

COMPLETION SCIENCE

Material Interest

Duncan's Completion Science develops biodegradable materials for well completions

When Brad Todd joined the energy industry as a completion engineer more than four decades ago, oil wells were drilled straight down into the earth.

"We rarely drilled horizontal wells, and we certainly didn't drill in shale formations," Todd told me during a recent tour of the research laboratory at Duncan's Completion Science LLC. "And we certainly didn't put 60 frac jobs in a single well bore like they are doing now."

Todd retired from one of the industry's largest oilfield service companies and founded Completion Science in 2012. Today, the company has seven employees and operates from a 6,400 square-foot building in an industrial park on Duncan's north side.

Modern oil wells are much more complicated than those of previous decades and require more scientific expertise to ensure the oil flows up to the surface, Todd said.

That's the niche that Completion Science has carved out for itself. The company name marries well completion engineering with material science.

Completion Science creates temporary, biodegradable materials that are used in many oilfield applications, from lost circulation to diverting fluids, reducing fluid loss, bridging particles, plugs and tool components.

"In the completion phase of the well, there are lots of uses of temporary materials, materials that are either balls or powders or beads that are only required temporarily to withhold flow from a certain part of the well while work goes on elsewhere," Todd said.

Todd earned his scientific credentials working both in the oilfield and in the laboratory. He has 115 patents in his name, most of them chemical patents for products used in the energy industry.

While I and my colleagues from the Oklahoma Center for the Advancement of Science and Technology (OCAST) looked on, Todd demonstrated how a biodegradable ball works deep in a well bore.

He picked up what appeared to be a small plastic ball and pressed it against a piece of metal through which holes have been bored. When used in a well, the ball seals off one of the holes in the pipe for a period of time, then degrades and disappears.

It works because it's only temporary, Todd said.

"We will mix the right set of particles and make a complete seal," he said. "So you are able to get something done in a matter of hours in a well, and by the next day the material has degraded and gone away."



Completion Science's materials are used across a wide swath of the United States, from New Mexico and west Texas up into Pennsylvania and Ohio. It works closely with oilfield service companies, which drive the demand for its products.

Even the recent industry downturn and decline in energy prices drove more business to Completion Science, he said.

"One of the cheapest opportunities to get a barrel of oil out of the ground is to re-frac some older wells," he said. "And our materials fit in real nice with that type of work."

Todd is quick to cite the Duncan Area Economic Development Foundation, along with OCAST for contributing to his company's growth.

Lyle Roggow, president of the Duncan Area Economic Development Foundation, said Completion Science originally began operations in the foundation's business incubator.

"It's been awesome to see the growth and opportunities," Roggow said. "We nurtured them and supported them, and then we were able to put them into a facility like this that allows them to have a great testing lab that helps them with their business."

Before we left the Completion Science laboratory, Lab Director Stan Heath demonstrated the power of a chemical catalyst by filling a beaker with water and a catalyst and placing a piece of metal in it.

The metal began disintegrating within a couple of minutes.

As the water bubbled on that demonstration, Todd told us another story about reading a decades-old scientific paper about experiments that chemists were then doing. Todd saw potential for today's modern oilfield, so he assembled the ingredients in a crucible and cooked the mixture in a kiln. It came out looking like a glass material but with a controlled solubility rate.

Now it's in production helping oil companies complete their wells.

"Let's just say that we quickly passed \$1 million in sales the first month we introduced that project," Todd said. "That's very satisfying."

[Read the article in the 11-17-17 Oklahoman](#)

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