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SUBJECT: Provides comments on the backfitting analysis for filtered vents for Mark I and II BWRs for the Commission's consideration

ACTION: Appropriate

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February 6, 2013

The Honorable Allison M. Macfarlane, Chairman
The Honorable Kristine L. Svinicki, Commissioner
The Honorable George Apostolakis, Commissioner
The Honorable William D. Magwood, IV, Commissioner
The Honorable William C. Ostendorff, Commissioner
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Re: Backfitting Analysis for Filtered Vents for Mark I and II BWRs

Dear Chairman Macfarlane and Commissioners:

On behalf of certain power reactor licensees,¹ we respectfully submit this letter for the Commission's consideration as it evaluates the Staff's recommendation that the Commission order Mark I and Mark II Boiling Water Reactors (BWRs) to design and install filtered containment venting systems (Option 3 of SECY-12-0157). We are writing specifically to provide comments on the backfitting analysis prepared by the NRC Staff in support of Option 3.

We appreciate the NRC's careful consideration of the filtered vent issue, including the detailed technical and regulatory analysis of the issue as summarized in SECY-12-0157. As explained below, however, we do not believe the backfitting analysis adequately justifies the imposition of the filtered vent requirement. In particular, the analysis does not adequately demonstrate that the filtered vent option will produce the requisite substantial increase in overall protection of public health and safety or that the direct and indirect costs of implementation – which the NRC estimates to be in the range of \$465 million to \$620 million industry-wide – are justified in view of the expected safety benefit.

As you know, the NRC's Backfit Rule is designed to promote regulatory stability and predictability by protecting licensees from the imposition of costly new safety requirements with comparatively insignificant safety benefits. The Backfit Rule requires a demonstration that a proposed backfit will (1) substantially increase the overall protection of the public health and safety or the common defense and security and (2) be cost-justified, *i.e.*, the direct and indirect costs of implementation for affected facilities are justified in view of the increased protection. 10 C.F.R. 50.109(a)(3).

¹ These comments are submitted on behalf of Exelon Generation Company, LLC, Constellation Energy Nuclear Group, LLC, Entergy Nuclear Operations, Inc. and Entergy Operations, Inc., all of whom are nuclear generating companies with Boiling Water Reactors with Mark I or II containments.

In our view, the backfitting analysis for Option 3, which was released to the public on December 10, 2012,² reflects a number of questionable assumptions and other weaknesses. These are discussed in turn below.

1. Uncertainty in the estimated safety benefit

The NRC's backfitting analysis (at page B-8) estimates that the "[i]n installation of filtered vents would decrease the radiation exposure to the public by between 34 and 25,000 person-rem." The very wide range of the estimated safety benefit, from as low as approximately 1.1 person-rem averted per reactor, suggests that there is a high degree of uncertainty in the analysis. At the same time, the estimate of person-rem saved appears to be based on conservative assumptions. The NRC's Regulatory Analysis (at page 25) indicates that the estimate includes dose to the public from reoccupation of land and other activities following a severe accident, as well as occupational dose to workers for cleanup and decontamination of offsite land. Further, while the safety benefit is measured from the status quo – which assumes continued implementation of Order EA-12-050 for reliable hardened vents – the analysis does not credit the risk reduction from other Tier 1 activities that are already being implemented.

Despite these conservatisms, the analysis does not appear to demonstrate, at least within the lower range of the estimated person-rem averted included in the Staff's wide range of projections, that the filtered vent option will produce a "substantial" increase in safety as required by the Backfit Rule. 10 C.F.R. 50.109(a)(3).

2. Reliance on "unquantified" or qualitative factors

The NRC's backfitting analysis (at page B-23) found that "[i]n none of the quantitative sensitivities is the filtered vent option cost-justified." Similarly, the NRC's Regulatory Analysis states (at page xii):

A comparison of only the quantifiable costs and benefits of the proposed modifications, would not, by themselves, demonstrate that the benefits exceed the associated costs. However, when qualitative factors such as the importance of containment systems within the NRC's defense-in-depth philosophy are considered, a decision to require the installation of engineered filtered vent systems is justified.

Thus the analysis relies upon a number of "unquantified" or qualitative factors to conclude that the filtered vent option is cost justified, including regulatory efficiency, defense in depth, and addressing international experience and practices.

Such heavy reliance on qualitative factors appears inconsistent with Commission policy. Qualitative factors have historically been used by the NRC only in the rulemaking context for "areas of difficulty where rulemakings thought to be worthwhile are difficult to justify quantitatively under the narrow safety enhancement criterion of the Backfit Rule." SECY-93-086, *Backfit Considerations*, dated June 30, 1993. Those rulemakings have typically involved situations such as updating NRC standards to be more in line with other relevant Federal rules and certain other unique situations that

² The NRC's Regulatory Analysis and backfitting analysis were summarized in Enclosure 1 to SECY-12-0157, which was publicly released on December 7, 2012. The actual Regulatory Analysis, which includes the backfitting analysis as Appendix B, was later released to the public on December 10, 2012 (ADAMS Accession No. ML12312A456). Because the backfitting analysis was largely derived from the Regulatory Analysis, our comments address both documents as appropriate.

do not directly involve plant operations or design modifications. For example, the NRC recently updated its Fitness for Duty (FFD) standards to be consistent with advances in other relevant Federal rules and guidelines, including the U.S. Department of Health and Human Services Mandatory Guidelines for Federal Workplace Drug Testing Programs.³ The corresponding regulatory analysis that supported that rulemaking explained that the “analysis relies on a primarily qualitative (rather than quantitative) evaluation of several other affected attributes... due to the difficulty in quantifying the impact of the current rulemaking.”⁴ In this instance, the NRC justified its use of qualitative factors because

These attributes are affected by the regulatory option through the associated reduction in the risks of accidents within the protected area due to worker fatigue or the undetected use of drugs or alcohol, or due to potential inconsistencies between the FFD and the authorization functions. Quantification of any of these attributes would require estimation of factors such as the types, frequencies, and results of damage that now occur (i.e., pre-rule) and would occur post-rule.⁵

A similar explanation was given in the regulatory analysis and backfit analysis that supported the NRC’s recent amendments to Emergency Preparedness requirements⁶ and power reactor security requirements.⁷

These examples show that in limited situations where the risk reduction impact is difficult to quantify due to the subject matter, the Commission may rely on qualitative considerations beyond the substantial safety enhancement criterion of the Backfit Rule in order to tip the balance in favor of new rules that were not otherwise cost-justified based on a quantitative analysis. In fact, the above precedent where qualitative factors were used reveals that the NRC relies on such an approach infrequently and only for circumstances involving “softer” subject matters, e.g., Fitness for Duty, Emergency Planning, and Security. In contrast, we have not found any circumstances where the NRC relied on the more subjective qualitative factors to tip the cost-benefit scale for Commission actions directly involving plant operations or design, which are susceptible to quantitative analysis.

Indeed, unlike those other rulemaking situations, the costs and benefits of filtered vents are capable of being quantified. Both the NRC and industry have analyzed the benefits and costs of filters numerous times over the years using quantitative factors. For example, Severe Accident Mitigation Alternatives (SAMA) analyses for BWR Mark I and Mark II containments performed as part of the license renewal process have found that filtered venting systems are not cost-justified for

³ Final Rule, Fitness for Duty Programs, 73 *Fed. Reg.* 16966 (Mar. 31, 2008).

⁴ NRC Regulatory Analysis of the Final Rulemaking to Amend the Fitness-for-Duty Rule (10 CFR Part 26) (ML080580135), at 16 (Feb. 28, 2008) (ML080580135). Identical language is also included in the Regulatory Analysis and Backfit Analysis, referenced *infra* in notes 6 and 7, for the Emergency Planning and Power Reactor Security Rulemakings.

⁵ *Id.*

⁶ Regulatory Analysis and Backfit Analysis, Final Rulemaking: Enhancements to Emergency Preparedness Regulations (10 CFR Parts 50 and 52) at 9 (Aug. 4, 2011) (ML112971541). In the Emergency Planning context, the NRC reasoned that “[q]uantification of any of these attributes would require estimation of factors such as (1) the frequency of various types of emergencies and emergency events, (2) the radiological consequences of such emergencies, and (3) pre-rule and post-rule impacts associated with such emergencies and hostile action.” *Id.*

⁷ Regulatory Analysis and Backfit Analysis, Final Rulemaking: Power Reactor Security Requirements, at 8 (Mar. 17, 2009) (ML083390372). In the physical security context, the NRC noted that “[q]uantification of any of these attributes would require estimation of factors such as (1) the frequency of attempted radiological sabotage, (2) the frequency with which radiological sabotage attempts are (i.e., pre-rule) and will be (i.e., post-rule) successful, and (3) the impacts associated with successful radiological sabotage attempts.” *Id.*

NEPA purposes. Since the issue is susceptible to quantitative evaluation, qualitative factors should not be relied upon as the determinative factor to justify imposition of the filtered vent option.

3. Underestimate of industry implementation costs

According to the SECY paper, the estimate of the implementation costs associated with Option 3 is \$15 million per unit. Enclosure 1 to the SECY explains (at page 16) that the "implementation costs for the filtered venting system are estimated based on discussions with foreign plants, vendors, and other stakeholders." In a corresponding footnote, the SECY points out that some stakeholders have noted that the design and installation costs could be factors of 2 or 3 higher, stating: "The costs could be significantly above \$15 million if the system is designed and installed as safety-related equipment or needed to be protected from beyond-design-basis external events." As noted in the SECY (Enclosure 1 at page 21), some stakeholders have estimated that the total installed cost of an engineered filter system could range from \$30 million to \$45 million.

The Backfit Rule requires the Commission to consider information relevant and material to the proposed backfit, including "[i]nstallation and continuing costs associated with the backfit, including the cost of facility downtime and the cost of construction delay." 10 C.F.R. 50.109(c)(5). It appears that the NRC's backfitting analysis does not adequately consider the full costs attributable to the design and installation of engineered filtered vent systems and the structures that would be needed to house the systems. Furthermore, the NRC's backfitting analysis (at page B-11) assumes that the filtered vent system can "be completed during normal operation outages, without having to extend the outage. . . ." As a result, the backfitting analysis assumes no replacement energy costs due to the modification. The Staff, however, does not provide an analysis to support its conclusion that the modification can be constructed and implemented without causing any additional facility downtime.

As the Nuclear Energy Institute (NEI) points out in its letter of January 25, 2013, new external structures and foundations must be built to house the engineered filters, making their installation "a major challenge at most existing sites." In these circumstances, it would be more reasonable to assume that additional outage time will be necessary for installation of filtered vent systems and associated structures at some sites. To ignore a potentially major cost factor would be contrary to the Backfit Rule's requirement in 10 C.F.R. 50.109(c)(5) that the NRC consider the costs of "facility downtime" to install the modification.

4. Failure to evaluate the priority and scheduling of the backfit in light of other ongoing activities

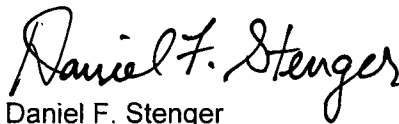
The NRC Staff's Draft Order for Option 3 would require that "Licensees shall promptly start implementation of the requirement in Attachment 2 to the Order and shall complete full implementation no later than December 31, 2017." The Backfit Rule requires the Commission to "consider how the backfit should be scheduled in light of other ongoing regulatory activities at the facility. . . ." 10 C.F.R. 50.109(c). SECY-12-0157 and the Draft Orders provide no assessment of how the backfit should be prioritized and scheduled in view of the other ongoing Fukushima actions, including those under the Order on mitigating strategies, and other Tier 1 initiatives. In contrast to the three March 12, 2012 post-Fukushima orders which provided for implementation within two refueling cycles after submittal of integrated plans, the draft order simply provides a deadline of December 31, 2017 for all sites, without any explanation of the basis for the deadline or how the Staff determined that this date was achievable. Moreover, unlike a rulemaking where an exemption or other provision for schedule relief would be available, the order may allow no meaningful opportunity for a licensee to seek schedule relief in the future.

* * *

With apparently significant uncertainty in the NRC's risk reduction analysis and reliance on unquantified factors for its cost-benefit analysis, combined with a likely significant underestimation of the implementation costs associated with the proposed Order, the Commission should revisit whether the backfitting analysis is adequate to comply with the standards of 10 C.F.R. 50.109.

We greatly appreciate the opportunity to submit comments on this important issue. If you have any questions regarding our comments, we would be pleased to discuss them further.

Sincerely,

A handwritten signature in black ink that reads "Daniel F. Stenger". The signature is written in a cursive, flowing style.

Daniel F. Stenger
Jennifer Mansh

cc: Mr. R. William Borchardt, NRC Executive Director for Operations
Ms. Margaret Doane, NRC General Counsel



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