

CHAIRMAN Resource

From: Samuel Miranda <sm973@caa.columbia.edu>
Sent: Tuesday, April 09, 2019 11:28 AM
To: Doane, Margaret
Cc: DataQuality Resource; Vietti-Cook, Annette; cmrsvinicki@nrc.gov; CMRBurns Resource; CMRBARAN Resource; CMRWright Resource; CMRCaputo Resource; Lee, David; Broaddus, Doug; Stoedter, Karla
Subject: [External_Sender] Keeping the public informed of the agency's regulatory activities

Dear Ms. Doane,

According to the NRC's website, the NRC, "has a long-standing practice of conducting its regulatory responsibilities in an open and transparent manner, consistent with The NRC Approach to Open Government. In that way, the NRC keeps the public informed of the agency's regulatory, licensing, and oversight activities."

I've searched the NRC's public records (i.e., the Agencywide Documents Access and Management System, a.k.a. ADAMS), and have not found any evidence of my correspondence with you, regarding my appeal of your predecessor's backfit order. I am writing to ask you to keep the public informed of the NRC's regulatory activities simply by recording this correspondence in ADAMS.

I refer, specifically to three messages that ought to be entered into the ADAMS database:

- (1) My e-mail message to you, dated August 28, 2018 (32 weeks ago), in which I submitted an appeal of the former EDO's de facto backfit order, dated September 15, 2016.
- (2) Your e-mail message to me, dated October 17, 2018 (25 weeks ago), in which you denied that appeal.
- (3) My e-mail message to you, dated February 21, 2019 (7 weeks ago), in which I submitted facts, and references (90 of them) that contradict the basis for your denial of the aforementioned appeal.

The three messages are reproduced below, as Enclosures (1), (2), and (3).

Please enter these messages, plus this one, into ADAMS, in accordance with the NRC's procedures that are intended to keep, "the public informed of the agency's regulatory, licensing, and oversight activities." Please send me the ADAMS Accession numbers that will point to publically available copies of these messages. I think that it's reasonable to expect receipt of these ADAMS numbers within two weeks from today.

Thank you,

Sam Miranda, PE

Enclosure (1) --- Backfit Appeal -----

From: Samuel Miranda <sm973@caa.columbia.edu>

Date: Tue, Aug 28, 2018 at 11:34 AM

Subject: Appeal of EDO's de facto Backfit Order

To: <Margaret.Doane@nrc.gov>

Cc: <Annette.vietti-cook@nrc.gov>, <CMRBURNS@nrc.gov>, <cmrsvinicki@nrc.gov>, <cmrbaran@nrc.gov>, <cmrcaputo@nrc.gov>, <cmrwright@nrc.gov>, <Robert.Lewis@nrc.gov>

28 August 2018

Congratulations on your recent promotion to the NRC's EDO position.

Regrettably, I have to call your attention to an outstanding issue that has been left behind by your predecessor. As EDO, it is now your responsibility to resolve it.

On September 15, 2016, almost two years ago, your predecessor granted an appeal, received from Exelon (the licensee) [1], regarding NRR's backfit order of October 9, 2015 [2]. Exelon's appeal had already been denied, twice, by NRR. When he granted this appeal, he agreed to every one of Exelon's arguments, and went on to establish several new NRC positions. These new positions formed a new, de facto backfit order. Furthermore, this de facto backfit order was issued without a backfit evaluation, or any input from the public. Some of these new NRC positions are demonstrably wrong, and untenable. They're well documented in ADAMS. For example, the de facto backfit order relieves Exelon from the requirement to account for the effects of critical, two-phase flow in certain of its licensing basis accident analyses. Critical, two-phase flow is a natural phenomenon that determines the break flow rate in all of the loss-of-coolant (LOCA) evaluation models that are regulated by 10 CFR §50.46. Its effects are fundamental to the analysis of many licensing basis accidents, in addition to the LOCA cases.

According to Section III of Management Directive (MD) 8.4, the EDO is responsible for reviewing and modifying, "any proposed facility-specific backfitting action on his or her own initiative or at the appeal of the affected licensee or stakeholders." As an author (and the initiator) of NRR's Backfit Order of 2015, I am an affected stakeholder, and empowered to submit an appeal to the EDO's de facto backfit order.

This appeal was submitted directly to the Commissioners, on May 31st. [3] This was necessitated by your predecessor's profound conflict of interest. (That appeal was not answered.) Since you do not have a conflict of interest, this appeal can now be properly addressed to you.

Since the prior EDO's de facto backfit order had not been declared, as such, the interval that is allowed for a backfit appeal has no beginning, and therefore, it's not defined. Furthermore, this backfit order is not even complete, since it's missing the backfit evaluation that is required by 10 CFR §50.109. Consequently, an appeal may be filed at any time (e.g., today). So, this appeal of the EDO's de facto backfit order is hereby filed in a timely manner. (Please respond in a timely manner.)

Please note too that the EDO's office is responsible for recording and tracking this appeal pursuant to NUREG-0910, "NRC Comprehensive Records Disposition Schedule." [4] I expect this message, along with all related documents and correspondence, to be entered into ADAMS, and made available to the public.

Please contact me for additional details. You may wish to assemble a team of technical experts to evaluate the particulars of my appeal, and to meet with me, and others, in a public setting. (It should be apparent, by now, that following your predecessor's example will not lead to a resolution of this issue.)

Thank you,

Samuel Miranda, PE

sm973@caa.columbia.edu

REFERENCES

- [1] 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)
- [2] 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, USNRC, October 9, 2015 (ADAMS No. ML14225A871)
- [3] "Appeal of the EDO's de facto Backfit Order", LTR-18-0218 (ADAMS No. ML18155A521)
- [4] USNRC, NUREG-1409, Backfitting Guidelines, dated July 1990. (ADAMS No. ML032230247)

Enclosure (2) --- Denial of Backfit Appeal -----

From: Doane, Margaret <Margaret.Doane@nrc.gov>

Date: Wed, Oct 17, 2018 at 2:11 PM

Subject: Exelon Backfit Appeal

To: sm973@caa.columbia.edu <sm973@caa.columbia.edu>

Dear Mr. Miranda:

Thank you for your email of August 28, 2018, regarding the Exelon backfit appeal.

The September 15, 2016, decision on the backfit appeal by my predecessor, Victor McCree, was based on a detailed review of relevant information by a Backfit Appeal Review Panel (Panel) made up of senior NRC staff and managers. Although the staff positions underlying the backfit could have provided additional safety margin, the Panel unanimously recommended that Exelon's appeal be granted because a compliance backfit was not justified on the facts presented. The Panel also identified that the licensing basis for Byron and Braidwood complies with the applicable regulations and provides adequate protection of public health and safety.

During its review, the Panel conducted an extensive document review; met with a number of relevant offices, as well as the Committee to Review Generic Requirements; obtained new risk analyses results from the Office of Nuclear Regulatory Research; and responded to questions from Mr. McCree regarding regulatory compliance, adequate protection, and risk significance. Given the detailed and methodical analysis that was performed, and the absence of new information, the NRC stands behind the backfit appeal decision.

Your email also states that you are appealing the backfit appeal decision to me because you view the decision as being a de facto backfit that establishes new NRC positions. However, the backfit appeal decision applied only to the Exelon backfit, and did not impose new or different staff positions on a licensee. Thus, the backfit appeal decision does not meet the definition of "backfit" in 10 CFR 50.109(a), and there is no existing backfit to be appealed.

The regulations in Title 10 of the Code of Federal Regulations (10 CFR), Section 2.206 provide a means for individuals to request that the NRC institute a proceeding to modify, suspend, or revoke a license, or for other appropriate action. This is the appropriate process for resolving any outstanding safety or compliance concerns you may have regarding the issues addressed in the Exelon backfit. I want to thank you for your interest in the NRC's work, and for taking advantage of this process since November 2016, to raise three separate issues directly or indirectly related to the backfit appeal. The NRC held multiple meetings with the Petition Review Boards and thoroughly reviewed your three petitions. The agency's determination and responses to the three petitions were provided in the NRC's closure letters (June 23 and August 23, 2017, and April 6, 2018).

Margaret M. Doane

Executive Director for Operations

Enclosure (3) --- Rebuttal of Denial of Backfit Appeal -----

From: Samuel Miranda <sm973@caa.columbia.edu>

Date: Thu, Feb 21, 2019 at 10:03 AM

Subject: Re: Exelon Backfit Appeal

To: Doane, Margaret <Margaret.Doane@nrc.gov>

Cc: <Annette.vietti-cook@nrc.gov>, <cmrsvinicki@nrc.gov>, <CMRBURNS@nrc.gov>, <cmrbaran@nrc.gov>, <cmrwright@nrc.gov>, <cmrcaputo@nrc.gov>, <david.lee@nrc.gov>, Broaddus, Doug <Doug.Broaddus@nrc.gov>, <Karla.Stoedter@nrc.gov>

Dear Ms. Doane,

I have received your reply, of October 17, 2018, to my e-mail message of August 28th, in which I submitted an appeal of the former EDO's *de facto* backfit order. I find it necessary to send you this response, since your reply fails to address any of the issues I raised in that appeal.

Here is my response. It evaluates your reply, and shows why your reply is not all responsive.

My e-mail message of August 28, 2018 is an appeal of the former EDO's *de facto* backfit order, not a request to revisit his backfit appeal decision of September 15, 2016, or reconsider any of my 10 CFR §2.206 petitions. Again, the former EDO's backfit appeal decision [3] did much more than grant Exelon's appeal. If his decision were simply a granting of Exelon's appeal, then it could have been conveyed with a simple one-liner (e.g., "Exelon's appeal is granted, and NRR's backfit order is hereby rescinded.") He granted Exelon's appeal, and then went on to set aside three general design criteria, a key federal regulation, and numerous, unspecified deficiencies in Byron and Braidwood's licensing basis. In this instance, he effectively imposed new NRC positions, upon the stakeholders (e.g., the public), not the licensee. Furthermore, this *de facto* backfit order was issued without the required backfit evaluation. According to MD 8.4, backfit orders are subject to appeal by stakeholders, as well as licensees.

Your reply also invokes a very creative reading of 10 CFR §50.109 to deny the existence of a backfit order. It cites irrelevant reports and petitions, demands new information, and also fails to recognize the new information that I have presented, in abundance. The NRC allowed Exelon to file three appeals, without demanding any new information.

The following is my response to your e-mail message of October 27, 2018. Its format copies your reply, section-by-section, each of which is followed by my comments. (Please add this response to ADAMS, and make it available to the public, in its entirety. NRC Schedule 2 of NUREG-0910, "NRC Comprehensive Records Disposition Schedule" pertains to the recording of this correspondence in ADAMS.)

My response ends with a summary and conclusion, and a description of several, relevant instances of waste, fraud, and abuse.

Your reply:

"The September 15, 2016, decision on the backfit appeal by my predecessor, Victor McCree, was based on a detailed review of relevant information by a Backfit Appeal Review Panel (Panel) made up of senior NRC staff and managers."

My comments:

"detailed review"

The "detailed review" of "relevant information" by his Backfit Appeal Review Panel (BARP) was intended to support your predecessor's backfit appeal decision (i.e., to overturn NRR's backfit order). It was not a balanced review or evaluation. Page 2 of the BARP's report [1] says so. It states, "On June 2, 2016, the licensee again appealed the NRC staff's decision, this time to the EDO. The purpose of this report is to provide information and recommendations to support the EDO's decision on the appeal." In the end, the BARP members focused upon the wrong questions, and consequently, reached the wrong answers. So, the BARP's report is irrelevant. It's basically a reiteration, in detail, of Exelon's backfit appeal. [2]

"relevant information"

Your predecessor's September 15, 2016 decision [3] was based upon a report [1] that was focused solely upon the ability of the pressurizer safety valves (PSVs) to relieve water, without tearing themselves apart, reliably reseal, and restore reactor coolant system pressure (RCS) to an acceptable level. His decision, and the BARP's report are very clear about this. Both state, "Without the presumption of PSV failure to reseal, the concerns in the Backfit SE related to event classification, event escalation, and

compliance with 10 CFR §50.34(b) and General Design Criteria 15, 21, and 29 are no longer at issue.” So, your predecessor’s September 15, 2016 decision sets aside four federal regulations solely upon a presumption that Exelon’s Crosby PSVs will not fail to reseat, ever. However, the BARP’s report fails to supply the facts needed to support this astonishing conclusion.

The BARP members had struggled to find the relevant test results needed to conclude that Exelon’s PSVs are capable of relieving water, and reliably reseating. (These are the test results that were cited by Exelon in its license amendment requests (LARs); but not supplied.) The panel didn’t find any definitive results, so it drew the supportive conclusion it needed by invoking its “well-informed engineering judgment” (i.e., guesswork).

This is telling. If the BARP had found the necessary test results, the BARP report could have been one page long; with one reference. Indeed, the BARP’s report [1] was 59 pages long, and listed 97 references. (Only a few of these references were actually cited in the text.) Therefore, the BARP’s “review” was only a literature search. It’s a literature search that failed to find a peer-reviewed, technical paper [4], which was published just a week after the BARP was chartered [5], and almost two months before the BARP report was issued. [1] This paper explained, in detail, why Exelon cannot possibly comply with the accident analysis acceptance criteria in Byron and Braidwood’s licensing basis.

“senior NRC staff and managers”

The “senior NRC staff and managers” who served on the BARP were: Gary M. Holahan (OEDO), Thomas G. Scarbrough (NRO), Michael A. Spencer (OGC), Theresa V. Clark (OEDO), and K. Steven West (NSIR).

The last member, K. Steven West, was also a member of the Committee to Review Generic Requirements (CRGR), which had been tasked by the former EDO, just two weeks earlier [6], to review the “adequacy of our guidance, training, and expertise for assessing issues for backfit implications and for responding to questions and concerns raised by our stakeholders.” Today, the same K. Steven West directs the NRC’s Region III Office. The NRC’s Region III Office has jurisdiction over Exelon’s Byron and Braidwood plants. This month, inspectors from this office are scheduled to conduct their triennial baseline design bases assurance inspection, at Exelon’s Braidwood plants. [7] This would be the first triennial baseline design bases assurance inspection to be conducted since the former EDO’s backfit appeal decision. [3]

NEI support

The EDO’s tasking memo [6] to the CRGR was accompanied by a letter from the NEI, dated January 20, 2016 [8], which questioned the NRC’s use of the compliance exception to the backfit rule. Among other things, NEI’s letter asserts: “NEI agrees with EGC that the NRC staff has not articulated an adequate basis for invoking the compliance exception to the backfitting rule in this case, and we continue to be concerned that misuse of the compliance exception is seriously undermining the efficacy of the agency’s backfitting program.”

Page 3 of the BARP’s report [1] states, “In addition to the document review, the Panel had the benefit of meetings with NRR (both the Division of Safety Systems and the Division of Engineering), the Office of the General Counsel, and the NRC Committee to Review Generic Requirements (CRGR). Both Exelon (Bradley Fewell, Senior Vice President of Regulatory Affairs) and NEI (Tony Pietrangelo, Senior Vice President and Chief Nuclear Officer) declined offers for a public meeting, but indicated a willingness to provide information if the Panel identified the need. The Panel did not identify a need for additional information from either Exelon or NEI to complete the review documented in this report.”

No Public Meeting

NRR’s appeal review panel had convened a public meeting [9], on March 7, 2016. The NRR appeal review panel heard arguments from Exelon, received comments from the public, and ultimately denied Exelon’s appeal. [10] The BARP didn’t convene a public meeting. Messrs. Fewell, and Pietrangelo declined BARP’s offer of a public meeting. It seems the BARP didn’t extend this offer to any other stakeholders (e.g., the public).

On September 15, 2016, the same day that he issued his decision regarding Exelon’s backfit appeal [3], the former EDO issued SECY-16-0105 [11], which informed the Commissioners that, “NRC holds over 1,000 public meetings every year, and the NRC will continue to ensure meaningful opportunities for the public and other stakeholders to participate in NRC regulatory activities, consistent with the openness strategies in NRC’s strategic plan.” The NRC’s Strategic Plan (NUREG-1614) states: “The NRC recognizes the public’s interest in the proper regulation of nuclear activities and provides opportunities for citizens to be heard. For that reason, to be consistent with ‘The NRC Approach to Open Government’, the agency is committed to providing

opportunities for the public to participate meaningfully in the NRC's decision-making process." In this case, NRR followed the NRC's Strategic Plan, whereas the former EDO, and his BARP did not.

So, why did the executives of Exelon and NEI decline the BARP's offer of a public meeting? Perhaps they didn't need one. As "senior executives" they had the option of "dropping in" for private meetings with the EDO and other NRC officials. MD 3.5 [12] states: "Senior executives of a licensee, applicant, or a potential applicant request the opportunity to conduct a 'drop-in' visit or similar management meeting with the EDO, with other senior managers at agency headquarters, or with senior managers of the region in which their facility is located. Because these visits or meetings are usually limited to a general exchange of information not directly related to any regulatory action or decision, they would not typically be public meetings." If a "drop in" visit is usually limited to a general exchange of information not directly related to any regulatory action or decision, then there is no reason to exclude the public. In practice, such "drop in" visits are almost always closed to the public. The visitor's log [13] shows that, on Friday, February 10, 2017, Bradley Fewell, and his VP of Licensing & Regulatory Affairs visited the NRC headquarters office at 6:45 AM. (The timing indicates that this visit was intended to be very much a closed meeting.) The "drop in" visiting privilege is not extended to members of the public.

Exelon used the MD 3.5 "drop in" privilege extensively. Exelon's senior legal executives (and a couple of engineers) visited the NRC's White Flint headquarters 34 times [13] during the period beginning shortly after Region III's denial of Exelon's appeal (around November 10, 2015) and ending on the day after the former EDO's granting of Exelon's appeal (September 16, 2016). [3] Ten of these visits were made by the attorneys who represented Exelon, on March 7, 2016, when the NRR appeal panel held its public meeting. [9] If this meeting is excluded from the "drop in" count, then there were 24 "drop ins", which occurred over a period of 9.9 months, or a little more than one "drop in" every other week. Each of "drop in" visits was made by a person who had also attended NRR's appeal panel public meeting of March 7, 2016.

Add the telephone call (i.e., a virtual visit) that the former EDO, and the BARP's chairman made to Bradley Fewell, Exelon's Senior Vice President of Regulatory Affairs, on June 30, 2016 (one week after the BARP was chartered by the EDO). [13] Also, add the letter of support from Tony Pietrangelo (NEI's Senior Vice President and Chief Nuclear Officer) that was submitted on January 20, 2016. This was effectively a written visit.

Details the detailed review missed

Finally, there are the technical aspects of design, operation, and compliance. PSV performance, whether relieving steam or water or a mixture of the two, has no influence, whatsoever, upon the licensee's compliance with the plant design requirement that prohibits the progression (or escalation) of an anticipated operational occurrence (i.e., an AOO or Condition II event) into a more serious, infrequent event (i.e., a Condition III event). Section 2.1.2.3 of ANS N18.2-1973 [14] requires that, "Condition II incidents shall be accommodated with, at most, a shutdown of the reactor." If, after the reactor is shut down, the RCS pressure continues to rise, and reaches the RCS design pressure (i.e., the opening set pressure of the PSVs), then the subject event is no longer a Condition II event. The incident has obviously not been accommodated with, "at most, a shutdown of the reactor". The incident must be categorized as a Condition III or IV event. Therefore, the PSVs, which cannot open until the RCS pressure attains a pressure that is 100 psi higher than the high pressure reactor trip setpoint, cannot possibly open in time to prevent a Condition II from becoming a Condition III event.

This design requirement, which has been widely known since 1973, was not "reviewed" in the BARP's report. When I called attention to the fact that PSVs cannot open during AOOs (i.e., while they're still AOOs), in my first petition [15], the PRB's closure letter [16] dismissed the issue with, "There is no requirement to justify the use of PSVs, in lieu of PORVs to respond to AOOs. Byron/Braidwood UFSAR, Section 5.4.13.1, states, 'The pressurizer power-operated relief valves are not required to open in order to prevent the overpressurization of the reactor coolant system. The pressurizer safety valves by themselves are sized to relieve enough steam to prevent an overpressurization of the primary system.' There is no statement that the PSVs cannot open during an AOO." The PORVs are installed in order to prevent the PSVs from being challenged by these transients, because their ability to reseal cannot be guaranteed. Furthermore, a failed PSV cannot be isolated, as can a failed PORV. The PRB shifted the requirement, from event escalation to overpressurization, and then used Section 5.4.13.1 to dismiss the issue. The PRB does not mention that UFSAR Section 5.4.13.3 states that the operation of PSVs is "undesirable".

Your predecessor's backfit appeal decision went beyond a mere overturning of NRR's backfit order. It exempted Exelon from meeting certain design standards and federal regulations. In so doing, he wrote a new backfit order. My appeal pertains to this *de facto* backfit order; not your predecessor's appeal decision.

Your reply:

“Although the staff positions underlying the backfit could have provided additional safety margin, the Panel unanimously recommended that Exelon’s appeal be granted because a compliance backfit was not justified on the facts presented.”

My comments:

“additional safety margin”

Your use of the term, “additional safety margin” is deceptive. There was no additional safety margin to be gained or even maintained by NRR’s backfit order. NRR’s backfit order would have restored the conservatism (not safety margin) that was lost when Exelon failed to comply with the specified regulations. Compliance-based backfits are analogous to safety-related product recalls. In the 1970s, Ford didn’t recall its Pintos to gain any additional safety margin.

It’s well known that, in accident analyses, conservative assumptions and values are necessary, and commonly applied in order to account for the effects of uncertainties. They guarantee that the reported analysis results will remain valid for the widest possible range of accident scenarios, even when all uncertainties are realized in the non-conservative direction. Conservative assumptions, or precautions do not provide safety margin that can be removed at will. Conservatism allows the licensee to claim that acceptable accident analysis results are a reliable, credible demonstration of compliance with plant design criteria for a wide range of possible scenarios. In the absence of conservative assumptions, acceptable analysis results can only be represented as some sort of probable demonstration of compliance. For this reason, conservatism is built into the accident analysis methodology that has been used by vendors, licensees, architect-engineers, and by the NRC reviewers for more than four decades.

It appears that the former EDO’s *de facto* backfit order lumped conservatism into “additional safety margin”, and then removed it.

In accident analyses, it is possible to reduce or remove safety margin; but this requires rigorous evaluations and analyses, which must be conducted according to NRC-approved methods. In MURPs [17], for example, the use of more accurate flow instrumentation justifies the allocation of a smaller, but still conservative measurement uncertainty allowance, which is then used to raise the authorized power level.

For the PSVs, application of this conservative approach requires the analyst to assume that PSVs will not reseal after having relieved water. This is because they’re not designed to relieve water, and the passage of water through them frequently causes them to be damaged and fail to reseal. The manufacturer, Crosby, and the supplier, Westinghouse, both specify that the PSVs are for steam relief, only. For example, WCAP-10105 states, “the design specification for pressurizer safety valves in Westinghouse designed nuclear power plants is for steam service only”. [18] Accident analyses that depend upon the operation of any equipment, even safety-related equipment, beyond its design capabilities demands the inclusion of some conservatism, to account for uncertainties in performance.

This conservatism is not an “additional safety margin” that can be waived by invoking “well-informed engineering judgment”. According to the former EDO’s *de facto* backfit order, Exelon’s PSVs are now absolutely reliable (i.e., infallible) components, insofar as they can be trusted to open and close, repeatedly; as necessary, even they’re operated, beyond their design capabilities, to relieve water. Even Murphy’s Law (i.e., as manifested by GDC 21) doesn’t apply to these valves. Therefore, the former EDO’s *de facto* backfit order essentially redesigns Exelon’s PSVs to include a fully trustworthy water relief capability.

Removal of conservatism, without sound justification, can lead to tragedy. On January 28, 1986, “the space shuttle Challenger exploded, and killed seven crewmembers, because two O-rings were operated beyond their design capabilities. These rings had lost their resiliency because the shuttle was launched on a very cold day. Ambient temperatures were in the low 30s and the O-rings themselves were much colder, less than 20°F. One day before the flight, the predicted temperature for the launch was 26°F to 29°. Concerned that the rings would not seal at such a cold temperature, the engineers who designed the rocket opposed launching Challenger on the next day. When presented with the available data, “A high-level NASA official responded that he was ‘appalled’ by the recommendation not to launch and indicated that the rocket maker, Morton Thiokol, should reconsider, even though this was Thiokol’s only no-launch recommendation in 12 years.” [19]

This “caused Thiokol management to discount proper technical concerns.” [20] So, NASA and Morton Thiokol removed a conservatism that was intended to account for uncertainties in O-ring performance, and this led directly to the explosion of the Space Shuttle Challenger. The conservatism demanded that the launch be delayed, to await warmer weather. The conservatism was eliminated in order to meet an already late launch schedule. (The launch had been originally scheduled for January 22nd.)

The Challenger disaster has been used as a case study in many discussions of engineering safety and workplace ethics. On February 25, 1986, a Presidential investigative panel held hearings with Morton Thiokol engineers [21] during which one of the engineers testified: “I had the feeling that we were in - it was a distinct feeling that we were in the position of having to prove it was unsafe instead of the other way around, which was a totally new experience.”

Another example of how removal of conservatism, without justification, can lead to tragedy, occurred on April 25, 1986, less than three months after the Challenger incident. Engineers, at Chernobyl, Unit 4, were ordered to bypass certain safety interlocks (i.e., conservatisms) in order to permit some very risky, low-power tests.

In this regard, the Byron and Braidwood *de facto* backfit order resembled the Challenger and Chernobyl incidents. The decision to eliminate important conservatism was made by the former EDO, without the technical evidence that was required to justify its elimination.

Leaking PSVs

Even Exelon’s infallible PSVs can leak after they’re seated. The BARP report [1] states, “the licensee stated that the PSVs would close after discharging water, although they may not be leaktight. The licensee stated that the leakage from up to three leaking PSVs is bounded by one fully open PSV.”

IN 86-92 [22], which is not listed among the BARP report’s 97 references, reports the results of a search of licensee event reports from January 1, 1983 through November 4, 1986. During this nearly four-year period, the search found 18 PSVs with setpoint drift, 12 valves with seat leakage, 1 valve with set pressure high and 1 valve designated as inoperable (Sequoyah 1). PSVs whose setpoints have drifted toward the low side could open unexpectedly (i.e., at relatively low pressures). Operating experience shows that PSVs, whose setpoints have drifted low, have opened, relieved steam, and then resealed, as designed. The BARP report mentions (but does not reference or describe) a Westinghouse report that evaluates PSV water relief considerations. [23]

Each of Exelon’s Byron and Braidwood plants is equipped with three PSVs. They’re described as Crosby Model HP-BP-86, size 6M6 (6-inch), spring-loaded pop type, opened by direct fluid pressure. Each PSV has a throat area of 3.6 sq. in. This is equivalent to a 2.1 inch diameter hole at the top of the pressurizer (i.e., the equivalent of a loss of coolant accident (LOCA) in the hot leg of the reactor coolant system). The Byron and Braidwood UFSAR [24] presents a series of analyses for small LOCAs, for a range of break sizes that include a 2-inch break. (See Subsection 15.6.5, “Loss-of-Coolant Accidents Resulting From a Spectrum of Postulated Piping Breaks Within the Reactor Coolant Pressure Boundary”.) Figure 15.6-15n depicts the break flow, and the consequential RCS depressurization that is predicted for a 2 in break. The initial break flow, at 2250 psia, is between 600 and 700 lbm/s. (The PSV leak flow rate would be higher, since it would occur at 2500 psia.) If one reads the break flow rate, from Figure 15.6-15n, to be about 650 lbm/s, then the initial break flow rate would be greater than 2 million lbm/h, or five times Crosby’s PSV rated steam flow relief capacity of 420,000 lbm/h. By definition, this is not a leak. It’s a LOCA. (See UFSAR Table 15.6-1b [24] for the results of a 2 inch break LOCA analysis.) An open PSV, by the way, is not isolable.

Subsection 15.6.2.1 of the Byron and Braidwood FSAR [24] verifies that this is not a leak. It states, “The maximum break size for which the normal makeup system can maintain the pressurizer level is obtained by comparing the calculated flow from the reactor coolant system (RCS) through the postulated break against the charging pump makeup flow at normal RCS pressure, i.e., 2250 psia. A makeup flow rate from one centrifugal charging pump is adequate to sustain pressurizer level and a pressure of 2250 psia for a break through a 0.375 inch diameter hole.” The flow area of a 2.1 inch diameter hole is more than 32 times the flow area of a 0.375 inch diameter hole. One centrifugal charging pump cannot possibly deliver enough makeup flow to replace the flow that exits the seated; but “leaking” PSVs. Again, this is a LOCA, not a leak.

In this case, the former EDO’s backfit appeal decision transformed a long-established conservatism for uncertainties into a removable “additional” safety margin, removed it, and also added a new AOO event to the Byron and Braidwood licensing basis. This is a frequently occurring, 2 in hot leg LOCA. This LOCA would be the predicted outcome (i.e., it would result without the assumption of any additional failures) of all anticipated operational occurrences (AOOs) that could fill the pressurizer, and open

the PSVs. AOOs, by definition, can occur one or more times during a year of reactor operation. So, the frequency of occurrence of this new, 2 in LOCA would be the sum of the frequencies of occurrence of all of the aforementioned AOOs.

This new, 2 in hot leg LOCA, when added to the Byron and Braidwood licensing bases, dramatically modifies a previously-held NRC position.

All the postulated events are grouped into four categories, each of which is defined according to its expected frequency of occurrence. [14]

Condition I, or Normal Operation: Operations that are expected frequently or regularly in the course of power operation, refueling, maintenance, or maneuvering of the plant (frequency of occurrence $\geq 1/\text{reactor-year}$)

Condition II, or Incidents of Moderate Frequency: Incidents, any one of which may occur during a calendar year for a particular plant (frequency of occurrence $\geq 0/\text{reactor-year}$)

Condition III, or Infrequent Incidents: Incidents, any one of which may occur during the lifetime of a particular plant (frequency of occurrence $\leq 1/\text{plant-lifetime}$)

Condition IV, Limiting Faults: Faults that are not expected to occur but are postulated because their consequences would include the potential for the release of significant amounts of radioactive material (frequency of occurrence = $0/\text{plant-lifetime}$)

The authorized lifetimes of the Braidwood plants have been extended from 40 years to 60 years. Therefore, the two-inch LOCA, which is categorized as a Condition III event, or Infrequent Incident, would be expected to occur no more than once in a plant lifetime of 60 years. Since the “leaking” PSV can be the direct result (i.e., no additional failures are assumed to occur) of a Condition II event, or Incident of Moderate Frequency, the 2 in LOCA could occur one or more times during a year of operation. This one change, *inter alia*, seriously undermines the foundation of nuclear safety analysis, and licensing, which are based upon a proven standard of event categorization and acceptance criteria that has been used by vendors, licensees, architect engineers, and regulators (foreign and domestic) since 1973 [14], and continues to be used, today. [25]

Unanimous recommendation

The BARP may have been unanimous in its conclusion; but that conclusion directly contradicted two previous appeal evaluation conclusions: one by Region III, and one by NRR. [10] The five BARP members determined that hundreds of engineers in Region III, and NRR were wrong (twice). For the record, the Director of NRR (Bill Dean) also questioned the former EDO’s appeal decision. [26]

It’s reasonable to ask how the BARP dealt with any received information that did not support its conclusion. It’s also reasonable to ask why the BARP members did not contact me, the backfit’s author, for any input.

Panels that are composed of like-minded people often reach unanimous conclusions. The BARP membership appears to have been structured to produce a unanimous conclusion, since it had no dissenting voice from NRR, which had already denied Exelon’s appeal. [10] In general, a unanimous conclusion is less credible than the same conclusion that is reached with at least one dissenting opinion. The dissenting opinion gives the reader an accounting of the evaluation process, and especially how it handled opposing views.

Your reply:

“The Panel also identified that the licensing basis for Byron and Braidwood complies with the applicable regulations and provides adequate protection of public health and safety.”

My comments:

The backfit order [27], two of the petitions [15] [28] that your reply cited, and a peer-reviewed, technical publication [4] identify at least 20 mistakes of fact and omissions that demonstrate, and meticulously document how the licensing basis for Byron and Braidwood fails to comply with the applicable regulations. Its licensing basis is rife with mistakes and omissions. The former EDO’s *de facto* backfit order accepts all of them, without explanation, and allows Exelon to continue to operate four large

nuclear plants, in Illinois, with known deficiencies in their licensing and design basis. Furthermore, these plants have been twice updated, and their operating lifetimes have been extended by 20 years.

Incomparable analyses in the licensing basis

Here are some examples of mistakes of fact and omissions that have nothing to do with the PSVs, or their performance.

Exelon's MUR application [29] "evaluates" the Chemical and Volume Control System Malfunction That Increases Reactor Coolant Inventory, Section II.2.10 (UFSAR Subsection 15.5.2) in the following manner: "This event is bounded by the evaluation of the boron dilution event in Section II.2.8 and the analysis of the inadvertent ECCS operation at power event in Section III.11. Therefore, the conclusions presented in the UFSAR remain valid." RG 1.70 [30] specifies that UFSAR Subsection 15.5.2 [24] is allocated for the analysis or evaluation of the Chemical and Volume Control Systems (CVCS) Malfunction that Increases Reactor Coolant Inventory. Therein, Exelon states, "An increase in reactor coolant inventory which results from the addition of cold, unborated water to the reactor coolant system is analyzed in Subsection 15.4.6, chemical and volume control system malfunction that results in a decrease in boron concentration in the reactor coolant. An increase in reactor coolant inventory which results from the injection of highly borated water into the reactor coolant system is analyzed in Subsection 15.5.1, inadvertent operation emergency core cooling system during power operation." So, Exelon deals with the analysis of Subsection 15.5.2 by referring to the analysis of Subsection 15.5.1. Subsection 15.5.1 reports the Inadvertent Operation of Emergency Core Cooling System during Power Operation. This is not a CVCS Malfunction, and this event is not comparable to the event that is to be reported Subsection 15.5.2.

Neither of the analyses in Subsections 15.5.1, and 15.5.2 is comparable to the event of Subsection 15.4.6, which concerns a reactivity anomaly, not an increase in reactor coolant inventory. In fact, the analysis in UFSAR Subsection 15.4.6 (i.e., a decrease in boron concentration) does not even include a model of a pressurizer. This is a mistake of fact. Furthermore, Subsection 15.5.2 does not contain an analysis or evaluation of any kind. This is an omission. Neither the mistake of fact nor the omission have any bearing upon the PSVs or their performance. The three event analyses are incomparable *toto caelo*. Yet, Exelon, the BARP members, and the former EDO treat them all as one (equivalent) event!

Pressurizer Safety Valves (PSVs)

The BARP also failed to recognize that the licensing basis for Byron and Braidwood does not define a link between the operation of PSVs, and a demonstration of compliance with the applicable regulations. The NRC reviewers, nor the BARP members, nor the EDO ever asked for such a link. In fact, it is the pressurizer power-operated relief valves (PORVs) that provide this link, not the PSVs.

In fact, operation of the PSVs is to be avoided. Subsection 5.4.13.3, "Design Evaluation" of Byron and Braidwood's UFSAR [31] states, "The pressurizer safety valves prevent reactor coolant system pressure from exceeding 110% of system design pressure, in compliance with the ASME B&PV Code, Section III. The pressurizer power relief valves prevent actuation of the fixed reactor high-pressure trip for all design transients up to and including the design step load decreases with steam dump. The relief valves also limit undesirable opening of the spring-loaded safety valves."

Section 1.4 of the BARP's report [1] correctly states, "the UFSAR Feedwater System Pipe Break analysis (Chapter 15.2.8) does not apply the single failure criterion to cause a PSV to stick open either during steam discharge or during water discharge." Then Section 3.4 states, "For the specific extended high pressure injection event, the 1988 SE states that water discharge through the PSVs and PORVs could be disregarded because of the long time available for operator action. However, the SE addressed water discharge through the PSVs and PORVs as part of the feedwater line break evaluation." Section 3.12.3 states, "the NRC staff evaluated the capability of the PSVs and PORVs during feedwater line break accidents, including water discharge. In these SEs, the NRC staff found that the performance of the PSVs and PORVs with water discharge was acceptable based on the EPRI tests. Therefore, the Panel also concluded that the licensee's reference to the EPRI testing program was not an omission or a mistake of fact." Section 6 concludes, "The Panel notes that water discharge through various pressurizer valves is not a new issue because water discharge has always been credited (by the licensee for Byron and Braidwood and other licensees) for the feedwater line break analysis in UFSAR Section 15.2.8."

Yes, "water discharge has always been credited (by the licensee for Byron and Braidwood and by other licensees) for the feedwater line break analysis in UFSAR Section 15.2.8." Water discharge has always been credited for feedwater line break

analyses because the feedwater line break is categorized as a Condition IV event. There is no design requirement that prohibits the aggravation of a Condition IV event into an event of a more serious category. In fact, a more serious category doesn't exist in any plant's design basis. That is, any or all PSVs that stick open, during a Condition IV feedwater line break, would create a small, hot leg LOCA; but that would be only a Condition III event. This would not violate the non-escalation criterion, since the initiating event would also be a Condition III event.

PSVs are solely a pressure relief system. They're designed to relieve enough steam to prevent the RCS pressure from rising above 110% of its design pressure (2750 psia). PSVs that limit RCS pressurization, in this way, are said to have fulfilled their safety function. Having fulfilled their safety function, they're not required to close. They cannot even be isolated from the reactor coolant system. Consequently, PSV closure, following steam or water relief, is not a required safety function for feedwater line break analyses, or of any Condition III or IV events.

The BARP members correctly observed that PSV water relief is commonly assumed to occur during Condition IV events; but failed to ask why! The BARP members found the information they needed to support the EDO's decision, and then stopped looking. "A little learning is a dangerous thing." (Alexander Pope, 1688 - 1744) The remedy is more learning. A more thorough investigation would have revealed that this information is simply not applicable.

Exelon's accident analyses, and the BARP's report [1] create a new assumption (e.g., the requirement to close) for the PSVs, and apply it to the mitigation of Condition II events (i.e., AOOs). This requirement cannot be fulfilled. If two or more valves are connected in parallel (e.g., the PSVs), and all of valves are required to close, in order to fulfill their safety function, then they cannot possibly achieve that safety function, and also meet the single failure requirement of GDC 21. Therefore, the former EDO, and the BARP set aside the problematic requirement to meet GDC 21 for the Byron and Braidwood plants. This is a new NRC position!

The BARP report refers to some PSV tests that were conducted in 1983 [32]. EPRI performed the following tests on the Crosby 6M6 PSV: "11 steam tests with filled loop seals, 3 steam-to-water transition tests, and 2 water tests. The report states that the valve experienced chatter during the tests, and one water test had to be terminated." Only two water tests were performed. At least one of them failed. Nevertheless, the BARP concludes that Exelon's Crosby 6M6 PSVs will reliably reseal after having relieved water. A 50% failure rate to reseal does not demonstrate that the valves will reliably reseal.

Appendix B of the BARP's report [1] states, "In January 1988, Westinghouse issued WCAP-11677 [33], which compared the EPRI test data with feedwater line break safety analyses. Westinghouse determined that all nuclear power plants addressed in the EPRI testing had PSVs that would operate reliably during water discharge. Westinghouse evaluated the performance of the Crosby 6M6 PSVs during the EPRI tests, and considered that the performance involved less significant flutter (half lift motion) than the chatter (full lift motion) determined in the EPRI report. Westinghouse concluded that the Crosby 6M6 PSV can pass slightly subcooled water at a minimum up to three times without damage." It seems that Exelon's Crosby PSVs would operate reliably during water discharge; but they could only "pass slightly subcooled water at a minimum up to three times without damage."

Westinghouse concluded that the Crosby 6M6 PSV can pass slightly subcooled water. Suppose the water is more than slightly subcooled. This would be the situation, for example, during an accident that occurs while the plant is operating at reduced power. Westinghouse also asserted that the Crosby 6M6 PSVs can pass slightly subcooled water at a minimum up to three times without damage. Does this mean that more than three times could cause damage? An incident at Salem, Unit 1, which occurred in 1994 [34], indicates that its PORVs, each of which is about half the size of a PSV, cycled open and closed about 300 times. [35]

Pressurizer Power-Operated Relief Valves (PORVs)

It is the PORVs, not the PSVs that are suitable, and available for operation during AOOs, to prevent the progression of AOOs into events of more serious categories. Unlike the PSVs, the PORVs can be driven closed, if necessary, or they can be isolated by manually closing upstream block valves.

In 1989, IN 89-90 [36] indicated that, "NUREG-0737, Item II.K.3.2 [37], addresses the need for reducing challenges to PSVs. Repetitive or frequent challenges to the PSVs may prevent the PSVs from reseating with a potential for an unisolable small-break loss-of-coolant accident (LOCA)." In 1994, NUREG/CR-6042 stated, "The safety valves and PORV are provided, as their names imply, to relieve abnormally high reactor coolant pressures. The safety valves open automatically on high pressure to prevent

rupture of the reactor coolant system. The PORV opens automatically at a lower pressure to prevent inadvertent and unnecessary opening of the safety valves.” [25]

In 1998, PG&E withdrew an LAR that sought to qualify its PSVs for water relief. [38] Westinghouse had advised PG&E that the water relief would be too subcooled. According to Exelon, this was not a problem for its Byron and Braidwood plants because the water relief, in those plants, would not be too subcooled. The following table will show that the designs of Byron and Braidwood are similar to Diablo Canyon 1 & 2; and they’re equipped with the same Crosby PSVs. In 2004, PG&E qualified its PORVs, not its PSVs, for water relief duty. [39]

Today, the Byron and Braidwood plants are the only plants that have been authorized, by the NRC, to operate their PSVs under water relief conditions. On the other hand, at least six plants have upgraded their PORVs to safety grade equipment; and qualified them for water relief duty. They are:

Salem Units 1 and 2 [40]	6/4/1997
Millstone, Unit 3 [41]	6/5/1998
Callaway [42]	9/26/2000
Diablo Canyon 1 & 2 [39]	7/2/2004

These licensees have demonstrated their plant designs’ compliance with written licensing commitments by applying their PORVs, not their PSVs.

PSVs vs PORVs

This table summarizes and compares the Diablo Canyon and the Byron/Braidwood units. The plants are similar in design, and age; but their licensing basis accident analyses are different.

	Diablo Canyon, Units 1 and 2	Byron and Braidwood Units
Licensee	Pacific Gas & Electric Company	Exelon Generation Co., LLC
Plant design	Four loop, Westinghouse PWR	Four loop, Westinghouse PWR
Rated power	3,411 MWth	3,645 MWth
Operations begun	1984 and 1985	1985, 1987, and 1988
Planned closure	2025	2044, 2046, and 2047 (or as early as 2022)
Relief device assumed for AOOs	2 PORVs	3 PSVs
History	1998, Failed attempt to qualify PSVs for water relief. [38] 2004, PORVs are upgraded and qualified for water relief. [39]	2001, water-qualified PSVs are assumed in accident analyses. [43]
Relief capacity (lbs/h, steam)	210,000 at 2350 psia, per PORV	420,000 at 2500 psia, per PSV
AOO analysis scenario	PORVs relieve water and reseal. One PORV could stick open. Pressure doesn’t reach PSV opening setpoint. (PSVs are not relevant.)	PSVs relieve water and reseal. Seated PSVs may leak; but not more than the steam flow of one open PSV. PORVs are not modelled.
Basis	Test results and analyses.	“Engineering judgment”.
Leak flow	None (PORVs can be closed or isolated).	≤ 420,000 lbs/h, steam; and ≥ 2 million lbs/h, water
Remedy for a stuck open valve	Close or isolate the PORV.	Depressurize to reduce leakage.
GDC 21 single failure criterion	Satisfied	Not satisfied (exempted)

Unlike the PSVs at Diablo Canyon, and other PWRs, which are qualified only for steam relief, the PSVs at the Byron and Braidwood plants are considered to be qualified for water as well as steam relief, and absolutely reliable.

Your reply:

“During its review, the Panel conducted an extensive document review; met with a number of relevant offices, as well as the Committee to Review Generic Requirements; obtained new risk analyses results from the Office of Nuclear Regulatory Research; and responded to questions from Mr. McCree regarding regulatory compliance, adequate protection, and risk significance. Given the detailed and methodical analysis that was performed, and the absence of new information, the NRC stands behind the backfit appeal decision.”

My comments:

“extensive document review”

Yes, there was an extensive document review. It was an inconclusive literature search. The panel claims that it met with a number of relevant offices; but there is no evaluation of the two prior appeals that were denied by Region III and NRR. Furthermore, the panel did not contact me, the author of the backfit order.

“Committee to Review Generic Requirements”

One of the BARP members was also a member of the CRGR. His membership in both bodies, means that each of these bodies was always up to date with the other’s deliberations. At least some of the meetings your reply mentions seem to have been redundant.

“new risk analyses”

Risk analysis results, adequate protection, and risk significance are not relevant to compliance exception-based backfits. So, obtaining new risk analyses results from the Office of Nuclear Regulatory Research was a waste of time, and money. (The risk analyses were requested by Exelon; but funded by the taxpayers.)

“absence of new information”

The NRC did not require any new information of Exelon, to support any of its appeals. I provided a wealth of new information; but none of it was acknowledged.

“the NRC stands behind the backfit appeal decision”

The backfit appeal decision went well beyond an appeal decision. It established a new backfit order that could jeopardize the public health and safety. I have appealed the new backfit order, not the backfit appeal decision.

Your reply:

“Your email also states that you are appealing the backfit appeal decision to me because you view the decision as being a de facto backfit that establishes new NRC positions. However, the backfit appeal decision applied only to the Exelon backfit, and did not impose new or different staff positions on a licensee. Thus, the backfit appeal decision does not meet the definition of “backfit” in 10 CFR §50.109(a), and there is no existing backfit to be appealed.”

My comments:

“there is no existing backfit”

Consider the definition of “backfit”, as it appears in 10 CFR §50.109(a):

“(a)(1) Backfitting is defined as the modification of or addition to systems, structures, components, or design of a facility; or the design approval or manufacturing license for a facility; or the procedures or organization required to design, construct or operate a facility; any of which may result from a new or amended provision in the Commission rules or the imposition of a regulatory staff position interpreting the Commission rules that is either new or different from a previously applicable staff position ...”.

The backfit definition does not specify upon whom new or modified requirements are to be imposed. Management Directive (MD) 8.4 indicates that new or different staff positions could be imposed upon a stakeholders, as well as licensees. Section III of

MD 8.4 allows for appeals from “the affected licensee or stakeholders.” As an author of the original backfit order, and stakeholder, I can file an appeal in accordance with both 10 CFR §50.109, and MD 8.4.

Note, too that the 10 CFR §50.109(a) definition allows for a, “modification of or addition to systems” “Modification” means removals, additions, and replacements. The former EDO’s *de facto* backfit order is a modification, since it removes 10 CFR §50.34(b), GDC 15, GDC 21, GDC 29, and certain other requirements in the Licensing Bases of the Byron and Braidwood plants.

Removing a requirement that is imposed upon a licensee (e.g., Exelon) is equivalent to imposing a burden (or requirement) upon stakeholders with opposing interests. This would include Illinois residents, ratepayers, members of the public, and me, the backfit’s author. Predictably, a removal (or relaxation) of requirements would not likely draw an appeal from the licensee; but it can (and should) draw an appeal from stakeholders (e.g., the public) whose health and safety is undermined by said removals. The former EDO imposed a backfit, in a negative way, by removing requirements. This backfit must be subject to the same evaluation requirements that apply to backfits that add requirements.

There is a requirement and procedure that applies to revising regulations, like 10 CFR §50.109. It’s specified in 10 CFR §2.801, “Initiation of Rulemaking”, and it includes a provision for the collection of public comments.

Your reply:

“The regulations in Title 10 of the Code of Federal Regulations (10 CFR), Section 2.206 provide a means for individuals to request that the NRC institute a proceeding to modify, suspend, or revoke a license, or for other appropriate action. This is the appropriate process for resolving any outstanding safety or compliance concerns you may have regarding the issues addressed in the Exelon backfit.”

My comments:

“Title 10 of the Code of Federal Regulations (10 CFR), Section 2.206”

Title 10 of the Code of Federal Regulations (10 CFR), Section 2.206 is not the appropriate process for resolving any outstanding safety or compliance concerns. The record will show that this process is not effective, or even credible. On August 22, 2017, the OIG reported the results of its audit of the 10 CFR §2.206 process. [44] [45] OIG concluded that, “NRC has not issued orders in response to any of the thirty-eight (38) 10 CFR §2.206 petitions filed from fiscal year (FY) 2013 through FY 2016. The lack of such actions could adversely affect the public’s perspective on the effectiveness of the agency’s 10 CFR §2.206 petition process.” The next day, August 23rd, the NRC staff closed my petition OEDO-17-00075. [46] So, the OIG’s number increased by one, to thirty-nine (39).

The NRC has not issued any orders in response to the hundreds of 10 CFR §2.206 petitions that it has received since 10 CFR §2.206 was promulgated, in 1974. 10 CFR §2.206, like the First Amendment of the Constitution, protects the right of the people to petition the Government for a redress of grievances. Therefore, the NRC’s systematic dismissal of hundreds of 10 CFR §2.206 petitions denies Americans their First Amendment right to petition the NRC with a grievance when it fails to regulate licensees, or even to follow its own procedures (i.e., MD 8.11). Furthermore, individual NRC employees who reject 10 CFR §2.206 petitions, without sound technical reasons, violate their oaths to “support and defend the Constitution” and to “faithfully discharge the duties of the office” (5 U.S.C. §3331).

I filed two (not three) 10 CFR §2.206 petitions [15] [28] that could be linked, even remotely, to Exelon’s compliance failures. MD 8.11 [47] [48] does allow for appeals by petitioners, so it was necessary to write letters of rebuttal to the PRBs. [49] [50] My letters of rebuttal identified flaws in the Petition Review Boards’ evaluations, which relied upon mistakes of fact, selective omissions, logical fallacies (e.g., begging the question), and even a denial of at least one law of nature (e.g., critical two-phase flow) to dismiss the petitions.

Furthermore, I am informed that MD 8.11, which controls the staff’s review of 10 CFR §2.206 petitions, is currently being revised. On February 8th, the NRC Commissioners held a public meeting [51], in which I participated, to discuss the proposed revisions to MD 8.11. At that meeting, the NRC staff committed to implement the OIG’s recommendations. The proposed MD 8.11 revisions were to be completed by April. That was delayed until the end of 2018. [52] [48] Today, MD 8.11 is still revised. This one additional year of revisions that will be made without an opportunity for public comment. The proposed revisions I’ve

seen, last February, are generally self-serving. They're designed to "streamline" the process. ("Streamline" is the staff's word, not mine.)

In its 2017 audit [44] of the 10 CFR §2.206 process, the OIG found that 38 petitions were received in three years; but no petition-based orders were issued. If this rate of petition submittals (i.e., a little more than one per month, is extrapolated over the period of MD 8.11's existence (i.e. from 1999 to the present), then the total number of petitions received would be expected to be about 235. However, there is no evidence to show that the rate of petition submittals is necessarily constant over a 19 year period. Therefore, the assumed rate of petition submittals can be conservatively halved, and the number of petitions received, by the NRC, would still be greater than 100. Then it is reasonable to estimate that the petition-based NRC order rate would be much less than one percent. That is, not one member of the public, in a hundred, has been able to convince the NRC staff that a 10 CFR §2.202 order was necessary. This seems to be consistent with the NRC staff's record in dealing with whistleblower complaints. Between 2010 and 2016, employees at the nation's nuclear power plants filed 687 whistleblower complaints with the NRC. The NRC staff investigated 235 of those complaints, and upheld none. [53]

Today, more than 18 years after the last MD 8.11 revision was issued, in October, 2000, the NRC staff is preparing two revisions to MD 8.11, one long [54] and one short. [55] The short, or "streamlined" version is billed as a desk reference for the long version.

Currently, MD 8.11 specifies that Office Directors, have overall responsibility for assigned petitions. It states, "Because 10 CFR §2.206 petitions request enforcement-related action, petitions are assigned to the Office of Nuclear Reactor Regulation, the Office of Nuclear Material Safety and Safeguards, the Office of Enforcement, or the Office of the General Counsel. Therefore, most of the actions described in this directive and the associated handbook apply only to those offices." A proposed revision adds the New Reactors Office (NRO), and the Office of International Programs (OIP), and relegates the offices of Enforcement, and the General Counsel to advisory roles.

The revision also deletes, "most of the actions described in this directive and the associated handbook apply only to those offices." In 2016, when I filed my first petition, OEDO-16-00783, the EDO assigned its review to the Office of Nuclear Reactor Regulation (NRR); but the petition review board (PRB) manager was drawn from the Office of Research (RES). RES is notably absent from MD 8.11's list of eligible offices. This PRB manager, then closed the petition without any concurrence from NRR. [16] In fact, his closure letter did not even mention anyone from NRR.

Another proposed revision introduces the term, "abeyance" (i.e., a petition may be held in abeyance). So, a petition can be accepted for review, and then be put on hold, indefinitely, for a variety of reasons. The OIG's audit observed that, some petition review criteria allow staff to reject a petition if a "proceeding" is underway, but there is no clear or consistent definition of a "proceeding." [44] It seems the review of my second petition, OEDO-17-00075, regarding Westinghouse's letters, NSAL 93-013, and NSAL 07-10, was held in "abeyance".

Your reply:

"The agency's determination and responses to the three petitions were provided in the NRC's closure letters (June 23 and August 23, 2017, and April 6, 2018)."

My comments:

"three petitions"

Your reply cites three petitions, none of which have any relation to the new positions in the former EDO's *de facto* backfit order. Furthermore, the PRBs rejected the first two petitions by referencing the BARP's irrelevant report more than 14 times. My responses to both petition closure letters explain and document the faults in the NRC staff's reviews.

My first petition, OEDO-16-00783, was filed on November 15, 2016. [15] It identified 20 specific errors and omissions in the licensing bases of Exelon's Byron and Braidwood Stations. OEDO-16-00783 was closed on June 23, 2017. [16] None of the 20 errors or omissions were addressed.

OEDO-16-00783, concerned faults that existed, and still exist, in Exelon's Byron and Braidwood licensing basis; it does not address any of the new positions that have been established by the former EDO's *de facto* backfit order. So, your reference to OEDO-16-00783 is not responsive to my appeal.

My second petition, OEDO-17-00075 was filed on January 25, 2017. [28] It pertained to advice that Westinghouse disseminated to its customers through its series of Nuclear Safety Advisory Letters (NSALs). OEDO-17-00075 concerns letters that Westinghouse published decades before the NRR issued its backfit order. OEDO-17-00075 also names dozens of Westinghouse-designed nuclear plants, sited all over the world. Four of these plants are Exelon’s Byron and Braidwood units. OEDO-17-00075 was closed on August 23, 2017. [46] The issues raised in OEDO-17-00075 were deferred (i.e., they were not addressed).

OEDO-17-00075, concerned Westinghouse’s NSALs; it does not address any of the new positions that have been established by the former EDO’s *de facto* backfit order. So, your reference to OEDO-17-00075 is not responsive to my appeal.

My third petition, OEDO-17-0341 [56], was closed on April 6, 2018. [57] It didn’t pertain to Exelon’s backfit appeal, in any way. This petition concerned the NRC’s practice of re-licensing old nuclear power plants that are reaching the ends of their design operating lifetimes. (These plants, licensed according to 10 CFR §50, are re-licensed according to 10 CFR §54.) So far, 93 operating plants have been authorized to operate for an additional 20 years (or 40 years in at least one docket). OEDO-17-0341 concerned the re-licensing of old nuclear power plants; not to any of the new positions that have been established by the former EDO’s *de facto* backfit order. So, your reference to OEDO-17-0341 is not responsive to my appeal, and serves no purpose in your reply.

The PRBs’ reviews of these three petitions did not reflect anything like the “prompt and thorough evaluation of any potential problem addressed by a petition filed under 10 CFR §2.206” that is promised in MD 8.11’s Objectives. The PRBs simply denied, dismissed or avoided every one of the issues I raised in these petitions.

Summary:

The following table depicts a chronological summary of the events that pertain to the aforementioned issues. It also includes some events that will add some historical perspective.

An Annotated Chronology of Events

Date	Event Description and Reference	Note
Mon 8/6/1973	American Nuclear Society, "Nuclear Safety Criteria for the Design of Stationary Pressurized Water Reactor Plants, ANS-N18.2-1973 is issued. [14]	(1)
Fri 4/5/1974	10 CFR §2.206 is promulgated.	
Tue 8/20/1974	Incident occurs at Beznau plant, in Switzerland. [58]	(2)
Fri 10/11/1974	Energy Reorganization Act of 1974 [59] is promulgated.	
Fri 9/24/1977	Incident occurs at Davis Besse plant. [60]	(3)
Wed 3/28/1979	Incident occurs at Three Mile Island, Unit 2. [60]	(3)
Tue 8/26/1980	Inadvertent ECCS at Surry, Unit 2	(4)
Fri 10/31/1980	NUREG-0737 is issued. [37]	(5)
Thu 1/29/1981	Inadvertent ECCS at H.B. Robinson	(4)
Tue 6/1/1982	WCAP-10105, “Review of PSV Performance as Observed in the EPRI Safety and Relief Valve Test Program”, is issued. [18]	(6)
Thu 2/14/1985	Byron 1 Operating License is issued	(7)
Fri 1/30/1987	Byron 2 Operating License is issued	(7)
Thu 7/2/1987	Braidwood 1 Operating License is issued	(7)
Fri 5/20/1988	Braidwood 2 Operating License is issued	(7)
Thu 12/28/1989	IN 89-90, PSV Lift Setpoint Shift, is issued. [36]	(5)
Thu 4/7/1994	Incident occurs at Salem, Unit 1. [34]	(8)
Fri 9/23/1994	MD 8.11 is issued	
Wed 6/4/1997	NRC approves the PORVs, at Salem Units 1 and 2, as safety grade, and qualified for water relief. [40]	(9)
Fri 6/5/1998	NRC approves the PORVs, at Millstone, Unit 3, as safety grade, and qualified for water relief. [41]	

Date	Event Description and Reference	Note
Thu 10/22/1998	PG&E withdraws LAR to use water-qualified PSVs. [38]	
Fri 6/2/2000	Inadvertent ECCS occurs at Shearon Harris, Unit 1 [61]	(4)
Tue 9/26/2000	Callaway: safety-grade, water-qualified PORVs. [42]	
Fri 5/4/2001	Power uprating is approved for Byron and Braidwood; NRC accepts the use of water-qualified PSVs in accident analyses. [43]	(10)
Fri 7/2/2004	Diablo Canyon 1 & 2: safety-grade, water-qualified PORVs. [39]	
Sun 4/17/2005	Incident occurs at Millstone, Unit 3. [62]	(11)
Tue 12/14/2005	RIS 2005-29, "Anticipated Transients that Could Develop into More Serious Events", is issued. [63]	(12)
Wed 11/7/2007	NSAL-07-10 [64] is issued, repeating the rationale of NSAL-93-013.	
Tue 6/23/2011	Exelon files an LAR for a Measurement Uncertainty Recapture (MUR) Power Uprate. [29]	
Mon 4/30/2012	Inadvertent ECCS signal is generated at Salem, Unit 1 [65]	(4)
Fri 12/12/2013	Backfit process begins with a non-concurrence in the review of Exelon's MUR uprating request. [66]	(13)
Fri 2/7/2014	MURP uprating is approved, despite the reviewer's objection. [17]	(14)
Fri 2/28/2014	The non-concurrence is recorded, the backfit issuance process is begun. [67] It takes 1.6 years to issue the backfit order. [27]	
Mon 6/29/2015	Michigan v. EPA, 135 S.Ct. 2699 (2115), is decided. [68]	(15)
Tues 9/1/2015	Victor McCree is appointed EDO.	
Fri 10/9/2015	NRR issues its backfit order to Exelon. [27]	
Fri 11/6/2015	Exelon appeals backfit to Region III Office.	(16)
Tue 11/10/2015	Region III Office denies Exelon's appeal.	(16)
Tue 11/17/2015	Exelon's Assistant General Counsel visits NRC. [13]	(17); (18)
Tue 12/8/2015	Exelon appeals the backfit to NRR. [69]	(19)
Wed 12/9/2015	Exelon's Assistant General Counsel visits NRC. [13]	(17); (18)
Fri 12/11/2015	Exelon's Sr VP of Licensing & Regulatory Affairs & General Counsel, and VP of Licensing & Regulatory Affairs visit NRC visits NRC. [13]	(17); (18)
Thu 12/17/2015	Exelon's Assistant General Counsel visits NRC. [13]	(17); (18)
Thu 1/7/2016	Exelon's Assistant General Counsel visits NRC. [13]	(17); (18)
Wed 1/20/2016	NEI's letter supporting Exelon's appeal and complaining about the Compliance Exception is sent to the NRR Office Director. [8]	(20)
Thu 1/21/2016	Exelon's Assistant General Counsel visits NRC. [13]	(17); (18)
Thu 3/3/2016	Exelon's Assistant General Counsel visits NRC. [13]	(17); (18)
Fri 3/4/2016	Exelon's Assistant General Counsel visits NRC. [13]	(17); (18)
Mon 3/7/2016	NRR public meeting re Exelon's backfit appeal. 10 lawyers, representing Exelon, are in attendance. [9] Exelon's Assistant General Counsel makes a presentation.	(12)
Tue 3/8/2016	Exelon's Assistant General Counsel visits NRC. [13]	(17); (18)
Fri 3/11/2016	Exelon's Assistant General Counsel visits NRC. [13]	(17); (18)
Wed 3/23/2016	Exelon's Sr VP of Licensing & Regulatory Affairs & General Counsel, and VP of Licensing & Regulatory Affairs visit NRC visit the EDO. [13]	(17); (18)
Tue 3/29/2016	Exelon's Assistant General Counsel visits NRC. [13]	(17); (18)
Wed 4/20/2016	Exelon's Assistant General Counsel visits NRC. [13]	(17); (18)
Tue 5/3/2016	NRR denies Exelon's backfit appeal. [10]	
Thu 6/2/2016	Exelon appeals backfit directly to the EDO. [2]	(21)
Thu 6/9/2016	EDO tasks the CRGR. [6]	

Date	Event Description and Reference	Note
Mon 6/20/2016	Exelon's Assistant General Counsel visits NRC. [13]	(17); (18)
Wed 6/22/2016	EDO's backfit appeal review panel (BARP) is chartered. [5]	
Tue 6/28/2016	Exelon's Assistant General Counsel visits NRC. [13]	(17); (18)
Thu 6/30/2016	A relevant technical paper is published by the ASME. [4] EDO and BARP chairman telephone Exelon's Sr VP of Licensing & Regulatory Affairs & General Counsel. [13]: page 642	
Thu 7/14/2016	Exelon's Assistant General Counsel visits NRC. [13]	(17); (18)
Thu 7/21/2016	Exelon's Assistant General Counsel visits NRC. [13]	(17); (18)
Tue 7/26/2016	Exelon's Assistant General Counsel visits NRC. [13]	(17); (18)
Thu 8/16/2016	A risk evaluation report, requested by Exelon, is issued by RES. [70]	
Tue 8/23/2016	BARP's report is issued. [1]	(22)
Tue 9/13/2016	CRGR convenes a public meeting re its assessment of the NRC's implementation of backfitting. [71] Exelon's Assistant General Counsel attends this meeting and makes a presentation. [72]	(17)
Wed 9/14/2016	Exelon's Assistant General Counsel visits NRC. [13]	(17); (18)
Thu 9/15/2016	EDO grants Exelon's appeal [3], and issues new backfit. EDO requests the staff to review Westinghouse's NSAL. [73] EDO responds to the NRR Director's questions. [26] EDO issues SECY-16-0105. [11]	(23) (24) (25)
Fri 9/16/2016	Exelon's Assistant General Counsel visits NRC. [13]	(17); (18)
Thu 9/22/2016	NEI issues a press release reporting the backfit appeal result. [74]	(26)
Thu 10/4/2016	Summary of CRGR's 9/13/2016 public meeting is issued. [71] [72]	
Mon 10/31/2016	NEI comments on CRGR's public meeting of 9/13/2016. [75]	
Tue 11/15/2016	Enforcement petition OEDO-16-00783 is filed. [15]	(28)
Wed 11/16/2016	Exelon's VP of Licensing and Regulatory Affairs visits NRC. [13]	(17); (18)
Wed 12/21/2016	Letter from Senators Inhofe, and Capito Stephen Burns, Chairman, USNRC, dated December 21, 2016. [76]	(27)
Tue 1/3/2017	NRR sends its plan to assess NSAL 93-013 [73] to the EDO. [77]	
Tue 1/9/2017	Energy Insider Reports, "Senators request monthly progress reports from NRC" [78]	
Wed 1/25/2017	OEDO-17-00075 regarding NSAL 93-013 is filed. [28]	
Fri 2/10/2017	Exelon's Sr VP of Licensing & Regulatory Affairs & General Counsel, and VP of Licensing & Regulatory Affairs visit NRC (at 6:45 AM). [13]	(17); (18)
Mon 2/13/2017	Exelon's Assistant General Counsel, and it's legal representative from Morgan Lewis visit NRC [13]	(17); (18)
Thu 2/16/2017	PRB meets, internally, to consider OEDO-16-00783. Exelon's Sr Licensing Engineer, and Assistant General Counsel visit NRC. [13]	(17); (18)
Fri 2/17/2017	Exelon's Assistant General Counsel visits NRC. [13]	(17); (18)
Tue 2/28/2017	CRGR holds 2nd public meeting (scheduled for 3 hrs; ends in 1 hr). Exelon's Assistant General Counsel attends. [13]	(17); (18)
Thu 3/23/2017	Allegations against the former EDO filed with OIG [79]	(29)
Tue 6/6/2017	NEI sends a letter to the EDO regarding "Compliance with General Design Criteria". [80]	(30)
Fri 6/23/2017	OEDO-16-00783 closure letter is issued. [16]	
Fri 6/27/2017	CRGR's report is issued. [81] A 2003 proposal to supply backfitting support services, from the Office of Nuclear Regulatory Research, is added to ADAMS. [82]	(31); (32)
Mon 7/17/2017	Petitioner rebuts closure of OEDO-17-00783. [49]	(33)

Date	Event Description and Reference	Note
Tue 8/22/2017	OIG issues its audit results (OIG-17-A-23) re the NRC's 10 CFR §2.206 review process.	
Wed 8/23/2017	OEDO-17-00075 closure letter is issued. [46]	
Tue 9/5/2017	Petitioner rebuts closure of OEDO-17-00075. [50]	
Wed 9/13/2017	Petition (OEDO-17-0341) re-license renewals is filed. [56]	(34)
Tue 10/31/2017	Letter from Senators Barrasso, and Capito to Kristine Svinicki, Chairman, USNRC, dated October 31, 2017. [83]	
Thu 12/7/2017	NRR convenes public meeting re planned revision of MD 8.11.	
Sat 12/30/2017	RIII Office Director retires.	
Sun 12/31/2017	K. Stephen West becomes RIII Office Director.	
Thu 2/8/2018	NRC Commissioners hold public meeting re 10 CFR §2.206 review process. [52]	(35)
Wed 3/14/2018	NRC's annual Regulatory Information Conference (RIC) includes a session regarding NRR's backfit, and Exelon's appeals. Presentations were made by attorneys from Exelon and NEI. [84]	
Fri 4/6/2018	Petition (OEDO-17-0341) regarding license renewals is closed. [85]	(34)
Tue 5/29/2018	Annie Caputo becomes an NRC Commissioner. [86]	(27)
Sat 6/30/2018	Former EDO retires, after serving 2 yrs, 10 mos. as EDO.	
Tue 8/28/2018	Stakeholder's appeal of EDO's <i>de facto</i> backfit is filed.	
Wed 10/17/2018	EDO does not recognize a <i>de facto</i> backfit order	
Tue 12/12/2018	Plans for Braidwood Design Basis Assurance Inspection. [87] [88]	(36)

Notes:

- (1) ANS-N18.2-1973 defines four categories of events, and the analysis acceptance criteria for each category. This is used by all operators of PWRs (US and foreign) for deterministic licensing basis accident analyses. An equivalent standard, ANS-222, is issued for BWRs in May, 1974.
- (2) One of two turbines tripped at Beznau-1, both PORVs opened, and one stuck open. The operator closed the PORV block valve in 2 – 3 min. The cast iron frame between valve body and operator was broken, and the valve spindle was bent, probably due to water hammer (slug flow) and a poorly supported discharge line. The operator ended ECCS flow before the pressurizer became water-solid. (Ginna was equipped with PORVs of the same PORV design, and materials.)
- (3) This incident began with a Condition II anticipated operational occurrence, and then developed into a Condition III infrequent event, without the occurrence of any additional faults. The PORVs opened and relieved water; but none failed to reseal.
- (4) Inadvertent ECCS actuation is an AOO that could cause the PORVs (ot the PSVs) to open and relieve steam, in plants whose ECCS designs employ charging pumps. If the pressurizer fills, then they will relieve water. PORVs that are not qualified to relieve water are assumed to stick open, and create a small LOCA at the top of the pressurizer. This AOO plays an important role in NRR's backfit, and Exelon's subsequent appeals.
- (5) "Repetitive or frequent challenges to the PSVs may prevent the PSVs from reseating with a potential for an unisolable small-break loss-of-coolant accident (LOCA)."
- (6) The WCAP states, "the design specification for pressurizer safety valves in Westinghouse designed nuclear power plants is for steam service only".
- (7) The licensing basis includes ANS N18.2 [14] by reference and use.
- (8) The PORVs opened and relieved water; but none failed to reseal. The NRC fined PSE&G \$500,000.
- (9) In 1996, I worked at PSE&G's Salem site, where I helped to prepare, submit, and support its LAR for the qualification of Salem's PORVs as safety grade components that are qualified to relieve water (the first such approval in the industry).
- (10) The NRC staff accepts Exelon's use of PSVs, under water relief conditions, in accident analyses.

- (11) The PORVs opened and relieved water; but none failed to reseal. Millstone's PORVs were safety grade components that were qualified to relieve water.
- (12) RIS 2005-29, "Anticipated Transients that Could Develop into More Serious Events", received 16 concurrences, including one from an OGC lawyer who subsequently went to work for Exelon, as Assistant General Counsel, and filed Exelon's backfit appeals. She attended NRR's backfit appeal meeting of March 7, 2016.
- (13) NCP-2013-014 was signed on December 12, 2013; but not added to ADAMS until July 12, 2016, ten days after Exelon filed its backfit appeal with the EDO. [2]
- (14) The Backfit Rule, 10 CFR §50.109(4), states: "No licensing action will be withheld during the pendency of backfit analyses required by the Commission's rules."
- (15) The Supreme Court found for Michigan, by a 5-4 decision, that the EPA unreasonably interpreted the Clean Air Act's amendment when it deemed cost irrelevant to its regulation of power plants.
- (16) This is an estimated date (i.e., within about a week of actual). Shortly after the backfit order was issued, in October, 2015, Exelon filed an appeal with the NRC's Region III office, which is located in Lisle, Illinois. This office regulates commercial nuclear power operations in Illinois, where Exelon's office is located, as well as its Byron, and Braidwood nuclear generation plants.
- (17) This person also attended the NRR appeal review panel's public meeting of 3/7/2016. [9] There were 10 representatives from Exelon, 1 from NEI, and 1 from Morgan Lewis. It's possible that not every visit pertains to Exelon's backfit appeal.
- (18) MD 3.5 states: "Senior executives of a licensee, applicant, or a potential applicant request the opportunity to conduct a "drop-in" visit or similar management meeting with the EDO, with other senior managers at agency headquarters, or with senior managers of the region in which their facility is located. Because these visits or meetings are usually limited to a general exchange of information not directly related to any regulatory action or decision, they would not typically be public meetings. If a "drop in" visit is limited to a "general exchange of information not directly related to any regulatory action or decision," then a "drop in" visit should "typically" be a public meeting. In practice, they're closed meetings. Some visits are made for the purpose of attending public meetings of the NRC commissioners, the CRGR, or the ACRS. Such visits, if known, are not be counted as "drop ins".
- (19) The NRC staff appointed an appeal panel to evaluate the appeal, and held a public meeting, on March 7, 2016, to hear Exelon's case. At that meeting, Exelon was represented by ten (10) lawyers. [9] After about six months of evaluation, the NRC's appeal panel denied Exelon's second appeal.
- (20) NEI's letter [8] states: "NEI agrees with EGC that the NRC staff has not articulated an adequate basis for invoking the compliance exception to the backfitting rule in this case, and we continue to be concerned that misuse of the compliance exception is seriously undermining the efficacy of the agency's backfitting program."
- (21) Exelon offers no new information, in its appeal. EDO does not reject the appeal on this basis. Instead, he asks his BARP to give him a reason to overturn the decisions of his cognizant engineers.
- (22) BARP does not convene any public meetings during its review.
- (23) The former EDO's appeal decision, and his *de facto* backfit mark the end of the regulatory era in which the Backfit Rule's Compliance Exception might be applied, and the beginning of a new era in which the Backfit Rule's Compliance Exception must not be applied (i.e., the NRC technical review staff is condemned to repeat its mistakes, and overlook the mistakes of certain, privileged licensees). This is the "rough beast, its hour come round at last" that is slouching towards White Flint to be born. (Apologies to W.B. Yeats)
- (24) ANS standard N18.2-1973 [14] describes, as one example of a Condition II event, a minor reactor coolant system leak which would not prevent orderly reactor shutdown and cooldown assuming makeup is provided by normal makeup systems only. The NSAL [73] claims that, since the cause of the water relief is the ECCS flow, the magnitude of the leak will be less than or equivalent to that of the ECCS. The leak flow rate is determined by the critical two-phase flow phenomenon, which depends upon RCS pressure, temperature, and flow quality, not by the ECCS flow delivery rate. The NSAL logic is used, *verbatim*, in Chapter 15.5.1 of the Byron and Braidwood FSAR [24], and in other licensing submittals. According to Westinghouse, Exelon, and

the former EDO, the natural phenomenon of critical two-phase flow does not apply in this example. This is wrong! It is also inconsistent with the requirements of 10 CFR §50.46.

(25) SECY-16-0105 informs the Commissioners that, "NRC holds over 1,000 public meetings every year". Yet, the former EDO granted Exelon's backfit appeal, on the same day, without holding a public hearing.

(26) The lede of NEI's press release is, "In a win for good government, the U.S. Nuclear Regulatory Commission's highest-ranking career official formally decided last week that the NRC staff's new interpretation of an existing regulatory requirement did not meet the standard to impose changes on two nuclear plants." NEI "has over 260 corporate members in 15 countries" and "about 120 employees" at its Washington DC headquarters. It was founded in 1994, by merging the Nuclear Utility Management and Resources Council, the U.S. Council for Energy Awareness, the American Nuclear Energy Council, and the nuclear division of the Edison Electric Institute. Two of these NEI parent organizations, NUMARC and USCEA, were created by the Atomic Industrial Forum, which "was created in 1953 to focus on the beneficial uses of nuclear energy," helping to birth the "Atoms for Peace" PR campaign.

(27) Page 2 of [76] refers to the "recent decision by the Executive Director regarding an industry appeal of a backfit which was not consistent with written regulations." This backfit order underwent almost two years of reviews, by teams of diligent lawyers and cognizant engineers, before it was approved, and issued by NRR. This letter was signed by Senators Inhofe and Capito; but it referred questions to Annie Caputo, of the committee's staff. Before she joined the staff of the Senate's Environmental and Public Works Committee, Annie Caputo worked as a congressional affairs manager for Exelon from 1998 to 2005. Today, she is a Commissioner of the NRC.

(28) The petition described 20 errors and omissions in the licensing basis of Exelon's Byron and Braidwood Stations. Very few of these errors and omissions involved water relief through PSVs.

(29) Allegations were submitted in person, and by e-mail. There was no response, at all. The procedures in the NRC Allegation Manual [79] were not followed.

(30) This letter implies that it is the PDCs (principle design criteria, which are found in the Construction Permit); not necessarily the general design criteria (GDCs) that must be met. A Commission memo concluded that: "the design basis of the plant, as reflected in the PDCs, meets or exceeds the minimum criteria set forth in the GDCs." NRR's backfit order had identified certain that GDCs that had not been met. If the GDCs represent minimum criteria, and they're not met, then how could the minimum criteria possibly be met by the PDCs? The former EDO's backfit appeal decision sets aside three GDCs with respect to Byron and Braidwood licensing basis.

(31) According to Page 3 of this report, the offices with backfitting responsibilities are, "the Office of Nuclear Material Safety and Safeguards (NMSS), the Office of New Reactors (NRO), the Office of Nuclear Reactor Regulation (NRR), the Office of Nuclear Security and Incident Response (NSIR), OGC, the Office of Nuclear Regulatory Research (RES), and the four NRC regional offices". When did RES acquire any regulatory responsibilities? The Thadani letter was written in 2003, and added to ADAMS, by CRGR, on the same day its report was issued. It is a proposal, by RES, to supply administrative services to the offices with backfitting responsibilities.

(32) According to MD 8.11, "Petitions are assigned to the Office of Nuclear Reactor Regulation, the Office of Nuclear Material, Safety and Safeguards, the Office of Enforcement, or the Office of the General Counsel." The chairman of this petition's PRB was selected from the Office of Research. This office, which doesn't have any responsibility for the subject matter, is conspicuously absent from the list of eligible organizations. I objected to this appointment. No corrective action was taken.

(33) PRB's closure letter [16] for this petition invoked the BARP's report [1] 14 times, to avoid evaluating the issues raised in the petition.

(34) This petition is not related, in any way, to any backfit actions. It's included here, solely because the EDO cites it, along with two other petitions.

(35) The distribution list indicates that this meeting summary, dated February 20, 2018, was sent to every NRC employee; but not to any of the external participants.

(36) Commonwealth Edison (now Exelon) should have a design review package, pre-dating 2001, that justifies the re-purposing of its Byron and Braidwood PSVs to relieve water, as well as steam.

Conclusions:

Your reply bears very little relation to my appeal. It simply relies upon a discredited report [1] that has been used, extensively by the staff, to avoid addressing legitimate, safety-related issues that I've raised.

1. The NRC's transparency policy is not consistently followed. For example, the former EDO's backfit appeal decision was made without a public meeting. For another example, the 10 CFR §2.206 petition review procedure (MD 8.11) is being revised without any public meetings since February 8, 2018. (MD 8.11) is still not revised.)

2. The NRC does not provide for appeals of contested 10 CFR §2.206 petition reviews.

3. The NRC favors licensees over public stakeholders (e.g., MD 3.5), and favors Exelon over other licensees (e.g., the former EDO's backfit appeal decision).

4. It appears that knowledge of the foundation of nuclear safety analysis, and licensing, which follows a proven standard [14] of event categorization and acceptance criteria, applies specific safety margins and conservatisms, verifies the performance of computer models, and reactor systems and components through comprehensive testing, has been lost or forgotten. This is true for regulator and regulated, alike. (The NRC has replaced this system with "well-informed engineering judgment".) Furthermore, attempts, like mine, to apply some of that knowledge (e.g., through 10 CFR §2.206 petitions) are systematically rebuffed.

5. PSV closure, following steam or water relief, is not a required safety function for feedwater line break analyses, or of any Condition III or IV events. The BARP members correctly observed that PSV water relief is commonly assumed to occur during Condition IV events, and then used this to conclude that the NRR technical review staff had not made an error (an error is one reason a compliance-based backfit order may be issued). A more thorough investigation, the BARP members, would have revealed that PSV water relief during any Condition III or IV events is not relevant.

6. In the final analysis, the former EDO's backfit appeal decision, and his concurrent *de facto* backfit order were not even the products of engineering judgment (i.e., guesswork by engineers). Exelon's first appeals were evaluated by engineers and denied. Exelon's third (successful) appeal, to the EDO, appears to have been evaluated by managers, lawyers, lobbyists, Senate committee staffers, senators, and others. All of this was done under cover of an inconclusive literature search. [1] It seems that the EDO's basis for overturning NRR's backfit order amounted to little more than brute force. Engineering decisions that are taken by persons who lack the relevant education, and experience can have disastrous consequences. History is full of such examples (e.g., consider NASA's fatal launch of January, 1986). [21]

7. It seems that your reply is exactly the sort of reply that would be issued by a captured regulatory agency. [89] [90]

Finally, the former EDO's backfit appeal decision, his *de facto* backfit order, the NRC staff's reviews of my 10 CFR §2.206 petitions, and your reply to my appeal display a number of instances of waste, fraud, and abuse that should be addressed. They're summarized below.

Waste

1. Shortly after the former EDO received Exelon's appeal, he appointed a panel of five "senior NRC staff and managers" to review Exelon's appeal, and make the recommendations necessary to support his appeal decision. The panel failed to provide the requested support, since it asked the wrong questions. Consequently, the panel's conclusions were irrelevant, and also wrong. The time and effort, devoted by the five panel members, to produce their report [1], was a waste of taxpayers' money.

2. At Exelon's request, the former EDO also appointed another panel of five "senior NRC staff and managers" to perform a probabilistic risk evaluation of Exelon's regulatory compliance strategy. Probabilistic evaluations are not required for backfits that are based upon the Compliance Exception. So, this effort was based upon the premise that a backfit that is not justified by the Compliance Exception might be still be justified by a need to provide "adequate protection". The report was irrelevant, and did not figure in the former EDO's backfit appeal decision. So, the time and effort devoted by the five panel members to produce their report [70] was another waste of taxpayers' money.

3. Two weeks before the former EDO commissioned the aforementioned reports, he tasked the Committee to Review Generic Requirements (CRGR) [6] to review the "adequacy of our guidance, training, and expertise for assessing issues for backfit

implications and for responding to questions and concerns raised by our stakeholders.” This is a “lessons learned” program to remedy any inadequacies that are identified in the NRC staff’s handling of the appealed backfit. It’s a review that should be done after the backfit is evaluated, not before, or even concurrently. The CRGR report had not identified any specific faults to correct. So, review was not necessary. The time and effort, devoted by the CRGR members, to produce their report [81] was yet another waste of taxpayers’ money.

I estimate the total cost to produce the three reports was between half a million and one million dollars.

Fraud

1. It is well known that the agency’s 10 CFR §2.206 petition process, as controlled by MD 8.11, is not effective. [44] [45] Therefore, any advice to use this process would be deliberately misleading.
2. Reference to the BARP’s discredited report [1], in order to dismiss two 10 CFR §2.206 petitions, is not relevant. This, too, is misleading.
3. The NRC continues to claim a goal and practice of transparency (e.g., in SECY 16-0105, and NUREG-1614); but its EDO decided a landmark backfit appeal without holding a public meeting. Incidentally, this backfit appeal decision [3], and SECY 16-0105 [11] were issued on the same day.
4. The NRC knowingly made false statements, in the BARP’s report, in its evaluations of three 10 CFR §2.206 petitions, and in its reply to my appeal. The statements denied at least one law of nature (e.g., two-phase critical flow), and abused a fundamental rule of logic (i.e., circular reasoning).
5. The definition of “backfit” in 10 CFR §50.109(a) does not exclude stakeholders from appealing modified requirements. The NRC’s interpretation of 10 CFR §50.109(a) infers requirements that do not exist. The NRC staff also fails to follow MD 8.4.
6. The former EDO’s backfit appeal decision, made without benefit of a public hearing, failed to follow the NRC’s Strategic Plan (NUREG-1614). Selective application of this part of the Strategic Plan undermines public confidence.

Abuse

1. 10 CFR §2.206 was promulgated in 1974, before the NRC was organized. Yet, the NRC staff has not issued a single order, based upon a 10 CFR §2.206 petition. This is an egregious abuse. The NRC’s treatment of 10 CFR §2.206 petitions (see MD 8.11) violates stakeholders’ First Amendment right to petition the Government for a redress of grievances. This right predates 1974. A look at the Declaration of Independence will reveal, “We have Petitioned for Redress in the most humble terms: Our repeated Petitions have been answered only by repeated injury.” (To be fair, these petitions were put to the British government.) The NRC staff’s “evaluations” of my petitions are rife with demonstrably faulty; even deceptive arguments. Petitioners have no way to appeal the NRC staff’s evaluations.
2. The NRC staff goes beyond denying Americans’ First Amendment right to petition the government for a redress of grievances. The NRC staff collects a person’s petitions, and lumps them together, regardless of subject or merit. Then it uses the body of petitions (many are better than a few) to imply that any further petitions or appeals are not worthy of serious review. This is a form of retaliation.
3. The definition of “backfit” in 10 CFR §50.109(a) allows the former EDO to issue the backfit order I identified. Your reply’s innovative definition would require a rulemaking, and a correspondent revision of MD 8.4. Re-writing 10 CFR §50.109(a) via an e-mail message is an abuse.
4. The former EDO’s *de facto* backfit order favors Exelon over all other licensees.
5. The former EDO’s *de facto* backfit order relieves Exelon of meeting certain safety-related federal regulations and design criteria at the expense of the public health and safety. This is a defining attribute of a captured regulatory agency. [89] [90]
6. The former EDO’s *de facto* backfit order established new positions that deny the NRC staff’s admitted error (i.e., the mistake of fact that justified NRR’s compliance-based backfit order). Consequently, this error will henceforth be very difficult, if not impossible to correct.
7. The former EDO’s *de facto* backfit order is not justified by a backfit evaluation, as required by 10 CFR §50.109. Denying that a backfit order exists is one way to avoid meeting the requirements of 10 CFR §50.109.

8. The NRC staff and former EDO's accepted Exelon's backfit appeals without demanding any new information. Yet, I'm required to provide new information. Nevertheless, I've provided a wealth of new information; but this hasn't been acknowledged.

9. The former EDO assigned the CRGR, headed by K. Stephen West, the task of recommending improvements to the NRC staff's backfit procedures. Then he appointed the same person to serve on the BARP. So, this person was simultaneously reviewing Exelon's backfit appeal, and formulating corrective actions to be taken after the appeal is granted. At the end of 2017, the EDO appointed him to head the NRC's Region III Office, the Office where Exelon had filed its first backfit appeal. These conflicts of interest are egregious, sequential abuses. His current position, as head of NRC's Region III Office, is a continuing conflict of interest.

10. According to MD 3.5, "drop-in" visits are permitted by this falsehood: "Because these visits or meetings are usually limited to a general exchange of information not directly related to any regulatory action or decision, they would not typically be public meetings." MD 3.5 explains why "drop-in" visits should "usually" be open to the public; but then allows them to be closed, anyway.

11. The visitors log shows that Exelon executives made frequent use of the privilege of "drop-in" visits. This privilege is not extended to any other stakeholders.

12. Setting aside federal regulations, and design criteria, without adequate justification, can be an irresponsible, potentially dangerous [21] practice. "A little learning is a dangerous thing."

13. The NRC is using the Supreme Court's decision in *Michigan v. Environmental Protection Agency (EPA)*, 135 S.Ct. 2699 (2015) [68] to introduce a consideration of cost in certain backfit decisions that are based upon the Compliance Exception. Cost considerations have long been required by the NRC's Backfit Rule; but only for proposed safety enhancements. If cost considerations are extended to backfit decisions that are based upon the Compliance Exception, then the Compliance Exception would no longer be an exception. This would be like asking Ford to consider the cost implications of recalling all of its Pintos.

14. On March 23, 2017, allegations against the former EDO were submitted to several OIG staff members, in person, and again by e-mail. The procedures in the NRC Allegation Manual [79] were not followed (i.e., there was no response, at all).

Please review this response, and my comments with your staff, verify the facts, and check the references. Consult your experts, and ask questions. (Feel free to contact me with your questions.) I believe that the evidence that surfaces will encourage you to give my appeal the evaluation it deserves.

Sincerely,

Samuel Miranda, PE

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