



UNITED STATES
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June 6, 2018

MEMORANDUM TO: Brian Holian, Acting Director
Office of Nuclear Reactor Regulation

David C. Lew
Acting Regional Administrator
Region I

FROM: Brice Bickett, Team Leader **/RA/**
Allegation and Enforcement
Region I

SUBJECT: INSPECTION PROCEDURE 95003: EVALUATION OF NRC ASSESSMENT AND
INSPECTION PROCESSES AT PILGRIM NUCLEAR POWER STATION

On May 10, 2017, the NRC issued Inspection Report 05000293/2016011 documenting the results of the supplemental inspection conducted at Pilgrim Nuclear Power Station (Pilgrim) in accordance with Inspection Procedure (IP) 95003, "Supplemental Inspection for Repetitive Degraded Cornerstones, Multiple Degraded Cornerstones, Multiple Yellow Inputs, or One Red Input." As prescribed in IP 95003, Section 02.11 and 03.11, the enclosed evaluation was conducted to determine whether the NRC assessment and inspection processes appropriately characterized licensee performance based on previous inspection information and whether sufficient warning was provided to identify a significant reduction in safety.

In summary, given the inputs into the Reactor Oversight Process (ROP), the evaluation team determined the NRC responded appropriately to the decline in Entergy's performance at Pilgrim. Specifically, Region I identified the decline in performance and appropriately used the known ROP assessment inputs to transition Pilgrim through the NRC's Action Matrix (Column 1 through Column 4) prior to a significant reduction in safety. Further, the evaluation team determined that the ROP and inspection processes were appropriate to provide sufficient warning of degraded and declining Entergy performance at Pilgrim such that there was not a significant reduction in safety or unacceptable operational margins to safety at any time.

However, one performance issue in the NRC's implementation of the ROP was identified, specific to the Region's review and disposition of self-revealing performance deficiencies described in Licensee Event Reports (LERs). The evaluation team observed that several potential performance deficiencies associated with LERs in the 2011 – 2013 timeframe were not consistently evaluated and documented as findings or violations consistent with ROP and enforcement guidance.

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The ROP implementation issue did not prevent the NRC from identifying declining licensee performance and transitioning Pilgrim to Column 4 prior to a significant reduction in safety. However, the evaluation team opined that, had applicable ROP guidance been followed, there likely would have been a greater number of documented ROP inputs as well as greater awareness to additional performance insights, which may have resulted in a different regulatory response during that timeframe. The evaluation team also identified several of these potential performance deficiencies would have required a more detailed risk evaluation to determine the risk significance of the performance issue. The team noted it would require senior risk analyst review and more detail than what was in the LERs to ascertain whether any of those issues may have actually resulted in findings of more than very low safety significance. The evaluation team forwarded this issue to the Region I management team who initiated separate actions to further evaluate this performance issue.

The enclosed evaluation also contains additional program and ROP implementation insights related to the NRC inspection and assessment processes implemented at Pilgrim. It should also be noted that, due to retirements from the agency, the evaluation team did not attempt to interview all key NRC individuals involved in inspection and assessment during 2011 – 2013 timeframe. However, the team has a high level of confidence based on individuals interviewed, as well as available documentation, that the observations are supportable.

Please contact Brice Bickett at 610-337-5312 should you have any questions regarding this evaluation.

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Evaluation of NRC Assessment and Inspection Processes at Pilgrim

Purpose

In accordance with Inspection Procedure (IP) 95003, "Supplemental Inspection for Repetitive Degraded Cornerstones, Multiple Degraded Cornerstones, Multiple Yellow Inputs, or One Red Input," section 02.11 and 03.11, this evaluation was conducted to determine whether the NRC assessment and inspection processes appropriately characterized licensee performance based on previous information and whether sufficient warning was provided to identify a significant reduction in safety. Additionally, any insights into the effectiveness of the Reactor Oversight Process (ROP) and its revisions, if applicable, were considered.

This evaluation did not include a review on the adequacy of and/or implementation aspects of the actual IP 95003 procedure. The focus of this evaluation was on NRC assessment and ROP program guidance preceding the date NRC transitioned Pilgrim Nuclear Power Station (Pilgrim) to the Repetitive Degraded Cornerstone Column (Column 4) of the ROP Action Matrix.

Methodology

In order to provide an assessment of the above evaluation objectives, the evaluation team considered, to the extent available, the licensee's performance and NRC processes that assessed the major regulatory and operational performance issues at Pilgrim. In particular, the evaluation team considered the record of station performance since 2009 which included documented plant performance summaries, ROP findings/violations, licensee event reports (LERs), and supplemental inspection results. The evaluation team also conducted a number of discussions with applicable Region I staff to gain perspectives and further insights on the above information.

Additionally, the evaluation team reviewed IP 95003 team inspection results as well as considered inspection manual chapter (IMC) 0350, 'Oversight of Reactor Facilities in a Shutdown Condition due to Significant Performance and/or Operational Concerns,' and IMC 0305, 'Operating Reactor Assessment Program,' guidance to inform the evaluation team's assessment of whether the NRC appropriately characterized licensee performance prior to a significant reduction in safety.

Background

Pilgrim transitioned into the Repetitive Degraded Cornerstone Column (Column 4) of the ROP Action Matrix as of the first quarter of 2015. This resulted from issuance of a White finding under the Mitigating Systems cornerstone while Pilgrim was already in the Degraded Cornerstone Column (Column 3) for more than five consecutive quarters due to two open White inputs under the Initiating Events cornerstone. In the IP 95002 Supplemental Inspection Report 05000293/2014008 (ML15026A0691), dated January 26, 2015, the NRC noted that Entergy did not adequately evaluate the causes and take or plan timely corrective actions to address the issues associated with a high number of unplanned scrams which occurred in 2013. As a result, the two White inputs under the Initiating Events cornerstone remained open for greater than five consecutive quarters, and were in effect when the new White finding was identified during an inspection exit on March 20, 2015. The NRC subsequently closed the White inputs under the Initiating Events cornerstone on June 30, 2015, due to successful completion of the IP 95002 follow-up inspection. Pilgrim currently remains in Column 4 at the issuance of this memorandum.

¹ Designation in parentheses refers to an Agencywide Documents Access and Management System (ADAMS) accession number. Documents referenced in this report are publicly available using the accession number in ADAMS.

Summary of Results

Given the inputs into the ROP, the evaluation team determined the NRC responded appropriately to the decline in Entergy's performance at Pilgrim. Specifically, Region I identified the decline in licensee performance at Pilgrim and appropriately used the known ROP assessment inputs to transition Pilgrim through the NRC's Action Matrix (Column 1 through Column 4) prior to a significant reduction in safety. Further, the evaluation team determined that the ROP and inspection processes were appropriate to provide sufficient warning of degraded and declining licensee performance at Pilgrim such that there was not a significant reduction in safety or unacceptable operational margins to safety at any time.

However, one performance issue in the NRC's implementation of the ROP was identified, specific to Region I's review and disposition of self-revealing performance deficiencies described in LERs. The evaluation team observed that several LERs in the 2011 – 2013 timeframe were not consistently evaluated and documented as findings or violations consistent with ROP and enforcement guidance **[Observation #1]**.

The ROP implementation issue did not prevent the NRC from identifying declining Entergy performance and transitioning Pilgrim to Column 4 prior to a significant reduction in safety. However, the evaluation team opined that, had applicable ROP guidance been followed, there likely would have been a greater number of documented ROP inputs as well as greater awareness to additional performance insights, which may have resulted in a different regulatory response during that timeframe. The evaluation team also identified that several of these potential performance deficiencies would have required a more detailed risk evaluation to determine the risk significance of the performance issue. It would require significantly more detail than was available in the LERs, as well as risk analyst support, to fully inspect and ascertain whether any of those issues may have resulted in a finding of more than very low safety significance.

The evaluation team also identified a strength in inspector engagement that contributed significantly to Region I's ability to make fully informed and timely decisions at the senior management level. In particular, Region I inspector insights, including significant engagement and views during key decision-making processes, were a primary contributor in enabling Region I senior management to make timely and fully-informed decisions regarding Pilgrim performance and the site's transition in the Action Matrix. **[Observation #2]**

The observations and additional program insights are provided in greater detail below.

DETAILS

Observation #1: Self-revealing performance deficiencies described in LERs were not consistently evaluated and documented as findings or violations in accordance with applicable ROP and enforcement guidance.

The evaluation team reviewed LERs to assess Entergy's performance at Pilgrim prior to entry into the repetitive degraded cornerstone column of the Action Matrix (Column 4). The team then evaluated Region I's inspection closeout and assessment of the LERs to determine if the NRC had properly evaluated performance deficiencies that caused or were associated with the reported events and equipment conditions.

The evaluation team determined, based on the information described in the LERs, that Region I did not appear to properly assess and document potential, self-revealing performance deficiencies associated with a number of LERs consistent with applicable NRC inspection and enforcement guidance. The evaluation team determined that LERs, predominantly in the 2011 through 2013 timeframe, routinely described equipment conditions and events with potential, self-revealing performance deficiencies that should have been documented by inspectors and evaluated for significance and applicable cross-cutting aspects. For example, in 2013 there were 10 LERs with no performance deficiencies described by the inspectors in the closeout documentation when, by limited review, the evaluation team preliminarily determined that six (6) findings/violations could have been documented. It should be noted that the evaluation team did not fully re-inspect the closure of the LERs which would involve significantly more review of past information beyond what was documented in the LER. However, in many of these LERs, the documented details and causes identified by the licensee reasonably indicated an equipment performance challenge that was associated with a licensee performance deficiency. The evaluation team also identified several of these potential performance deficiencies would have required a more detailed risk evaluation to determine the risk significance. Specifically, it would require senior risk analyst review and more detail than what was in the LERs to ascertain whether any of those issues may have actually resulted in findings of more than very low safety significance.

This ROP implementation deficiency likely caused a number of licensee performance insights to not be considered by Region I. The evaluation team opined that, had applicable ROP guidance been followed, there would have been a greater awareness to these issues, which may have resulted in a different regulatory response during that timeframe. Additionally, the evaluation team believes that Region I may have been in a more supportable position to conclude there was a substantive cross-cutting issue (SCCI) regarding the HP/PIR themes in 2011 through 2013 if all inputs were properly documented. In particular, performance summary documentation indicated Region I had significant discussions on whether the PIR theme in 2013 should be considered a SCCI and that decision was influenced, in part, based on the number and timing of the findings previously documented.

The evaluation team noted that those ROP implementation gaps appeared to have at least been resolved in 2015 going forward.

Recommendations –

- *Region I should consider an assessment/extent of condition review focused on LER closures for similar implementation deficiencies in documenting self-revealing performance issues.*
- *Region I should consider training with regards to required disposition of performance*

deficiencies, to include a focus on performance deficiencies (self-revealing and licensee-identified) described in LER reports.

- *Region I should share the assessment and corrective actions with other regional and program offices, as applicable.*

Observation #2 – Region I inspector insights, including significant engagement and views during key decision-making processes, were a primary contributor in enabling Region I senior management to make timely and fully-informed decisions regarding Pilgrim performance. In particular, there were two examples where staff engagement in the decision-making processes were especially notable:

- During the 95002 supplemental inspection, the inspectors on the 95002 team appropriately identified and characterized Entergy's corrective action program weaknesses and articulated the inspection team's rationale for failure to meet the inspection objectives. The evaluation team determined that the 95002 inspection team had accurately captured, with well supported inputs, Entergy performance at Pilgrim and it was reasonable and appropriate for the NRC to have opened the two parallel White findings in accordance with the ROP. The evaluation team considers the decision-making and contribution by inspectors to be especially notable when considering the rarity of the situation and decision to open two (2) parallel white findings during a single supplemental inspection, during a timeframe when the performance indicators had already returned to Green.
- The evaluation team determined Region I methodically reviewed station performance in the second quarter of 2015 to determine whether Entergy performance warranted Column 4 designation or to deviate from the current ROP when considering near term, upcoming changes to the ROP specific to the Action Matrix and Degraded Cornerstone inputs. The evaluation team determined that Region I senior management team fully engaged staff to understand not only the formal performance inputs in the Action Matrix but also the related performance insights gathered by senior inspectors to inform the NRC's decision. Just as notable as the inspection insights, was the significant amount of discussion fostered by senior management which considered significant views and discussions by inspectors to ensure Region I decision-making adequately considered all available performance and program information.

Recommendation – *None. The team considered these very positive examples of staff and management interaction that demonstrated a positive practice of adhering to NRC values during challenging decision-making processes.*

Program/ROP Implementation Insight #1: The documentation of PIR sample reviews could have been improved to provide a more focused assessment of degraded performance in the corrective action program (CAP) area.

The ROP baseline inspection was implemented as designed in all inspection areas. The inspectors routinely exceeded nominal and occasionally maximum samples under operability, adverse weather and maintenance effectiveness. While these samples provide a snapshot of the current assessment and performance of the station, the evaluation team considered that PIR sample documentation could have been utilized to provide a more in-depth insight into the CAP performance weaknesses known to the reactor project branch. Specifically, during a period of elevated events and inspector findings (2009 - 2015), the project branch could have better documented the inspection insights and assessment of CAP performance during PIR samples,

most notably during semi-annual trend reviews. The project branch and management team consistently described in-depth CAP insights in performance summary packages for mid and end-of-cycle assessments that identified weaknesses in CAP effectiveness; however, the supporting documentation from applicable PIR samples in the inspection reports had not consistently matched the assessment.

***Recommendation:** Region I should consider whether guidance changes in IMC 0305 or regional-specific guidance (regarding quarterly and end-of-cycle reviews) is needed to ensure PIR sample purpose/assessment for degraded plant performance is well documented.*

Program/ROP Implementation Insight #2 – There can be an inconsistent understanding of whether a loss of offsite power event satisfies the deterministic criteria, loss of a safety function, described in IMC 0309, ‘Reactive Inspection Decision Basis for Reactors,’ which would benefit from additional guidance or clarity.

The evaluation team reviewed events and equipment failures that appeared to have potential risk significance, with a particular focus on storm and associated loss of offsite power events in 2013 and 2015. These events were then reviewed to assess whether an IMC 0309 evaluation had been performed and, if performed, a documented basis for conducting or not conducting a reactive inspection was completed. The evaluation team focused in this area in recognition that event follow-up decision-making can have significant influence on the amount of inspector resources applied to a given event or condition at a plant.

The evaluation team determined that, based upon the samples reviewed, the IMC 0309 process was properly followed. The evaluation team noted in this determination that there is some judgment allowed by IMC 0309 to be applied by NRC decision-makers in response to these events, including whether a reactive inspection is warranted if the deterministic criteria and risk components are met. However, the evaluation team also determined there are differing perspectives in how staff and managers interpret the deterministic questions in IMC 0309 that may have a significant impact on the decision-making process. For example, in 2013 after Storm Nemo, the plant experienced a loss of offsite power and scram which were inspected by NRC resident inspector event follow-up and supplemented by reactor inspector resources. The evaluation team was able to locate a draft IMC 0309 evaluation developed at that time (team could not locate a finalized version) which concluded that no deterministic criteria were met because it was determined no loss of safety function occurred. The team’s review of the event initially questioned that determination and whether the IMC 0309 deterministic criteria could have been met specific to the following criteria:

- Loss of a safety function or multiple failures in systems used to mitigate an actual event.

The evaluation team found that even amongst the most senior inspectors and risk analysts involved, there were differing perspectives about this criteria specific to whether the loss of offsite power constituted a loss of safety function as it relates to this process. The differing perspectives seem to be derived from the various understandings of what loss of safety function could mean in this process based upon review of different NRC guidance documents, such as NUREG-1022 and applicable PRA guidance.

The evaluation team also determined that the decision to launch a special inspection after Storm Juno in 2015 (which also had an associated loss of offsite power event) was warranted and not contrary to nor inconsistent with the Region’s 2013 Storm Nemo decision. Specifically, the evaluation team noted the deterministic criteria in the Storm Juno event were determined to be satisfied for repetitive equipment failures and operator response challenges.

***Recommendation** - NRR consider whether clarity is needed in IMC 0309 guidance to ensure a consistent application and understanding of the deterministic criteria with a particular focus on loss of a safety function.*

Program/ROP Program Insight #3: Based on documented inspection inputs, the ROP cross-cutting issues program was effectively implemented by Region I. The team also determined that the decision to not issue a substantive cross-cutting issue (SCCI) in 2011 and 2013 was consistent with program guidance.

The evaluation team reviewed applicable documents and assessed the NRC staff's implementation of the program beginning in 2009 extending through 2015. The team did not independently evaluate the assignment of cross-cutting aspects for each inspection finding. During the evaluated period, there were two cross-cutting themes identified. The evaluation team determined that consistent with the existing program documents, Region I appropriately documented and supported its rationale that no substantive cross-cutting issues (SCCIs) were identified as a result of the themes. The evaluation team also reviewed end of cycle assessment letters for the same time frame, and determined that the NRC staff had properly notified the licensee of identified cross-cutting themes. The team concluded that the cross-cutting issues program was appropriately implemented by Region I.

The evaluation team attempted to evaluate the overall effectiveness of the cross-cutting issues program, in light of similar observations documented in prior 95003 reviews conducted in other regions. However, because the review was limited to application of the program at Pilgrim, the team could not provide an objective assessment of the entire program. In discussions with NRR's Division of Inspection and Regional Support, the evaluation team was made aware that an effectiveness review of the cross-cutting issues program is being scheduled as part of the annual ROP program assessment for calendar year 2019. The evaluation team considered that including focus on Column 4 sites in this review would be an effective method for assessing the effectiveness of the cross-cutting issues program.

***Recommendation:** NRR/DIRS consider Column 4 plant experiences with cross-cutting issues program during its 2019 effectiveness review.*

Program/ROP Implementation Insight #4 – There is limited guidance regarding the conduct of this IP 95003 evaluation which has led to different approaches and scope of this effort.

The evaluation team believes there is a need for improved guidance on the implementation of this IP 95003 limited review as there is minimal guidance regarding the conduct of this review and the expected resources to accomplish it. Further, the evaluation team noted a different approach of the IP 95003 review taken by each region on past IP 95003 reviews which would suggest additional guidance could lead to a more consistent approach to these efforts.

***Recommendation** – NRR/DIRS consider improved guidance to better provide a consistent approach and conduct of these reviews. In particular, that guidance should consider defining key aspects like (1) scope of effort, (2) independence aspects of the team composition, and (3) resource expectations to achieve the objectives.*