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**Tritium in Groundwater Monitoring at  
Pilgrim Nuclear Power Station, Plymouth, MA  
July - December 2020**

This report provides data from the ongoing monitoring of tritium in groundwater and surface water at the Pilgrim Nuclear Power Station (PNPS) located in Plymouth, MA. The history of the investigation, which began in 2010, and previous update reports, are available online<sup>1</sup>.

**Summary**

- Monitoring results for July-December 2020 indicate that tritium levels do not present a health risk.
- No detectable tritium was measured in either surface water samples or in 11 of 23 routinely sampled groundwater wells. Tritium levels in the other wells were detectable and were generally stable or tended to decrease over time.
- All measured levels of tritium in groundwater are less than the US EPA drinking water standard for tritium of 20,000 picocuries per liter (pCi/L).

**Background**

Holtec collects samples at 23 groundwater wells and one surface water location on-site at PNPS. The sampling intervals for the last six months of 2020 were either monthly or quarterly, depending on past monitoring results and analysis of possible tritium pathways in groundwater. Well and surface water samples were sent to an independent analytical lab, Teledyne, with duplicate (or “split”) samples provided to the Massachusetts Department of Public Health (DPH) for analysis at the Massachusetts Environmental Radiation Lab (MERL). Holtec regularly reports the Teledyne results to DPH, the Massachusetts Emergency Management Agency (MEMA), and

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<sup>1</sup> Previous PNPS Tritium in Groundwater Investigation Updates are available here:

<https://www.mass.gov/lists/environmental-monitoring-data-for-tritium-in-groundwater-at-pilgrim-nuclear-power-station>

the Nuclear Regulatory Commission (NRC). Summaries of both laboratory results are then provided on the DPH website<sup>2</sup>.

Results are compared to a conservative, health-protective screening level of 3,000 pCi/L, or 1/10<sup>th</sup> the NRC-approved level of 30,000 pCi/L of tritium in non-drinking water sources, as well as to the US Environmental Protection Agency (EPA) drinking water standard for tritium of 20,000 pCi/L. As the closest municipal drinking water wells are 2.5 miles from PNPS, municipal water is not expected to be impacted by the tritium on-site at PNPS.

## **Results and Discussion**

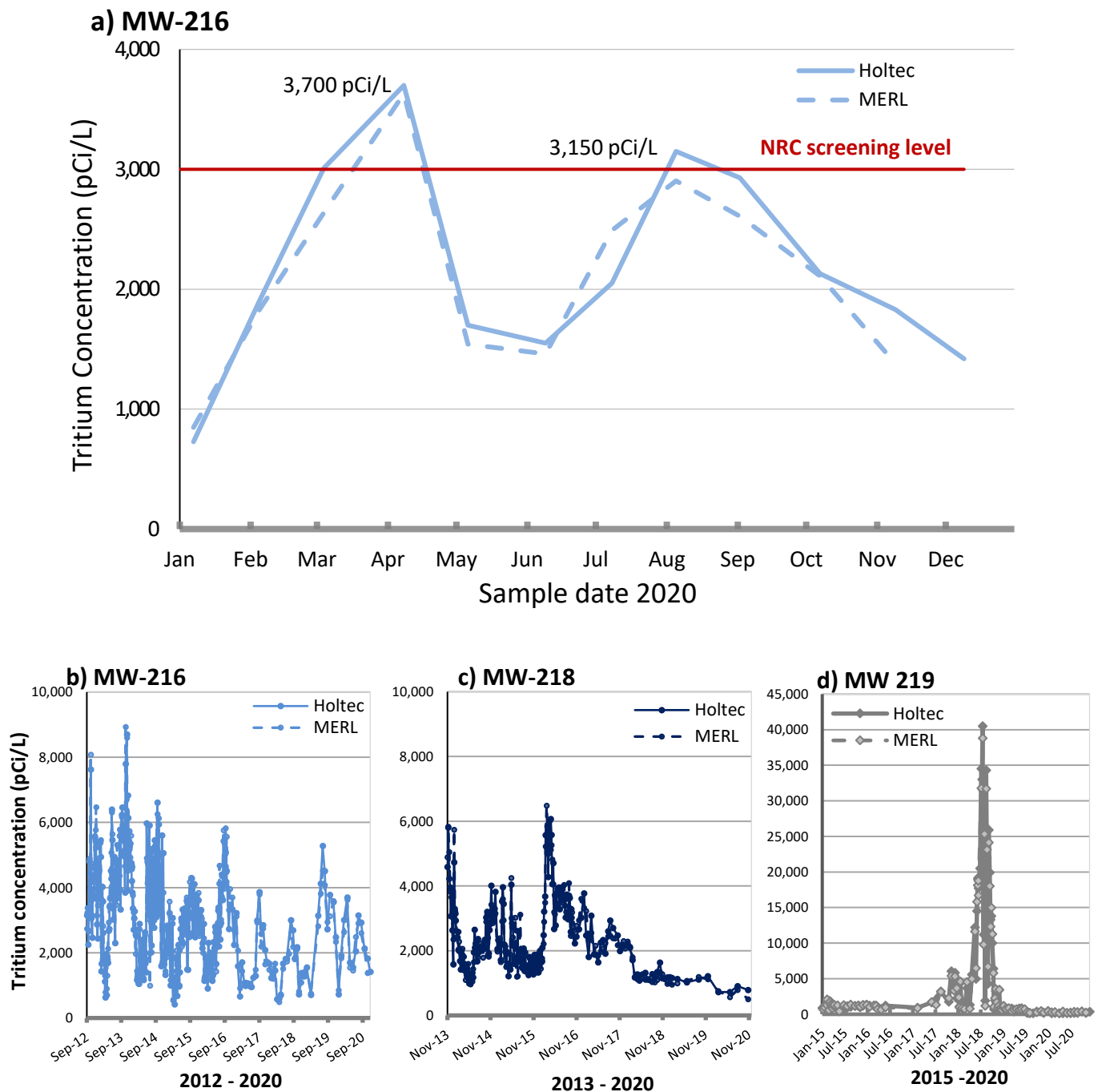
Groundwater monitoring results for the last six months of 2020 showed stabilization or a reduction in tritium levels at most wells; there was no detectable tritium activity in surface water samples or in 11 of the 23 on-site groundwater wells that are routinely monitored<sup>2</sup>.

- Figure 1 shows both 2020 sampling results and historical results for MW-216, where tritium levels exceeded the screening level of 3,000 pCi/L.
- Figure 1 also shows historical results for two additional wells of interest (MW-218, and MW-219), where results previously exceeded 3,000 pCi/L, but remained below 1,000 pCi/L for the last six months of 2020.
- Elevated tritium levels in MW-216 are consistent with the historically cyclical pattern at this well and may be related to its location in a preferential pathway of water from seismic gaps (i.e., separation joints between different parts of a building that allow independent movement during an earthquake).
- Tritium levels in MW-209, MW-211 and MW-215, where levels have more recently exceeded 3,000 pCi/L, were less than 1,000 pCi/L for the last six months of 2020.
- Tritium levels in the other six wells where tritium was detected (MW-201, MW-205, MW-210, MW-212, MW-213, and MW-220) were less than 1,000 pCi/L for the last 6 months of 2020.

None of the tritium levels measured in groundwater wells at PNPS for the last six months of 2020 present a health risk.

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<sup>2</sup> Summary tables of groundwater and surface water monitoring results are on the DPH website:  
<https://www.mass.gov/lists/environmental-monitoring-data-for-tritium-in-groundwater-at-pilgrim-nuclear-power-station#summaries---results->



**Figure 1.** Results for tritium in groundwater samples collected from Pilgrim Nuclear Power Station (PNPS). Data are plotted separately based on PNPS operator (solid lines) or DPH (dotted lines) produced results. **a)** Results from samples collected from January through December 2020 for MW-216 showing a maximum level of 3,700 pCi/L on April 8, 2020. The solid red line at 3,000 pCi/L represents the screening level, which is  $1/10^{\text{th}}$  of the 30,000 pCi/L NRC level of concern. **b-d)** Historical monitoring results for MW-216, MW-218 and MW-219. Values below detection limit (DL) plotted as DL/2.

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