultimately acquire up to 13 cores to the bottom of Hole UT-GOM2-1-H005.

5. DOWNHOLE LOGGING OPERATIONS:

No additional log data acquired over the last 24 hr.

6. CORE DATA:

PCTB-FB Coring (pressure coring) Totals: 2 cores, 8.0 ft cored; 14.9 ft recovery.

Core UT-GOM2-1-H005-02
F/8081 ft RKB T/8091 ft RKB: Recovered: 4.9 ft, 2834 psi
Performed coring operations F/8081 ft MD T/8091 ft MD
Drilling/Coring Parameters: 60 RPM w/4.6 K lb torque and Cement Pump circulating sea water at 40-90 gpm, ROP 29 ft/hr, WOB 3-7 tons, with O-ring seals in the diverter.
Successful coring run with clean pick up from BHA. On recovery the ball valve was closed and the autoclave was left in the cold shuck for 45 mins before a pressure of 2834 psi was measured in the service van, indicating that there was a very slight leak which was located around the ball valve. The autoclave pressure was increased to 4000 psi before being transferred to PCATS.

Core UT-GOM2-1-H005-03
F/8091 ft RKB T/8101 ft RKB: Recovered: 10.0 ft, 1780 psi
Performed coring operations F/8091 ft MD T/8101 ft MD
Drilling/Coring Parameters: 60 RPM w/4.6 K lb torque and Cement Pump circulating sea water at 70-120 gpm, ROP 12 ft/hr, WOB 2.5-5 tons, with O-ring seals in the diverter.
Another good coring run with clean pick up from BHA. On recovery the ball valve was closed and the autoclave was left in the cold shuck for 45 mins before a pressure of 1780 psi was measured in the service van indicating that there might be a slow leak. The autoclave was transferred to PCATS where pressure was increased to 4000 psi before core handling and processing. DST record showed that autoclave had fully sealed during recovery.

7. Science Activities

Core UT-GOM2-1-H005-2 and Core UT-GOM2-1-H005-3 were logged in PCATS. These scans indicated high P-wave velocities consistent with hydrate at high-saturations and produced X-ray images clearly revealing sedimentary structures (see Figure 1 below). Drilling mud and PCATS water samples were collected for contamination control. The second quantitative core degassing from Core UT-GOM2-1-H002-4 was completed, producing a large volume of methane indicating high gas hydrate saturations. The Scientific Party continued to process data and write reports from Hole UT-GOM2-1-H002.

Core UT-GOM2-1-H002-07
F/8122 ft RKB T/8132 ft RKB: Recovered 1.5 ft, 0 psi
Performed coring operations F/8122 ft RKB T/8132 ft RKB
Drilling/Coring Parameters: 60 RPM w/3-4 Kflb torque and Hex Pump 2 circulating 10.5 ppg WBM at 50-100 gpm and standpipe pressure of 20 psi, ROP 10-25 ft/hr, WOB 5 tons, with no seals in the diverter
Core start time 0727 hr; Core end time 0815 hr; Core on deck at 0855 hr
For Core UT-GOM2-1-H002-07, the ball-valve failed to close or hold pressure (displaced BV seal); however, it did return core to the surface. For Core UT-GOM2-1-H002-07 the tool was recovered to the rig floor with the ball-valve partially closed (not sealed). Silt and sand was found packed between the ball valve and seal. In addition, sediment was also found above the core rabbit in the PCTB-CS autoclave, indicating that formation sediment had been fluidized during coring and flowed up into the core liner through the small ports in the rabbit. Core UT-GOM2-1-H002-07 did recover 1.5 ft (46 cm) of non-pressurized core that was transferred and processed through the onboard UT core processing lab.

Core UT-GOM2-1-H002-08
F/8132 ft RKB T/8142 ft RKB: Recovered 4.6 ft, 0 psi
Performed coring operations F/8132 ft RKB T/8142 ft RKB
Drilling/Coring Parameters: 60 RPM w/2-4 Kflb torque and Cement Pump circulating 10.5 ppg WBM at 210 gpm and standpipe pressure of 20 psi, ROP 20 ft/hr, WOB 5-8 tons, with no seals in the diverter
Core start time 1310 hr; Core end time 1350 hr; Core on deck at 1440 hr
For Core UT-GOM2-1-H002-08, the ball-valve failed to actuate or hold pressure. The ball-valve release sleeve (collett) failed by sliding over stop position, which resulted in the failure of the ball-valve to actuate. Core UT-GOM2-1-H002-08 did recover 4.6 ft (140 cm) of non-pressurized core that was transferred and processed through the onboard UT core processing lab.

7. Science Activities

In the last 24 hours, Hole UT-GOM2-1-H002 was advanced from 8112 ft RKB to 8142 ft RKB with 3 PCTB-CS pressure cores (Core UT-GOM2-1-H002-06, Core UT-GOM2-1-H002-07, Core UT-GOM2-1-H002-08). All three of the recovered PCTB-CS cores failed to hold pressure. The failure of the first two core runs have been attributed to problems associated with sand and silt interfering with the operations of the ball-valve in the PCTB-CS core system that could be linked to an internal core tool flow problem that is being currently evaluated.

The 'conventionalized' core material from cores Core UT-GOM2-1-H002-06, Core UT-GOM2-1-H002-07, and Core UT-GOM2-1-H002-08 was transferred to the UT mud lab and whole rounds were subsampled and preserved for shore-based microbiological, geochemical, physical property measurements. Head space gas samples were also acquired for post expedition analysis. A total of 3.25 ft (99 cm) was sampled as whole rounds and the remaining 8.0 ft (244 cm) was archived for shore-based analysis. Based on a quick description of core ends, the primary lithology in these cores ranges from sandy silt to silty, fine sand. A sample of drilling fluid was collected and preserved to characterize potential

core contamination in support of the geochemistry and microbiological analyses. Geotek finished logging Core UT-GOM2-1-H002-04 in PCATS (139 cm) including full CT. Draft pressure core cutting plan provided to UT science team. In total, 27.5 ft of sediment was recovered from Hole UT-GOM2-1-H002 (34% recovery), with 4.5 ft under pressure.

Hole UT-GOM2-1-H002 reached a TD of 8142 ft RKB (1423 fbsf) at 1630 hr with the recovery of Core UT-GOM2-1-H002-08, after which the hole was swept with 280 bbls of 10.5 ppg water-based mud in preparation for downhole wireline logging. The wireline logging tool string (including EDTC-HRLA-GPIT) was lowered to bottom of the hole, and two up hole log runs from 8045 ft RKB to 7680 ft RKB (Main Pass and Repeat Pass) were acquired without any problems. Because of borehole blockages, the wireline logging tool string could not pass below 8045 ft RKB and the BHA had been set back to a depth of 7680 ft RKB.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 15-May-2017, 0000-2400 hr

2. LOCATION:

0000 - 2400 hr, 15-May-2017
Green Canyon 955
Hole UT-GOM2-1-H002
Corrected Location: Lat: 27° 00.04154', Long: -90° 25.58715' (WGS 84)
Water depth: 6667.0 ft (6719.0 ft RKB)
Per Datum: RKB 52.0 ft above SL

3. DESCRIPTION OF OPERATIONS:

0000-0130	At Hole UT-GOM2-1-H002
	Continue downhole logging operations
	POOH logging tool string F/5000 ft RKB to T/Surface ft RKB
	JSA for the personnel involved in wireline logging program
	RD logging tools, wireline, and wireline sheaves
0130-0430	Prepare to set cement plug in Hole UT-GOM2-1-H002
	RIH BHA F/7680 ft RKB T/8142 ft RKB (bottom of the hole)
	Spot 25 bbls of 11.5 ppg Gel pad followed by 200 bbls of 10.5 ppg WBM
	POOH BHA F/8142 ft RKB T/7900 ft RKB
	Deploy Geotek cement barrel, free-fall to BHA
	Build cement
0430-1230	JSA for the personnel involved in setting cement plug
	Cementer pumped 20 bbls gel spacer
	Cementer mixed and pumped 77 bbls 16.4 ppg cement
	Place 500 ft cement plug F/7400 ft RKB T/7900 ft RKB
	Cementer pumped 17 bbls of gel spacer
	Cementer pumped 171 bbls of seawater
	POOH BHA F/7900 ft RKB T/6611 ft RKB
	Flushed DS and cement barrel W/seawater
	Pumped 2 nerf balls and 350 bbls of seawater
	Recover Geotek cement barrel on slickline
	Flushed DS with 245 bbls of seawater
1230-1825	POOH BHA F/6611 ft RKB T/Surface
	BO BHA (5 drill collars, 2 stabilizers, bit sub, bit)
1825-2400	Prepare to run PCTB-FB pressure core BHA
	MU face bit and bit sub to outer core barrel
	MU landing saver sub, top sub, head sub
	Geotek performed space out on center bit core barrel
	Geotek performed space out core barrel in outer core barrel
	Geotek performed space out cementing barrel in outer core barrel

4. OPERATIONAL PLAN (Next 24 Hours):

Conduct series of full function (water) tool test of the PCTB-FB in DP. Move onto location of Hole UT-GOM2-1-H005, RIH, and spud hole.

5. DOWNHOLE LOGGING OPERATIONS:

No additional log data acquired over the last 24 hr.

6. CORE DATA:

No additional cores acquired over the last 24 hr.

7. Science Activities

In the last 24 hours, the downhole logging program in Hole UT-GOM2-1-H002 was completed with the acquisition of a main pass and repeat pass surveys (EDTC-HRLA-GPIT) over the depth interval from 7680 ft RKB to 8045 ft RKB. Hole UT-GOM2-1-H002 was abandoned with the emplacement of a 500 ft cement plug that was set above the hydrate interval to avoid any potential problem associated with hydrate dissociation that may be caused by the heat generated by cement hydration. The last half of the day dealt with preparations to move onto the location of Hole UT-GOM2-1-H005.

The technical objectives of the Hole UT-GOM2-1-H005 drilling and coring program include (1) demonstrate the engineering capability of the "face-bit" version of the PCTB pressure-coring tool to effectively and consistently capture, collect, and recover hydrate-bearing sand sediments, (2) test the coring efficiency of the cutting shoe BHA, and (3) obtain up to 13 pressure cores in the methane-hydrate-bearing sand and adjacent interfaces.

The pressurized core from Hole UT-GOM2-1-H002 (Core 4) and the conventionalized core material from other cores collected from Hole UT-GOM2-1-H002 continued to be processed through their respective labs on the ship. A cut plan for Hole UT-GOM2-1-H002 was finalized and two sections were selected for quantitative degassing, and one section transferred to a storage vessel for shipment to UT. Head space gas samples obtained from degassing experiments of subsamples from Core UT-GOM2-1-H002-04 have yielded significant volumes of mostly methane gas.

The drilling, wireline, and core pressure/temperature data were integrated for analyzing the performance of each pressure core run. The core pressure/temperature data indicate that several cores that failed to hold pressure experienced substantial cooling due to hydrate dissociation during retrieval.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 16-May-2017, 0000-2400 hr

2. LOCATION:
0000 - 2400 hr, 16-May-2017
Green Canyon 955
Hole UT-GOM2-1-H002
Corrected Location: Lat: 27° 00.04154', Long: -90° 25.58715' (WGS 84)
Water depth: 6667.0 ft (6719.0 ft RKB)
Per Datum: RKB 52.0 ft above SL

3. DESCRIPTION OF OPERATIONS:

0000-0330 At Hole UT-GOM2-1-H002
Continue operations in support of the "PCTB-FB BHA Water Test 3"
Geotek completed space out test of the PCTB-FB core system

0330-0800 JSA for the personnel involved deployment of BHA
MU PCTB-FB BHA
RIH PCTB-FB BHA F/surface T/1090 ft RKB
Fill DP with seawater every 10 connections

0800-1000 **Conduct PCTB-FB BHA Water Test 3**
JSA for the personnel involved with slick line and RU PCTB-FB
RU slick line in TDS
MU PCTB-FB core barrel (with O-ring seal in diverter)
RIH CTB-FB F/surface T/1038 ft RKB; POOH running tool
RIH slick line with CTB-FB pulling tool F/surface T/1038 ft RKB
Circulate seawater at 2 bpm using Hex Pump 2
Shutdown Hex Pump 2, latch pulling tool
POOH CTB-FB core barrel F/1038 ft RKB T/surface

1000-1200 **Conduct PCTB-FB BHA Water Test 4**
MU PCTB-FB core barrel (with O-ring seal in diverter)
RIH CTB-FB F/surface T/1040 ft RKB; POOH running tool
RIH slick line with CTB-FB pulling tool F/surface T/1038 ft RKB
Circulate seawater at 2 bpm using Hex Pump 2
Shutdown Hex Pump 2, latch pulling tool
POOH CTB-FB core barrel F/1038 ft RKB T/surface

1200-1630 **Conduct PCTB-FB BHA Water Test 5**
MU PCTB-FB core barrel (with O-ring seal in divereer)
RIH CTB-FB F/surface T/1035 ft RKB; POOH running tool
RIH slick line with CTB-FB pulling tool F/surface T/1035 ft RKB
Circulate seawater at 1.75 bpm using Hex Pump 2
Shutdown Hex Pump 2, latch pulling tool
POOH CTB-FB core barrel F/1035 ft RKB T/surface

1630-1800 MU PCTB-FB center bit assembly to slick line
RIH PCTB-FB center bit assembly F/surface T/1034 ft RKB

JSA for the personnel involved rigging down slick line
Rig down slick line
1800-2400 RIH CTB-FB BHA F/1090 ft RKB T/6700 (18 ft above sea floor)

4. OPERATIONAL PLAN (Next 24 Hours):

Re-enter Hole UT-GOM2-1-H002 with PCTB-FB BHA tag and test cement plug. Spud Hole UT-GOM2-1-H005 and advance to first core point at 7645 ft RKB.

5. DOWNHOLE LOGGING OPERATIONS:

No additional log data acquired over the last 24 hr.

6. CORE DATA:

No additional cores acquired over the last 24 hr. However, we conducted a series of full function (water) tool tests of the PCTB-FB in DP. The results of these tests have been described below in this report.

7. Science Activities

Operations and science activities over the last 24-hours focused mostly on reviewing the performance of the PCTB-CS core runs and the various tool "pump" and "water" tests that were conducted over the last six days of this field test. Also, a total of three full function (water) tool tests of the PCTB-FB were conducted today in the drill pipe as it was being deployed in preparation for drilling the next test hole in the project (Hole UT-GOM2-1-H005).

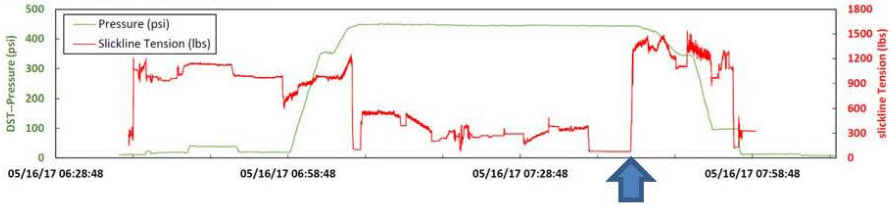
The Geotek and onboard UT-technical staff along with support from Weatherford, who are maintaining the systems that monitor shipboard drilling/coring parameters and performance, have been accessing, compiling, and analyzing the large number of drilling/coring data sets that have been generated during each tool test and core run over the last six days. These data include pressure and temperature data recorded in each core barrel when deployed in the borehole, data on the performance of the wireline system that deploys and recovers the pressure core barrels during each core run, information on drilling performance and drilling fluids (including drilling fluid pressures, temperature, bit penetration rates, weight on bit, drilling mud flow rates, rate of bit rotation, etc.) and many other important performance measurements.

To further test and demonstrate the engineering capability of the "face-bit" version of the PCTB pressure-coring tool, it was tested today in three successive tests in which the configuration of the tool was not changed between each tests and the coring and core handling procedures were conducted in a similar fashion in each test. The tools as tested were all the face-bit cutting version of the PCTB, which is also known as the PCTB-FB. In each case the "flow diverter" in the pressure core barrel was sealed with an O-ring. These tests were all full function tests in that the PCTB-FB inner barrel was lowered into drill pipe on a slick line wire, (2) the PCTB-FB inner barrel was locked into the BHA, (3) the wireline "running in" tool was used to deploy the PCTB-FB inner barrel and the wireline "pulling" tool was used to recover the PCTB-FB inner barrel to the deck of the ship. Under normal operations, the pulling tool is deployed and latches into the PCTB-FB inner barrel in the

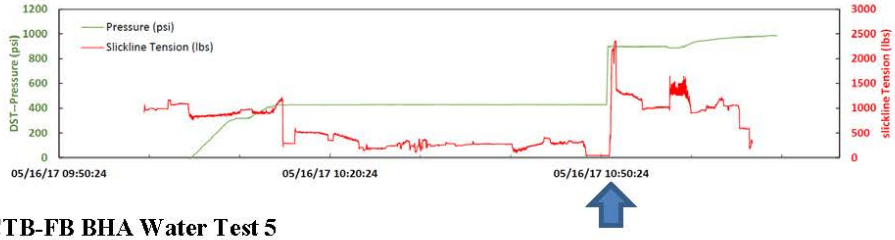
BHA and when pulled by the slick line the ball-valve at the bottom of the PCTB-FB inner barrel closes, the upper valve on the tool closes, the entire inner core barrel unlatches from the BHA, and the onboard pressure boost system activates to maintain internal tool pressures during recovery.

In the plots of the PCTB-FB BHA Water Test 4 and PCTB-FB BHA Water Test 5 we see good examples of the expected pressure boost as the PCTB-FB inner barrel is unlatched from the BHA; and the PCTB-FB was recovered sealed and at pressure for both of these tests (the large blue arrow in each plot marks the time the PCTB-FB inner barrel unlatches from the BHA). For Test 4 the autoclave pressure was measured at 1015 psi and for Test 5 the autoclave pressure was measured at 1113 psi. The PCTB-FB BHA Water Test 3, however, does not show the expected pressure boost and in this case the autoclave was not sealed.

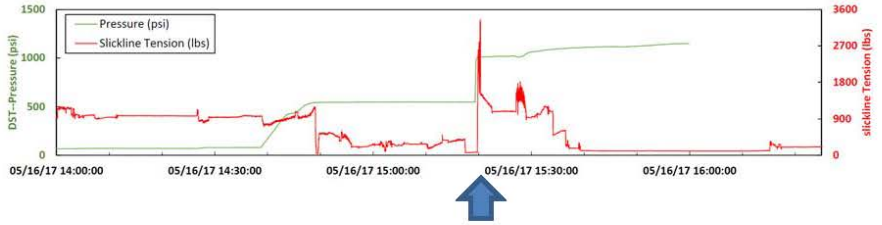
PCTB-FB BHA Water Test 3



PCTB-FB BHA Water Test 4



PCTB-FB BHA Water Test 5



The pressurized core from Hole UT-GOM2-1-H002 (Core 4) and the conventionalized core material from other cores collected from Hole UT-GOM2-1-H002 continued to be processed through their respective labs on the ship. Quantitative pressure core degassing experiments have continued on two sections from Core 4. Head space gas samples obtained from degassing experiments of subsamples from Core UT-GOM2-1-H002-04 have continued to yield significant volumes of mostly methane gas that suggest high methane hydrate saturation in this core. Additional gas samples have been collected for shore-based gas analyses.

Helix also conducted a large crew change today with a total of four helicopter flights. The UT led science team on the *D/V Q4000* also saw the departure of Yongkoo Seol, Gilles Guerin, Anton Caputo, and Robert Andrew Ott.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 13-May-2017, 0000-2400 hr

2. LOCATION:

0000 - 2400 hr, 13-May-2017
Green Canyon 955
Hole UT-GOM2-1-H002
Lat: 27° 00.04548', Long: -90° 25.59312' (WGS 84)
Water depth: 6667.0 ft (6719.0 ft RKB)
Per Datum: RKB 52.0 ft above SL

3. DESCRIPTION OF OPERATIONS:

0000-0400 At Hole UT-GOM2-1-H002
Core UT-GOM2-1-H002-03 core barrel would not unlatch from the BHA
Pumped numerous mud sweeps and worked SLB slickline to free tool
Deployed Geotech Coring -- Emergency Recovery Tool
0345 unlatch and recovered tool to the surface via SLB slickline

0400-0630 Prepare to acquire Core UT-GOM2-1-H002-04
Assemble new core barrel
JSA to review coring and wireline operations
RU and RIH PCTB-CS F/Surface T/8135 ft RKB

0630-0900 SLB slickline dropped core barrel off wireline
Work and pull core barrel with Geotech Coring -- Emergency Recovery Tool
POOH PCTB-CS F/8092 ft RKB T/Surface

0900-1300 Prepare to acquire Core UT-GOM2-1-H002-04
Assemble new core barrel
RU and RIH PCTB-CS F/Surface T/8092 ft RKB

1300-1330 **Core UT-GOM2-1-H002-04, F/8092 ft T/8102 ft MD: Recovered 4.6 ft, 3372 psi**

1330-1530 Recover PCTB-CS inner core barrel
Upon recovery stabbed into vertical cold shuck
Upon inspection of core barrel was confirmed to be pressurized

1530-1930 Prepare to acquire Core UT-GOM2-1-H002-05
Rebuild upper and lower section of PCTB-CS
RU and RIH PCTB-CS F/Surface T/8102 ft RKB

1930-2000 **Core UT-GOM2-1-H002-05, F/8102 ft T/8112 ft MD: Recovered 3.1 ft, 0 psi**

2000-2400 Recover PCTB-CS inner core barrel
Difficulty unlatching PCTB-CS outer barrel
Work and pull core barrel with SLB slickline
Upon inspection of core barrel it was confirmed not to be pressurized

4. OPERATIONAL PLAN (Next 24 Hours):

Continue to advance Hole UT-GOM2-1-H002 with continuous pressure coring with the PCTB-CS system.

5. DOWNHOLE LOGGING OPERATIONS:

NA

6. CORE DATA:

PCTB-CS Coring (pressure coring) Totals: 2 core, 20.0 ft cored; 7.7 ft recovery

Core UT-GOM2-1-H002-04
F/8092 ft MD T/8102 ft MD: Recovered 4.6 ft, 3372 psi
Performed coring operations F/ 8092 ft MD T/ 8102 ft MD
Drilling/Coring Parameters: 60 RPM w/ 3-6 K torque and Hex Pump 2 circulating 10.5 ppg WBM at 280 gpm and standpipe pressure of 12 psi, ROP 20 ft/hr, WOB 2-6 tons, with no seals in the diverter.

Core UT-GOM2-1-H002-04 was recovered on deck with ball valve closed and at an internal autoclave pressure of 3372 psi, which was the first core acquired during this expedition at pressure. The deployment and recovery of the PCTB-CS core barrel was conducted without any problems. The cutting of the core at the bottom of the hole also appeared to be good with almost constant core penetration rates and weight on bit. Upon recovery, the PCTB-CS core barrel was placed in the vertical ice-shuck on the rig floor. The internal pressure of the PCTB-CS autoclave when received in the Geotech Coring Service Van measured 3372 psi, which is slightly less than the expected hydostatic pressure at the depth of the cored reservoir section at this site. In the PCATS lab, an X-ray scan of the PCTB-CS autoclave revealed 4.6 ft (140 cm) section of sediment core and 4.0 ft (123 cm) sediment fill above the core rabbit, which indicates that formation sediment had been fluidized during coring and flowed up into the core liner through the small ports in the rabbit. The Geotek PCATS X-ray image of the recovered core section, from below the core rabbit, measured a total thickness of 4.6 ft (140 cm) and the following characteristics with depth along the core: **00-53 cm** sheared and biscuited core section with an upward decreasing bulk denisty trend, with the upper 32.0 cm of this section characterized by peak P-wave velocites ranging from 2,500 to over 3,200 m/s indicating the pressence of a highly saturated gas hydrate-beaing sediments; **53-102 cm** is also characterized by an upward decreasing bulk density trend and several 10-25 cm thick intervals exhibiting velocities as high as 3,400 m/s also indicating the presence of gas hydrate ; **102-140 cm** is a third upward decreasing bulk density section with a relatively massively-bedded 23 cm thick high velocity likely hydrate bearing unit. The PCATS cut plan for this core is under review, but it is likely that most of this core will be preserved for post expedition analysis and some sections may be selected for quantitative degassing.

Core UT-GOM2-1-H002-05
F/8102 ft MD T/8112 ft MD: Recovered 3.1 ft, 0 psi
Performed coring operations F/8102 ft MD T/8112 ft MD
Drilling/Coring Parameters: 60 RPM w/ 4-8 K torque and Hex Pump 2 circulating 10.5 ppg WBM at 100-225 gpm and standpipe pressure of 12 psi, ROP 40-60 ft/hr, WOB 4-12 tons, with no seals in the diverter.
Core start time 1947 hr; Core end time 2000 hr; Core on deck at 2323 hr.

For Core UT-GOM2-1-H002-05, the ball-valve failed to close or hold pressure; however, it did return core to the surface. For Core UT-GOM2-1-H002-05 the tool was recovered to the rig floor with the ball-valve closed but not sealed. Silt and sand was found packed between the ball

valve and seal; and the seal appeared to be damaged. We also had significant trouble unlatching this tool from the BHA during recovery, which may also have been caused by the impact of silt/sand on the operation of the latch system within the PCTB-CS BHA. Core UT-GOM2-1-H002-05 did recover 3.1 ft (94 cm) of non-pressurized core that was transferred and processed through the onboard UT core processing lab.

7. Science Activities

In the last 24 hours, Hole UT-GOM2-1-H002 was advanced from 8092 ft MD to 8112 ft MD with 2 PCTB-CS pressure cores (Core UT-GOM2-1-H002-04 and Core UT-GOM2-1-H002-05). Only Core UT-GOM2-1-H002-04 was recovered near its pre-set pressure, the other PCTB-CS failed to hold pressure. PCATS processing and scans yielded significant evidence (i.e., P-wave velocities) for the occurrence of gas hydrate at high concentrations in Core UT-GOM2-1-H002-04. The failure of Core UT-GOM2-1-H002-05 has been attributed to problems associated with sand and silt interfering with the operations of the ball-valve in the PCTB-CS core system.

The Core UT-GOM2-1-H002-05 'conventionalized' core material was transferred to the UT mud lab and a whole round was subsampled and preserved for shore-based physical property measurements. A head space gas sample was also acquired for post expedition analysis. A total of 0.17 ft (5 cm) was sampled as whole rounds and the remaining 2.93 ft (89 cm) was archived for shore-based analysis. Based on a quick description of core ends, the primary lithology in this core is sandy silt at the bottom and silty sand at the top. A sample of drilling fluid and a sample of PCATS water were collected and preserved to characterize potential core contamination in support of the geochemistry and microbiological analyses.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 14-May-2017, 0000-2400 hr

2. LOCATION:

0000 - 2400 hr, 14-May-2017
Green Canyon 955
Hole UT-GOM2-1-H002
~~Lat: 27° 00.04548', Long: -90° 25.59312' (WGS 84)~~
Corrected Location: Lat: 27° 00.04154', Long: -90° 25.58715' (WGS 84)
Water depth: 6667.0 ft (6719.0 ft RKB)
Per Datum: RKB 52.0 ft above SL

3. DESCRIPTION OF OPERATIONS:

0000-0200 At Hole UT-GOM2-1-H002
Prepare to acquire Core UT-GOM2-1-H002-06
Rebuild upper and lower section of PCTB-CS
RU and RIH PCTB-CS F/Surface T/8112 ft RKB
0200-0230 **Core UT-GOM2-1-H002-06, F/8112 ft T/8122 ft MD: Recovered 5.2 ft, 0 psi**
Stop coring and monitor hole until returns stop
0230-0315 Recover PCTB-CS inner core barrel
POOH PCTB-CS F/8122 ft RKB T/Surface
Upon inspection of core barrel it was confirmed not to be pressurized
0315-0730 Prepare to acquire Core UT-GOM2-1-H002-07
Rebuild upper and lower section of PCTB-CS
RU and RIH PCTB-CS F/Surface T/8122 ft RKB
0730-0830 **Core UT-GOM2-1-H002-07, F/8122 ft T/8132 ft MD: Recovered 1.5 ft, 0 psi**
Stop coring and monitor hole until returns stop
0830-0920 Recover PCTB-CS inner core barrel
POOH PCTB-CS F/8132 ft RKB T/Surface
Upon inspection of core barrel it was confirmed not to be pressurized
Noted cut O-ring on ball valve of core barrel
0920-1330 Prepare to acquire Core UT-GOM2-1-H002-08
Rebuild upper and lower section of PCTB-CS
RU and RIH PCTB-CS F/Surface T/8132 ft RKB
1330-1400 **Core UT-GOM2-1-H002-08, F/8132 ft T/8142 ft MD: Recovered 4.6 ft, 0 psi**
Stop coring and monitor hole until returns stop
1400-1530 Recover PCTB-CS inner core barrel
POOH PCTB-CS F/8142 ft RKB T/Surface
Upon inspection of core barrel it was confirmed not to be pressurized
Noted ball-valve did not accurate
1530-1630 Hole UT-GOM2-1-H002 TD at 8142 ft RKB (1423 fbsf)
Pumped 280 bbls of 10.5 ppg to sweep hole clean
1630-1730 Prepare for wireline logging operations
JSA and TBT in support of logging program

	Install wireline logging sheaves
1730-1830	POOH BHA F/8142 ft RKB (1423 fbsf) T/7680 ft RKB (961 fbsf) at 5min/90ft
1830-2040	**Conduct wireline logging operations in UT-GOM2-1-H002**
	JSA and TBT in support of logging program
	Move logging tools from moonpool to rig floor
	RU logging wireline through travel block and TDS
	MU logging wireline packoff in TD
	Terminate logging wireline cable head
	MU logging tools and build logging string in DP
2040-2400	RIH with EDTC-HRLA-GPIT, DP set at 7680 ft RKB (961 fbsf)
	Logging tool string includes Induction Inclinometer
	WL tools unable to pass 8045 ft RKB (1326 fbsf)
	Obtain up hole log run from F/8045 ft RKB T/7680 ft RKB (Repeat Pass)
	RIH with EDTC-HRLA-GPIT F/7680 ft RKB T/8045 ft RKB
	Obtain up hole log run from F/8045 ft RKB T/7680 ft RKB (Main Pass)
	Continue up hole log run to obtain seafloor log depth at 6704 ft RKB.
	POOH logging tool string F/7680 ft RKB to T/5000 ft RKB

4. OPERATIONAL PLAN (Next 24 Hours):

Complete wireline logging program in Hole UT-GOM2-1-H002, set cement plug and abandon Hole UT-GOM2-1-H002, move to location of Hole UT-GOM2-1-H005, and MU BHA and RIH.

5. DOWNHOLE LOGGING OPERATIONS:

Wireline Logs: EDTC-HRLA-GPIT F/7680 ft RKB T/8045 ft RKB (Main Pass)
Wireline Logs: EDTC-HRLA-GPIT F/7680 ft RKB T/8045 ft RKB (Repeat Pass)

6. CORE DATA:

PCTB-CS Coring (pressure coring) Totals: 3 core, 30.0 ft cored; 11.3 ft recovery

Core UT-GOM2-1-H002-06
F/8112 ft T/8122 ft RKB: Recovered 5.2 ft, 0 psi
Performed coring operations F/8112 ft RKB T/8122 ft RKB
Drilling/Coring Parameters: 60 RPM w/2-5 Kflb torque and Hex Pump 2 circulating 10.5 ppg WBM at 100 gpm and standpipe pressure of 20 psi, ROP 20-50 ft/hr, WOB 6 tons, with no seals in the diverter.
Core start time 0155 hr; Core end time 0244 hr; Core on deck at 0355 hr.
For Core UT-GOM2-1-H002-06, the ball-valve closed, seal at top end of autoclave plug failed; however, it did return core to the surface. For Core UT-GOM2-1-H002-06 the tool was recovered to the rig floor with the ball-valve partially closed (not sealed). Silt and sand was found packed between the ball valve and seal. Core UT-GOM2-1-H002-06 recovered 5.2 ft (158 cm) of non-pressurized core that was transferred and processed through the onboard UT core processing lab.

7. Science Activities

In the last 24 hours, spudded and advanced Hole UT-GOM2-1-H002 to a depth of 8032.0 ft RKB (1313.0 fbsf) by midnight without any significant problems. Geotek completed preparations for coring operations and developed plans for simulated core runs to be conducted before reaching core point as planned for the morning of 12-May-17. The UT Scientific Party refined and finalized the Hole UT-GOM2-1-H002 core plan and continued to work on the "Methods Section" writing assignments in support of the expedition initial results volume. The UT Scientific Party also continued to develop the core handling and processing plan. Based on 1) lateral correlation with seismic data from Hole GC955-H as drilled under the Gulf of Mexico Gas Hydrate Joint Industry Project Leg II (GOM JIP Leg II) in 2009 to the Hole UT-GOM2-1-H002 and 2) the seafloor depth at UT-GOM2-1-H002, the first pressure core point (Core UT-GOM2-1-H002-01) was set at 8062.0 ft RKB (1343.0 fbsf). Posted below is the finalized core plan for Hole UT-GOM2-1-H002.

GC955 H002 Coring Plan	
Water Depth (tvdss)	6667
Rig Floor elevation above sl. (ft)	52
mud line depth RKB	6719
Hydrate Top (fbsf)	1358
Hydrate top (RKB)	8077
Hydrate Bottom (fbsf)	1444
core length (ft)	10
wash interval (ft)	10

Core #	Top (fbsf)	Bottom (fbsf)	Top (RKB)	Bottom (RKB)
1	1343	1353	8062	8072
2 (hydrate top in middle)	1353	1363	8072	8082
3	1363	1373	8082	8092
4	1373	1383	8092	8102
5	1383	1393	8102	8112
6	1393	1403	8112	8122
Drill/Wash	1403	1429	8122	8148
7	1429	1439	8148	8158
8 (hydrate base in middle)	1439	1449	8158	8168
9	1449	1459	8168	8178
10	1459	1469	8178	8188
Drill/Wash	1469	1719	8188	8438

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 12-May-2017, 0000-2400 hr

2. LOCATION:

0000 - 2400 hr, 12-May-2017
Green Canyon 955
Hole UT-GOM2-1-H002
Lat: 27° 00.04548', Long: -90° 25.59312' (WGS 84)
Water depth: 6667.0 ft (6719.0 ft RKB)
Per Datum: RKB 52.0 ft above SL

3. DESCRIPTION OF OPERATIONS:

0000-0030 At Hole UT-GOM2-1-H002
Continue to circulate hole clean and fill with F/8.6 ppg T/10.5 ppg mud
0030-0230 Performed coring simulations drilling down:
F/ 8032 ft MD T/ 8042 ft MD
F/ 8042 ft MD T/ 8052 ft MD
F/ 8052 ft MD T/ 8062 ft MD
0230-0330 Circulate hole clean and fill with 10.5 ppg mud
0330-0730 Prepare to acquire Core UT-GOM2-1-H002-01
JSA to review wireline operations
Transfer PCTB-CS tools to rig floor
Recover PCTB-CS center bit
RU and RIH PCTB-CS F/Surface T/8062 ft RKB
Circulate hole clean and fill with 10.5 ppg mud
0730-0900 **Core UT-GOM2-1-H002-01, F/8062 T/8072 ft MD: Recovered 2.26 ft, 0 psi**
0900-0930 Recover PCTB-CS inner core barrel
Upon recovery stab into vertical cold shuck
Upon inspection of core barrel discovered sample was not pressurized
Pressure boost failed to fully-charge the PCTB-CS autoclave
0930-1010 **Conduct PCTB-CS BHA Water Test 1**
Standard PCTB-CS configuration (with polypack seals)
RIH F/ Surface T/ 8072 ft RKB, lock tool into BHA
POOH PCTB-CS with standard pulling tool
Upon inspection (0 psi) pressure boost failed
Pressure boost failed to charge PCTB-CS autoclave
1010-1230 **Conduct PCTB-CS BHA Water Test 2**
Upper seal changed to a 0-ring to allow limited fluid transfer
RIH F/ Surface T/ 8072 ft RKB, lock tool into BHA
POOH PCTB-CS with standard pulling tool
Upon inspection (0 psi) pressure boost failed
Pressure boost failed to charge PCTB-CS autoclave

1230-1830 Prepare to acquire Core UT-GOM2-1-H002-02
JSA to review wireline operations
PU and RIH PCTB-CS F/Surface T/8072 ft RKB
Circulate hole clean and fill with 10.5 ppg mud
1830-1900 **Core UT-GOM2-1-H002-02, F/8072 T/8082 ft MD: Recovered 5.33 ft, 0 psi**
1900-1945 Recover PCTB-CS inner core barrel
Upon inspection the core did not retract and the ball valve did not close
1945-2230 Prepare to acquire Core UT-GOM2-1-H002-03
PU and RIH PCTB-CS F/Surface T/8082 ft RKB
Circulate hole clean and fill with 10.5 ppg mud
2230-2330 **Core UT-GOM2-1-H002-03, F/8082 T/8092 ft MD: Recovered 1.08 ft, 0 psi**
2330-2400 Recover PCTB-CS inner core barrel
Note from 13-May-2017 UT-GOM2-1 Daily Operational and Science Report: The PCTB-CS inner core barrel would not unlatch from the coring BHA using the standard recovery tool. After several hours of attempting to free the tool, the Geotek emergency release tool was used to successfully release the inner core barrel; however, the normal functioning of this tool will not activate the ball valve or other tool functions resulting in the depressurization of the core.

4. OPERATIONAL PLAN (Next 24 Hours):
Continue to advance Hole UT-GOM2-1-H002 with continuous pressure coring with the PCTB-CS system.

5. DOWNHOLE LOGGING OPERATIONS:
NA

6. CORE DATA:
PCTB-CS Coring (pressure coring) Totals: 3 core, 30.0 ft cored; 8.67 ft recovery

Core UT-GOM2-1-H002-01
F/8062 T/8072 ft MD: Recovered 2.26 ft, 0 psi
Performed coring operations F/ 8062 ft T/ 8072'
Drilling/Coring Parameters : 50 RPM w/ 3.5 K torque and cement unit circulating 10.5 ppg WBM at 125 gpm and standpipe pressure of 15 psi, ROP 5-15 ft/hr, WOB 2-6 tons, With polypack diverter seal.
Core start time 0745 hr; Core end time 0840 hr; Core on deck at 0917 hr.
Core barrel recovered on deck with ball valve closed but with little to no pressure in the autoclave. Core UT-GOM2-1-H002-01, which was the first core acquired during this expedition, recovered 2.26 ft of core in poor condition and failed to retain pressure. The deployment, cutting, and recovery of the core appeared to be conducted without any problems. We did not see any trouble with the latching of the tool or it's deployment in the pipe. But it took more than 6,000 lbs of pull to unlatch the tool from the BHA. The cutting of the core on bottom also appeared to be good with somewhat variable penetration rates and weight on bit. Upon recovery, the ball valve was closed but the pressure boost appeared not to have pressurized the autoclave below the new flow diverter set above the upper autoclave seal (polypack seals). It was speculated that the interaction of the new upper seal and flow diverter

had created a pressure seal (hydraulic lock) that did not allow the pressure charging of the autoclave. Two additional PCTB-CS operational tests were conducted in the open drillpipe (while not in contact with the sediment) that appeared to confirm that there was some form of pressure block in the tool. It is also important to add that the spring type core catcher was damaged upon recovery, showing evidence of inverted and twisted fingers.

Core UT-GOM2-1-H002-02
F/8072 T/8082 ft MD: Recovered 5.33 ft, 0 psi
Drilling/Coring Parameters : 60 RPM w/ 3.5 K torque and cement unit circulating 10.5 ppg WBM at 125 gpm and standpipe pressure of 15 psi, ROP 20-90 ft/hr, WOB 1-20 tons, With O-ring diverter seal.
Core start time 1840 hr; Core end time 1857 hr; Core on deck at 2430 hr.
Tool recovered on deck. Ball valve not closed; core liner visible through ball valve (no pressure). Core did not retract into the autoclave. The upper threaded connection of the liner to the top of the core plug was broken and the core catcher was damage indicating that the core likely jammed, which caused core milling and the breaking of the liner. It also took about a 6000 lb pull to unlatch the inner core barrel from with the BHA during the recovery of the core. We have concluded that the main factor affecting/limiting our core recovery, core quality and sometime creating tool damage (preventing recovery under pressure) is 'formation jamming'. This happens when the formation is forced up inside the cutting shoe, without the core having been correctly cut and the cuttings removed. This can happen as a result of ship's movement indicated by the rapid and significant changes to the weight on bit (WOB).

Core UT-GOM2-1-H002-03
F/8082 T/8092 ft MD: Recovered 1.08 ft, 0 psi
Drilling/Coring Parameters : 60 RPM w/ 3.5 K torque and cement unit circulating 10.5 ppg WBM at 125 gpm and standpipe pressure of 15 psi, ROP 7-24 ft/hr, WOB 5-15 tons, With O-ring diverter seal.
Core start time 2225 hr; Core end time 2315 hr; Core on deck at 0245 hr (13-May-17).
Core UT-GOM2-1-H002-03 failed to hold pressure; however, it did return core to the surface. This failure of the core system to retain pressure was attributed to the fact that the retrieval of the inner core-barrel required a special procedure to release it form the latches in the BHA. We did not see any trouble with the deployment and latching of the tool before coring. The actual core cut event appeared to be good with somewhat variable penetration rates and weight on bit. However, at the end of the test the inner core-barrel was stuck in the BHA. The rig crew and Geotek staff core team managers worked with the Schlumberger wireline engineer for nearly four hours to unlatch the core barrel from the BHA. Eventually, the decision was made to use a special emergency release procedure that was successful but also presents the ball-valve on the tool from closing.

7. Science Activities

The 'conventionalized' core material from each core was transferred to the UT mud lab whole rounds were subsampled and preserved for shore-based geochemistry, microbiology, and physical properties. Head space gas samples were sampled for shore-based analyses. A total of 2.65 ft was sampled as whole rounds and the remaining 6.02 ft was archived for shore-based splitting and description. Based on a quick description of core ends, the primary lithology in the recovered cores ranges from sandy silt with clay to silty sand with clay. A sample of drilling fluid was sampled and preserved to characterize potential contamination.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 08 May 2017, 0000-2400 hr

2. LOCATION:
0000 - 2400 hr, 08 May 2017
Green Canyon 955
UT-GOM2-1-H002

3. DESCRIPTION OF OPERATIONS:
There was a fire/abandon ship drill at 0819 hr. The supply boat transfer was completed and the boat departed at 1227 hr. The mud lab was placed into location and hooked up to utilities. Helix finished installing the duct work for the mud pumps. Helix made up ~2300 ft of drill pipe between 1400-1930 hr and then between1940-2200 hr brought up and laid down pipe in doubles. Starting at 2015 hr, Weatherford software began logging top drive data; they now can record all drilling parameters, except the stroke counter on the mud pumps. Helix performed pressure testing of the upper and lower IBOP valves and the wireline night cap starting at 2315 hr.

4. OPERATIONAL PLAN (Next 24 Hours):
The BHA will be picked up in the morning of 09 May 2017 to begin PCTB flow testing. Geotek will install the cold shuck and chillers. There will be three to four helicopter flights tomorrow for additional crew change and the arrival of the remainder of the science party.

5. DOWNHOLE LOGGING OPERATIONS:
NA

6. CORE DATA:
NA

7. Science Activities
The science party continued to refine coring points. Geotek trained UT personnel in quantitative degassing. UT worked on setting up the mud lab for sampling.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 09 May 2017, 0000-2400hr

2. LOCATION:
0000 -2400 hr, 09 May 2017
UT-GOM2-1-H002

3. DESCRIPTION OF OPERATIONS:

0200	Pressure test of wireline night cap
0310	Pressure test of lower IBOP
0545	Pressure test of upper IBOP
0930 hr	BHA picked up in preparation of the flow test.
1230-1300	Space out with PCTB and instrumented core barrel

1621-1646 hr
Surface Pump Test 1 PCTB-CS
Bit just above sea surface below ship
0-140 SPM; 0-28 GPM
33-1450 psi standpipe pressure (Weatherford)

1653-1710 hr
Surface Pump Test 2 PCTB-CS
Bit just above sea surface below ship
0-140 SPM; 0-28 GPM
19-1824 psi standpipe pressure (Weatherford)

1953-2022 hr
Surface Pump Test 3 (cement pump) PCTB-CS
Bit just above sea surface below ship
0.5-8.0 barrels per minute (BPM); 21-40 GPM
80-1055 psi standpipe pressure (Weatherford need to confirm source)

2130 hr	Space out of cementing core barrel in outer core barrel
2205	Space out of center bit in outer core barrel

There were three helicopter flights for crew change, and the remainder of the science party arrived at 1445 and went through the safety orientation.

4. OPERATIONAL PLAN (Next 24 Hours):
Trip pipe to the seafloor (~10 hrs). Run a pump test just above the seafloor. Spud hole near the end of 10 May 2017.

5. DOWNHOLE LOGGING OPERATIONS:
NA

6. CORE DATA:

NA

7. Science Activities

Preliminary analysis of data from Geotek instrumented core liner shows only small pressure differentials across the core liner during each of the three Surface Pump Test of the PCTB-CS as conducted on 09-May-17. The instrumented core liner upon visual inspection did not exhibit any damage or deformation.

The science party met to discuss the plan for the expedition report and began working on report chapters. The official hole names for this expedition are UT-GOM2-1-H002 and UT-GOM2-1-H005.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 10-May-2017, 0000-2400 hr

2. LOCATION:
0000 - 2400 hr, 10-May-2017
Green Canyon 955
UT-GOM2-1-H002

3. DESCRIPTION OF OPERATIONS:

0000-0015	JSA in support of BHA MU
0015-0215	Continue to MU BHA (PCTB-CS) with drill collars BHA: 203.12ft drifted BHA W/ 4.105" drift
0215-1200	MU in RIH BHA (PCTB-CS) and DP, fill with seawater
1200-1630	Continue to RIH BHA (PCTB-CS) F/ 4929ft T/ 6550ft Drifted each joint W/ 4.125" drift.
1630-1700	JSA/TBT in support of PCTB-CS pump test Vessel off lump sum mobilization
1700-1930	Change bails on TDS, stage PCTB-CS, RU wireline
1930-2110	MU and RIH instrumented core barrel F/surface T/6545ft and POOH
2110-2230	RIH instrumented core barrel F/surface T/6200ft **Seafloor Pump Test X PCTB-CS (incomplete test)** Bit just above sea surfloor Using Hex Pump 2 switched to Hex Pump 1 (circulating seawater) Hex Pump 2: 30 SPM; 150 GPM; 32 psi (Weatherford) Hex Pump 1: 30 SPM; 150 GPM; 18 psi (Weatherford)
2230-2235	Shutdown Hex Pump 1 because of electrical problem
2235-2315	**Seafloor Pump Test 1 PCTB-CS** Bit just above seafloor Using Hex Pump 2 (circulating seawater) 0-140 SPM; 0-700 GPM 16-1922 psi standpipe pressure (Weatherford)
2315-2400	**Seafloor Pump Test 2 (cement pump) PCTB-CS** Bit just above seafloor 0.5-7.0 barrels per minute (BPM); 21-40 GPM 1.0-239 psi standpipe pressure (Schlumberger gauge)

4. OPERATIONAL PLAN (Next 24 Hours):
Update: Spudded hole UT-GOM2-1-H002 at 08:53 on 11-May-2017. Tagged seafloor, drill pipe measured depth 6719 ft. Coordinates: Lat: 27° 00.04548', Long: -90° 25.59312' (WGS 84).

5. DOWNHOLE LOGGING OPERATIONS:
NA

6. CORE DATA:

NA

7. Science Activities

The PCTB-CS pressure core BHA reached near the seafloor (6716 MD) at 2110hr and the Geotek instrumented core barrel was deployed in preparation for conducting a series of seafloor level pump tests. The first attempted seafloor pump test was not completed because of an electrical problem associated with one of the ship's mud pumps. However, two additional seafloor pump tests were completed without any concerns. The pump tests also allowed for the analysis of the performance of all three pump units on the platform (i.e., Hex Pumps 1 and 2; and the Schlumberger cement pump). Analysis of data obtained from both the sea surface and seafloor pump test documented only small pressure differentials across the core liner for all of the completed tests. In addition, the instrumented core liner was not damaged during any of the completed pump test. Modifications to the drilling fluid flow paths through the PCTB-CS appear to have significantly reduced the internal pressure conditions that have in the past resulted in the collapse of core liners within the PCTB-CS system. The pump tests also represented an excellent opportunity for Geotek and the Q4000 rig crew to become familiar with operations and handling of the PCTB-CS pressure core system as deployed on this expedition.

The Science Party continued to work on core handling and sample plans in preparation for the spuding of the UT-GOM2-1-H002 hole now scheduled for early on 11-May-17. In addition, Geotek technical staff and UT scientists have reviewed and further refined the planned pressure core degassing experimental protocols that will be used to conduct new "slow degassing protocols".

Confirmed following shipboard conversions (Geotek, UT, etc.):
-Mud pumps 5.04 US Gallons per stroke, will use 5.0 GPM/stroke in calculations
-US barrels to US gallons (1bbl = 42 gallons)

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 11-May-2017, 0000-2400 hr

2. LOCATION:

0000 - 2400 hr, 11-May-2017
Green Canyon 955
Hole UT-GOM2-1-H002
Lat: 27° 00.04548', Long: -90° 25.59312' (WGS 84)
Water depth: 6667.0 ft (6719.0 ft RKB)
Per Datum: RKB 52.0 ft above SL

3. DESCRIPTION OF OPERATIONS:

0000-0100 Complete the PCTB-CS Seafloor Pump Test 2 from 10-May-2017
Flow test Hex Pump 1 (unable to maintain pump rate)
0100-0500 Prepare to spud Hole UT-GOM2-1-H002
POOH instrumented core barrel F/6454 T/surface
JSAs to deal with PCTB-CS and wireline systems
MU and RIH PCTB-CS center bit barrel
MU wireline night cap to TDS
0500-0530 Test wireline night cap on TDS to 5000 psi
0530-0600 Held Spud meeting with all personnel involved
0600-0630 RIH DP F/6550ft T/6709ft
0630-0730 *D/S Q4000* DP moved over proposed drill site
0730-0830 RIH and tagged mudline at 6719.0 ft RKB
Pull clear of mudline a reset data loggers
0830-1200 Spud Hole UT-GOM2-1-H002 at 6667.0 ft (6719.0 ft RKB).
Advance hole to 6992.0 ft RKB (273.0 fbsf)
BSEE inspection (Inspectors Campo, Boudreaux, Fry, Shedd
1200-2300 Advance hole to 8032.0 ft RKB (1313.0 fbsf)
2300-2400 Circulate hole clean with 8.6 ppg mud

4. OPERATIONAL PLAN (Next 24 Hours):

Continue to advance Hole UT-GOM2-1-H002 to planned first core point at 8062.0 ft RKB (1343.0 fbsf), deploy and conduct continuous pressure coring with the PCTB-CS system.

5. DOWNHOLE LOGGING OPERATIONS:

NA

6. CORE DATA:

NA

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 30 April 2017, 0000-2400hr

2. LOCATION:
0000 – 2400 hr, 30 April 2017
Brownsville, TX at the dock in the Keppel Amfels shipyard.

3. DESCRIPTION OF OPERATIONS:
UT and Geotek have boarded the Q4000. All Geotek containers have been loaded onto the vessel. Phone and internet have been connected to company man and the 3rd party offices. Representatives from UT, Geotek, Helix, Schlumberger, and Weatherford met to discuss the status/plans for rig floor and container operations going forward. These plans include utility connections to Geotek containers, grating installation, Schlumberger wireline rig up through the top drive, Weatherford instrumentation, and mouse-hole installation/modification. The current priority is for Helix to finish loading and load-testing before the above operations can continue.

4. OPERATIONAL PLAN (Next 24 Hours):
We are scheduled to depart from Brownsville tomorrow morning, May 1, at 0700. The plans discussed above will continue during the transit to GC 955.

5. DOWNHOLE LOGGING OPERATIONS:
Hole: NA
LWD Totals: NA
Wireline Totals: NA

6. CORE DATA:
Hole: NA
PCTB Coring (pressure coring) Totals: NA

7. Science Activities
NA

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 01 May 2017, 0000-2400 hr

2. LOCATION:
0000 – 0750 hr, 01 May 2017
Brownsville, TX
0750 – 2200 hr, 01 May 2017
Transit
2200 – 2400
Stationary offshore

3. DESCRIPTION OF OPERATIONS:
At 0750 hr the *Q4000* left the dock and was guided by the harbor pilot through the channel towards South Padre Island. At 1020 hr the vessel entered the Gulf of Mexico, and continued offshore at 1105 after the pilot disembarked. At 1300 there was a fire drill. Geotek gained access to clean freshwater for their containers. Most activities are paused until Helix finishes sea trials for the vessel.

4. OPERATIONAL PLAN (Next 24 Hours):
The *Q4000* will stop and ballast late today and then Helix will perform sea trials of various vessel functions starting this evening, and should be complete by Wednesday. The transit to Green Canyon 955 will continue after the tests.

5. DOWNHOLE LOGGING OPERATIONS:
NA

6. CORE DATA:
NA

7. Science Activities:
Reviewed drilling program and coring plan.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 02 May 2017, 0000-2400 hr

2. LOCATION:
0000-2400 hr, 02 May 2017
26.1025° N, 96.05967° W
Approximately 60 nmi offshore South Padre Island, TX

3. DESCRIPTION OF OPERATIONS:
The Q4000 has remained stationary offshore while conducting a variety of tests. Geotek worked on organizing their containers and are awaiting electrical connections.

4. OPERATIONAL PLAN (Next 24 Hours):
Helix will continue their FMEA sea trials.

5. DOWNHOLE LOGGING OPERATIONS:
NA

6. CORE DATA:
NA

7. Science Activities
The science party has been reviewing the drilling and coring plan.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 03 May 2017, 0000-2400hr

2. LOCATION:
0000 -2400 hr, 03 May 2017
26.1025° N, 96.05967° W
Approximately 60 nmi east of South Padre Island, TX

3. DESCRIPTION OF OPERATIONS:
The *Q4000* remained stationary and Helix completed FMEA tests. Geotek gained electrical power to their equipment and started one their chilling units.

4. OPERATIONAL PLAN (Next 24 Hours):
After a crew change in the morning of 04 May 2017, the *Q4000* will de-ballast and begin transit to GC955. Forecasted strong winds may cause delays.

5. DOWNHOLE LOGGING OPERATIONS:
NA

6. CORE DATA:
NA

7. Science Activities
The science party has been reviewing the drilling and coring plan.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 04 May 2017, 0000-2400hr

2. LOCATION:
0000 – 1800 hr, 04 May 2017
26.1025° N, 96.05967° W
Approximately 60 nmi east of South Padre Island, TX
1800 – 2400 hr, 05 May 2017
Transit towards GC995

3. DESCRIPTION OF OPERATIONS:
Helix completed a crew change through the morning and afternoon with three helicopter flights. After transfers were complete, the *Q4000* was de-ballasted and began to transit towards GC955. Helix began installing the grating around Geotek's containers. Geotek continued to organize and inventory their equipment.

4. OPERATIONAL PLAN (Next 24 Hours):
The *Q4000* will continue its transit to the northeast with an expected arrival at GC955 late on 06 May 2017.

5. DOWNHOLE LOGGING OPERATIONS:
NA

6. CORE DATA:
NA

7. Science Activities
The science party has been reviewing the drilling, coring and sampling plan.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 05 May 2017, 0000-2400 hr

2. LOCATION:
0000 – 2400 hr, 05 May 2017

3. DESCRIPTION OF OPERATIONS:
The *Q4000* continued transit towards GC955 throughout the day. Grating is installed around Geotek's containers and they are continuing to set up their equipment. UT, Helix, Geotek and all third parties had a pre-spud meeting to discuss the expedition objectives and the operational plan. Schlumberger and Helix worked on rigging up the wireline equipment to the top drive.

4. OPERATIONAL PLAN (Next 24 Hours):
The *Q4000* is expected to arrive at GC955 at 1530 on 06 May 2017. The supply boat is ready and will arrive on Saturday.

5. DOWNHOLE LOGGING OPERATIONS:
NA

6. CORE DATA:
NA

7. Science Activities
The science party continued to review and refine the drilling and coring plan.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 06 May 2017, 0000-2400hr

2. LOCATION:
0000 – 1640 hr, 06 May 2017
Transit to GC955
1640 hr – 2400 hr
On site at GC955-H002

3. DESCRIPTION OF OPERATIONS:
The Q4000 arrived 1 nmi from GC955-H002 at 1600 hr after a 307 nmi transit. The wireline equipment is now rigged up to the top drive. Geotek continued to prepare their equipment. The ROV was launched at 2040 to deploy four Compatt transponders and survey the site area. The H001 well was found at 2247 hr at a location of 27° 00.05126' N, 090° 25.58367' W in a WGS84 coordinate system. The condition of the top of the borehole is intact.

4. OPERATIONAL PLAN (Next 24 Hours):
The supply boat is scheduled to arrive early 07 May 2017 and will be offloaded much of the day. Drilling mud will be offloaded and mixed. On-site mobilization will continue in preparation for the flow test. UT will work to unpack and organize the mud lab.

5. DOWNHOLE LOGGING OPERATIONS:
NA

6. CORE DATA:
NA

7. Science Activities
The science party continued to work on resolving the coring points and sampling protocols.

Daily Operational and Science Report
UT-GOM2-1: Hydrate Pressure Coring Expedition

1. DATE: 07 May 2017, 0000-2400hr

2. LOCATION:
0000 - 2400 hr, 07 May 2017
GC955H

3. DESCRIPTION OF OPERATIONS:
A partial crew change occurred via three helicopter flights. The supply boat was offloaded over most of the day; drilling mud, gel, and the mud lab were brought on board. The as-found survey with the ROV was completed. Geotek did a trial run of attaching an autoclave to PCATS. Helix increased the voltage at Geotek's containers to 204 V. Helix worked on installing the HVAC system for the mud pumps. Weatherford installed a new interface and software to record active signals during drilling.

4. OPERATIONAL PLAN (Next 24 Hours):
Potable water and fuel will be transferred to the *Q4000*. Helix will make up doubles in drill pipe. The flow test is planned to occur sometime on 08 May 2017.

5. DOWNHOLE LOGGING OPERATIONS:
NA

6. CORE DATA:
NA

7. Science Activities
The science party worked to finalize the location of the H002 well based on the 'as found' location of the H001 borehole. The final location of the H002 well was selected to be: 27° 0.0460' N 90° 25.5930 W in the WGS84 coordinate system. This is 59 ft SSW from the existent H001 borehole. The Science Party worked on planning the expedition report.

Appendix C. UT-GOM2 Pre-Drill Operations Plan

UT/DOE PCTB Marine Test Activity Forecast and Time Estimate

Revision: K Date: 1 May 2017

ITEM	ACTIVITY	TASK DESCRIPTION	TIME (hr)	TIME CUM	TIME Start	TIME Stop	NOTES
Saturday, April 29, 2017							
1	**In Port**	Load PCATS and PCTB containers and connect services (electric, air, water).	24.00	24.00	0:00	0:00	
2	**Brownsville**	Load lifting baskets, rack tubulars.					
3	**Texas**	Install grating.					
4		Install wireline unit and test loading weight bar.					Requires rigging up wireline.
5							
Sunday, April 30, 2017							
6	**In Port Brownsville**	Continue port call activities.	24.00	48.00	0:00	0:00	
7							
Monday, May 01, 2017							
8	**FMEA Sea Trial**	Transit to deep water, continue ship refurbishment, complete inspection/FMEA.	24.00	72.00	0:00	0:00	Mobilization tasks to be completed as time, equipment and personnel availability allows.
Tuesday, May 02, 2017							
9	**FMEA Sea Trial**	Continue ship refurbishment, complete inspection/FMEA.	24.00	96.00	0:00	0:00	Mobilization tasks to be completed as time, equipment and personnel availability allows.
Wednesday, May 03, 2017							
10	**FMEA Sea Trial**	Continue ship refurbishment, complete inspection/FMEA.	24.00	120.00	0:00	0:00	Mobilization tasks to be completed as time, equipment and personnel availability allows.
Thursday, May 04, 2017							
11	**FMEA Sea Trial**	Continue ship refurbishment, complete inspection/FMEA.	24.00	144.00	0:00	0:00	Mobilization tasks to be completed as time, equipment and personnel availability allows.
Friday, May 05, 2017							
12	**FMEA Sea Trial**	Complete ship refurbishment, inspection/FMEA.	24.00	168.00	0:00	0:00	Mobilization tasks to be completed as time, equipment and personnel availability allows.
Saturday, May 06, 2017							
13	**Transit to**	Set up and test PCATS.	24.00	192.00	0:00	0:00	
14	**Site GC-955**	Assemble and test PCTB subassemblies.					
15		Install instrumented core liner in PCTB.					
16		Make up drill pipe.					
17		Set up and test chillers.					
Sunday, May 07, 2017							
18	**Transit to Site GC-955**	Continue transit activities.	24.00	216.00	0:00	0:00	
Monday, May 08, 2017							
19	**Mobilization**	Transfer liquid mud and bulk materials.	24.00	240.00	0:00	0:00	
20	**(on site)**	Launch ROV, deploy beacon(s), take up station.					
21		Perform "as found" site survey with ROV.					
22		Prep for PCTB flow tests.					
23		Test DP system.					
24		Load mud van and other equipment from Fourchon.					
25		Embark UT personnel via helicopter.					
Tuesday, May 09, 2017							
26	**Mobilization (on site)**	Continue on-site mobilization activities.	24.00	264.00	0:00	0:00	
Wednesday, May 10, 2017							
27	**Safety**	Operations safety meeting.	0.50	264.50	0:00	0:30	**Start time dependent on completion of mobilization tasks.**
28	**MU Cutting Shoe BHA**	Install lockable float valve in 9-7/8 bit sub.	0.00	264.50	0:30	0:30	Geotek. Pre-install.
29		Install bit seal and fish pill in 9-7/8 cutting shoe bit, MU bit to bit sub.	0.00	264.50	0:30	0:30	Geotek. Pre-install.
30		Pick up seal bore drill collar, make up bit sub/bit subassembly to seal bore drill collar, torque all connections.	0.50	265.00	0:30	1:00	Helix/Geotek.
31		Make up landing saver sub to seal bore drill collar.	0.25	265.25	1:00	1:15	Helix/Geotek. Install replaceable landing seat.
32		Make up top sub to landing saver sub.	0.25	265.50	1:15	1:30	Helix/Geotek.
33		Make up head sub to top sub.	0.25	265.75	1:30	1:45	Helix/Geotek. Install latch sleeve.
34		Place cutting shoe-configured PCTB lower w/ ICL using lifting clamp and tugger; land on assembly stand over 10" mousehole	0.25	266.00	1:45	2:00	Helix/Geotek. May stage in 10" mouse hole.
35		Pick up PCTB upper end w/tugger, make up upper end to lower end.	0.50	266.50	2:00	2:30	Helix/Geotek.

36		Pick up PCTB assy using tugger, remove lower end lifting clamp, transfer into drill pipe and land upper lifting clamp on crossover sub; attach tugger to wireline running tool, insert running tool in PCTB, pick up PCTB, remove latch-lock clamp and lifting clamp, land PCTB assy in BHA	0.50	267.00	2:30	3:00	Helix/Geotek.
37		Space out cutting shoe configured PCTB. Leave PCTB in OCB assembly after spacing out.	2.75	269.75	3:00	5:45	Geotek/Helix.
38		Make up drill pipe to BHA cross over sub to head sub.	0.25	270.00	5:45	6:00	Helix.
39		Lower outer core barrel assembly w/2 stands (doubles) 5-7/8 drill pipe, hang off at rig floor.	0.75	270.75	6:00	6:45	Helix.
40		PU top drive to drill pipe.	0.50	271.25	6:45	7:15	Helix.
41	**Cutting Shoe Flow Test**	Start mud pump and circulate at 25 gpm, note stand pipe pressure.	0.25	271.50	7:15	7:30	Circulate sea water. Note pressure at steady state flow. Helix/Geotek.
42		Increase flow rate in 25 gpm intervals, noting stand pipe pressure for each interval, to 400+ gpm, 1,000 psi max.	0.50	272.00	7:30	8:00	Note pressures at steady state flows. Helix/Geotek.
43		Stop mud pump, rack back top drive.	0.50	272.50	8:00	8:30	Helix. Assumes top drive parked for tripping.
44		POOH with 2 stands 5-7/8 drill pipe.	0.75	273.25	8:30	9:15	Helix. Leave XO sub attached to drill pipe.
45		Pick up PCTB w/tugger and wireline emergency pulling tool, install lifting clamp and latch-lock clamp on PCTB upper end, land PCTB assy on drill pipe, remove emergency pulling tool.	0.25	273.50	9:15	9:30	Geotek/Helix. May stage in 10" mouse hole.
46		Pick up PCTB w/tugger, transfer to 10" mousehole, install lifting clamp on PCTB lower end, land PCTB assy on assembly stand over 10" mousehole.	0.25	273.75	9:30	9:45	Geotek/Helix. May stage in 10" mouse hole.
47		Break PCTB upper end, stage in shuck.	0.50	274.25	9:45	10:15	
48		Recover PCTB lower end w/instrumented core liner and layout w/tugger/crane to service van.	0.50	274.75	10:15	10:45	Geotek/Helix.
49		Remove fish pills from instrumented core liner.	0.00	274.75	10:45	10:45	Perform while breaking down outer core barrel assembly.
50		Break bit - do not remove, break bit sub, lay out bit sub/bit subassembly.	0.25	275.00	10:45	11:00	Helix.
51		Remove bit, recover fish pill(s).	0.25	275.25	11:00	11:15	Geotek.
52		Review flow test pressure data and size bit nozzles accordingly.	0.75	276.00	11:15	12:00	Geotek/UT.
53	**Safety**	Operations safety meeting.	0.50	276.50	12:00	12:30	
54		Continue review flow test pressure data and size bit nozzles accordingly.	1.25	277.75	12:30	13:45	Geotek/UT.
55		Make up 9-7/8 cutting shoe bit to bit sub.	0.00	277.75	13:45	13:45	Geotek/Helix. Complete while reviewing flow test data.
56	**RIH for Coring**	Make up bit sub/bit subassy to outer core barrel assy.	0.00	277.75	13:45	13:45	Helix/Geotek. Complete while reviewing flow test data.
57		Torque up bit and bit sub to outer core barrel assy, land outer core barrel assy at rig floor.	0.00	277.75	13:45	13:45	Helix. Complete while reviewing flow test data.
58		Pick up cementing barrel w/tugger, land on C-plate on crossover sub.	0.00	277.75	13:45	13:45	Helix/Geotek. Complete while reviewing flow test data.
59		Remove lifting clamp, pull C-plate, drop cementing barrel into outer core barrel assy.	0.00	277.75	13:45	13:45	Helix/Geotek. Complete while reviewing flow test data.
60		Check cementing barrel space out.	0.00	277.75	13:45	13:45	Helix/Geotek. Complete while reviewing flow test data.
61		Attach running tool to tugger, insert into cementing barrel, raise cementing barrel from outer core barrel assy, attach lifting clamp, land lifting clamp on crossover sub, remove running tool, attach tugger to lifting clamp, raise and lay out w/tugger.	0.25	278.00	13:45	14:00	Helix/Geotek. Complete while reviewing flow test data.
62		Pick up center bit w/tugger, land lifting clamp on drill pipe, attach running tool to tugger, insert running tool, raise center bit assy, remove lifting clamp, lower and land in outer core barrel assy.	0.25	278.25	14:00	14:15	Helix/Geotek. Complete while reviewing flow test data.
63		Space out center bit. Leave center bit in outer core barrel assy after spaced out.	1.00	279.25	14:15	15:15	Helix/Geotek.
64		Make up 9-7/8 stabilizer to outer core barrel assy.	0.25	279.50	15:15	15:30	Helix.
65		Make up 1 ea. 8-1/2 drill collar to stabilizer.	0.25	279.75	15:30	15:45	Helix.
66		MU 9-7/8 stabilizer to drill collars.	0.25	280.00	15:45	16:00	Helix.
67		MU 4 ea. 8-1/2 drill collars to stabilizer.	1.50	281.50	16:00	17:30	Helix.
68		Make up drill pipe to BHA cross over sub to drill collars.	0.25	281.75	17:30	17:45	Helix.
69		RIH to 6,650 ft on 5-7/8 drill pipe. Seafloor depth = 6716 ft.	6.25	288.00	17:45	0:00	Helix. Note, logging tool drift test may be performed prior to RIH (reference logging tool drift test time estimate).
Thursday, May 11, 2017							
70	**Safety**	Operations safety meeting.	0.50	288.50	0:00	0:30	
71		Continue RIH to 6,650 ft on 5-7/8 drill pipe. Seafloor depth = 6716 ft.	1.75	290.25	0:30	2:15	Helix. Note, logging tool drift test may be performed prior to RIH (reference logging tool drift test time estimate).
72		Pick up top drive.	0.50	290.75	2:15	2:45	Helix. Assumes top drive parked for tripping.
73	**Spud Hole**	Spud hole H-002, drill 6,716 ft to 7,760 ft.	4.25	295.00	2:45	7:00	Helix. Drill with sea water, pump Hi-Vis and/or weighted mud sweeps as needed. May need to begin continuous 10.5 ppg mud circulation to keep hole open. Maintain top hole integrity as much as possible.

74	**Hole Survey (Gyro Tool)**	Rig up wireline.	1.00	296.00	7:00	8:00	Assumes waiver to forego survey until end of hole has been denied.
75		Rig up survey tool.	0.50	296.50	8:00	8:30	
76		RIH w/survey tool on wireline.	0.50	297.00	8:30	9:00	
77		Take inclination survey, POOH w/survey tool on wireline.	0.75	297.75	9:00	9:45	
78		Lay out survey tool.	0.50	298.25	9:45	10:15	
79		Rig down wireline.	1.00	299.25	10:15	11:15	
80	**Drilling**	Drill 7,760 - 8,064 ft.	0.75	300.00	11:15	12:00	Helix. Drill with sea water, pump Hi-Vis and/or weighted mud sweeps as needed. May need to begin continuous 10.5 ppg mud circulation to keep hole open. Maintain top hole integrity as much as possible.
81	**Safety**	Operations safety meeting.	0.50	300.50	12:00	12:30	
82	**Drilling**	Drill 7,760 - 8,064 ft.	0.50	301.00	12:30	13:00	Helix. Drill with sea water, pump Hi-Vis and/or weighted mud sweeps as needed. May need to begin continuous 10.5 ppg mud circulation to keep hole open. Maintain top hole integrity as much as possible.
83		Clean and condition hole as required. Fill hole with 10.5 mud.	1.00	302.00	13:00	14:00	Helix. Maintain continuous pumping of 10.5 ppg mud while coring.
84		Rig up wireline, including sinker bar and jar assemblies.	1.00	303.00	14:00	15:00	Helix/Slb.
85		Break drill string, load wireline/emergency pulling tool, close drill string.	0.25	303.25	15:00	15:15	Helix/Geotek/Slb.
86		RIH w/wireline at max safe speed, latch center bit, maintain circulation at 10 gpm min.	0.75	304.00	15:15	16:00	Slb/Geotek/Helix. Rotate and manipulate as required.
87		POOH w/center bit on wireline @ max safe speed, maintain circulation at 10 gpm min.	0.75	304.75	16:00	16:45	Slb/Geotek/Helix. Rotate and manipulate as required.
88		Break drill string, install lifting clamp on center bit, land center bit on drill pipe, unlatch wireline, change out emergency pulling tool for running tool.	0.25	305.00	16:45	17:00	Helix/Geotek.
89		Lay out center bit w/tugger.	0.25	305.25	17:00	17:15	Helix/Geotek.
90		Pick up PCTB lower end w/tugger, land lifting clamp on assembly stand over 10" mousehole.	0.25	305.50	17:15	17:30	Helix/Geotek. May stage in 10" mousehole.
91		Pick up PCTB upper end w/tugger, make up to lower end, lift and transfer to drill pipe, land PCTB assy on drill pipe.	0.50	306.00	17:30	18:00	Helix/Geotek.
92		Latch wireline to PCTB assy, pick up PCTB assy, remove lifting clamp, close drill string, RIH w/PCTB on wireline @ max safe speed, land/latch PCTB in outer core barrel assy, maintain circulation at 10 gpm min.	1.00	307.00	18:00	19:00	Slb/Geotek/Helix. Rotate and manipulate as required.
93		POOH w/wireline @ max safe speed, break drill string, change out running tool for pulling tool, close drill string.	0.75	307.75	19:00	19:45	Slb/Geotek/Helix. Rotate and manipulate as required.
94		RIH with wireline at max safe speed to 7950 ft.	0.00	307.75	19:45	19:45	Slb. RIH while coring.
95	**Core 1CS**	**Core 8,064 ft to 8,074 ft.**	1.00	308.75	19:45	20:45	Helix/Geotek. Note, top of hydrate @ 8,071 ft.
96		Lower wireline, latch PCTB, POOH w/PCTB at max safe speed, maintain circulation @ 10 gpm min.	0.75	309.50	20:45	21:30	Slb/Geotek/Helix. Rotate and manipulate as required.
97		Break drill string, install lifting clamp on PCTB upper end, land PCTB on drill string, unlatch wireline.	0.25	309.75	21:30	21:45	Helix/Geotek/Slb.
98		Pick up PCTB w/tugger, install lifting clamp on lower end, load/land lower end in cold shuck.	0.25	310.00	21:45	22:00	Helix/Geotek/Slb.
99		Break PCTB upper end, stage in mousehole.	0.25	310.25	22:00	22:15	Geotek/Helix.
100		Pick up refurbished PCTB lower end w/tugger, load/land in assembly stand over 10" mousehole	0.25	310.50	22:15	22:30	Geotek/Helix.
101		Pick up PCTB upper end w/tugger, make up to PCTB lower end, pick up PCTB assy, transfer to drill pipe, land PCTB on drill pipe,	0.50	311.00	22:30	23:00	Geotek/Helix.
102		Change out wireline pulling tool for running tool, latch wireline to PCTB, pick up PCTB w/wireline, remove lifting clamp, close drill string, RIH w/PCTB on wireline @ max safe speed, maintain circulation @ 10 gpm min.	1.00	312.00	23:00	0:00	Slb/Geotek/Helix. Rotate and manipulate as required.
Friday, May 12, 2017							
103	**Safety**	Operations safety meeting.	0.50	312.50	0:00	0:30	
104		Land/latch PCTB in outer core barrel assy, POOH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	313.25	0:30	1:15	Slb/Geotek/Helix. Rotate and manipulate as required.
105		Break drill string, change out wireline running tool for pulling tool, close drill string.	0.25	313.50	1:15	1:30	Helix/Geotek/Slb.
106		RIH w/wireline at max safe speed to 7,950 ft.	0.00	313.50	1:30	1:30	Slb. RIH while coring.
107	**Core 2CS**	**Core 8,074 ft to 8,084 ft.**	1.00	314.50	1:30	2:30	Helix/Geotek.
108		Lower wireline, latch PCTB, POOH w/PCTB at max safe speed, maintain circulation @ 10 gpm min.	0.75	315.25	2:30	3:15	Slb/Geotek/Helix. Rotate and manipulate as required.
109		Break drill string, install lifting clamp on PCTB upper end, land PCTB on drill string, unlatch wireline.	0.25	315.50	3:15	3:30	Helix/Geotek/Slb.
110		Pick up PCTB w/tugger, install lifting clamp on lower end, load/land lower end in cold shuck.	0.25	315.75	3:30	3:45	Helix/Geotek/Slb.
111		Break PCTB upper end, stage in mousehole.	0.50	316.25	3:45	4:15	Geotek/Helix.
112		Pick up refurbished PCTB lower end w/tugger, load/land in assembly stand over 10" mousehole	0.25	316.50	4:15	4:30	Geotek/Helix.
113		Pick up PCTB upper end w/tugger, make up to PCTB lower end, pick up PCTB assy, remove lifting clamp from lower end, land PCTB on drill pipe.	0.50	317.00	4:30	5:00	Geotek/Helix.

114		Change out wireline pulling tool for running tool, latch wireline to PCTB, pick up PCTB w/wireline, remove lifting clamp, close drill string, RIH w/PCTB on wireline @ max safe speed, maintain circulation @ 10 gpm min.	1.00	318.00	5:00	6:00	Slb/Geotek/Helix. Rotate and manipulate as required.
115		Land/latch PCTB in outer core barrel assy, POOH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	318.75	6:00	6:45	Slb/Geotek/Helix. Rotate and manipulate as required.
116		Break drill string, change out wireline running tool for pulling tool, close drill string.	0.25	319.00	6:45	7:00	Helix/Geotek/Slb.
117		RIH w/wireline at max safe speed to 7,950 ft.	0.00	319.00	7:00	7:00	Slb. RIH while coring.
118	**Core 3CS**	**Core 8,084 ft to 8,094 ft.**	1.00	320.00	7:00	8:00	
119		Lower wireline, latch PCTB, POOH w/PCTB at max safe speed, maintain circulation @ 10 gpm min.	0.75	320.75	8:00	8:45	Slb/Geotek/Helix. Rotate and manipulate as required.
120		Break drill string, install lifting clamp on PCTB upper end, land PCTB on drill string, unlatch wireline.	0.25	321.00	8:45	9:00	Helix/Geotek/Slb.
121		Pick up PCTB w/tugger, install lifting clamp on lower end, load/land lower end in cold shuck.	0.25	321.25	9:00	9:15	Helix/Geotek/Slb.
122		Break PCTB upper end, stage in mousehole.	0.50	321.75	9:15	9:45	Geotek/Helix.
123	**Hole Cleaning (if required)**	Pick up center bit w/tugger, load/land center bit on drill pipe.	0.25	322.00	9:45	10:00	Helix/Slb/Geotek. Rotate and manipulate as required.
124		Latch wireline to center bit, close drill string, RIH w/center bit on wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	322.75	10:00	10:45	Helix/Slb/Geotek. Rotate and manipulate as required.
125		Land/latch center bit in outer core barrel assy, maintain circulation at 10 gpm min.	0.75	323.50	10:45	11:30	Helix/Slb/Geotek. Rotate and manipulate as required.
126		POOH w/wireline @ max safe speed, maintain circulation at 10 gpm min.	0.00	323.50	11:30	11:30	Helix/Slb/Geotek. POOH whole cleaning hole.
127		Break drill string, change out wireline running tool for emergency pulling tool, close drill string.	0.25	323.75	11:30	11:45	
128		RIH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.25	324.00	11:45	12:00	RIH while cleaning hole.
129	**Safety**	Operations safety meeting.	0.50	324.50	12:00	12:30	
130		Hole cleaning.	0.75	325.25	12:30	13:15	
131		Latch center bit, POOH w/center bit on wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	326.00	13:15	14:00	Helix/Slb/Geotek. Rotate and manipulate as required.
132		Break drill string, install lifting clamp on center bit, land center bit on drill pipe, unlatch wireline, lay out center bit w/tugger.	0.25	326.25	14:00	14:15	Helix/Slb/Geotek. Rotate and manipulate as required.
133	**Coring**	Pick up refurbished PCTB lower end w/tugger, load/land on assembly stand over 10" mousehole.	0.25	326.50	14:15	14:30	Geotek/Helix.
134		Pick up PCTB upper end w/tugger, make up to PCTB lower end, pick up PCTB assy, remove lifting clamp from lower end, transfer and land PCTB assy on drill pipe.	0.50	327.00	14:30	15:00	Geotek/Helix.
135		Change out wireline emergency pulling tool for running tool, latch wireline to PCTB, pick up PCTB w/wireline, remove lifting clamp, close drill string, RIH w/PCTB on wireline @ max safe speed, maintain circulation @ 10 gpm min.	1.00	328.00	15:00	16:00	Slb/Geotek/Helix. Rotate and manipulate as required.
136		Land/latch PCTB in outer core barrel assy, POOH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	328.75	16:00	16:45	Slb/Geotek/Helix. Rotate and manipulate as required.
137		Break drill string, change out wireline running tool for pulling tool, close drill string.	0.25	329.00	16:45	17:00	Helix/Geotek/Slb.
138		RIH w/wireline at max safe speed to 7,950 ft.	0.00	329.00	17:00	17:00	Slb. RIH while coring.
139	**Core 4CS**	**Core 8,094 ft to 8,104 ft.**	1.00	330.00	17:00	18:00	
140		Lower wireline, latch PCTB, POOH w/PCTB at max safe speed, maintain circulation @ 10 gpm min.	0.75	330.75	18:00	18:45	Slb/Geotek/Helix. Rotate and manipulate as required.
141		Break drill string, install lifting clamp on PCTB upper end, land PCTB on drill string, unlatch wireline.	0.25	331.00	18:45	19:00	Helix/Geotek/Slb.
142		Pick up PCTB w/tugger, install lifting clamp on lower end, load/land lower end in cold shuck.	0.25	331.25	19:00	19:15	Helix/Geotek/Slb.
143		Break PCTB upper end, stage in mousehole.	0.50	331.75	19:15	19:45	Geotek/Helix.
144		Pick up refurbished PCTB lower end w/tugger, load/land on assembly stand over 10" mousehole.	0.25	332.00	19:45	20:00	Geotek/Helix.
145		Pick up PCTB upper end w/tugger, make up to PCTB lower end, pick up PCTB assy, remove lifting clamp from lower end, transfer and land PCTB on drill pipe.	0.50	332.50	20:00	20:30	Geotek/Helix.
146		Change out wireline pulling tool for running tool, latch wireline to PCTB, pick up PCTB w/wireline, remove lifting clamp, close drill string, RIH w/PCTB on wireline @ max safe speed, maintain circulation @ 10 gpm min.	1.00	333.50	20:30	21:30	Slb/Geotek/Helix. Rotate and manipulate as required.
147		Land/latch PCTB in outer core barrel assy, POOH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	334.25	21:30	22:15	Slb/Geotek/Helix. Rotate and manipulate as required.
148		Break drill string, change out wireline running tool for pulling tool, close drill string.	0.25	334.50	22:15	22:30	Helix/Geotek/Slb.
149		RIH w/wireline at max safe speed to 7,950 ft.	0.00	334.50	22:30	22:30	Slb. RIH while coring.
150	**Core 5CS**	**Core 8,104 ft to 8,114 ft.**	1.00	335.50	22:30	23:30	
151		Lower wireline, latch PCTB, POOH w/PCTB at max safe speed, maintain circulation @ 10 gpm min.	0.50	336.00	23:30	0:00	Slb/Geotek/Helix. Rotate and manipulate as required.

Saturday, May 13, 2017							
152	**Safety**	Operations safety meeting.	0.50	336.50	0:00	0:30	
153		Break drill string, install lifting clamp on PCTB upper end, land PCTB on drill string, unlatch wireline.	0.25	336.75	0:30	0:45	Helix/Geotek/Slb.
154		Pick up PCTB w/tugger, install lifting clamp on lower end, load/land lower end in cold shuck.	0.25	337.00	0:45	1:00	Helix/Geotek/Slb.
155		Break PCTB upper end, stage in mousehole.	0.50	337.50	1:00	1:30	Geotek/Helix.
156		Pick up refurbished PCTB lower end w/tugger, load/land on assembly stand over 10" mousehole.	0.25	337.75	1:30	1:45	Geotek/Helix.
157		Pick up PCTB upper end w/tugger, make up to PCTB lower end, pick up PCTB assy, remove lifting clamp from lower end, land PCTB on drill pipe.	0.50	338.25	1:45	2:15	Geotek/Helix.
158		Change out wireline pulling tool for running tool, latch wireline to PCTB, pick up PCTB w/wireline, remove lifting clamp, close drill string, RIH w/PCTB on wireline @ max safe speed, maintain circulation @ 10 gpm min.	1.00	339.25	2:15	3:15	Slb/Geotek/Helix. Rotate and manipulate as required.
159		Land/latch PCTB in outer core barrel assy, POOH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	340.00	3:15	4:00	Slb/Geotek/Helix. Rotate and manipulate as required.
160		Break drill string, change out wireline running tool for pulling tool, close drill string.	0.25	340.25	4:00	4:15	Helix/Geotek/Slb.
161		RIH w/wireline at max safe speed to 7,950 ft.	0.00	340.25	4:15	4:15	Slb. RIH while coring.
162	**Core 6CS**	**Core 8,114 ft to 8,124 ft.**	1.00	341.25	4:15	5:15	
163		Lower wireline, latch PCTB, POOH w/PCTB at max safe speed, maintain circulation @ 10 gpm min.	0.75	342.00	5:15	6:00	Slb/Geotek/Helix. Rotate and manipulate as required.
164		Break drill string, install lifting clamp on PCTB upper end, land PCTB on drill string, unlatch wireline.	0.25	342.25	6:00	6:15	Helix/Geotek/Slb.
165		Pick up PCTB w/tugger, install lifting clamp on lower end, load/land lower end in cold shuck.	0.25	342.50	6:15	6:30	Helix/Geotek/Slb.
166		Break PCTB upper end, stage in mousehole.	0.50	343.00	6:30	7:00	Geotek/Helix.
167	**Drilling**	Pick up center bit w/tugger, load/land center bit in drill pipe.	0.25	343.25	7:00	7:15	Helix/Slb/Geotek. Rotate and manipulate as required.
168		Change out wireline pulling tool for running tool, latch wireline to center bit, pick up center bit, remove lifting clamp, close drill string, RIH w/center bit on wireline @ max safe speed, maintain circulation @ 10 gpm min.	1.00	344.25	7:15	8:15	Helix/Slb/Geotek. Rotate and manipulate as required.
169		Land/latch center bit in outer core barrel assy, POOH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.00	344.25	8:15	8:15	Helix/Slb/Geotek. Rotate and manipulate as required. POOH while drilling.
170		**Drill from 8,124 ft to 8,150 ft.**	0.75	345.00	8:15	9:00	Helix.
171	**Hole Cleaning**	Clean hole.	1.00	346.00	9:00	10:00	Helix.
172		Break drill string, change out wireline running tool for emergency pulling tool, close drill string, RIH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	346.75	10:00	10:45	Helix/Slb/Geotek. Rotate and manipulate as required.
173		Latch center bit, POOH w/center bit on wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	347.50	10:45	11:30	Helix/Slb/Geotek. Rotate and manipulate as required.
174		Break drill string, install lifting clamp on center bit, land center bit on drill pipe, unlatch wireline.	0.25	347.75	11:30	11:45	Helix/Slb/Geotek. Rotate and manipulate as required.
175		Lay out center bit w/tugger.	0.25	348.00	11:45	12:00	
176	**Safety**	Operations safety meeting.	0.50	348.50	12:00	12:30	
177	**Coring**	Pick up refurbished PCTB lower end w/tugger, load/land on assembly stand over 10" mousehole.	0.50	349.00	12:30	13:00	Geotek/Helix.
178		Pick up PCTB upper end w/tugger, make up to PCTB lower end, pick up PCTB assy, remove lifting clamp from lower end, transfer and land PCTB assy on drill pipe.	0.75	349.75	13:00	13:45	Geotek/Helix.
179		Change out wireline emergency pulling tool for running tool, latch wireline to PCTB, pick up PCTB w/wireline, remove lifting clamp, close drill string, RIH w/PCTB on wireline @ max safe speed, maintain circulation @ 10 gpm min.	1.00	350.75	13:45	14:45	Slb/Geotek/Helix. Rotate and manipulate as required.
180		Land/latch PCTB in outer core barrel assy, POOH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	351.50	14:45	15:30	Slb/Geotek/Helix. Rotate and manipulate as required.
181		Break drill string, change out wireline running tool for pulling tool, close drill string.	0.25	351.75	15:30	15:45	Helix/Geotek/Slb.
182		RIH w/wireline at max safe speed to 7,950 ft.	0.00	351.75	15:45	15:45	Slb. RIH while coring.
183	**Core 7CS**	**Core 8,150 ft to 8,160 ft.**	1.00	352.75	15:45	16:45	
184		Lower wireline, latch PCTB, POOH w/PCTB at max safe speed, maintain circulation @ 10 gpm min.	0.75	353.50	16:45	17:30	Slb/Geotek/Helix. Rotate and manipulate as required.
185		Break drill string, install lifting clamp on PCTB upper end, land PCTB on drill string, unlatch wireline.	0.25	353.75	17:30	17:45	Helix/Geotek/Slb.
186		Pick up PCTB w/tugger, install lifting clamp on lower end, load/land lower end in cold shuck.	0.25	354.00	17:45	18:00	Helix/Geotek/Slb.
187		Break PCTB upper end, stage in mousehole.	0.50	354.50	18:00	18:30	Geotek/Helix.
188		Pick up refurbished PCTB lower end w/tugger, load/land on assembly stand over 10" mousehole.	0.25	354.75	18:30	18:45	Geotek/Helix.
189		Pick up PCTB upper end w/tugger, make up to PCTB lower end, pick up PCTB assy, remove lifting clamp from lower end, land PCTB on drill pipe.	0.50	355.25	18:45	19:15	Geotek/Helix.

190		Change out wireline pulling tool for running tool, latch wireline to PCTB, pick up PCTB w/wireline, remove lifting clamp, close drill string, RIH w/PCTB on wireline @ max safe speed, maintain circulation @ 10 gpm min.	1.00	356.25	19:15	20:15	Slb/Geotek/Helix. Rotate and manipulate as required.
191		Land/latch PCTB in outer core barrel assy, POOH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	357.00	20:15	21:00	Slb/Geotek/Helix. Rotate and manipulate as required.
192		Break drill string, change out wireline running tool for pulling tool, close drill string.	0.25	357.25	21:00	21:15	Helix/Geotek/Slb.
193		RIH w/wireline at max safe speed to 7,950 ft.	0.00	357.25	21:15	21:15	Slb. RIH while coring.
194	**Core 8CS**	**Core 8,160 ft to 8,170 ft.**	1.00	358.25	21:15	22:15	
195		Lower wireline, latch PCTB, POOH w/PCTB at max safe speed, maintain circulation @ 10 gpm min.	0.75	359.00	22:15	23:00	Slb/Geotek/Helix. Rotate and manipulate as required.
196		Break drill string, install lifting clamp on PCTB upper end, land PCTB on drill string, unlatch wireline.	0.25	359.25	23:00	23:15	Helix/Geotek/Slb.
197		Pick up PCTB w/tugger, install lifting clamp on lower end, load/land lower end in cold shuck.	0.25	359.50	23:15	23:30	Helix/Geotek/Slb.
198		Break PCTB upper end, stage in mousehole.	0.50	360.00	23:30	0:00	Geotek/Helix.
Sunday, May 14, 2017							
199	**Safety**	Operations safety meeting.	0.50	360.50	0:00	0:30	
200		Pick up refurbished PCTB lower end w/tugger, load/land on assembly stand over 10" mousehole.	0.50	361.00	0:30	1:00	Geotek/Helix.
201		Pick up PCTB upper end w/tugger, make up to PCTB lower end, pick up PCTB assy, remove lifting clamp from lower end, land PCTB on drill pipe.	0.50	361.50	1:00	1:30	Geotek/Helix.
202		Change out wireline pulling tool for running tool, latch wireline to PCTB, pick up PCTB w/wireline, remove lifting clamp, close drill string, RIH w/PCTB on wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.50	362.00	1:30	2:00	Slb/Geotek/Helix. Rotate and manipulate as required.
203		Continue RIH w/PCTB on wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.50	362.50	2:00	2:30	Slb/Geotek/Helix. Rotate and manipulate as required.
204		Land/latch PCTB in outer core barrel assy, POOH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	363.25	2:30	3:15	Slb/Geotek/Helix. Rotate and manipulate as required.
205		Break drill string, change out wireline running tool for pulling tool, close drill string.	0.25	363.50	3:15	3:30	Helix/Geotek/Slb.
206		RIH w/wireline at max safe speed to 7,950 ft.	0.00	363.50	3:30	3:30	Slb. RIH while coring.
207	**Core 9CS**	**Core 8,170 ft to 8,180 ft.**	1.00	364.50	3:30	4:30	
208		Lower wireline, latch PCTB, POOH w/PCTB at max safe speed, maintain circulation @ 10 gpm min.	0.75	365.25	4:30	5:15	Slb/Geotek/Helix. Rotate and manipulate as required.
209		Break drill string, install lifting clamp on PCTB upper end, land PCTB on drill string, unlatch wireline.	0.25	365.50	5:15	5:30	Helix/Geotek/Slb.
210		Pick up PCTB w/tugger, install lifting clamp on lower end, load/land lower end in cold shuck.	0.25	365.75	5:30	5:45	Helix/Geotek/Slb.
211		Break PCTB upper end, stage in mousehole.	0.50	366.25	5:45	6:15	Geotek/Helix.
212		Pick up refurbished PCTB lower end w/tugger, load/land on assembly stand over 10" mousehole.	0.25	366.50	6:15	6:30	Geotek/Helix.
213		Pick up PCTB upper end w/tugger, make up to PCTB lower end, pick up PCTB assy, remove lifting clamp from lower end, land PCTB on drill pipe.	0.50	367.00	6:30	7:00	Geotek/Helix.
214		Change out wireline pulling tool for running tool, latch wireline to PCTB, pick up PCTB w/wireline, remove lifting clamp, close drill string, RIH w/PCTB on wireline @ max safe speed, maintain circulation @ 10 gpm min.	1.00	368.00	7:00	8:00	Slb/Geotek/Helix. Rotate and manipulate as required.
215		Land/latch PCTB in outer core barrel assy, POOH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	368.75	8:00	8:45	Slb/Geotek/Helix. Rotate and manipulate as required.
216		Break drill string, change out wireline running tool for pulling tool, close drill string.	0.25	369.00	8:45	9:00	Helix/Geotek/Slb.
217		RIH w/wireline at max safe speed to 7,950 ft.	0.00	369.00	9:00	9:00	Slb. RIH while coring.
218	**Core 10CS**	**Core 8,180 ft to 8,190 ft.**	1.00	370.00	9:00	10:00	Bottom of hydrate @ 8,166 ft RKB (1,445 fbsf).
219		Lower wireline, latch PCTB, POOH w/PCTB at max safe speed, maintain circulation @ 10 gpm min.	0.75	370.75	10:00	10:45	Slb/Geotek/Helix. Rotate and manipulate as required.
220		Break drill string, install lifting clamp on PCTB upper end, land PCTB on drill string, unlatch wireline.	0.25	371.00	10:45	11:00	Helix/Geotek/Slb.
221		Pick up PCTB w/tugger, install lifting clamp on lower end, load/land lower end in cold shuck.	0.25	371.25	11:00	11:15	Helix/Geotek/Slb.
222		Break PCTB upper end, stage in mousehole.	0.50	371.75	11:15	11:45	Geotek/Helix.
223	**Drilling**	Pick up center bit w/tugger, load/land center bit in drill pipe.	0.25	372.00	11:45	12:00	Helix/Slb/Geotek. Rotate and manipulate as required.
224	**Safety**	Operations safety meeting.	0.50	372.50	12:00	12:30	
225		Change out wireline pulling tool for running tool, latch wireline to center bit, pick up center bit, remove lifting clamp, close drill string, RIH w/center bit on wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.50	373.00	12:30	13:00	Helix/Slb/Geotek. Rotate and manipulate as required.
226		Continue RIH w/center bit on wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.50	373.50	13:00	13:30	Helix/Slb/Geotek. Rotate and manipulate as required.
227		Land/latch center bit in outer core barrel assy, POOH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	1.00	374.50	13:30	14:30	Helix/Slb/Geotek. Rotate and manipulate as required. POOH while drilling.

228		Rig down wireline.	1.00	375.50	14:30	15:30	
229		**Drill 8,190 ft to 8,440 ft.**	1.00	376.50	15:30	16:30	250 ft rat hole for logging
230		Clean hole for logging.	1.00	377.50	16:30	17:30	
231		Rig up wireline.	1.00	378.50	17:30	18:30	
232		RIH w/emergency pulling tool on wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	379.25	18:30	19:15	
233		Latch center bit, POOH w/center bit on wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	380.00	19:15	20:00	Helix/Slb/Geotek. Rotate and manipulate as required.
234		Break drill string, install lifting clamp on center bit, land center bit on drill pipe, unlatch wireline.	0.25	380.25	20:00	20:15	Helix/Slb/Geotek. Rotate and manipulate as required.
235		Lay out center bit w/tugger, close drill string.	0.25	380.50	20:15	20:30	
236		Rig down wireline.	1.00	381.50	20:30	21:30	
237		POOH w/bit to 7,871 ft.	1.00	382.50	21:30	22:30	
238	**Logging**	EDTC/HLDS/DSI/HRLA, Speed = 1,200 ft/hr		382.50	22:30	22:30	
239		Rig up logging line.	1.50	384.00	22:30	0:00	
Monday, May 15, 2017							
240	**Safety**	Operations safety meeting.	0.50	384.50	0:00	0:30	
241		Continue to rig up logging line.	0.50	385.00	0:30	1:00	
242		Rig up tool string.	1.00	386.00	1:00	2:00	
243		Calibration before run (in pipe).	0.25	386.25	2:00	2:15	
244		Run tool to pipe depth.	1.25	387.50	2:15	3:30	
245		Log down.	0.25	387.75	3:30	3:45	
246		Log up.	0.50	388.25	3:45	4:15	
247		Log down.	0.25	388.50	4:15	4:30	
248		Log up.	0.50	389.00	4:30	5:00	
249		Log to mudline.	1.00	390.00	5:00	6:00	
250		POOH.	1.25	391.25	6:00	7:15	
251		Calibration after run (in pipe).	0.25	391.50	7:15	7:30	
252		Rig down tool string.	0.75	392.25	7:30	8:15	
253		Rig down logging line.	2.25	394.50	8:15	10:30	
254	**Cementing**	RIH to TD @ 8,441 fbsf.	1	395.50	10:30	11:30	
255		Displace hole from TD to 7,900 ft with 11.5 ppg Hi-Vis pad mud.	1	396.50	11:30	12:30	
256	**Safety**	Operations safety meeting.	0.50	397.00	12:30	13:00	
257		POOH to 7,900 ft.	0.75	397.75	13:00	13:45	Bit at top of pad mud, 100 ft above hydrate zone.
258		Drop outer core barrel assembly (OCBA) cementing liner.	0.75	398.50	13:45	14:30	Free fall deploy.
259		Pump cement per Schlumberger program.	5	403.50	14:30	19:30	300 ft plug.
260		POOH to 6,616 ft (100 ft above sea floor).	2.5	406.00	19:30	22:00	100 ft above sea floor. Pull slowly through cement column 5 min/double.
261		Circulate ≥2X drill string volume w/sea water and 3x rubber balls at ≥5 bbl/min.	0.75	406.75	22:00	22:45	Pump foam pipe wipers.
262		Rig up wireline.	1	407.75	22:45	23:45	
263		RIH w/pulling tool on wireline, latch OCBA cementing liner, maintain 10 gpm min circulation.	0.25	408.00	23:45	0:00	Circulate.
Tuesday, May 16, 2017							
264	**Safety**	Operations safety meeting.	0.50	408.50	0:00	0:30	
265		Continue RIH w/pulling tool on wireline, latch OCBA cementing liner, maintain 10 gpm min circulation.	0.5	409.00	0:30	1:00	Circulate.
266		POOH w/OCBA cementing liner, maintain 10 gpm min circulation.	0.75	409.75	1:00	1:45	Circulate.
267		Break drill string, install lifting clamp on OCBA cementing liner, land OCBA cementing liner on drill pipe, unlatch wireline.	0.25	410.00	1:45	2:00	Helix/Slb/Geotek. Rotate and manipulate as required.
268		Lay out OCBA cementing liner w/tugger, close drill string.	0.50	410.50	2:00	2:30	
269		Rig down wireline.	1	411.50	2:30	3:30	
270		Circulate ≥1X drill string volume w/sea water at ≥5 bbl/min.	0	411.50	3:30	3:30	Circulate while rigging down wireline.
271		Rack back top drive.	0.5	412.00	3:30	4:00	
272	**POOH**	POOH to top of outer core barrel assy.	8.00	420.00	4:00	12:00	
273		Observe borehole for signs of out flow.	0	420.00	12:00	12:00	Observe while cleaning drill string
274	**Safety**	Operations safety meeting.	0.50	420.50	12:00	12:30	
275		POOH to bit, break bit - do not remove - break bit sub.	0.25	420.75	12:30	12:45	
276		Lay out bit sub/bit subassembly.	0.25	421.00	12:45	13:00	
277		Remove 9-7/8 cutting shoe bit, bit seal, LFV.	0.50	421.50	13:00	13:30	Inspect for retained cement.
278		Clear rig floor and stage face bit BHA components.	1.00	422.50	13:30	14:30	
279		Continue to clear rig floor and stage face bit BHA components.	1.00	423.50	14:30	15:30	
280	**MU Face Bit BHA**	Install standard float valve in 9-7/8 bit sub.	0.00	423.50	15:30	15:30	Geotek. Pre-install.
281		Install bit seal and fish pill in 9-7/8 face bit, MU bit to bit sub.	0.00	423.50	15:30	15:30	Geotek. Pre-install.
282		Pick up seal bore drill collar, make up bit sub/bit subassembly to seal bore drill collar, torque all connections.	0.50	424.00	15:30	16:00	Helix/Geotek.
283		Make up landing saver sub to seal bore drill collar.	0.25	424.25	16:00	16:15	Helix/Geotek. Install replaceable landing seat.
284		Make up top sub to landing saver sub.	0.25	424.50	16:15	16:30	Helix/Geotek.
285		Make up head sub to top sub.	0.25	424.75	16:30	16:45	Helix/Geotek. Install latch sleeve.
286		Pick up face bit configured PCTB lower end w/ instrumented core liner w/tugger, load/land PCTB lower end in mousehole.	0.25	425.00	16:45	17:00	Helix/Geotek. May stage in 10" mouse hole.

287		Pick up PCTB upper end w/tugger, make up upper end to lower end.	0.50	425.50	17:00	17:30	Helix/Geotek.
288		Pick up PCTB assy w/tugger, remove lower end lifting clamp, land PCTB assy on Outer Core Barrel assy.	0.25	425.75	17:30	17:45	Helix/Geotek.
289		Space out face bit configured PCTB. Leave PCTB in OCB assembly after spacing out.	2.00	427.75	17:45	19:45	Geotek/Helix.
290		Make up drill pipe to BHA cross over sub to head sub.	0.25	428.00	19:45	20:00	Helix.
291		Lower outer core barrel assembly w/2 stands (doubles) 5-7/8 drill pipe, hang off at rig floor.	0.75	428.75	20:00	20:45	Helix.
292		Make up top drive to drill pipe.	0.50	429.25	20:45	21:15	Helix.
293	**Face Bit Flow Test**	Start mud pump and circulate at 25 gpm, note stand pipe pressure.	0.25	429.50	21:15	21:30	Circulate sea water. Note pressure at steady state flow. Helix/Geotek.
294		Increase flow rate in 25 gpm intervals, noting stand pipe pressure for each interval, to 400+ gpm, 1,000 psi max.	0.50	430.00	21:30	22:00	Note pressures at steady state flows. Helix/Geotek.
295		Stop mud pump, park top drive.	0.25	430.25	22:00	22:15	Helix. Assumes top drive parked for tripping.
296		POOH with 2 stands 5-7/8 drill pipe.	0.50	430.75	22:15	22:45	Helix.
297		Break and lay out drill pipe to BHA XO.	0.25	431.00	22:45	23:00	Helix. XO sub can be left on last joint of drill pipe.
298		Pick up PCTB w/tugger and wireline pulling tool, install lifting clamp on PCTB upper end, land PCTB assy on outer core barrel assy, remove wireline pulling tool.	0.25	431.25	23:00	23:15	Geotek/Helix. May stage in 10" mouse hole.
299		Pick up PCTB w/tugger, install lifting clamp on PCTB lower end, land PCTB assy on outer core barrel assy.	0.25	431.50	23:15	23:30	Geotek/Helix. May stage in 10" mouse hole.
300		Break PCTB upper end, stage in shuck.	0.50	432.00	23:30	0:00	
Wednesday, May 17, 2017							
301	**Safety**	Operations safety meeting.	0.50	432.50	0:00	0:30	
302		Recover PCTB lower end w/instrumented core liner and layout w/tugger/crane to service van.	0.50	433.00	0:30	1:00	Geotek/Helix.
303		Break bit - do not remove, break bit sub, lay out bit sub/bit subassembly.	0.25	433.25	1:00	1:15	Helix.
304		Remove bit, recover fish pill(s).	0.25	433.50	1:15	1:30	Geotek.
305		Review flow test pressure data and size bit nozzles accordingly.	1.00	434.50	1:30	2:30	Geotek/UT.
306		Continue to review flow test pressure data and size bit nozzles accordingly.	1.00	435.50	2:30	3:30	Geotek/UT.
307		Make up 9-7/8 face bit to bit sub.	0.00	435.50	3:30	3:30	Geotek/Helix. Complete while reviewing flow test data.
308	**RIH for Coring**	Make up bit sub/bit subassy to outer core barrel assy.	0.00	435.50	3:30	3:30	Helix/Geotek. Complete while reviewing flow test data.
309		Torque up bit and bit sub to outer core barrel assy, land outer core barrel assy at rig floor.	0.00	435.50	3:30	3:30	Helix. Complete while reviewing flow test data.
310		Attach running tool to tugger, pick up cementing barrel w/tugger/running tool, remove lifting clamp, land cementing barrel in outer core barrel assy.	0.00	435.50	3:30	3:30	Helix/Geotek. Complete while reviewing flow test data.
311		Check cementing barrel space out.	0.00	435.50	3:30	3:30	Helix/Geotek. Complete while reviewing flow test data.
312		Remove cementing barrel from outer core barrel assy and lay out w/tugger.	0.00	435.50	3:30	3:30	Helix/Geotek. Complete while reviewing flow test data.
313		Pick up center bit w/tugger and land in outer core barrel assy.	0.25	435.75	3:30	3:45	Helix/Geotek.
314		Space out center bit. Leave center bit in outer core barrel assy after spaced out.	1.00	436.75	3:45	4:45	Helix/Geotek.
315		Make up 9-7/8 stabilizer to outer core barrel assy.	0.25	437.00	4:45	5:00	Helix.
316		Make up 1 ea. 8-1/2 drill collar to stabilizer.	0.25	437.25	5:00	5:15	Helix.
317		MU 9-7/8 stabilizer to drill collars.	0.25	437.50	5:15	5:30	Helix.
318		MU 4 ea. 8-1/2 drill collars to stabilizer.	1.50	439.00	5:30	7:00	Helix.
319		Make up drill pipe to BHA cross over sub to drill collars.	0.25	439.25	7:00	7:15	Helix.
320		RIH to 6,700 ft on 5-7/8 drill pipe. Seafloor depth = 6,716 ft.	4.75	444.00	7:15	12:00	
321	**Safety**	Operations safety meeting.	0.50	444.50	12:00	12:30	
322		Continue RIH to 6,700 ft on 5-7/8 drill pipe. Seafloor depth = 6,716 ft.	3.25	447.75	12:30	15:45	
323		Pick up top drive.	0.25	448.00	15:45	16:00	Helix. Assumes top drive parked for tripping.
324		Reenter Hole H-002	1	449.00	16:00	17:00	
325		RIH to 7600 ft (top of cement), set 15,000 WOB on cement.	2	451.00	17:00	19:00	Rotate only enough to monitor torque.
326		POOH to 6625 ft (100 ft above seafloor)	2	453.00	19:00	21:00	
327		Offset rig to Hole H-005	2	455.00	21:00	23:00	
328	**Spud Hole**	Spud Hole H-005, drill 6,725 ft to 7,765 ft.	0.25	455.25	23:00	23:15	Helix. Drill with sea water, pump Hi-Vis and/or weighted mud sweeps as needed. May need to begin continuous 10.5 ppg mud circulation to keep hole open. Maintain top hole integrity as much as possible.
329	**Hole Survey (Gyro Tool)**	Rig up wireline.	0.75	456.00	23:15	0:00	Assumes waiver to forego survey until end of hole has been denied.
Thursday, May 18, 2017							
330	**Safety**	Operations safety meeting.	0.50	456.50	0:00	0:30	

331		Continue rig up wireline.	0.50	457.00	0:30	1:00	Assumes waiver to forego survey until end of hole has been denied.
332		Rig up survey tool.	0.50	457.50	1:00	1:30	
333		RIH w/survey tool on wireline.	0.50	458.00	1:30	2:00	
334		Take inclination survey, POOH w/survey tool on wireline.	0.75	458.75	2:00	2:45	
335		Lay out survey tool.	0.50	459.25	2:45	3:15	
336		Rig down wireline.	1.00	460.25	3:15	4:15	
337	**Drilling**	Drill 7,765 ft to 8,063 ft.	2.00	462.25	4:15	6:15	Helix. Drill with sea water, pump Hi-Vis and/or weighted mud sweeps as needed. May need to begin continuous 10.5 ppg mud circulation to keep hole open. Maintain top hole integrity as much as possible.
338		Clean and condition hole as required. Fill hole with 10.5 mud.	1.00	463.25	6:15	7:15	Helix. Maintain continuous pumping of 10.5 ppg mud while coring.
339		Rig up wireline.	1.00	464.25	7:15	8:15	
340		Break drill string, load wireline/pulling tool, close drill string.	0.25	464.50	8:15	8:30	
341		RIH w/wireline at max safe speed, latch center bit, maintain circulation at 10 gpm min.	0.75	465.25	8:30	9:15	Slb/Geotek/Helix. Rotate and manipulate as required.
342		POOH w/center bit on wireline @ max safe speed, maintain circulation at 10 gpm min.	0.75	466.00	9:15	10:00	Slb/Geotek/Helix. Rotate and manipulate as required.
343		Break drill string, install lifting clamp on center bit, land center bit on drill pipe, unlatch wireline, change out pulling tool for running tool.	0.25	466.25	10:00	10:15	Helix/Geotek.
344		Lay out center bit w/tugger.	0.25	466.50	10:15	10:30	Helix/Geotek.
345	**Coring**	Pick up refurbished PCTB lower end w/tugger, load/land on assembly stand over 10" mousehole.	0.25	466.75	10:30	10:45	Geotek/Helix.
346		Pick up PCTB upper end w/tugger, make up to PCTB lower end, pick up PCTB assy, remove lifting clamp from lower end, transfer and land PCTB assy on drill pipe.	0.50	467.25	10:45	11:15	Geotek/Helix.
347		Change out wireline emergency pulling tool for running tool, latch wireline to PCTB, pick up PCTB w/wireline, remove lifting clamp, close drill string, RIH w/PCTB on wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	468.00	11:15	12:00	Slb/Geotek/Helix. Rotate and manipulate as required.
348	**Safety**	Operations safety meeting.	0.50	468.50	12:00	12:30	
349		POOH w/wireline @ max safe speed, break drill string, change out running tool for pulling tool, close drill string.	0.25	468.75	12:30	12:45	Slb/Geotek/Helix. Rotate and manipulate as required.
350		Continue to POOH w/wireline @ max safe speed, break drill string, change out running tool for pulling tool, close drill string.	0.50	469.25	12:45	13:15	Slb/Geotek/Helix. Rotate and manipulate as required.
351		RIH with wireline at max safe speed to 7950 ft.	0.00	469.25	13:15	13:15	Slb. RIH while coring.
352	**Core 11FB**	**Core 8,063 ft to 8,073 ft.**	1.00	470.25	13:15	14:15	Helix/Geotek. Note, top of hydrate @ 8,071 ft.
353		Lower wireline, latch PCTB, POOH w/PCTB at max safe speed, maintain circulation @ 10 gpm min.	0.75	471.00	14:15	15:00	Slb/Geotek/Helix. Rotate and manipulate as required.
354		Break drill string, install lifting clamp on PCTB upper end, land PCTB on drill string, unlatch wireline.	0.25	471.25	15:00	15:15	Helix/Geotek/Slb.
355		Pick up PCTB w/tugger, install lifting clamp on lower end, load/land lower end in cold shuck.	0.25	471.50	15:15	15:30	Helix/Geotek/Slb.
356		Break PCTB upper end, stage in mousehole.	0.50	472.00	15:30	16:00	Geotek/Helix.
357		Pick up refurbished PCTB lower end w/tugger, load/land on assembly stand over 10" mousehole.	0.25	472.25	16:00	16:15	Geotek/Helix.
358		Pick up PCTB upper end w/tugger, make up to PCTB lower end, pick up PCTB assy, remove lifting clamp from lower end, land PCTB on drill pipe.	0.50	472.75	16:15	16:45	Geotek/Helix.
359		Change out wireline pulling tool for running tool, latch wireline to PCTB, pick up PCTB w/wireline, remove lifting clamp, close drill string, RIH w/PCTB on wireline @ max safe speed, maintain circulation @ 10 gpm min.	1.00	473.75	16:45	17:45	Slb/Geotek/Helix. Rotate and manipulate as required.
360		Land/latch PCTB in outer core barrel assy, POOH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	474.50	17:45	18:30	Slb/Geotek/Helix. Rotate and manipulate as required.
361		Break drill string, change out wireline running tool for pulling tool, close drill string.	0.25	474.75	18:30	18:45	Helix/Geotek/Slb.
362		RIH w/wireline at max safe speed to 7,950 ft.	0.00	474.75	18:45	18:45	Slb. RIH while coring.
363	**Core 12FB**	**Core 8,073 ft to 8,083 ft.**	1.00	475.75	18:45	19:45	Helix/Geotek.
364		Lower wireline, latch PCTB, POOH w/PCTB at max safe speed, maintain circulation @ 10 gpm min.	0.75	476.50	19:45	20:30	Slb/Geotek/Helix. Rotate and manipulate as required.
365		Break drill string, install lifting clamp on PCTB upper end, land PCTB on drill string, unlatch wireline.	0.25	476.75	20:30	20:45	Helix/Geotek/Slb.
366		Pick up PCTB w/tugger, install lifting clamp on lower end, load/land lower end in cold shuck.	0.25	477.00	20:45	21:00	Helix/Geotek/Slb.
367		Break PCTB upper end, stage in mousehole.	0.50	477.50	21:00	21:30	Geotek/Helix.
368		Pick up refurbished PCTB lower end w/tugger, load/land on assembly stand over 10" mousehole.	0.25	477.75	21:30	21:45	Geotek/Helix.
369		Pick up PCTB upper end w/tugger, make up to PCTB lower end, pick up PCTB assy, remove lifting clamp from lower end, land PCTB on drill pipe.	0.50	478.25	21:45	22:15	Geotek/Helix.
370		Change out wireline pulling tool for running tool, latch wireline to PCTB, pick up PCTB w/wireline, remove lifting clamp, close drill string, RIH w/PCTB on wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	479.00	22:15	23:00	Slb/Geotek/Helix. Rotate and manipulate as required.

371		Land/latch PCTB in outer core barrel assy, POOH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	479.75	23:00	23:45	Slb/Geotek/Helix. Rotate and manipulate as required.
372		Break drill string, change out wireline running tool for pulling tool, close drill string.	0.25	480.00	23:45	0:00	Helix/Geotek/Slb.
Friday, May 19, 2017							
373	**Safety**	Operations safety meeting.	0.50	480.50	0:00	0:30	
374		RIH w/wireline at max safe speed to 7,950 ft.	0.00	480.50	0:30	0:30	Slb. RIH while coring.
375	**Core 13FB**	**Core 8,083 ft to 8,093 ft.**	1.00	481.50	0:30	1:30	
376		Lower wireline, latch PCTB, POOH w/PCTB at max safe speed, maintain circulation @ 10 gpm min.	0.75	482.25	1:30	2:15	Slb/Geotek/Helix. Rotate and manipulate as required.
377		Break drill string, install lifting clamp on PCTB upper end, land PCTB on drill string, unlatch wireline.	0.25	482.50	2:15	2:30	Helix/Geotek/Slb.
378		Pick up PCTB w/tugger, install lifting clamp on lower end, load/land lower end in cold shuck.	0.25	482.75	2:30	2:45	Helix/Geotek/Slb.
379		Break PCTB upper end, stage in mousehole.	0.50	483.25	2:45	3:15	Geotek/Helix.
380	**Hole Cleaning (if required)**	Pick up center bit w/tugger, load/land center bit on drill pipe.	0.25	483.50	3:15	3:30	
381		Latch wireline to center bit, close drill string, RIH w/center bit on wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	484.25	3:30	4:15	Helix/Slb/Geotek. Rotate and manipulate as required.
382		Land/latch center bit in outer core barrel assy, maintain circulation at 10 gpm min.	0.75	485.00	4:15	5:00	Helix/Slb/Geotek. Rotate and manipulate as required.
383		POOH w/wireline @ max safe speed, maintain circulation at 10 gpm min.	0.00	485.00	5:00	5:00	Helix/Slb/Geotek. POOH whole cleaning hole.
384		Break drill string, change out wireline running tool for emergency pulling tool, close drill string.	0.25	485.25	5:00	5:15	
385		RIH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.00	485.25	5:15	5:15	RIH while cleaning hole.
386		Hole cleaning.	1.50	486.75	5:15	6:45	
387		Latch center bit, POOH w/center bit on wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	487.50	6:45	7:30	Helix/Slb/Geotek. Rotate and manipulate as required.
388		Break drill string, install lifting clamp on center bit, land center bit on drill pipe, unlatch wireline, lay out center bit w/tugger.	0.25	487.75	7:30	7:45	Helix/Slb/Geotek. Rotate and manipulate as required.
389	**Coring**	Pick up refurbished PCTB lower end w/tugger, load/land on assembly stand over 10" mousehole.	0.25	488.00	7:45	8:00	Geotek/Helix.
390		Pick up PCTB upper end w/tugger, make up to PCTB lower end, pick up PCTB assy, remove lifting clamp from lower end, transfer and land PCTB assy on drill pipe.	0.50	488.50	8:00	8:30	Geotek/Helix.
391		Change out wireline emergency pulling tool for running tool, latch wireline to PCTB, pick up PCTB w/wireline, remove lifting clamp, close drill string, RIH w/PCTB on wireline @ max safe speed, maintain circulation @ 10 gpm min.	1.00	489.50	8:30	9:30	Slb/Geotek/Helix. Rotate and manipulate as required.
392		Land/latch PCTB in outer core barrel assy, POOH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	490.25	9:30	10:15	Slb/Geotek/Helix. Rotate and manipulate as required.
393		Break drill string, change out wireline running tool for pulling tool, close drill string.	0.25	490.50	10:15	10:30	Helix/Geotek/Slb.
394		RIH w/wireline at max safe speed to 7,950 ft.	0.00	490.50	10:30	10:30	Slb. RIH while coring.
395	**Core 14FB**	**Core 8,093 ft to 8,103 ft.**	1.00	491.50	10:30	11:30	
396		Lower wireline, latch PCTB, POOH w/PCTB at max safe speed, maintain circulation @ 10 gpm min.	0.50	492.00	11:30	12:00	Slb/Geotek/Helix. Rotate and manipulate as required.
397	**Safety**	Operations safety meeting.	0.50	492.50	12:00	12:30	
398		Continue POOH w/PCTB at max safe speed, maintain circulation @ 10 gpm min.	0.75	493.25	12:30	13:15	Slb/Geotek/Helix. Rotate and manipulate as required.
399		Break drill string, install lifting clamp on PCTB upper end, land PCTB on drill string, unlatch wireline.	0.25	493.50	13:15	13:30	Helix/Geotek/Slb.
400		Pick up PCTB w/tugger, install lifting clamp on lower end, load/land lower end in cold shuck.	0.25	493.75	13:30	13:45	Helix/Geotek/Slb.
401		Break PCTB upper end, stage in mousehole.	0.50	494.25	13:45	14:15	Geotek/Helix.
402		Pick up refurbished PCTB lower end w/tugger, load/land on assembly stand over 10" mousehole.	0.25	494.50	14:15	14:30	Geotek/Helix.
403		Pick up PCTB upper end w/tugger, make up to PCTB lower end, pick up PCTB assy, remove lifting clamp from lower end, land PCTB on drill pipe.	0.50	495.00	14:30	15:00	Geotek/Helix.
404		Change out wireline pulling tool for running tool, latch wireline to PCTB, pick up PCTB w/wireline, remove lifting clamp, close drill string, RIH w/PCTB on wireline @ max safe speed, maintain circulation @ 10 gpm min.	1.00	496.00	15:00	16:00	Slb/Geotek/Helix. Rotate and manipulate as required.
405		Land/latch PCTB in outer core barrel assy, POOH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	496.75	16:00	16:45	Slb/Geotek/Helix. Rotate and manipulate as required.
406		Break drill string, change out wireline running tool for pulling tool, close drill string.	0.25	497.00	16:45	17:00	Helix/Geotek/Slb.

407		RIH w/wireline at max safe speed to 7,950 ft.	0.00	497.00	17:00	17:00	Slb. RIH while coring.
408	**Core 15FB**	**Core 8,103 ft to 8,113 ft.**	1.00	498.00	17:00	18:00	
409		Lower wireline, latch PCTB, POOH w/PCTB at max safe speed, maintain circulation @ 10 gpm min.	0.75	498.75	18:00	18:45	Slb/Geotek/Helix. Rotate and manipulate as required.
410		Break drill string, install lifting clamp on PCTB upper end, land PCTB on drill string, unlatch wireline.	0.25	499.00	18:45	19:00	Helix/Geotek/Slb.
411		Pick up PCTB w/tugger, install lifting clamp on lower end, load/land lower end in cold shuck.	0.25	499.25	19:00	19:15	Helix/Geotek/Slb.
412		Break PCTB upper end, stage in mousehole.	0.50	499.75	19:15	19:45	Geotek/Helix.
413		Pick up refurbished PCTB lower end w/tugger, load/land on assembly stand over 10" mousehole.	0.25	500.00	19:45	20:00	Geotek/Helix.
414		Pick up PCTB upper end w/tugger, make up to PCTB lower end, pick up PCTB assy, remove lifting clamp from lower end, land PCTB on drill pipe.	0.50	500.50	20:00	20:30	Geotek/Helix.
415		Change out wireline pulling tool for running tool, latch wireline to PCTB, pick up PCTB w/wireline, remove lifting clamp, close drill string, RIH w/PCTB on wireline @ max safe speed, maintain circulation @ 10 gpm min.	1.00	501.50	20:30	21:30	Slb/Geotek/Helix. Rotate and manipulate as required.
416		Land/latch PCTB in outer core barrel assy, POOH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	502.25	21:30	22:15	Slb/Geotek/Helix. Rotate and manipulate as required.
417		Break drill string, change out wireline running tool for pulling tool, close drill string.	0.25	502.50	22:15	22:30	Helix/Geotek/Slb.
418		RIH w/wireline at max safe speed to 7,950 ft.	0.00	502.50	22:30	22:30	Slb. RIH while coring.
419	**Core 16FB**	**Core 8,113 ft to 8,123 ft.**	1.00	503.50	22:30	23:30	
420		Lower wireline, latch PCTB, POOH w/PCTB at max safe speed, maintain circulation @ 10 gpm min.	0.50	504.00	23:30	0:00	Slb/Geotek/Helix. Rotate and manipulate as required.
Saturday, May 20, 2017							
421	**Safety**	Operations safety meeting.	0.50	504.50	0:00	0:30	
422		Break drill string, install lifting clamp on PCTB upper end, land PCTB on drill string, unlatch wireline.	0.25	504.75	0:30	0:45	Helix/Geotek/Slb.
423		Pick up PCTB w/tugger, install lifting clamp on lower end, load/land lower end in cold shuck.	0.25	505.00	0:45	1:00	Helix/Geotek/Slb.
424		Break PCTB upper end, stage in mousehole.	0.50	505.50	1:00	1:30	Geotek/Helix.
425	**Drilling**	Pick up center bit w/tugger, load/land center bit in drill pipe.	0.25	505.75	1:30	1:45	Helix/Slb/Geotek. Rotate and manipulate as required.
426		Change out wireline pulling tool for running tool, latch wireline to center bit, pick up center bit, remove lifting clamp, close drill string, RIH w/center bit on wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	506.50	1:45	2:30	Helix/Slb/Geotek. Rotate and manipulate as required.
427		Land/latch center bit in outer core barrel assy, POOH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	507.25	2:30	3:15	Helix/Slb/Geotek. Rotate and manipulate as required.
428	**Drilling**	**Drill from 8,123 ft to 8,149 ft.**	1.00	508.25	3:15	4:15	
429	**Hole Cleaning**	Clean hole.	1.00	509.25	4:15	5:15	
430		Break drill string, change out wireline running tool for emergency pulling tool, close drill string, RIH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	510.00	5:15	6:00	
431		Latch center bit, POOH w/center bit on wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	510.75	6:00	6:45	Helix/Slb/Geotek. Rotate and manipulate as required.
432		Break drill string, install lifting clamp on center bit, land center bit on drill pipe, unlatch wireline.	0.25	511.00	6:45	7:00	Helix/Slb/Geotek. Rotate and manipulate as required.
433		Lay out center bit w/tugger.	0.25	511.25	7:00	7:15	
434	**Coring**	Pick up refurbished PCTB lower end w/tugger, load/land on assembly stand over 10" mousehole.	0.25	511.50	7:15	7:30	Geotek/Helix.
435		Pick up PCTB upper end w/tugger, make up to PCTB lower end, pick up PCTB assy, remove lifting clamp from lower end, transfer and land PCTB assy on drill pipe.	0.50	512.00	7:30	8:00	Geotek/Helix.
436		Change out wireline emergency pulling tool for running tool, latch wireline to PCTB, pick up PCTB w/wireline, remove lifting clamp, close drill string, RIH w/PCTB on wireline @ max safe speed, maintain circulation @ 10 gpm min.	1.00	513.00	8:00	9:00	Slb/Geotek/Helix. Rotate and manipulate as required.
437		Land/latch PCTB in outer core barrel assy, POOH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	513.75	9:00	9:45	Slb/Geotek/Helix. Rotate and manipulate as required.
438		Break drill string, change out wireline running tool for pulling tool, close drill string.	0.25	514.00	9:45	10:00	Helix/Geotek/Slb.
439		RIH w/wireline at max safe speed to 7,950 ft.	0.00	514.00	10:00	10:00	Slb. RIH while coring.
440	**Core 17FB**	**Core 8,149 ft to 8,159 ft.**	1.00	515.00	10:00	11:00	
441		Lower wireline, latch PCTB, POOH w/PCTB at max safe speed, maintain circulation @ 10 gpm min.	0.75	515.75	11:00	11:45	Slb/Geotek/Helix. Rotate and manipulate as required.
442		Break drill string, install lifting clamp on PCTB upper end, land PCTB on drill string, unlatch wireline.	0.25	516.00	11:45	12:00	Helix/Geotek/Slb.
443	**Safety**	Operations safety meeting.	0.50	516.50	12:00	12:30	

444		Pick up PCTB w/tugger, install lifting clamp on lower end, load/land lower end in cold shuck.	0.25	516.75	12:30	12:45	Helix/Geotek/Slb.
445		Break PCTB upper end, stage in mousehole.	0.50	517.25	12:45	13:15	Geotek/Helix.
446		Pick up refurbished PCTB lower end w/tugger, load/land on assembly stand over 10" mousehole.	0.25	517.50	13:15	13:30	Geotek/Helix.
447		Pick up PCTB upper end w/tugger, make up to PCTB lower end, pick up PCTB assy, remove lifting clamp from lower end, land PCTB on drill pipe.	0.50	518.00	13:30	14:00	Geotek/Helix.
448		Change out wireline pulling tool for running tool, latch wireline to PCTB, pick up PCTB w/wireline, remove lifting clamp, close drill string, RIH w/PCTB on wireline @ max safe speed, maintain circulation @ 10 gpm min.	1.00	519.00	14:00	15:00	Slb/Geotek/Helix. Rotate and manipulate as required.
449		Land/latch PCTB in outer core barrel assy, POOH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	519.75	15:00	15:45	Slb/Geotek/Helix. Rotate and manipulate as required.
450		Break drill string, change out wireline running tool for pulling tool, close drill string.	0.25	520.00	15:45	16:00	Helix/Geotek/Slb.
451		RIH w/wireline at max safe speed to 7,950 ft.	0.00	520.00	16:00	16:00	Slb. RIH while coring.
452	**Core 18FB**	**Core 8,159 ft to 8,169 ft.**	1.00	521.00	16:00	17:00	
453		Lower wireline, latch PCTB.	0.50	521.50	17:00	17:30	Slb/Geotek/Helix. Rotate and manipulate as required.
454		POOH w/PCTB at max safe speed, maintain circulation @ 10 gpm min.	0.25	521.75	17:30	17:45	Slb/Geotek/Helix. Rotate and manipulate as required.
455		Break drill string, install lifting clamp on PCTB upper end, land PCTB on drill string, unlatch wireline.	0.25	522.00	17:45	18:00	Helix/Geotek/Slb.
456		Pick up PCTB w/tugger, install lifting clamp on lower end, load/land lower end in cold shuck.	0.25	522.25	18:00	18:15	Helix/Geotek/Slb.
457		Break PCTB upper end, stage in mousehole.	0.50	522.75	18:15	18:45	Geotek/Helix.
458		Pick up refurbished PCTB lower end w/tugger, load/land on assembly stand over 10" mousehole.	0.25	523.00	18:45	19:00	Geotek/Helix.
459		Pick up PCTB upper end w/tugger, make up to PCTB lower end, pick up PCTB assy, remove lifting clamp from lower end, land PCTB on drill pipe.	0.50	523.50	19:00	19:30	Geotek/Helix.
460		Change out wireline pulling tool for running tool, latch wireline to PCTB, pick up PCTB w/wireline, remove lifting clamp, close drill string, RIH w/PCTB on wireline @ max safe speed, maintain circulation @ 10 gpm min.	1.00	524.50	19:30	20:30	Slb/Geotek/Helix. Rotate and manipulate as required.
461		Land/latch PCTB in outer core barrel assy, POOH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	525.25	20:30	21:15	Slb/Geotek/Helix. Rotate and manipulate as required.
462		Break drill string, change out wireline running tool for pulling tool, close drill string.	0.25	525.50	21:15	21:30	Helix/Geotek/Slb.
463		RIH w/wireline at max safe speed to 7,950 ft.	0.00	525.50	21:30	21:30	Slb. RIH while coring.
464	**Core 19FB**	**Core 8,169 ft to 8,179 ft.**	1.00	526.50	21:30	22:30	
465		Lower wireline, latch PCTB, POOH w/PCTB at max safe speed, maintain circulation @ 10 gpm min.	0.75	527.25	22:30	23:15	Slb/Geotek/Helix. Rotate and manipulate as required.
466		Break drill string, install lifting clamp on PCTB upper end, land PCTB on drill string, unlatch wireline.	0.25	527.50	23:15	23:30	Helix/Geotek/Slb.
467		Pick up PCTB w/tugger, install lifting clamp on lower end, load/land lower end in cold shuck.	0.50	528.00	23:30	0:00	Helix/Geotek/Slb.
Sunday, May 21, 2017							
468	**Safety**	Operations safety meeting.	0.50	528.50	0:00	0:30	
469		Break PCTB upper end, stage in mousehole.	0.50	529.00	0:30	1:00	Geotek/Helix.
470		Pick up refurbished PCTB lower end w/tugger, load/land on assembly stand over 10" mousehole.	0.25	529.25	1:00	1:15	Geotek/Helix.
471		Pick up PCTB upper end w/tugger, make up to PCTB lower end, pick up PCTB assy, remove lifting clamp from lower end, land PCTB on drill pipe.	0.50	529.75	1:15	1:45	Geotek/Helix.
472		Change out wireline pulling tool for running tool, latch wireline to PCTB, pick up PCTB w/wireline, remove lifting clamp, close drill string, RIH w/PCTB on wireline @ max safe speed, maintain circulation @ 10 gpm min.	1.00	530.75	1:45	2:45	Slb/Geotek/Helix. Rotate and manipulate as required.
473		Land/latch PCTB in outer core barrel assy, POOH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	531.50	2:45	3:30	Slb/Geotek/Helix. Rotate and manipulate as required.
474		Break drill string, change out wireline running tool for pulling tool, close drill string.	0.25	531.75	3:30	3:45	Helix/Geotek/Slb.
475		RIH w/wireline at max safe speed to 7,950 ft.	0.00	531.75	3:45	3:45	Slb. RIH while coring.
476	**Core 20FB**	**Core 8,179 ft to 8,189 ft.**	1.00	532.75	3:45	4:45	Bottom of hydrate @ 8,166 ft RKB (1,445 fbsf).
477		Lower wireline, latch PCTB, POOH w/PCTB at max safe speed, maintain circulation @ 10 gpm min.	0.75	533.50	4:45	5:30	Slb/Geotek/Helix. Rotate and manipulate as required.
478		Break drill string, install lifting clamp on PCTB upper end, land PCTB on drill string, unlatch wireline.	0.25	533.75	5:30	5:45	Helix/Geotek/Slb.
479		Pick up PCTB w/tugger, install lifting clamp on lower end, load/land lower end in cold shuck.	0.25	534.00	5:45	6:00	Helix/Geotek/Slb.
480		Break PCTB upper end, stage in mousehole.	0.50	534.50	6:00	6:30	Geotek/Helix.
481	**Hole Survey (Gyro Tool)**	Pick up survey tool w/tugger, load/land in drill pipe, latch wireline to survey tool, close drill pipe.	0.50	535.00	6:30	7:00	Rotate and circulate as required.
482		RIH w/survey tool to 6,670 ft @ max safe speed, maintain circulation @ 10 gpm min.	0.75	535.75	7:00	7:45	Rotate and circulate as required.
483		RIH w/survey tool to 7,600 ft @ 200 ft/min, maintain circulation @ 10 gpm min.	0.25	536.00	7:45	8:00	
484		Stop at 7,600 ft for 5 min.	0.00	536.00	8:00	8:00	
485		RIH w/survey tool to 8,182 ft (TD) @ 200 ft/min, maintain circulation @ 10 gpm min.	0.25	536.25	8:00	8:15	

486		Stop at 8,182 (TD) for 5 min.	0.00	536.25	8:15	8:15	
487		POOH w/survey tool to 7,600 ft @ 200 ft/min, maintain circulation @ 10 gpm min.	0.50	536.75	8:15	8:45	Rotate and circulate as required.
488		Stop at 7,600 ft for 5 min.	0.00	536.75	8:45	8:45	
489		POOH w/survey tool @ max safe speed, maintain circulation @ 10 gpm min.	0.75	537.50	8:45	9:30	Rotate and circulate as required.
490		Break drill pipe, lay out survey tool.	0.50	538.00	9:30	10:00	
491	**Cementing**	Rig down wireline.	1.00	539.00	10:00	11:00	
492		Displace hole from TD to 7,900 ft with 11.5 ppg Hi- Vis pad mud.	1	540.00	11:00	12:00	
493	**Safety**	Operations safety meeting.	0.50	540.50	12:00	12:30	
494		POOH to 7,900 ft.	0.75	541.25	12:30	13:15	Bit at top of pad mud, 100 ft above hydrate zone.
495		Drop cementing liner.	0.25	541.50	13:15	13:30	Free fall deploy.
496		Rig up cementing manifold.	1.50	543.00	13:30	15:00	
497		Pump cement per Schlumberger program.	5.5	548.50	15:00	20:30	300 ft plug.
498		Rig down cementing manifold.	1.50	550.00	20:30	22:00	
499		POOH to 6625 ft (100 ft above seafloor).	2	552.00	22:00	0:00	100 ft above sea floor. Pull slowly through cement column 5 min/double.
Monday, May 22, 2017							
500	**Safety**	Operations safety meeting.	0.50	552.50	0:00	0:30	
501		Circulate ≥2X drill string volume w/sea water and 3x rubber balls at ≥5 bbl/min.	1.5	554.00	0:30	2:00	Pump foam pipe wipers.
502		Rig up wireline.	1	555.00	2:00	3:00	Rig up while circulating.
503		RIH w/wireline, latch OCBA cementing liner.	0	555.00	3:00	3:00	Circulate. RIH while circulating.
504		POOH with cementing liner.	0.75	555.75	3:00	3:45	Circulate.
505		Break drill string, lay out cementing liner.	0.25	556.00	3:45	4:00	
506		Circulate ≥1X drill string volume w/sea water and pipe wipers at ≥5 bbl/min.	1	557.00	4:00	5:00	Pump foam pipe wipers.
507		Observe borehole for signs of out flow.	0	557.00	5:00	5:00	Observe while cleaning drill string.
508	**Tag Cement**	Break drill string, pick up center bit w/tugger, load/land center bit in drill pipe.	0.25	557.25	5:00	5:15	Helix/Slb/Geotek. Rotate and manipulate as required.
509		Change out wireline pulling tool for running tool, latch wireline to center bit, pick up center bit, remove lifting clamp, close drill string, RIH w/center bit on wireline @ max safe speed, maintain circulation @ 10 gpm min.	1.00	558.25	5:15	6:15	Helix/Slb/Geotek. Rotate and manipulate as required.
510		Land/latch center bit in outer core barrel assy, POOH w/wireline @ max safe speed, maintain circulation @ 10 gpm min.	0.75	559.00	6:15	7:00	Helix/Slb/Geotek. Rotate and manipulate as required.
511		Rig down wireline.	1.00	560.00	7:00	8:00	
512		Reenter Hole H-005	1	561.00	8:00	9:00	
513		RIH to 7600 ft (top of cement), set 15,000 WOB on cement.	2	563.00	9:00	11:00	Rotate only enough to monitor torque.
514		POOH to 6564 ft (100 ft above seafloor)	1	564.00	11:00	12:00	
515	**Safety**	Operations safety meeting.	0.50	564.50	12:00	12:30	
516		Continue POOH to 6564 ft (100 ft above seafloor)	1	565.50	12:30	13:30	
517		Rig up wireline.	1	566.50	13:30	14:30	If pipe is draining fast enough to not have to pull a wet string center bit can be left in place.
518		RIH w/pulling tool at max safe speed.	0.5	567.00	14:30	15:00	
519		Latch center bit, POOH w/center bit on wireline @ max safe speed.	0.5	567.50	15:00	15:30	
520		Break drill string, lay out center bit.	0.25	567.75	15:30	15:45	
521		Rig down wireline.	1	568.75	15:45	16:45	
522		Rack top drive.	0.5	569.25	16:45	17:15	
523		POOH to top of outer core barrel assy.	6.75	576.00	17:15	0:00	
Tuesday, May 23, 2017							
524	**Safety**	Operations safety meeting.	0.50	576.50	0:00	0:30	
525		Continue POOH to top of outer core barrel assy.	1.25	577.75	0:30	1:45	
526		Break down and layout outer core barrel assy.	2.50	580.25	1:45	4:15	Clean, re-dope, and install thread protectors, all sub and collar threads.
527		Clear rig floor for demobilization.	2.50	582.75	4:15	6:45	
528		ROV site survey.	1.00	583.75	6:45	7:45	Complete while POOH with BHA.
529		Recover ROV, beacon(s).	1.00	584.75	7:45	8:45	Complete while POOH with BHA.
530		Begin demobilization.	15.25	600.00	8:45	0:00	
Wednesday, May 24, 2017							
531		Demobilization. Pack and off load all containers and equipment.	24.00	624.00	0:00	0:00	
Thursday, May 25, 2017							
532		Demobilization. Pack and off load all containers and equipment.	24.00	648.00	0:00	0:00	
533		Disembark Geotek and UT personnel via helicopter.					One Geotek person to accompany core samples on work boat.

Notes:

1	Time estimate assumes worst case and includes gyro survey at 1,000 fbsf and cementing in both holes.
2	Site GC-955, water depth = 6,670 fbsl, RKB to sea level = 51 ft
3	10 pressurized core samples per hole to be taken
4	Instrumented PCTB assembled for deployment
5	Rig capable of handling doubles
6	All depths are referenced to RKB (rig floor).
7	Plug and abandon cementing per Schlumberger program
8	MU = make up
9	POOH = pull out of hole
10	RIH - run in hole
11	Core depths shown are place holders, actual depths to be determined
12	Cementing depths are place holders, actual depths to be determined