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A unit of American Electric Power

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July 31, 2006

AEP:NRC:6001
10 CFR 50.4

Docket Nos.: 50-315
50-316

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

Donald C. Cook Nuclear Plant Units 1 and 2
GROUND WATER PROTECTION – DATA COLLECTION QUESTIONAIRE

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 Nuclear Regulatory Commission. The completed questionnaire for Donald C. Cook Nuclear Plant is enclosed.

This letter contains no new commitments.

Should you have any questions, please contact Ms. Susan D. Simpson, Regulatory Affairs Manager, at (269) 466-2428.

Sincerely,

Mark A. Peifer
Site Vice President

HLE/rdw

Attachment

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Industry Groundwater Protection Initiative
Voluntary Data Collection (Questionnaire)
Donald C. Cook Nuclear Plant

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.

   - Operational groundwater monitoring and air monitoring is in place as identified in the Radiological Environmental Monitoring Program (REMP).
   - The Offsite Dose Calculation Manual (ODCM) program is in place to monitor and control effluent releases.
   - The Donald C. Cook Nuclear Plant (CNP) has a Spent Fuel Leakage Detection system which is used to monitor leakage from the spent fuel pools.
   - Operations, Radiation Protection, and Environmental personnel perform routine surveillance rounds inside as well as outside of the protected area. Operations personnel perform their rounds on a daily basis while Environmental personnel perform their rounds each week. These rounds include the requirement to identify and report any leaks and spills. Leaks and spills are documented via the Corrective Action Program, Shift Manager notification, and appropriate clean-up actions.
   - Operations personnel perform Reactor Coolant System leak rate calculations and Environmental personnel perform Waste Disposal System volume calculations to determine radioactive wastewater leak rates.
   - System engineers perform periodic walk-downs of the systems for which they are responsible. These rounds include the requirement to identify and report leaks and spills. Leaks and spills are documented via the Corrective Action Program, Shift Manager notification, and appropriate clean-up actions.
   - Storm water drains, Turbine Room Sump (TRS), and Absorption Pond (a permitted groundwater discharge point) sampling are in place to monitor potential radioactive contamination.
   - Fuel Oil Tank and pipe integrity testing programs are in place for underground storage tanks that contain potentially contaminated oil.
   - CNP has Corrective Action Program trending, reporting, and tracking of leaks, spills, and other conditions. This program evaluates instances for 10 CFR 50.75(g) impact.

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

   - CNP has fifteen onsite groundwater monitoring REMP wells.
   - The wells are sampled quarterly and analyzed for radionuclides (including tritium).
   - CNP samples the raw water intake flow of two offsite drinking water treatment plants daily as part of the REMP. These samples are combined into a composite for each

sample location. Daily sampling and analysis has been added for the indicator drinking water location.

- Two surface water samples are obtained daily. The samples are collected approximately 500 feet north and south of the plant centerline. The composite samples are analyzed monthly for gamma isotopes and quarterly for tritium.
- Four groundwater wells around the original U-2 Steam Generator Mausoleum are sampled and analyzed quarterly. This structure is now used for the storage of contaminated equipment. The samples are analyzed for gamma isotopes, gross alpha, and gross beta. The samples are analyzed to the site's REMP Lower Limits of Detection (LLDs).
- Typical sample Minimum Detectable Activities (MDAs) are as follows:

Nuclide	Typical MDA (pCi/l)	Required LLDs (pCi/l)
Gross Beta	3.06	4
Tritium	1160	2000
Ba-140	9.9	60
La-140	11.4	15
Cs-134	4.65	15
Cs-137	4.39	18
Mn-54	4.38	15
Fe-59	12.5	30
Co-58	4.63	15
Co-60	4.90	15
Zn-65	10.7	30
Zr-95	8.17	30
Nb-95	5.4	15
I-131	0.66	1

- Although not a specific consideration for monitoring, CNP has a deeded groundwater use Restrictive Covenant for the potentially affected area of the site near the permitted groundwater discharge locations. This Restrictive Covenant provides reasonable assurance that the groundwater at the site cannot be used as a drinking water source.

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

- Steam Generator Startup Flash Tank Vents. This identified gaseous release pathway is comprised of a steam/water mixture from the plant's secondary system during the operation of the Start-up Blowdown Flash System. When primary-to-secondary steam generator leakage occurs, this release pathway has caused the release of radioactive liquids to the dune hillside and surrounding area including the storm drain

system. The vents exhaust horizontally above the Radiation Protection Access Control Building toward an exposed dune hillside and the steam can condense falling to the ground and to the surrounding storm drain systems. Due to meteorological conditions, the released activity may precipitate to ground at various rates. This is not considered an inadvertent release.

- On-site Disposal of Slightly Contaminated Absorption Pond Dredging as described in the ODCM. This documents the disposal of slightly contaminated (Cs-134, Cs-137 and Co-60) sludge that was disposed of as under-layment for a paved parking lot on site. This was not considered an inadvertent release.

- Absorption Pond release via TRS. The TRS is an identified release path in the ODCM that accepts drains from the turbine building and discharges them to the Absorption Pond. This pond allows the water to percolate into the groundwater and flow westward to Lake Michigan. The pond has and will periodically contain radioactive contaminates due to primary to secondary leakage and equipment drains that may contain contaminated liquids. Tritium and other radioactive contaminates have been detected in several groundwater monitoring wells over the life of the plant. Both Unit 1 and Unit 2 steam generators have been replaced, and contaminated equipment drainage practices have changed with regard to releasing radioactivity via the TRS. The ODCM reporting levels were not exceeded during the period of significant primary-to-secondary leakage. This is not considered an inadvertent release.

- Heating Boiler Fuel Oil System. This system is used to incinerate radioactive waste oil that meets specifications for radiological releases and air quality. The tanks fill lines are currently posted as Restricted Area, Radioactive Material Area. These tanks are included in a leak testing program and implemented through Plant Heating Boiler Storage Tanks Leakage Tests. This is not considered an inadvertent release.

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 United States Environmental Protection Agency (EPA) for drinking water.

   - CNP has had no occurrences of measured groundwater radioactivity that exceeded the Nuclear Regulatory Commission's Reporting Levels (based on the EPA drinking water limits).

   - In the 1980s and 1990s, primary-to-secondary steam generator leaks along with Component Cooling Water system drains caused tritium to be directed into the TRS which is pumped to the Absorption Pond. A summary of this history is as follows:

This pond allows for percolation to the groundwater for natural biological treatment. As a result of the tritium intrusion into the TRS, tritium was introduced into adjacent groundwater. These tritium discharges were detected and evaluated as part of the ODCM.

Actions were initiated to reduce tritium discharge into the groundwater and to increase monitoring capability. Hydrology studies were performed that documented that the groundwater flow path on site is predominantly from east to west which is toward Lake Michigan. These studies determined that any influence or off-site impact is minimized by the local hydrogeology. In addition, it was determined that none of the residents in the area who could have been potentially affected by contaminated groundwater were using private wells for drinking water and were on Township water supplies. This fact was verified again for the residences in 2005.

Two actions were taken from a 1991 study titled "Evaluation of Tritium Migration in the Aquifer of the Donald C. Cook Nuclear Plant." First, seven groundwater monitoring wells were added to the REMP in the early 1990s. Quarterly groundwater samples are analyzed for tritium from these additional wells placed along the southern and northern site boundaries. Second, the threshold detection action level was lowered to 10,000-pCi/l tritium for the TRS samples. Exceeding this action level initiates an investigation into the cause and effect of the discharge.

Three Condition Reports have documented exceeding this action level since that time. From late 1996 through 1997, tritium levels were detected in the samples from REMP Well 14. The highest concentration was 19,000 pCi/l. During this timeframe, samples indicated tritium levels in the blowdown of Unit 1 and in the TRS. Significant primary-to-secondary leakage in the Unit 1 steam generators was believed to be the cause of this increase in tritium. The Unit 1 steam generators were replaced in 1998.

In order to continue to minimize radioactive discharges to the groundwater from plant systems, procedures were revised for Auxiliary Building wastewater management and the clearance permit process in 2000 and 2001. These revisions required tracking/investigation and communication of leak rates in excess of 2.0 gpm averaged daily and system drainage to waste greater than 200 gallons, respectively. Since the implementation of these revisions no tritium has been detected in groundwater greater than the LLD.

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.

- There have been no instances where remediation efforts have been required.

- Although not remediation actions, several actions have been taken due to the detection of low levels of tritium in groundwater during the 1980s and 1990s. These actions provide for means of early detection and corrective action as required. A hydrology study was performed in 1991. Quarterly groundwater samples are analyzed for tritium from additional wells (W-8 through W-14) placed along the southern and northern site boundaries in the early 1990s. An action level of 10,000-pCi/l tritium for the TRS is in place. Procedures were revised for Auxiliary Building wastewater management and the clearance permit process. These revisions required tracking/investigation and communication of leak rates in excess of 2.0 gpm averaged daily and system drains greater than 200 gallons, respectively. Since the implementation of these revisions, no tritium has been detected in groundwater greater than the LLD. Most recently groundwater Well 15 was added to the ODCM with the implementation of Revision 20, effective on June 22, 2006.

- Currently three other actions are being evaluated for implementation to assist in groundwater monitoring and impact of any tritium releases on the environment.
  - Consider the addition of groundwater monitoring wells in the vicinity of the Refueling Water Storage Tanks and Primary Water Storage Tanks.
  - Consider the impact of Lake Michigan currents on liquid releases.
  - Determine if an additional well is warranted in the southwest corner of the site to provide for more comprehensive groundwater monitoring.