Epilogue

Dual-string barrier evaluation

Evaluate the A- and B-annuli without removing the inner pipe during well decommissioning operations

Temperature:
350 degF [177 degC]

Pressure:
20,000 psi [137,895 MPa]

Applications

- Plug and abandonment (P&A) well decommissioning
  - Well integrity evaluation
  - Cement evaluation
- Other applications
  - Sidetrack well candidate selection
  - Time optimization for drilling new wells
  - Carbon sequestration time-lapse monitoring
  - Production well time-lapse monitoring

Benefits

- Evaluates the B-annulus through tubing to avoid inner-pipe removal during P&A well decommissioning operations, saving time and costs
- Provides multiple deliverables depending on your operational objectives: corrected bond index, segmented bond log, 360° azimuthal maps

Barrier evaluation in the P&A well decommissioning phase

The well decommissioning phase can be complex and costly because of the unknown status of the barrier (often cement) in the B-annulus that may have changed during the life of the well.

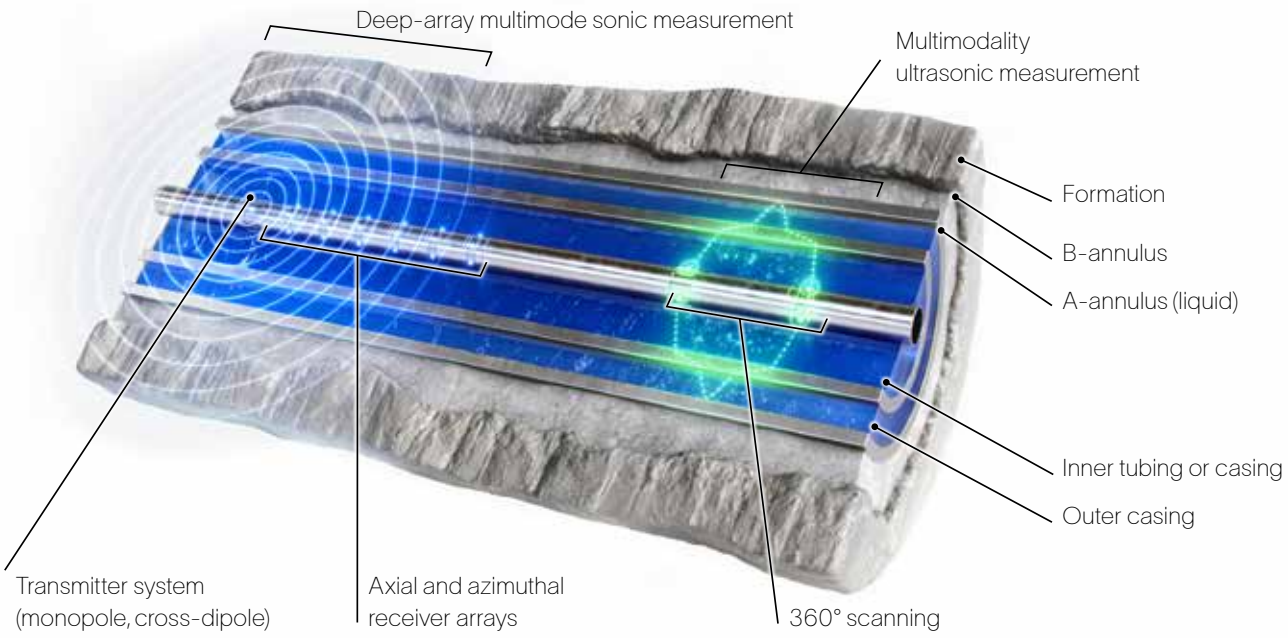
Many factors contribute to annular condition changes, such as barite sag, the casing subjected to production or injection cycles, crossflow due to differential depletion, and formation squeeze from shales or salts. This complexity of annular composition and cement placement can be resolved when the completion is a single cemented casing string using widely deployed ultrasonic and basic sonic measurements. However, the industry has faced challenges implementing barrier evaluation in dual-string environments.

More efficient P&A operations

Part of Epilogue™ efficient P&A services, Epilogue dual-string barrier evaluation enables you to avoid costly and unnecessary steps in the well decommissioning phase. It uses the most advanced method for imaging the B-annulus—all without inner-pipe (tubing or casing) removal, significantly reducing the time required for operations.

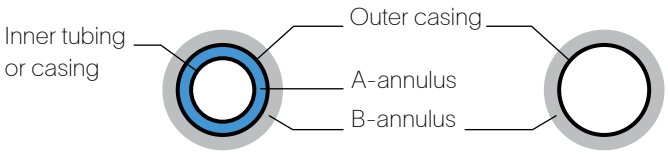
Advanced measurements and mapping

Epilogue dual-string barrier evaluation leverages a combination of deep-array multimode sonic measurement (0.5–20 kHz) and multimodality ultrasonic measurement (100–500 kHz). These advanced measurements produce phase and amplitude attributes that yield a combined image of the A- and B- annuli conditions. Ultrasonic measurements provide crucial pipe-to-pipe standoff information and enable you to charaterize liquid conditions in the A-annulus, as well as corrosion-related gross deformations of the tubing or outer casing. The low-frequency, deep-array sonic measurement provides the B-annulus evaluation. Together, these two measurements provide a more reliable B-annulus evaluation with radial coverage and azimuthal mapping.

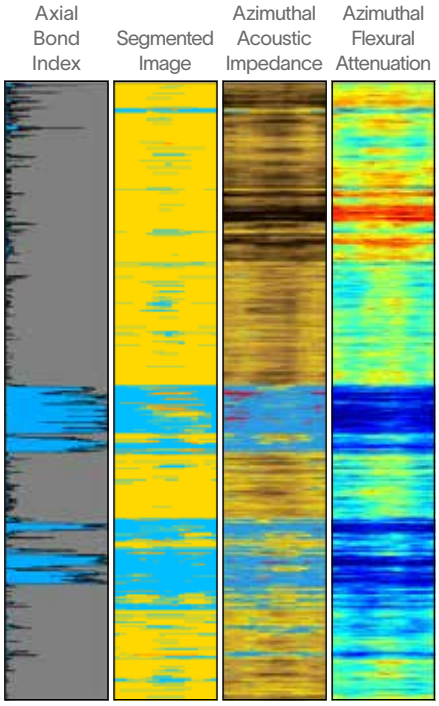


Epilogue dual-string barrier evaluation enables A- and B-annuli barrier logging without removing the inner pipe.

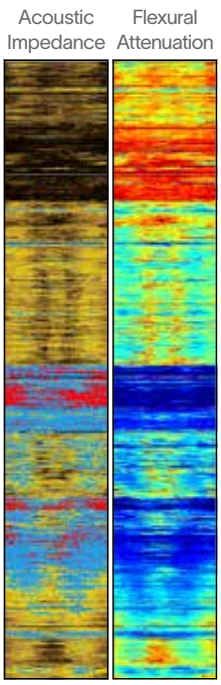
Epilogue dual-string barrier evaluation



Epilogue Dual-String Barrier Evaluation—B-Annulus



Single-String Barrier Evaluation—B-Annulus



Tubing and Casing Combinations for 3.625-in Tool

Inner Tubing or Casing OD, in	Outer Casing OD, in	A-Annulus	B-Annulus
5½	7	Liquid	Liquid, cement, or formation squeeze
	9⅝	Liquid	Liquid, cement, or formation squeeze
6⅝, 7	9⅝	Liquid	Liquid, cement, or formation squeeze
	10, 10¾	Liquid	Liquid, cement, or formation squeeze
9⅝, 10, 10¾	13⅜	Liquid	Liquid, cement, or formation squeeze

All specifications are subject to change without notice.

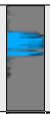
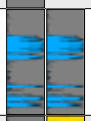
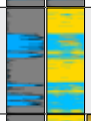
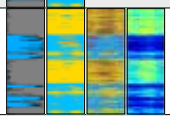
Specifications

Condition	Specification
Pressure, psi [kPa]	20,000 [137,895]
Temperature, degF [degC]	350 [177]
Min. ID and restriction, in [mm]	4 [101.6]
Min. inner tubing or casing OD, in [mm]	5½ [139.7]
Max. outer casing OD, in [mm]	13⅜ [339.7]
Logging speed, ft/h [m/h]	700 [213]

All specifications are subject to change without notice.

Logs derived from the same well, with (right) and without (left) the inner pipe removed, showing high data quality using Epilogue dual-string barrier evaluation.

Epilogue Dual-String Barrier Evaluation—B-Annulus Deliverables

Level	B-Annulus Deliverables	Example (B-Annulus)	Radial Coverage	B-Annulus Deliverable Outputs
1	Bond index			Bond index without environmental corrections
2	Corrected bond index			Bond index with environmental corrections
3	Segmented bond log			Eight-segment bond index and segmented image
4	360° azimuthal maps			Azimuthal acoustic impedance and flexural attenuation maps

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