Beneficial Use Case Study

Oil Field Well Closure

Coal Combustion Product Type
Fly Ash (PozzoCem H-65 and PozzoSlag)

Project Name
Oil Field Well Closure

Project Location
Harris County, Texas; Alberta, Canada

Project Participants
Eco Material Technologies, O'Neill Industries

Project Completion Date
March 2025

Project Summary
The Humble Oil Field in Harris County, Texas, discovered in 1905, is the second oldest in the state and was once owned by business magnate Howard Hughes Sr. After more than a century of production, aging wells in the field now require permanent closure under regulations overseen by the Texas Railroad Commission. Known as "plug and abandonment," this process prevents oil and gas reservoir fluids from migrating upward and potentially contaminating other formations or freshwater aquifers. In December 2023, O'Neill Industries carried out one such closure using a new low-carbon cement solution developed by Eco Material Technologies. The project not only honored regulatory requirements but also highlighted an innovative approach to reducing emissions in a traditionally carbon-intensive process.

Project Description
For the closure, Eco Material Technologies supplied PozzoCem H-65, a specially formulated green cement blend made of 65 percent PozzoSlag and 35 percent Type H cement. The cement grout was injected through tubing to the base of the wellbore, then allowed to rise upward to form a continuous, durable plug. The spherical shape of the fly ash particles in PozzoSlag provided a "ball-bearing effect" that improved plasticity and workability, allowing for less water use, greater cohesiveness, and smoother pumping into place. The result was a strong, uniform seal that met all technical and regulatory requirements.

The use of PozzoCem H-65 reduced greenhouse gas emissions by approximately 70 percent compared with traditional portland cement. In addition to lowering the environmental footprint of the closure process, the material helps limit fugitive methane emissions by ensuring wells are permanently sealed. This first application at Humble Oil Field demonstrated a replicable model for low-carbon well closure across the U.S. energy sector.

Building upon this success, Eco Material Technologies extended its innovation to the Canadian oil and gas market in 2024, developing a new high-temperature green cement for a thermal well closure in Alberta. That formulation—containing one-third PozzoSlag, one-third portland cement, and one-third silica flour—was designed to withstand temperatures exceeding 300 degrees Fahrenheit, such as those encountered in deep reservoirs and steam-enhanced recovery operations.

Together, the Humble Oil Field closure in Texas and the subsequent thermal well project in Alberta demonstrate how Eco Material Technologies' green cement solutions can be adapted to different conditions while delivering both performance and environmental benefits. These projects highlight the scalability of products like PozzoCem H-65 and related formulations to meet the growing demand for low-carbon, environmentally responsible well closure practices across North America.

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