

---

---

## **OBS Nodes Deliver Wide-Azimuth Image Improvement in Gulf of Mexico Deepwater at Atlantis**

**John M. Howie, David B. Shepherd, Gerard Beaudoin, and Patrice Mahob**

BP, 501 Westlake Park Blvd., Houston, Texas 77079

---

---

### **ABSTRACT**

The world's first 3D deepwater wide-azimuth ocean bottom seismic (OBS) node survey at Atlantis Field in the Gulf of Mexico has produced significant image improvement over the existing narrow-azimuth towed streamer (NATS) seismic.

The Atlantis Field is located approximately 190 miles south of New Orleans in the Gulf of Mexico and along a prolific trend of deepwater hydrocarbon discoveries. At Atlantis, there are two fundamental issues that challenge seismic depth imaging: First, the northern portion of the structure sits beneath a complex allochthonous salt body. Second, the complex salt canopy approaches the seafloor from the north and causes a major bathymetric feature, the Sigsbee Escarpment, where the seafloor plunges from 4500 feet to 7000 feet, with slopes up to 30 degrees.

An OBS node system provides important flexibility with autonomous receivers on the seafloor and independent ROV deployment and source vessels on the surface. This flexibility resulted in successful acquisition of a seamless survey in and around significant production infrastructure with little delay because of simultaneous operations.

A major salt velocity model rebuild project was initiated to improve salt definition using the wide-azimuth OBS node illumination. Several iterations of sediment flood migration, top salt interface interpretation, salt flood migration, and base salt interface interpretation, were applied to develop the complex salt shape, particularly along the southern edge of the salt mass.

A major key to the success of the project was the efficient use of shot record migration for the native OBS node receiver gather geometry—all shots recorded on a single OBS node. The receiver gather for each node is migrated as a single fold volume.