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Sent: Friday, December 29, 2006 10:26 AM
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Subject: Re: Region III Tritium Update — December 8, 2006
Attachments: RIII Tritium Update (15Dec06).wpd

H-51

Region III Onsite/Offsite Contamination Update – **December 29, 2006**

Exelon Issues and Split/Independent Sampling Program

Independent State Inspections:

Illinois Emergency Management Agency (IEMA) Staff indicated that the Illinois EPA and IEMA plan to begin inspections at Exelon sites as required by Illinois law (Pub Act 094-0849) (http://www.ilga.gov/legislation/publicacts/fulltext.asp?Name=094-0849). That law requires IEMA and IEPA to perform inspections at each nuclear power plant during each calendar quarter to ensure that the licensee is meeting requirements of the act, i.e., the detection and reporting of unpermitted releases of radionuclides into groundwater, surface water, or soil. On Friday, December 15, the State will begin these inspections at Exelon's Byron station. The Region staff had several communications with the IEMA and the IL EPA to better understand the inspections; however, the scope of the inspections was not fully indicated. Consequently, Region III is observing the State's inspection at Byron to better understand the inspections and to identify any areas of potential preemption of regulatory jurisdiction.

NRC Split Sampling:

During 2006, Region III collected and analyzed over 600 water samples that were obtained independently or via split samples with all Region III Exelon Sites (Braidwood, Byron, Clinton, Dresden, LaSalle, Quad Cities, Zion). Cumulatively, 96 percent of the comparisons between the NRC contract laboratory's results and the licensee laboratory's results were in agreement.

Based on the results, Region III has determined that the extensive confirmatory measurements effort with all of the Region III Exelon sites is no longer warranted. However, Region III will continue two aspects of the program:

(1) selective split samples will be obtained during the Braidwood groundwater remediation project, which is consistent with the Region I efforts at Indian Point

(2) limited split samples will be obtained at Dresden to evaluate the licensee's improvement actions, which were implemented as a result of a number of nonagreements in the program.

On December 8, 2006, Region III notified the licensee. Region III and OCA also notified appropriate external stakeholders of the results of the program and future sampling activities (in accordance with a predetermined communications strategy). External stakeholders included local and State officials and U.S. Senate and Congressional staff. As of December 15, 2006, the NRC had not received any feedback or issues from the external stakeholders.

Tritium comparison results through mid-October 2006 have provided a high degree of confidence in Exelon sampling and analysis capabilities at each Region III site:

Site	No. of Comparisons	Percent Agreement
Braidwood	162	100
Byron	74	100
Clinton	34	100

Dresden	110	83[1]
LaSalle	48	100
Quad Cities	31	94
Zion	36	97
Cumulative	495	96

[1]Dresden re-analyzed 14 of the non-agreement samples, resulting in 10 additional agreements. After reviewing the analytical practices, licensee recently modified its analysis times/protocols, refined its sample geometry to better correlate with its calibration geometry, and modified its scintillation cocktail (AR 00540522).

The licensee notified Region III staff and State/Local officials that it has completed its initial onsite groundwater monitoring review at each of its sites, and has developed written reports. The licensee provided copies of these reports to the Region III office on Monday, September 25 and issued press releases on September 28, 2006. These reports are being reviewed by NRC staff and have been entered into ADAMS (ML062760519 - publicly avail; ML062760524 non-publicly avail).

Braidwood

On December 14, 2006 a small amount of water was found inside vacuum breakers 9 and 7 during a routine visual inspection. On December 22, 2006 water was found in vacuum breaker vault 6. The water was identified after a series of heavy rains and during a time when liquid releases were not taking place. The licensee determined the source of the water to be groundwater infiltration through the installed impermeable membrane. The licensee has conducted an evaluation that determined the amount of groundwater infiltration was within the design specifications of the membrane.

The licensee also reported spurious alarms from the water detection system inside vacuum breaker vaults 6 and 11. The licensee followed plant procedures and dispatched operators to the vacuum breaker vaults and determine the conditions to be false alarms.

The licensee has placed a hold on liquid releases and remediation efforts until further notice, or the repair of associated control systems is completed.

The effectiveness of the impermeable barrier and the water detection system are being considered for inclusion in the 95001 inspection next month.

On Tuesday, November 13, 2006, Exelon held a news conference and announced its commitment of $11.5 in support of a municipal water supply system for the Village of Godley, Illinois. The licensee indicated that it was providing support for the water supply project because of the poor water quality (non-radiological) and as a good neighbor/community gesture.

Routine Discharges: The licensee continues to perform routine discharges of radioactive liquids from the site. The discharges are being maintained at a lower flow-rate than historical releases to reduce any measurable levels in the Kankakee River. While the initial discharges were occurring, the licensee obtained samples in the river to validate mixing and transport criteria, which were under evaluation.

Tritium Remediation (Pond): The licensee continues to hold pond level at between 6.5 and 7.5 feet. The licensee's pumping system is operating in an automatic mode to ensure that the pond level is maintained in that range. As of October 26, 2006, the licensee had pumped in excess of about 100 million gallons from the pond. The interim remediation project includes the removal of contaminated water from the offsite pond that it recently purchased and to return that water through the blowdown line to the Kankakee River. The reduction in water level in the pond is expected to result in a reduction of environmental tritium levels and reduction in the impacted areas. The licensee projects that the pumping will need to remove about 3.3 curies of tritium over the next 3.5 years to achieve tritium concentration levels of less than 200 pCi/l in the groundwater aquifer.

Tritium Remediation (Vacuum Breaker Valve No. 1): The licensee continues to pump very low-level tritium contaminated water from three remediation groundwater wells installed near the onsite tritium plume near Vacuum Breaker Valve No. 1 (near the main site entrance) and discharging that water directly to the blowdown line to mitigate the underground tritium in that location. The total flow rate of this operation is about 75 gpm (3 pumps @ 25 gpm). The licensee estimates that the remediation will need to remove about 0.2 curies of tritium over the next 1.5 to 2 years to achieve tritium concentrations of less than 200 pCi/l in the groundwater aquifer.

Temporary Liquid Radioactive Waste Storage: Currently, all 20 FRAC tanks and the temporary bladders have been emptied, and the outside tank farm has been dismantled. The tanks are undergoing decontamination. The licensee plans to retain 8 of the empty tanks in a storage building, as a contingency for water management.

Drainage Ditch: On September 15, 2006, the licensee detected elevated levels of tritium in the onsite ditch that traverses the site and runs along the Village of Godley, IL (307 and 255 picoCuries/liter of tritium near the site boundary). The licensee speculated that the water may have originated from the Spring 2006 relief valve discharge that has migrated to the oil separator. On 9/14/06, the licensee initially measured 742 and 793 picoCuries/liter in the oil separator, which had been overflowing due to rains in the area. As of September 22, 2006, the overflow from the oil separator has subsided. The most current measurements were 270 pCi/l of tritium in the oil separator and less than 180 pCi/l in the ditch.

Secondary Side Tritium: As of October 2006, tritium levels in the Unit 1 secondary side have been reduced to about 640,000 pCi/l as a result of water inventory changes for the Unit 2 outage. Since the licensee's interim corrective actions, the level of tritium in the secondary side has declined from its peak value of about 1.2 million pCi/l (nominal value of about 40,000 pCi/L). Over the past several months, the licensee had identified a notable increase in tritium activity in the Braidwood Unit 1 secondary side. The licensee attributed the increase to leakage of diaphragm valves in its Spent Resin Flushing System that has provided an inadvertent communication of the primary and the steam generator blowdown systems through their respective demineralizers. The licensee speculates that the impact of the resin flushing system leakage has been exacerbated by the higher tritium levels in the primary system (via the recent recycling program) and operating the resin flushing system with certain valves open for ALARA considerations. Currently, the licensee has isolated valves and has developed plans for valve maintenance and batch dilutions to further reduce tritium levels to about 20,000 pCi/l. The elevated value has also been seen in the licensee's releases to its cooling lake, which consists of secondary side inputs (Turbine Building drains, etc.). The licensee's Offsite Dose Calculation Manual (ODCM) has an administrative level of 4 curies into the cooling lake per year, as the lake is used by the public for recreational activities. Historically, the licensee has not approached this number, but annual releases will have exceeded the limit in August 2006, which results in additional cooling lake sampling. Recently, the licensee has measured about

130 pCi/l of tritium in the cooling lake, which is elevated from the Spring 2006 measurements of about 30 pCi/l.

Byron

No significant changes in status:

On July 17, 2006, EXELON received notice from the Illinois EPA that it had rejected EXELON's response to the Illinois EPA Violation Notice. The Illinois EPA only stated in its letter that the rejection was due to "the nature and seriousness of the violations." At this time, Region III has no additional insights as to the basis for the rejection.

The licensee continues to perform routine liquid radioactive waste releases. The releases have been performed without incident. As of July 28, 2006, the licensee had completed its installation of its automated leakage detection and communications system for all of the vacuum breaker vaults and was conducting releases with reliance on that system. Operations personnel monitor system indications, and a roving operator is in the field to respond to any potential alarms.

Dresden

No significant changes in status:

On Wednesday, September 13, the licensee notified the Region III staff that it had completed its initial onsite monitoring initiative at each of its sites. At Dresden, the licensee measured (in May 2006) strontium-90 (Sr-90) in one of its newly installed wells at a level of about 2.17 to 4 picocuries per liter (pCi/l). The licensee's lower limit of detection is about 2 pCi/l. (Excepting Dresden, only tritium was detected in other wells at all other sites.) The monitoring well is located just north of the Dresden Unit 1 Turbine Building, near the Unit 1 intake canal (which is a relatively stagnant body of water). The licensee indicated that Sr-90 was not detected in any other groundwater well or surface water sample. The licensee is attributing the Sr-90 to a contamination event that occurred in 1975 on Unit 1, which was reported to the NRC at that time. Based on the movement of groundwater, there are no receptors between that well and the Illinois/DesPlaines Rivers. Any offsite public dose from the measured level of Sr-90 is expected to be insignificant. The licensee has notified state and local officials of the Sr-90 result. The NRC's contract laboratory performed confirmatory Sr-90 analyses on split samples collected in September and October 2006. Results determined by the NRC contract laboratory are consistent with the licensee's result.

The licensee continues its efforts to identify and to repair the leak in the underground HPCI return line from the condensate storage tanks (CSTs). Replacement of the HPCI supply and return piping and re-routing 124 feet of cross tie piping between the two CSTs started on 5/4/2006. The licensee excavated much of the CST and HPCI piping, but they were not successful in pinpointing the leak. The old piping removal was completed as of May 22, 2006, and fit up/welding of replacement piping was completed. During pressure testing of the new piping five leaks were identified in the longitudinal welds in the new piping. This is non-safety, aluminum piping and the leaks appear to be porosity leaks. Investigation revealed that the fabrication welds from the supplier have several quality issues. In mid-October, 2006, the HPCI piping from the CST to the HPCI pump suction was replaced and pressure tested satisfactorily completing the pipe replacement project.

Duane Arnold

No significant changes in status:

On June 15, 2006, the licensee detected tritium (about 3000 pCi/l) in water collected from a pit that surrounds its two condensate storage tanks. After removal of the water, no leakage was observed from the tanks. The licensee's initial evaluation has concluded that the contamination is likely from rainwater condensing gaseous effluent releases from its Reactor Building vents, which are located near the pit. The licensee has detected low levels of tritium in onsite rainwater that has been collected as part of its Radiological Environmental Monitoring Program.

Kewaunee

No significant changes in status:

On August 10, 2006, the licensee detected tritium in three settling plug holes located in the basements of the Auxiliary Building and the Turbine Building. The levels ranged from 6000 to 102,500 picocuries per liter. This activity is onsite, small in volume and, at this time, there is no indication of any off-site contamination.

The licensee continues to evaluate the potential sources of the tritium activity under the Auxiliary and Turbine Buildings. The licensee suspects leaking floor drain piping to be the source of the tritium. Plans were in place to clean floor drain piping to better boroscope floor drains and gather data for both welded and epoxied joints, which may be contributing to the tritium contamination.

The licensee's hydrologist/hydro-geologist were on site the week of September 5th to assess the site's hydrologic characteristics and to develop recommendations for a groundwater (well) monitoring scheme. The consultants groundwater monitoring proposal was due to the licensee in October 2006. Based on the consultants recommendations, the licensee will initiate installation of a system of groundwater monitoring wells beginning in early 2007.

Clinton

No significant changes in status:

On May 3, 2006, Clinton performed tritium analysis on two water samples taken from a condenser pit located next to the CST. The results of the analysis showed tritium concentrations of 7,000 pCi/L with background at approximately 300 pCi/L. The second sample verified this result at 6,810 pCi/L. Additional samples taken from puddles in the area as well as from a newly dug monitoring well adjacent to the CST showed background tritium levels.

LaSalle

No significant changes in status:

On June 14, 2006, the licensee identified 1280 pCi/L of tritium in a recently installed monitoring well near its Radwaste Building, which is located within the protected area. Two additional wells had measurable levels of tritium very near the licensee's detection limit of 200 pCi/L. These wells had been installed as part of its onsite monitoring program. Based on the sampling locations and results, it does not appear that contaminants have migrated beyond the site into the public domain. The licensee is investigating its source.

Perry

No significant changes in status:

On September 6, 2006, the licensee detected 1100 pCi/L of tritium at the suction of the "A" ESW pump. This is a first time detection of tritium in the ESW system, and the licensee was uncertain of the source but suspects that the discharge of the underground collection system may have played a role. The licensee has a hydrologist onsite and is planning to install some test wells.

On August 17, the licensee noted an increased level (9300 pCi/l) of tritium in a sample from the underdrain system. Most recently (10/25/06), the licensee had obtained samples which did not contain any detectable levels of tritium. The licensee speculates that the fluctuations in tritium activity may be attributable to rainfall (groundwater recharge rates), which is being evaluated by its hydrologist.

Prairie Island

No significant changes in status:

On August 5, 2006, while performing maintenance on the plant heating boiler (a secondary side system that communicates with the condensate system) approximately 170 gallons of water containing tritium at 19,000 picocuries per liter was accidently drained outside the turbine building instead of into the Turbine Building sump. NRC split sample results (about 22,000 pCi/l) confirmed the licensee's measurements. The Prairie Island Indian Tribe, County and State officials were notified by the licensee.

The licensee measures tritium (< 1000 pCi/l) in an onsite well it monitors as part of its on-site tritium ground water monitoring, which was instituted in response to unexpectedly high sample results found in 1989 from a discharge piping leak. The tritium levels in the ground water fluctuate at levels less than 5 percent of the Environmental Protection Agency's drinking water standard of 20,000 picocuries/liter. The licensee was continuing the process of assessing the potential cause(s) of the slightly elevated sample results.

Quad Cities

No significant changes in status:

On May 31, 2006, the licensee identified tritium concentrations ranging from approximately 10,000 - 30,000 pCi/L in samples collected from recently installed shallow wells located within the site boundary. Other recently installed shallow wells in the same vicinity showed no detectable levels. Based on the sampling locations and results, it does not appear that contaminants have migrated beyond the site into the public domain. The licensee is drilling deep wells and additional shallow wells to better characterize the extent of the tritium, and is investigating its source.

Zion

No significant changes in status:

The licensee identified about 600 pCi/L of tritium in a recently installed monitoring well near its Unit 2 Condensate Storage Tank, which is located within the site boundary. An additional well had measurable levels of tritium very near the licensee's detection limit of 200 pCi/L. These wells had been installed as part of its onsite monitoring program. Based on the sampling locations and results, it does not appear that contaminants have migrated beyond the site into

the public domain. The licensee is investigating its source and is planning to install additional wells.