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N-plant plans revive spent-fuel concern

Progress Energy and Duke Power will soon name the locations of new reactors in the Carolinas

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Any day now, Progress Energy expects to announce a site for two new nuclear reactors in the Carolinas.

In coming weeks, Charlotte-based Duke Power will announce a site for two reactors.

And this spring, Progress Energy, based in Raleigh, will pick a site for two reactors in Florida.

The two North Carolina companies are among a dozen utilities leading the push to seek licenses for the nation's first reactors since a partial nuclear meltdown at Three Mile Island paralyzed the industry a quarter-century ago.

A diverse group of supporters is promoting nuclear power as the best answer to global warming and to carbon-belching coal plants. Progress Energy's chief executive said in April that the company's Shearon Harris nuclear plant outside Raleigh would be a logical choice for expansion.

But five decades into the era of nuclear energy, with 103 nuclear reactors powering one-fifth of the nation's homes, there is still no accepted method for ridding the world of nuclear waste that remains lethal for thousands of years.

The waste is so dangerous that after 50 years in storage it emits gamma rays potent enough to deliver a fatal dose within a half-hour, from a distance of 3 feet.

Neutralizing the waste requires thinking about time on an entirely different scale -- not years or centuries, but millennia. The spent fuel from a nuclear reactor must be safeguarded for at least 10,000 years -- longer than the recorded history of human civilization.

And that's the most optimistic scenario. Under a federal court order, the U.S. government is drawing up a plan to sequester the toxic material in a desert crypt in Nevada for 1 million years. That's four times as long as homo sapi- ens has roamed planet Earth.

With nowhere to go, the waste is now accumulating at scores of nuclear plants around the country. The prospect of new reactors churning out even more radioactive waste is presenting the industry with a growing financial, legal and public-relations liability.

"It's a public confidence issue," said Brian Gutherman, president of CST Associates, a New Jersey nuclear consulting group that advises Progress Energy and other utilities. "The public wants assurance that we can handle this fuel from birth to death, that it's not going to sit at [more than] 70 reactors around the country. If it's not resolved -- that's not an option. It's got to be resolved."

The subject is especially sensitive in North Carolina in an age of international terrorism. Six times a



A tower rises at the Shearon Harris nuclear plant, 25 miles from Raleigh.

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year, under armed escort, Progress Energy transfers radioactive waste by rail about 200 miles from the company's Brunswick nuclear plant, which is running out of storage room, to the Shearon Harris plant in southwestern Wake County. The train's schedule and route are kept secret to thwart sabotage. So is the amount of deadly material moved to the Shearon Harris complex, just 25 miles from Raleigh.

"We don't have a solution for the waste that already exists," said Kevin Kamps, a nuclear waste specialist with the Nuclear Information and Resource Service, an anti-nuclear organization in Washington. "With 20-year license extensions [for existing plants] and talk of building new reactors, we're talking about doubling, tripling or quadrupling the problem."

Originally, the federal government proposed that nuclear waste be buried, presumably forever, in two vaults: one in the West and one in the East. Yucca Mountain in Nevada was picked as the western site. Proposals for the eastern site included two North Carolina locations, but the eastern one was dropped.

Environmentalists in North Carolina fear that with Duke Power and Progress Energy pushing to build new reactors, the two sites originally proposed in North Carolina -- one in Wake County, the other near Asheville -- could be reconsidered.

A crucial debate

The benevolent promise of nuclear energy rested on the simple pledge that modern science would devise a safe way to eliminate highly radioactive waste.

But with a solution delayed indefinitely by political and scientific disputes, the nuclear industry has been forced to adopt a fallback public-relations strategy: that radioactive waste can be stored safely for many decades at 73 sites around the country, including Shearon Harris. Winning public acceptance for this claim is crucial for companies such as Progress and Duke to move ahead with plans to build new reactors.

"We're going to be fine on this," said John Kane, senior vice president at the Nuclear Energy Institute, an industry trade group in Washington. "Spent fuel is safe for decades where it's stored at plants today."

The option of stockpiling more waste on site is not universally embraced within the nuclear industry. The nation's largest nuclear utility, Chicago-based Exelon, has declared a self-imposed moratorium on building reactors until a permanent solution is found to isolate the radioactive material.

"The sites themselves are purposefully not licensed for long-term storage of nuclear waste," said Adam Levin, Exelon's director of spent fuel and decommissioning strategy. "The public interest is satisfied only with a long-term solution for spent nuclear fuel."

Concern about terrorism has given nuclear critics new cause for worry. The opponents say that the accumulation of more than 50,000 tons of nuclear waste at nuclear plants has created 73 terrorist targets.

"We have viewed nuclear power plants as World Trade Centers with a thousand Hiroshimas of radiation stored inside," said Dave Kraft, director of the Nuclear Energy Information Service, an anti-nuclear group in Evanston, Ill.

Exceptional safety?

Intense public emotions aroused by nuclear power have vexed an industry that half a century ago promised to harness a source of energy "too cheap to meter" and dismissed the likelihood of a catastrophic accident as once in a million years. Instead, this country has experienced one partial nuclear meltdown and, since that 1979 accident, the Nuclear Regulatory Commission has ordered 107 safety-related plant shutdowns.

Still, industry officials say nuclear power has an exceptional safety record and is the wisest choice for keeping up with the growing energy demand without polluting the environment.

Both Progress Energy and Duke Power have said they will need new power plants in a decade, but they won't decide for several years whether the fuel source will be uranium or coal. They're starting the long process of licensing a nuclear plant now because it takes two years to prepare the application. To promote nuclear power, President Bush signed an energy bill last year that includes up to \$2 billion in incentives for the first utilities that build nuclear reactors.

Steven Edwards, Progress Energy's supervisor for spent fuel management, said building more reactors could finally force the issue of waste disposal: "The new construction effort can be a factor

for making progress on [a permanent solution]."

Nuclear plants were not built for long-term waste storage. They have reinforced water tanks to cool the spent fuel rods down to about 500 degrees over five years; at that point the material can be safely shipped to some permanent destination.

The water tanks are showing signs of age. Plants in New York and Connecticut, for example, have developed minor seepage -- though it poses no public health risk, according to the Nuclear Regulatory Commission. The superheated fuel rods must be submerged in water; if exposed, they would catch fire, cause a meltdown and emit a radioactive plume that could expose tens of thousands of people.

The nation's cooling pools are filling to capacity. The Shearon Harris complex stores not just waste from its own reactor but also the overflow from two other nuclear plants. Nearly half the nation's 64 commercial nuclear sites have been forced to move the radioactive waste out of the temporary water tanks and into outdoor concrete silos for extended storage. And at least 15 utilities will need to start using outdoor storage in the next several years, according to the NRC.

At a height of 20 feet, the outdoor storage silos present a much more difficult terrorist target than the World Trade Center towers, industry officials say. The 200-ton structures are typically designed to withstand the impact of an airplane, the violence of an earthquake and the force of a tornado, according to the nuclear industry and federal regulators.

Once encased in stainless steel and shielded by reinforced concrete, the intense radioactivity is safely contained and the silo can be approached without a hazmat suit.

But the silos are not indestructible, critics warn, and are vulnerable to direct hit by artillery. They are licensed for 20 years at a time but designed to last at least a century.

"They are incredibly resistant, but everything has a breaking point," said Kraft at the Illinois anti-nuclear group.

The NRC maintains that if one of the stainless steel canisters were damaged, the radioactivity would be decayed enough that the area contaminated would be limited.

"At 100 yards, you don't worry about it," said Wayne Hodges, a deputy director in the NRC's Spent Fuels Project Office. "The public at large would not be threatened."

Moving the outdoor canisters -- as Progress Energy is forced to do -- presents its own challenges. In 2002, two prison escapees hopped aboard one of Progress Energy's rail transports, apparently hoping to ride the rails to freedom, hobo-style. The fugitives were caught, but industry critics seized on the incident as an example of the company's vulnerability to potential attack.

Still, for the foreseeable future, the country's nuclear waste will be stored in outdoor silos and bunkers.

"It's a very long-term temporary solution," said Steve Nesbit, Duke Power's spent fuel manager.

(Staff researchers Lamara Williams-Hackett, Becky Ogburn, Denise Jones, Brooke Cain and Susan Ebbs contributed to this report.)

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