Appendix A. Operational Review and Daily Log

This appendix contains the operational review and daily log.

UT/DOE GOM2-2 Operational Review and Daily Log			
Revision: 1 Date: 31-October-2023			
Date	**Time**	**Activity Description**	**Daily Log**
30-Jul-23	0000-2400	**Helix D/V Q4000 located approximately 21 nm north of the proposed location of Hole UT-GOM2-02-H003.** General Operations/Maintenance: General house keeping on weather deck.	Helix D/V Q4000 located approximately 21 nm north of the proposed location of Hole UT-GOM2-02-H003. Harvey Hermes Supply Vessel completed transit from Port Fourchon (departed at 0730 hr on 29-July-2023) to the UT-GOM2-02 Coring Expedition equipment/supplies transfer site located approximately 21 nm north of the proposed location of Hole WR313 H003, rendezvoused with the Helix D/V Q4000 at 0700 hr. Conducted personal, equipment/supplies, and mud/fuel transfers from the Harvey Hermes Supply Vessel to the Helix D/V Q4000. Completed multiple lifts and transfers to the Helix D/V Q4000 of Geotek coring containers, associated core analysis laboratories, drill pipe, and associated drilling equipment, and other related consumables. Crew transfers by helicopter and supply boat included 13 Geotek engineers, 12 project scientists, 2 Fugro technicians, and 2 Schlumberger technicians. Upon arrival on the Helix D/V Q4000, members of the Science Party and Geotek staff participated in mandatory shipboard orientation and safety training. The shipboard Scientific Party was also able to access the laboratory containers that had been transferred to the Helix D/V Q4000 and started the process of unpacking the required coring and laboratory equipment and supplies. The Science Party continued to work on staffing plans, berthing arrangements, and refining core handling and processing
	0000-0700	Harvey Hermes Supply Vessel completed transit from Port Fouchon (LA) and rendezvoused with the Helix D/V Q4000.	
	0700-2400	Conducted transfers of personal, equipment, and supplies from Harvey Hermes Supply Vessel to the Helix D/V Q4000. Conducted a total of four helicopter crew transfers from Bristow Houma Heliport (Houma, LA) to the Helix D/V Q4000.	

			plans in preparation for spudding of Hole UT-GOM2-02-H003.
31-Jul-23	0000-1615	**Helix D/V Q4000 located approximately 21 nm north of the proposed location of Hole UT-GOM2-02-H003.** General Operations/Maintenance: General house keeping on weather deck. Ran communication and power cabling. Prepared Tod Drive System (TDS) for upcoming operations. Assisted crane crew with offloading the M/V Harvey Hermes Supply Vessel.	Helix D/V Q4000 located approximately 21 nm north of the proposed location of Hole UT-GOM2-02-H003. Continued to transfer drilling equipment and supplies from the M/V Harvey Hermes Supply Vessel to the Helix D/V Q4000, including the Geotek Pressure Core Analysis and Transfer System (PCATS), drill pipe, and associated drilling equipment, and other related consumables. Crew transfers by two helicopter flights included 10 additional project scientists. At 1630 hr the Helix D/V Q4000 began transiting (DP move at 3 nm/hr, while ballasted down) from the UT-GOM2-2 Coring Expedition equipment/supplies transfer site to the location of the of the proposed location of Hole UT-GOM2-02-H003. The shipboard GOM2-2 Scientific Party continued to access the projected designated (1) Conventional Core Receiving Lab – G17, (2) Conventional Core Processing Lab – G19, and (3) Conventional Core Pore Water Labs – G20 in preparation of the planned spudding, coring, and operations associated with Hole UT-GOM2-02-H003. These labs will be used to process and begin the analysis of the physical, chemical, and biological properties of the hydrate-bearing layers, associated with the occurrence of gas hydrates in the greater Terrebonne Basin. As a critical project requirement, upon arrival on the Helix D/V Q4000, members of the Science Party participated in mandatory
	1210-1630	Conduct a total of two helicopter crew transfers from Bristow Houma Heliport (Houma, LA) to the Helix D/V Q4000.	
	1630-2400	The Helix D/V Q4000 began the transit to the proposed location of Hole UT-GOM2-02-H003.	

			shipboard orientation and safety training. The Science Party also continued to work on staffing plans, berthing arrangements, and finalizing core handling and processing plans leading the coring/drilling operations in Hole UT-GOM2-2-H003.
1-Aug-23	0000-2400	**Helix D/V Q4000 located over the proposed location of Hole UT-GOM2-02-H003.** General Operations/Maintenance: Transferred additional fuel and the required BHA coring collars from the M/V Harvey Ram supply vessel to the Helix D/V Q4000.	By 0100 hr the Helix D/V Q4000 completed transiting to the location of the Gulf of Mexico Gas Hydrates Joint Industry Project (JIP) Expedition II Hole WR313 H001. The Science Party continued to refine and finalize both the conventional and pressure core handling and processing plans leading the coring/drilling operations in Hole UT-GOM2-2-H003. In the first hole to be established at the Walker Ridge Block 313 H gas hydrate research test site (Hole UT-GOM2-2-H003), conventional cores, pressure cores, and temperature/pressure measurements were to be obtained in the shallow interval. Pressure-cores were to be obtained from hydrate-bearing targets (Red, Upper Blue, and/or Orange sands), bounding mud, and background mud to total depth of the hole. The Geotek pressure Core Analysis and Transfer System (PCATS), which was transferred to the Q4000 late on 31-July-2023, was connected to ship power in order to bring online the pressure core handling and analysis capabilities of the PCATS. The Geotek technical staff completed preparation of the Conventional Core Receiving Lab (G17), which has been instrumented with the Geotek thermal infrared (IR) imaging system.
	0000-0100	The Helix D/V Q4000 completed the transit to the proposed location of Hole UT-GOM2-02-H003.	
	0100-0600	Pressure tested the drilling system internal blowout preventers (IBOPs) and Full Opening Safety Valve (short for FOSV), and electrical line night cap.	
	0600-2400	Deployed Helix D/V Q4000 work class ROVs (XLS09 and XLS10) and conduct a systematic search for the 2009 drilled Hole WR313 H001 that was previously drilled in the Walker Ridge Block 313 during the Gulf of Mexico Gas Hydrates Joint Industry Project (JIP) Expedition II in 2009.	

2-Aug-23	0000-2400	**Helix D/V Q4000 located over the proposed location of Hole UT-GOM2-02-H003.** General Operations/Maintenance: M/V Harvey Ram supply vessel continued to transfer supplies/equipment to the Helix D/V Q4000. Conducted general housekeeping in pipe bay.	The Science Party continued to refine and finalize both the conventional and pressure core handling and processing plans leading the coring/drilling operations in the UT-GOM2-2-H003 hole. The Science Party ran through "dry runs" of conventional core sampling and archiving of conventional core, including sectioning, sampling whole rounds, and sampling gases. This activity led to improvements to the planned sampling plan. The Science Party continued to prepare the projected designated (1) Conventional Core Receiving Lab – G17, (2) Conventional Core Processing Lab – G19, and (3) Conventional Core Pore Water Labs – G20 in preparation for the planned conventional coring operations associated with the Hole UT-GOM2-2-H003. Work on preparing the T2P continued.
	0000-2400	Helix D/V Q4000 continued to move to well center for DP calibration surveys. Helix troubleshooting new navigation system. SLB GeoServices continued troubleshooting wireline communication issues.	
	0400-2400	PCTB cold-shuck was installed in the rig floor. Made up (MU) the PCTB-CS bottom hole assembly (BHA) and conducted two PCTB space out tests. The advanced piston corer (APC) and extended core barrel (XCB) conventional core systems were spaced out with the BHA. The PCTB BHA and pipe was run into the hole 2029 ft RKB below the rig-floor by 2400 hr.	
	0700-2400	The Helix D/V Q4000 work class ROVs (XLS09 and XLS10) continued the search for the location of the 2019 Hole WR313 H001.	
3-Aug-23	0000-2400	**Helix D/V Q4000 located over the proposed location of Hole UT-GOM2-02-H003.** General Operations/Maintenance: M/V Harvey Ram supply vessel continued to transfer supplies/equipment to the Helix D/V Q4000. Also conducted general housekeeping in the pipe bay and on the weather deck and rig floor.	The Science Party continued to refine and finalize both the conventional and pressure core handling and processing plans leading the coring/drilling operations in the UT-GOM2-2-H003 hole. The Conventional Core Receiving Lab – G17, Conventional Core Processing Lab – G19, and Conventional Core Pore Water Labs – G20 were made ready to receive cores. The Science Party worked on setting up gas sampling equipment in the Pressure Core Degassing Van – R17. Work on preparing the T2P continued. Scientists involved in microbiology and pore water chemistry coordinated
	0000-1115	The Helix D/V Q4000 work class ROVs (XLS09 and XLS10) continued search for the location of the 2019	

		Hole WR313 H001 and marked the seafloor location for the proposed Holes UT-GOM2-02-H002 and UT-GOM2-02-H003.	collection of drilling fluid samples for contamination control with M-I SWACO.
	0130-1000	Conduct PCTB-CS Full Function Test #1. The depth of the water core test was changed from ~500 to ~2000 ft RKB below the rig-floor due to strong currents.	
	1000-2000	RIH PTCB-CS BHA from 2029 ft RKB to 6365 ft RKB.	
	2000-2315	Vessel troubleshooting EFC control readouts. Calibrated vessel parameters with GeoServices logging unit.	
	2315-2400	Held JSA with Geotek and SLB slickline then prepared equipment for upcoming test run of the PDT/T2P.	
4-Aug-23	0000-2400	**Helix D/V Q4000 located over the location of Hole UT-GOM2-02-H003.** General Operations/Maintenance: The M/V Harvey Hermes supply vessel transferred supplies to Helix D/V Q4000 throughout the day.	At the site of Hole UT-GOM2-02-H003 the seafloor mud line was tagged at a depth of 6506 ft RKB (pipe tally) corresponding to a water depth of 6454 ft with the Helix D/V Q4000 rig floor height 52 ft above the sea-surface. The Science Party and Geotek staff processed Cores UT-GOM2-2-H003-01H and Core UT-GOM2-2-H003-02H, after infrared scanning, each core was sampled at a high resolution with one set whole-round time-sensitive core subsamples being collected from each core section. **Core Run: Core UT-GOM2-2-H003-01H.** Acquire Core UT-GOM2-2-H003-01H over the depth interval from 000.0 to 27.0 fbsf; 25.23 ft recovered core (93% recovery). **Core Run: Core UT-GOM2-2-H003-02H.** Acquire Core UT-GOM2-2-H003-02H over the depth interval from 27.0 to 55.0 fbsf; 32.97 ft recovered core (118% recovery). **<u>Hole UT-GOM2-2-H003 Reference Data</u>**
	0000-0630	Executed a test of the PDT/T2P (Probe Deployment Tool). The tool detached at the rig floor while hanging in the drill pipe. It fell to the bottom of the hole and landed in the BHA (bottom hole assembly). The PDT/T2P was successfully fished from the bottom of the hole without incident.	
	0630-0800	RIH PTCB-CS BHA from 6335 ft RKB down to 6506 ft RKM to tag mud line then picked up to 6500 ft RKB to acquire Core UT-GOM2-2-H003-01H.	
	0900-1200	BSSE (Bureau of Safety and Environmental Enforcement) conducted an inspection of the Helix D/V Q4000 and associated Geotek and UT program laboratories.	

	0800-1600	Acquired and recovered Core UT-GOM2-2-H003-01H.	**RKB to Mud line: 6506 ft (Per Datum: 52 ft)** **Water depth: 6454 ft (updated 05-AUG-2023)** **Lat 26°39'45.4451"N, Long 091°40'33.5852"W NAD27 BLM15 Feet**
	1600-2400	Acquired and recovered Core UT-GOM2-2-H003-02H.	
5-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H003.** General Operations/Maintenance: General housekeeping.	The Science Party and Geotek staff acquired and processed a total of three G-APC conventional cores and two PCTB-CS pressure cores. Core UT-GOM2-2-H003-03H was the last core to be sampled at a higher vertical resolution, with the acquisition of the standard set of whole-round time-sensitive interstitial water, microbiological, and organic geochemical headspace gas samples being collected from each core section. The acquisition of the first pressure core during the GOM2-2 Expedition, Core UT-GOM2-2-H003-04CS, recovered 10.40 ft
	0000-0400	Acquired and recovered Core UT-GOM2-2-H003-03H.	
	0400-0830	Acquired and recovered Core UT-GOM2-2-H003-04CS.	
	0830-1430	Acquired and recovered Core UT-GOM2-2-H003-05CS.	
	1430-1700	Acquired and recovered Core UT-GOM2-2-H003-06H.	
	1700-2130	Acquired and recovered Core UT-GOM2-2-H003-07H.	

	2130-2400	Preparing to acquire Core UT-GOM2-2-H003-08CS.	of core material; however, the ball valve failed to fully close. Visual inspection of the recovered PCTB-CS coring tool revealed that the lower ball valve assembly was packed off with a “sticky” clay debris that appears to have prevented the PCTB-CS from sealing. The decision was made to change the core plan to include an additional deployment of the PCTB-CS (i.e., Core UT-GOM2-2-H003-05CS). In the case of the Core UT-GOM2-2-H003-05CS, considerable effort was made to clean out the bottom of the hole before acquiring the pressure core by pumping 5 bbls of 10.5 ppg Hi-Vis sweep to clean the hole. Upon examination in the Geotek PCATS system, it was determined that Core UT-GOM2-2-H003-05CS recovered 7.51 ft of core and was sealed at an internal pressure of 3475 psi, which was near the pre-set PCTB-CS boost pressure. **Core Run: Core UT-GOM2-2-H003-03H.** Acquire Core UT-GOM2-2-H003-03H over the depth interval from 61.0 to 89.0 fbsf; 33.53 ft recovered core (120% recovery). Acquired APCT-3 temperature record (5 minute dwell time). **Core Run: Core UT-GOM2-2-H003-04CS.** Acquire Core UT-GOM2-2-H003-04CS over the depth interval from 89.0 to 99.0 fbsf; 10.63 ft recovered core (106% recovery), 0 psi recovery pressure. Core Acquisition: F 6595'- T 6605' (RKB) at 20 rpm w/ 1-2 K torque circulating 8.6 ppg SW at 1 bpm w/ 30 psi standpipe. Maintaining 1-5K on bit. **Core Run: Core UT-GOM2-2-H003-05CS.** Acquire Core UT-GOM2-2-H003-04CS over the depth interval from 99.0 to 106.0 fbsf; 7.51 ft recovered core (107% recovery), 3475 psi recovery pressure. Core Acquisition: F 6605''- T 6612' (RKB) at 60 RPM w/ 3K torque and cementer

			circulating 8.6 ppg SW at 3.5 bpm w/ 210 psi while maintaining 1-5K on bit. **Core Run: Core UT-GOM2-2-H003-06H.** Acquire Core UT-GOM2-2-H003-06H over the depth interval from 106.0 to 129.0 fbsf; 34.19 ft recovered core (149% recovery). Acquired APCT-3 temperature record (10 minute dwell time). **Core Run: Core UT-GOM2-2-H003-07H.** Acquire Core UT-GOM2-2-H003-07H over the depth interval from 129.0 to 153.0 fbsf; 27.79 ft recovered core (116% recovery). Acquired APCT-3 temperature record (10 minute dwell time).
6-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H003.** General Operations/Maintenance: General housekeeping. Offloaded/backloaded groceries and supplies from M/V Harvey Hermes and transfer fuel hose to the M/V Harvey Hermes.	Core UT-GOM2-2-H003-05CS (as acquired on 06-Aug-23) was scanned in the Geotek Pressure Core Analysis and Transfer System (PCATS) and cut into two sections for onboard quantitative degassing. Members of the Science Party also processed the APCT-3 temperature measurements from Cores UT-GOM2-2-H003-03H, UT-GOM2-2-H003-06H, and UT-GOM2-2-H003-7H (as acquired on 06-Aug-23). In addition, subsamples from the conventional cores as acquired on 06-Aug-23 were processed through the Pore Water and Core Processing Labs. These labs also processed contamination control samples from drilling fluid and PCATS.
	0000-0415	While preparing to run Core UT-GOM2-2-H003-08CS (within the depth interval 153-163 fbsf) the SLB Slickline line parted while resetting zero at surface and after installing PCTB-CS retrieval tool.	
	0415-1145	SLB conducted slip/cut of the core retrieval slickline, M/U new rope socket and fishing assembly, RIH	

		the pulling tool and POOH the PCTB-CS retrieval tool.	
	1145-1515	RIH Geotek Emergency core barrel pulling tool and latched into the PCTB-CS; however, the PCTB-CS could not be removed from the BHA. It was interpreted that the PTCB-CS was packed-off in the BHA with mud/sand. M/U TDS to drill string then POOH from 6618 ft RKB. No over pull noted. Decision made to POOH the drill string.	
	1515-1600	POOH from 6616 to 6176 ft RKB (clearing the mud line at 6506 ft RKB), while laying down the 7th double it was noted that the string was no longer wet. This indicates that there was, once again, circulation inside the pipe.	
	1600-2218	M/U TDS to the drill string then pumped at 8 bpm with 300 psi down drill string with noticeable dirty fluid coming out PCTB cutting shoe as observed with the ROV. Geotek Emergency core barrel pulling tool was RIH and latched into PCTB tool. PCTB tool was easily POOH. TDS was connected to the drill string then pumped at 7 bpm with 60 psi to clean out PCTB cutting shoe.	
	2118-2400	In preparation to re-enter Hole UT-GOM2-2-H003, the Geotek center bit was deployed and RIH. Used cement pump at 10 bpm (100 psi) to help set the center-bit in the PCTB cutting shoe.	
7-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H003.** General Operations/Maintenance: General housekeeping. Offloaded/backloaded groceries and supplies from the M/V Harvey Hermes.	Operations included tripping into Hole UT-GOM2-2-H003 from a depth of 6506 ft RKB (mud line) to the previously completed total depth of the hole to 6659 ft RKB by 1300 hr. The Science Party and Geotek staff acquired and processed a total of two G-APC conventional cores and one PCTB-CS

	0000-1500	Moved rig into position over WR 313 H003 and re-enter mudline at 6506 ft RKB. Wash and ream F/ 6506 ft RKB T/ 6659 ft RKB (TD). Retrieve Geotek Center Bit and prepare to run PCTB-CS.	pressure core. Core UT-GOM2-2-H003-08CS was processed through PCATS. Cores UT-GOM2-2-H003-09H and UT-GOM2-2-H003-10H were infrared scanned, sectioned and sampled for the standard sampling set in the Core Receiving Lab. Both cores were expansive and were sampled for void gas. Analysis of in-situ measurements derived from APCT-3 deployments continued. New temperature measurements at Core UT-GOM2-2-H003-09H and Core UT-GOM2-2-H003-010H were made. The interpreted temperature gradient is 21.6 deg. C per km and the seafloor temperature was measured at 4.5 deg. C. Pressure core section UT-GOM2-2-H003-05CS-2 was quantitatively degassed to calculate the dissolved methane concentration, and gas samples were collected. After quantitative degassing, core section UT-GOM2-2-H003-05CS-2 (as acquired on 05-Aug-23) was sub-sectioned for porewater and microbiology samples in the Core Receiving Lab. Sections that were quantitatively degassed are processed section-by-section as conventionalized core in the Core Receiving Lab. Water from PCATS, spiked with a contamination tracer, was also collected for contamination control. **Core Run: Core UT-GOM2-2-H003-08CS.** Acquire Core UT-GOM2-2-H003-08CS over the depth interval from 153.0 to 163.0 fbsf; 8.20 ft recovered core (82% recovery), 2075 psi recovery pressure. Coring F 6659 ft – T 6669 ft (RKB) at 60 rpm w/ 2-4 K torque circulating 8.6 ppg SW at 2 bpm w/ 63 psi standpipe. Maintaining 1-5K on bit. **Core Run: Core UT-GOM2-2-H003-09H.** Acquire Core UT-GOM2-2-H003-09H over the depth interval from 163.0 to 186.0 fbsf; 29.27 ft recovered core (127% recovery). Acquired APCT-3
	1500-1700	Acquired and recovered Core UT-GOM2-2-H003-08CS.	
	1700-2030	Acquired and recovered Core UT-GOM2-2-H003-09H.	
	2030-2400	Acquired and recovered Core UT-GOM2-2-H003-10H.	

			temperature record (10 minute dwell time). **Core Run: Core UT-GOM2-2-H003-10H.** Acquire Core UT-GOM2-2-H003-10H over the depth interval from 186.0 to 209.0 fbsf; 27.23 ft recovered core (118% recovery). Acquired APCT-3 temperature record (10 minute dwell time).
8-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H003.** General Operations/Maintenance: General housekeeping.	Operations included advancing Hole UT-GOM2-2-H003 from a depth of 209 fbsf (6715 ft RKB) to a total depth of 300 fbsf (6806 ft RKB) by the deployment of three conventional piston cores (G-APC) and two pressure cores (PCTB-CS). This combination of conventional and pressure cores targeted a prominent well log derived density transition that was identified in the logging while drilling (LWD) data as acquired in the WR313H-001 well during the 2009 Joint Industry Project Expedition II. Core UT-GOM2-2-H003-11H, -12H, and -14H were processed thorough the Geotek Core Receiving Lab using the
	0000-0100	Continue to recover Core UT-GOM2-2-H003-10H.	
	0100-0430	Acquired and recovered Core UT-GOM2-2-H003-11H.	
	0430-1100	Acquired and recovered Core UT-GOM2-2-H003-12H.	
	1100-1620	Acquired and recovered Core UT-GOM2-2-H003-13CS.	
	1620-1935	Acquired and recovered Core UT-GOM2-2-H003-14H.	

	1935-2400	Acquired and recovered Core UT-GOM2-2-H003-15CS.	standard approach developed for gas hydrate research expeditions that start with the full core infrared scan of the recovered core to identify cold sections of the core that often indicate the presence of dissociating gas hydrates. The core infrared scans were used to guide the collection of void gas samples, cutting of whole-round (WR) sample sets, collecting headspace sediment, hand measurements of sediment strength, microbiological WR sub-coring, headspace gas sediment preservation, and processing of drilling fluid and PCATS water samples. **Core Run: Core UT-GOM2-2-H003-11H.** Acquire Core UT-GOM2-2-H003-11H over the depth interval from 209.0 to 232.0 fbsf; 30.31 ft recovered core (132% recovery). **Core Run: Core UT-GOM2-2-H003-12H.** Acquire Core UT-GOM2-2-H003-12H over the depth interval from 232.0 to 255.0 fbsf; 30.28 ft recovered core (132% recovery). Acquired APCT-3 temperature record (10 minute dwell time). **Core Run: Core UT-GOM2-2-H003-13CS.** Acquire Core UT-GOM2-2-H003-13CS over the depth interval from 255.0 to 265.0 fbsf; 1.38 ft recovered core (14% recovery), 3531 psi recovery pressure. Coring F 6761 ft – T 6771 ft (RKB) at 60 rpm w/ 2-4 K torque circulating 8.6 ppg SW at 2 bpm w/ 63 psi standpipe. Maintaining 1-5K on bit. **Core Run: Core UT-GOM2-2-H003-14H.** Acquire Core UT-GOM2-2-H003-14H over the depth interval from 265.0 to 290.0 fbsf; 30.91 ft recovered core (124% recovery). Acquired APCT-3 temperature record (10 minute dwell time).

			Core Run: Core UT-GOM2-2-H003-15CS. Acquire Core UT-GOM2-2-H003-15CS over the depth interval from 290.0 to 300.0 fbsf; 2.95 ft recovered core (30% recovery), 0 psi recovery pressure. Coring F 6796 ft – T 6806 ft (RKB) at 60 rpm w/ 1-3 K torque circulating 8.6 ppg SW at 2 bpm w/ 190 psi standpipe. Maintaining 1-3K on bit.
9-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H003.** General Operations/Maintenance: General housekeeping.	Operations included advancing Hole UT-GOM2-2-H003 from a depth of 300 fbsf (6806 ft RKB) to a total depth of 449 fbsf (6955 ft RKB) by the deployment of six conventional piston cores (G-APC) and two pressure cores (PCTB-CS). This combination of conventional and pressure cores targeted a series of transitional low to high density stratigraphic intervals as observed on the logging while drilling (LWD) data as acquired in the WR313H-001 well. The conventional cores UT-GOM2-2-H003-16H, -17H, -18H, -20H, -21H, and -22H were processed thorough the Geotek Core Receiving Lab using the standard GOM2-2 core processing techniques. Laboratory measurements conducted on the acquired core material will provide important understanding of reservoir and bounding mud properties. Characterizing these properties will
	0000-0145	Continue to recover Core UT-GOM2-2-H003-15CS.	
	0145-0430	Acquired and recovered Core UT-GOM2-2-H003-16H.	
	0430-0800	Acquired and recovered Core UT-GOM2-2-H003-17H.	
	0800-1100	Acquired and recovered Core UT-GOM2-2-H003-18H.	
	1100-1530	Acquired and recovered Core UT-GOM2-2-H003-19CS.	
	1530-1800	Acquired and recovered Core UT-GOM2-2-H003-20H.	
	1800-2100	Acquired and recovered Core UT-GOM2-2-H003-21H.	

	2100-2400	Acquired and recovered Core UT-GOM2-2-H003-22H.	allow us to better understand fluid and gas transport processes in the greater Walker Ridge area associated with reservoirs and seals, providing insight in terms of gas migration and hydrate formation. Pressure core sections UT-GOM2-2-H003-08CS-2 and UT-GOM2-2-H003-08CS-3 (as acquired on 07-AUG-23) were quantitatively degassed to calculate the dissolved methane concentration, and multiple gas samples were collected. These sections were depressurized in an extra slow manner in an attempt to preserve the thin beds and laminations observed in the PCATS scans. **Core Run: Core UT-GOM2-2-H003-16H.** Acquire Core UT-GOM2-2-H003-16H over the depth interval from 300.0 to 321.0 fbsf; 26.90 ft recovered core (128% recovery). **Core Run: Core UT-GOM2-2-H003-17H.** Acquire Core UT-GOM2-2-H003-17H over the depth interval from 321.0 to 342.0 fbsf; 28.31 ft recovered core (135% recovery). Acquired APCT-3 temperature record (10 minute dwell time). **Core Run: Core UT-GOM2-2-H003-18H.** Acquire Core UT-GOM2-2-H003-18H over the depth interval from 342.0 to 364.0 fbsf; 31.43 ft recovered core (143% recovery). **Core Run: Core UT-GOM2-2-H003-19CS.** Acquire Core UT-GOM2-2-H003-19CS over the depth interval from 364.0 to 374.0 fbsf; 11.35 ft recovered core (114% recovery), 3042 psi recovery pressure. Coring F 6870 ft – T 6880 ft (RKB) at 60 rpm w/ 2-4 K torque circulating 8.6 ppg SW at 3 bpm w/ 270 psi standpipe. Maintaining 4-5K on bit.

			Core Run: Core UT-GOM2-2-H003-20H. Acquire Core UT-GOM2-2-H003-20H over the depth interval from 374.0 to 399.0 fbsf; 29.63 ft recovered core (119% recovery). **Core Run: Core UT-GOM2-2-H003-21H.** Acquire Core UT-GOM2-2-H003-21H over the depth interval from 399.0 to 424.0 fbsf; 28.35 ft recovered core (113% recovery). Acquired APCT-3 temperature record (10 minute dwell time). **Core Run: Core UT-GOM2-2-H003-22H**. Acquire Core UT-GOM2-2-H003-22H over the depth interval from 424.0 to 449.0 fbsf; 23.79 ft recovered core (95% recovery).
10-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H003.** General Operations/Maintenance: General housekeeping. Backload Blower motor to the M/V Harvey Hermes.	Operations included advancing Hole UT-GOM2-2-H003 from a depth of 449 fbsf (6955 ft RKB) to a total depth of 509 fbsf (7015 ft RKB) by the deployment and recovery of three conventional piston cores (G-APC) and one pressure core (PCTB-CS). This combination of cores targeted a mud-rich section with the goal to further characterize the methane solubility profile within the upper stratigraphic section at the site of Hole UT-GOM2-2-H003. One of the critical operational concerns associated with coring Hole UT-GOM2-2-H003 was the determination of the depth where the hole could no longer be safely advanced with piston style G-APC cores and the need to switch over to rotary style G-XCB coring operations.
	0000-0100	Continue to recover Core UT-GOM2-2-H003-22H.	
	0100-0400	Acquired and recovered Core UT-GOM2-2-H003-23H.	

	0400-0815	Acquired and recovered Core UT-GOM2-2-H003-24CS.	The first evidence of significant challenges associated with the G-APC coring operations was observed in Core UT-GOM2-2-H003-022H where the core contained numerous gas voids and a partially collapsed core liner. Core UT-GOM2-2-H003-023H was also expansive in nature with numerous gas voids. Core UT-GOM2-2-H003-025H marked the end of G-APC operations in Hole UT-GOM2-2-H003 where the core was again expansive throughout, exhibiting evidence of possible inflow of sediment debris into the core barrel, and the core liner proved to be very difficult to remove from the inner core barrel. The decision was made to switch from the G-APC to the G-XCB coring systems to further advance the conventional coring operations in Hole UT-GOM2-2-H003. Repairs to the shipboard Geotek PCATS pressure core analysis system allowed the processing of the Core UT-GOM2-2-
	0815-0945	Acquired and recovered Core UT-GOM2-2-H003-25H.	
	0945-1215	Drill out and condition hole to 509 fbsf. Trouble Shoot TDS (shutting down while rotating) found blower motor not working.	

	1215-2400	Remove blower motor. Monitor well while circulating/conditioning and reciprocating drill string.	H003-19CS that was recovered on 09-AUG-2023. At the time of this report, Core UT-GOM2-2-H003-24CS was being processed through PCATS. Additional PCTB-CS acquired pressure core samples as obtained earlier in the expedition have also been transferred to the Geotek degassing van for quantitatively degassed in order to further define the dissolved methane concentration profile at the site of Hole UT-GOM2-2-H003. After recovering Core UT-GOM2-2-H003-025H and while drilling the "rathole" section from 6990 ft RKB to 7015 ft RKB, it was discovered by Helix that the Top Drive System (TDS) was showing a "high temperature alarm" for the drill motor. Operations were halted and the crews began troubleshooting. We were able to continue circulating and reciprocating the pipe. The maintenance team discovered that the blower motor (cooling fan motor) for the drill motor had electrically grounded. Helix did not have a spare motor onboard the Helix Q4000. The plan was to take the blower motor to shore and repair it as rapidly as possible. The M/V Harvey Hermes supply vessel departed WR 313 with the blower motor from the Helix Q4000 at 2220 hr, 08-AUG-23, end route HGIM dock, Port Fourchon, with an ETA 1630, 11-AUG-23. The Helix Q4000 went onto "Vessel, ROV & Tubular Downtime. It is estimated that the repairs to the ship will be completed in 36 to 48 hours (e.g., between 1200 hr and 2400 hr on 12-AUG-23). The SLB wireline was rigged down and a night cap installed. We laid down a single length of drill pipe to get off bottom and circulated the hole and reciprocating the pipe. The hole was determined to be in good condition regarding well control, at a depth ~500 fbsf below the mud-line and still able to

			circulate and reciprocate. The Q4000 ROV's also monitored the wellhead at the seafloor. This afternoon, two members of the UT-GOM2-2 Science Party and an additional Helix crew member tested positive for COVID; all of the affected individuals were quarantined where they were expected to remain for the next five days until cleared by the vessel's medic. The Helix Q4000 was placed under Helix prescribed COVID protocols that include social distancing requirements and a rotational meal schedule to reduce the possibility of potential exposure. **Core Run: Core UT-GOM2-2-H003-23H.** Acquire Core UT-GOM2-2-H003-23H over the depth interval from 449.0 to 474.0 fbsf; 29.0 ft recovered core (116% recovery) **Core Run: Core UT-GOM2-2-H003-24CS.** Acquire Core UT-GOM2-2-H003-24CS over the depth interval from 474.0 to 484.0 fbsf; 11.35 ft recovered core (114% recovery), 3091 psi recovery pressure. Coring F 6980 ft – T 6990 ft (RKB) at 60 rpm w/ 2-4 K torque circulating 8.6 ppg SW at 2 bpm w/ 200 psi standpipe. Maintaining 4-5K on bit. **Core Run: Core UT-GOM2-2-H003-25H.** Acquire Core UT-GOM2-2-H003-25H over the depth interval from 484.0 to 509.0 fbsf; 34.32 ft recovered core (137% recovery). Acquired APCT-3 temperature record (10 minute dwell time).

11-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H003.** General Operations/Maintenance: General housekeeping.	The M/V Harvey Hermes supply vessel arrived in Port Fourchon at 1525 hr on 11-AUG-23 and immediately transferred the damaged Q4000 TDS blower motor (cooling fan motor) to Houma Armature Works for rewinding of the motor coil. The blower motor is expected to be returned to the Q4000 between 1200 hr and 2400 hr on 12-AUG-23 (via helicopter). We rig crew continued to circulate the hole and ran regularly scheduled Hi-Vis mud sweeps as needed while reciprocating the drill string. The Q4000 remained in "Vessel, ROV & Tubular Downtime" status throughout the day. The onboard scientific operations over the last 24-hours focused on processing through the onboard UT and Geotek labs the sediment, gas, and water samples labs collected from the previously acquired conventional wireline cores and the conventionalized pressure cores. Based on the excellent quality of pressure core UT-GOM2-2-H003-19CS, we were able to use the PCATS acquired core scans and compare them with the downhole log data collected from Hole WR H001 in 2009. The core was collected with the top at 6870 ft RKB. After plotting the data and comparing the bulk density (downhole log) and gamma density (core scan) curves, we believe the most likely depth correlation with the acquired core is about ~3 ft deeper at depth of 6873 ft RKB. The Blue well log "core-point pick" was shifted down 3 ft. This is an encouraging result and future cores were examined to see if we remained "on depth" so that we can effectively core deeper key targets such as the red, blue, and orange sands as defined in the project prospectus. Shipboard analysis of recovered
	0000-2400	Waiting on repairs/replacement of TDS blower motor. Monitored the well while reciprocating the drill string and alternating the circulation of 8.6 ppg SW at 70 psi and pumping 25 bbl 10.5 ppg Hi-Vis sweeps at 75 psi.	

			pressure cores also continued, including the approval of the “core cut plan” for Core UT-GOM2-2-H003-19CS, which involved the cutting the 3.5 m long core into three nearly equal lengths and the controlled quantitative degassing of each core section to precisely determine the volume of gas evolved from each section. These analysis will again be used to further define the dissolved methane concentration profile at the site of Hole UT-GOM2-2-H003. Data on in situ methane solubility helps to define the potential distribution of gas hydrate in a marine sedimentary section. Pressure core UT-GOM2-2-H003-08CS has also been fully process through PCATS and was sub-sectioned for porewater, microbiology, and geomechanical samples in the conventional Core Receiving Lab. No new COVID cases were reported today.
12-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H003.** General Operations/Maintenance: Performed corrosion maintenance in misc. areas and “weekly” maintenance on the vessel cranes. Performed 250-350 psi / 3,000 psi for 5 min test on Full-Opening Safety Valve (FOSV) using vessel mud pumps with 8.3 ppg.	Upon inspection of the damaged Q4000 TDS blower motor (cooling fan motor) at the Houma Armature Works it was determined that the motor was more severely damaged. The new replacement blower motor, however, is expected to arrive in Houston tonight (12-AUG-23). When it clears customs, the replacement blower motor will be transported to Houma, Louisiana. We hope it will leave Sunday (13-AUG-23)

	0000-2400	Waiting on repairs/replacement of TDS blower motor. Monitored the well while reciprocating the drill string and alternating the circulation of 8.6 ppg SW at 70 psi and pumping 25 bbl 10.5 ppg Hi-Vis sweeps at 75 psi.	morning and will be flown out by helicopter to the Q4000 (or possible transported by service boat). Installation of the new blower motor is expected to go quickly. If the blower arrives at the Q4000 on Sunday, we should be able to return to coring operations sometime in the evening 13-AUG-23. The onboard scientific operations over the last 24-hours continued to focus on processing both conventional and conventionalized core samples previously collected in Hole GOM2-2-H003. Shipboard analysis of recovered pressure cores has also continued with detailed X-ray, gamma-density, and compressional-wave scanning of the successfully recovered pressure cores in the Geotek Pressure Core Analysis and Transfer System (PCATS) along with quantitatively degassed pressure cores. The number of active COVID cases on the vessel increased with four additional members of the drilling crew being quarantined and a third member of the science party testing positive for COVID. Face masking is now required for common areas on the ship where people congregate.
13-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H003.** General Operations/Maintenance: Performed corrosion maintenance in misc. areas and weekly maintenance on the vessel cranes.	The Helix D/V Q4000 replacement TDS blower motor arrived in Houston this morning and was loaded to an hotshot delivery. The replacement blower motor arrived at the Bristow Houma Heliport 1300 hr and was flow out to the Vessel by helicopter, arriving on the rig around 1530 hr. Helix expedited the installation of the new blower motor in the TDS, which was operational and tested by 1930 hr. After consultation with the onboard scientists and Geotech, it was decided to advance the hole from its current depth of 7015 ft RKB (509.0 fbsf) by drilling
	0000-1530	Waiting on repairs/replacement of TDS blower motor. Monitor the well while reciprocating the drill string and alternating the circulation of 8.6 ppg SW at 70 psi and pumping 25 bbl 10.5 ppg Hi-Vis sweeps at 75 psi.	
	1530-1930	Installed and tested replacement blower motor in the TDS.	

	1930-2015	Wash and Ream from 6992 ft RKB to 7015 ft RKB (former hole TD).	(without coring) to a core point depth of 7420 ft RKB (914.0 fbsf) to just above the Red Sand, where one G-XCB core and three PCTB-CS pressure cores will be acquired. The Red sand will be cored to examine methane migration mechanisms and gas hydrate formation in fine-grained marine sediments that also contain coarse-grained gas hydrate-bearing sedimentary units. In intervals dominated by fine-grained sediments, with coarse-grained layers, gas hydrate is found disseminated in the pore space. Hydrate can form from microbial methane that is believed to have diffused from adjacent fine-grained sediments as in short-range migration, which will be tested with the cores targeting the Red Sands. In support of the ongoing microbiological research program being conducted on the Helix D/V Q4000, for the first time during this expedition, pressure cores were processed as cryo cores frozen in liquid nitrogen within a Geotek core processing device that allows pressure cores while still under controlled pressure conditions to be frozen. There are currently 4 members of the ship crew with COVID and 4 members of the scientific party with COVID. All are deemed to be stable and recuperating while isolated.
	2015-2400	M/U Geotek center bit (CBRT) and deploy in the hole, which failed to land out in the BHA. After several deployment attempts and pumping 5 bpm of mud at 101 psi was able to latch the CBRT into the BHA.	
14-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H003.** General Operations/Maintenance: Helix D/V Q4000 ROV corrosion maintenance, general rig housekeeping.	As reviewed in the Daily Log above for 13-AUG-23, it was decided to advance Hole UT-GOM2-2-H003 by drilling (without coring) to a core point depth of 7420 ft RKB (914.0 fbsf) to just above the Red Sand. The hole was successfully drilled without any problems to the targeted depth of 7420 ft RKB by 0930 hr on 14-AUG-23. The first G-XCB core (Core UT-GOM2-2-H003-26X) of the UT-GOM2-2 Expedition was acquired over
	0000-1258	Drilled ahead from 7015 to 7420 ft RKB at 70 RPM, w/ 3-4k torque, pumping at 7 bpm, and a pressure of 830 psi while maintaining 2-5k	

		on bit and 100 ROP; pumped 40 bbl of 10.5 ppg Hi-Vis sweep.	the core depth interval from 914.0 to 942.0 fbsf, with a total recovery of 27.92 ft of core (100 % recovery). The G-XCB also known as the Geotek "Extended Core Barrel" or "Rotary Extended Shoe Coring System" is designed to acquire cores in relatively more lithified sedimentary formations. In this case, Core UT-GOM2-2-H003-26X yield almost a continuous core section characterized by several large (up to ~10 inches long) gas-charged voids in the recovered core liner. Much like similar gas voids commonly observed in G-APC cores, as described in earlier UT-GOM2-2 Coring Expedition reports, the gas voids were sampled by using a specialized tool to pierce the Butyrate liner and collect gas samples in several different containers that will be processed post-expedition to further characterize the processes controlling the formation of gas hydrates in marine sediments. The other data critical to these analyses were collected in Core UT-GOM2-2-H003-27CS, which was a pressure core collected immediately after the Core UT-GOM2-2-H003-26X. There were no new COVID cases on the Helix D/V Q4000 in the last 48 hours; 2 of the 4 members of the scientific party were released from isolation on the afternoon of 14-AUG-23. There are 3 members of the ship crew and 2 members of the of the scientific party that are still in quarantine; all are being closely monitored and are recuperating. **Core Run: Core UT-GOM2-2-H003-26X.** Acquire Core UT-GOM2-2-H003-26X over the depth interval from 914.0 to 942.0 fbsf; 27.92 ft recovered core (100% recovery). Acquire G-XCM rotary Core UT-GOM2-2-H003-26X from F/ 7420 to T/ 7448 ft (RKB) at 80 rpm, maintaining 8-10k on bit, CMT pumping 8.6 ppg SW at 3.5
	1258-1800	Acquire and recover Core UT-GOM2-2-H003-26X.	
	1800-2147	Acquire and recover Core UT-GOM2-2-H003-27CS.	
	2147-2400	Prepare to acquire Core UT-GOM2-2-H003-28CS.	

			bpm and 330 psi. **Core Run: Core UT-GOM2-2-H003-27CS.** Acquire Core UT-GOM2-2-H003-27CS over the depth interval from 942.0 to 952.0 fbsf; 11.06 ft recovered core (92% recovery), 3091 psi recovery pressure. Coring F/ 7448 - T/ 7458 ft (RKB) at 80 rpm, maintaining 8-10k on bit, CMT pumping 8.6 ppg seawater at 3.5 bpm and 330 psi.
15-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H003.** General Operations/Maintenance: General housekeeping. Fluid management during pumping operations.	Coring operations in the last 24-hrs in Hole UT-GOM2-2-H003 featured the acquisition of two additional pressure cores that targeted the "Red Sand", with the first of the three PCTB-CS cores (Core UT-GOM2-2-H003-27CS) being collected the day before on 14-AUG-23. Core UT-GOM2-2-H003-28CS was acquired from a depth of F/ 7460 - T/ 7470 ft (RKB) (954-964 fbsf). The third core in this set of three PCTB-CS deployments that targeted the "Red Sand" was the Core UT-GOM2-2-H003-29CS. Again, this set of three PCTB-CS and the overlying Core UT-GOM2-2-H003-26X conventional G-XCB core were deployed to obtain additional information on the solubility of methane within the pore fluids associated with the occurrence of gas hydrate in the
	0000-0330	Remove damaged wire from SLB slick line (S/L), slip and cut 200 ft of S/L wire, rebuilt pack off.	
	0330-0900	Continue to acquire and recover Core UT-GOM2-2-H003-28CS.	
	0900-1025	Acquire and recover Core UT-GOM2-2-H003-29CS.	
	1025-1200	Drill ahead from 7480 to 7485 ft RKB at 70 RPM, w/ 3-4k torque, pumping at 8 bpm, and a pressure of 1000 psi while maintaining 2-5k on bit and a ROP of 100 per minute.	

	1200-1300	Drill ahead from 7485 to 7505 ft RKB at 70 RPM, w/ 3-4k torque, pumping at 7 bpm, and a pressure of 803 psi while maintaining 2-5k on bit and a ROP of 100 per minute.	cored stratigraphic section and examine the formation of gas hydrate within mud-rich stratigraphic sections that also contain coarse sand layers with high gas hydrate saturations. The significant deviation from vertical of the UT-GOM2-2-H003 borehole (borehole inclination of 7.765º at 7505 ft RKB), places our ability to target the deeper coring targets at significant risk. The cause of the measured hole deviation is unknown; however, it is possible that the strong currents that were present when the hole was originally spudded resulted in an offset of the drilling vessel position relative to the spudded position of the borehole at the seafloor. The offset could have led to the establishment of an inclined borehole at spud and the observed deviated well at depth. It is important to highlight that coring the gas hydrate-bearing sands associated with the deeper Orange Interval is the most important science goal of the expedition, and it is highly doubtful that that we would have successfully cored these critical targets from the current position of the UT-GOM2-2-H003 borehole. There was no new COVID cases on the Helix D/V Q4000 in the last 72 hours; the 3rd member of the scientific party was released from isolation on the afternoon of 14-AUG-23. There were 3 members of the ship crew and 1 person from the scientific party that were still in quarantine. **Core Run: Core UT-GOM2-2-H003-28CS.** Acquire Core UT-GOM2-2-H003-28CS over the depth interval from 954.0 to 964.0 fbsf; 2.46 ft recovered core (25% recovery), 3478 psi recovery pressure. Coring F/ 7460 - T/ 7470 ft (RKB) at 60
	1300-1330	Pumped 40 bbls of 10.5 ppg Hi-Vis sweep to prepare hole for logging operations.	
	1330-1630	RIH Gyro-Data Omega – 1.875 inch Battery Slickline Gyro and performed a gyro survey at 6600 and 7500 ft RKB. **Directional Survey:** After advancing the hole to a depth of 7505 ft RKB (999 fbsf), conducted wireline deployed (memory sonde) gyroscopic surveys at two depths with a Gyro-Data Omega – 1.875 inch Battery Slickline Gyro and performed a gyro survey at 6600 and 7500 ft RKB. After completing the surveys, POOH and laid out gyroscopic tool and accessed the tool memory, the recorded survey data at a depth of 7505 ft RKB (999 fbsf) indicated a borehole inclination of 7.765º degrees at a azimuth of 124.38º. The same survey at the mud line (seafloor) indicated an inclination of 6.06º degrees at a azimuth of 123.32º. Note that BSEE considers any borehole with an inclination of the more the 3º to be a deviated well, which requires additional approvals and the acquisition of more regular directional surveys with depth (every 500 ft).	
	1630-2000	Pumped 8.6 ppg seawater at 7 bpm with 818 psi while rotating and reciprocating the drill pipe from 7450 to 7505 ft RKB.	
	1947	Received verbal approval on 15-Aug-23 at 1947 hours to proceed with proposed abandonment of	

		Hole UT-GOM2-2-H003 from Mr. Bill Sanders BSEE Houma District.	rpm, maintaining 8-10k on bit, CMT pumping 8.6 ppg seawater at 3.5 bpm and 330 psi. **Core Run: Core UT-GOM2-2-H003-29CS.** Acquire Core UT-GOM2-2-H003-29CS over the depth interval from 964.0 to 974.0 fbsf; 8.60 ft recovered core (86% recovery), 3480 psi recovery pressure. Coring F/ 7470 - T/ 7480 ft (RKB) at 80 rpm, maintaining 8-10k on bit, CMT pumping 8.6 ppg seawater at 4.0 bpm and 400 psi.
	2000	Decision to terminate operations in Hole UT-GOM2-2-H003.	
	2000-2400	Displaced hole by pumping 115 bbls of 11.0 ppg WBM (P&A MUD) with Hex pump #1 at 7 bpm with 464 psi followed by 110 bbls of 8.6 ppg seawater. POOH Geotek PTCB cutting shoe BHA from 7505 to 6491 ft RKB.	
16-Aug-23	**0000-0900**	**Helix D/V Q4000 located on Hole UT-GOM2-02-H003.** General Operations/Maintenance: General Housekeeping.	As reviewed in the 15-AUG-23 Daily Operational and Science Report for the UT-GOM2-2 Coring Expedition, after confirming the significant deviation from vertical of the UT-GOM2-2-H003 borehole (borehole inclination of 7.765º at 7505 ft RKB), the decision was made at 2000 hr on 15-AUG-23 to terminate operations in Hole UT-GOM2-2-H003 and move over and drill/core Hole UT-GOM2-2-H002. Hole UT-GOM2-2-H003 was completed to a total depth of 7505 ft RKB (999 fbsf), with the deployment of 18 G-APCs, 1 G-XCB, and 10 PCTB-CS pressure cores. The PCATS scans of Core UT-GOM2-2-H003-27CS revealed evidence of fracture filling gas hydrate. Operations at the location of Hole UT-GOM2-2-H002 began at 0900 on 16-AUG-2023 with the preparation of running into the open ocean the PCTB Face Bit pressure coring tool (PCTB-FB) Bottom Hole Assemblage (BHA). There were no new COVID cases on the Helix D/V Q4000 in the last four days. There was one person from the science party that is still in quarantine.
	0000-0030	M/U to TDS POOH F/ 6491 to T/ 6455 ft RKB, flush drill sting with 200 bbls of seawater at 8 bpm and 1100 psi.	
	0030-0900	POOH F/ 6455 to T/ 203 ft RKB while laying down doubles of 5 7/8" XT57 drill pipe.	
	900	End of Hole UT WR313 H003 and start of Hole UT WR313 H002.	
	0900-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H002.** The University of Texas at Austin submitted Rig Move Notification to move from WR313 H003 to WR H002 on 16-AUG-23 to BSEE Houma District. Held pre-spud meeting with vessel crew members to discuss the drilling plan for the well and possible hazards.	
	0900-1030	M/U 9-7/8 inch PCTB Face Bit pressure coring tool (PCTB-FB) Bottom Hole Assemblage (BHA). Install Geotek Center Bit Assembly into the PCTB-FB BHA seal bore assembly and confirm space out.	

	1030-2100	RIH BHA with 8.5 inch drill collar and 9-7/8 inch stabilizers to 6454 ft RKB making up doubles of 5 7/8" XT57 drill pipe, torquing to 52k ft/lbs. Drifted drill string w/ 4.125 inch drift.	**<u>Hole UT-GOM2-2-H002 Reference Data</u>** **RKB to Mud line: 6506 ft (Per Datum: 52 ft)** **Water depth: 6454 ft** **Lat 26°39'44.2229"N, Long 091°40'33.8972"W NAD27 BLM15 Feet**
	2100-2400	MU TDS and pump-in sub and install testing equipment. Conducting pressure test of the drilling system internal lower blowout preventers (IBOPs) on the TDS.	
17-Aug-23	**0000-2400**	**Helix D/V Q4000 located on Hole UT-GOM2-02-H002.** General Operations/Maintenance: Held pit drill with drill crew. General rig housekeeping. Fluid management during pumping operations.	Hole UT-GOM2-2-H002 was spudded at 0600 hr on 17-AUG-23 at a ROV observed "bit-tag" mudline (seafloor) depth of 6506 ft RKB. Hole UT-GOM2-2-H002 was than advanced throughout the remainder of the day to a depth of 6924 ft RKB (418 fbsf). Before the spudding of Hole UT-GOM2-2-H002 the Helix Q4000 rig crew had to complete an extensive set of permit required testing of the drilling systems, including the internal lower blowout preventers (IBOPs) on the TDS, the rig Night Cap, and the Kelly Hose assemblies. Because of the well deviation concerns associated with the previously drilled/cored Hole UT-GOM2-2-H003, the spud in program and initial "top-hole" drilling phase of Hole UT-GOM2-2-H002 featured the use of controlled drilling parameters designed to reduce borehole deviations, such as limiting weight on bit and the use of higher mud pump rates that allows the borehole to "drop more straight" with depth. Two shallow directional surveys were conducted in Hole UT-GOM2-2-H002 at a depth of 6506 ft RKB (0 fbsf) and the second at 6715 ft RKB (209 fbsf), which yielded measured borehole inclinations of 0.24° and 0.82° at an azimuth of 110°, respectively. The Science Party quantitatively
	0000-0500	Continued pressure testing of the drilling system internal lower blowout preventers (IBOPs) on the TDS. Test Night Cap and Kelly Hose assemblies. Test cement assembly offline.	
	0500-0600	Move drilling vessel 35 m at an azimuth of 191º to the selected spud position.	
	0600-0800	Spud Hole UT-GOM2-2-H002, verified mudline (seafloor) depth by ROV observation of drill bit tag at 6506 ft RKB. Drilled ahead at 150 GPM, 18 RPM, w/ 90 psi, and 0 k WOB, F/ 6506 to 6570 ft RKB. Pumped 15 bbls of 10.5 ppg Hi-Vis sweeps as directed.	
	0800-1100	Prepare for initial directional survey in Hole UT-GOM2-2-H002, RIH Gyro-Data Omega – 1.875 inch Battery Slickline Gyro and performed a gyro survey at 6506 ft RKB (0 fbsf). POOH the gyro survey tool. Circulated and condition hole while downhole gyro log data was acquired. Gyro inclination survey reading of 0.24°.	

	1100-1600	Drilled ahead at 200 GPM, 25 RPM, w/ 90 psi, 0 k WOB, F/ 6570 to 6720 ft RKB. Pumped 15 bbls of 10.5 ppg Hi-Vis sweeps as directed.	degassed two core sections from Core H003-27CS that was previously acquired in Hole UT-GOM2-2-H003, which were then processed as conventionalized core. Two sections from H003-29CS (also acquired in Hole UT-GOM2-2-H003) were quantitatively degassed. Gas samples were collected from each of the degassed sections. The degassing results indicate the presence of low-saturation methane hydrate in each of these sections. Liquid-nitrogen frozen microbiology samples (i.e., cryo cores) were collected from Cores H003-27CS and H003-29CS. There was no new COVID cases on the Helix D/V Q4000 over the last five days and the last member of the science party was released from quarantine. **Directional Surveys:** Because of the well deviation problem experienced in Hole UT-GOM2-2-H003, the drilling of the "top hole" section in the Hole UT-GOM2-2-H002 included two relatively shallow borehole deviation surveys (inside of drill pipe), one at 6506 ft RKB (0 fbsf) and the second at 6715 ft RKB (209 fbsf); and an additional deviation survey yet to be conducted in the same hole at 7715 ft RKB (1209 fbsf). The wireline deployed (memory sonde) gyroscopic logging services on the Q4000 are being provided by Gyro-Data, who used an Omega – 1.875 inch Battery Slickline Gyro and performed the directional surveys in both Holes UT-GOM2-2-H002 and -H003. After completing each of the surveys in Hole UT-GOM2-2-H002 and accessing the tool memory, it was determined that for the recorded survey at a depth of 6506 ft RKB (0 fbsf) the borehole was inclined at 0.24° and for the survey at 6715 ft RKB (209 fbsf) the borehole was inclined at 0.82° at an azimuth of 110°. Both of these initial surveys show that Hole UT-
	1600-1830	Prepare for second directional survey in Hole UT-GOM2-2-H002, RIH Gyro-Data Omega – 1.875 inch Battery Slickline Gyro and performed a gyro survey at 6667 ft RKB (161 fbsf). POOH the gyro survey tool. Circulated and conditioned hole while downhole gyro log data was acquired. Gyro inclination survey reading of 0.82° at 110° azimuth. Vessel was moved 14 m at 110° to correct for the measured deviation.	
	1830-2400	Drilled ahead at 275 GPM, 35 RPM, w/ 92 psi, 0-2 k WOB, F/ 6720 to 6924 ft RKB. Pumped 15 bbls of 10.5 ppg Hi-Vis sweeps as directed.	

			GOM2-2-H002 is well within the BSEE inclination limit of 3.0º for a deviated well classification.
18-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H002.** General Operations/Maintenance: General rig housekeeping. Paint spots on deck with first primer coat. Offload and backload supply connex from M/V Harvey Hermes.	Over the last 24 hours, Hole UT-GOM2-2-H002 was advanced by drilling from a depth of 6924 to 7853 ft RKB (with a total drilled interval of 929 ft) without any significant problems. Because of the well deviation concerns associated with the previously drilled/cored Hole UT-GOM2-2-H003, the drilling program in the "top-hole" section of Hole UT-GOM2-2-H002 was executed using controlled drilling parameters, which also limited the rate of bit penetration within the upper section of the well to about 30 to 60 ft per hour. After conducting a borehole direction survey at 7667 ft RKB (1161 fbsf) and determining that the borehole was very near vertical with and inclination 0.35° (with an azimuth of 96.79°), it was determined that it was now safe to increase the borehole drilling rate. By increasing the weight on bit (WOB) to ~5000 lbs, and increasing drilling fluid pump rates ~350 GPM, and similarly increasing the drill bit RPMs to over ~70, we experienced a drilling rate increase to as high as 120 ft per hour. We hope to reach the core point for the first PCTB-FB in Hole UT-GOM2-2-H003 around 1600 hr on 19-AUG-23. The Science Party completed the processing of all of the remining PCTB-
	0000-0700	Continued to drill ahead at 330 GPM, 50 RPM, w/ 150 psi, 0-2 k WOB, F/ 6924 to 7299 ft RKB. Pumped 10.5 ppg Hi-Vis sweeps as directed.	
	0700-0830	Service Topdrive, Block Equipment, and TDS Dolly Roller.	
	0830-1200	Continued to drill ahead at 330 GPM, 60 RPM, w/ 230 psi, 0-5 k WOB, F/ 7299 to 7489 ft RKB. Pumped 8.6 ppg Hi-Vis sweeps as directed.	
	1200-1830	Continued to drill ahead at 350 GPM, 70 RPM, w/ 300 psi, 0-5 k WOB, F/ 7489 to 7720 ft RKB. Pumped 8.6 ppg Hi-Vis sweeps as directed.	
	1830-2130	Prepare for third directional survey in Hole UT-GOM2-2-H002, RIH Gyro-Data Omega – 1.875 inch Battery Slickline Gyro and performed a gyro survey at 7667 ft RKB (1161 fbsf). POOH the gyro survey tool. Gyro inclination survey reading of 0.35°.	

	2130-2400	Continued to drill ahead at 350 GPM, 70 RPM, w/ 330 psi, 0-5 k WOB, F/ 7720 to 7853 ft RKB. Pumped 8.6 ppg Hi-Vis sweeps as directed.	CS pressures cores that were acquired from Hole UT-GOM2-2-H003 with the final conventionalization of two sections from Core H003-29CS. There have been no new COVID cases on the Helix D/V Q4000 in the last six days. **Directional Survey:** The wireline deployed (memory sonde) gyroscopic logging services on the Q4000 are being provided by Gyro-Data, who used an Omega – 1.875 inch Battery Slickline Gyro to perform the directional surveys in Hole UT-GOM2-2-H002 at a depth of 7667 ft RKB (1161 fbsf). It was determined that for the recorded survey at a depth of 7667 ft RKB (1161 fbsf) the borehole was inclined at 0.35° at an azimuth of 96.79°. This survey is again within the BSEE inclination limit of 3.0º for a deviated well classification.
19-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H002.** General Operations/Maintenance: General rig housekeeping. Offload and backload supply connex from M/V Harvey Hermes. Changed out mechanical seal on brine charge pump #1.	Hole UT-GOM2-2-H002 was advanced by drilling from a depth of 7853 to 8621 ft RKB (for a total drilled interval of 768 ft) without any significant problems. Continued to drill ahead to the first PCTB-FB core point at 8621 ft RKB (2115 fbsf) and prepared to acquire Core UT-GOM2-2-H003-01FB. The plan forward for coring in Hole UT-GOM2-2-H002 calls for acquiring six cores associated with the Blue Sand and background mud, nine cores associated with the Orange Sand and its bounding intervals, and two cores selected to staddle the base of the gas hydrate stability zone as inferred by a prominent seismic imaged bottom simulation reflector (BSR) that crosses the path of Hole UT-GOM2-2-H002. At a depth of ~8100 ft RKB (~1594 fbsf) the drilling fluids program in Hole UT-GOM2-2-H002 was slowly switched over to the continuous use of water-based weighted drilling mud. Mud was mixed on the fly to the active pit and a mud
	0000-0450	Continued to drill ahead while pumping at 330 GPM, w/ 150 psi, 70 RPM, 0-5 k WOB, F/ 7853 to 8100 ft RKB. Pumped 10.5 ppg Hi-Vis sweeps as directed.	
	0450-0455	Continued to drill ahead while pumping at 300 GPM, w/ 202 psi, 70 RPM, 0-5 k WOB, F/ 8100 ft RKB. Swapped borehole over to 9.0 ppg water based mud (WBM).	
	0455-1200	Continued to drill ahead while pumping 10.3 ppg WBM at 300 GPM, w/ 202 psi, 70 RPM, 0-10 k WOB, F/ 8100 to 8272 ft RKB.	
	1200-2000	Continued to drill ahead while pumping 10.3 ppg WBM at 300	

		GPM, w/ 90 psi, 70 RPM, 0-5 k WOB, F/ 8272 to 8621 ft RKB.	weight of ~10.5 ppg mud, while drilling ahead from ~8100 ft RKB and pumping 10.5 ppg mud at ~300-350 gpm, ~60-70 RPM, ~3-5k WOB, and a maximum ROP of 100 ft/hr. The WR313 H001 well at this location was drilled without incident with 10.5 ppg mud back in 2009 under the Joint Industry Project Leg II. As reviewed above for Hole WR313 H002, it will be drilled with 10.5 ppg mud below about ~1600 fbsf to allow for better hole cleaning, increased hole stability, and to counterbalance any overpressure from gas or water that may be present. The bottom hole assembly (BHA) being used to recover pressure cores in Hole UT-GOM2-2-H002 is referred to as the face bit BHA. The BHA provides weight and stiffness for drilling as well as a means for landing and latching the coring tools. Various subs for landing and latching the coring tools and attaching the coring bits are also included in the BHA. The cutting shoe and face bit BHAs have flapper valves to prevent back flow into the drill string when a coring tool or center bit is not in place. The Pressure Coring Tool with Ball Valve (PCTB-FB) in the face bit configuration is used to recover pressurized core samples. Once landed and latched in the BHA the borehole can be advanced up to 10 feet (3 m) while capturing the core. Upon recovery of the PCTB-FB, the ball valve is closed and the pressure chamber is sealed. The PCTB-FB is then recovered with the core maintained at near in situ pressure. There was no new COVID cases on the Helix D/V Q4000 over the last seven days.
	2000-2400	R/U and RIH Geotek Center Bit retrieval tool and POOH Center Bit. Prepare and RIH PCTB-FB coring tool.	

20-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H002.** General Operations/Maintenance: General rig housekeeping. Offload/backload supplies and continued to transfer drilling mud from M/V Harvey Hermes. Held shallow gas drill with crew.	From 0030 to 0100 hr on the morning of 20-AUG the first PCTB-FB core (Core UT-GOM2-2-H003-01FB) was attempted in Hole UT-GOM2-2-H002 within the depth interval from 8621 to 8631 ft RKB (2115.0 to 2125.0 fbsf). Upon recovery of Core UT-GOM2-2-H003-01FB it was confirmed that the lower ball valve seal on the PCTB-FB had properly sealed, however, the upper seal on the autoclave failed to fully engage; thus, Core UT-GOM2-2-H003-01FB was recovered without pressure. The onboard Scientific Party processed the conventionalized Core UT-GOM2-2-H003-01FB with the acquisition of the standard set of wholeround cores subsamples. An additional regulatory required directional survey was conducted in Hole UT-GOM2-2-H002 immediately following the acquisition of Core UT-GOM2-2-H003-01FB. The directional survey conducted at a depth of 8577 ft RKB (2071 fbsf) in in Hole UT-GOM2-2-H002 indicated a borehole inclination of 0.60° with an azimuth of 99.31°. The hole was then advanced by drilling from 8631 to 8718 ft RKB (2125-2212 fbsf) (87 ft hole advance), at 8718 ft RKB our attention turned to the acquisition of three consecutive PCTB-FB pressure cores across the main reservoir section of the Blue Sands in Hole UT-GOM2-2-H002 at a depth from 8718 to 8748 ft RKB (2212-2242 fbsf). The first core in the Blue Sands reservoir section, Core UT-GOM2-2-H003-02F, was acquired from the depth interval from 2212 to 2222 fbsf. Upon examination in the
	0000-0030	Continue to RIH PCTB-FB coring tool.	
	0030-0210	Acquire and recover Core UT-GOM2-2-H002-01FB.	
	0210-0830	Prepare and RIH Geotek Center Bit (required several attempts to land out Center Bit).	
	0830-1000	Prepare for fourth directional survey in Hole UT-GOM2-2-H002, RIH Gyro-Data Omega – 1.875 inch Battery Slickline Gyro and performed a gyro survey at 8577 ft RKB (2071 fbsf). POOH the gyro survey tool. Gyro inclination survey reading of 0.60° at an azimuth of 99.31°.	
	1000-1500	Drilled ahead while pumping 10.3 ppg mud, at 7 bpm, w/ 93 psi, 70 RPM, 0-10 k WOB, F/ 8631 to 8718 ft RKB. R/U and RIH Geotek Center Bit retrieval tool and POOH Center Bit.	
	1500-1700	Observed with the ROV partial loss of returns from the wellhead to the seafloor, possibly caused by borehole carvings, pumped 30 bbls of Hi Vis sweep to clear the borehole.	
	1700-2155	Acquire and recover Core UT-GOM2-2-H002-02FB.	

	2155-2400	Acquire and recover Core UT-GOM2-2-H002-03FB.	Geotek Pressure Core Processing Van it was determined that Core UT-GOM2-2-H003-02F was recovered at a pressure of 4543 psi and is currently being processed through PCATS. In addition, at the very end of the day Core UT-GOM2-2-H003-03F was acquired from 8728 to 8738 ft RKB (2222-2232 fbsf); it was determined later the next day that Core UT-GOM2-2-H003-03F was recovered at a pressure of 4530 psi. There was no new COVID cases on the Helix D/V Q4000 in the last eight days. **Core Run: Core UT-GOM2-2-H002-01FB.** Acquire Core UT-GOM2-2-H002-01FB over the depth interval from 2115.0 to 2125.0 fbsf; 3.31 ft recovered core (33% recovery), 0 psi recovery pressure. Coring F/ 8621 - T/ 8631 ft RKB at 80 rpm, maintaining 8-10k on bit, CMT pumping 10.3 ppg WBM at 3.5 bpm and 155 psi. **Core Run: Core UT-GOM2-2-H002-02FB.** Acquire Core UT-GOM2-2-H002-02FB over the depth interval from 2212.0 to 2222.0 fbsf; 4.39 ft recovered core (44% recovery), 4543 psi recovery pressure. Coring F/ 8718 - T/ 8728 ft RKB at 80 rpm, maintaining 8-10k on bit, CMT pumping 10.3 ppg WBM at 3.5 bpm and 155 psi. **Directional Survey:** The wireline deployed (memory sonde) gyroscopic logging services on the Q4000 were provided by Gyro-Data, who used an Omega – 1.875 inch Battery Slickline Gyro to perform the directional surveys in Hole UT-GOM2-2-H002 at a depth of 8577 ft RKB (2071 fbsf) at which depth the borehole was determined to inclined at 0.60° and at an azimuth of 99.31°. This survey is within the BSEE inclination

			limit of 3.0º for a deviated well classification.
21-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H002.** General Operations/Maintenance: Performed maintenance on Hex pump #1. General housekeeping.	Core UT-GOM2-2-H003-03FB was cut from 8728 to 8738 ft RKB (2222-2232 fbsf). This was the second of three consecutive PCTB-FB pressure cores planned for the Blue Sand within the interval from 8718 to 8748 ft RKB (2212-2242 fbsf) in Hole UT-GOM2-2-H002. Upon recovery, we found the lower ball valve had properly sealed on the PCTB-FB and the measured pressure in the Geotek Pressure Core Receiving Lab was 4530 psi. The PCATS acquired X-Ray scans along with the gamma-density and P-wave velocity core scans confirmed the recovery of 4.66 ft of core and two probable gas hydrate-bearing sand units. This was our first recovery of sandy core with high hydrate concentrations on the GOM2-2 Expedition. We next cut Core UT-GOM2-2-H003-04FB for 10 feet from 8738 to 8748 ft RKB. The Geotek CTB-FB recovery tool was lowered into the hole and latched into the PCTB-FB core barrel to recover the inner core barrel. We attempted to unlatch the PCTB-FB core barrel by pulling on slickline. However we could not recover the tool. We applied greater
	0000-0100	Continue to recover Core UT-GOM2-2-H002-03FB.	
	0100-1930	Prepare and RIH the PCTB-FB coring tool. After latching the PCTB-FB coring tool into the BHA, POOH from depth with PCTB setting tool and RIH the PCTB retrieval tool. Cut Core UT-GOM2-2-H003-04FB, F/8738 - T/8748 ft RKB (2232.0 to 2242.0 fbsf). After multiple attempts to unlatch the PCTB-CS tool, the slickline parted at the packer in the TDS. The parted end of the SLB slickline was recovered from the drill pipe and after multiple attempts to again pull the CTB-FB core barrel free it was ultimately decided that the inner barrel to the PCTB-FB could not be removed from the BHA. Decision was made to recover the PCTB-FB coring BHA to the Helix D/V Q4000.	

	1930-2400	M/U to TDS POOH F/8366 to T/5476 ft RKB while laying down doubles of 5 7/8" XT57 drill pipe and slipping and cutting SLB coring wireline.	than 10,000 lb pulls and used the rig mud pumps to clear any debris preventing the tool from unlatching. After multiple attempts, the slickline parted at the packer in the TDS. The BHA was raised and stands of pipe were removed until the slickline was encountered in the pipe. The slickline was recovered from the drill pipe and reattached to the SLB wireline spooler. After multiple attempts to again pull the CTB-FB core barrel free, it was ultimately decided that the inner barrel to the PCTB-FB could not be removed from the BHA. We also tried to shear off the slickline from the coring tool, which would allow the running of the CTB-FB emergency recovery tool; however, it was not possible to shear off the slickline. We then cut the slickline allowing it to drop inside of the pipe and proceeded to pull the BHA to the surface. After recovering each stand of pipe, we used a wire cutter to remove the exposed slickline. As of midnight on 21-AUG-23, the BHA was recovered to the surface. There was no new COVID cases on the Helix D/V Q4000 over the last eight days. **Core Run: Core UT-GOM2-2-H002-03FB.** Acquire Core UT-GOM2-2-H002-03FB over the depth interval from 2222.0 to 2232.0 fbsf; 4.66 ft recovered core (47% recovery), 4530 psi recovery pressure. Coring F/ 8728 - T/ 8738 ft RKB at 80 rpm, maintaining 8-10k on bit, CMT pumping 10.3 ppg WBM at 3.5 bpm and 155 psi. **Core Run: Core UT-GOM2-2-H002-04FB**. Acquire Core UT-GOM2-2-H002-04FB over the depth interval from 2232.0 to 2242.0 fbsf; 8.63 ft recovered core (86% recovery), 0 psi recovery pressure. *Information on recovery of Core UT-*

			GOM2-2-H002-04FB was acquired after recovery of the core on 22-AUG-23. Coring F/ 8738 - T/ 8748 ft RKB at 80 rpm, maintaining 8-10k on bit, CMT pumping 10.3 ppg WBM at 3.0 bpm and 120 psi.
22-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H002.** General Operations/Maintenance: General housekeeping on weather deck.	After Core UT-GOM2-2-H003-04FB was extracted from the recovered PCTB-FB BHA, it was confirmed that the integrated sealing system was not fully engaged and the core was recovered unsealed with no pressure. Thus, the conventionalized Core UT-GOM2-2-H003-04FB was transferred to the Geotek Core Receiving Van for processing. The appearance of the core suggested the presence of a < 3 ft long gas-hydrate-bearing sand-to-silt section with mousse-like to soupy texture that appeared to be bounded by two mud-rich sedimentary sections. We collected the two sets of WRC microbiological (MBIO) and interstitial water (IW) sample sets to further characterize the inferred hydrate-bearing section in the recovered core. In addition, a standard set of headspace gas samples (HS); along
	0000-0300	Perform electrical repairs on the iron roughneck.	
	0300-0900	Continue to POOH the PCTB-FB BHA and Core UT-GOM2-2-H003-04FB from 5476 ft RKB to surface while laying down doubles of 5 7/8" X T57 drill pipe.	
	0900-1200	Breakdown BHA, layed down drill collars, and remove core barrel containing Core UT-GOM2-2-H002-04FB.	
	1200-1515	MU, space out, and RIH PCTB-CS BHA to 293 ft RKB.	
	1515-2230	Continue to RIH on doubles F/293 – T/6484 ft RKB.	

	2230-2400	Position vessel over Hole UT-GOM2-2-H002 and began to wash and jet into hole (re-entering operations).	with vane-shear (VANE) and pocket penetrometer (PEN) measurements were acquired from the core. Analysis conducted in the onboard IW laboratory of the core acquired pore-water samples indicated that the core did contain gas hydrate within anomalous section as observed in Core UT-GOM2-2-H003-04FB. Cores UT-GOM2-2-H003-02FB and -03FB were also processed through PCATS. Based on the PCATS acquired gamma-density and P-wave scans, Core UT-GOM2-2-H003-02FB was interpreted to contain two gas hydrate-bearing sand beds. The core was sub-sectioned and quantitatively degassed, a MBIO cryo core, and a 100 cm long section was stored for further analysis in the post-expedition labs in Salt Lake City. The "cut plan" for Core UT-GOM2-2-H003-02FB also called for storing two apparent gas-hydrate bearing intervals in a storage chamber for later analysis in Salt Lake City. In addition, a 35 cm long section of the core will be quantitively degassed and an IW core sample will be taken.
23-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H002.** General Operations/Maintenance: General housekeeping on weather deck and completed daily crane review/report.	Operations on the Helix D/V Q4000 included the successful completion of one of the most critical phases of the GOM2-02 Expedition with the re-entry of Hole UT-GOM2-2-H002 at 0600 hr. As recorded above in this time-line report, the PCTB-CS deployed BHA (with Geotek

	0000-0600	The Helix D/V Q4000 was positioned over Hole UT-GOM2-2-H002 and was preparing to wash/jet into hole (re-entering operations). Re-enter and advance Hole UT-GOM2-2-H002 F/ 6506 T/ 6829 ft RKB through the following series of actions: 0112: One stab-in and advance, with weight on bit (WOB), failed re-enter. Move vessel, wait for visibility to clear. 0149: Two stab-in and advance, with weight on bit (WOB), failed re-enter. Move vessel, wait for visibility to clear. 0414: One stab-in and advance, with weight on bit (WOB), failed re-enter. Move vessel, wait for visibility to clear. 0448: One stab-in and advance, with weight on bit (WOB), failed re-enter. Move vessel, wait for visibility to clear. 0550: Four stab-in and advance, with weight on bit (WOB), failed re-enter. Move vessel, wait for visibility to clear. 0600: At a depth of 6829 ft RKB. Able to slack off drill string with no WOB and no rotation. Confirmed re-entry into Hole UT-GOM2-2-H002.	Center Bit) reached the seafloor over the location of the well head for Hole UT-GOM2-2-H002 just after midnight of 22-AUG-23. Both of the Helix D/V Q4000 ROVs had been deployed to the seafloor to assist with the Hole UT-GOM2-2-H002 re-entry. The visual examination of the surveyed location of the expected well head revealed a large, elongated, crater like feature with dimensions exceeding 20 by 40 ft in size. The crater was filled with a soup-like mixture of drilling mud and borehole cuttings; with no visible evidence of the well head opening. The decision was made to move ahead with the borehole re-entry, with the bit being moved into position over the well head associated crater by making small, controlled movements of the Q4000. The specific location for the first attempted stab-in of the hole was based on the comparison of the physical appearance of the site with ROV images obtained during previous drilling operations. The fist attempted stab into the hole involved advancing the drill bit about 30 ft into the subsurface where the Q4000 rig monitoring system detected weight on bit (as inferred from the hook load coming off), which indicated that we had not entered the hole. Over the next ~5 hours there were multiple attempts to enter the hole through a series of ship moves and additional stab-in attempts, which often required long waiting periods to allow the visibility in and around the site to clear after sediment was suspended in the water column during previous re-entry attempts. Finally, at 0600 hr and at a bit depth of 6829 ft RKB it was observed that the drill string was hanging freely in open hole with no weight on bit; thus confirming that we had successfully re-entered Hole UT-GOM2-2-H002. The successful re-entry
	0600-1020	Continued to RIH Hole UT-GOM2-2-H002 F/6829 T/8617 ft RKB.	
	1020-1200	Washed and reamed from F/8617 T/8748 ft RKB, pumping 10.3 ppg water-based mud (WBM) at 7 bpm with 71 psi.	
	1200-1230	Drilled ahead from F/8748 T/8776 ft RKB, pumping 10.3 ppg WBM at 300 GPM with 50 psi.	
	1230-1330	Repair TDS brake and release brake friction.	

	1330-2030	Drilled ahead from F/8776 T/9132 ft RKB (core point), pumping 10.5 ppg WBM with 50 psi at 300 GPM, 70 RPM, 3-4k torque. Pumping high viscosity sweeps every 100 ft.	of Hole UT-GOM2-2-H002 allowed the resumption of operations that would now allow the expedition to move ahead and acquire pressure cores from critical Orange Sand stratigraphic section. After successfully re-entering Hole UT-GOM2-2-H002, the PCTB-CS BHA was advanced to the previous total depth of the hole at 8748 ft RKB relatively quickly. The hole was than advanced by drilling to a depth of 9132 ft RKB which was the core point for the fist PCTB-CS core associated with the Orange Sand continuous pressure coring campaign. The onboard scientific party also moved ahead with processing of Cores UT-GOM2-2-H003-02FB and -03FB. Core UT-GOM2-2-H003-02FB was processed according to the cut plan with one 96 cm section stored under pressure for onshore analysis. A 20 cm cryo sample was cut, frozen, depressurized, and stored at -80 °C for microbiological analyses. Core UT-GOM2-2-H003-03FB was cut into a 96 cm section stored in a pressurized storage chamber for onshore analyses and a 35 cm section for quantitative degassing.
	2030-2400	Prepare and RIH the PCTB-FB coring tool.	
24-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H002.** General Operations/Maintenance: General housekeeping on weather deck and complete daily crane review/report. Transfer bulk hose to and from M/V Harvey Hermes.	The last 24 hours of operations on the Helix D/V Q4000 has dealt with advancing Hole UT-GOM2-2-H002 from a depth of 2626 fbsf (9132 ft RKB) to a total depth of 2686 fbsf (9192 ft RKB) by the deployment of the first six PCTB-CS pressure cores of the planned set of eight (now nine) cores that are targeting the Orange Sand (and bounding mud). The Orange Sand was first identified in the logging while drilling (LWD) data as acquired in the WR313H-001 well during the 2009 Joint Industry Project Expedition II (JIP Leg II). The Orange sand is the thickest and is believed to be the cleanest (consistently low gamma-
	0000-0015	Continue to RIH (Hole UT-GOM2-2-H002) the PCTB-CS coring tool in order to acquire Core UT-GOM2-2-H002-05CS at the start of a planned eight (now nine) consecutive PCTB-CS pressure core deployments associated with the Orange Sand Coring Campaign.	

	0015-0330	Acquire and recover Core UT-GOM2-2-H002-05CS.	ray) reservoir penetrated in the Terrebonne Basin based on the LWD data acquired during JIP Leg II. The Orange Sand may represent a levee deposit on the flank of a submarine channel, or it represents a regional sheet sand that was subsequently incised by the inferred channel. We interpret that the turbidite flows that formed the Orange Sand were less mud prone, likely higher-energy, that they are likely coarser grain-size and they have greater bed-thickness than the sandy silt levee deposits cored in GC 955 during the GOM2-1 Expedition in 2017. The Orange Sand has been identified as a key research target during UT-GOM2-2. A total of five of the six PCTB-CS pressure cores acquired today were recovered at pressure, with the recovery pressure of four of the cores being near the set boost pressure for these core runs. It is important to highlight in a "continuous" pressure core program that the function of PCATS becomes to quickly and safely transfer recovered cores from their pressurized autoclave to a set of 350-cm-long temporary storage vessels that are integrated into the PCATS system. This allows the PCTB-CS autoclaves to be quickly rebuilt and returned to service. One limitation of this modified PCATS processing program is that we only have enough time to complete a single-axis X-ray scan of each core and not the more informative
	0330-0900	Acquire and recover Core UT-GOM2-2-H002-06CS.	
	0900-1245	Acquire and recover Core UT-GOM2-2-H002-07CS.	

	1245-1615	Acquire and recover Core UT-GOM2-2-H002-08CS.	gamma-density and P-wave velocity scans (these scans will be collected along with the more detailed CT-scans as time permits later in the expedition). With X-ray only images of the cores it is not possible to differentiate gas hydrate-bearing sediment cores from water-bearing cores. Thus, the following descriptions of the cores are highly preliminary. The percent of core recovery for the first two cores (Core UT-GOM2-2-H002-05CS and -06CS) in this campaign were high in what we have preliminary interpreted to have been dominantly mud-rich cores. Core UT-GOM2-2-H002-07CS, with only limited recovery, may have cored a sediment contact between a mud-dominated and hydrate-bearing sedimentary section. The X-ray image Core UT-GOM2-2-H002-08CS, which was nearly a full core, revealed a complex geologic section that without additional data cannot be fully evaluated at time. Core UT-GOM2-2-H002-09CS was the only core in today's coring campaign to be recovered without pressure. However, it did yield important sedimentologic data (i.e., fine grain silt to mud rich sediment core) that helped us to further direct the ongoing coring program. Core UT-GOM2-2-H002-09CS was also processed as a conventional core and important interstitial-water, microbiological, and headspace geochemistry samples were collected from the core. Core UT-GOM2-2-H002-10CS was the only core from today's effort that we had enough time to complete all of the PCATS scans, which showed a series of prominent hydrate-bearing intervals recovered in the upper 60 cm of this core. **Core Run: Core UT-GOM2-2-H002-05CS.** Acquire Core UT-GOM2-2-H002-05CS over the depth interval from 2626.0 to
	1615-2015	Acquire and recover Core UT-GOM2-2-H002-09CS.	
	2015-2400	Acquire Core UT-GOM2-2-H002-10CS.	

			2636.0 fbsf; 7.61 ft recovered core (76% recovery), 4566 psi recovery pressure. Coring F/ 9132 - T/ 9142 ft RKB at 80 rpm, maintaining 6-10k on bit, CMT pumping 10.5 ppg WBM at 5.0 bpm and 122 psi. **Core Run: Core UT-GOM2-2-H002-06CS.** Acquire Core UT-GOM2-2-H002-06CS over the depth interval from 2636.0 to 2646.0 fbsf; 8.89 ft recovered core (89% recovery), 3784 psi recovery pressure. Coring F/ 9142 - T/ 9152 ft RKB at 80 rpm, maintaining 10-18k on bit, CMT pumping 10.5 ppg WBM at 3.0 bpm and 103 psi. **Core Run: Core UT-GOM2-2-H002-07CS.** Acquire Core UT-GOM2-2-H002-07CS over the depth interval from 2646.0 to 2656.0 fbsf; 3.84 ft recovered core (38% recovery), 4503 psi recovery pressure. Coring F/ 9152 - T/ 9162 ft RKB at 80 rpm, maintaining 6-10k on bit, CMT pumping 10.5 ppg WBM at 3.0 bpm and 110 psi. **Core Run: Core UT-GOM2-2-H002-08CS.** Acquire Core UT-GOM2-2-H002-05CS over the depth interval from 2656.0 to 2666.0 fbsf; 9.81 ft recovered core (98% recovery), 4631 psi recovery pressure. Coring F/ 9162 - T/ 9172 ft RKB at 80 rpm, maintaining 8-18k on bit, CMT pumping 10.5 ppg WBM at 3.0 bpm and 90 psi. **Core Run: Core UT-GOM2-2-H002-09CS.** Acquire Core UT-GOM2-2-H002-05CS over the depth interval from 2666.0 to 2676.0 fbsf; 11.22 ft recovered core (11% recovery), 0 psi recovery pressure. Coring F/ 9172 - T/ 9182 ft RKB at 80 rpm, maintaining 15-18k on bit, CMT pumping 10.5 ppg WBM at 3.0 bpm and 90 psi. **Core Run: Core UT-GOM2-2-H002-10CS.**

			Acquire Core UT-GOM2-2-H002-10CS over the depth interval from 2676.0 to 2686.0 fbsf; 4.07 ft recovered core (41% recovery), 2777 psi recovery pressure. Coring F/ 9182 - T/ 9192 ft RKB at 80 rpm, maintaining 15-18k on bit, CMT pumping 10.5 ppg WBM at 4.0 bpm and 200 psi.
25-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H002.** General Operations/Maintenance: General housekeeping on weather deck and complete daily crane review/report. Offload/backload the M/V Harvey Hermes. Lowered groceries down the galley hatch.	The last 24 hours of operations on the Helix D/V Q4000 has dealt with advancing Hole UT-GOM2-2-H002 from a depth of 2686 fbsf (9192 ft RKB) to a total depth of 2716 fbsf (9222 ft RKB) by the deployment of three PCTB-CS pressure cores, marking the end of the Orange Sand Coring Campaign. In review, the first core recovered today was Core UT-GOM2-2-H002-11CS, which was recovered at a pressure of 4708 psi, and yielded a core section length of only about 0.59 ft. Cores UT-GOM2-2-H002-12CS and -13CS, which targeted the well log inferred mud-rich section at the base of the Orange Sand, were recovered unsealed and not at pressure. However, both cores were nearly filled with sediment, which appeared to be mostly mud rich and contained gas voids. For the three PCTB-CS cores recovered today, two of the cores were recovered without pressure (Cores UT-GOM2-2-H002-12CS and -13CS). The coring tool DST recorded temperature and pressure histories for the two cores that failed to maintain pressure were examined to assess any performance issues associated with these two core deployments. This analysis focused on the comparison of the PCTB-CS set boost pressure, which was set at 4500 psi for both of these cores, and the calculation of the likely bottom hole pressure conditions. Assuming a total hole depth of 9222 ft RKB and a mud weight of 10.3
	0000-0055	Continue to POOH (Hole UT-GOM2-2-H002) the PCTB-CS coring tool in order to acquire Core UT-GOM2-2-H002-10CS, which represented the sixth of the planned nine consecutive PCTB-CS pressure core deployments associated with the Orange Sand Coring Campaign.	
	0055-1300	Acquire and recover Core UT-GOM2-2-H002-11CS. While trying to recover core Core UT-GOM2-2-H002-11CS we were unable to pull the PCTB-CS beyond ~200 out of the coring shoe. Decided to recover the PCTB retrieval tool. R/D SLB slickline and slip/cut 100 ft wireline. R/U pack off in the TDS and SLB slickline. M/U and RIH Geotek Emergency Pulling Tool, at 8826 ft RKB latched into PCTB-CS and attempt to recover tool. SLB slickline pulled core barrel free and continued to pull to surface. Placed Core UT-GOM2-2-H002-11CS in ice shuck.	
	1300-2030	Acquire and recover Core UT-GOM2-2-H002-12CS.	

	2030-2400	Acquire and recover Core UT-GOM2-2-H002-13CS.	ppg, we would expect a downhole static pressure of about 4434 psi, which is near the pre-deployment set boost pressure for the PCTB-CS. It was suggested that the reason for the tool not sealing may because of the small difference between the core tool set boost pressure and the downhole measured and calculated static pressure. It has been shown in the past that some differential pressure is required to effectively seal the lower ball valve and other seals in the PCTB core system. Thus, a plan was developed and reviewed to raise the boost pressure for the next PCTB-CS deployment to a targeted pressure of 5200 psi (see 26-AUG-23 post for Core UT-GOM2-2-H002-14CS). **Core Run: Core UT-GOM2-2-H002-11CS.** Acquire Core UT-GOM2-2-H002-11CS over the depth interval from 2686.0 to 2696.0 fbsf; 0.59 ft recovered core (6% recovery), 4708 psi recovery pressure. Coring F/ 9192 - T/ 9202 ft RKB at 80 rpm, maintaining 10-12k on bit, CMT pumping 10.5 ppg WBM at 2.0 bpm and 58 psi. **Core Run: Core UT-GOM2-2-H002-12CS.** Acquire Core UT-GOM2-2-H002-12CS over the depth interval from 2696.0 to 2706.0 fbsf; 11.38 ft recovered core (114% recovery), 0 psi recovery pressure. Coring F/ 9202 - T/ 9212 ft RKB at 80 rpm, maintaining 10-12k on bit, CMT pumping 10.5 ppg WBM at 2.0 bpm and 58 psi. **Core Run: Core UT-GOM2-2-H002-13CS.** Acquire Core UT-GOM2-2-H002-13CS over the depth interval from 2706.0 to 2716.0 fbsf; 11.29 ft recovered core (113% recovery), 0 psi recovery pressure. Coring F/ 9212 - T/ 9222 ft RKB at 80

			rpm, maintaining 10-12k on bit, CMT pumping 10.5 ppg WBM at 2.0 bpm and 58 psi.
26-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H002.** General Operations/Maintenance: General housekeeping on weather deck. Mud transfer from the M/V Harvey Spirit.	The last 24 hours of operations on the Helix D/V Q4000 dealt with advancing Hole UT-GOM2-2-H002 from a depth of 2706 fbsf (9212 ft RKB) to a total depth of 2826 fbsf (9332 ft RKB) by the deployment of three PCTB-CS pressure cores, marking the end of coring operations in Hole UT-GOM2-2-H002. The three PCTB-CS cores recovered today (Core UT-GOM2-2-H002-13CS, -14CS, and 015CS) were recovered without pressure. However, Core UT-GOM2-2-H002-13CS and -14CS each yielded over 11 ft of sediment core, which because of expansion due to gas voids in the cores, the recovered cores were actually longer than the "throw" for each of these cores. Core UT-GOM2-2-H002-13CS also recovered about 4.1 ft of sediment. Each of the cores acquired today targeted the well log inferred mud-rich sections below the base of the
	0000-0052	Continue to acquire Core UT-GOM2-2-H002-13CS, F/9212 - T/9222 ft RKB (2706.0-2716.0 fbsf), which was the ninth and final core within the Hole UT-GOM2-2-H002 PCTB-CS Orange Sand Pressure Coring Campaign.	
	0052-0810	M/U and RIH Geotek Center Bit to a depth of 9222 ft RKB and latch Center Bit into the BHA and continue to RIH. Advance the hole by drilling F/9222 to T/9277 ft RKB by, while pumping 10.5 ppg WBM at 7 bpm with 100 psi, 70 RPM, maintain 0-10 k WOB. Pick up (P/U) and RIH Geotek Center Bit	

		Retrieval Tool, latch into Center Bit, and POOH.	Orange Sand and just above the projected depth of the base of the gas hydrate stability field at this site. These cores are expected to provide information about the rate and direction of solute diffusion in the sedimentary section below the hydrate-bearing sand section at this site, which in turn will provide insights on fluid flow within the sand. Modeling studies of free gas and water flow in the sand sections at this site from below the base of the gas hydrate stability zone are expected to result in elevated dissolved methane and a diffusional gradient both below and through the hydrate-bearing sand which we will be able to test with the cores from this site. As discussed in yesterday's Daily Operational and Science Report (from 25-AUG-23), the reason for the lack of sealing in several of the PCTB-CS core tool deployments from yesterday remains uncertain. As suggested in yesterday's report, we were concerned about the possible impact of the small differences between the core tool set boost pressures and the downhole
	0810-1215	Prepare and RIH the PCTB-FB coring tool. SLB slickline RIH a PCTB-CS to 9272 ft RKB inadvertently actuated. SLB slickline POOH to surface to replace PCTB-CS.	
	1215-1600	Acquire and recover Core UT-GOM2-2-H002-14CS.	
	1600-1915	Pickup (P/U) and RIH Geotek Center Bit, latch into BHA. Advance the hole by drilling F/9287 to T/9322 ft RKB, while pumping 10.5 ppg WBM at 7 bpm with 100 psi, 70 RPM, maintain 0-10 k WOB.	
	1915-2100	Prepare run directional survey in Hole UT-GOM2-2-H002, RIH Gyro-Data Omega – 1.875 inch Battery Slickline Gyro and performed a gyro survey at a measured depth of 9268 ft RKB. POOH the gyro survey tool.	
	2100-2200	Pick up (P/U) and RIH Geotek Center Bit Retrieval Tool, latch into Center Bit, and POOH.	

	2200-2400	Acquire Core UT-GOM2-2-H002-15CS; POOH from depth with PCTB setting tool and RIH the PCTB retrieval tool.	measured/calculated static pressure conditions. In response, Cores UT-GOM2-2-H002-14CS and -15CS were ran with their operational boost pressures increased to 5200 and 5500 psi, respectively. However, it does not appear that the changes in the PCTB-CS set pressures had any significant impact on the operation of the pressure coring tools. **Core Run: Core UT-GOM2-2-H002-14CS.** Acquire Core UT-GOM2-2-H002-14CS over the depth interval from 2771.0 to 2781.0 fbsf; 11.29 ft recovered core (113% recovery), 0 psi recovery pressure. Coring F/ 9277 - T/ 9287 ft RKB at 80 rpm, maintaining 15-22k on bit, CMT pumping 10.5 ppg WBM at 3.0 bpm and 100 psi. **Core Run: Core UT-GOM2-2-H002-15CS.** Acquire Core UT-GOM2-2-H002-15CS over the depth interval from 2816.0 to 2826.0 fbsf; 4.10 ft recovered core (41% recovery), 0 psi recovery pressure. Coring F/ 9322 - T/ 9332 ft RKB at 80 rpm, maintaining 10-12k on bit, CMT pumping 10.5 ppg WBM at 3.0 bpm and 101 psi. **Directional Survey:** The wireline deployed (memory sonde) gyroscopic logging services on the Q4000 were provided by Gyro-Data, who used an Omega – 1.875 inch Battery Slickline Gyro to perform the directional surveys in Hole UT-GOM2-2-H002 at a depth of 9268 ft RKB (2762 fbsf), which recorded a borehole inclination at 0.47° at an azimuth of 78.33°. This survey is again within the BSEE inclination limit of 3.0º for a deviated well classification.

27-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H002.** General Operations/Maintenance: General housekeeping on weather deck. Mud transfer from the M/V Harvey Spirit. Derrickman build pad mud and cement spacer. Pit Cleaners cleaning Brine Tanks.	Coring operations in Hole UT-GOM2-2-H002 ended today with the recovery and processing of Core UT-GOM2-2-H002-15CS from the depth interval 9322-9332 ft RKB (2816-2826 fbsf), which also marked the total final depth of Hole UT-GOM2-2-H002 at 9332 ft RKB (2826 fbsf). Core UT-GOM2-2-H002-14CS and Core UT-GOM2-2-H002-15CS were also processed today as conventional core and important interstitial-water, microbiological, and headspace geochemistry samples were collected from each core. It is also important to note that Geotek has been acquiring X-ray scans of the conventionalized core using PCATS to help direct the core sub-sampling efforts. Since 0650 hr today Geotek and the Helix D/V Q4000 rig crew have been dealing with freeing the Geotek Cement Liner BHA and regaining the ability to circulate through the drill bit and pipe. The focus of this effort has been the consideration that we may be dealing with a “pressure lock” that formed at the bottom of the BHA when the Geotek Cement Liner was landed out in the BHA during deployment. After making a number attempts to pull the Cement Liner from the BHA, the decision was made to cut the wireline connected to the Cement Liner and slip/cut while tripping the BHA back to near the seafloor and to try again to pull the Cement Liner from the BHA, which started near the end of today’s reporting period at midnight on 27-AUG-23. The Scientific Party worked on finalizing the writing assignments in support of the hole section descriptions in the Expedition Report and processing samples and data that have been collected during the expedition. In addition, the UT Scientific Party worked
	0000-0548	Continue to acquire Core UT-GOM2-2-H002-15CS from Hole UT-GOM2-2-H002.	
	0548-0800	M/U and RIH Geotek Cement Liner BHA. SLB slickline lower cement liner in to BHA noted pressured up to ~500 psi on drill string, shut pumps down then bled pressure to 0 psi. SLB slickline unable to P/U free from cement liner. Company representative and SLB slickline discuss forward plan.	
	0800-1500	Cycled drill string while SLB slickline attempt to pull free, continued to try to pull the Cement Liner from the BHA.	
	1500-1530	Laydown one single and cut wireline. R/D TDS wireline packoff and wireline equipment.	
	1530-1900	POOH drill pipe doubles cutting wireline slip/cut on way out F/9332 to T7017 ft RKB.	
	1900-2030	About 300 ft below mudline, R/U wireline and wireline equipment, splice wireline into the SLB wireline unit. SLB wireline continue to attempt to remove the Cement Liner from the BHA.	
	2030-2230	M/U wireline to the bails on the TDS to enable a more straight pull from the hole. Pump seawater through the TDS in an attempt to reduce the mass of the high density mud in the drill pipe. No flow was possible. Repeated attempts to remove the Cement Liner from the BHA were unsuccessful.	

	2230-2400	POOH drill pipe in doubles cutting wireline slip/cut on way out F/7017 to T/6326 (above seafloor) ft RKB.	with Geotek staff to further develop and refine the operational plans for the post-expedition core processing and analysis efforts to be conducted at the Geotek facilities at Salt Lake City.
28-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H002.** General Operations/Maintenance: General housekeeping on weather deck. Mud transfer from the M/V Harvey Spirit.	The onboard science party completed the last shipboard sampling of two remaining PCTB-CS acquired core sections (Cores UT-GOM2-2-H002-05CS and -08CS) that had been processed through PCATS and quantitively degassed to calculate the volume of gas hydrate or concentration of dissolved methane within each of the core samples. The same two samples were also sub-sampled in the Geotek conventional core processing laboratory to acquire the standard set of interstitial-water, microbiological, and headspace geochemistry samples. Geotek also acquired today the last shipboard LN2 frozen (cryogenic) microbiological core samples from Core UT-GOM2-2-H002-05CS and Core UT-GOM2-2-H002-11CS. The Scientific Party also continued to work with Geotek staff to further develop and refine the operational plans for the post-expedition core processing and analysis efforts to be conducted at the Geotek facilities at Salt Lake City. Work also continued until about 1330 hr to remove the Geotek Cement Liner from the coring BHA, which had become stuck on 27-Aug-23. After numerous failed attempts to remove the Cement Liner from the BHA, the decision was made yesterday to trip the stuck Cement Liner and BHA out of the hole. Several additional attempts to pull the Cement Liner from the BHA at approximately 3000 ft RKB were also unsuccessful. Upon the recovery of the BHA to the vessel, it was discovered that the running tool on the SLB slickline was stuck inside the drill collars on the BHA. By 2230 hr, a new Cementing BHA had
	0000-0500	Continue to pull out of Hole UT-GOM2-2-H002 in double lengths of drill pipe while cutting wireline (slip/cut) F/6326 to T/3000 ft RKB.	
	0500-0630	RIH SLB slickline and hang off the wireline below TDS. Attempt to pull out Geotek Cement Liner. SLB Slickline could not pull cement liner out of BHA, decision was made to rig down slickline then continue to POOH.	
	0630-1200	POOH drill pipe doubles cutting wireline (slip/cut) on way out F/3000 ft RKB to surface. L/D BHA noted SLB slickline was stuck inside drill collar.	
	1200-1330	Continue to POOH L/D Seal Bore Assembly and Cement Liner core barrel.	
	1330-2200	P/U new Cementing BHA assembly RIH to 6505 ft RKB.	
	2200-2230	M/U top drive to fill pipe while ROV and Helix D/V Q4000 Bridge made various moves to put BHA over Hole UT-GOM2-2-H002.	
	2230-2400	After re-entering Hole UT-GOM2-2-H002 without any problems, RIH washing F/6505 to T/6917 ft RKB.	

			been M/U and RIH to the seabed where, because of extensive planning by the UT Drilling Staff and the Helix D/V Q4000 operational crew, the BHA entered the seafloor and was RIH to 412 fbsf by midnight.
29-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H002.** General Operations/Maintenance: General housekeeping on weather deck. Transferred 16.0 ppg WBM from M/V Harvey Spirit to surface pits and brine tanks.	After spotting 105 bbls of 11.5 ppg pad mud from F/9332 to T/8548 ft RKB followed by 209 bbls of 10.5 ppg WBM pulled drill pipe back to 8548 ft RKB. Pumped mud spacers and 71 bbls 16.4 ppg Class H Cement, followed by a tail spacer and 198 bbls of seawater. Cement in place at 14:00 hr. Wait on cement for 24 hrs. With the expected completion of the at-sea part of the UT-GOM2-2 Expedition in the next several days, our attention has now turned to the demobilization of the UT-Austin and Geotek coring equipment and associated core processing laboratories from the Helix D/V Q4000 and onto the Geotek facilities in Salt Lake City, Utah where the traditional "dockside" operations will focus on completing the primary analysis of the recovered core and the shipping of samples to various institutions for additional detailed analysis.
	0000-0640	Continuing running into Hole UT-GOM2-2-H002 with doubles of 5-7/8" drill pipe F/6917 to T/9332 ft RKB.	
	0640-0730	Spotted 105 bbls of 11.5 ppg pad mud from F/9332 to T/8548 ft RKB followed by 209 bbls of 10.5 ppg WBM.	
	0730-0900	POOH from F/9332 to T/8548 L/O singles of 5-7/8" drill pipe.	
	0900-1230	Prepare for borehole cementing operations. M/U cement stand to the drill string. MU cementer and pump 5 bbl WBM spacer of 10.5 ppg and a second 36.3 bbl WBM spacer of 10.5 ppg. Cementer shut down pumps and cleaned unit.	
	1230-1315	Mix and pump 71 bbls (369 sks) 16.4 ppg Class H Cement w/ 0.05 gps D047 Antifoam, 0.30 gps D500 Gas Agent, 0.05 gps D230 Dispersant, 0.25 gps D186 Accelerator, Yld 1:08, FT# 398.6 cubic ft.	
	1315-1400	Pump 8.7 bbls of tail spacer followed by 5 bbls of seawater. Align Hex Pump and place 6 bpm seawater total pumped 193 bbls. Cement in place at 14:00 hr. Wait on cement for 24 hrs.	

	1400-2400	Laid down Cement Head on deck. POOH F/8548 to T/8048 ft RKB in doubles. Install 2 nerf balls into drill string to clean drill pipe, pump 11 ppg WBM.	
30-Aug-23	0000-2400	**Helix D/V Q4000 located on Hole UT-GOM2-02-H002.** General Operations/Maintenance: General housekeeping on weather deck. General housekeeping on weather deck pressure washing on the top drive and rig floor. Cleaning of Brine Tanks. Prepare Geotek equipment in preparation for backloading. Removing slickline "hang-off" sheave from the TDS dolly. Cleaning cement Silo #1.	Work has continued today to breakdown and pack the remaining UT and Geotek labs and offices on the Helix D/V Q4000. Special care is being taken to maintain power to the containers with thermally sensitive core samples. Demobilize of equipment from the Helix D/V Q4000 to the M/V Harvey Hermes service vessel has also stated and expected to continue to the expected departure of the M/V Harvey Hermes from Walker Ridge on the afternoon of 31-AUG-23.
	0000-1400	Continuing "waiting on cement" in Hole UT-GOM2-2-H002.	
	1400-1415	RIH F/8048 to 8105 ft RKB and tagged top of cement plug w/15k bit weight.	
	1415-1730	POOH 5-7/8 inch DP in singles F/8105 to 6352 ft RKB.	
	1730-1930	Pump seawater to flush Hex pump #1 & 2 and string clean of drilling mud.	
	1930-2400	**Vessel on Lump Sum Demobilization.** Continue to POOH DP 5-7/8 inch DP in singles F/6352 to T/3400 ft RGB.	
31-Aug-23	0000-2400	**Helix D/V Q4000 located over the location of Hole UT-GOM2-02-H002.** General Operations/Maintenance: Continue cleaning mudpits.	Work continue to offload UT and Geotek labs and offices on the Helix D/V Q4000. Special care taken to maintain power to the containers with thermally sensitive core samples. All UT personnel except company man Thomas Redd departed with the Harvey Hermes from Walker Ridge at 1500 hours.
	0000-0400	Pulled drill string in singles. Brought on deck drill collars and Geotek Bottom Hole Assembly.	
	1255	Completed backloading container units to the M/V Harvey Hermes along with transferring all Geotek crew and remaining shipboard scientists. The University of Texas	

		at Austin submitted Rig Move Notification.	
	1500	MV Harvey Hermes departed location with all remaining Geotek and UT Project Equipment.	
1-Sep-23	0000-2400	**Helix D/V Q4000 located over the location of Hole UT-GOM2-02-H002 (until moving 1 mile off location at the 24:00 hr 01-SEP-23).** General Operations/Maintenance: General cleaning, continue cleaning mudpits and moon pool.	Work continue to offload UT and Geotek labs and offices on the Helix D/V Q4000. Special care taken to maintain power to the containers with thermally sensitive core samples. All UT personnel except company man Thomas Redd departed with the M/V Harvey Hermes from Walker Ridge at 1500 hours.
	2230	Helix D/V Q4000 moving one mile off location.	
	2400	Helix D/V Q4000 one mile off location. End of lump sum demobilization and UT-GOM2-2 Expedition.	
1-Sep-23 (other activates)	930	M/V Harvey Hermes completed transit from Walker Ridge to Port Fourchon, LA.	All powered units with core samples offloaded connected to generators with the temperature and pressure of all 17 pressure cores in storage chambers being monitored in Port Fourchon. Pressure cores transferred to PTRANS36.
	0930-1500	Geotek PTRANS36 (with stored pressure cores) and associated conventional core storage container offloaded at Port Fourchon and connected to shore-based generators. Pressure and temperature conditions of the pressure core samples were monitored.	