

Daily Operational and Science Report
UT-GOM2-2 Coring Expedition
Terrebonne Basin, Gulf of Mexico Outer Continental Slope

1. **DATE:** 24-August-2023, 0000-2400hr

2. **LOCATION:**

2400 hr, 24-August-2023

Hole: *Helix D/V Q4000* was located over Hole UT-GOM2-2-H002

Last Drill/Core depth: 9192 ft MD RKB

RKB to Mud line: 6506 ft on Drill pipe measurements

Water depth: 6454 ft

Per Datum: 52 ft

Lat 26°39'44.2229"N, Long 091°40'33.8972"W NAD27 BLM15 Feet

3. **DESCRIPTION OF OPERATIONS:**

0000-2400 At Hole UT-GOM2-2-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*.

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.

0015-0130 POOH from depth with PCTB setting tool and RIH the PCTB retrieval tool.

0130-0230 Acquire **Core UT-GOM2-2-H002-05CS**, F/9132 - T/9142 ft RKB (2626.0-2636.0 fbsf).

0230-0330 POOH PCTB-CS coring tool and transfer to the Geotek Pressure Core Processing Van.

0330-0532 Prepare and RIH the PCTB-FB coring tool.

0532-0700 POOH from depth with PCTB setting tool and RIH the PCTB retrieval tool.

0700-0730 Acquire **Core UT-GOM2-2-H002-06CS**, F/9142 - T/9152 ft RKB (2636.0-2646.0 fbsf).

0730-0900 POOH PCTB-CS coring tool and transfer to the Geotek Pressure Core Processing Van.

0900-0956 Prepare and RIH the PCTB-FB coring tool.

0956-1100 POOH from depth with PCTB setting tool and RIH the PCTB retrieval tool.

1100-1130 Acquire **Core UT-GOM2-2-H002-07CS**, F/9152 - T/9162 ft RKB (2646.0-2656.0 fbsf).

1130-1245 POOH PCTB-CS coring tool and transfer to the Geotek Pressure Core Processing Van.

1245-1330 Prepare and RIH the PCTB-FB coring tool.

1330-1430 POOH from depth with PCTB setting tool and RIH the PCTB retrieval tool.

1430-1500 Acquire **Core UT-GOM2-2-H002-08CS**, F/9162 - T/9172 ft RKB (2656.0-2666.0 fbsf).

1500-1615 POOH PCTB-CS coring tool and transfer to the Geotek Pressure Core Processing Van.

1615-1730 Prepare and RIH the PCTB-FB coring tool.

1730-1830 POOH from depth with PCTB setting tool and RIH the PCTB retrieval tool.

1830-1900 Acquire **Core UT-GOM2-2-H002-09CS**, F/9172 - T/9182 ft RKB (2666.0-2676 fbsf).

1900-2015 POOH PCTB-CS coring tool and transfer to the Geotek Pressure Core Processing Van.

2015-2200 Prepare and RIH the PCTB-FB coring tool.

2200-2300 POOH from depth with PCTB setting tool and RIH the PCTB retrieval tool.

2300-2330 Acquire **Core UT-GOM2-2-H002-10CS**, F/9182 - T/9192 ft RKB (2676.0-2686 fbsf).

4. OPERATIONAL PLAN (Next 24 Hours):

Acquire last three of the eight (now nine) planned consecutive PCTB-CS pressure core runs in **Hole UT-GOM2-2-H002** associated with the Orange Sand within a depth interval from 9132 to 9222 ft RKB:

Core UT-GOM2-2-H003-11CS, 2686.0 to 2696.0 fbsf
Core UT-GOM2-2-H003-12CS, 2696.0 to 2706.0 fbsf
Core UT-GOM2-2-H003-13CS, 2706.0 to 2716.0 fbsf

Orange Sand (and bounding mud) Coring Campaign

Activity	Ft RKB	fbsf	Completed
H002-05CS Start	9132	2626	X
H002-05CS End	9142	2636	X
H002-06CS Start	9142	2636	X
H002-06CS End	9152	2646	X
H002-07CS Start	9152	2646	X
H002-07CS End	9162	2656	X
H002-08CS Start	9162	2656	X
H002-08CS End	9172	2666	X
H002-09CS Start	9172	2666	X
H002-09CS End	9182	2676	X
H002-10CS Start	9182	2676	X
H002-10CS End	9192	2686	X
H002-11CS Start	9192	2686	
H002-11CS End	9202	2696	
H002-12CS Start	9202	2696	
H002-12CS End	9212	2706	
H002-13CS Start	9212	2706	
H002-13CS End	9222	2716	

5. DOWNHOLE LOGGING OPERATIONS:

Hole: NA

Wireline Totals (directional): NA

6. CORE OPERATIONS AND DATA:

Hole: Hole UT-GOM2-2-H002

G-APC Coring Totals: NA

G-XCB Coring Totals: NA

PCTB-CS Coring Totals:

Core UT-GOM2-2-H002-05CS: 7.61 ft (76% recovery), 4566 psi.

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 UT-GOM2-2-H002-06CS: 8.89 ft (89 % recovery), 3784 psi.

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 UT-GOM2-2-H002-07CS: 4.07 ft (41 % recovery), 4503 psi.

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 UT-GOM2-2-H002-08CS: 9.81 ft (98 % recovery), 4631 psi.

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 UT-GOM2-2-H002-09CS: 8.20 ft (82 % recovery), 0 psi.

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 UT-GOM2-2-H002-10CS: 4.07 ft (41% recovery), 2777 psi.

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.

PCTB-FB Coring Totals: NA

7. DOWNHOLE MEASUREMENTS

Hole: NA

Pressure and Temperature Tool Deployment (T2P): NA

Temperature Tool Deployment (APCT-3): NA

8. SCIENCE ACTIVITIES

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-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 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 as shown in Figure 1, which showed a series of prominent hydrate-bearing intervals recovered in the upper 60 cm of this core.

The Scientific Party is working on finalizing the “Methods” section and working on the H003 and H002 “Results” sections of the Expedition Report and processing samples and data that have been collected during the expedition.

There have been no new COVID cases on the *Q4000* in the last ten days.

9. ACRONYMS

bpm	Barrels per minute
Fish	The object to be recovered from the borehole/BHA
gpm	Gallons per minute
M/U	Make up
PCATS	Pressure Core Analysis and Transfer System
PCTB-CS	Pressure coring tool with ball-cutting shoe version.
POOH	Pull out of hole
psi	Pounds per square inch
P/U	Pick up
RIH	Run in hole
RKB	Depth measured from the rig floor
rpm	Revolutions per minute
R/U	Rig up
SLB	Schlumberger
Slickline	Wireline used to deploy and recover core, etc.
TD	Total depth
TDS	Top drive system
WOB	Weight on bit

UT-GOM2-2-**H003-10CS, 2676.0 ft BSF**
 WR313-
AS CUT IN PCATS AT SEA

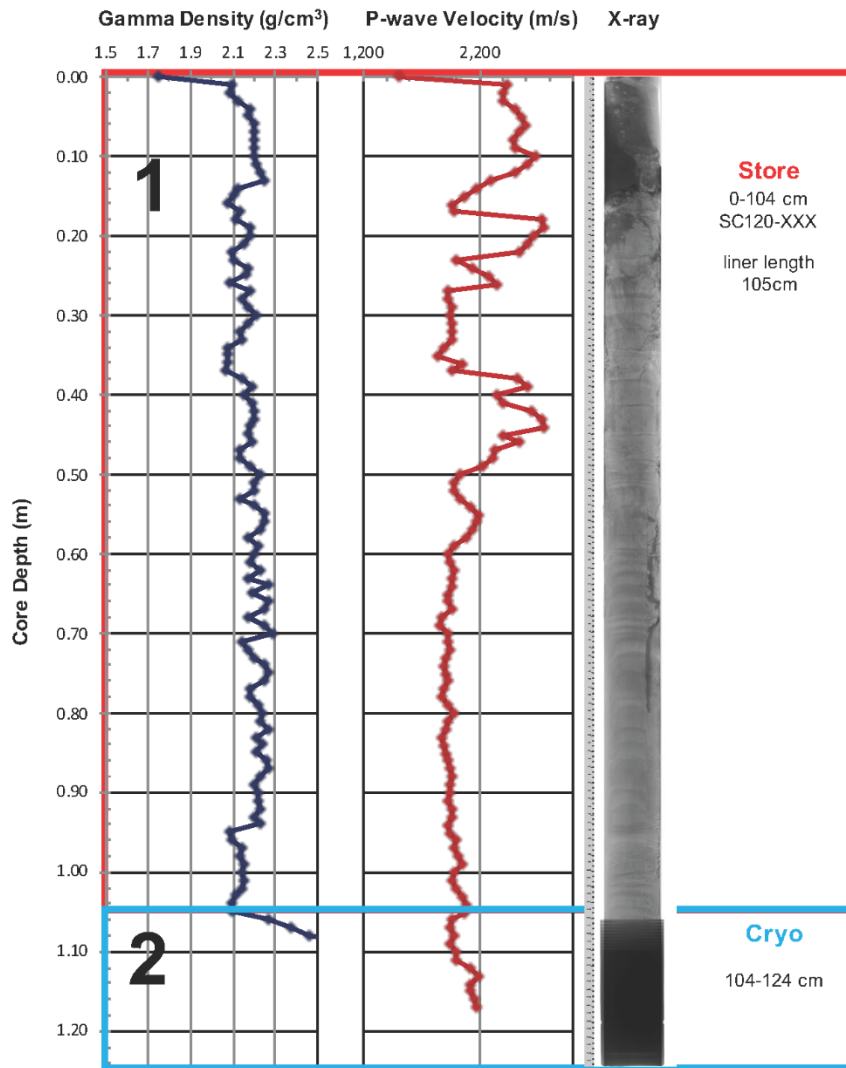


Figure 1: X-ray, P-wave velocity, and density of Core UT-GOM2-2-H003-10CS from the Geotek Pressure Core Analysis and Transfer System (PCATS). Gamma density and P-wave velocity logs along with the X-ray images and “as cut core in PCATS and position of conventionalized core samples and measurements.