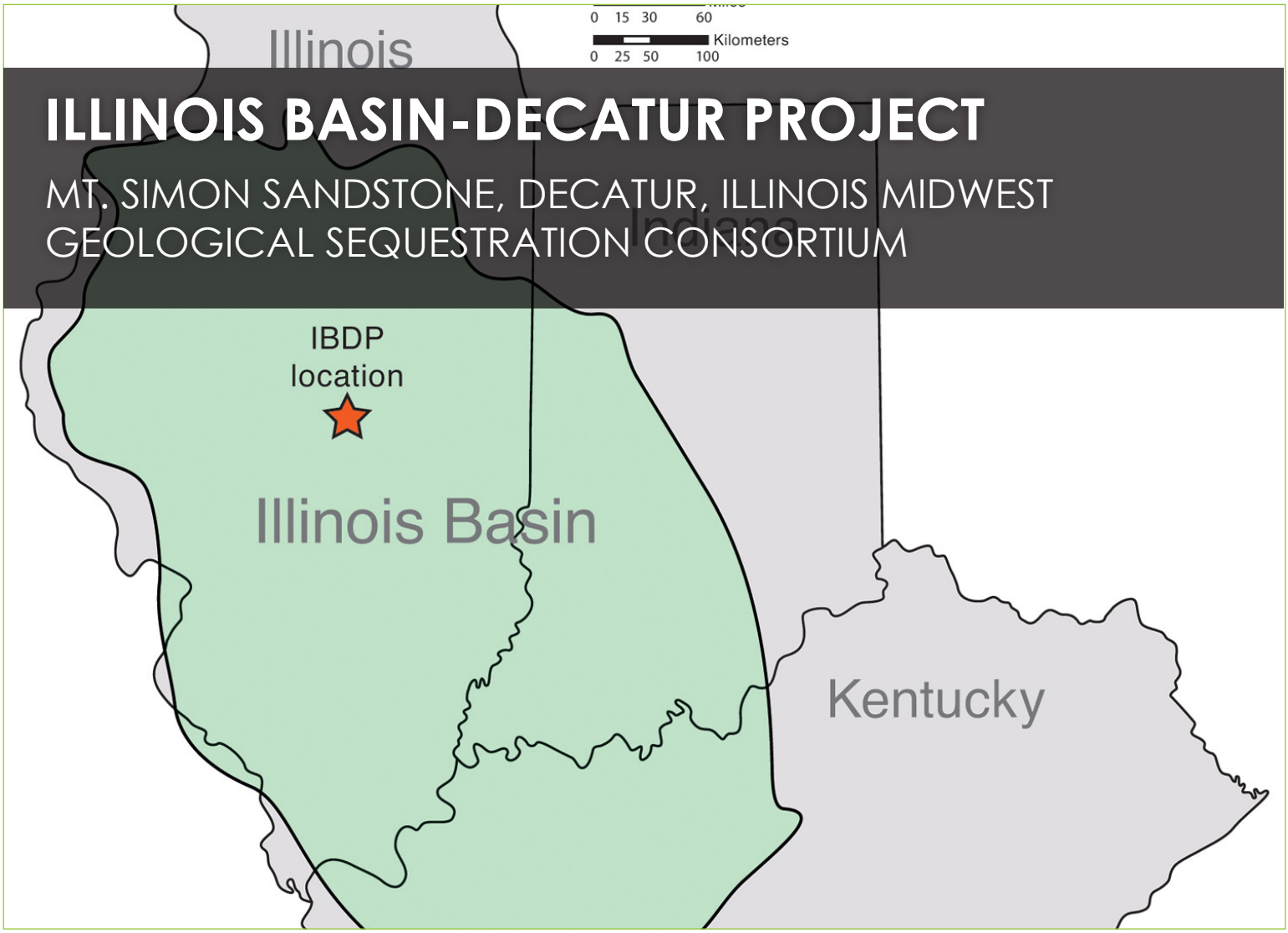

ILLINOIS BASIN-DECATUR PROJECT

MT. SIMON SANDSTONE, DECATUR, ILLINOIS MIDWEST GEOLOGICAL SEQUESTRATION CONSORTIUM

NETL

NATIONAL ENERGY TECHNOLOGY LABORATORY

BACKGROUND

The Midwest Geological Sequestration Consortium's (MGSC) Illinois Basin-Decatur Project (IBDP) is a collaboration of the Illinois State Geological Society (ISGS), the Archer Daniels Midland Company (ADM), Schlumberger Carbon Services, and other subcontractors. The IBDP injected approximately 1 million metric tons of CO_2 derived from biofuel production into a saline reservoir, the Mt. Simon Sandstone, in Decatur, Illinois. Operational injection started in November 2011 and was completed in November 2014. The IBDP effort is currently conducting post-injection monitoring.

The Illinois Basin region covers most of Illinois, southwestern Indiana, and western Kentucky. The Mt. Simon Sandstone represents the primary CO_2 storage resource of the Illinois Basin and the Midwest Region, with potential storage volumes in the range of 12 billion to 172 billion metric tons of CO_2.

ILLINOIS BASIN-DECATUR PROJECT

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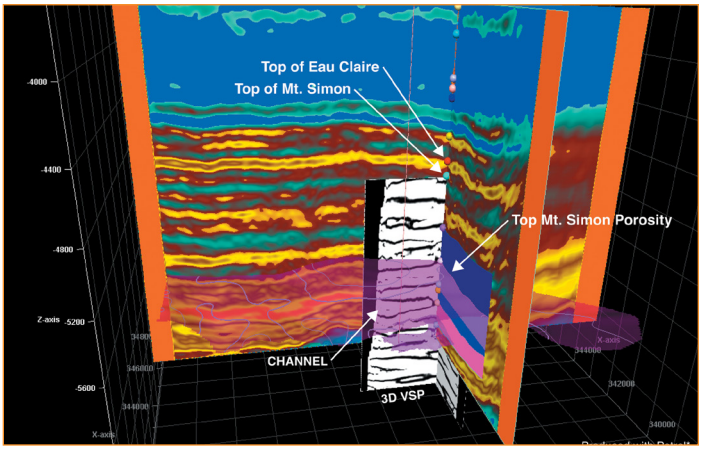
PROJECT OVERVIEW

The IBDP is an integrated industrial carbon capture and storage (CCS) system from source to reservoir. The project stored CO_2 from ADM's ethanol fermentation plant. Operations consist of a compression/dehydration facility, a delivery pipeline, one injection well, one deep observation/verification well, and a geophysical test well, all developed on the ADM-owned site.

The IBDP developed and implemented a rigorous and extensive monitoring, verification, and accounting (MVA) program, including high-fidelity induced seismicity monitoring, 3-D seismic surveying, 3-D vertical seismic profiling, soil flux monitoring, atmospheric monitoring, shallow groundwater monitoring, and deep subsurface monitoring and fluid sampling. Data collection covers 24 months of pre-injection baseline, 36 months of operational injection, and up to 10 years of post-injection monitoring.

Key research targets for the MGSC's large-scale injection test relate to CO_2 injectivity and volumetric storage capacity of the saline reservoir; the integrity of the seals to contain the CO_2 in the subsurface; and the entire process of pre-injection



characterization, injection process monitoring, and post-injection monitoring to understand the reservoir response to the CO_2. Because of its extensive capacity, this formation is desirable for future CCS projects, and the research targets undertaken in the IBDP effort will serve as tools for larger injection projects.

PROJECT SUCCESSES

The IBDP is the only completed large-scale injection into a saline formation. To date, 1 million metric tons of CO_2 have been injected into an extensive reservoir with no difficulties. This project validated the capacity, injectivity, and containment of the Mt. Simon Sandstone, which represents the region's primary CO_2 storage resource. Capacity, injectivity, and containment potential have met, and in many cases exceeded, pre-injection expectations. The IBDP is also the site of one of the first EPA Underground Injection Control Class VI permits (for wells used for geologic sequestration of CO_2).

In addition, the IBDP site has also been successful in developing and field testing CO_2 storage-related MVA instrumentation and technologies for deployment at future CCS projects in the United States and throughout the world. The MVA program at IBDP involves approximately 20 different monitoring methods and technologies, including a well for studying and understanding induced seismicity.

As a result of this effort, a pathway for commercial usage of the Mt. Simon Sandstone CO_2 storage resource has been demonstrated. The project has generated a world-class

microseismic data set that has the potential to benefit all fluid-injecting industries, including oil and gas, geothermal, solution mining, and CCS.

The site has garnered international interest with over 700 visitors from 29 countries. The IBDP effort was also featured in a special issue of Greenhouse Gases: Science and Technology journal.

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