

From: [Samuel Miranda](#)
To: [Corujo-Sandin, Jorge](#)
Subject: [External_Sender] Design Bases Assurance Inspection at the Byron and Braidwood units
Date: Friday, November 23, 2018 3:58:55 PM

Dear Mr. Corujo-Sandin,

Please consider my comments, regarding your upcoming Design Bases Assurance Inspection at the Byron and Braidwood units. I understand that the Design Bases Assurance Inspection focuses on the “design, maintenance, and operation of risk significant components ... associated with an accident scenario, or a specific system. The inspection also monitors the implementation of modifications to structures, systems, and components.”

Please look at the Byron and Braidwood licensing basis [1], and think about how the accident analysis assumes how the plants’ pressurizer safety valves (PSVs) will operate. The PSVs are designed to open at the RCS design pressure (2500 psia), and relieve enough steam to prevent the RCS pressure from rising above 110% of its design pressure (2750 psia). Any accident that can pressurize the RCS its design pressure, post-reactor trip, would have to be a Condition III or IV event. PSVs are designed to open and limit this pressurization. They are not required to close. The analyses in the Byron and Braidwood licensing basis [1] contain several important changes, or deviations from this design requirement:

(1) The PSVs are assumed to open, during an AOO, in order to prevent the AOO from developing into a Condition III or IV event. (This is an acceptance criterion for AOO events.) The assumption makes no sense, since by the time the PSVs can open (at 2500 psia), the AOO will have already developed into a Condition III or IV event.

(2) The PSVs are now required to close, in order to prevent the progression to a Condition III or IV event (e.g., a stuck-open PSV). This is a new design requirement for the PSVs.

(3) The PSVs are now required to relieve water, as well as steam. This is a new design requirement for the PSVs. Crosby, the firm that manufactures these valves, intends these valves to be used only for steam relief.

(4) The PSVs are now required to open and close, repeatedly; as necessary, and relieve water, as well as steam, without incurring any damage. It appears that Exelon intends to operate the PSVs as PORVs.

(5) GDC 21 requires that, redundancy and independence designed into the protection system shall be sufficient to assure that ... no single failure results in loss of the protection function. The new requirement (i.e., PSV closure) makes it impossible to comply with GDC 21. The failure of one PSV to close would create a Condition III LOCA at the top of the pressurizer (i.e., a single failure would cause the loss of the protection function). In other words, if the GDC 21 single failure assumption is applied, the required protection function (i.e., closure of all PSVs) cannot be accomplished when all the valves are connected in parallel. Consider, too, that the PSVs are not isolable. The PSV system can meet the GDC 21 single failure requirement when the PSVs are required to open; but not when they’re required to close.

In October, 2015, NRR issued a backfit order, regarding the Byron and Braidwood plants, which included, among other things, this issue of PSV closure requirements, and the application of GDC 21. [2] Exelon appealed the backfit [3] directly to the EDO. Upon receiving the appeal, the EDO appointed a panel of five to review Exelon’s appeal, and make the recommendations necessary to support his appeal decision. [4]

(Note that one member of this panel was [K. Stephen West](#).)

The EDO’s decision [5] deems Exelon’s PSVs to be absolutely reliable (i.e., infallible) components,

insofar as they can be trusted to open and close, without fail, even when they're operated beyond their design capabilities (i.e., under water relief duty). In order to do this, the EDO set aside GDC 21. In other words, GDC 21 no longer applies to the PSVs at the Byron and Braidwood plants.

The EDO's backfit appeal decision recognizes the PSVs, at Exelon's Byron and Braidwood plants, as PSVs that are capable of relieving water. Have you seen a design review and modification package, from Exelon that justifies the use of PSVs, under water relief duty, in the Byron and Braidwood licensing basis? [1] If not, would it be reasonable to request this information, as part of your Design Bases Assurance Inspection?

Samuel Miranda, PE

REFERENCES

[1] Final Safety Analysis Report, Braidwood Station, Units 1 and 2, and Byron Station, Unit Nos. 1 and 2, Chapter 15.5.1, Inadvertent Operation of Emergency Core Cooling System During Power Operation (ADAMS No. ML14363A495)

[2] USNRC, Braidwood Station, Units 1 and 2, and Byron Station, Unit Nos. 1 and 2 -Backfit Imposition Regarding Compliance with 10 CFR 50.34(b), GDC 15, GDC 21, GDC 29, and Licensing Basis, October 9, 2015 (ADAMS No. ML14225A871)

[3] Exelon Generation Company, LLC, letter from J. Bradley Fewell to Victor M. McCree, U.S. NRC, "Appeal of Imposition of Backfit Regarding Compliance with 10 CFR § 50.34(b), General Design Criteria (GDC) 15, GDC 21, GDC 29, and Licensing Basis," dated June 2, 2016 (ADAMS Accession No. ML16154A254)

[4] USNRC, Report of the Backfit Appeal Review Panel Chartered by the Executive Director for Operations to Evaluate the June 2016 Exelon Backfit Appeal, Gary M. Holahan (OEDO), Thomas G. Scarbrough (NRO), Michael A. Spencer (OGC), Theresa V. Clark (OEDO), K. Steven West (NSIR), August 23, 2016, (ADAMS No. ML16236A208)

[5] Result of Appeal to the Executive Director for Operations of Backfit Imposed on Byron and Braidwood Stations Regarding Compliance with 10 CFR 50.34(b), GDC 15, GDC 21, GDC 29, and the Licensing Basis, USNRC, September 15, 2016, (ADAMS Nos. ML16246A247, ML16236A202, ML16246A247, ML16243A067, ML16246A150, and ML16236A208)



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