Test Drilling for Possible Rad Waste Disposal, Rejected in North Dakota, Faces Opposition in South Dakota

Energy Dept. Eyes 26 States for Potential "Deep Borehole" Experiments

By John LaForge

The US Department of Energy (DOE)—always looking to dispose of radioactive waste—was recently told to leave Pierce County, North Dakota where the agency had proposed one of its current radioactive waste experiments.

The DOE wants to drill large-diameter boreholes more than three miles into the earth to evaluate rock formations for potential deep disposal of high-level radioactive waste left from nuclear weapons production.

A February 16 public hearing in Rugby, the county seat, was attended by almost 300 opponents—both residents and political officials—who demanded guarantees that radioactive materials would never be a part of the test drilling.

The Battelle Memorial Institute, Inc.—with 22,000 employees at 60 sites worldwide—was awarded a $35 million taxpayer-funded contract to oversee the experimental attempt to cut straight down 16,000 feet (three miles) into granite bedrock.

Also hired were Schlumberger, an oil and gas drilling firm from Houston, Texas, and Solexperts of Switzerland, which does highly specialized field tests on tunneling and nuclear waste repositories.

The tiny, isolated town of Rugby, North Dakota, population 2,876, is on US Highway 2, about 35 miles south of Turtle Mountain Indian Reservation and 130 miles north of Bismarck.

The journal *Science* reports that DOE scientists "need to figure out how practical and how expensive it will be to drill a [17-inch]-wide hole that deep." And the department wants to test ways "to ensure the surrounding rock at the bottom of the hole is solid enough, and that any water there can't travel up toward the surface." DOE has hired the giant company, which manages a number of DOE research labs, to lead a five-year-long, $80 million experimental "pilot" deep borehole drilling test to answer such questions.

Even after Battelle and agency officials promised the community that no nuclear waste would be involved, Pierce County Commissioners unanimously agreed to reject the project and place a moratorium on any such experimental drilling in the county. On February 18, the Pierce County Planning and Zoning Board unanimously endorsed the commission's moratorium.

For the North Dakota test, Battelle had teamed up with the University of North Dakota's Energy & Environmental Research Center, which had agreed to do the drilling.

North Dakota out, South Dakota on the hook

Almost immediately after the Pierce County, North Dakota Commission rejected the test drilling, the Energy Department and Battelle hurriedly moved their focus to a remote East-Central South Dakota site near Redfield.

Rod Osborne, with Battelle, told South Dakota Public Broadcasting (SDPB) on May 12 that the geology near Redfield, population 2,333, in Spink County, South Dakota is great for testing to see whether deep boreholes are possible and to figure out how to make them.

Robert MacKinnon, a technical manager on the project at DOE's Sandia National Laboratories in Albuquerque, New Mexico, told the *Salt Lake Tribune*, "It's to confirm the viability and concept."

The research team will analyze the deep rock body for water permeability, stability, geothermal characteristics and seismic activity.

But at meetings May 11 and 17 in Redfield, South Dakota, Spink County residents spoke against the proposal. Local television reported, "Opponents … are organized and letting commissioners know what they think." The critics have formed "Citizens for a Non-Nuclear South Dakota" and are working to make sure their county commissioners deny a drilling permit.

"What we are doing is testing the idea of drilling a very straight hole, fairly sizeable in diameter, eight and half inches, 16 thousand feet into the granite," Battelle's Osborne told SDPB. "So the combination of the depth, the very straight hole, and the diameter into granite is pretty unique. So we're going to have to develop new tools, new methods, [and] new pieces of equipment to be able to do this kind of a test. And that's really as much part of the project as actually getting the actual rock data."

If nearby earthquakes occur, the crystalline rock could slip and allow for water and radioactive materials to migrate away from the site, according to Stephen Hickman, director of the US Geological Survey's Earthquake Science Center, who spoke to the Salt Lake Tribune. Other potential problems with crystalline rock disposal are cavities, lava tubes and other voids in rock that could facilitate movement of water that could carry contaminants beyond the boreholes.

On May 23, Battelle spokesman T. R. Massey said to the Sioux Falls *Argus Leader*, "These wells will not be designed to hold nuclear waste. Period."

Instead, dummy canisters without radioactive material would be used in the project's third and final phase.

Waste fuel rods—the vast majority of high-level radioactive waste—"have been ruled out as too big to easily fit in these boreholes," *Science* reported.

Warren Cornwall writing for the magazine said, "But [Energy Secretary Ernest] Moniz has said it could be ideal for some kinds of waste, particularly 1,936 slender, half-meter-long tubes of highly radioactive cesium-137 and strontium-90. Those are currently stored in a pool of water at a federal nuclear facility in eastern Washington State."

These "capsules" of cesium and strontium had been scheduled to be directly disposed of inside Yucca Mountain, in Nevada, but that program was cancelled in 2010. A DOE Inspector General's report says that these capsules are not to be disposed of before 2048.

16 billion gallons already injected in deep wells

According to the engineers involved with the deep borehole experiment, this sort of drilling test has not previously been attempted.

The "Deep Borehole Field Test" is supposed to combine several complex drilling practices and do something completely new: Drill a wide-diameter hole three miles deep into solid granite. One vexing problem is cutting a hole straight enough to allow the lowering of waste canisters.

"It can't be off two inches here or three inches there, because the can won't be able to slide down," Massey told the *Argus Leader*.

The Energy Department's January 5, 2016 press release announcing the deep borehole disposal experiment stated in part: "Over 40 years ago, scientists suggested the idea of disposing of nuclear weapons production waste in holes drilled miles into granite. In January 2012, the Blue Ribbon Commission on America's Nuclear Future recommended research into the possibility of using deep boreholes…"

Deep well disposal of liquid radioactive waste was practiced in Idaho for more than 18 years but then halted. Some 16 billion gallons of waste water were dumped into the Snake River Aquifer at the Idaho National Engineering Lab (INEL) between 1952 and 1970. Wells were drilled directly into the Snake River Plain aquifer and the wastes were injected into the groundwater. [For perspective, 16 billion gallons would fill 127 football fields including end zones to a depth of 300 feet.] State and public pressure forced the DOE to stop the use of these injection wells in the mid-1980s.*

A 1976 study by EG&G, a prime contractor at INEL, found that radioactive wastes may follow groundwater through fractures and cracks in rock formations. Water may also collect at the bottom of disposal sites, tending to facilitate movement through discrete zones.

Sparsely populated sites targeted

Ranked 46 and 47 out of 50 states in population respectively, South and North Dakota may have been considered by the DOE to be short on public opposition. Over two dozen other states have similar granite bedrock characteristics but have so far not been named as test drilling hosts.

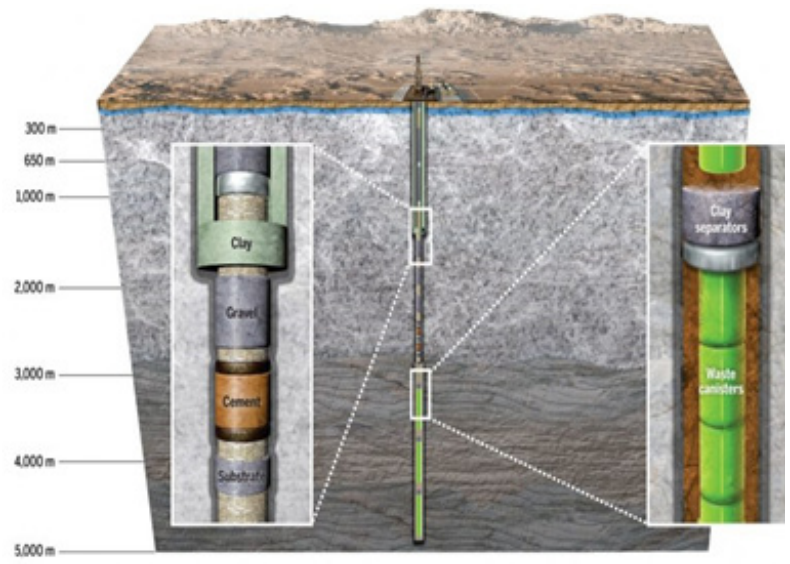
A 2008 DOE study ("Report to the President and the Congress by the Secretary of Energy on the Need for a Second Repository") identifies 25 states considered potentially suitable for deep disposal of high-level waste. Named because of granite geology, the states are: Minnesota, Wisconsin, Michigan, Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Pennsylvania, New York, New Jersey, Delaware, Maryland, Virginia, N. Carolina, S. Carolina, Georgia, Washington, Idaho, Arizona, Wyoming, Texas, Alabama, South Dakota, and Oklahoma.

Seven decades and no answer

Seventy years into the federal experiment with radioactive waste production, the only operational deep hideaway for it—the Waste Isolation Pilot Project, WIPP, in Carlsbad, New Mexico—was abruptly closed in February 2014. The shutdown happened when at least one waste barrel burst apart, spreading plutonium debris throughout the underground chambers, inundating the elevator and air shafts, and sending a plume into the open air above ground. Some 22 site workers were internally contaminated, having inhaled the contaminated dust. The WIPP site has not yet reopened.

**Deadly Defense: Military Radioactive Landfills* by the Radioactive Waste Campaign (1988), p. 51; and *Killing Our Own* by Harvey Wasserman and Norman Solomon, (1980), p. 167.

Sources: *Argus Leader*, May 23; South Dakota Public Broadcasting, May 12; KSBY-TV, May 11; *Bismarck Tribune,* May 10, Mar. 2, Feb. 2 & 18; *Dakota Free Press*, Apr. 27; AP, Apr. 21; Science Online, March 23; Exchange Monitor, Apr. 22 & Mar. 4; *Salt Lake Tribune*, and Minneapolis *StarTribune*, Feb. 14; *Pierce County Tribune*, Feb. 5; *Columbus Ohio Dispatch*, Jan. 24; DOE and Beyond Nuclear, Jan. 5, 2016



The Department of Energy is considering drilling three-mile-deep boreholes to test the viability of granite bedrock as a potential disposal method for high-level radioactive waste.

Who's Behind Pro-Nuclear Legislation?

(Continued from Front Cover)

made during the heat of the debate on the recently passed legislation during January, February, and March (those numbers will be reported after June 30).

Is $175,000 really all it takes to buy a state law? Probably not. Besides being more politically effective, NEI's new coalition-building strategy also makes its policy investments difficult to track. For example, in 2013 the Center for Public Integrity exposed a $10,000 donation that NEI made to the American Legislative Exchange Council (ALEC), the radical right-wing group with which many Wisconsin Republican legislators are publicly affiliated. NEI's spokesperson said at the time that the donation (ALEC is a registered "charity") was meant to "increase awareness of energy and environmental considerations among state and local" officials.

According to NEI's Jon Breed, the repeal in Wisconsin will help inform the group's efforts to change legislation in other states. The National Conference of State Legislatures lists 15 states as having some kind of restriction on new nuclear power construction; they are California, Connecticut, Hawaii, Illinois, Kentucky, Maine, Massachusetts, Minnesota, Montana, New Jersey, New York, Oregon, Rhode Island, Vermont, and West Virginia.

NEI also pushes the industry's agenda at the federal level. In 2015, the 501(c)(6) nonprofit organization (meaning it pays no federal taxes, but member dues are not tax deductible) reported $2.345 million in federal lobbying expenditures, mostly focused on influencing members of the House and Senate as well as the Department of Energy and the Nuclear Regulatory Commission, according to the Center for Responsive Politics. NEI's 2015 financial report breaks down its $53.2 million annual budget by program goals; two of these, "Regulation" and "Policy and Building Public and Political Support," account for well over half its expenditures—after operating expenses.

Ordinary citizens and electricity ratepayers, like those represented by the Citizens Utility Board of Wisconsin, which opposed the repeal of what it called "Wisconsin's Nuclear Ratepayer Protection Law," are largely opposed to new reactor construction. But NEI's membership—those paying the dues that make up its $53 million budget—includes a large number of publicly funded institutions and ratepayer-owned cooperative utilities. The head of the University of Tennessee's Nuclear Engineering Department sits on NEI's board of directors next to representatives of corporate nuclear giants like Westinghouse, Exelon, and Holtec, along with trade union leaders. Dairyland Power, a wholesale energy distribution and transmission cooperative serving rural Wisconsin, is an NEI member—so are the University of Wisconsin, Madison Area Technical College, the Harvard School of Public Health, and more than 100 other publicly and privately funded community colleges, technical schools, and universities. International membership includes the Tokyo Electric Power Company (owners of the destroyed Fukushima reactors that continue to spew radiation into the air and the Pacific Ocean).

As member/owners and ratepayers of one of the rural co-ops in Dairyland Power's web, Nukewatch and most rural residents in our region are roped into the NEI sphere. (Though we're hooked to the grid, the bulk of our office and community electricity comes from our own 10,000-watt photovoltaic panel array.)

Grassroots efforts to counter NEI's powerful public policy agenda need to be highly organized, if not well-funded. Perhaps one strategy would be to push public institutions and member-owned cooperatives to withdraw their support from the organization that keeps taxpayer-funded life support flowing to a dying, destructive industry.

—PR Watch, Mar. 26, 2009; Center for Public Integrity, Nov. 12, 2013; Nukewatch *Quarterly*, Fall 2014; EnergyBiz News Service, Nov. 8, 2015; US Energy Information FAQ, Updated Feb. 4, 2016; NEI Nuclear Notes blog, Apr. 16, 2016.