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# Finland's 100,000-Year Plan to Banish Its Nuclear Waste

By **DENNIS OVERBYE**

It is, in the words of the Danish filmmaker Michael Madsen, “a place we must remember to forget.”

On a wooded island more than a hundred miles northwest of Helsinki, in the town of Eurajoki, Finnish engineers are digging a tunnel. When it is done 10 years from now, it will corkscrew three miles in and 1,600 feet down into crystalline gneiss bedrock that has been the foundation of Finland for 1.8 billion years.

And there, in a darkness that is still being created, the used fuel rods from Finland's nuclear reactors — full of radioactive elements from the periodic table as dreamed up by Lord Voldemort, spitting neutrons and gamma rays — are to be sealed away forever, or at least 100,000 years.

The place is called Onkalo (Finnish for “hidden”) and it is the subject of “Into Eternity,” a new documentary by Mr. Madsen.

Watching it during the recent [Tribeca Film Festival](#) brought me into a more visceral contact with the vicissitudes of geologic time than I might have really wanted. These days I find that I can barely envision the future more than about six months ahead — hardly enough time even to plan for a proper summer vacation. My images of the deep future have always been vaguely utopian, like “Star Trek,” but “Star Trek” takes place only a few hundred years into the future, not 100,000 years.

Onkalo, on the other hand, is supposed to last 20 times as long as the pyramids have so far — so long that the builders of the site have to take into account the next ice age, when the weight of two miles of ice on top of Finland will be added to the stress on the buried waste containers, copper canisters two inches thick.

It might seem crazy, if not criminal, to obligate 3,000 future generations of humans to take care of our poisonous waste just so that we can continue running our electric toothbrushes. But it's already too late to wave off the nuclear age, and Mr. Madsen's film comes at a perfect time to join a worldwide conversation about what to do with its ashes. On June 3, administrative law judges from the [Nuclear Regulatory Commission](#) will begin hearing arguments about whether the Department of Energy can proceed with shutting down development of the Yucca Mountain site in Nevada, where the United States had been planning since 1987 to store its own nuclear waste.

If the Obama administration prevails, the United States will be back to square one in figuring out how to get rid of its own 77,000 radioactive tons, including 53 million gallons left over from the dawn of the nuclear age sitting in leaky tanks in the Washington desert near the Columbia River. There are somewhere between 250,000 and 300,000 tons of high-level radioactive waste already in the world, much of it in pools on the sites of nuclear power plants where the rods have to cool for years before they can be put into containers.

Onkalo is being built to do its job without human intervention or maintenance. Once it is done and sealed back up a hundred years or so from now, the problem is less with keeping all the radioactivity in than keeping people out. Unfortunately, nothing in history suggests that humans will actually keep out. Indeed the builders themselves, according to their environmental impact statement, have not ruled out the possibility that future technological development will make it feasible to dig all this stuff back up and reprocess it to create more fuel or weapons material, in which case Onkalo will be like buried treasure

The pyramids, after all, are not an auspicious precedent. They have been looted and their inhabitants dispersed to the museums of the world by intrepid archaeologists and grave robbers not at all deterred by rumors of the Curse of the Mummy.

Mr. Madsen seems to agree. The film is framed as a message to the future, to those of us who might have blundered into this place *We Were Never Meant to Go*. Mr. Madsen himself appears in the darkness, illuminated by a burning match just long enough to drop rhetorical bombs, like the idea that we are encountering the last remnant of the fires that once warmed our civilization.

I found myself wondering just who, after another ice age, he might be talking to: Computers? Cockroaches? Ourselves, reduced to Stone Age lifestyles after the collapse of civilization under the weight of ice or nuclear or biological apocalypse? Citizens of the galaxy on a sentimental tour of the old home world? Does future history go up or down or sideways?

Robots won't mind the radioactivity; cockroaches might live on it. The rest of us, if history is

any guide, will forget it. We'll be lucky, for that matter, if those future galactic citizens even remember the Earth in anything more than fairy tales. We're always reading about time capsules being buried, but we rarely hear about them being dug up and opened. One of the most famous archaeological discoveries of modern times, the terra-cotta army buried with the first Chinese emperor, Qin, outside the city of Xian, was made by a farmer digging a well.

As a species, we are good at forgetting. So maybe the best, ultimate, defense against people messing with Onkalo would be simply to forget that it is there. The best way to keep a secret is not to let on that there is a secret at all.

But what about the ethical duty to warn those future generations with some kind of marker that would survive the scouring of Finland by glaciers and evolution of language? If, in fact, the canisters are rediscovered a few hundred years or a few thousand years from now, we can imagine our descendants' reaction at having been left such a nasty surprise.

Of course, we ourselves could be surprised, like the peasant who found Qin's army. One joke that went around the Onkalo project for a while, according to Mr. Madsen's film, could have come straight from a novel by [Arthur C. Clarke](#). What if, the team thought, the first thing it found when it started digging were canisters left by somebody else?