

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

**Topic:** PNPS Updates as of September 13, 2010

**Previous Plans:** Six new groundwater monitoring wells were installed in August, bringing the total number of groundwater monitoring wells to 18. Two rounds of sampling for all 18 groundwater monitoring wells and two surface water samples were taken on August 26-27 and August 30-31. Because of the large number of samples collected close in time, both labs (Entergy's contract lab and the MDPH MERL) have had difficulty analyzing all the samples at the same time, and thus, some results are pending. However, samples are being prioritized for analysis based on previous well testing and continuing hydrogeology evaluations.

**Current Status:**

Table 1<sup>1</sup>: August 26<sup>th</sup>

Location	Date	MERL <sup>2</sup> pCi/L	GEL <sup>3</sup> pCi/L
MW 201	8/26/2010	973	873
MW 202	8/26/2010	**	364
MW 202 I	8/26/2010	**	485
MW 203	8/26/2010	**	423
MW 204	8/26/2010	559	383
<b>MW 205</b>	<b>8/26/2010</b>	<b>7526</b>	<b>7960</b>
<b>MW 206</b>	<b>8/26/2010</b>	<b>10696</b>	<b>10500</b>
MW 207	8/26/2010	**	453
MW 208-S	8/26/2010	**	NDA<303
MW 208-I	8/26/2010	**	NDA<348
MW 209 new	8/26/2010	2775	2940
MW 210 new	8/26/2010	1213	1280
MW 211 new	8/26/2010	1377	1540
MW 212 new	8/26/2010	524	514
MW 213 new	8/26/2010	305	NDA<346
MW 214 new	8/26/2010	NDA<300	NDA<345
MW 3	8/26/2010	**	NDA<345
MW 4	8/26/2010	550	557
SW-boat ramp	8/26/2010	**	NDA<347
Sw-intake	8/26/2010	**	NDA<343

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

\*\* results pending

Table 2: August 30<sup>th</sup>

Location	Date	MERL pCi/L	GEL pCi/L
MW 201	8/26/2010	**	974
MW 202	8/26/2010	**	NDA<364
MW 202 I	8/26/2010	**	NDA<364
MW 203	8/26/2010	**	**
MW 204	8/26/2010	**	**
<b>MW 205</b>	<b>8/26/2010</b>	<b>**</b>	<b>1390</b>
<b>MW 206</b>	<b>8/26/2010</b>	<b>**</b>	<b>2790</b>
MW 207	8/26/2010	**	**
MW 208-S	8/26/2010	**	**
MW 208-I	8/26/2010	**	**
MW 209 new	8/26/2010	**	1780
MW 210 new	8/26/2010	**	NDA<362
MW 211 new	8/26/2010	**	1340
MW 212 new	8/26/2010	**	385
MW 213 new	8/26/2010	**	NDA<361
MW 214 new	8/26/2010	**	NDA<364
MW 3	8/26/2010	**	**
MW 4	8/26/2010	**	**
SW-boat ramp	8/26/2010	**	**
Sw-intake	8/26/2010	**	**

The most recent results (August 30) demonstrate declines in tritium concentrations for both MW-205 and MW-206 from the August 26<sup>th</sup> sampling

<sup>1</sup> PNPS screening level for tritium in groundwater monitoring wells is 3,000 pCi/L, which is 1/10<sup>th</sup> 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.

<sup>2</sup> Results from the Massachusetts Environmental Radiation Laboratory (MERL)

<sup>3</sup> GEL Laboratories are a radioanalytical laboratory contracted by PNPS

rounds. It is also worthwhile to note that all results from August 30 show levels below the 3,000 pCi/L screening level used at Pilgrim. The continuing fluctuation in tritium concentrations in groundwater is difficult at best to interpret. Entergy staff are reviewing the possible role of heavy rainfall in recent weeks influencing tritium concentrations, as well as the possible integrity of concrete drainage pipes capturing rainwater runoff from the roof of the reactor building, one of which passes in the vicinity of MW-206 prior to discharge to the intake canal. Entergy plans to sample water in a manhole near MW-206 after a measurable rainfall event and then, shortly after the rainfall, sampling the groundwater from MW-206.

The gamma radiation scan on each sample (before it is sent to Entergy's contract lab) demonstrate that all results to date have been non-detect. In addition, Entergy reported that a "hard to detect" radionuclide analysis was done on the groundwater sample from the July MW 205 sample that showed the highest tritium concentration to date (over 25,000 pCi/L). Hard-to-detect compounds include cobalt, strontium, and others. Results of this analysis, which takes substantially longer than tritium analysis, was also non-detect. This information supports the focus on systems that may be sources of tritium versus other systems that may have other facility-related radioisotopes.

Also, during the week of September 6, MDPH, MassDEP, and MEMA staff met to further discuss hydrogeological issues at PNPS. One outcome of the meeting was the scheduling of a site visit for agency staff followed by another brainstorming session with all involved, including ERM, the hydrogeology consultants to Entergy. MEMA is taking the lead to coordinate the site visit with PNPS.

Entergy/PNPS has also been working since late spring/early summer with a company from Arkansas, Ozark, to consider dye testing for tracing possible sources of tritium in the groundwater. A meeting was held at the facility on Tuesday, September 7, and suggested dye testing of drainage/piping systems as a way of investigating possible communication/connections between groundwater, wells, or piping/drainage systems. The Entergy/PNPS team will be reviewing suggestions provided by the Ozark proposal/scope of work.

### **Looking Forward:**

MDPH, MEMA, and MassDEP anticipate the site visit to PNPS in October 2010.

Entergy/PNPS has contacted their headquarters to send a team of experts to review all the available data gathered so far and assist on next steps in the investigation. Entergy/PNPS anticipates that the expert team will be mostly Entergy or other industry experts, including those involved with tritium investigations at Indian Point, NY, and Vermont Yankee, VT. Entergy/PNPS reported that they anticipated the expert team would go to PNPS within the month.