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U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Byron Station, Units 1 and 2
Facility Operating License Nos. NPF-37 and NPF-66
NRC Docket Nos. STN 50-454 and STN 50-455

Subject: Response to NRC Integrated Inspection Report 2009003

Reference: Byron Station, Units 1 and 2 Integrated Inspection Report 05000454/2009003; 05000455/2009003, dated August 7, 2009

Exelon Generation Company, LLC (EGC) is respectfully contesting one Non-Cited Violation (NCV) contained in the referenced inspection report; specifically NCV 05000455/2009003-01, "Failure to comply with TS 3.4.13.B reactor coolant pressure boundary leakage." This NCV concludes that EGC's failure to comply with Technical Specifications (TS) 3.4.13.B was a performance deficiency warranting a significance evaluation. EGC maintains that Byron Station Unit 2 correctly complied with TS 3.4.13.B on June 24, 2009.

NCV 05000455/2009003-01

The referenced inspection report documented a finding of very low safety significance and associated violation of the TS 3.4.13.B for failure to repair or isolate reactor coolant pressure boundary leakage, under the leakage definition of TS 1.1, within the required 6 hours. The NCV is stated below.

> A finding of very low safety significance and associated Non-Cited Violation of Technical Specification 3.4.13.B was identified by the NRC inspectors on June 24, 2009, when reactor coolant pressure boundary leakage was identified on a Unit 2 process sampling line and the licensee continued to operate the unit but did not repair or isolate the leak with the Technical Specification Limiting Condition for Operation requirement of 6 hours.

The licensee entered this issue into the corrective action program and replaced the leaking section of pipe.

The inspectors concluded the finding was greater than minor in accordance with Appendix E, Example 2a, of IMC 0612, regarding situations when Technical Specification limits were exceeded. The finding was determined to be of very low safety significance after an SDP Phase 2 evaluation.

EGC is contesting this NCV.

Basis for NCV 05000455/2009003-01 denial

A three-eighth inch Process Sampling (PS) line fault leak was identified on June 24, 2009, and it was estimated to be leaking at approximately one drop per five minutes (i.e., 0.0000034 gpm). The fault was identified as a weld coupling pinhole leak, located inside containment downstream of the Reactor Coolant System (RCS) piping connection and between a closed sample isolation valve (i.e., 2PS9350B) and the closed inboard containment isolation valve. The closed sample isolation valve, 2PS9350B, is a three-quarter inch Valtech air-operated valve with a design rated seat leakage to be less than 1900 cubic centimeters per minute (0.5 gpm).

The leakage could have been occurring either due to leakage past the seat of the closed 2PS9350B or from residual water trapped in the line between the closed 2PS9350B valve and the closed containment isolation valve. The repair activities used the 2PS9350B valve as an isolation point, and the line was depressurized and drained. Subsequently, a small trickle of water was observed, as expected; however, it quickly reduced to less than a discernable amount. This observation supports that 2PS9350B could have been leak tight and the originally observed leakage was due to residual water in the line.

However, conservatively assuming a small amount of leak-by from 2PS9350B was occurring, EGC maintains that the leakage from the PS line was an isolable RCS pressure boundary leak and therefore excluded from TS 3.4.13 pressure boundary leakage limit. Accordingly, EGC's Byron Station Unit 2 was in compliance with TS 3.4.13, "RCS Operational Leakage," on June 24, 2009. This determination is based on the application of TS and TS Bases descriptions, requirements concerning RCS leakage, and industry experience.

TS 1.1, "Definitions," defines RCS pressure boundary leakage as "... leakage (except SG leakage) through a nonisolable fault in an RCS component body, pipe wall, or vessel wall" [underline emphasis added]. "Nonisolable fault" is not defined explicitly; however, a reasonable definition would be that no isolation device exists to separate the fault from the RCS such that fault growth could continue and exacerbate the RCS leakage condition. Conversely, "Isolable fault"

would be reasonably defined as an isolation device exists and isolates the fault from the RCS in a manner that continued fault growth would not cause higher RCS leakage.

The TS Bases for TS 3.4.13 supports this distinction between a fault being isolable or nonisolable. The Bases defines Pressure Boundary Leakage as leakage that "... could cause further deterioration, resulting in higher leakage. Violation of this Limiting Condition for Operations (LCO) could result in continued degradation of the Reactor Coolant Pressure Boundary (RCPB). Leakage past seals, valve seats, and gaskets is not pressure boundary leakage." This definition indicates that for nonisolable faults, the magnitude of RCS leakage would be governed by the size of the fault. Since the fault's growth rate can not be predicted, the fault could quickly grow and RCS leakage could accordingly, grow quickly beyond the RCS makeup capabilities resulting in a Loss of Coolant Accident before the reactor could be shutdown and depressurized.

The potential for uncontrolled RCS leakage growth and further deterioration did not exist in this PS line fault condition. The PS line contained an isolation valve upstream of the fault, and this valve was closed. Conservatively, a very small amount of seat leakage was potentially occurring past this valve's seat. This potential seat leakage was well within its seat leakage design allowances of the valve, and the valve was considered a fully qualified operable isolation valve. Regardless of how large the PS line fault could be postulated to have grown, the RCS leakage would remain bounded by this small seat leakage past the closed isolation valve's seat; therefore, the fault is considered isolable.

The TS Bases for TS 3.4.13 further states that valve interfaces can produce a varying amount of reactor coolant leakage and leakage from these sources is limited by the LCO (i.e., one gpm for Unidentified Leakage and 10 gpm for Identified Leakage) to amounts that do not compromise safety. Leakage from valve interfaces is allowed by the LCO and can be classified as either Identified or Unidentified Leakage. The PS line fault was isolated by a valve that could have been potentially experiencing a small amount of seat leakage. As such, valve seat leakage is allowed by TS 3.4.13 in accordance with the LCO, which limits the leakage to amounts that do not compromise safety. Following the PS line fault being isolated, the RCS leakage was bounded by that leakage past the valve's seat and therefore, should be considered RCS Identified Leakage and compared to Identified Leakage limits of TS 3.4.13, accordingly.

The TS Bases for TS 3.4.13 defines Identified Leakage as "...leakage from known sources that do not interfere with detection of Unidentified Leakage and is well within the capability of the RCS makeup system. Identified Leakage includes leakage to the containment from specifically known sources, but does not include pressure boundary leakage...." The PS line leak was into the containment atmosphere and was specifically located. Due to the extremely small nature of the potential leakage, it was well within the makeup capability of

the RCS, and it would not have interfered with the detection of Unidentified Leakage by the leakage detection system. Since the leakage was isolable and functionally isolated, the leak did not satisfy the definition of Pressure Boundary Leakage. Consequently, the PS line leakage condition meets the definition of Identified Leakage.

In addition, characterizing the isolated PS line leak as Identified Leakage is consistent with the treatment of leakage past RCS Pressure Isolation Valves (PIVs). The TS Bases for TS 3.4.13 states that "...if both valves leak and result in a loss of mass from the RCS, the loss must be included as RCS identified leakage." Seat leakage past much larger closed PIVs is allowed in accordance with TS 3.4.14, "RCS PIV Leakage," provided it is classified as RCS Identified Leakage and subject to the Identified Leakage limit of TS 3.4.13.

From a nuclear safety significance perspective, a TS Action Condition should require an immediate Unit shutdown when the safety significance of the condition is unacceptable for continued power operations. TS 3.4.13 has basically three RCS leakage limits, other than SG tube leakage. The limits are based on the potential safety significance of the type of leak before a plant shutdown is required. These limits are:

- No Pressure Boundary Leakage
- 1 gpm Unidentified Leakage
- 10 gpm Identified Leakage

Pressure Boundary Leakage has a zero gpm leakage limit because of the potential of an uncontrolled RCS leakage growth that could lead to a Loss of Coolant Accident. The immediate controlled shutdown requirement for a condition of this nature is consistent with its safety significance. Unidentified Leakage has a one gpm limit because of its unknown location and the possibility that it could be a non-isolable pressure boundary leak. Identified Leakage has a 10 gpm limit because some leakage from mechanical interfaces is expected and is allowed provided it does not compromise safety (i.e., very low safety significance).

The PS line fault leak was located downstream of an isolation valve and was functionally isolated from the RCS. Given the configuration, it did not have the potential for uncontrolled growth. This PS leak is consistent with the Identified Leakage very low safety significance criteria.

The concept of isolation valves not being 100% leaktight is consistent with other TSs and leak-by of isolation valves is allowed, provided it has very low safety significance. Most notable is TS 3.6.3, "Containment Isolation Valves," where leakage past closed containment isolation valves is allowed provided the cumulative leak-by of all the containment penetrations is less than an overall

containment leakage limit. Also, as mentioned above, TS 3.4.14 allows valve leakage of up to 0.5 gpm per nominal inch of valve size.

Additionally, the basis for the NCV is not consistent with how the NRC has approached similar situations at other utilities. EGC has searched industry operating experience and did not find any examples of situations that support the NRC position that the isolation valve to isolate Pressure Boundary Leakage must be leaktight. Rather, a search identified two examples where RCS leakage existed through an RCS pressure boundary fault that was isolated, but the isolation valve was experiencing leak-by or mechanical joint leakage was present, and the RCS pressure boundary leakage limit was not applied. In both cases, the NRC, although knowledgeable of the situation, did not pursue action against the utilities, which would indicate at least tacit agreement by the NRC that the utilities correctly characterized the leakage as not Pressure Boundary Leakage. These industry experiences are documented in NRC Event Notifications (EN) 42822 and 42642, respectively.

EN 42822 involved a fault in the incore detector thimble tube, which is part of the RCS pressure boundary. The thimble tube isolation valve was closed to isolate the pressure boundary leak. However, the threaded connection of the isolation valve was leaking into the containment atmosphere. The utility characterized the leak as RCS Identified Leakage consistent with our circumstances. The NRC challenged the utility at the time indicating that it should be characterized as RCS Pressure Boundary Leakage. The NRC later accepted the utility's leakage classification as Identified Leakage. This situation is similar to EGC's Byron Unit 2 PS line leak in that a fault in the RCS pressure boundary was considered isolated by an isolation valve that was not leak tight.

EN 42641 involved the identification of a RCS Pressure Boundary Leak that was mistakenly identified four months prior as Identified Leakage (i.e., body to bonnet leakage). An ENS retraction was subsequently made based on the determination that the leak was not a Pressure Boundary Leak because it was isolated from the RCS even though one of the isolation valves was leaking by causing the leakage that was mistaken for body to bonnet leak. Again, this situation is similar to EGC's Byron Unit 2 PS line fault leak in that a fault in the RCS pressure boundary was considered isolated by an isolation valve that was not leak tight.

Conclusion

The PS line leak condition was through an isolable fault that was functionally isolated with a fully operable isolation valve and therefore does not meet the TS definition of RCS Pressure Boundary Leakage. The 2PS9350B valve was functioning within its design basis seat leakage limits to isolate the PS line. With

the plant operating within its design basis, a TS Required Action shutdown was not appropriate.

In addition, the leakage meets the definition of Identified Leakage and was, accordingly, correctly classified as RCS Identified Leakage. Since this leakage did not cause the TS 3.4.13 Identified Leakage limit to be exceeded, the TS 3.4.13 Action Condition was not applied and EGC's Byron Station Unit 2 was in compliance with TS 3.4.13 on June 24, 2009.

There are no regulatory commitments contained in this letter. Should you have any questions concerning this letter, please contact Mr. David T. Gudger, Regulatory Assurance Manager, at (815) 406-2800.

Respectfully,

Daniel J. Enright
Site Vice President
Byron Station

cc: NRC Regional Administrator, NRC Region III
NRC Director, Office of Enforcement
NRC Senior Resident Inspector, Byron Station