The Deep Shear Wave Imaging (DSWI) processing service, from Baker Hughes, a GE company (BHGE) provides exceptional formation investigation. Using much higher-resolution images than those available from surface seismic services, it captures features located up to 100 ft away from the borehole. The DSWI service uses a proprietary processing technique to analyze crossdipole data from the XMAC™ F1 acoustic service and map sub-seismic faults and fractures that would otherwise be invisible with conventional borehole images. This combination of services permits geomechanical acquisition in one pass.

The optimized processing workflow of the DSWI service reduces the amount of manual input for interpretation, shrinking turnaround time in some cases to 48 hours. The service provides an image of the reflective feature, its distance away from the borehole, the magnitude of the reflection, and its strike orientation. The identified features can then be integrated into the reservoir model.

Conventional borehole imaging services can pose limitations on understanding the reservoir structure farther away from the borehole. Existing services only detect features at the point of intersection with the borehole, failing to identify outlying faults and fractures and missing critical formation details. The DSWI service overcomes these limitations by mapping acoustic reflections away from the borehole, even those not intersecting the wellbore.

The XMAC F1 service offers deployment flexibility in open- and cased-hole environments—typically not an option with conventional borehole imaging services. As a result, the DSWI service is capable of acoustic reflection imaging in cased holes by employing a low-frequency dipole source, which is less sensitive to casing wave noise than a monopole source.

The dipole source of the XMAC F1 service operates at a higher frequency than surface seismic imaging services. Shear waves generated by the dipole source respond to smaller scale features that are typically missed with seismic services. Therefore, the DSWI service is able to resolve features of the formation’s structure significantly farther away from the borehole than

Applications

• Wellbore placement in reservoir sections
• Design completion during pre-fracturing logging
• Diagnostic analysis during post-fracturing logging
• Fracture detection—borehole intersecting and non-intersecting
• Fault detection—large-scale and subseismic
• Refinement of reservoir models and seismic interpretation
• Completion optimization for unconventional and salt dome storage wells

Benefits

• Detects formation features up to 100 ft away from borehole
• Obtains cleaner images with higher signal-to-noise ratio
• Enables deeper investigation depth
• Provides imaging results, even in cased holes, due to lower sensitivity to casing wave noise
conventional borehole imaging and supports a higher image resolution than surface seismic services. Accurate analysis of dipole data by the DSWI service provides existing large-scale field models with sharper resolution detail.

Improvements made to the instrument of the XMAC F1 acoustic service increase the working range of the DSWI service by 70%. The standard cross-dipole mode of the DSWI service images acoustic reflections up to 60 ft away from the borehole in fast formations. The extended cross-dipole data acquisition source of the DSWI service increases the range of detection up to 100 ft. This increased processing depth aids operators in mapping the formation structure and subseismic faults and fractures at a distance farther than ever before.

Contact your BHGE representative to learn how the DSWI service can help you improve reservoir models using a clearer perception of formation details or visit bhge.com.

**Pre-fracture:**
Detects natural formations 60 ft or closer

**Post-fracture:**
Detects formation features up to 100 ft away