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# Nuclear Revival Rekindles Waste Concerns

**The Associated Press**

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Thousands of canisters of highly radioactive waste from the world's most nuclear-energized nation lie, silent and deadly, beneath this jutting tip of Normandy. Above ground, cows graze and Atlantic waves crash into heather-covered hills.

The spent fuel, vitrified into blocks of black glass that will remain dangerous for thousands of years, is in "interim storage." Like nearly all the world's nuclear waste, it is still waiting for the long-term disposal solution that has eluded scientists and governments in the six decades since the atomic era began.

Industry officials hope renewed worldwide interest in nuclear energy will break a long, awkward silence surrounding nuclear waste. They want to revive momentum for scientific and political breakthroughs on waste that stalled after the accidents at Three Mile Island in 1979 and Chernobyl in 1986, which raised worldwide fears about radioactivity's risks to human and planetary health.

So far, though, recent talk of a nuclear renaissance has focused on the "front end," or reactor construction. Engineers are designing the next generation of reactors to be safer than today's \_ and they're being billed as a solution to global warming. Nuclear reactors do not emit carbon dioxide, blamed for heating the planet.

Few people have been talking about the "back end," industry-speak for the hundreds of thousands of tons of waste that nuclear plants produce each year, and the lucrative, secretive business of storing it away.

Waste "is the main problem with this so-called nuclear rebirth," said Mycle Schneider, an independent expert who co-authored a recent study for the European Parliament casting doubt on a global nuclear resurgence. He says government efforts to revive nuclear energy will stall without a "miracle" solution to waste disposal.

Workers at this waste treatment and storage site on France's Cherbourg peninsula, run by industry giant Areva, don't see a problem.

Though much of the technology here dates from the 1970s and 1980s, they point to a strong safety record and the 26,000 environmental tests conducted every year as evidence that the public has nothing to fear from their activity.

The tests routinely find crabs, cows and humans living nearby to be healthy. One longtime plant employee gestured toward her pregnant abdomen, holding her third child, as proof that there's nothing to worry about. Plant officials say strict security measures, tightened since the Sept. 11, 2001, attacks, rule

out terrorism risks.

Greenpeace questions state-run Areva's safety figures, and accuses the government of playing down accidents and soil and water contamination. A group called Meres en Colere, or Angry Mothers, was formed in the region after a 1997 study showed higher than usual local rates of child leukemia, a malady linked to radiation exposure.

Now the "pros" are on a new mission to dispel a generation of scares and suspicion, saying nuclear power is less dangerous to humans and the Earth than burning oil or coal. The "antis" say nuclear energy can never offer 100 percent protection from its radioactive ingredients.

The splitting of uranium atoms in a nuclear reactor creates the exceptional heat that drives turbines to provide electricity. The process also creates radioactive isotopes such as cesium-137 and strontium-90 that take about 30 years to lose half their radioactivity. Higher-level leftovers includes plutonium-239, with a half-life of 24,000 years.

Direct exposure to such highly radioactive material, even for a short period, can be fatal. Indirect exposure, through seepage into groundwater, can lead to life-threatening illness for those living nearby and environmental damage.

For now, the best scientific solution for getting rid of the most lethal waste is to shove it deep underground.

Yet no country has built a deep geological repository. Governments meet protests each time one is proposed. The Yucca Mountain waste site in Nevada was commissioned in 1982 and is still awaiting a license.

Another option is recycling. Countries such as France, Russia and Japan reprocess much nuclear waste into new fuel. That dramatically reduces the volume: Forty years' worth of France's highly radioactive waste is stored under just three floor surfaces, each about the size of a basketball court, at Beaumont-Hague.

Recycling, though, produces plutonium that could be used in nuclear weapons \_ so the United States bans it, fearing proliferation.

And not all waste can be reprocessed. The deadliest bits \_ such as fuel rod casings and other reactor parts as well as concentrated fuel residue containing plutonium and highly enriched uranium \_ must be sealed and stored away.

That's what lurks 10 feet underground at this Normandy plant: More than 7,000 cylindrical steel canisters, each about the height of a parking meter, stacked and sealed upright in holes beneath the slick floor. Some contain compacted radioactive metal, the others hold spent fuel that has been vitrified into glass.

Among other ideas once floated for disposing of nuclear waste have been shooting it into space (deemed too risky because of the volatile rocket fuel) or injecting it in the ocean floor (stalled because testing its feasibility is too costly), or shipping all the world's waste to a collective nuclear dump.

The last idea proved too diplomatically delicate. But Greenpeace and Norwegian environmental group Bellona say European nations have for years been illegally shipping radioactive waste to Russia and leaving it there.

Current research in industry leader France \_ which relies on nuclear energy for more than 70 percent of its electricity, more than any other country \_ is focusing on new chemical processes that would shrink nuclear waste and cool it faster.

It will be at least 2040, though, before these might be put to use, scientists estimate. Schneider says scientists are "creating work for themselves" by researching methods that may never be commercially feasible or do much to solve the long-term waste quandary.

The World Nuclear Association, an industry group, disagrees, citing increasing interest in waste research by governments. The managers at the Normandy plant say long-held taboos about the industry are fading.

"We have the best scientific solution for treating waste," deputy director Eric Blanc said, referring to the plant's vitrification process and network of cooling pools. "Others are coming all the time to study it."

Visitors to the plant must wear special uniforms and trek through a maze of security and radioactivity checkpoints.

The plant used to have Webcams and "open house" days for people from nearby communities, but both practices were stopped after Sept. 11. Now the Defense Ministry regularly monitors the plant, and vets all visitors.

Meanwhile, new reactor clients are lining up.

China signed a staggering \$11.7 billion deal last month for two nuclear reactors from Areva. Areva later said the deal included a feasibility study for a waste treatment and recycling facility in China that would cost another \$22 billion.

Areva already makes \$2.2 billion in revenues a year on treating and recycling waste. The plant at Beaumont-Hague takes in 22,000 tons of spent nuclear fuel a year, from France, Japan, Germany, Switzerland, Belgium, the Netherlands, Italy and Australia. The foreign fuel by law must be returned to its owners once it has been reprocessed into a more stable form that \_ through lack of alternatives \_ is buried or held in storage.

The French fuel stays in Normandy indefinitely, while bulkier, lower-level nuclear waste is piling up in dumps worldwide.

Nuclear scientists' dream is a wasteless reactor, and some sketches for the next crop of reactors, the Generation IV, include those that recycle 100 percent of their refuse.

Both nuclear fans and foes agree, however, that it will take a few more human generations for that dream to come true.

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