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Mr. Stuart A. Richards, Deputy Director
Division of Inspection and Regional Support
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUSQUEHANNA STEAM ELECTRIC STATION
GROUNDWATER PROTECTION –
DATA COLLECTION QUESTIONNAIRE **Docket Nos. 50-387**
PLA-6086 **and 50-388**

Dear Mr. Richards:

The nuclear industry, in conjunction with the Nuclear Energy Institute, has developed a questionnaire to facilitate the collection of groundwater data at commercial nuclear reactor sites. The objective of the questionnaire is to compile baseline information about the current status of site programs for monitoring and protecting groundwater and to share that information with the NRC. The completed questionnaire for PPL Susquehanna, LLC is enclosed.

This submittal contains no new regulatory commitments.

Please contact Richard Doty at (610) 774-7932 if you have questions about the enclosed information.

Sincerely,

B. T. McKinney

Attachment: Groundwater Protection Data Collection Questionnaire

cc: USNRC Document Control Desk
Samuel Collins, USNRC Regional Administrator – Region I
Mr. A. J. Blamey, NRC Sr. Resident Inspector
Mr. R. V. Guzman, NRC Project Manager
Ralph Andersen, Nuclear Energy Institute
Mr. R. Janati, DEP/BRP

Attachment to PLA-6086

Groundwater Protection Data Collection Questionnaire

Industry Groundwater Protection Initiative
Voluntary Data Collection Questionnaire

Plant: Susquehanna Steam Electric Station

1. **Briefly describe the program and/or methods used for detection of leakage or spills from plant systems, structures, and components that have a potential for an inadvertent release of radioactivity from plant operations into groundwater.**

ANSWER:

- Susquehanna SES has identified seven systems that are more likely to contaminate groundwater with tritium than the other plant systems: Cooling Tower (via blowdown line), Emergency Service Water, Fuel Pool, Residual Heat Removal Service Water, Ultimate Heat Sink, Condensate Transfer, and Radwaste. In the case of the Fuel Pools, a liner leakage detection system is monitored to detect leakage. There are no inspection programs to determine the condition of underground piping associated with the systems mentioned above that include underground piping. There are no inspection programs to monitor the integrity of the concrete berms around the above-surface Condensate Storage Tanks and Refueling Water Storage Tank.

- The Susquehanna plant has an underdrain (French drain) system which is installed around the entire perimeter of the power block immediately above the building base slab. Groundwater, which may infiltrate into this piping system would flow to one of three foundation drain manholes. Without sump pumps, accumulation of water would occur in those manholes until the water reached the elevation of overflow pipes (to the station storm drain system). However, sump pumps are in place and actuate to direct the water to the overflow pipes at a level below the overflow elevation. There is no periodic radioactive-material sampling system in place at these manholes; however, a sampling program is in development as described in the answer to question 2.

- All plant systems are periodically and routinely walked down by Operations and Systems Engineering personnel independently. Additionally, Health Physics personnel perform walk-downs of radiologically controlled areas of the station. (As noted above, there are no inspections of the underground piping). The expected response to the discovery of a system leak or spill is the notification of supervision and the generation of a Condition Report, which leads to evaluation of appropriate corrective actions. A bi-annual surveillance test is performed on the Ultimate Heat Sink for indications of gross leakage into groundwater.

- Groundwater sampling is conducted as part of the Radiological Environmental Monitoring Program (REMP).

- Spills of potentially radioactive materials are addressed in accordance with established procedures. These procedures include notifications to appropriate plant personnel and initiation of appropriate control and clean-up actions.

2. Briefly describe the program and/or methods for monitoring onsite groundwater for the presence of radioactivity released from plant operations.

ANSWER:

- The REMP groundwater monitoring program consists of quarterly sampling of four wells. These wells are located within the site boundary but are outside of the Protected Area boundary (security fencing). The four wells are used for domestic water (drinking and various system support) supply to buildings within the site boundary. The water is sampled from faucets within the applicable buildings being supplied by the respective wells. The wells vary in location from 1,400 to 4,500 feet from the centerline of the Unit 1/2 reactor buildings. A well located approximately 6 miles from the site is sampled (quarterly) as a "control" location.

- The plant has a foundation drainage system for collection of groundwater along the perimeter of the reactor and turbine buildings (both units) and the radwaste building, as described in the answer to question 1. Excess water (overflow) collected from the underdrain system in the three manholes is pumped to the storm drain system. The storm water collection basin is sampled/analyzed for tritium and gamma emitting radionuclides quarterly. The three underdrain system manholes are scheduled to be added to the REMP groundwater sampling and analysis program later in 2006.

- Radiological analysis performed on groundwater samples includes tritium and gamma-emitting radionuclides. Typical groundwater sample Minimal Detectable Concentrations (MDC) are as follows:

Radionuclide	MDC (pCi/L)
H-3	150
Mn-54	15
Fe-59	30
Co-58/60	15
Zn-65	30
Zr-95	30
Nb-95	15
I-131	1
Cs-134	15
Cs-137	18
Ba-140	60
La-140	15
Gross alpha	2
Gross beta	4

3. If applicable, briefly summarize any occurrences of inadvertent releases of radioactive liquids that had the potential to reach groundwater and have been documented in accordance with 10 CFR 50.75(g).

ANSWER:

- Four events have been identified which are judged to have had the potential, however small, for inadvertent release to groundwater. Each event has been documented in the 10 CFR 50.75(g) files.

- The first event occurred in December 1983 (with Unit 1 in operation and Unit 2 under construction) and involved a condensate system leak into a Unit 2 Turbine Building central area sump, which was being pumped to a temporary sump outside the Unit 2 Turbine Building. The areas impacted included the central area sump inside the Unit 2 Turbine Building and the temporary sump outside the Radiologically Controlled Area. Cleanup of the affected sumps (contaminated liquid removal via pumping and sump decontamination) was promptly initiated. The potential for significant contamination of groundwater is believed to be small.

- The second event occurred in April 1988. Liquid from a spill from the Unit 2 condensate system extended beyond the Radiologically Controlled Area boundary at a Turbine Building train bay door. Cleanup of the liquid and affected soil was promptly initiated. Construction of a Tool Room has since occurred in the affected area, with that Tool Room being inside the Radiologically Controlled Area. The potential for significant contamination of groundwater is believed to be small.

- The third event occurred in July 1991. Liquid from the radwaste/condensate-transfer system was inadvertently released into a cement silo building affixed to the radwaste building. The area impacted was the immediate vicinity of the cement silo building. Cleanup of the area was promptly initiated. The potential for significant contamination of groundwater is believed to be small.

- The fourth event occurred in February 1995. There was a leak of condensate system water into a drain pipe in the area of the Unit 2 Condensate Storage Tank (CST) berm. The area impacted was the Unit 2 CST berm area. Monitoring of the liquid in the berm area and the leakage path showed very low levels of radioactive material. The potential for significant contamination of groundwater is believed to be small.

4. **If applicable, briefly summarize the circumstances associated with any onsite or offsite groundwater monitoring result indicating a concentration in groundwater of radioactivity released from plant operations that exceeds the maximum contaminant level (MCL) established by the USEPA for drinking water.**

ANSWER:

- PPL has identified no instances where a groundwater monitoring result indicated a groundwater concentration of tritium or other radionuclide released from plant operations that exceeded the MCL established by the USEPA for drinking water.

5. **Briefly describe any remediation efforts undertaken or planned to reduce or eliminate levels of radioactivity resulting from plant operations in soil or groundwater onsite or offsite.**

ANSWER:

- The potential for contamination of groundwater and/or soils is being re-evaluated as part of the on-going review of events (see question 3) involving inadvertent releases of liquid radioactive materials outside of the Radiologically Controlled Area. At this time, there is no indication that remediation efforts need to be initiated on-site or off-site, based on evaluations and sampling results obtained to date. By virtue of placement of the events in the plant decommissioning files, residual contamination, if any, resultant from the four events listed in the response to question 3, would be considered at the time of plant decommissioning.

- As noted in the response to question 3 above, the spill that occurred in April 1988 involved the removal of soils just outside a Unit 2 train bay door.