Quarterly Report – Public Page

Date of Report: *9th Quarterly Report – January 12, 2023*
Contract Number: *#693JK32110008POTA*
Prepared for: *DOT and Co-funders*
Project Title: *Advancement of Through-tubing Casing Inspection for Underground Storage Wells*
Prepared by: *Pipeline Research Council International, Inc.*
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For quarterly period ending: *December 31, 2023*

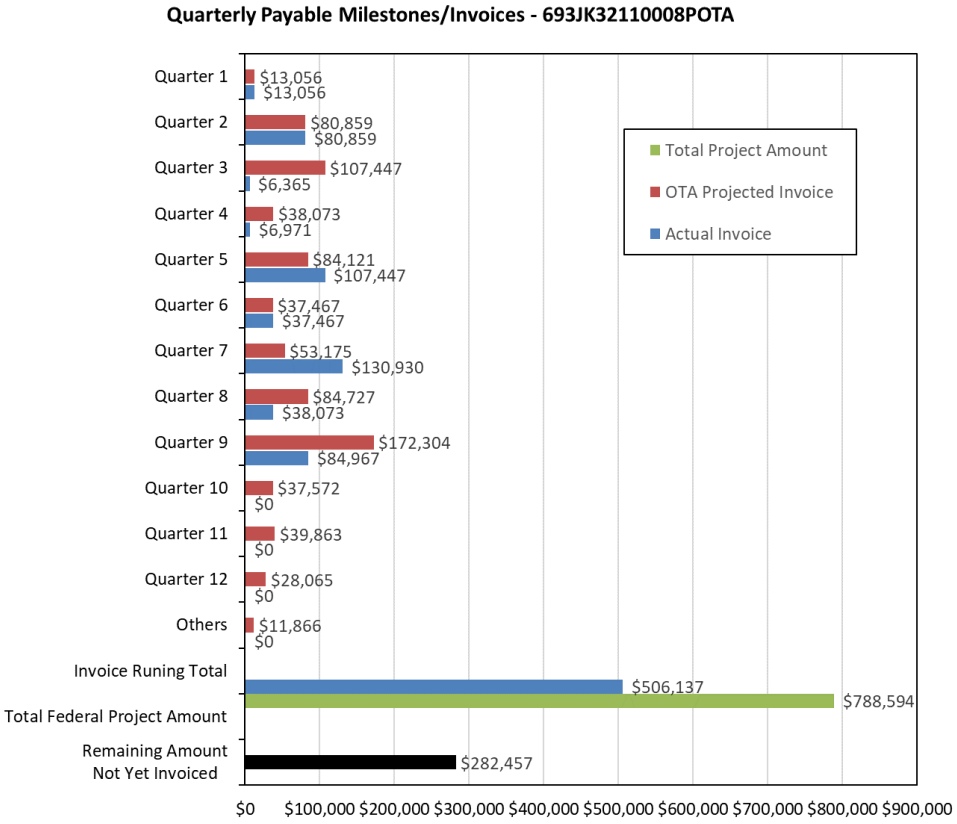
1: Items Completed During this Quarterly Period:

Item #	***Task #***	***Activity/Deliverable***	***Title***	***Federal Cost***	***Cost Share***
17	*2*	*Conduct logging test round #3*	*Results to be included in the quarterly report*	*$77,755.6*	*$77,755.6*
21	*5*	*9th quarterly status report & project management*	*Submit 9th quarterly report*	*$7,211.74*	*$7,211.74*

2: Items Not Completed During this Quarterly Period:

Item #	***Task #***	***Activity/Deliverable***	***Title***	***Federal Cost***	***Cost Share***
19	*2*	*Tool performance evaluation for logging test round #3*	*Results to be included in the final report*	*$31,102.24*	*$31,102.24*
20	*4*	*Conduct Field Trial*	*Results to be included in the quarterly report*	*$133,990.4*	*$133,990.4*

3: Project Financial Tracking During this Quarterly Period:



4: Project Technical Status:

[Item #17] [Task #2] [Conduct logging test round #3] [Results to be included in the quarterly report]

Baker Hughes and GOWell conducted the logging tool test at C-FER between December 11th and December 20th 2023. Schlumberger's test was scheduled for December 4th to 6th, 2023, however Schlumberger was not able to participate in Round 3 of testing. Tests were completed successfully and were within the 3-day plan for each vendor. Details of the test well setup are described in Appendix A and the vendor reports are attached in Appendix B of this quarterly report.

[Item #21] [Task #5] [9th quarterly status report & project management] [Submit 9th quarterly report]

A quarterly Technical Advisory Panel (TAP) meeting was held on January 8th, 2024. In this meeting, the test setup from Round 3 was presented, along with the overall project progress, and forecast the work plan for the next quarter

5: Project Schedule:

Anticipated schedule of delayed tasks:

[Item #19] [Task #2] [Tool performance evaluation for logging test round #3] [Results to be included in the quarterly report]

The tool performance evaluation for the 3rd round of logging tool tests is expected to be executed in Q10.

[Item #20] [Task #4] [Conduct field trial] [Results to be included in the quarterly report]

A preliminary schedule for the field trial is expected to be finalized in Q10.

APPENDIX A – SUMMARY OF TEST WELL SETUP AND THIRD ROUND TESTING

Item 17, Task 2 Conduct logging test round #3

1. LABORATORY TEST SETUP

1.1 Test Well Setup

Prior to the test well setup, casing modules were assembled into individual casing joints by following a predetermined order of the metal-loss features for the third round of tests. The metal-loss feature order is different in each round of test ensuring a blind test for the vendors. The assembled casing joints were then placed on the vertical storage apparatus, as shown in Figure 1. Before each day of testing, the casing joints were assembled into a ~145 ft long casing string using standard-size couplings (with ACME threads). Three casing sizes (4.5", 5.5" and 7.0") were included in the test program with one size to be tested each day.

The casing string was hung from a hanging plate into C-FER's deep well simulator (DWS), which consists of a cased wellbore (2 ft in diameter and 150 ft deep) that can support various test well assembly configurations. Then the tubing joints were assembled and hung inside the casing string in a dual-string configuration as shown in Figure 2. For each casing size, only the concentric casing-tubing configuration was considered in round 3 of testing since the round 1 test results showed a negligible impact of tubing eccentricity on the tool response. Figure 3 shows the 3D model and the actual picture of the top section of the test well.

Figure 1 Assembled Casing Joints

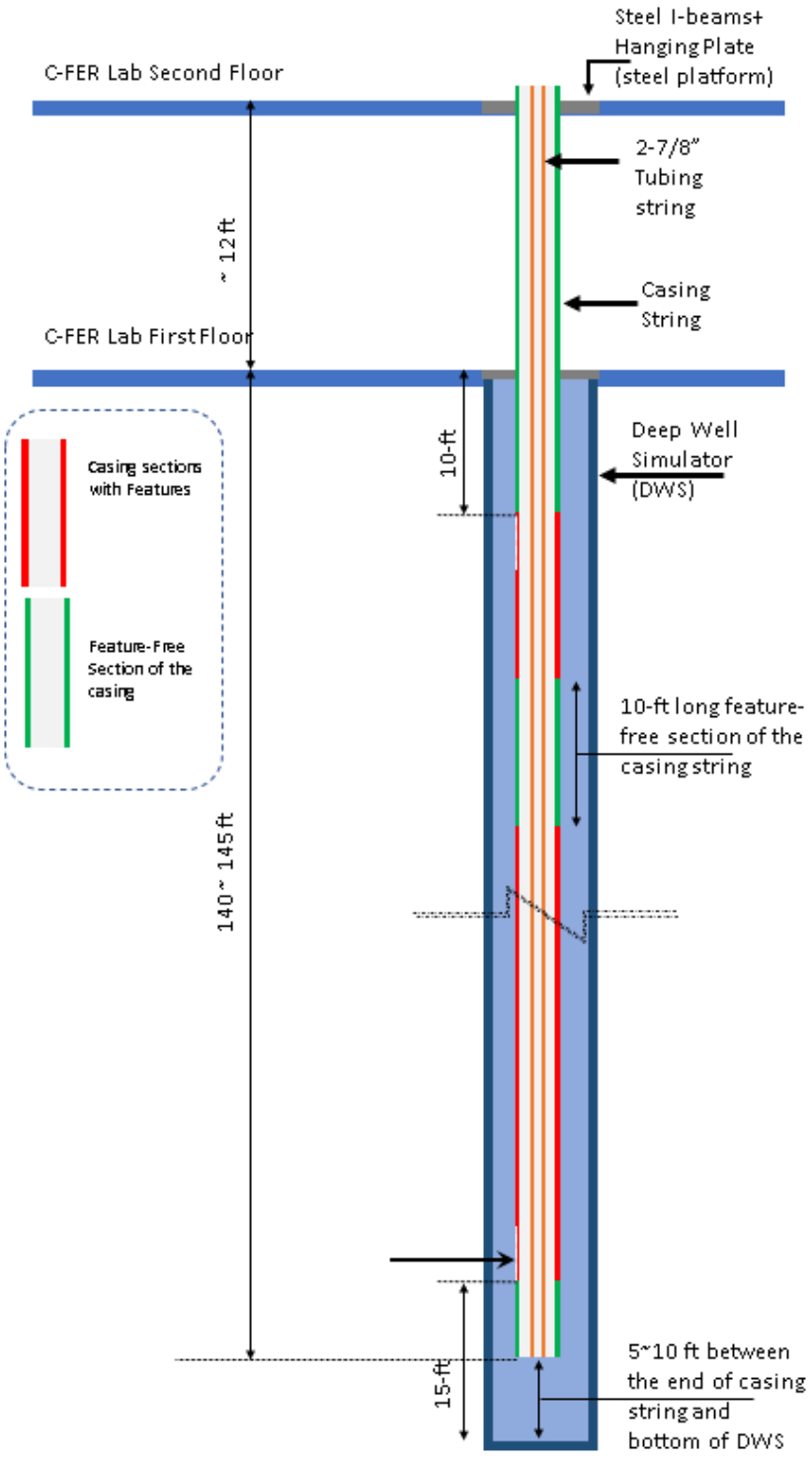


Figure 2 Test Well Setup Concept

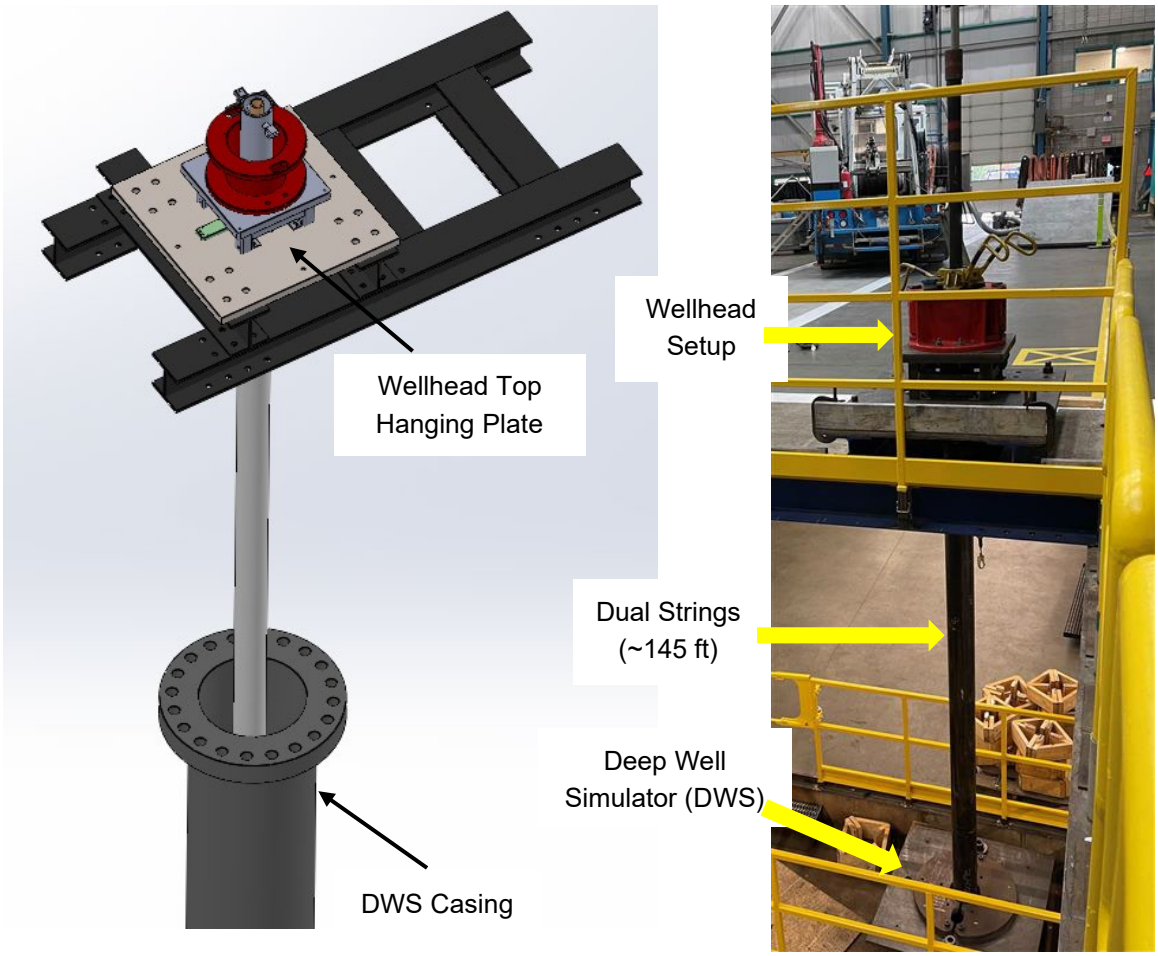


Figure 3 Test Well Setup

1.2 Third Round of Laboratory Test

In the third round, only two vendors took part in the laboratory testing. Although Schlumberger was initially scheduled for December 4th to 6th, 2023, they were unable to participate in Round 3. The third round of lab tests took place over a two-week period, spanning from December 11th to December 20th, 2023. Table 1 provides a summary of the two participating vendors and the tools they tested. Each vendor conducted their tests over a three-day period within one of the two weeks.

Before each test, vendors received basic information about the general test well setup, including casing size, weight, grade, and total depth. This information was necessary for configuring their tools appropriately. Notably, details regarding metal-loss features were not disclosed, ensuring a truly "blind" test for the vendors. Table 2 outlines the test schedule and casing-tubing

configurations for both vendors. Casing string changes for the following day's testing were carried out after completing the vendor test each day.

Figure 4 and Figure 5 show pictures of the two vendors' logging tool tests executed at C-FER's laboratory. The through-tubing tools were run by wireline trucks following the same procedure as that in the field. Each vendor conducted multiple runs for each casing size configuration.

Upon receipt of the vendors' test reports, C-FER will provide each vendor with a complete set of truth data for the metal-loss features. Subsequently, a meeting will be arranged between C-FER and each vendor to discuss and analyze their respective tool performance outcomes as previously conducted after the first and second rounds. The best two performing tools will be participating in the upcoming field trial.

Vendor	Logging Tool
Baker Hughes	EMDeX
GOWell	MTD

Table 1 Participating Vendors and Logging Tools

Day	Casing-tubing Configuration	
	Baker Hughes	GOWell
1	4.5 in casing + concentric tubing	7.0 in casing + concentric tubing
2	5.5 in casing + concentric tubing	5.5 in casing + concentric tubing
3	7.0 in casing + concentric tubing	4.5 in casing + concentric tubing

Table 2 Test Schedule for Round 3 of Testing

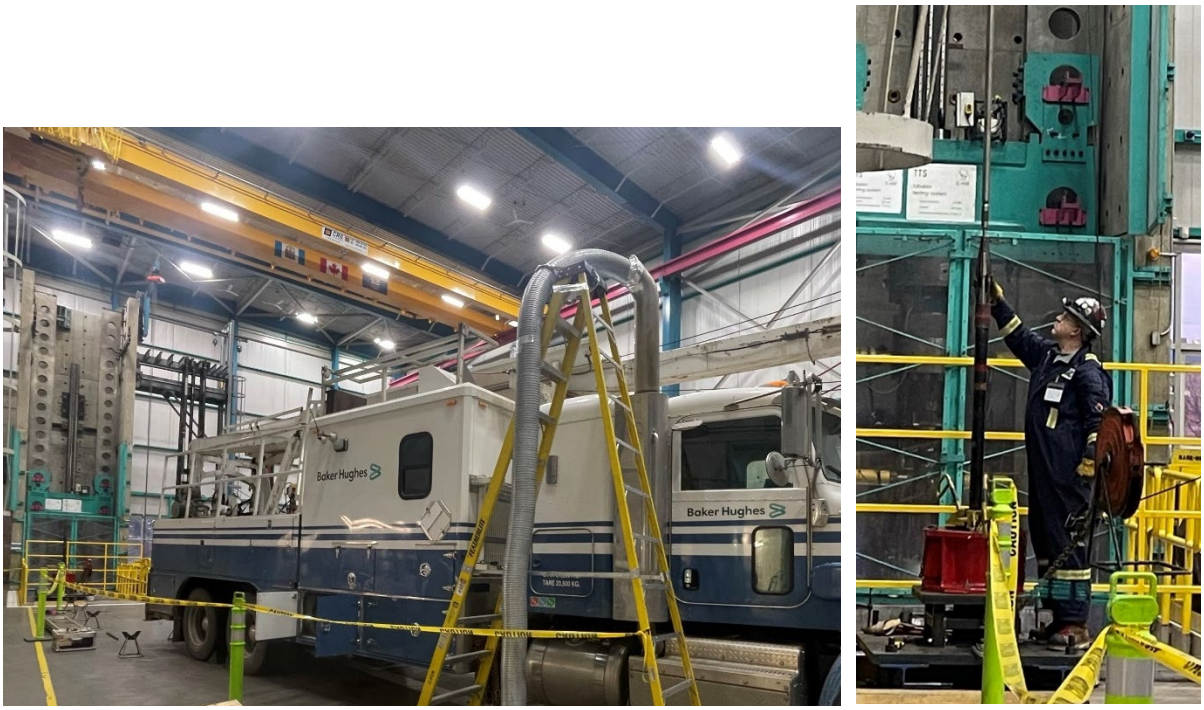


Figure 4 Baker Hughes Logging Tool Test

Figure 5 GOWell Logging Tool Test