

# OFFSHORE RESEARCH



# NETL

## NATIONAL ENERGY TECHNOLOGY LABORATORY

Natural gas and crude oil provide approximately two-thirds of our nation's primary energy supply. We expect that will continue as the nation responsibly transitions to a more sustainable energy future with the further development of renewable energy resources. Current operations in the offshore have unique challenges associated with safe and efficient exploration and production in harsh, and sometimes unpredictable, environments. These challenges include:

- High pressure and high-temperature (HPHT) conditions.
- Unique geohazards.
- Flow assurance issues in deep water pipelines.
- The need for increasingly sophisticated seismic imaging to visualize deep and complex reservoirs.
- The need to operate subsea production equipment under extreme conditions.



Within the Oil and Gas Recovery portfolio of programs, the Offshore Research area is addressing the unique challenges posed by conducting operations under subsea conditions. This area supports research aimed at arming producers with the knowledge to accurately calculate reservoir depths, pressures and potential payouts while conducting operations with more precision, safety and economic efficiency.

Advancing the creation of sophisticated tools, equipment and imaging technologies will accomplish the following goals: revolutionize today's approaches to problem solving; deliver the information needed to provide a robust foundation for the characterization of offshore reservoirs; improve the performance, reliability and integrity of surface and subsea equipment and infrastructure; and develop the data needed to identify, assess, and mitigate risks to inform future research investment decisions.

**WELLBORE INTEGRITY** — Incidents related to the loss of oil/gas well control typically occur when the primary barriers (casing and cement) fail, requiring the secondary barrier (closing of the blowout preventers) to engage in order stop the breach from becoming a well control incident. Research continues to support safe, economic offshore resource development by ensuring the integrity of the wellbore in ultra-deepwater environments.

**RISK REDUCTION** — Developing risk assessment tools to quantify and mitigate knowledge gaps in offshore systems, including the assessment of geohazard potential, equipment failure, and casing deformation.

**RAPID DETECTION AND IN-SITU CHARACTERIZATION** — Improving the safety and efficiency of offshore drilling and production operations through early kick detection at the drill bit and in-situ characterization of subsurface processes during drilling.

## OFFSHORE TECHNOLOGIES WILL EXTRACT THE FULL ECONOMIC VALUE FROM OUR NATION'S FINITE OIL AND GAS RESOURCES BY:

- Mitigating the risk of incidents that could result in the loss of life and damage to the environment.
- Enhancing U.S. energy security for future generations.
- Improving safety through research and development areas such as wellbore integrity, spill risk mitigation, cementing alternatives, advanced riser technology and subsea inspection of seafloor facilities and equipment.

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