

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

1. **DATE:** 28-August-2023, 0000-2400hr

2. **LOCATION:**

2400 hr, 28-August-2023

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

Last Drill/Core depth: 9332 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. Mud transfer from the *M/V Harvey Spirit*.

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.

4. **OPERATIONAL PLAN (Next 24 Hours):**

Continue running into **Hole UT-GOM2-2-H002**, RIH Cementing BHA assembly to above the Orange Sand and set a ~300 ft long cement plug.

5. **DOWNHOLE LOGGING OPERATIONS:**

Hole: NA

Wireline Totals (directional): NA

6. **CORE OPERATIONS AND DATA:**

Hole: NA

G-APC Coring Totals: NA

G-XCB Coring Totals: NA

PCTB-CS Coring Totals: NA
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 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 quantitatively 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 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 411 fbsf by midnight.

The completion of the shipboard processing of the PCTB-FB- and PCTB-CS-acquired pressure cores from the **Hole UT-GOM2-2-H002** provided the shipboard scientific party with the opportunity to further examine to results of the *Orange Sand Coring Campaign* that was conducted from 24-AUG-23 through 25-AUG-23. The *Orange Sand Coring Campaign* included the acquisition of nine PCTB-CS pressure cores (**Core UT-GOM2-2-H002-05CS through Core UT-GOM2-2-H002-13CS**) over the depth interval from 9132 ft RKM to 9222 ft RKB (2626-2716 fbsf). As shown in Figure 1, six of the nine PCTB-CS deployments were recovered near their pre-set boost pressures. The percent of core recovery in this section of the hole was greater than 76% for six of the deployments and dropped to 38-41% for two of the cores, with one core yielding only about 6 inches of core.

The well data (Gamma-Ray, Bulk Density, and Resistivity logs) shown in Figure 1 was obtained in 2009 from **Hole WR313 H001** as drilled during the JIP Leg II Expedition. The far righthand column in this display depicts the actual depth from which the cores were obtained in **Hole UT-GOM2-2-H002**. The second column from the right in Figure 1, depicts the shipboard science party derived depth correlations between **Hole WR313 H001** log data and the **Hole UT-GOM2-2-H002** acquired cores. The PCATS acquired Gamma-Density, P-Wave Velocity, and X-Ray scans for five of the pressure cores (Figures 2a-e) obtained from this sequence were used to help make the "Preliminary Core-Log Correlations" depicted in Figure 1. The PCATS scans of **Cores UT-GOM2-2-H002-05CS through -6CS** (Figures 2a-2b) appear to be contain mostly mud-rich sediments with numerous thin hydrate-bearing sand beds; the well log data from this interval also suggests the presence of thin hydrate-bearing sand beds in the same section of the hole. **Core UT-GOM2-2-H002-07CS** (Figure 2c) is an important core in that it appears to have penetrated the top of thick hydrate-bearing likely silt-sand interval. This contact likely correlates the top

of log inferred gas hydrate occurrence at a depth of ~9161 ft RKB in **Hole UT-GOM2-2-H002** (Figure 1). It is important to note that **Core UT-GOM2-2-H002-07CS** is missing ~6.2 ft (~1.9 m) of sediment, which would have likely been hydrate-bearing sediment as shown in Figure 1 that may have “jammed” and was “milled” during coring. **Core UT-GOM2-2-H002-08CS** (Figure 2d) is another important core acquired from the Orange Sand in that it appears to contain an upper and a lower prominent hydrate-bearing silt-sand units that straddles a mostly mud-rich section; this same relationship is inferred in the log data as depicted in Figure-2. **Core UT-GOM2-2-H002-09CS** was not recovered under pressure; therefore, we do not have any PCATS scans from this core. However, upon visual inspection of this conventionalized core in the Geotek Core Receiving Lab, it was determined to be mostly mud-rich with several possible former hydrate-bearing silt-sand beds that may have dissociated upon recovery, which would again closely match the well log inferred geologic characteristics of this section in the hole. The PCATS scans of **Core UT-GOM2-2-H002-010CS** (Figure 2e) indicate that the upper 65 cm (2.1 ft) of this core likely contains several hydrate-bearing silt-sand intervals, while the lower 65 cm (2.1 ft) of the recovered core section appears to be mostly mud-rich. The well log section that appears to correlate to the **Core UT-GOM2-2-H002-010CS** also exhibits the presence of similar hydrate-bearing silt-sand intervals overlying a relatively thin mud-rich. It is important to note that the lower 176 cm (5.8 ft) of **Core UT-GOM2-2-H002-010CS** is missing, which according to the log data from this interval indicates that this missing section may have contain a hydrate-bearing silt-sand interval.

It is again important to highlight that the suggested core-log correlations as reviewed in this report are highly preliminary and will be the focus of extensive additional and much more advance examination during the post-expedition laboratory studies in Salt Lake City. The analysis presented in this report, suggest that most of the Orange Sand section was cored and recovered during the expedition. In addition, several of the more significant gas hydrate-bearing sections were successfully cored and stored for later intensive laboratory studies. At the same time, however, we also acknowledge that it appears that we failed to recover several prominent hydrate-bearing sections.

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

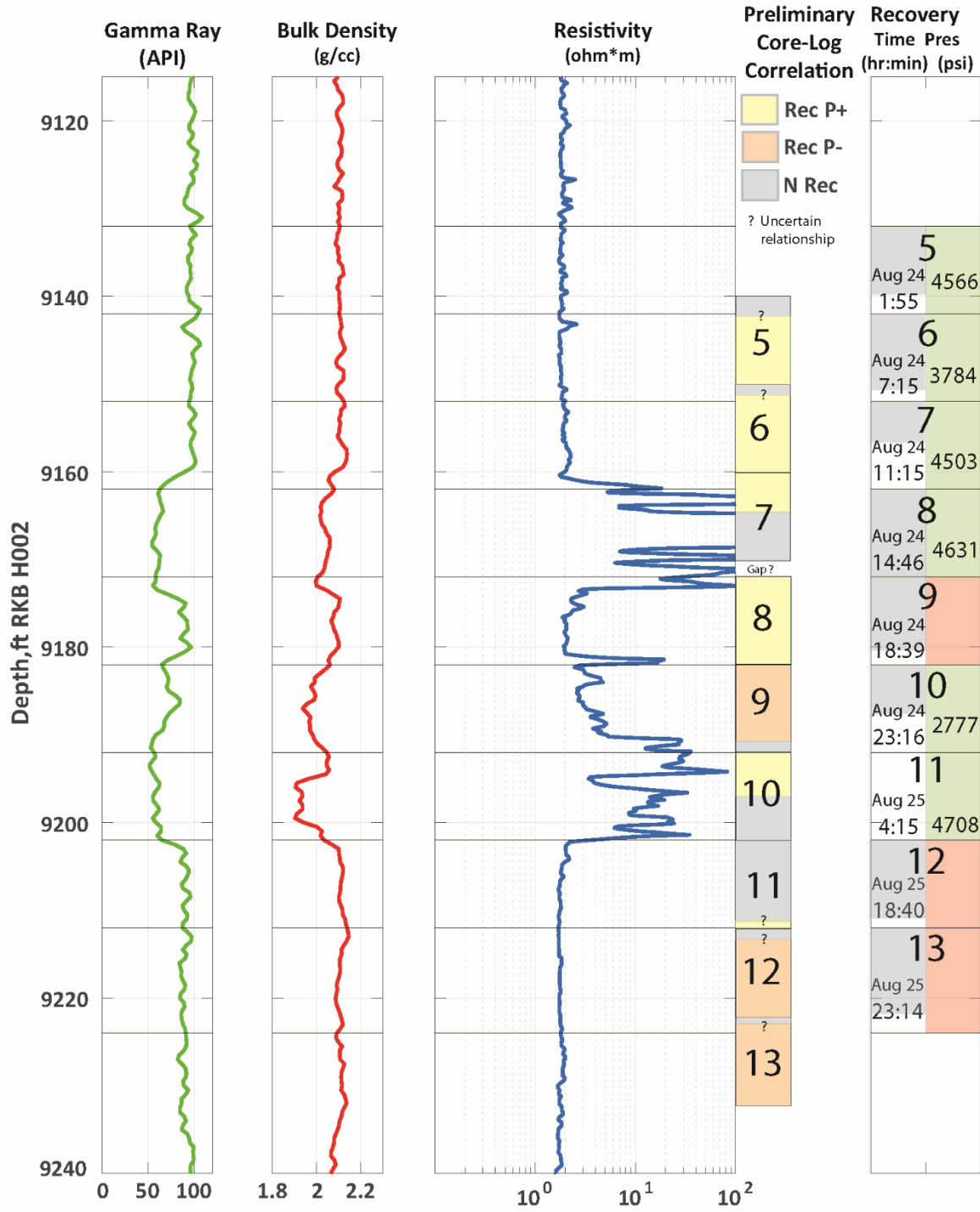


Figure 1: Preliminary depth correlations between **Hole WR313 H001** log data and the **Hole UT-GOM2-2-H002** acquired cores. See text in this report for additional information on the depicted log-core correlations.

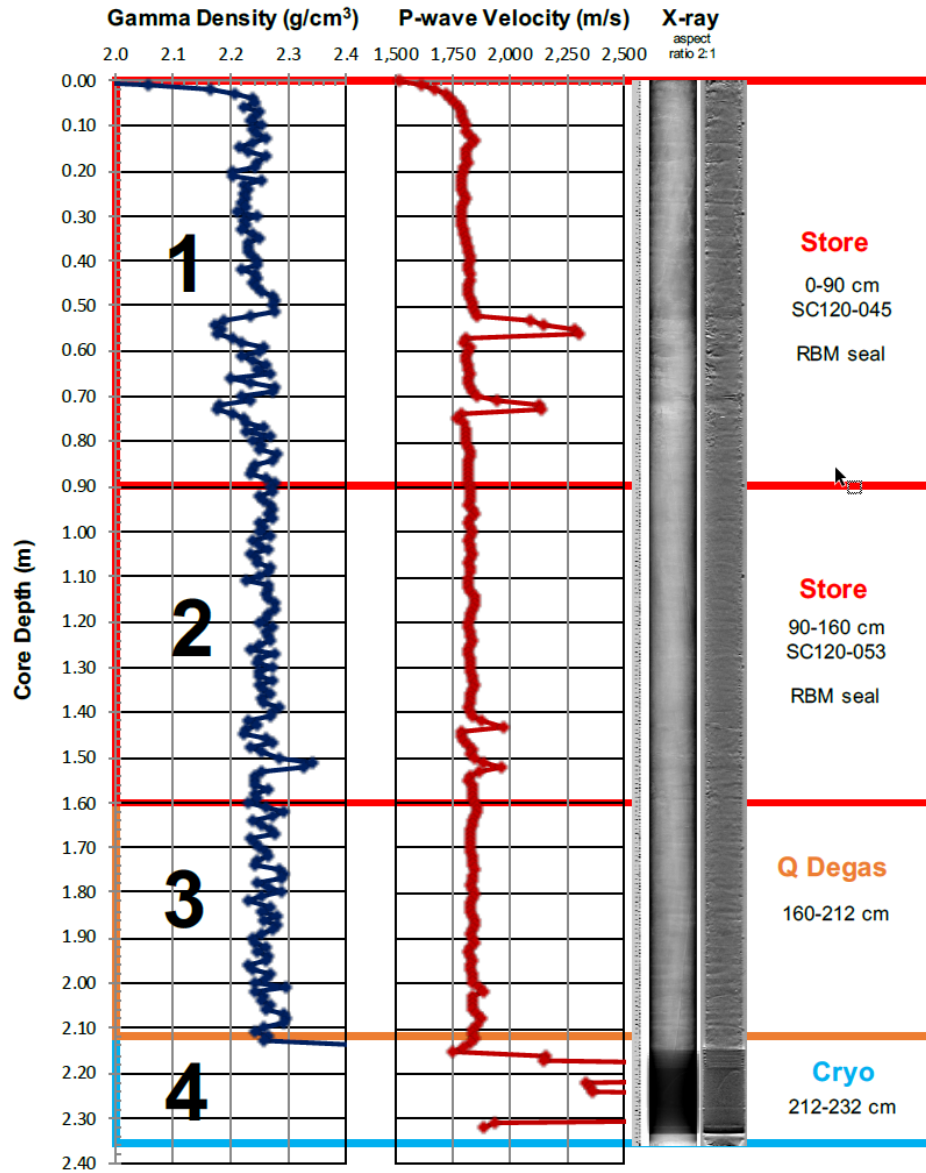


Figure 2a: X-ray, P-wave velocity, and density scans of Core UT-GOM2-2-H002-05CS as acquired from the Geotek Pressure Core Analysis and Transfer System (PCATS). Also shown is the position of the core cuts made in PCATS (As Cut Core in PCATS) along with how the cut core sections were distributed for future analysis and storage.

UT-GOM2-2-**H002-06CS, 2636.0 ft BSF**
 WR313-
AS CUT IN PCATS AT SEA v3

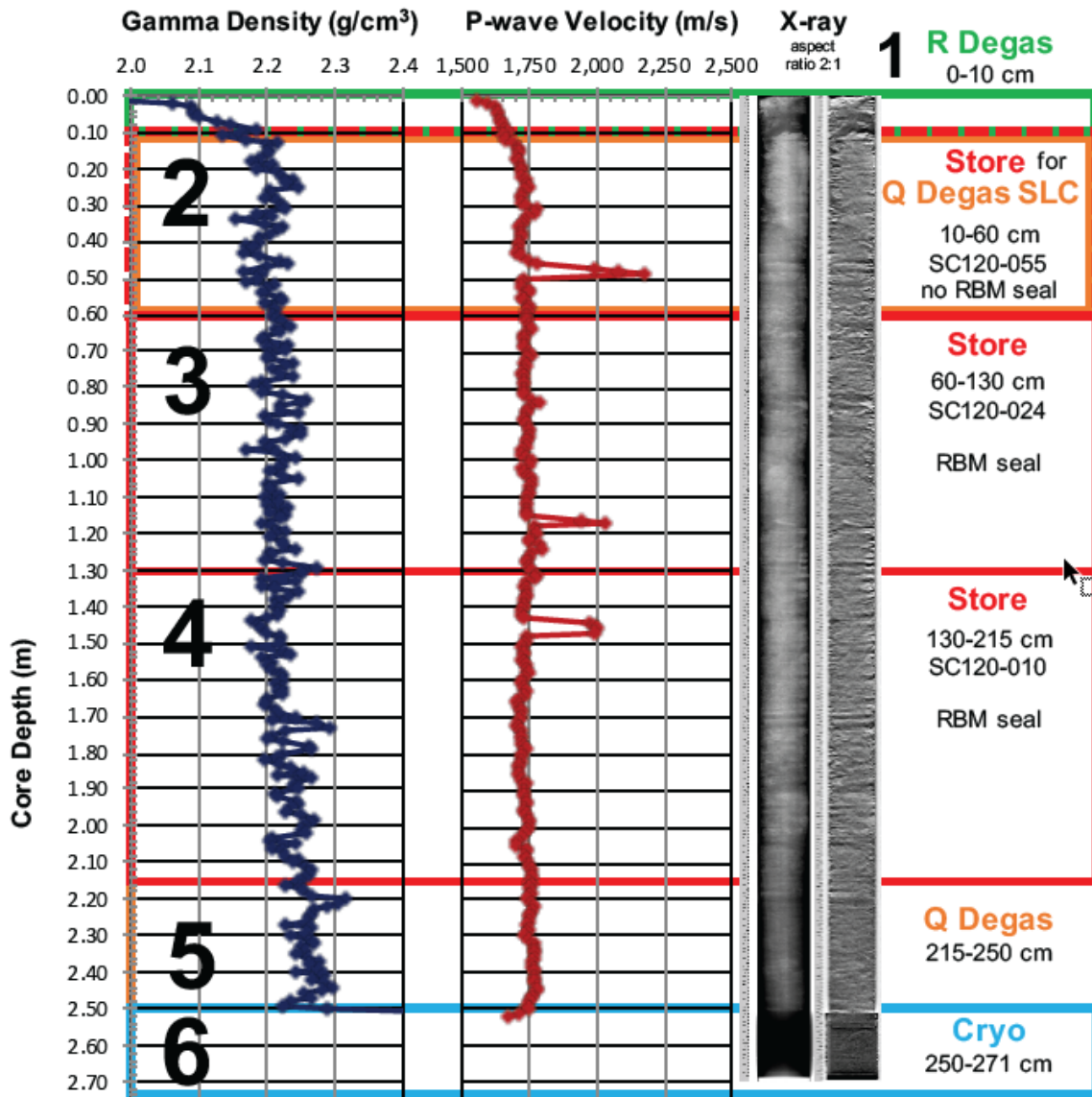


Figure 2b: X-ray, P-wave velocity, and density scans of Core UT-GOM2-2-H002-06CS as acquired from the Geotek Pressure Core Analysis and Transfer System (PCATS). Also shown is the position of the core cuts made in PCATS (As Cut Core in PCATS) along with how the cut core sections were distributed for future analysis and storage.

UT-GOM2-2-
WR313-

H002-7CS, 2646.0 ft BSF

AS CUT IN PCATS AT SEA v2

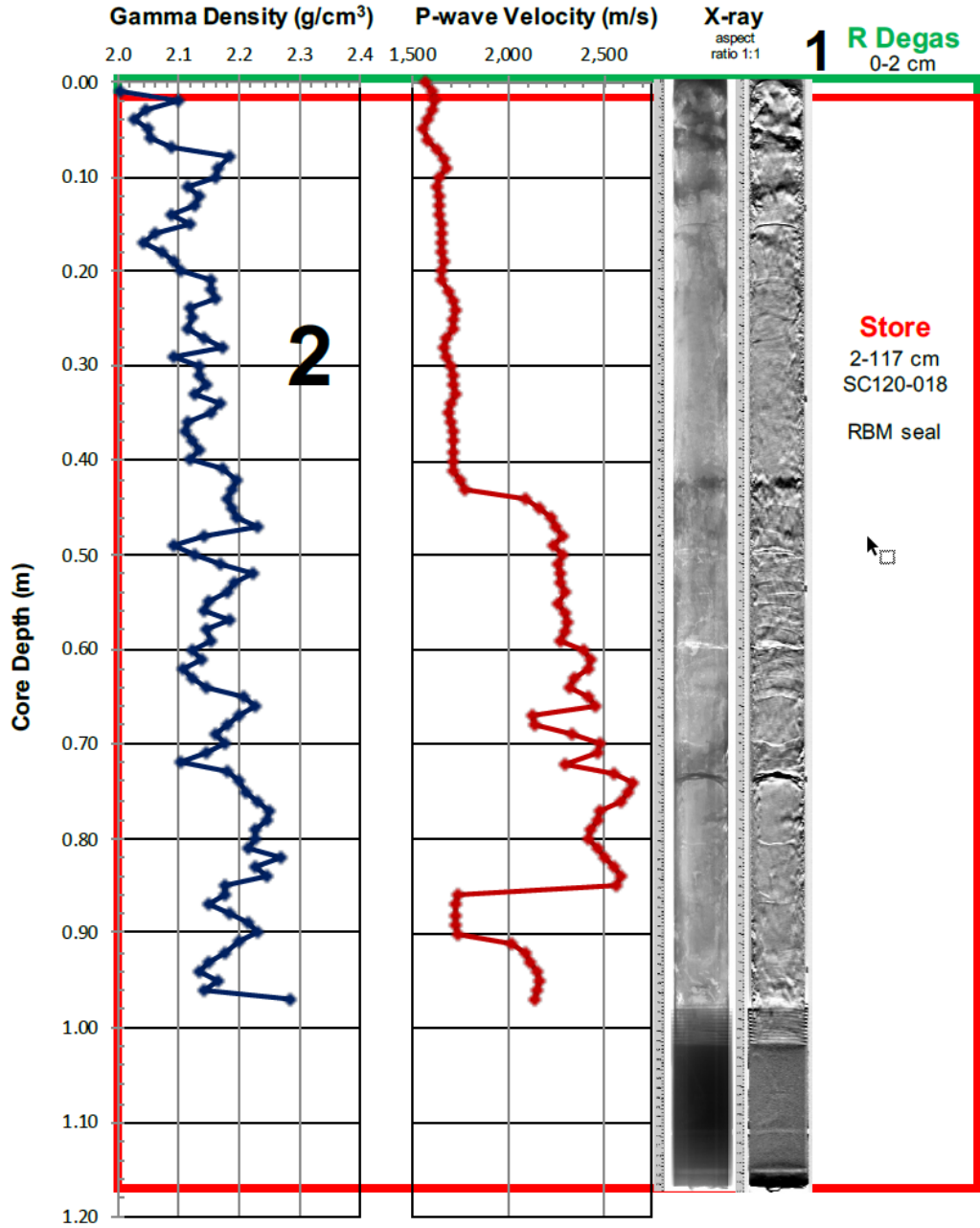


Figure 2c: X-ray, P-wave velocity, and density scans of Core UT-GOM2-2-H002-07CS as acquired from the Geotek Pressure Core Analysis and Transfer System (PCATS). Also shown is the position of the core cuts made in PCATS (As Cut Core in PCATS) along with how the cut core sections were distributed for future analysis and storage.

UT-GOM2-2-**H002-08CS, 2656.0 ft BSF**
 WR313-
AS CUT IN PCATS AT SEA v2

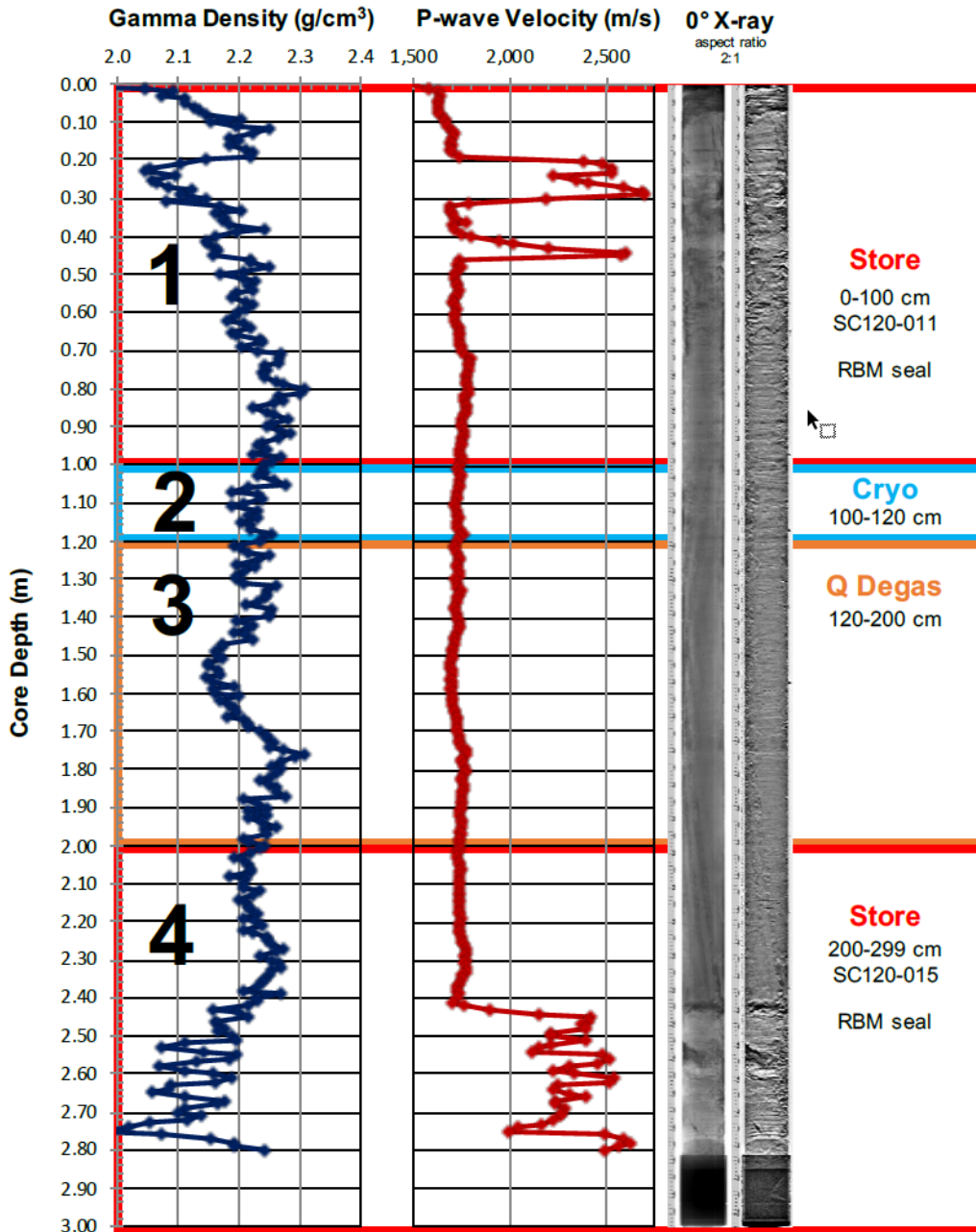


Figure 2d: X-ray, P-wave velocity, and density scans of Core UT-GOM2-2-H002-08CS as acquired from the Geotek Pressure Core Analysis and Transfer System (PCATS). Also shown is the position of the core cuts made in PCATS (As Cut Core in PCATS) along with how the cut core sections were distributed for future analysis and storage.

UT-GOM2-2-**H003-10CS, 2676.0 ft BSF**
 WR313-
AS CUT IN PCATS AT SEA v2

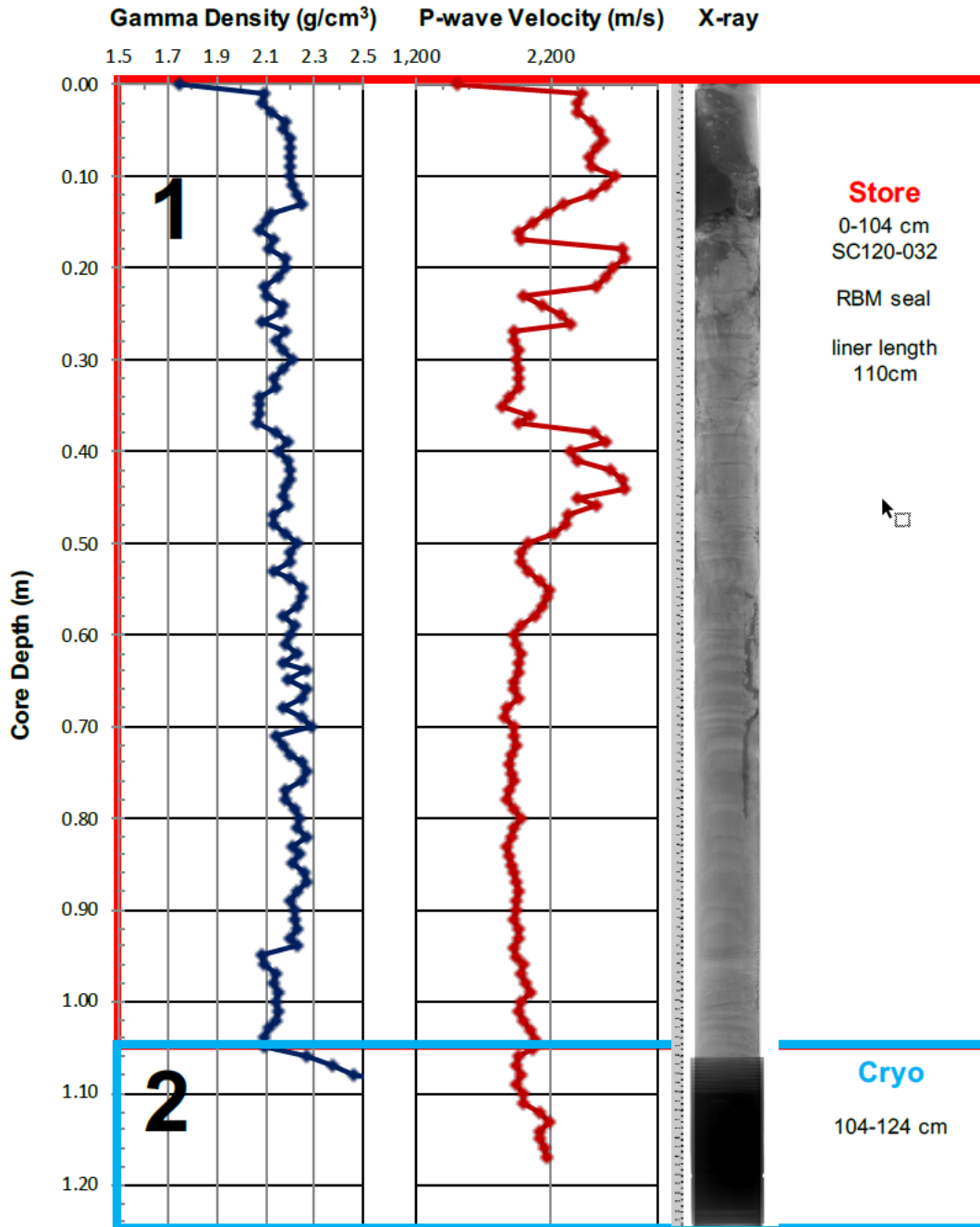


Figure 2e: X-ray, P-wave velocity, and density scans of Core UT-GOM2-2-H002-10CS as acquired from the Geotek Pressure Core Analysis and Transfer System (PCATS). Also shown is the position of the core cuts made in PCATS (As Cut Core in PCATS) along with how the cut core sections were distributed for future analysis and storage.