Brian Pepin

TESTING TECHNICIAN

Matthew Barton/WHOI

"This is one of eight hard spheres, made out of titanium, used for ballasting *Alvin*. Water gets pumped into or out of six of them to adjust the sub's overall buoyancy. The other two store high-pressure air to ballast the sub at the surface. I was told these tanks were made in the 1970s, so they've seen lots of service. We're checking for damage, or any signs of wear and tear or fatigue.

First we clean the surface of the tanks to ensure there's no dirt or grease or oil that would get in the way of the testing. Then we put on what's called a fluorescent liquid penetrant. It has capillary action that soaks and seeps into any cracks or seams. We let that soak in for 25 minutes. Then we shine a black light, basically an ultraviolet light, on it, and that allows us see if there are any imperfections in the tanks.

In the next step, we clean off any excess penetrant and put on a developer. It's a white powder—kind of like talcum powder, but finer—which draws out the penetrant from any flaws or defects where it may be hiding back onto the surface. And that allows us to see different types of defects with the black light.

Then we do ultrasonic testing. A transducer sends and receives sound waves that go through the metal. By analyzing the waves' travel time and the distance they travel and the material they're going through, we can detect flaws and defects. We directed the ultrasound from the top of the tanks and from the bottom and all the way around to verify that there were no defects.

This sort of testing goes a lot faster with two guys, so I came down here with Doug Mendes [at rear]. The testing took roughly two hours per tank. We did four tanks a day over two days. They were all still in perfect operational shape.

I got out of the Army about five and half years ago and got into the field of non-destructive testing. I work for the MITRAS Group, a worldwide company that does inspections and testing on parts and machinery prior to service, in service, or after service. We do testing for NASA, the military, the aerospace and petrochemical industries. We've done testing on missiles, cars, guns, all sorts of machinery.

A lot of the time, when I get a service call, I often don't know what sorts of parts or machinery I'm going to be testing. I didn't really know about this job, but when I drove down here, I found out I was testing parts from something that went down and discovered *Titanic*. That's pretty cool. ▲