



Aperio Pulse Echo Service

High-resolution simultaneous cement evaluation and casing inspection service

The primary goal of cement placement is to provide zonal isolation while at the same time protect the casing from corrosive fluids. However, the cement sheath can be stressed by well activity or a poor cementing job to the point where it is no longer effective. The casing is the first barrier for well integrity and it endures significant wear and corrosive conditions throughout the lifecycle of the well. Compromised casing can lead to catastrophic failure impacting safety, the environment and production.

Regulatory compliance requires evaluation of the casing and cement to ensure well integrity is maintained over the lifecycle of the well.

The **Aperio™ Pulse Echo service** from Baker Hughes provides ultrasonic pulse echo mapping of the casing and cement with one logging run to gain maximum understanding of wellbore zonal isolation. The Aperio Pulse Echo service employs a rotating transducer to provide high resolution, 360-degree assessment of both the casing integrity and the cement bond. The transducer uses varying frequencies from

250 to 450 kHz to transmit and measure ultrasonic waveforms reflected from the casing and the cement to assess annular integrity. It provides high-resolution circumferential casing and cement coverage data – detecting defects or channels as narrow as 1.2-in. (30.5 mm) The Aperio Pulse Echo service can also identify casing integrity problems by inspecting the casing for drill wear, ovality and corrosion.

The Aperio pulse echo service simultaneously acquires measurements for casing and cement in one run. Post processing of the logs is integrated with the acquisition software. The evaluation logs are available immediately after the run reducing non-productive time and significantly shortening the time to make critical decisions to maintain well integrity.

To learn more about how Baker Hughes' Aperio Pulse Echo service will provide maximum understanding of your wellbore zonal isolation in one run, contact your Baker Hughes representative or visit bakerhughes.com.

Applications

- Cement top determination and mapping of cement placement
- Deepwater wells with a variety of cement or fluid conditions
- Drilling wear and corrosion evaluation
- Primary or remedial cement job quality check
- Locating internal and external casing defects
- Heavy wellbore fluid environments

Benefits

- Compliance with well integrity regulations
- Operational efficiency
- Reduce risk of zonal communication
- Reduce risk of casing failure
- Reduce Non-productive time

Aperio Pulse Echo Service specifications

| | |
|---------------------------------------|--|
| Answer Products | Acoustic impedance, cement bond data, casing thickness, internal radius, external radius, ovality, internal rugosity, burst pressure |
| Range of measurement | 0 - 10 Mrayl |
| Accuracy | |
| Cement impedance | 0 - 3.3 Mrayl +/- 0.50 Mrayl; > 3.3 Mrayl +/- 15% |
| Casing thickness | +/- 2% |
| Maximum operating pressure | 20,000 psi (138 kPa) |
| Maximum operating temperature | 347° F (175 °C) for 4 hr |
| Maximum casing size (OD) | 20.0-in. (508 mm) |
| Minimum casing size (OD) | 4.5-in.* (114.3 mm) |
| Mud type or weight limitations | |
| Maximum water-base mud weight | Any weight |
| Maximum oil-base mud weight | 13.3 ppg (1.6 g/cc) [attenuation: 12 db/cm per MHz] |
| Tool OD | 3- ⁵ / ₈ -in. (92 mm) |
| Length | 12.86 ft (3.92 m) |
| Weight (in air) | 216 lb (98 kg) |
| Maximum logging speed | 40 ft/min (13 m/min) |
| Combinability | INTeX, DAL |

* Minimum ID of 4.00-in.