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ENVIRONMENT

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When the Vermont Yankee nuclear plant finally closes, will there be enough money to clean up its radioactive legacy?

BY **KEN PICARD** [12.12.07] - 554 READS

TAGS: **energy, environment, Vermont Yankee**

In the world of industrial-scale electricity generation, some structures are so large and powerful that the sight of them takes your breath away. Their massive, spinning turbines can generate millions of kilowatt-hours of cheap and reliable energy for years at a time, while contributing virtually nothing to global warming.

Yet, even these enormous and seemingly permanent structures eventually reach the end of their operational lives. Because their mere presence on the landscape, even dormant, is deemed hazardous to public safety and the environment, the State of Vermont has required their owners to set aside sufficient funds to ensure, *before they are even built*, that one day they can be fully dismantled and carted away.

Those facilities are Vermont's wind farms.

Apparently, the same standard hasn't been applied to nuclear energy. Of late, troubling new questions have arisen about whether there will be enough money to dismantle the **Vermont Yankee** nuclear power station in Vernon when it reaches the end of its useful life. Many of those questions have been raised by Margaret and Arnold Gundersen, two longtime nuclear-industry experts living in Burlington.

In interviews and a recently released white paper, the Gundersens contend that Vermont Yankee's current owner, **Entergy Nuclear Vermont Yankee** (ENVY), has not met its legal obligation of setting aside money to decommission the plant when the time comes to shut it down, clean it up, dispose of its radioactive material, and return the site to its natural state.

The **white paper**, prepared *pro bono* and released several weeks ago by Maggie Gundersen's firm, Fairewinds Associates, Inc., based its calculations on numbers ENVY provided to the state. Those calculations predict that if



Maggie and Arnie Gundersen

Matthew Thorsen

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proposed to the state. Those calculations predict that Vermont Yankee shuts down when its current license expires, in March 2012, the decommissioning fund will prove inadequate to cover the entire cost of clean-up and removal. In fact, the Gundersens point out that ENVY has not contributed “one penny” to Vermont Yankee’s future decommissioning expenses since it bought the plant in 2002, despite taking millions of dollars in profits out of the state each year.

As a result, the white paper asserts, Vermont and its rate-payers could be facing “two equally bleak alternatives”: One, ENVY could declare bankruptcy and leave the future cost of decommissioning the plant to Vermonters. Two, environmental remediation of the site could be delayed for years — possibly decades — leaving highly toxic material in the Connecticut River flood plain until enough money accrues in the fund to pay for its disposal.

And that’s not all Fairewinds Associates is arguing. Just this week, the firm released a second white paper suggesting that state regulators have created a “double standard” for the licensing of wind-energy projects. Unlike Vermont Yankee, both the **Sheffield** and **East Haven** wind farms were required by the **Vermont Public Service Board** (PSB) to be bonded and to maintain **fully funded decommissioning accounts** before they could be licensed and constructed. (East Haven never was, since the PSB later rejected the proposal.) This despite the fact that dismantling a wind turbine is considerably cheaper and safer than decommissioning a spent nuclear reactor. As Arnie Gundersen puts it, “We’re worried about the environmental ‘contamination’ from a freaking windmill — but *not* Vermont Yankee?”

Entergy Nuclear has consistently claimed the decommissioning fund will hold enough money when the time comes to shut Vermont Yankee down. As recently as August, an ENVY representative told the **Vermont State Nuclear Advisory Panel** — known

by its catchy acronym, “VSNAP” — that the money will be there whether the plant closes in 2012 or 2032 (assuming Vermont Yankee gets re-licensed).

Lately, ENVY has made some changes in its tune. In an interview last week with *Seven Days*, Dave McElwee, ENVY’s state liaison engineer, dismissed the findings in the Gundersens’ white paper, even after admitting he hadn’t read it yet.

“A lot of different people have come up with a lot of different assumptions and numbers, and they like to have their own ideas about how things should be done,” McElwee told *Seven Days*. ENVY, he said, gets its decommissioning cost estimates from TLG, “probably the premier decommissioning company in the world. Their numbers are about as good as you’re going to get.” TLG is owned by ENVY’s parent company, New Orleans-based Entergy Corporation.

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As McElwee explained, TLG expects that the market growth in the decommissioning fund will generate enough money to close Vermont Yankee *eventually*, even if it's not re-licensed in 2012. However, McElwee noted that, given the current rate of return on the fund, decommissioning probably won't start for 15 to 20 years *after* the plant stops generating power. In fact, he added, ENVY has always assumed the plant would sit idle for some time before it could be cleaned up and removed, giving the fund ample opportunity to mature and the radioactive material time to decay and become safer to handle.

That assumption came as news not only to the Gundersens, but to several state law makers, including VSNAP member Senator Mark MacDonald (D-Orange) and Senate President *Pro Tem* Peter Shumlin (D-Windham), who has asked State Auditor Tom Salmon to investigate the matter. Their concerns may be well founded.

According to the Gundersens' calculations, which were verified by an independent energy analyst at the University of Vermont's Gund Institute, the fund is *not* growing at a rate that will eventually catch up to the projected cost of decommissioning. Quite the contrary, it appears to be *losing* ground. If those calculations are correct, the Gundersens suggest, Vermont Yankee could become the bookkeeping equivalent of a nuclear meltdown, sinking future generations of Vermonters deeper and deeper into a financial abyss.

Arnie Gundersen, a longtime math and physics teacher at Burlington High School, is no dyed-in-the-wool anti-nukes activist. For 20 years, he was a licensed nuclear-reactor operator and worked in the atomic energy industry, assessing the safety and reliability of reactors. Gundersen eventually became senior vice president at Nuclear Energy Services (NES), one of the nation's premier nuclear maintenance firms, whose clients included Vermont Yankee. Gundersen also knows something about decommissioning reactors; he helped prepare the decommissioning report on the **Shippingport Atomic Power Station** in Pennsylvania, the first large-scale nuclear power plant in the world to undergo the process. That plant closed in 1982.

Maggie Gundersen is a paralegal and former teacher and journalist. She met her future husband in 1978 while working in public relations for New York State Electric and Gas, which at the time was trying to site a nuclear power plant on the shores of Lake Ontario. A year later, Americans' confidence in nuclear energy was rattled to the core by a **partial meltdown at Pennsylvania's Three Mile Island**. Arnie later testified about the causes of that accident. He was one of only three expert witnesses for the plaintiffs whose testimony the court did not dismiss.

Gundersen's professional career, finances and family life were thrown into turmoil in April 1990, when he discovered some low-level radioactive material was being stored in an accounting safe at NES headquarters in Danbury, Connecticut. After becoming a federal whistleblower, Gundersen was fired from his \$120,000-a-year job, blacklisted by the industry and harassed and ostracized by former co-workers.

But Gundersen refused to keep quiet about ongoing safety problems in the nuclear industry. In retaliation, his former employer slapped him with a \$1.5 million defamation suit. The case was settled out of court six years later, but not before the Gundersens had filed for bankruptcy, foreclosed on their house, and endured other personal and professional hardships.

These days, the two are harsh critics of the way Vermont Yankee is managed and operated, both on financial and safety grounds. Interestingly, their views diverge somewhat on the future of nuclear power. Maggie sees no place for it whatsoever, whereas Arnie says he'd support a new generation of nuclear plants *if* there were a safe place to store the waste, and

if conservation and renewable energy proved unable to meet all the country's future energy needs. Nonetheless, the two agree that Vermont Yankee should close when its current license expires in 2012.

Construction of Vermont Yankee began in 1968 and was completed in 1972; Gundersen likes to point out that the plant was designed and built "when Lawrence Welk was still on TV," in an era when virtually all engineering calculations were done by hand. As one of the oldest nuclear plants in the country, Vermont Yankee, which generates a third of Vermont's electricity, is also the oldest U.S. plant to have boosted its output by 20 percent — known in industry lingo as a power "uprate."

Gundersen has said repeatedly, both in the Vermont press and in testimony before the PSB, that Vermont Yankee's power uprate has increased the likelihood of maintenance problems and accidents. That assertion, he claims, has been borne out by all the problems the plant experienced this year, including the August collapse of a cooling tower, which Gundersen predicted several years ago.

Four other New England nuke plants of the same vintage — Yankee Rowe in western Massachusetts, Connecticut Yankee, Maine Yankee and Millstone I, also in Connecticut — have already been closed due to age-related problems. Just last week, New York State officials asked federal regulators at the Nuclear Regulatory Commission (NRC) to deny license extensions for two reactors at Indian Point — just 24 miles north of New York City — that were built at around the same time. Their licenses expire in 2013 and 2015.

When and how Vermont Yankee will eventually be decommissioned is already a contentious issue. In January 2006, Entergy submitted an application to the NRC to extend its license for another 20 years; a similar application must be filed with the PSB by March 21, 2008. Despite recent questions about whether the decommissioning fund will be up to snuff, McElwee insisted that ENVY intends to meet all its financial obligations to Vermont, regardless of whether they come due in 2012 or 2032.

"Some of this has gotten a little misrepresented in the press," McElwee explained. "As you know, the DOE [Department of Energy] has a contract with the utilities to take the spent [nuclear] fuel, and they've failed miserably on meeting that contract." McElwee was referring to the federal government's plan to build a **national nuclear waste storage repository** beneath Nevada's Yucca Mountain, a controversial and trouble-plagued project that's been stuck in limbo for more than 20 years. Earlier this year, McElwee said, the **Vermont Department of Public Service** asked ENVY to "consider a different type of scenario than normal decommissioning" — namely, storing all of its spent nuclear fuel on-site, which would further increase the cost of the process.

The option of leaving Vermont Yankee fully intact after it ceases operations has always been on the table, McElwee asserted. This practice, known in the industry as SAFESTOR, basically involves shutting down the reactor, securing the site and leaving the plant dormant for up to 60 years, until the radioactive material decays to the point where it's safer and cheaper to handle. In the meantime, money continues accruing in the decommissioning fund, presumably until there's enough to cover the cost of rehabilitating the site.

Was SAFESTOR always a possibility for Vermont Yankee? The answer depends on whom you ask. Steve Wark, communications director for the Vermont Department of Public Service, seconded McElwee. "The fund was *never* intended to be ready to close the plant in 2012," Wark said last week. "The fund was designed to take care of [decommissioning], but it's not specific on *when* it's supposed to take care of it."

But Senate President *Pro Tem* Peter Shumlin, who represents Windham County, where

Vermont Yankee resides, called Wark's remark "laughable." And he bristled at the notion that Vermonters always expected the plant's nuclear legacy to languish untouched for decades.

"There was absolutely no talk about extending the license when the sale took place to Entergy [in 2002]," Shumlin said last week. "And there was absolutely never any indication that the carcass of the plant would have to sit there for lack of adequate funds if the license was going to be taken away in 2012."

Likewise, Senator MacDonald, who served on VSNAP from 1996 to 2000, and from 2002 to the present, said the idea of mothballing the plant was a shock to him when McElwee first mentioned it at VSNAP's most recent meeting three weeks ago. "I said, 'Whoa! Where'd *this* come from?'" MacDonald recalled. "I've been on Natural Resources [Committee] for years, and we hadn't heard this before."

It appears, though, that the PSB considered the idea when it issued its order approving the sale of Vermont Yankee to ENVY back in June 2002. That order reads: "Both the Department [of Public Service] and ENVY operate from the assumption that if either the decommissioning costs are inadequate, or if the fund has not grown sufficiently to pay all decommissioning costs, the owners would be able to place Vermont Yankee in SAFESTOR while the fund grows to make up the difference."

Although the board described SAFESTOR as "a form of protection" for Vermont's rate-payers in the event of an under-funded decommissioning account, it also stated that "SAFESTOR should not be seen as a panacea for funding decommissioning." To date, ENVY has not contributed any money to that fund, though McElwee has claimed it's not required to under NRC regulations.

In fact, for the 30 years before ENVY purchased Vermont Yankee in 2002, Vermont rate-payers paid into that fund, and it was managed under the assumption that it would hold sufficient funds by the time the plant's license expired in 2012. At least, that was the understanding of Rich Sedano, former commissioner of the Department of Public Service, who left state government in January 2001.

In a recent email to *Seven Days*, Sedano suggested that it was "generally expected that SAFESTOR would be the decommissioning plan" for Vermont Yankee, because allowing time for the nuclear material to decay also lowers the decommissioning cost. That said, Sedano pointed out, "We wanted the funds all accumulated by the end of service [in 2012] . . . so that there would be no intergenerational disconnect between the beneficiaries of the power and the payers into the fund." In other words, the state didn't want the cost of cleaning up high-level nuclear waste to be borne by future generations of Vermonters.

For their part, the Gundersens have expressed serious concerns about SAFESTOR, both as a financial and a public-safety practice. Arnie Gundersen explained that in 2002, before the uprate, \$304 million had accrued in the fund. At that time, the cost of decommissioning Vermont Yankee was estimated at \$620 million. The difference: \$316 million. In 2007 — after the uprate — the cost of decommissioning was estimated at \$800 million, with \$416 million in the fund. The difference: \$384 million.

The Gund Institute's Bob Herendeen, who wasn't paid for his work, reviewed the Gundersens' calculations. His assessment: They used "very conservative" estimates for future rates of inflation and clean-up costs, and "generous" estimates for the decommissioning fund's annual growth. Even using those assumptions, the fund appears to be slipping further and further into the red.

What drove the decommissioning cost estimate up by 30 percent in five years? According to Gundersen, inflation between 2002 and 2006 only accounts for 10 percent of the difference. Did the additional expense derive from new assumptions on the part of ENVY, its decommissioning firm, TLG, and/or the state? Was it the result of the 20 percent power uprate, which creates 20 percent more spent radioactive fuel? Gundersen couldn't say, and ENVY wouldn't comment on Gundersen's calculations.

Arnie Gundersen believes a shortfall in the fund could eventually be used by ENVY as a bargaining chip to get Vermont Yankee re-licensed. "I think they're going to use it to put a gun to our head and say, 'If you shut us down in 2012, we're not going to decommission the plant,'" he said. "But if you let us run until 2032, we might."

Although he didn't word it that way, ENVY's McElwee said something similar just last week: "I should point out that, if we were to get license renewal, that additional 20 years of growth in the fund, coincidentally, would allow us to immediately decommission the plant at that time, and we wouldn't have to go to SAFESTOR."

Meanwhile, the SAFESTOR prospect raises other nagging questions. As Gundersen explained, no major single-reactor nuke plant in the United States has *ever* been put into SAFESTOR — with good reason. Nuclear reactors must be monitored very closely, even when they're no longer operational.

Consider the case of the **Dresden 1 Nuclear Power Plant** in Morris, Illinois, which was put into SAFESTOR in 1994. That reactor was essentially "left like an abandoned factory," Gundersen recalled. One winter, the heat in the building was turned off, and **some pipes froze and burst**, releasing 55,000 gallons of radioactive water into the basement.

"That's *really* bad," Gundersen said. If a night watchman hadn't discovered the leak several days later, another pipe would have frozen as well. Had it burst, he went on, it would have drained the reactor's entire fuel pool, releasing very high levels of radiation and causing "an incredibly severe accident." This at a nuclear plant where two neighboring reactors — Dresden 2 and 3 — were still up and running.

The fact is, Gundersen noted, decommissioning nuclear plants *never* goes according to plan. History has shown that actual costs always exceed the early estimates, for the simple reason that many problems don't come to light until the process begins.

A noteworthy example is Vermont Yankee's sister plant just down the river. Connecticut Yankee began major decommissioning work in 1998. At the time, it was assumed the decommissioning fund would have more than enough money to cover all the expenses — that is, until workers found that a leaking storage tank had **contaminated the groundwater with strontium-90**, a "really nasty isotope" that added \$400 million to the final price tag.

The Gundersens fear that if a similar problem is discovered at Vermont Yankee, ENVY, a limited liability corporation, may declare bankruptcy and just walk away. "Like in any bankruptcy, if you walk away, the town that's got the turd is the one that's got to clean it up," Gundersen said. "In this case, it's the state."

ENVY has insisted that it will never declare bankruptcy in Vermont because of the "financial assurances" provided by its parent company, Entergy. Nevertheless, some Vermont lawmakers suggest the idea isn't so farfetched. As MacDonald pointed out, Entergy did just that in 2005.

According to **published press reports**, three weeks after Hurricane Katrina devastated New Orleans' electrical grid, Entergy New Orleans declared bankruptcy and threatened to desert the city unless it received a federal bailout and assurances of much higher utility

rates. Entergy New Orleans exited bankruptcy in May 2007, but not before the State of Louisiana had announced that the company would be receiving a \$200 million federal bailout. This in a year when its parent company posted record profits and record-high stock prices.

MacDonald, Shumlin and others express additional concern about some of Entergy’s recent maneuvers, which appear intended to buffer itself against future liabilities. In November, **Reuters reported** that Entergy plans to spin off five of its nuclear plants, including Vermont Yankee, into a new company, currently referred to as SpinCo. **According to the Wall Street Journal**, SpinCo would be “the nation’s first stand-alone, publicly traded nuclear energy company.”

MacDonald believes even the name should raise red flags for Vermonters. “Entergy has always been willing to take the risk, because their stake in it is much less than the rate-payers’,” he said. “If they’re successful, they make a whole lot of money. If they’re unsuccessful, the rate-payers get screwed. They get to make this bet with rate-payers’ money.”

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