U.S. Nuclear Regulatory Commission

Overview of the Use of Submersion Heaters at the Pilgrim Nuclear Power Station

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September 25, 2023

Outline

- Allowable Liquid Effluent Disposal Paths
- Evaporation Considerations During Operation
- Evaporation as a Waste Disposal Method
- Use of Submersion Heaters at Pilgrim
- NRC Oversight Activities

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Allowable Liquid Effluent Disposal Paths for Nuclear Power Reactors

- Treated liquid discharge
- Monitored evaporation
- Shipment to an offsite disposal facility
- Discharge to the sanitary sewer
- Onsite storage for decay

- Under NRC regulations and the Pilgrim license, all options are available, and no prior NRC authorization is needed.

- Any of these options is subject to inspection by the NRC, including enforcement actions where warranted.

Evaporation Considerations During Operation

- Evaporation and the discharge of tritiated water vapor occurred routinely during plant operations.
- This evaporation rate would be greater during refueling outages when there was fresh spent fuel in the pool.

Evaporation as a Waste Disposal Option

- Evaporation of liquid wastes is an option available to all nuclear power plants and is being used at several.
- Most nuclear power plants were designed with liquid evaporators in their radwaste processing systems.

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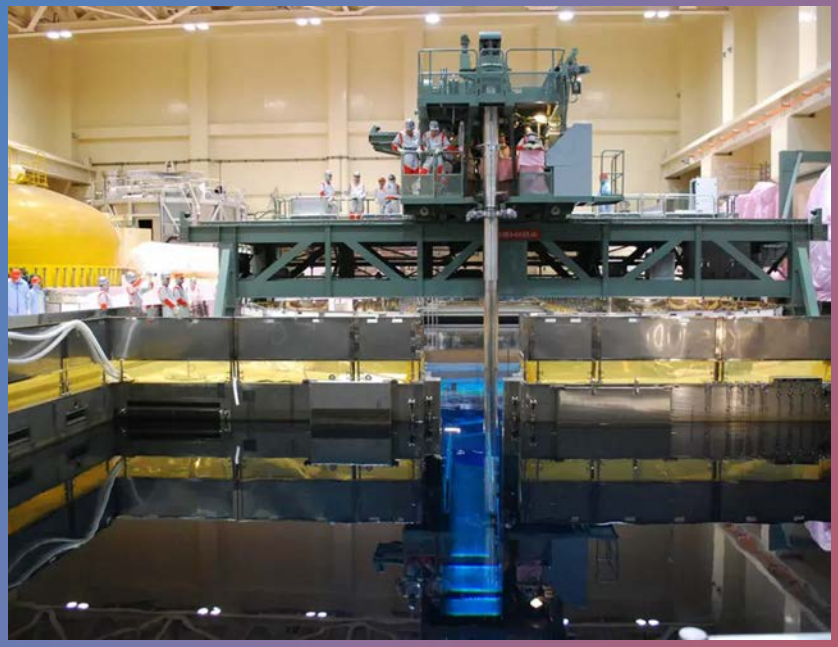

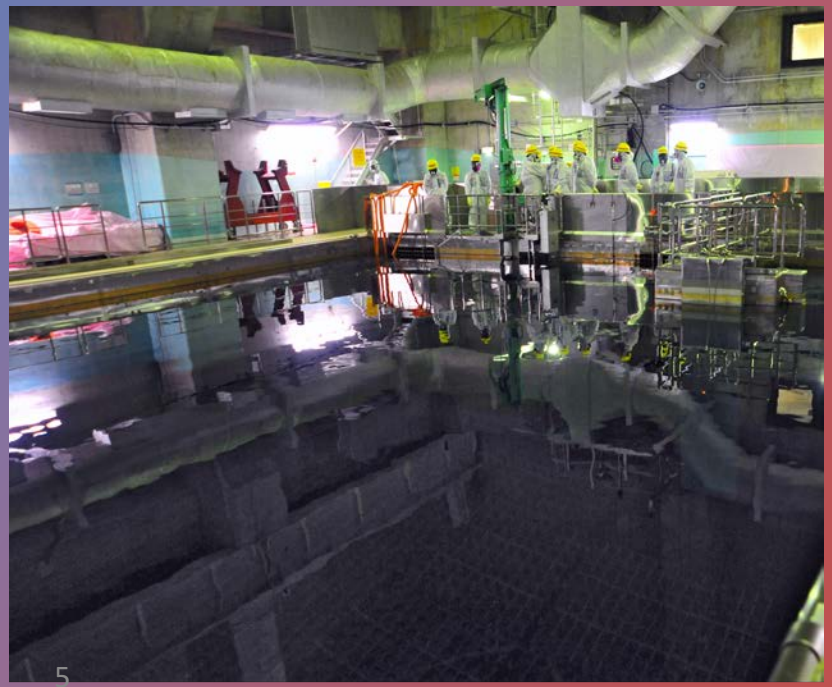

Use of Submersion Heaters at Pilgrim

- In accordance with its license, Holtec made the decision to pursue use of submersion heaters in support of decommissioning activities at Pilgrim.
- Holtec conducted an evaluation and determined that the heaters could be installed without prior NRC approval (10 CFR 50.59).
- This evaluation and the related engineering change were reviewed by the NRC staff during routine inspection activities.

No violations were identified by the NRC

NRC Oversight Activities

- The NRC was aware of the use of submersion heaters in the Pilgrim reactor cavity and initiated an onsite inspection of their use within weeks of their being energized.

- NRC inspectors confirmed that releases through the reactor building ventilation pathway were appropriately monitored, described and bounded by the site's Offsite Dose Calculation Manual (ODCM), and that the related data will be captured in the Annual Radioactive Effluent Release Report (ARERR).

Tritium Air Releases Based on Plant Conditions

(Source: NUREG/CR-2907 Radioactive Effluents from Nuclear Power Plants)

Year	Plant Condition	Tritium Released	Yearly Dose (tritium and particulates)	Percent of 10CFR50 Dose Objective
2022	Pilgrim Decom - no fuel	2.38 Ci	0.000070 mrem	0.00047%
2021	Pilgrim Decom - moving fuel	8.0 Ci	0.00024 mrem	0.0016%
2020	Pilgrim Decom - fuel in pool	7.7 Ci	0.00022 mrem	0.0014%
2018	Pilgrim Operating Boiling Water Reactor*	34.0 Ci	0.014 mrem	0.43%

*Average Operating BWR is 41.6 Ci per year

Questions?