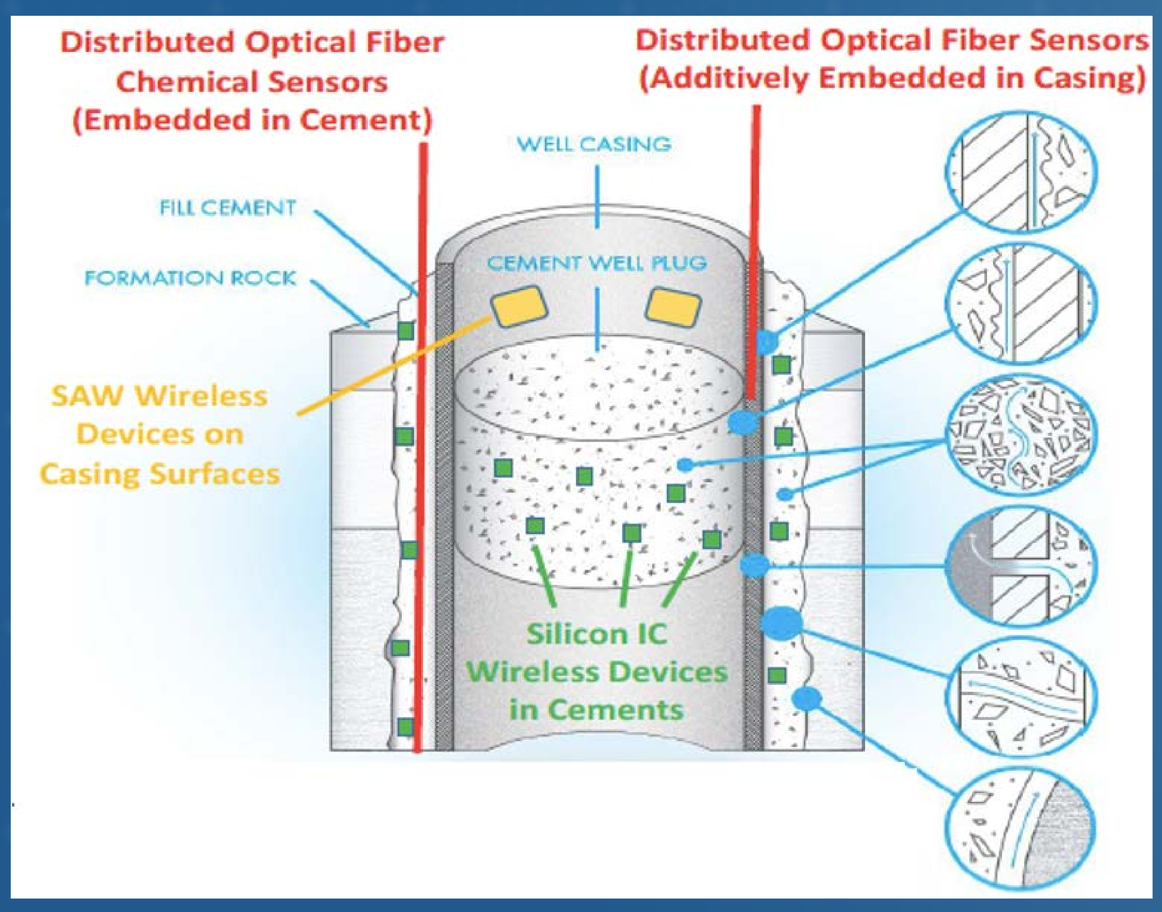
NETL RESEARCH & INNOVATION CENTER

NETL AND PARTNERS DEVELOP EMBEDDED SENSOR TECHNOLOGIES FOR SUBSURFACE WELLBORE INTEGRITY MONITORING

The technologies are critical for wellbore integrity in geologic carbon storage, subsurface natural gas and hydrogen storage and enhanced geothermal systems.



Schematic figure of a suite of complementary, multi-functional embedded sensor technologies for real-time subsurface monitoring of wellbore integrity.

Cement and casing steel are wellbore structural components. Real-time and predictive monitoring of these components can reduce wellbore integrity risks and support broad applications in subsurface activities.

- NETL and partners created a suite of complementary, multi-functional embedded sensor technologies for real-time subsurface monitoring of wellbore integrity, with emphasis on pH and corrosion monitoring of cement and casing steels.
- Thin film sensing layers and integration with sensor devices were pursued in parallel with device development and design efforts to enable the successful chemical sensing of three classes of devices, including optical fiber-based sensors, wireless surface acoustic wave sensors and wireless silicon integrated circuit sensors.
- The project has generated seven filed and issued patents, 22 published journal papers, 13 presentations and 27 conference papers.

PATENTED TECHNOLOGY

RESEARCH PRIORITIES

- HYDROGEN WITH CARBON MANAGEMENT
- CARBON STORAGE AND TRANSPORT
- METHANE MITIGATION

PERFORMERS

NATIONAL ENERGY TECHNOLOGY LABORATORY

ILLINOIS
Illinois State Geological Survey
PRAIRIE RESEARCH INSTITUTE

IOS INTELLIGENT OPTICAL SYSTEMS, INC.

UCLA

University of Pittsburgh

Carnegie Mellon University

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NETL ANNUAL ACCOMPLISHMENTS 2023

U.S. DEPARTMENT OF ENERGY
Fossil Energy and Carbon Management

NATIONAL ENERGY TECHNOLOGY LABORATORY