

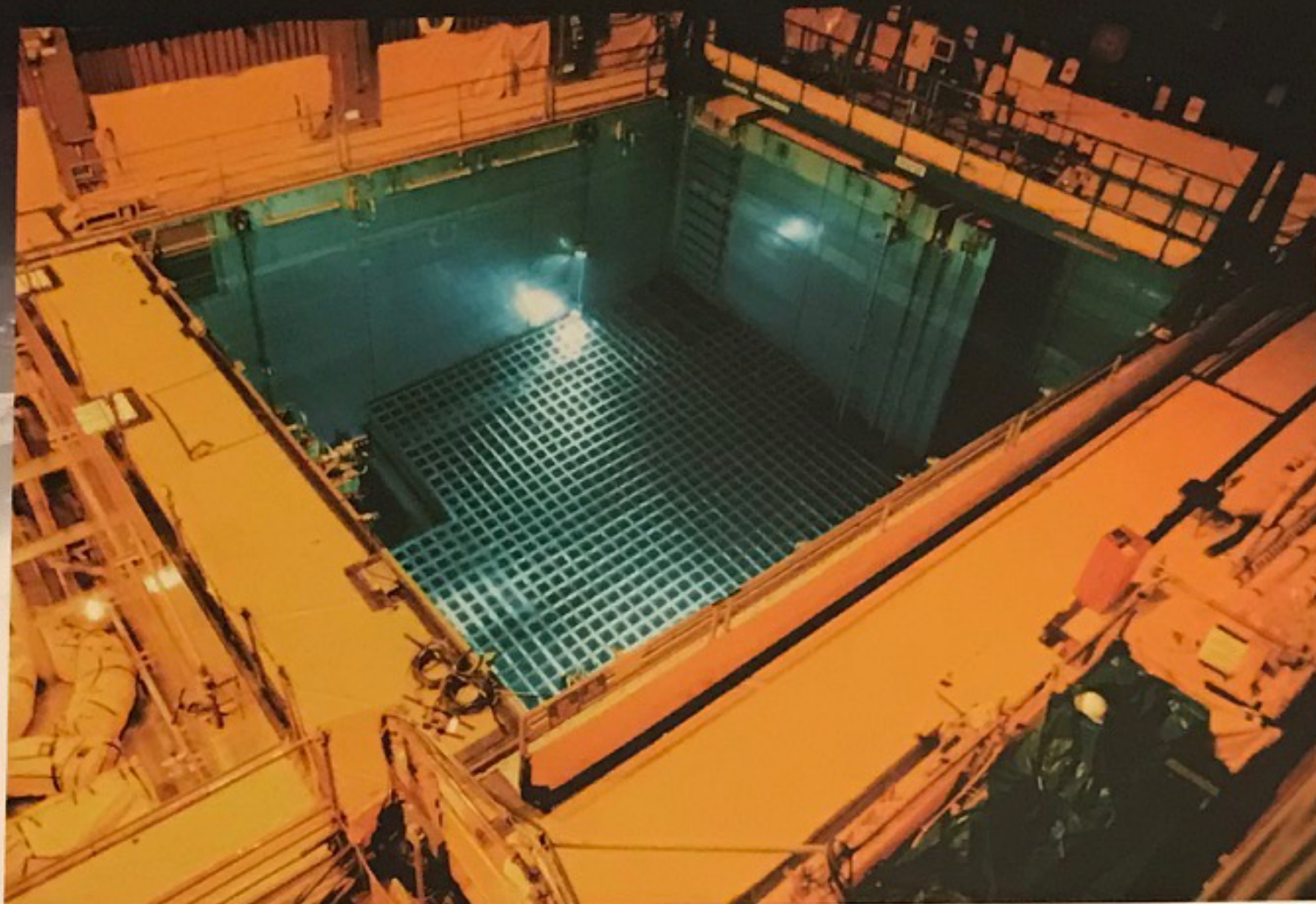
Maine Yankee Nuclear Power Plant

252,032 nuclear fuel rods are stored on-site at Maine Yankee. Each rod contains approximately 400 uranium fuel pellets, totalling over 100 million highly radioactive fuel pellets.

Welcome to Wiscasset, home of the former Maine Yankee Nuclear Power Plant, a pressurized water reactor, and current location of a radioactive waste storage facility. The plant, located 27 miles Northeast of Portland, Maine, operated from 1972 to 1996; for twenty-four years of the original 40-year lease. It was closed in 1996 due to ongoing safety violations and problems that proved too costly to effectively resolve. In 1997, the decommissioning process commenced, ending in 2005 when the containment building was demolished.

The site now serves as temporary storage for the highly radioactive spent fuel rods, and greater than class-C (GTCC) irradiated steel. Removal was mandated to begin in 1998. The U.S. Department of Energy (DOE) has failed to remove the radioactive waste as per statute/contract. A chain link fence was installed in 2015 to disincetivize trespassers.

U.S. Nuclear Regulatory Commission, Maine Yankee Atomic Power Company, Defueled Safety Analysis Report, December 9, 2014



In order to identify the radiation exposure pathways, one must answer the question, **"Who receives the dose?"**

Maine Yankee has chosen the scenario known as the "resident farmer scenario." In this case, the farmer is resident on the site, obtains drinking and irrigation water from the most contaminated portion of the site, and eats the crops and animals grown from the well water.* It is problematic that this scenario does not include the effects on pregnant women or children who are more vulnerable to exposure, nor consider the possibility of leaks or accidents in the waste storage containment tanks.

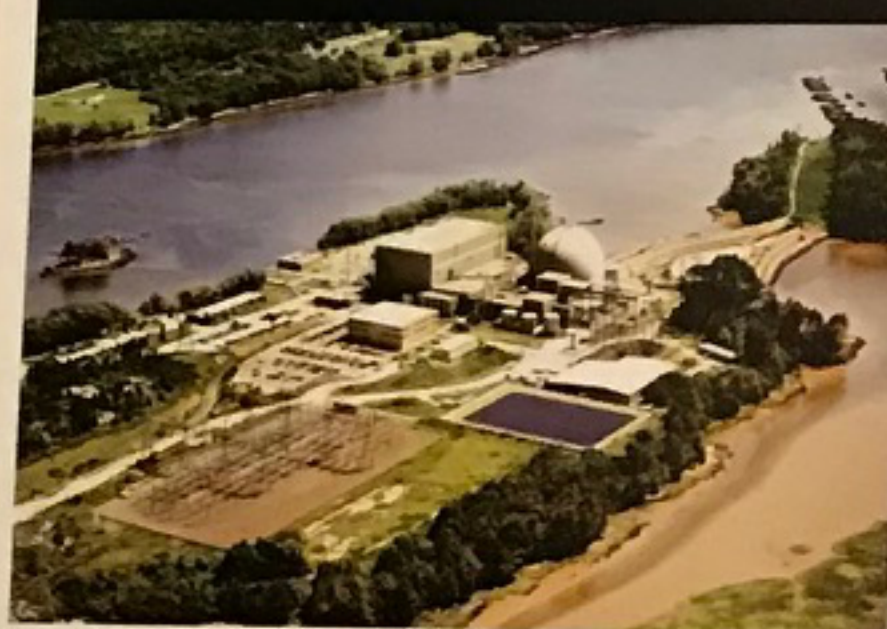
* Document from Maine Yankee to the U.S. Nuclear Regulatory Commission, dated February 27, 2009. MYAPC License Termination Plan. Document number MN-09-005 RA-09-006 (72-30 71-465) Background image: Maine Coast, 1896, painting by Winslow Homer

Safe dispositioning of the radioactive waste is the responsibility of the federal government, yet it continues to be temporarily stored on 11 acres onsite. According to the Nuclear Regulatory Commission (NRC), sixty sealed steel and concrete canisters contain 1,432 complete fuel assemblies. Each of these assemblies contain 176 zirconium alloy fuel rods, filled with radioactive uranium oxide fuel pellets. The NRC reports that the site also holds two partial assemblies and two partially-full failed fuel rod containers are in onsite storage.

Used fuel is called "spent," and is classified as High Level Waste because it is still highly radioactive and thermally hot. There is no site to permanently store this waste even though the Nuclear Waste Policy Act of 1982 mandated that the government build a facility. The proposed Yucca Mountain nuclear waste site in Nevada was suspended.

U.S. Nuclear Regulatory Commission, "Nuclear Waste Policy Act of 1982 (NWRG-0980) and U.S. NRC, "Standard Review Plan for Dry Cask Storage (RUREG-1536)

Serious violations at Maine Yankee



In 1998, the NRC determined that there were a number of very serious violations at the plant in four areas.

Failure to:

- (1) adequately test equipment
- (2) environmentally qualify equipment
- (3) perform adequate safety reviews
- (4) either identify deficiencies, or take appropriate corrective actions in a timely manner to address known deficiencies, including design related issues.

The NRC states that "Maine Yankee had become insular, failing to keep up with industry practice and failing to communicate adequately with the NRC."

U.S. Nuclear Regulatory Commission, EA-96-299 - Maine Yankee (Maine Yankee Atomic Power Company) Notice of Violation

"This nation's failure to come to grips with the nuclear waste issue has already proved damaging and costly."

United States 2012 Blue Ribbon Commission Report on America's Nuclear Future



Left: Aerial view of Maine Yankee site. Above: Reactor vessel head (NRC).

The pressurized water reactor (PWR) was supplied by Combustion Engineering and Asea Brown Boveri. Both companies were later bought-out by Westinghouse Electric. The reactor ran at 68% capacity during its lifetime; it produced 119 billion kilowatt hours of electricity. PWR reactors were built with a serious historical design flaw of irradiation embrittlement. The effects of embrittlement cause grain fractures in steel, compromising its strength, toughness and ductility. This can cause shear fracture in the reactor.

International Atomic Energy Agency, Integrity of Reactor Pressure Vessels in Nuclear Power Plants: Assessment of Irradiation Embrittlement Effects in Reactor Pressure Vessel Steels.



Above: Dry storage fuel casks stored onsite, with no permanent relocation plan.

A 2009 NRC report states that 550 metric tons of radioactive fuel waste is stored in Maine, whereas the oversite company that dispositioned the reactor reported that the "approximate total radioactive waste quantity for Maine Yankee is 460-million pounds." ** The state of Maine reports that "Until the DOE or Maine Yankee makes other arrangements, it is expected that spent nuclear fuel will need to be stored on the Maine Yankee site, probably in dry cask storage, for an indefinite period." ***

** NRC, Dry Cask Storage of Nuclear Spent Fuel ** Wayne A. Norton, President Yankee power plants, Decommissioning Three Nuclear Power Plants. *** State of Maine, Final Report of the Joint Select Committee to Oversee Maine Yankee Atomic Power Company.

Nuclear energy is not carbon free

When the nuclear power industry claims that the energy is "carbon-free," it does not take into consideration the critical front-end nor back-end of the process. Perceptions of carbon-free and carbon-neutral consider only the carbon emissions during plant operation, not the true carbon footprint. Millions of tons of carbon emissions are generated during various stages in the production of nuclear energy, including but not limited to: uranium mining and milling; conversion of ore into yellowcake and uranium hexafluoride (UF₆); construction of cylinders used to transport UF₆; enrichment processes; fabrication of fuel pellets and assembly of fuel rods; construction of supporting infrastructure including roads and transmission lines; power plant construction; transportation of fuel; generators used for maintenance, shut-downs and power outages; waste processing, incineration and vitrification; decommissioning and demolition of the plant and other support structures; manufacture of storage containment; maintenance of storage; security; clean-up efforts of accidents and incidents; monitoring, securing and periodically re-entombing waste into eternity.

"For planning purposes, Maine Yankee has assumed the high level waste repository or some interim storage facility will be operational by 2034."*
However, no such facility exists or is currently under construction.

*Nuclear Regulatory Commission - OMY 17-007 10 CFR 50.82(a) and 10 CFR 50.4