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Anthony J Vitale
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NL-16-116

September 29, 2016

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

Subject: **Response to Integrated Inspection Report No. 05000247/2016002 and 05000286/2016002**
Denial of Green Non-Cited Violation No. 05000286/2016002-02
Indian Point Nuclear Generating Unit No. 3
Docket No. 50-286

Reference: Letter from Glenn T. Dentel, U.S. Nuclear Regulatory Commission, to Anthony J. Vitale, Entergy Nuclear Operations, Inc., dated August 30, 2016, "Indian Point Nuclear Generating – Integrated Inspection Report 05000247/2016002 and 05000286/2016002

Dear Sir or Madam:

In the above referenced letter, Entergy Nuclear Operations, Inc. (Entergy) received the Indian Point Unit Nos. 2 and 3 integrated inspection report for the second quarter 2016. This letter is to request U.S. Nuclear Regulatory Commission (USNRC) withdrawal of the 10 CFR 50, Appendix B, Criterion V non-cited violation concerning the failure to follow the Entergy's operability determination process as prescribed in EN-OP-104. Additional details are contained in the attachment to this letter.

There are no new commitments made by Entergy contained in this letter. If you have any questions or require additional information, please contact Mr. Robert Walpole, Regulatory Assurance Manager at (914) 254-6710.

Sincerely,

AJV/rl

IE01
NRR

Attachment: Denial of Green Non-Cited Violation No. 05000286/2016002-02

cc: Director, Office of Enforcement, USNRC, Washington, DC 20555-0001
Mr. Daniel H. Dorman, Regional Administrator, USNRC Region I
Mr. Douglas Pickett, NRC, Sr. Project Manager, USNRC NRR DORL
Ms. Bridget Frymire, New York State Department of Public Service
Mr. John B. Rhodes, President and CEO NYSERDA
USNRC Resident Inspectors

ATTACHMENT TO NL-16-116

<u>DENIAL OF GREEN NON-CITED VIOLATION No. 05000286/2016002-02</u>

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NO. 3
DOCKET NO. 50-286

Denial of Green Non-Cited Violation (NCV)

Entergy respectfully disagrees that a violation of 10 CFR 50, App. B, Criterion V, "Instructions, Procedures, and Drawings" occurred. It is Entergy's position that Indian Point was in full compliance with procedure EN-OP-104 when, on May 5, 2016, while evaluating the baffle-former bolt (BFB) condition discovered at Unit 2 as it may apply to Unit 3, Entergy reasonably concluded that there was no degraded condition, that an operability evaluation was not needed, and that the affected SSCs were operable. After preparing an immediate determination of operability per EN-OP-104 Section 5.3, Entergy concluded that a degraded condition, defined in EN-OP-104 Section 3.0[6] as, "A condition in which the qualification of an SSC or its functional capability is reduced," did not exist at Unit 3. On May 5, 2016, based upon engineering input it was concluded that Unit 3 was less susceptible to the type of BFB degradation that was found at Unit 2.

The conclusion that there was not a degraded condition at Unit 3 was supported by the absence of any direct evidence to confirm that there was a failure, malfunction, or deficiency of the BFBs at Unit 3, which is consistent with EN-OP-104. This conclusion was based upon engineering judgment of the best available data that considered such factors as Unit 3 effective full power years (EFPY) of operation, fluence levels, pressure differentials across the baffle plates, and fatigue-inducing loading cycles. Entergy further determined that there was reasonable assurance that the lower core support structure at Unit 3 would be able to perform its safety function (i.e. maintain coolable core geometry and fully insertable control rods), based on the expected lower number of failed BFBs at Unit 3, until the BFBs are inspected at the next refueling outage.

On May 8, 2016, an extent-of-condition (EOC) evaluation was completed by engineering which concluded that "there is a degree of confidence that the baffle-former bolts at IP3 will remain acceptable to enable the safety function of the baffle to be met, until the bolts are scheduled for inspection in the 2017 3R19 refuel outage." (Reference 1) As a prudent safety step, Entergy accelerated the schedule for the Unit 3 inspections by two years from its original 2019 refueling outage date.

Entergy's position is that it was more appropriate to use the corrective action process (CAP) and an Extent-of-Condition (EOC) evaluation to review the applicability of the Unit 2 inspection findings on Unit 3, rather than the operability evaluation process. An EOC review under the CAP program allows a wider range of possibilities and safety impacts than would be explored in an operability evaluation.

Details

Section 1R15 of Integrated Inspection Report No. 05000247/2016002 and 05000286/2016002 issued by the NRC dated August 30, 2016, contains the following Green NCV:

> Enforcement. 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," states, in part, that activities affecting quality shall be prescribed by documented procedures of a type appropriate to the circumstances and shall be accomplished in accordance with those procedures. The introduction to Appendix B states that 'quality assurance' comprises all those planned and systematic actions necessary to provide adequate confidence that a structure, system, or component (SSC) will perform satisfactorily in service. Procedure EN-OP-104, Step 5.3[2], related to immediate operability, states "Determine if there is an ongoing degradation mechanism that may impact future operability based on changing conditions, specifically consider the SSCs specified safety function and mission time." Step 5.3(3) follows with, in part "If no Degraded or Non-conforming Condition exists, then perform the following as the Immediate Determination:" "Declare the SSC Operable" and "Exit this procedure."
>
> Contrary to the above, from May 5, 2016 until July 11, 2016, Entergy did not adequately accomplish actions as prescribed by EN-OP-104 for a degraded condition associated with the Unit 3 baffle-former bolts. Specifically, Entergy incorrectly concluded that no degraded or non-conforming condition existed related to the Unit 3 baffle-former bolts and exited the operability determination procedure. The NRC determined this is contrary to EN-OP-104 because a comparison of Unit 2 and 3 operational factors resulted in Entergy concluding that the Unit 3 baffle bolts would likely be affected due to the same degradation mechanism. Entergy's corrective actions included entering the issue into the CAP and documenting an operability evaluation to support the basis for operability of the baffle bolts and ECCS. Because this issue is of very low safety significance (Green) and Entergy entered this into their CAP as CR-IP3-2016-01961, this finding is being treated as an NCV consistent with Section 2.3.2.a of the Enforcement Policy. **(NCV 05000286/2016002-02, Failure to Follow Operability Determination Procedure for Unit 3 Baffle-Former Bolts)**

The Description Section of the NCV in the integrated inspection report states, in part:

> "The inspectors noted that Entergy staff concluded an operability evaluation was not needed, in part, because "the baffle-former bolts are not required by TS and are not described in the UFSAR. The inspectors noted that while the baffle bolts are not described in these documents, their failure in sufficient numbers could have consequential effects on the TS-controlled ECCS if the baffle bolts were to become detached or deformed".

"The inspectors concluded that since the baffle bolts support the ECCS, which is subject to TS, Entergy's decision to not perform further evaluation of the operability evaluation was inconsistent with EN-OP-104. Specifically, Section 5.1(7) of Entergy's procedure EN-OP-104 requires that an operability determination be performed whenever a condition exists in the supporting SSC that may affect the ability of the TS-controlled SSC to perform its specified safety function."

"The inspectors noted that plant operating data and fuel performance from Unit 2 did not result in identification of the bolt degradation; therefore, the absence of indications for these problems on Unit 3 was technically insufficient to support Entergy's conclusion that there was no degraded condition on Unit 3."

"The inspectors noted that in completing an IOD in EN-OP-104, Step 5.3.2 states "determine if there is an ongoing degradation mechanism that may impact future operability based on changing conditions, specifically consider the SSCs specified safety function and mission time."

"This finding is more than minor because it is associated with the equipment performance attribute of the Mitigating Systems cornerstone and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage)."

<u>Basis for Denial</u>

Entergy acknowledges that it considered that the BFBs are not required by TS and are not described in the UFSAR in its decision not to require an operability evaluation, but it did consider the safety functions of the baffle plates and ECCS. Further, the most important factor in concluding that a full operability evaluation was not needed was the result of the immediate operability determination that was performed in the response to CA-1 of CR-IP3-2016-01035. In the response to CA-2, Entergy concluded that "Due to the number of baffle-former bolt indications at IP-2, an initial operability assessment for Indian Point Unit 3 was performed in CA-1 to address the potential for similar baffle-former bolt degradation at IP-3." Based upon the conclusions from the initial operability assessment that Unit 3 would be less susceptible to degraded baffle-former bolt failures than Unit 2, the consequential effects on the TS-controlled ECCS safety function would be expected to be small (i.e., not degraded). Entergy concurs that the key factors considered in its initial operability assessment (i.e. EFPY of operation, fluence levels, pressure differentials across the baffle plates and fatigue-inducing loading cycles) had not resulted in the identification of the extent of BFB degradation at Unit 2. However, based upon engineering judgment these factors show that Unit 3 is less susceptible to BFB failure.

BFB degradation is a known industry operating experience identified concern, and for plants undergoing license renewal, such as Unit 2 and 3, is the basis for performing the EPRI MRP-227-A inspections, which NRC has reviewed and approved. Therefore, the NRC and the industry have long recognized the potential for BFB degradation and had measures in place to address potential degradation. As discussed above, Entergy has scheduled these inspections at Unit 3 during the 2017 (3R19) refueling outage.

Compliance with EN-OP-104, Operability Determination Process

The following is an event narrative and summary of the actions taken by Entergy upon the discovery of a greater than anticipated number of degraded BFBs at Unit 2.

1. On April 21, 2016, while performing BFB inspections at Unit 2, a condition report (CR) was initiated to evaluate the impact of the Unit 2 inspection findings on the Unit 3 BFBs. This condition was documented in CR-IP3-2016-01035.
2. Once the issue was entered into the CAP process, EN-OP-104, Section 5.3 required that an immediate operability determination be made using the best information available. NOTE Operability should be determined immediately upon discovery (i.e., Immediate Determination) without delay and in a controlled manner using the best information available. Time of Discovery is documented in PCRS.
3. The immediate operability determination was completed and assigned an operability code of "OPERABLE-OP EVAL" pending a further, more detailed evaluation of the condition of Unit 3 by engineering.
4. For the purposes of determining immediate operability, confirmation of the existence of a degraded condition at Unit 3 was neither feasible nor practical. Inspection of the condition of the Unit 3 BFBs would require all of the fuel to be offloaded from the reactor vessel. Consequently, confirmation of the existence of a degraded or nonconforming condition could not be performed for purposes of an immediate operability determination.
5. Per corrective action (CA) -1 of CR-IP3-2016-01035, an engineering assessment was performed to determine whether Unit 3 was susceptible to the same failure mechanism and failure rate. This more detailed assessment concluded that Unit 3 would be less susceptible to degraded BFB failures than Unit 2 and, therefore, safe to continue to operate pending further analysis. This conclusion was supported by the fact that there was no evidence of fuel damage as a result of baffle jetting nor was there evidence of bolt-related loose parts at IP3.
6. In the response to CA-2 to perform an operability evaluation per EN-OP-104, Entergy concluded that further evaluation of BFB failures should be addressed as an EOC review rather than an operability evaluation. This determination was based, in part, on the fact that the BFBs and the baffle-former assembly are not required by the TSs nor are they described in the UFSAR. But more importantly, based on data from the immediate operability evaluation, including EFPY of operation, fluence levels, pressure differentials

across the baffle plates, fatigue induced loading cycles, operating data and fuel performance, Entergy determined that a degraded or non-conforming condition did not exist at Unit 3. EN-OP-104 process was then exited.

7. The issue continued to be evaluated in the CAP process. As a result, additional corrective actions were assigned in CR-IP3-2016-01035 including preparation of an EOC evaluation (CA-3), review of operating experience (CA-5), and increased monitoring of reactor coolant system (RCS) parameters to detect BFB degradation (CA-10).
8. With Unit 3 currently in operation, specific reactor parameters will be monitored at an increased frequency to detect fuel leaks and early indication of loose parts that could potentially be caused by BFB failures.

Specific requirements cited in EN-OP-104.

EN-OP-104, Step 5.3[1], "Immediate Determination

<u>*Confirm the existence*</u> of a Degraded or Nonconforming Condition for the TS SSC. *(Emphasis added)*

- <u>*Inspect*</u> the SSC if needed for <u>*confirmation*</u>. *(Emphasis added)*
- Perform other investigation as needed to confirm the condition exists. Do not delay Immediate Operability Determination for extensive research and testing after confirmation of the existence of a Degraded or Nonconforming Condition. Refer to the definition of degraded condition or nonconforming condition (any loss of function, loss of qualification).
- Review TS and CLB documents to determine SSC Specified Safety Function.
- Determine the impact of the Degraded or Non-Conforming Condition on the TS SSC or the specified safety function. Refer to the discussion and guidance in Attachment 9.1.

EN-OP-104, Section 5.11, "Discussion and Guidance"

[2] Immediate Determination

After confirming the existence of Degraded or Nonconforming Condition or if required to address an Unanalyzed Condition, an Immediate Determination of SSC Operability should be completed. The determination should be made without delay and in a controlled manner using the best available information. Immediate Determination should not be postponed until receiving the results of detailed evaluations. If a piece of information material to the determination is missing or unconfirmed, and cannot reasonably be expected to support a determination that the SSC is OPERABLE, the SM should declare the SSC INOPERABLE. While the determination is in progress, operators should remain aware of the status of affected SSCs. The Immediate Determination

documents the basis for concluding that a Reasonable Expectation of Operability exists. When a Reasonable Expectation of Operability does not exist, the SSC should be declared INOPERABLE.

EN-OP-104, Section 5.5, "Operability Evaluation"

[1] Purpose

The purposes of an Operability Evaluation are to:

a) Confirm the existence of a Degraded or Nonconforming Condition.
b) Determine if there is a basis to support the Reasonable Expectation that a TSSSC can perform its Specified Safety Function(s).
c) Gather, generate, and document technical information to support the basis for the Reasonable Expectation of Operability when an SSC has a Degraded or Nonconforming Condition.
d) Identify and develop any Compensatory Measures that may restore, enhance, or maintain the future Operability of an SSC that has a Degraded or Nonconforming Condition.
e) Provide a recommendation to the SM for Operability declaration.

<u>No Direct Evidence of Degraded Condition at Unit 3</u>

EN-OP-104, Attachment 9.1, Operability Classification Guide, provides guidance for evaluating degraded or nonconforming conditions, examples, and suggested operability classifications.

The following specific guidance is provided:

"In order to have a Degraded or Nonconforming Condition one of the following must be answered in the affirmative:

- Do deficiencies exist that result in a reduction in functional capability to perform its Functions?

  One must know detailed information on how the deficiency affects functional ability and what the Functions (including operational and environmental conditions) are.
- Do deficiencies exist that result in the physical condition not meeting the assumed design and engineering margins and qualification standards of the CLB?

  One must have detailed knowledge of both the CLB requirements and the physical condition.
- Is there a Nonconforming Condition that results from improper design, construction, installation, modification or testing of the SSC?

> Detailed knowledge of the requirements and the documentation and details of the design, construction, installation, modification, and testing must be known."

This procedural guidance has long been viewed as requiring direct evidence of a degraded condition. The corrective action program, not the operability procedure, has consistently been used to consider possible impacts of conditions identified at one unit on another unit. And as noted below, Entergy considers that is the more appropriate process for issues such as this.

Based upon the procedural guidance provided above, on May 5, 2016, Entergy concluded that a degraded or nonconforming condition did not exist for the baffle-former bolts (BFBs) and determined that Unit 3 was operable. In accordance with EN-OP-104 Section 5.3, the operability determination process was exited and the issue further evaluated in the corrective action program (CAP). There remains no direct evidence to show that the BFBs at Unit 3 are degraded. No visual inspections or non-destructive examinations of the BFBs had been performed that would have provided an indication of the condition of the BFBs at Unit 3. There were no indications of elevated radioactivity in the reactor coolant system that would be indicative of fuel cladding damage, nor were there indications of loose metallic parts from the metal impact monitor.

As part of the corrective action process, a detailed extent-of-condition evaluation of Unit 3 was performed to evaluate the Unit 3 baffle and BFBs considering the Unit 2 inspection findings. The evaluation concluded that "there is a degree of confidence that the baffle-former bolts at IP3 will remain acceptable to enable the safety function of the baffle to be met, until the bolts are scheduled for inspection in the 2017 3R19 refuel outage." Consequently, Entergy appropriately relied on its CAP program to evaluate potential impacts on Unit 3 and had a high confidence level that the consequential effects on the TS-controlled ECCS would be minimal and that it would be able to operate Unit 3 safely until the next refueling outage.

<u>No Direct Evidence of Nonconforming Condition</u>

EN-OP-104 defines a nonconforming condition as "A condition of a SSC that involves a failure to meet the current licensing basis (CLB) or a situation in which quality has been reduced because of factors such as improper design, testing, construction, or modification." Several examples are provided, one of which is "Operating experience or engineering reviews identify a design inadequacy." The results from the Unit 2 BFB inspections represented operating experience information that was pertinent to Unit 3 plant safety and was subsequently evaluated under the CAP program. However, similar to the lack of direct evidence of a degraded condition, there was no direct evidence to show that the BFBs at Unit 3 had failed to meet the CLB or that there was a reduction in quality.

<u>Current Licensing Bases (CLB)</u>

The Unit 3 UFSAR and Technical Specifications do not explicitly discuss the safety functions of the BFB.

UFSAR Section 3.2.3 describes the lower core support structure as:

> "The lower core support structure and principally the core barrel serve to provide passageways and control for the coolant flow. Inlet coolant flow from the vessel inlet nozzles proceeds down the annulus between the core barrel and the vessel wall, flows on both sides of the thermal shield, and then into a plenum at the bottom of the vessel. It then turns and flows up through the lower support plate, passes through the intermediate diffuser plate and then through the lower core plate. The flow holes in the diffuser plate and the lower core plate are arranged to give a very uniform entrance flow distribution to the core. After passing through the core, the coolant enters the area of the upper support structure and then flows generally radially to the core barrel outlet nozzles and directly through the vessel outlet nozzles."
>
> "A small amount of water also flows between the baffle plates and core barrel to provide additional cooling of the barrel. Similarly, a small amount of the entering flow is directed into the vessel head plenum to provide cooling of the head. Both these flows eventually are directed into the upper support structure plenum and exit through the vessel outlet nozzles."

UFSAR Section 6.2.1 describes the design basis for the Safety Injection System as:

> "Adequate emergency core cooling is provided by the Safety Injection System (which constitutes the Emergency Core Cooling System) whose components operate in three modes. These modes are delineated as passive accumulator injection, active safety injection and residual heat removal recirculation."
>
> "The system assures that the core will remain intact and in place with its essential heat transfer geometry preserved following a rupture in the Reactor Coolant System. It also assures that the extent of metal-water reaction is limited such that the amount of hydrogen generated from this source in combination with that from other sources, is tolerable in the Containment."
>
> "The primary function of the emergency Core Cooling System (ECCS) for the ruptures described is to remove the stored and fission product decay heat from the core such that fuel damage to the extent that would impair effective cooling of the core is prevented. This implies that the core remain intact and in place with its essential heat transfer geometry preserved."

Technical Specification (TS) 3.5, Emergency Core Cooling System (ECCS) provides the requirements for the ECCS but does not explicitly discuss the lower core support structure or BFBs.

No information regarding the design, engineering margins or qualification standards for the BFBs is discussed in the UFSAR and TS. Consequently, while the lower core support structure is important to directing the ECCS flow of coolant to the core, the specified safety functions of the BFBs are not described in the current licensing basis (CLB) for Unit 3.

Extent-of-Condition Evaluation

Entergy performed an extent-of-condition evaluation of the Unit 3 reactor pressure vessel baffle bolts and determined, "...that there is a degree of confidence that the baffle-former bolts at Unit 3 will remain acceptable to enable the safety function of the baffle to be met, until the bolts are scheduled for inspection in the 2017 (3R19) refueling outage."

Operability Determination vs. Operating Experience

The Analysis section of the NCV in the NRC's integrated inspection report states,

> "This finding is related to the cross-cutting aspect of Problem Identification and Resolution, Operating Experience, because Entergy did not effectively evaluate relevant internal and external operating experience. Specifically, Entergy did not adequately evaluate the impact of degraded baffle bolts at Unit 3 when relevant operating experience was identified at Unit 2. [P.5]"

Entergy disagrees that it did not adequately evaluate the impact of degraded bolts at Unit 3 when relevant operating experience was identified at Unit 2. In the immediate operability determination that was performed on April 21, 2016, Entergy stated that "Baffle bolt failures due to irradiation-assisted stress corrosion cracking (IASCC) is a known industry issue and since IP-2 and IP-3 utilize a Westinghouse Type 347 baffle bolt design similar in geometry and material to other plants with baffle bolt failures, the IP-3 baffle bolts are susceptible to IASCC-induced cracking." Entergy has been engaged with the industry and the NRC through its license renewal application (LRA) project. In a letter dated September 28, 2011, Entergy provided an inspection plan regarding the aging management programs for reactor vessel internals. The inspection plan was developed in accordance with the results of industry programs applicable to the reactor vessel internals and addresses the action items and conditions stated in the NRC Final Safety Evaluation of MRP-227. Entergy has been evaluating operating experience associated with BFB degradation well before it was identified at Unit 2.

EN-OE-100, Operating Experience Program identifies the requirements for sharing, screening, evaluating, implementing actions, and oversight for fleet and industry operating experience.

Attachment 9.1 of EN-OE-100 provides guidance for evaluating the vulnerability to a similar issue occurring at a plant, the risk, and the barriers that would be credited for managing the risk. When the number of degraded BFBs at Unit 2 was discovered to be higher than anticipated, Entergy initiated a CR to evaluate the impact of the Unit 2 inspection findings on Unit 3 and prepared a detailed EOC evaluating the finding of Unit 2 on Unit 3. While the EN-OE-100 process was not specifically used to assess the BFB degradation in Unit 3, the same conclusions and actions would have resulted. In addition, no additional information was likely to be identified by not exiting EN-OP-104 that would have changed the conclusion in the immediate operability determination.

The Nuclear Energy Institute (NEI) is aware of the NCVs the NRC has issued to Entergy and PSE&G (Reference 2) regarding BFB degradation and compliance with the operability determination process. The NEI has elected to engage the NRC on the apparent expansion of the operability determination process to include operating experience. (Reference 3)

Summary

In summary, on the basis of the information provided herein the NRC should withdraw the NCV. The NRC and industry should work together to clarify the appropriate uses of the operability determination process involving operating experience. The ongoing NEI initiative to develop industry guidance for this process provides an opportunity to do this, by clarifying the entry criteria for the process.

Separately, Entergy contends the issue should not be considered more than minor because the availability, reliability, and capability of the ECCS to mitigate the consequences of an accident were never in question. Further, based upon a 10 CFR 21.21(a) evaluation performed by Westinghouse to address degraded BFBs, it has been concluded that "this situation does not represent a potential defect, this issue does not create a substantial safety hazard (SSH) if left uncorrected, and continued operation of the unit(s) in consideration of this issue is acceptable."

References

1. Entergy Engineering Report IP-RPT-16-00025, Rev 0 "Evaluation of Indian Point Unit 3 Reactor Core Baffle Bolting following MRP-227-A Inspection Findings at Indian Point Unit 2 during 2R22," dated May 6, 2016
2. NRC Letter, "Salem Nuclear Generating Station, Units 1 and 2 – Integrated Inspection Report 05000272/2016002 and 05000311/2016002," dated September 22, 2016
3. NEI Letter, "NRC Non-Cited Violations Related to Susceptibility to Baffle Bolt Degradation," dated September 29, 2016