A Santa Fe company is looking to nature for solutions to crumbling roads and uranium mines that were abandoned without proper capping.

Bob Sherwin, CEO of Lithified Technologies, developed accelerated lithification technology, or LithTec, to mimic the process by which soil turns into stone over thousands of years. LithTec can be used to build roads that last longer and cost much less to build and maintain than roads built with traditional methods, Sherwin said. The same technology, he said, can solve serious problems associated with poorly sealed uranium mines.

It took seven years of research and development for Sherwin's company to develop a dry blend of naturally occurring minerals that turn rock-solid within a day after being mixed with and compacted into traditional road-base materials at optimum moisture content.

Along the way, Lithified Technologies sought help from the New Mexico Small Business Assistance program, which pairs small businesses with scientists at the state's national laboratories to test, design and research products that are technically challenging. The company obtained an individual NMSBA award in 2019 to have its trademarked soil technology tested and studied by Los Alamos National Laboratory.

Sherwin worked with Gilles Bussod, a scientist in the Earth System Observation Group at LANL, to test the road technology under strenuous conditions that might have otherwise taken decades. The year-long study resulted in a 38-page white paper that substantiated test results involving customized formulations designed to achieve superior strength and load-bearing capacity in a wide range of soil classifications.

“Roads wear from the top down and fail from the bottom up,” Sherwin said. “We are solving the underlying problems that cause roads to fail. In addition, we recycle the failing asphalt roads in place without the need to haul it away to a landfill or recycling plant. Once the base layer is treated with LithTec, the asphalt thickness can be reduced by 50 percent or more.”

While working with the Navajo Nation on reservation road projects, Sherwin learned about the tribe’s problems associated with the 523 uranium mines that were abandoned after World War II and the Cold War.

Historically, Sherwin said, the design for capping abandoned uranium mines involved a concrete cap on top of a 5-foot layer of clay. “Water would find its way into the clay, which would swell causing the concrete cap to break,” he said. “That allowed additional water to erode away the clay, exposing the uranium, which becomes airborne and leaches into groundwater.”

The current U.S. Nuclear Regulatory Commission-approved design uses alternating layers of clay and sand up to five feet thick and covered with crushed rock. “Neither of these designs has been effective in containing the uranium and keeping it out of the water sources,” Sherwin said. “This is a massive problem, as there are 15,000 AUMs in the 17 western states affecting 50 million people living within 10 miles of them. We have the technology to solve that problem.”

Sherwin worked with former Navajo Nation President Russell Begaye to apply for the second NMSBA project to again work with Bussod to research whether LithTec could be used to permanently cap the tribe’s AUMs and provide a uranium filtration system that would prevent uranium from leaching into water sources. In 2020, Lithified Technologies received a leveraged award to test its “LithTec U-Capping System” on behalf of the company, the Navajo Nation, investors, and other stakeholders who would benefit if the technology proved sound.

The results were positive, and the company is applying for a patent on its design. Meanwhile, Sherwin, Bussod, and Begaye plan to meet with the NRC and the Environmental Protection Agency to present their findings that show the U-Capping System is 300 percent more effective than the current NRC design in containing uranium. Sherwin hopes this technology could be used in the remediation of other Superfund sites nationwide.

Both the roadbuilding and mine-capping projects are multibillion-dollar enterprises, Sherwin said, and the NMSBA awards were essential to bringing his product to market.

For more information on Lithified Technologies, visit www.LithTec.com. Businesses interested in getting technical help through the NMSBA program can apply at https://www.nmsbaprogram.org./

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By Holly Bradshaw-Eakes
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