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

Salem Generating Station, Unit 1
Renewed Facility Operating License No. DPR-70
NRC Docket No. 50-272

Subject: **Response to Integrated Inspection Report 05000272/2017003 and 05000311/2017003**

Reference: (1) Salem Nuclear Generating Station, Units 1 and 2 – Integrated Inspection Report 05000272/2017003 and 05000311/2017003

PSEG is submitting this letter to contest the Green non-cited violation (NCV) of Salem Generating Station (Salem) Unit 1 technical specification (TS) limiting condition for operation (LCO) 3.6.1.1 as described in NRC Inspection Report 05000272/2017003 and 05000311/2017003 (Reference 1).

The NRC stated that a violation existed because PSEG did not ensure that the air particulate detector (APD) backup containment isolation valves (CIV), associated with penetrations required to be closed during accident conditions, were unisolated intermittently under appropriate administrative controls. Specifically, manual CIVs associated with the APD sampling system were opened and left continuously open for 27 days, under tagging instructions that would have resulted in an actual open penetration outside of containment during certain design basis accidents and PSEG had not evaluated the adequacy of the tagging instruction to ensure radiological dose consequences would remain in conformance with the licensing basis.

PSEG Nuclear respectfully requests that this non-cited violation be withdrawn. As described in the attachment, administrative controls put in place to govern the open

remote manual CIVs were adequate. Operating in a manner that keeps important monitoring equipment like the APD in service promotes public health and safety. The unintended consequence of this violation could adversely impact safety by encouraging licensees to disable such equipment.

During the pendency of the NRC review of our appeal on the NCV, PSEG Nuclear will toll the timing related to submission of a licensee event report (LER) as may be required under 10 CFR 50.73(a)(2)(i)(B).

There are no regulatory commitments in this correspondence.

Should there be any questions regarding this matter, please contact Jean Fleming, Director, Site Regulatory Compliance, at 856-339-1653.

Sincerely,

A handwritten signature in black ink, appearing to read 'C. McFeaters', with a long horizontal flourish extending to the right.

Charles V. McFeaters
Site Vice President
Salem Generating Station

Attachment

cc: Mr. David C. Lew, Regional Administrator – Region I, NRC
Ms. Carleen J. Parker, Project Manager - US NRC
Mr. Patrick W. Finney, NRC Senior Resident Inspector – Salem (X24)
Ms. Anne T. Boland, Director, Office of Enforcement, US NRC
Mr. Patrick Mulligan, Chief NJ Bureau of Nuclear Engineering /Manager IV
Mr. Thomas J. Cachaza, Salem Commitment Tracking Coordinator (H02)
Mr. Lee A. Marabella - Corporate Commitment Tracking Coordinator (N21)

Attachment 1

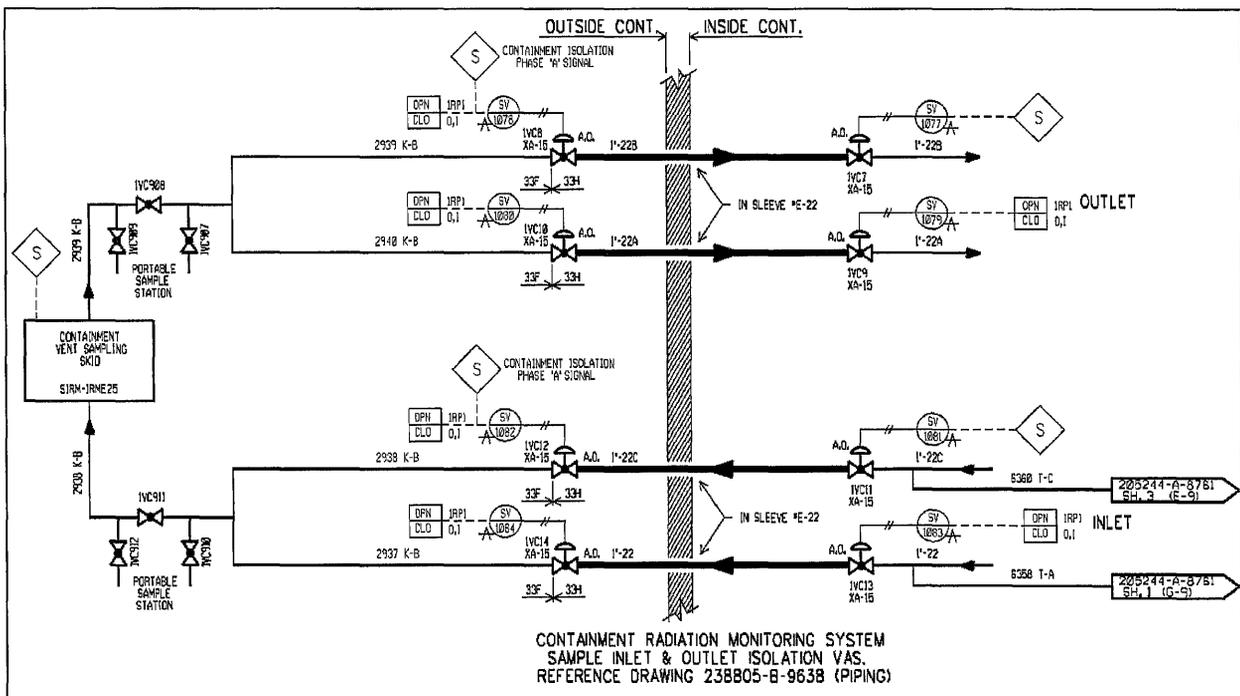
Administrative Controls Related to Salem Unit 1 Containment Isolation Valves

This attachment provides background information and addresses the individual NRC concerns that are discussed in the contested NCV. That discussion is followed by identification and discussion of two additional concerns. Those concerns have the potential for unintended consequences and backfit issues associated with the NCV.

Background

The containment APD monitors for the presence of radionuclides in the containment atmosphere. The actual radiation monitor is located outside of containment and is supplied with containment air through one inch diameter sample lines. The sample lines are equipped with normally open air operated CIVs identified as 1VC7, 8, 11 and 12 that automatically close in response to accident conditions. A parallel flow path is provided that is equipped with normally closed air operated valves (AOV) identified as 1VC9, 10, 13 and 14. These are the 'manual CIVs' the NRC refers to. These manual CIVs can be closed remotely from the control room by operation of a switch.

The flow paths are illustrated below. The containment ventilation sampling skid identified below as S1RM-1RME25 contains both the APD and a gaseous radioactivity (radiogas) monitoring system. Isolating air flow to the skid disables both monitoring systems.



Salem Unit 1 TS prescribes the following definitions and LCOs:

- TS 1.7 states CONTAINMENT INTEGRITY shall exist when all penetrations required to be closed during accident conditions are either capable of being closed by an operable containment automatic isolation valve system, or closed by manual valves, blind flanges, or deactivated automatic valves secured in their closed positions, except for valves that are open under administrative control as permitted by TS 3.6.3.1.
- LCO 3.6.1.1 requires that CONTAINMENT INTEGRITY be maintained when operating in modes 1, 2, 3 and 4. Surveillance requirement (SR) 4.6.1.1.a1 is associated with this LCO and requires that CIVs required to be closed during accident conditions are closed except for CIVs that are open under administrative controls.
- LCO 3.6.3.1 requires that each CIV be operable when operating in modes 1, 2, 3 and 4. NOTE 1 to this LCO allows intermittently opening CIVs under administrative controls. The basis section of TS for this LCO explains that opening of locked or sealed closed CIVs on an intermittent basis under administrative controls includes three considerations:
 - 1) Stationing a dedicated individual, who is in constant communication with the control room, at the valve controls;
 - 2) Instructing the dedicated individual to close the valves in an accident situation; and
 - 3) Assuring that environmental conditions will not preclude access to close the valves and that this action will prevent the release of radioactivity outside of containment.
- LCO 3.4.6.1 requires that three reactor coolant system (RCS) leakage detection methods be OPERABLE. The required methods include containment atmosphere particulate radioactivity, the containment sump level, and either the containment fan cooler condensate flow rate or the containment atmosphere gaseous radioactivity monitoring system. The associated action statement requires grab sampling of the containment atmosphere if the APD or gaseous radioactivity monitoring system is not operable.

Section 5.2.7.1 of the Salem updated final safety analysis report (UFSAR) explains that reactor coolant system (RCS) leakage is detected by radiation sensitive instruments (APD and radiogas monitor), humidity detection, increased RCS makeup to maintain constant pressurizer level and increased containment sump level. The UFSAR

description explains that the APD is the most sensitive instrument of those available to detect RCS leakage into containment.

Finally, 1VC9, 10, 13 and 14 are tested each calendar quarter by measuring the time it takes to close. Local leak rate testing of the associated penetrations is completed every refueling outage. The remote valve position indications are tested every two years.

As described in the contested NCV, CIVs 1VC7, 8, 11 and 12 (the "automatic CIVs") were closed to support work on an unrelated radiation monitor. CIVs 1VC9, 10, 13 and 14 (the "remote-manual CIVs") were opened to allow the containment APD to continue operating. This configuration was entered pursuant to a clearance and tagging document that mandated placement of information tags to alert control room operators that the automatic CIVs were disabled and that the remote-manual CIVs needed to be closed in the event of an accident. This was a planned maintenance activity that began on December 8, 2016 and was successfully completed on January 4, 2017.

The NRC states that:

- Tagging instructions may have caused a penetration to remain open for some accident scenarios;
- PSEG failed to adequately assess the tagging instructions to ensure radiological dose consequences would remain below licensing basis limits;
- PSEG did not assess the timing of the control room action to close the remote-manual CIVs;
- A technical evaluation prepared in response to inspection questions was inadequate;
- Placement of a note in LCO 3.6.3.1 mandates entry into the associated action statement before the guidelines of the note can be invoked;
- Emergency operating procedure (EOP) guidance to check CIVs closed was insufficient; and
- Operation during the maintenance activity with remote-manual CIVs open was continuous and not intermittent.

PSEG Nuclear contends that this NCV is erroneously classified as a violation. The following discussion addresses each of these aspects of the NCV. This is followed by a discussion of two additional considerations. The additional considerations are unintended safety consequences of prosecuting this NCV and backfit concerns.

Adequacy of the Tagging Instructions

The NRC states that the tagging instructions may have caused an open penetration for some accident scenarios and that PSEG failed to adequately assess the tagging instructions to ensure radiological dose consequences would remain below licensing basis limits. PSEG Nuclear asserts that a radiological dose consequence analysis is not required by administrative controls associated with opening a CIV or by the clearance and tagging process.

The tagging instructions associated with this work indicated that the open/close indication for 1VC8 and 1VC12 will extinguish when the power supply breaker is opened and tags are hung. These extinguished lights continuously indicate to operators that the configuration is not normal. The tagging instructions state the remote-manual valves must be manually closed from the control room if a Phase 'A' containment isolation signal were to occur. These instructions were carried from shift to shift through the turnover process. The tagging included three instructional tags posted in the control room that would alert control room operators of the configuration. One tag was at the switch for inboard valves 1VC9 and 1VC13. Another tag was at the switch for outboard valves 1VC10 and 1VC14. The third tag was on a control room operating panel to alert control room operators that the backup APD valves were open. These instructions were sufficient to alert operators of the need to isolate the APD containment air flow path if necessary.

The NRC stated that PSEG did not evaluate the adequacy of the tagging instruction to ensure radiological dose consequences would remain in conformance with the station licensing basis. There is no requirement to perform such an evaluation in the clearance and tagging process or, as described below, in the administrative controls associated with opening CIVs.

The tagging instructions were written to comply with the TS bases of LCO 3.6.3.1. The TS basis provides requirements for administrative controls that include a dedicated operator in constant communication with the control room, with instructions to close the valves and in an environment that does not preclude successful operation. Here, the dedicated operator is a control room operator; who was required to be in the control room by technical specifications and was provided with instructions to manually close the remote-manual CIVs if a Phase 'A' containment isolation signal occurs. The technical specifications administrative controls section 6.2.2.b requires that at least one licensed Reactor Operator shall be in the control room when fuel is in the reactor. By virtue of the Salem licensing basis, the operator's presence in the control room met the administrative requirements for constant communication and for a safe environment.

The Enforcement section of the NCV indicates that PSEG did not evaluate the adequacy of the tagging instruction to ensure radiological dose consequences would remain in conformance with the licensing basis. The NRC Enforcement Manual, section 2.2.5, requires that a NCV provide sufficient detail to substantiate the existence of a violation associated with a green significance determination process (SDP) outcome. NRC Inspection Manual 0612, Power Reactor Inspection Reports, section 06.03, requires identification of the requirement or standard that was not met and a description of how the licensee failed to satisfy the requirement or standard. However, the NCV Description and Analysis sections were not specific with regard to tagging instruction deficiencies. PSEG Nuclear asserts that the instructions were adequate based on the above discussion.

Adequacy of the Technical Evaluation

The NRC states that PSEG did not assess the timing of the manual action to close the remote-manual CIVs and that a technical evaluation prepared in response to inspection related questions was inadequate. PSEG Nuclear asserts that a technical evaluation of dose consequences or timing of the manual action to close the remote-manual CIVs is not required.

The NRC asserts that a technical evaluation did not ensure radiological dose consequences would remain within the station licensing basis. A technical evaluation of dose consequences is not a requirement for administrative controls of CIVs or clearance and tagging. Moreover, the maintenance activity is not within the scope of 10CFR50.59 because the activities are considered maintenance. NEI 96-07, "Guidelines for 10CFR50.59 Implementation", supports this understanding and was endorsed by the NRC by Regulatory Guide 1.187, "Guidance for Implementation of 10CFR50.59, Changes, Tests, and Experiments". The technical evaluation was prepared to support NRC inspection efforts and is not a requirement to open a CIV under administrative controls.

The NRC disagreed with a fundamental assumption of the unrequired evaluation, that CIVs would be isolated before the onset of fuel damage. In their assessment, the NRC relied on the alternate source term (AST) amendment to the plant licensing basis and rejected application of leak before break (LBB) assumptions that are consistent with the Salem licensing basis for large primary loop ruptures.¹ The NRC states the unrequired technical evaluation was inadequate because it assumed the remote-manual CIVs

¹ U. S. Nuclear Regulatory Commission letter dated May 25, 1994; granting approval to eliminate primary loop pipe rupture from the design basis for Salem, Units 1 and 2.

would be isolated within ten minutes instead of thirty seconds of accident initiation. The ten minute assumption is consistent with the Salem licensing basis that includes LBB of large primary loop ruptures.² Interpreting the licensing basis in this fashion effectively invalidates all TS and UFSAR provisions that allow opening of CIVs under administrative controls because a thirty second closure is an unrealistic expectation that would render administrative control unachievable. Consequently, this interpretation raises backfit issues that require resolution per 10CFR50.109.

To summarize, the technical evaluation is not a requirement for administrative control of CIVs or the PSEG Nuclear clearance and tagging process. The tagging instructions were written in conformance with the TS prescribed administrative controls for CIVs and did not require a dose consequence analysis. Finally, maintenance activities are governed by 10CFR50.65(a)(4) and plant TS. As such, maintenance activities are exempt from 10CFR50.59.

Sufficiency of Emergency Operating Procedure (EOP) Guidance

The NRC stated the technical evaluation was inadequate because it assumed the expected time for operators to reach a step in the EOPs that mandates verification of Phase 'A' isolation would be ten minutes instead of thirty seconds. The NRC stated that a number of steps preceding step 10 of 1-EOP-TRIP-1, "Reactor Trip or Safety Injection" would divert operators to other EOPs. Step 10 directs operators to verify that 1VC7, 8, 11 and 12 (the automatic CIVs) are closed. However, the EOP flow path directs operators to close the remote-manual CIVs for each diversion out of 1-EOP-TRIP-1 as detailed below:

- Step 2 of 1-EOP-TRIP-1 directs operators to confirm that the reactor is tripped. If the reactor is not tripped, they are directed to functional recovery procedure, 1-EOP-FRSM-1, "Response to Nuclear Power Generation", to take higher priority actions related to anticipated transient without scram (ATWS). Step 7 of 1-EOP-FRSM-1 directs operators to 1-EOP-APPX-3, "SI Verification". Step 3 of 1-EOP-APPX-3 directs operators to close phase 'A' CIVs.
- Step 4 of 1-EOP-TRIP-1 directs operators to 1-EOP-LOPA-1 "Loss of all AC Power", if all 4kV vital electric buses are not energized. Step 22 of 1-EOP-LOPA-1 directs operators to close the automatic CIVs. At this point, the tagging instructions would alert operators that the remote-manual CIVs should be closed.

² U. S. Nuclear Regulatory Commission letter dated May 25, 1994; granting approval to eliminate primary loop pipe rupture from the design basis for Salem, Units 1 and 2.

- Step 5 of 1-EOP-TRIP-1 directs operators to 1-EOP-TRIP-2, “Reactor Trip Response” only if a safety injection (SI) is not required; in which case a Phase ‘A’ actuation is neither required nor desired. A continuous action step in 1-EOP-TRIP-2 returns operators to 1-EOP-TRIP-1 if a SI has been initiated. Therefore, operators would return to a procedure that directs verification of Phase ‘A’ actuations.

Each diversion prior to 1-EOP-TRIP-1, step 10 addresses higher priority accident symptoms and directs verification of Phase ‘A’ actuations at the most appropriate time.

Timing of the Manual Actions

The NRC stated that the timing of CIV manual actions was not evaluated prior to implementation of the tagging instructions. The requirements to implement CIV administrative controls do not require an evaluation of the timeliness of those manual actions. Further, the tagging instructions directed operators to close the remote-manual CIVs in a timely manner as directed by the EOPs.

LCO 3.6.3.1 and Associated Notes

LCO 3.6.3.1 has three notes. Note 1 allows penetration flow paths to be unisolated intermittently under administrative controls. Note 2 excludes containment purge valves from the CIV classification if isolated by blind flange. Note 3 allows the containment pressure-vacuum relief isolation valves to be opened intermittently, under administrative control, to satisfy requirements of LCO 3.6.1.4, Containment Systems, Internal Pressure.

The NRC stated that the action statement associated with LCO 3.6.3.1 must be entered to take advantage of NOTE 1 because the notes appear below the line that separates the LCO and associated applicability from the required actions to be taken if the LCO is not met while operating in an applicable MODE. Construction of the Salem LCO is consistent with NUREG-1431, “Standard Technical Specifications, Westinghouse Plants”.

This interpretation set forth in the NCV is contrary to Salem’s longstanding practice of invoking NOTE 3 to the same LCO when opening containment pressure-vacuum relief valves 1VC5 and 1VC6 to reduce containment pressure. This activity has been

conducted thousands of times over the life of the plant without entering the action statement of LCO 3.6.3.1.

LCO 3.6.3.1 requires that CIVs be operable. According to the Salem Technical Requirements Manual (TRM), the remote-manual backup valves are CIVs and, as such, are required to be operable. However, at no time during this maintenance activity were the valves inoperable. They were open and capable of being closed by a dedicated reactor operator in the control room, who was given adequate instructions and an environmentally secure location.

The Meaning of Intermittent

The NRC categorized this maintenance activity as continuous without distinguishing 'continuous' from 'intermittent'.

PSEG Nuclear research did not identify a regulatory definition of 'intermittent'. However, this maintenance activity was shorter than ninety days at which point review under 10CFR50.59 would have been considered.

Finally, LCO 3.6.1.1 requires that containment integrity be maintained. Surveillance requirement (SR) 4.6.1.1.a1 is associated with this LCO and requires that CIVs required to be closed during accident conditions are closed except for CIVs that are open under administrative controls. The allowance for use of administrative controls applies to OPERABLE CIVs. The restriction of intermittently opening CIVs only applies to inoperable CIVs. Therefore, the SR is not required to be met when the valves are open under administrative controls and the LCO is fully complied with.

Additional Considerations

The discussion above addresses each point of NCV. The following discussion identifies two additional considerations; specifically, the potential for unintended safety consequences and backfit concerns.

Risk-informed Decision-making

The NRC Principles of Good Regulation include Efficiency, Clarity and Reliability. Efficiency calls for regulatory activities that are consistent with the degree of risk reduction they achieve. When multiple effective alternatives are available, the option

that uses the minimum use of resources should be adopted. Clarity calls for a clear nexus between regulations and agency goals. Agency positions should be readily understood and easily applied. Reliability calls for the use of best available knowledge from research and operational experience.

The containment APD is considered the most sensitive monitoring method because it can more rapidly detect small RCS leaks that are likely to precede a large break of the RCS barrier. PSEG's decision to operate with the APD in service by opening the remote-manual CIVs under administrative control is wholly consistent with safe operating practices and is aligned with the principles of efficiency and clarity.

Regulatory activities should be consistent with the degree of risk reduction they achieve. The containment penetrations at issue here are two one-inch diameter flow paths. Most full power internal events (FPIE) probabilistic risk assessments (PRA) for commercial nuclear power plants screen penetrations of two inches or less from the level 2, large early release analysis.

PSEG could have isolated the APD for up to 30 days and relied only on a daily grab sample of the containment atmosphere. This would have defeated the safer alternative of continuing to operate the APD in the modified lineup and could drive licensees to take actions that do not reduce risk and can be shown to actually increase it. PSEG's actions were based on the best available knowledge regarding leak behavior and were aligned with the principle of reliability.

Backfit Analysis

The NRC states that tagging instructions may have caused an open penetration for some accident scenarios. However, PSEG has shown that the tagging instructions met TS requirements and complemented the existing EOPs to ensure sufficient guidance was available to dedicated operators who had the means to perform the safety function. The NRC states that PSEG failed to adequately assess the tagging instructions to ensure radiological dose consequences would remain below licensing basis limits. However, PSEG has shown that an assessment of radiological dose consequences is not required. The NRC states that PSEG did not assess the timing of the control room action to close the remote-manual CIVs. However, PSEG has shown that an assessment of timing is not required. The NRC states that a technical evaluation prepared in response to inspection questions was inadequate. PSEG has shown that the technical evaluation uses the best available knowledge of RCS leak behavior and was consistent with the station licensing basis that includes LBB for large RCS piping. The NRC states that placement of a note in LCO 3.6.3.1 mandates entry into the

associated action statement before the guidelines of the note can be invoked. However, PSEG has shown that this interpretation is inconsistent with many years of operation. The NRC states that Salem Unit 1 EOP guidance to check CIVs closed was insufficient. However, PSEG has shown that the EOP guidance prioritizes activities based on accident symptoms and, in all cases, returns to a requirement to ensure Phase 'A' containment actuation if required. Finally, the NRC states that operation during maintenance with remote-manual CIVs open was continuous and not intermittent. However, PSEG has shown that intermittent is not precisely defined by Salem TS or other related regulatory guidance.

Given the NCV as written, PSEG Nuclear is required to take corrective actions that include evaluating dose consequences when opening CIVs under administrative controls and defining intermittent. Moreover, applying a thirty second time limit to manually close a CIV that is opened under administrative controls effectively nullifies the TS and UFSAR provisions that allow opening a CIV under administrative controls. Finally, PSEG Nuclear will be required to file a licensee event report per 10CFR50.73 within sixty days of the event. However, the event date is not defined because intermittent is not defined. Consequently, PSEG Nuclear concludes the NCV is a backfit subject to 10CFR50.109, as discussed below.

10CFR50.109(a)(1) defines BACKFITTING to include modification of or addition to the procedures required to operate a facility. This includes imposition of a new or different interpretation or regulatory staff position after the operating license is issued. A demonstration of substantial increase in public health and safety justifying the additional cost for implementation is required of the NRC unless the backfit meets one of three exceptions set forth in 10CFR50.190(a)(4)(i) through (iii). The regulatory action represented by this NCV does not fit any of the three exceptions.

10CFR50.190(a)(4)(i) allows a backfit to be imposed without evaluation and justification if necessary to restore compliance with NRC requirements (the "compliance exception"). According to section 3.1 of NUREG-1409, "Backfitting Guidelines", the compliance exception is intended to address situations where the licensee failed to meet known and established standards because of omission or mistake of fact. The NCV at issue does not identify a known and established standard that Salem Unit 1 is not complying with. As described above, the administrative controls were adequate, consisting of tagging instructions that complemented existing EOPs for use by control room operators; the technical evaluation was not required before entering the configuration and was consistent with the best available knowledge; the technical specification interpretation was consistent with longstanding past practice; and the distinction between 'continuous' and 'intermittent' is not defined. Nor does the NCV at issue identify an omission or

mistake of fact that NRC staff relied upon when the licensing basis and LCOs were approved. New or revised interpretations do not fall within scope of this exception.

10CFR50.190(a)(4)(ii) allows a backfit to be imposed without evaluation and justification if necessary to ensure the facility provides adequate protection to the health and safety of the public and is in accord with the common defense and security (“provide assurance of adequate protection”). Nevertheless, per NUREG-1409, a written evaluation is needed to provide the objectives of and reasons for a backfit modification under the compliance exception or to provide assurance of adequate protection. The written evaluation must also disclose the basis for invoking either exception. As discussed above, the unrequired technical evaluation used the best available information concerning plant behavior in a manner consistent with the plant licensing basis to provide assurance of adequate protection. The NCV does not explain the objectives or reasons for invoking an exception to the requirements of 10CFR50.109.

10CFR50.190(a)(4)(iii) allows a backfit to be imposed without evaluation and justification if the regulatory action defines or redefines what level of protection to the public health and safety or common defense and security is adequate (“new level of protection”). According to NUREG-1409, specific criteria determining when adequate protection should be redefined is not available. However, PSEG has shown that its actions enhanced safety and that the alternative of operating with the APD unavailable has potential unintended consequences that arguably make the plant less safe.

Given that none of these exceptions are applicable to the issue, the regulation requires an evaluation and justification of the backfit per guidance of 10CFR50.190(c)(1) through (9). These considerations include a general description and estimated costs of the activities necessary to complete the backfit; potential impact on risk, safety and radiological consequences; and whether the backfit is interim or final.

Conclusion

Issuing a violation of Salem Unit 1 LCO 3.6.1.1 is not justified. Salem Unit 1 remained in full compliance with its technical specifications and regulations.

PSEG Nuclear respectfully requests that this non-cited violation be withdrawn. As described in the attachment, administrative controls put in place to govern the open remote manual CIVs were adequate. PSEG Nuclear adequately supported inspection efforts to assess potential radiological consequences with a technical evaluation that applied the best available knowledge of plant behavior that was also consistent with the plant licensing basis.

Operating in a manner that keeps important monitoring equipment like the APD in service promotes public health and safety. The unintended consequence of this violation could adversely impact safety by encouraging licensees to disable such equipment.