**Issue/Title:** Pilgrim Nuclear Power Station (PNPS): Tritium in Groundwater Monitoring Wells

**Topic:** PNPS Updates as of June 7, 2013

**Previous Plans:** Results from groundwater monitoring well samples collected during the weeks of April 29, 2013 and May 13, 2013 were reported by Entergy. Split sample results for the weeks of April 29, 2013 and May 13, 2013 are currently being analyzed by MERL, however, results have been delayed as a result of a piece of lab equipment needing to be sent out of state for servicing.

**Current Status:**

Table 1[1]: Week of April 29th

| Location | Date | MERL pCi/L | GEL pCi/L |
|---|---|---|---|
| MW 201 | 04/29/2013 | ** | NDA(333)* |
| MW 202 | 04/29/2013 | - | - |
| MW 202 I | 04/29/2013 | - | - |
| MW 203 | 04/29/2013 | - | - |
| MW 204 | 04/29/2013 | - | - |
| MW 205 | 04/29/2013 | ** | 701 |
| MW 206 | 04/29/2013 | ** | 503 |
| MW 207 | 04/29/2013 | - | - |
| MW 208-S | 04/29/2013 | - | - |
| MW 208-I | 04/29/2013 | - | - |
| MW 209 | 04/29/2013 | ** | 592 |
| MW 210 | 04/29/2013 | - | - |
| MW 211 | 04/29/2013 | ** | 1,420 |
| MW 212 | 04/29/2013 | - | - |
| MW 213 | 04/29/2013 | - | - |
| MW 214 | 04/29/2013 | - | - |
| MW 215 | 04/29/2013 | ** | 1,090 |
| MW 216 | 04/29/2013 | ** | 1,690 |
| MW 217 | 04/29/2013 | - | - |
| MW 3 | 04/29/2013 | - | - |
| MW 4 | 04/29/2013 | - | - |
| SW-boat ramp | 04/29/2013 | - | - |
| SW-intake | 04/29/2013 | ** | NDA(336)* |

Table 2: Week of May 13th

| Location | Date | MERL pCi/L | GEL pCi/L |
|---|---|---|---|
| MW 201 | 05/13/2013 | ** | NDA(384)* |
| MW 202 | 05/13/2013 | ** | 923 |
| MW 202 I | 05/13/2013 | ** | 614 |
| MW 203 | 05/13/2013 | ** | NDA(422)* |
| MW 204 | 05/13/2013 | ** | NDA(422)* |
| MW 205 | 05/13/2013 | ** | 1,630 |
| MW 206 | 05/13/2013 | ** | 426 |
| MW 207 | 05/13/2013 | ** | NDA(453)* |
| MW 208-S | 05/13/2013 | ** | NDA(420)* |
| MW 208-I | 05/13/2013 | ** | NDA(425)* |
| MW 209 | 05/13/2013 | ** | 700 |
| MW 210 | 05/13/2013 | ** | 694 |
| MW 211 | 05/13/2013 | ** | 1,040 |
| MW 212 | 05/13/2013 | ** | 419 |
| MW 213 | 05/13/2013 | ** | NDA(412)* |
| MW 214 | 05/13/2013 | ** | NDA(421)* |
| MW 215 | 05/13/2013 | ** | 805 |
| MW 216 | 05/13/2013 | ** | 2,730 |
| MW 217 | 05/13/2013 | ** | 429 |
| MW 3 | 05/13/2013 | ** | NDA(426)* |
| MW 4 | 05/13/2013 | ** | 525 |
| SW-boat ramp | 05/13/2013 | ** | NDA(413)* |
| SW-intake | 05/13/2013 | ** | NDA(432)* |

*** NDA = not detected at less than activity value listed**

**** Results pending**

**- not analyzed this week**

[1] PNPS screening level for tritium in groundwater monitoring wells is 3,000 pCi/L, which is 1/10th of the NRC-approved Pilgrim Offsite Dose Calculation Manual standard for tritium in non-drinking water sources. The EPA drinking water standard is 20,000 pCi/L. The nearest drinking water wells are approximately 2.5 miles from the plant.

The groundwater monitoring results reported by Entergy show MW205 increased slightly to a level of 701 pCi/L of tritium detected during the week of April 29th, and increased to a level of 1,630 pCi/L of tritium detected during the week of May 13th (the previous result during the week of April 15th was 354 pCi/L). Entergy results show that MW206 increased slightly to a level of 503 pCi/L of tritium detected during the week of April 29th and decreased slightly to 426 pCi/L of tritium detected during the week of May 15th (the previous result during the week of April 15th was 443 pCi/L). Weekly sampling results for MW216 are discussed below. Results for the other wells sampled during the weeks of April 15th and April 29th were within typical ranges detected since the groundwater monitoring for tritium began. It should be noted that May 13th was a comprehensive round, which included all wells. MERL split sample results for the weeks of April 19th and May 13th are currently being analyzed by MERL.

To date, weekly sampling results from Entergy for MW216 indicate fluctuations between 630 pCi/L to 7,620 pCi/L of tritium detected for the weeks of September 17, 2012 through May 20, 2013. The most recent results for MW216 were 2,730 pCi/L of tritium detected during the week of May 13, 2013 and 3,450 pCi/L of tritium detected during the week of May 20, 2013. MERL split sample results for MW216 for September 17, 2012 through April 15, 2013 have also been generally consistent with Entergy's results and split sample results for the weeks of April 22, 2013 through May 20, 2013 are currently being analyzed by MERL (as noted above, results from MERL have been delayed as a result of a piece of lab equipment needing to be sent out of state for servicing). MDPH is continuing to closely monitor tritium levels in MW216 and MW206, which appear to be fluctuating with similar trends. MW201, which is down-gradient of MW206 and MW216 also seems to be weakly fluctuating along with these two wells, although at much lower levels. MW209 and MW211 on the other side of the plant also seem to be fluctuating along with MW216. It is possible that some of these apparent trends may be related to the recently discovered separation in the neutralization sump discharge line. MW216 continues to be sampled weekly and MW209 and MW211 have also recently been added to the weekly sampling regiment. MW211 has been sampled weekly since the week of April 8, 2013 with results through the week of May 20, 2013 ranging from 1,010

pCi/L to 1,420 pCi/L of tritium detected. MW209 has been sampled weekly since late May 2013 and results will be summarized in a future update once available.

Entergy surface water sampling results for the intake canal downstream of MW205 for the weeks of April 29th and May 13th indicated no detectable tritium. May 13th was also a comprehensive sampling round and Entergy surface water sampling results from the boat ramp area also indicated no detectable tritium. MERL split sample results for surface water for the weeks of April 29th and May 13th are currently being analyzed by MERL.

As previously described, Entergy has reported that the neutralization sump discharge line, which serves as a permitted discharge line to the discharge canal, was separated below grade. MDPH and MEMA staff recently met with Entergy and their consultants to learn more about the ongoing investigation activities related to this discharge line. At the meeting, Entergy reported that this separation has been confirmed with an in-line camera inspection. Entergy has also reported that they do not intend for this line to be brought back into service. The camera inspection also indicated two other possible areas along the neutralization sump discharge line where it is possible that past leakage may have occurred. Entergy plans to conduct a soft-dig excavation down to all three areas to inspect the pipe and will also collect soil samples that will be evaluated for tritium and analyzed by gamma spectroscopy. MDPH also plans to visit PNPS and observe the excavations, which are expected to take place in the early to mid July time frame depending on equipment availability (i.e. the vacuum excavator for the soft-dig). Entergy will provide splits of these soil samples to MDPH for analysis at MERL.

Entergy's contractor is also working to determine how long the neutralization sump discharge line has been separated/leaking, how much discharge water may have been released, how much tritium the water may have contained, and which monitoring wells it would reach or may have reached in the past. This effort will be enhanced by the excavations and soil samples as well as by review of historical information regarding use of the line already underway. Entergy also indicated water from the neutralization

sump discharge line typically contained nitrates/nitrites and a sampling program for these constituents is also being considered for monitoring wells to help evaluate the potential relationship between tritium detected in groundwater and past use of the neutralization sump discharge line.

**Looking Forward:**

MDPH will continue to closely follow all investigational activities that are currently underway at PNPS, especially the new developments concerning the neutralization sump discharge line.