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

Topic: PNPS Updates as of November 4, 2011

Previous Plans: Results from groundwater monitoring well samples collected during the weeks of October 18th and October 25th, 2011 were reported by Entergy (see tables below). Split sample results for the weeks October 18th and October 25th, 2011 are currently being analyzed by MERL.

Current Status:

Table 1[1]: October 18th

Location	Date	MERL[2] pCi/L	GEL[3] pCi/L
MW 201	10/18/2011	**	533
MW 202	10/18/2011	-	-
MW 202 I	10/18/2011	-	-
MW 203	10/18/2011	-	-
MW 204	10/18/2011	-	-
MW 205	**10/18/2011**	****	**4,340**
MW 206	**10/18/2011**	****	**1,590**
MW 207	10/18/2011	-	-
MW 208-S	10/18/2011	-	-
MW 208-I	10/18/2011	-	-
MW 209 **new**	10/18/2011	**	1,170
MW 210 **new**	10/18/2011	-	-
MW 211 **new**	10/18/2011	**	1,370
MW 212 **new**	10/18/2011	-	-
MW 213 **new**	10/18/2011	-	-
MW 214 **new**	10/18/2011	-	-
MW 3	10/18/2011	-	-
MW 4	10/18/2011	-	-
SW-boat ramp	10/18/2011	-	-
SW-intake	10/18/2011	-	-

Table 2: October 25th

Location	Date	MERL pCi/L	GEL pCi/L
MW 201	10/25/2011	**	512
MW 202	10/25/2011	-	-
MW 202 I	10/25/2011	-	-
MW 203	10/25/2011	-	-
MW 204	10/25/2011	-	-
MW 205	**10/25/2011**	****	**4,900**
MW 206	**10/25/2011**	****	**1,400**
MW 207	10/25/2011	-	-
MW 208-S	10/25/2011	-	-
MW 208-I	10/25/2011	-	-
MW 209 **new**	10/25/2011	**	1,160
MW 210 **new**	10/25/2011	-	-
MW 211 **new**	10/25/2011	**	1,130
MW 212 **new**	10/25/2011	-	-
MW 213 **new**	10/25/2011	-	-
MW 214 **new**	10/25/2011	-	-
MW 3	10/25/2011	-	-
MW 4	10/25/2011	-	-
SW-boat ramp	10/25/2011	-	-
SW-intake	10/25/2011	-	-

*** 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 decreased to a level of 4,340 pCi/L of tritium detected on October 18th and slightly increased to 4,900 pCi/L of tritium detected on October 25th (the previous result on October 11th was 7,110 pCi/L). Results for MW206 decreased to 1,590 pCi/L of tritium detected on October 18th and to 1,400 pCi/L of tritium detected on October 25th (1,950 pCi/L of tritium was detected in the previous sample on October 11th). Results for MW201 indicated 533 pCi/L of tritium detected on October 18th and 512 pCi/L of tritium on October 25th. Results for MW209 indicated 1,170 pCi/L of tritium detected on October 18th, and 1,160 pCi/L of tritium detected on October 25th. For MW211, 1,370 pCi/L of tritium was detected on October 18th, and 1,130 pCi/L of tritium was detected on October 25th. Split sample results for the weeks of October 18th and October 25th, 2011 are currently being analyzed by MERL.

The surface water sampling location near the boat ramp was previously deemed unsafe by Entergy due to loose footing and has not been able to be sampled in the last four comprehensive sampling rounds. MDPH is currently discussing alternate locations with Entergy. It is important to note that surface water samples have continued to be collected from the intake canal downstream of MW205 in the last four comprehensive sampling rounds, the most recent of which was on October 11th. Results of surface water samples continue to indicate no detectable tritium.

As previously reported, the charcoal samplers placed in monitoring wells for the dye testing effort continue to be collected. 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 instead of weekly, at least until dye is detected in any sample. In that case, weekly sampling will resume.

There continues to be no clear explanation for the ongoing fluctuations in tritium at MW205 and MW206 despite environmental monitoring efforts. 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 in a summary document. 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. The summary document will include a map indicating the precise location of new wells and the location of the alternate second surface water sampling location. In the meantime, the regular groundwater and surface water sampling will continue.

As part of this process, Entergy invited MDPH to participate in a site visit on October 26, 2011. Entergy and their consultant ERM met to discuss and walk through possible locations for new groundwater monitoring wells. MDPH was able to observe the meeting between Entergy and ERM and participate in the site walk through. Areas of interest for possible new wells were focused close to the deep foundations of the reactor and turbine buildings, as it is believed that groundwater is diverted around these structures and flows along the deep foundations. Potential leaks from underground systems such as the augmented off-gas system, radwaste discharge line, or neutralization sump discharge will be investigated by these new wells. Since up gradient wells have not shown concentrations of tritium similar to MW205 and MW206, Entergy plans to explore whether any potential leaks in these lines may be occurring closer to the deep building foundations and flowing along them. MW205 and MW206 are directly down stream from the ends of the deep foundations. The proposal is focusing on placing three wells closer to the deep foundation, two on the west side of the reactor building downstream of the lines mentioned above and upstream of MW205, and one on the east side of the reactor building downstream from part of the radwaste discharge line and upstream of MW206. These wells will help to better characterize the possible origin of tritium in groundwater.

Looking Forward:

MDPH continues to reach out to radiation control program contacts in other states to better understand tritium in groundwater monitoring programs at other nuclear power plants across the U.S. and learn any information that may be applicable to groundwater investigations at PNPS.

MDPH and MEMA plan to review Entergy's proposed next steps in the tritium investigation and will provide feedback once a more detailed summary document of the proposed steps is provided by Entergy.