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Braidwood Station, Units 1 and 2
Facility Operating License Nos. NPF-72 and NPF-77
NRC Docket Nos. STN 50-456 and STN 50-457

Subject: Resumption of Liquid Radioactive Discharges Through Blowdown Line

This letter is being submitted to document discussions held between representatives of Exelon Generation Company, LLC (Exelon) and the NRC Region III office on August 28, 2006, regarding the planned resumption of radioactive discharges through the circulating water blowdown line at Braidwood Station. To ensure continued safe plant operation and to avoid the necessity of implementing temporary fixed rear axle container (FRAC) tank storage, Exelon must resume discharging tritiated water from plant operations via the blowdown line starting October 1, 2006.

Exelon has implemented substantial measures to ensure the integrity of the circulating water blowdown line so that liquid radioactive effluents will be safely discharged through the blowdown line to the Kankakee River in accordance with our NRC Facility Operating Licenses for Braidwood Station. These measures include the following.

- Operating the blowdown line at positive pressure such that the vacuum breaker valves are sealed at all times the line is fully operational, thereby eliminating the risk of water leaking due to improperly seated valves;

- Removing all but three vacuum breaker valves from service, thereby eliminating the other eight vacuum breaker valves as a possible leakage source;

- Installing impermeable membranes in the vacuum breaker vaults so that, in the event of leakage from a vacuum breaker valve, the released water would be contained within the vault;

- Installing a continuous moisture detection system capable of detecting the presence of one inch of water in the vacuum breaker vaults, and immediately alerting the main control room of the presence of water; and

- Enhancing our inspection and monitoring program along the blowdown line by installing twenty-one monitoring wells along the line, adjacent to and halfway between each vacuum breaker, and implementing weekly visual inspections of the blowdown line.

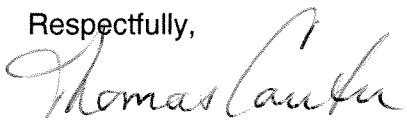
Each of these measures adds a layer of protection against the risk of any significant release of tritiated water into the environment. The ability of these measures to minimize this risk has already been demonstrated at both Braidwood Station and Byron Station, where similar measures have been in place since Byron Station resumed liquid radioactive waste discharges in April 2006. At Braidwood Station, we have been releasing tritium from the groundwater remediation project through the blowdown line with all of the above measures in place since June 11, 2006, with no releases of water other than into the Kankakee River.

Exelon must resume the discharge of tritiated water to continue to operate Braidwood Station in a safe and efficient manner. The release of radioactive liquid effluents is an essential part of the operational design of the station. Since November 2005, Braidwood Station has stored and recycled this water through its operations. However, we can no longer rely on this approach. As a result, in the event we do not resume the discharge of tritiated water, Braidwood Station will be forced again to store water in temporary FRAC tanks, which we consider a much less preferable option.

The enclosure to this letter provides additional detail on the enhancements to the blowdown line and the operational need to resume discharge of tritiated water.

If you have any questions about this letter, contact Kenneth Ainger at (630) 657-2800.

Respectfully,



Thomas Coutu
Site Vice President

Enclosure

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Braidwood Station

Braidwood Station
Resumption of Liquid Radioactive Effluent Discharges

A. Enhancements to the Blowdown line

Exelon has implemented substantial measures to ensure the integrity of the circulating water blowdown line. These measures include: (1) operating the blowdown line at positive pressure, (2) removing all but three vacuum breaker valves from service, (3) installing impermeable membranes in the vacuum breaker vaults, (4) installing a continuous leakage detection system, and (5) enhancing inspection and monitoring along the blowdown line. Each of these five measures is described in more detail below.

1. **Pressurization.** The prior tritium leaks were caused by the failure of vacuum breaker valves along the blowdown line to properly seat and seal. As one measure to address that problem, Exelon now operates the blowdown line at continuous positive pressure of at least 10 psi. This ensures that at all times while the blowdown line is fully operational the vacuum breaker valves are sealed. As a result, water cannot leak out of the valve seals. In order to maintain constant pressure while the blowdown line is operating, a valve was installed at the discharge structure which increases backpressure in the entire blowdown line. A procedure has been implemented to verify that with a given flow rate, there is a constant pressure of at least 10 psi throughout the blowdown line. The pressure in the blowdown line is monitored through a gauge at the discharge structure, and correlates to the flow rate which is continuously monitored in the main control room. Under this system, the maximum variation in pressure that could be experienced by the line is 1 to 2 psi, with any larger change being readily apparent to the operators.

2. **Isolation of Vacuum Breaker Valves.** The blowdown line was originally designed with eleven vacuum breakers. As a result of a hydraulic transient analysis of the circulating water blowdown line performed in May 2006, it has been determined that the blowdown line can be safely operated with only three vacuum breaker valves in service: Nos. 1, 5, and 11. The remaining vacuum breakers have been isolated, thereby eliminating the potential for leaks from eight of the eleven vacuum breaker valves.

3. **Installation of Impermeable Membranes.** As another precautionary measure, in June 2006, the vacuum breaker vaults surrounding each vacuum breaker valve were sealed with an impermeable membrane. That polyurethane membrane prevents any water that might leak into the vaults from exiting the vaults into the groundwater. The vaults were sealed by installing the polyurethane reinforced membrane that lines the sides and floor of the vault and forms a seal around the pipe leading into the vacuum breaker valve. In order to ensure that the membrane does not float up as a result of groundwater pushing on it, a layer of pea gravel has been placed on top of the membrane.

4. **Continuous Leakage Detection System.** As a further redundant precaution, Exelon installed a new leakage detection system to detect moisture in each of the eleven vacuum breaker vaults. The system has been fully operational since May 2006. The system works through a moisture switch that is installed one inch from the bottom of the vault such that it

will detect water in the vault when it reaches that level. When water is detected in the vault, a transmitter, through cellular technology, alerts the main control room by calling a dedicated phone until a person acknowledges the alarm. The units are solar-powered through solar panels installed on each of the vaults and contain a seven-day battery back up. To ensure that the units are fully functional, each of the transmitters is set to call the vendor website once every 24 hours. In the event a transmitter does not make this call, an alarm is triggered to inform the main control room. In the event an alarm is received in the main control room, the operator must follow a protocol established to respond to such an alarm. A log of all alarms is kept by the vendor, and any response actions are documented in the Braidwood Station operator's log.

5. **Inspection and Monitoring Program.** Exelon also has installed 21 monitoring wells along the blowdown line. Eleven of the wells are placed immediately downgradient of the eleven vacuum breaker valves, and the remaining ten wells are placed between the vacuum breaker valves, along the blowdown line. The wells are set at about 15 feet below grade so as to detect any potential leaks into the groundwater from the blowdown pipeline which is set eight feet below ground. The wells are sampled monthly for the presence of tritium, sodium and chloride. Since sampling began, no samples have shown levels indicative of an active leak. In addition to the monitoring wells, Exelon conducts a visual inspection of the blowdown line on a weekly basis. The vacuum breakers are also inspected every six months.

B. Operational need to resume liquid radioactive effluent discharges

Exelon is studying several means for managing its tritium wastewater, including developing alternative methods for disposing of the water and building additional permanent storage capacity. Through recycling, Exelon has succeeded in reducing the volume of tritiated water that must be discharged. Despite these efforts, to continue plant operation, Braidwood Station must resume discharges of tritiated water to continue to operate the plant in a safe and efficient manner.

An essential part of the operational design of Braidwood Station is the release of liquid effluents. Since November 2005, Braidwood Station has not discharged tritiated wastewater from the facility through the blowdown line. Although the excess water was initially stored in temporary FRAC tanks, Braidwood Station has now recycled the water stored in those temporary tanks and the tanks have been removed. However, permanent on-site storage and recycling are limited solutions. As the water is recycled through the plant, the concentration of tritium in the water increases with each cycle, thereby limiting the ability of the plant to continue to recycle that water.

In addition, the ability to store the tritiated water is restricted by the capacity of existing tanks and the station's operational demands for water storage. The plant requires sufficient available storage capacity to execute periodic shutdowns, including refueling outages. These shutdowns can require a large volume of water to be processed the system. As a result, Exelon cannot simply fill all of its existing tanks to capacity as there must be capacity for this surge of water to pass through the system. In the event Exelon does not resume the discharge of tritiated water, Braidwood Station will be forced again to begin storing tritiated water in temporary FRAC tanks, which Exelon considers a much less preferable option.