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

Topic: PNPS Updates as of August 26, 2011

Previous Plans: Results from groundwater monitoring well samples collected during the weeks of August 2nd and August 9th, 2011 were reported by Entergy (see tables below). Split sample results for the week of August 2nd and August 9th, 2011 are currently being analyzed by MERL.

Current Status:

Table 1[1]: August 2nd

Location	Date	MERL[2] pCi/L	GEL[3] pCi/L
MW 201	8/2/2011	**	NDA
MW 202	8/2/2011	-	-
MW 202 I	8/2/2011	-	-
MW 203	8/2/2011	-	-
MW 204	8/2/2011	-	-
MW 205	**8/2/2011**	****	**2,520**
MW 206	**8/2/2011**	****	**1,840**
MW 207	8/2/2011	-	-
MW 208-S	8/2/2011	-	-
MW 208-I	8/2/2011	-	-
MW 209 **new**	8/2/2011	**	669
MW 210 **new**	8/2/2011	-	-
MW 211 **new**	8/2/2011	**	626
MW 212 **new**	8/2/2011	-	-
MW 213 **new**	8/2/2011	-	-
MW 214 **new**	8/2/2011	-	-
MW 3	8/2/2011	-	-
MW 4	8/2/2011	-	-
SW-boat ramp	8/2/2011	-	-
SW-intake	8/2/2011	-	-

Table 2: August 9th

Location	Date	MERL pCi/L	GEL pCi/L
MW 201	8/9/2011	**	529
MW 202	8/9/2011	-	-
MW 202 I	8/9/2011	-	-
MW 203	8/9/2011	-	-
MW 204	8/9/2011	-	-
MW 205	**8/9/2011**	****	**5,320**
MW 206	**8/9/2011**	****	**1,380**
MW 207	8/9/2011	-	-
MW 208-S	8/9/2011	-	-
MW 208-I	8/9/2011	-	-
MW 209 **new**	8/9/2011	**	833
MW 210 **new**	8/9/2011	-	-
MW 211 **new**	8/9/2011	**	1,240
MW 212 **new**	8/9/2011	-	-
MW 213 **new**	8/9/2011	-	-
MW 214 **new**	8/9/2011	-	-
MW 3	8/9/2011	-	-
MW 4	8/9/2011	-	-
SW-boat ramp	8/9/2011	-	-
SW-intake	8/9/2011	-	-

*** 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 2,520 pCi/L of tritium detected on August 2nd and then increased to 5,320 pCi/L of tritium detected on August 9th (the previous result on July 27th was 9,100 pCi/L). Results for MW206 show 1,840 pCi/L of tritium detected on August 2nd and 1,390 pCi/L of tritium detected on August 9th (the previous result on July 27th was 1,220 pCi/L). Results for MW201 indicated no tritium detected on August 2nd and 529 pCi/L of tritium detected on August 9th. Results for MW209 indicated 669 pCi/L of tritium detected on August 2nd, and 833 pCi/L of tritium detected on August 9th. For MW211, 626 pCi/L of tritium was detected on August 2nd, and 1,240 pCi/L of tritium was detected on August 9th. For the weeks of August 2nd and August 9th split sample results are currently being analyzed by MERL.

A meeting was held between MDPH, MEMA, MDEP, NRC, and Entergy at PNPS on August 15, 2011. Groundwater results and dye testing results from the past year were discussed, as well as possible next steps in the tritium investigation. State agency staff toured the reactor building accompanied by Entergy and NRC, including the neutralization sump pump room and the spent fuel pool from above and below, and also viewed the control room.

Analyses presented by Entergy's contractor, ERM, at the August 15th meeting showed no apparent correlations between fluctuating tritium levels in groundwater and a number of other factors including rainfall, temperature, water conductivity, water pH, or system processes (e.g., discharges), even when taking into account time lags for groundwater flow rates. MDPH has requested more detailed information from Entergy on these analyses.

The charcoal samplers placed in monitoring wells for the dye testing effort continue to be collected weekly. No dye has been detected in groundwater including the dye that was introduced directly to the soil beneath the French drain in January to help characterize groundwater flow in the area between the reactor building and the ocean.

At the August 15th meeting, Entergy suggested that they believe it is taking longer than originally anticipated for the dye to be detected in groundwater because it may still be moving through the 7 feet of soil above the water table. To help address this, Entergy and their contractor have been adding water to the French drain regularly in order to help move the dye to the groundwater table. Because of this delay Entergy plans to continue the dye testing through at least the end of 2011.

Despite environmental monitoring efforts, there is still no clear explanation for the continued fluctuations in tritium at MW205 and MW206. Neither Entergy nor NRC officials reported comparable situations at any other nuclear power plants in the country. At other nuclear power plants the levels of tritium in groundwater, once detected, have generally been much higher than the levels that have been observed at PNPS, thus making identification of the source more obvious. MDPH is also reaching 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. Entergy reported they are currently considering several new investigational activities to help identify the cause of the tritium detections at PNPS using a process of elimination. Activities being considered include: taking the radwaste discharge line out of service, excavations near the radwaste discharge line and neutralization sump discharge line in order to inspect them, doing additional soil sampling in the vicinity of the radwaste discharge line or other areas to identify a possible legacy spill, the placement of new wells near the radwaste discharge line and neutralization sump discharge line, replacing the 2-inch main stack drain line, dye testing to show well connectivity and assess groundwater flow (e.g., placing dye in MW209 and seeing how long it takes to show up in MW205), and power washing the reactor building to test runoff. Entergy will summarize these proposals for commonwealth agencies for input. In the meantime, the regular groundwater and surface water sampling will continue.

Looking Forward:

MDPH and MEMA will review Entergy's proposed next steps and share suggestions with Entergy.