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A salty tomb within an underground crystal

By Dr. E. Kirsten Peters

The next time you have a saltshaker handy, you might want to remove a few grains. If you have a simple magnifying glass, you'll see the salt is really tiny cubes. Salt is a mineral and each grain is a well-formed crystal that breaks into cubic shapes.

Salt in your saltshaker looks like a simple solid, just another bit of sturdy matter that doesn't flow or deform. But salt that's under pressure is different. Salt far enough underground behaves like Silly Putty, oozing and flowing over time.

Salt has been on my mind recently because I've been reading about nuclear energy. Bear with me and I'll explain.

Nuclear plants give us a fifth of the electrical power that we use in the grid each day. Even some environmental activists think nuclear energy holds significant promise because it gives us power without the production of greenhouse gases.

But our use of nuclear plants also demands that we address the question of burying radioactive waste. The good news is that we've started to do exactly that in New Mexico and so far things are going just as planned. I've been reading recently about that topic in an interesting book about nuclear energy called *Power to Save the World* by Gwyneth Cravens.

The four square mile Waste Isolation Pilot Plant (or WIPP as it's commonly known) is in the Chihuahuan Desert. It makes use of one small part of an enormous salt bed that's 690 miles long and 260 miles wide.

The gigantic body of salt was laid down by a shallow sea in what geologists call the Permian Period about 250 million years ago. It's been a crystalline body of salt from that day to this, surviving intact despite all the changes that went on above it at the surface of the Earth in the following two geologic eras.

In many parts of the world circulating groundwater could move nuclear waste after it's buried in the Earth. Happily, the salt formation at WIPP is quite dry, with only a little water in it. Best of all, the water does not move to any appreciable extent from the salt to the surrounding rocks.

"Movement of groundwater from or through the salt formation to rocks nearby is essentially nonexistent," Dr. Don Wall of Washington State University told me. Wall is the director of the nuclear reactor at WSTU and he used to work on the WIPP project.

WIPP's storage rooms for our nuclear waste are over 2000 feet underground in the salt bed. The WIPP facility accepts what's called transuranic waste, much of which is materials like gloves that have been in contact with uranium, plutonium and other radioactive elements.

From my point of view, part of the magic of WIPP is that salt 2000 feet underground deforms like plastic, flowing about three inches per year at the repository. That's a helpful feature for the isolation of the nuclear waste because it means the salt will flow around the casks of waste, enveloping them in earth material and sealing them in place as time unfolds.

When WIPP is finally finished, it will have eight underground areas with seven rooms apiece. Each room will be 33 feet wide and 13 feet high. Waste will be placed in the rooms. Over time, the salt of the ceiling, walls and floors of the room will flow together, "healing the wound" of the empty areas within the Earth.

Alert readers may remember that more concentrated, high-level nuclear waste was slated to go to the Yucca Mountain site in Nevada. We as a nation spent billions of dollars researching and building that repository. But Yucca Mountain was ultimately nixed because people in Nevada didn't want the waste in their state.

Most folks in New Mexico feel differently about WIPP and its successful operations are converting some skeptics, one by one. There's even the argument to be made that WIPP could someday accept high level waste, not just the type it's licensed for.

Nuclear energy is part of our daily electrical power supply. No matter your feelings about that, we've got nuclear waste on our hands and we therefore need to address waste disposal. For my part, I'm glad WIPP is putting waste into a salty tomb.

Dr. E. Kirsten Peters, a native of the rural Northwest, was trained as a geologist at Princeton and Harvard. Planet Rock Doc, a collection of Peters' columns, is available at bookstores or from the publisher at wsupress.wsu.edu or 1-800-354-7360. This column is a service of the College of Agricultural, Human and Natural Resource Sciences at Washington State University.

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