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

Topic: PNPS Updates as of October 14, 2011

Previous Plans: Results from groundwater monitoring well samples collected during the weeks of September 27th and October 4th, 2011 were reported by Entergy (see tables below). Split sample results for the week of September 27th, 2011 have been reported by MERL (see tables below) and split sample results for the week October 4th, 2011 are currently being analyzed by MERL.

Current Status:

Table 1[1]: September 27th

Location	Date	MERL[2] pCi/L	GEL[3] pCi/L
MW 201	9/27/2011	610	493
MW 202	9/27/2011	-	-
MW 202 I	9/27/2011	-	-
MW 203	9/27/2011	-	-
MW 204	9/27/2011	-	-
MW 205	**9/27/2011**	**5,480**	**4,650**
MW 206	**9/27/2011**	**3,666**	**3,740**
MW 207	9/27/2011	-	-
MW 208-S	9/27/2011	-	-
MW 208-I	9/27/2011	-	-
MW 209 **new**	9/27/2011	1,553	1,570
MW 210 **new**	9/27/2011	-	-
MW 211 **new**	9/27/2011	1,616	1,270
MW 212 **new**	9/27/2011	-	-
MW 213 **new**	9/27/2011	-	-
MW 214 **new**	9/27/2011	-	-
MW 3	9/27/2011	-	-
MW 4	9/27/2011	-	-
SW-boat ramp	9/27/2011	-	-
SW-intake	9/27/2011	-	-

Table 2: October 4th

Location	Date	MERL pCi/L	GEL pCi/L
MW 201	10/4/2011	-	-
MW 202	10/4/2011	-	-
MW 202 I	10/4/2011	-	-
MW 203	10/4/2011	-	-
MW 204	10/4/2011	-	-
MW 205	**10/4/2011**	******	**2,040**
MW 206	**10/4/2011**	******	**2,650**
MW 207	10/4/2011	-	-
MW 208-S	10/4/2011	-	-
MW 208-I	10/4/2011	-	-
MW 209 **new**	10/4/2011	**	1,520
MW 210 **new**	10/4/2011	-	-
MW 211 **new**	10/4/2011	**	1,720
MW 212 **new**	10/4/2011	-	-
MW 213 **new**	10/4/2011	-	-
MW 214 **new**	10/4/2011	-	-
MW 3	10/4/2011	-	-
MW 4	10/4/2011	-	-
SW-boat ramp	10/4/2011	-	-
SW-intake	10/4/2011	-	-

*** NDA = not detected at less than activity value listed**
**** results pending**
***** well inaccessible due to scheduled equipment use**
- 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.
[2] Results from the Massachusetts Environmental Radiation Laboratory (MERL)
[3] GEL Laboratories are a radioanalytical laboratory contracted by PNPS

The latest groundwater monitoring results reported by Entergy show MW205 increased to a level of 4,650 pCi/L of tritium detected on September 27th and decreased to 2,040 pCi/L of tritium detected on October 4th (the previous result on September 19th was 1,890 pCi/L). Results for MW206 increased to 3,740 pCi/L of tritium detected on September 27th and decreased to 2,650 pCi/L of tritium detected on October 4th (2,970 pCi/L of tritium was detected in the previous sample on September 19th). Results for MW201 indicated 493 pCi/L of tritium detected on September 27th and no sample was taken on October 4th due to access being blocked by standing water. Results for MW209 indicated 1,570 pCi/L of tritium detected on September 27th, and 1,520 pCi/L of tritium detected on October 4th. For MW211, 1,270 pCi/L of tritium was detected on September 27th, and 1,720 pCi/L of tritium was detected on October 4th. Split sample results for the week of September 27th, 2011 reported by MERL were generally consistent with Entergy's results (see table above), and split sample results for the week of October 4th, 2011 are currently being analyzed by MERL.

The charcoal samplers placed in monitoring wells for the dye testing effort continue to be collected bi-weekly. Because no dye has been detected in any sample since the dye testing began in January 2011, dye testing is now being done every two weeks, at least until dye is detected in any sample. In that case, weekly sampling will resume. It should be noted that in January, when the dye was added to the miscellaneous tank and discharged through the radwaste discharge line, the dye could be observed in the discharge canal within days, indicating the dye made it through the line. The dye was observed in the discharge canal again in April during a routine discharge through the radwaste discharge line, indicating that residual dye introduced in January was still present in the line.

As previously reported, despite environmental monitoring efforts, there is still no clear explanation for the continued fluctuations in tritium at MW205 and MW206. Entergy is currently considering several new investigation activities to help identify the cause of the

tritium detections at PNPS. Entergy has drafted a list of these proposals and will be providing more details on these proposed activities for Commonwealth input. They include: placing dyes directly into wells (and hence, the groundwater) to characterize flow, new wells in the vicinity of the radwaste discharge line, new soil sampling near the radwaste discharge line, reactor building concrete sampling, and possibly taking the radwaste discharge line temporarily out of service and/or re-routing it. In the meantime, the regular groundwater and surface water sampling will continue.

MDPH has continued to reach out to radiation control program contacts in other states to better understand tritium in groundwater monitoring programs across the U.S. and any applicable information. We have been in communication with Vermont, New Hampshire, Connecticut, New York, New Jersey, Pennsylvania, Ohio, Nebraska, Missouri, Washington, and California. Tritium in groundwater at nuclear power plants has been perplexing in other states as well. New York and New Jersey both have nuclear power plants with tritium in groundwater that has no clear source to date. In New York, Fitzpatrick Power Station has a tritium source in groundwater that has not yet been confirmed, and has been contributing to tritium levels that have fluctuated, however not as inconsistently as Pilgrim. In New Jersey, there are areas at Salem Hope Creek Power Station that are showing tritium levels in the range of approximately 2,000 pCi/L to 14,000 pCi/L. Similar to Massachusetts, no source has been identified. Underground pipe analyses show no leaks. Some of the leading theories involve moisture from the reactor air vents that may be condensing and leaking out of a seal and onto the roof, and getting into the roof drain which goes into the storm drain system, and/or washout from precipitation. State radiation health and safety programs hope to build on each other's investigation strategies as we continue to share information.

As part of Entergy's buried pipe and tank program, excavations are taking place to inspect critical underground components, such as fuel piping associated with diesel generators and standby gas treatment system piping at the main stack. While this work is being conducted as part of their license renewal commitments and not directly related to the tritium in groundwater investigation, the excavations will provide Entergy with an

opportunity to inspect underground components as potential sources of tritium in groundwater.

MDPH staff observed the excavation at the standby gas treatment system piping at the main stack on Monday, October 3, 2011. This included piping that carries routine licensed and controlled releases of tritium gas to the main stack. The exposed piping and lining appeared to be in good shape. Ultrasonic testing will also be done on the piping to determine the thickness of pipe walls. Entergy will share results of this ultrasonic testing with MDPH.

Looking Forward:

MDPH will continue to reach out to radiation control program contacts in other states to better understand tritium in groundwater monitoring programs across the U.S. and any applicable information.

MDPH and MEMA are reviewing Entergy's proposed next steps in the tritium investigation and will provide feedback once a more detailed summary of the proposed steps are provided by Entergy.