

Decision time for Vt. Yankee by Alan Betts *Rutland Herald, published Jan 24, 2010*

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This is the year of decision for Vermont Yankee, as it approaches the end of its design life of 40 years. The owners are in a final battle for survival as they want to maximize their profits on their investment — while their aging reactor is leaking radioactive tritium into the ground on the banks of the Connecticut River. The corporate ads placed discretely on the environment page wistfully talk about safety and jobs and cheap power in green lettering.

We have long known that this day of reckoning was coming. The 1998 Vermont Comprehensive Energy Plan recognized the impending closure of Vermont Yankee and recommended that replacement alternatives, including renewable power, be developed before 2012. Did the state follow through on these recommendations in times of prosperity? No, our government philosophy only makes a pretense of long-term strategic planning — documents are fine — but real investment costs money.

It was cheaper to blow up the Champlain Bridge (after we had neglected maintenance for years) rather than rebuild it. But we can't blow up Vermont Yankee now that it has reached the end of its design life. We have to face up to the huge long-term costs and risks we have incurred.

OK, if we close Yankee (hopefully before it suffers worse radiation leaks from old age), we will lose jobs. But we will be stuck with many jobs, for centuries, taking care of the remains. Dismantling the plant may provide \$500 million to \$1 billion worth of jobs — somewhere. But I guess we are rightly fearful that Entergy, which has underfunded its decommissioning fund, and wants to mothball the plant for 60 years, will find a way to avoid its fiscal responsibility.

Entergy is only one of the players. The federal government, to facilitate the building of nuclear power plants, promised 40 years ago to build a long-term storage facility for the high-level nuclear waste containing plutonium. It hasn't done so, because no one wants it. So at Vermont Yankee, the used reactor rods were stored in a swimming pool-like structure until this became full. Now, so-called dry cask storage (in massive shielded containers) is being constructed right on the banks of the Connecticut River, just a foot or two above the maximum probable flood. Well, the maximum flood estimated from the last two centuries of the river's history — we expect flows on the Connecticut River to increase this century as the climate warms. They had to put these radioactive casks near the flood-plain, so that the children in the school across the street wouldn't receive excessive radiation.

The problem with nuclear power is that it is not at all "green." It violates the number one rule for a sustainable resilient earth system. This is that we must minimize the lifetime of human wastes in the biosphere. Over and over again, violating this rule has got us into big trouble with the earth. The CFCs that were used for years as refrigerants were hailed as a great invention, because they were such stable chemicals — but this meant they accumulated in the stratosphere till they were broken down by sunlight and catalyzed the destruction of the protective ozone layer. Fossil fuels were a godsend to our energy needs and our consumerism, but the century-long lifetime of the waste CO₂ in the atmosphere is radically changing the climate, and melting the ice caps. Nuclear power is the ultimate example of a dangerous waste stream, whose lifetime in the earth's biosphere is far longer than human history — and now we, here in Vermont, must plan for the long-term costs. All these issues were raised by the thoughtful public decades ago, when these plants were first built, but they were ignored. Instead, society bought into the fantasy of cheap power.

So let's lay this out explicitly. Vermont Yankee fissions uranium to generate heat to boil water to drive a turbine to make electricity. The fission products are intensely radioactive, so they must be kept isolated from the biosphere. Some fission products decay to stable elements quickly, in days or years, but one important one, plutonium, takes tens of thousands of years to decay. Plutonium is particularly dangerous for two reasons. It is very toxic, and worse it can be used to make nuclear bombs. Without public discussion (and you won't find it in Entergy's ads), Vermont is now the custodian of the materials for a large nuclear bomb stockpile. Yes, no one mentions that Yankee, like every similar reactor, has made enough plutonium for several hundred nuclear bombs. Every year it runs it makes more, and this is being stored in Vermont on the banks of the Connecticut River. Now Vermont has no intention of making bombs, but we live in a world of terrorism, and we might have to safeguard this nuclear material for thousands of generations. This is a hidden cost of our power from Vermont Yankee.

To get a little technical, it is one isotope of plutonium, Pu-239, that is used for nuclear bombs, which has the long decay half-life of 24,000 years. In the reactor waste, it is mixed with other plutonium isotopes, which mostly decay faster, as well as other very radioactive fission products. This means that terrorists seizing raw fission waste (and willing to sacrifice their lives in the process) could only make a rather inefficient nuclear bomb. Unfortunately, as the centuries and millennia pass, most fission products decay, leaving the bomb-material, Pu-239. Not our problem you say, but it is a profound moral issue for Vermont — the generation of long-lived nuclear waste, with weapon's potential, that must be managed at great risk for a very long time.

If we had looked at all the costs of Vermont Yankee, we probably wouldn't have built it. No one likes to admit they were wrong, so we try to hide our mistakes. Vermont is a wise enough state to recognize honestly what has been done, and to turn towards building an efficient, renewable society.