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MEMORANDUM TO: Christopher G. Miller, Director
Division of Reactor Oversight
Office of Nuclear Reactor Regulation

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SUBJECT: RESULTS OF THE REACTOR OVERSIGHT PROCESS SELF-ASSESSMENT EFFECTIVENESS REVIEW OF THE DEGRADED PERFORMANCE COLUMN OF THE ACTION MATRIX

The report attached to this memorandum presents results from the Reactor Oversight Process (ROP) self-assessment effectiveness review of the Degraded Performance Column of the ROP Action Matrix. This review evaluated the effect of changes implemented in calendar year 2015 to the definition of a Degraded Cornerstone in the ROP Action Matrix and corresponding changes to inspection follow-up of multiple White assessment inputs. The level of industry pushback on White findings, as described by Commissioner Baran at a September 30, 2020 Commission Meeting, was also reviewed. Specific recommendations for your consideration and direction are included in the report.

Enclosure: Results of the Reactor Oversight Process Self-Assessment Effectiveness Review of the Degraded Performance Column of the Action Matrix

Appendix: Raw Data

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SUBJECT: RESULTS OF THE REACTOR OVERSIGHT PROCESS SELF-ASSESSMENT EFFECTIVENESS REVIEW OF THE DEGRADED PERFORMANCE COLUMN OF THE ACTION MATRIX DATED: MARCH 30, 2021

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Results of the Reactor Oversight Process Self-Assessment Effectiveness Review of the Degraded Performance Column of the Action Matrix

Background

An effectiveness review of the definition of Column 3 of the ROP Action Matrix commenced in late 2020. Effectiveness reviews were added to the ROP self-assessment program as part of the November 23, 2015, revision to Inspection Manual Chapter (IMC) 0307, "Reactor Oversight Process Self-Assessment Program." These effectiveness reviews are intended to assess recently implemented ROP changes to evaluate their effectiveness to ensure that the intended results have been realized and to evaluate any unintended consequences. A change to the definition of a Degraded Cornerstone, and corresponding changes to Column 3 of the Action Matrix and Inspection Procedure (IP) 95001, "Supplemental Inspection Response to Action Matrix Column 2 (Regulatory Response) Inputs," implemented in December 2015 were the subject of this effectiveness review.

The concept of the Action Matrix was initially described in SECY-99-007, "Recommendations for Reactor Oversight Process Improvements." The SECY stated regarding the concept of the Action Matrix:

> *An action matrix, shown in Attachment 1, Table 5, was developed to provide guidance for consistent consideration of actions. The actions are graded across five ranges of licensee performance in all response categories (management meeting, licensee action, NRC inspection, and regulatory actions) and in terms of annual communication of assessment results. Action decisions are triggered directly from the threshold assessments of PIs and cornerstone inspection areas.*

The initial version of the Action Matrix defined Column 2 as "One or Two White Inputs (in different cornerstones) in a Strategic Performance Area" and Column 3 as "One Degraded Cornerstone (2 White Inputs or 1 Yellow Input) or any 3 White Inputs in a Strategic Performance Area." The inspection follow-up for plants in Column 2 has always been via IP 95001 and for Column 3, IP 95002, "Supplemental Inspection for One Degraded Cornerstone or Any Three White Inputs in a Strategic Performance Area." The initial difference between an IP 95001 and 95002 inspection involved independent extent of condition reviews. Over time the scope of IP 95002 activities expanded to include an independent determination of whether safety culture components caused or contributed to risk significant performance issues.

An independent assessment of the ROP conducted in 2013 at the direction of the Commission concluded that the ROP was functioning well, though opportunities to further enhance the ROP structure, program implementation, and the conduct of self-assessments were noted. One of the issues documented, with a corresponding recommendation, in the independent assessment report was:

> Issue: Internal and external stakeholders agree that the resources expended to disposition a finding at the Green/White threshold can be excessive. Licensees are willing to expend a great deal of resources to challenge a White finding because, in part, the increase in regulatory oversight for two White findings in a cornerstone (transition to Column 3 of the NRC Action Matrix) is not viewed as proportionate to the risk associated with the White findings. Consequently, the NRC also expends significant resources to finalize the characterization of White findings.

> Recommendation 5: The NRC should review the criteria for transition to Column 3 of the NRC Action Matrix against the original ROP program goals to ensure that the significance of White inspection findings is not being overemphasized and to ensure that agency resources used to process White inspection findings are commensurate with findings that, by definition, are of low-to-moderate safety significance. (Section 6.3.3)

This recommendation led to a 2014 working group that evaluated whether the existing Column 3 criteria of two White inputs was appropriate. The working group conducted an extensive review of the historical and technical bases of the current threshold and determined that two White inputs may not appropriately balance NRC regulatory response with the risk-informed input into the process. The working group recommended changing the definition of a Degraded Cornerstone to three White inputs in a cornerstone such that the Column 3 threshold would be one Yellow input or any three White inputs in a strategic performance area. The working group report and basis is in ADAMS as Accession Nos. ML14350B164 and ML14350B180. The change to the Degraded Cornerstone definition was proposed to the Commission for approval in SECY-15-0108, "Recommendation to Revise the Definition of Degraded Cornerstone as Used in the Reactor Oversight Process," (ADAMS Accession No. ML15076A066) and was approved in the associated Staff Requirements Memorandum (SRM) (ADAMS Accession No. ML15335A559).

The revised Action Matrix was implemented in the December 23, 2015, revision of IMC 0305. Along with the revised Action Matrix came a revised IP 95001, dated August 24, 2016 (ML15223B348), to include additional resources and guidance to be used to review licensee common cause analyses when a licensee has a second White input in the same cornerstone in order to consider the potential for programmatic weaknesses in a licensee's performance.

Figure 1: Pre-December 2015 and Post-December 2015 Column 2 and Column 3 Criteria

Pre-December 2015			Current	
Column 2	**Column 3**		**Column 2**	**Column 3**
One or Two White inputs (in different cornerstones) in a Strategic Performance	One Degraded Cornerstone (2 White Inputs or 1 Yellow Input) or any 3 White inputs in a Strategic Performance Area	→	One or Two White inputs in a strategic performance area	One Degraded Cornerstone (3 White inputs or 1 Yellow input), or Any 3 White inputs in a strategic performance area

Effectiveness Criteria

The team reviewed documentation surrounding the Degraded Cornerstone change recommended by the 2014 working group and implemented in December 2015 upon Commission approval. The bases documented by the 2014 working group for their recommended change included consideration of the cumulative risk of multiple White findings and review of downstream plant performance after exiting Column 3.

This planned effectiveness review was discussed at a September 30, 2020, Commission Meeting. Pages 104 and 105 of the transcript for that meeting (ML20280A819) documented comments from Commissioner Baran about the industry's assertion that we would see fewer challenges to White findings if the Degraded Cornerstone definition were changed from two to

three White inputs. The industry assertion to which Commissioner Baran referred was documented in an Nuclear Energy Institute (NEI) document dated August 8, 2014, entitled, "Proposal for Changing the Threshold for Transition to Column 3 of the NRC's Reactor Oversight Process Action Matrix," (ADAMS Accession No. ML14246A465) which was submitted in response to Recommendation 5 of the 2013 ROP independent assessment. In this document NEI proposed that the criteria for Column 3 be changed from two White inputs to three White inputs and articulated that if the change were implemented (1) licensees would continue to perform a Root Cause Evaluation that assures the root and contributing causes of each White input are understood, (2) licensees would continue to conduct collective reviews of multiple White inputs, (3) the change would likely significantly reduce the number of licensee challenges to potential White findings, (4) the additional margin to Column 3 would likely result in licensees deciding not to spend extensive resources to challenge finding significance, and (5) extensive NRC and licensee resources would no longer be expended on regulatory challenges associated with low-to-moderate safety-significant issues. This industry proposal and basis was described in SECY-15-0108 when the staff requested approval for changing the Degraded Cornerstone definition.

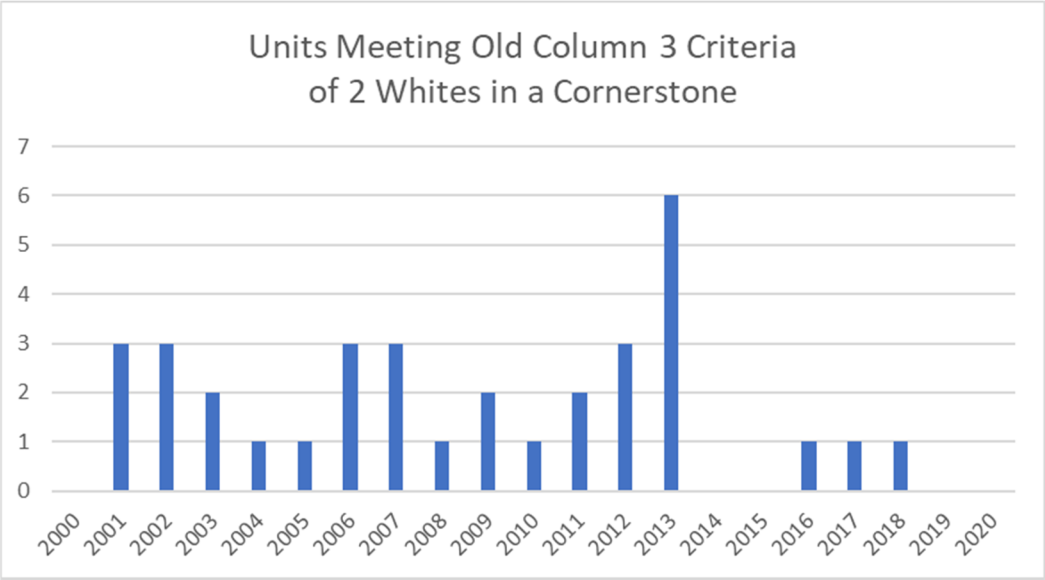
In evaluating the effectiveness of the change the team (1) assessed whether the basis for the 2015 remained valid, (2) whether the change was implemented as intended and achieved the intended objective, (3) whether there have been any unintended impacts of the change, and (4) whether the statements provided by industry in the August 8, 2014, letter have proven true in the time since the change was implemented.

Data and Information Reviewed

The information and data reviewed included the basis for the 2015 Degraded Cornerstone and related IP changes, documented in ADAMS at Accession Nos. ML14350B164 and ML14350B180, the history of the Action Matrix from initial concept documented in SECY-99-007 to implementation via IMC 0305 and IMC 0308, all greater than Green (GTG) assessment inputs (findings and performance indicators) since 2015, the risk significance of all White findings in the Initiating Events, Mitigating Systems, and Barrier Integrity Cornerstones, other performance insights and plant event information, including MD 8.3 screenings and ASP reports, and perspectives on pushback on potentially GTG findings. Review of this information was intended to inform whether or how the change to the Degraded Cornerstone definition affected regulatory oversight of plants that met pre-2015 criteria but not post-2015 criteria. The team also discussed the topic of pushback on potentially White findings with internal and external stakeholders.

The team identified 42 assessment inputs classified as White or GTG from the beginning of 2016 through the end of 2020; 30 inspection findings and 12 performance indicators. This time period was chosen since the Degraded Cornerstone change became effective in December 2015. These 42 inputs resulted in three instances at two plants in which multiple White inputs were open simultaneously in a single cornerstone. A list of the 2016 and onward GTG inputs and open dates is included in the Appendix to this report. Figure 2 shows the number of instances of overlapping White inputs in a single cornerstone since ROP inception.

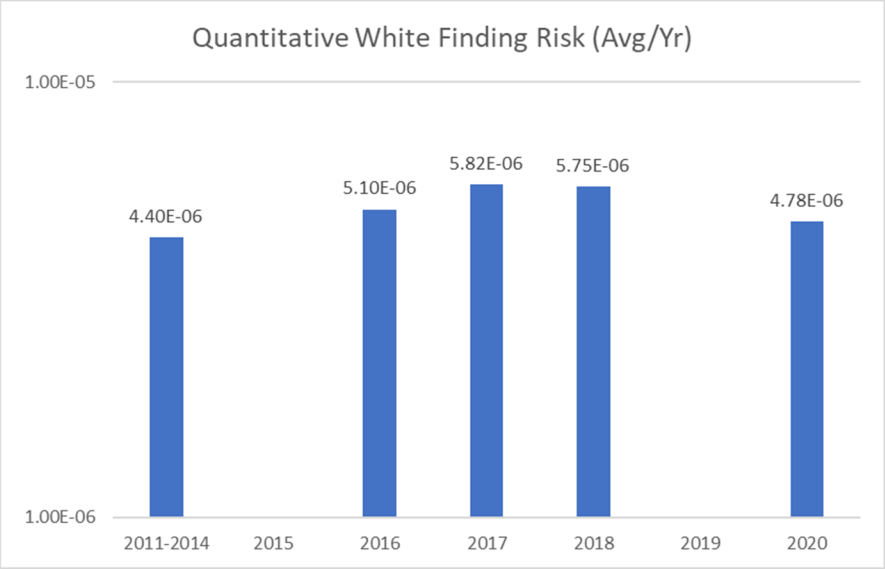
Figure 2: Units with Two White Inputs in a Cornerstone



The 2014 Column 3 evaluation determined that, on average, it took more than two White findings for the combined significance to be the quantitative equivalent to a single Yellow finding and that the mean risk value of a sample of previous White findings was a change in core damage frequency (CDF) of 4.4E-6/year. This review found that from 2016 through 2020 the quantitatively assessed finalized White findings had a mean change in CDF value of 5.6E-6/year. Figure 3 shows the average quantitative White finding risk for the time period evaluated by the 2014 team and each year since then. While the mean of 2016-2020 is a slight increase over the mean value calculated in the previous review, the team did not find this to be of significance for several reasons. First, the Significance Determination Process (SDP) is a risk-informed rather than risk-based process and there is no intent to apply the 1E-5 threshold to the cumulative impact of multiple White findings. Second, fundamental to the SDP is the concept of "best available information," meaning the SDP is by design not striving for absolute possible precision but rather the best answer given available information in a reasonable time period. Finally, many White assessment inputs do not involve a quantitative outcome, for example performance indicators or inspection findings using the deterministic SDP procedures. The quantitative data reviewed, when taken holistically with other factors involving the significance of White assessment inputs, did not point to a definitive number of White inputs that could generally be considered equivalent to a Yellow input and, most notably for the purpose of this review, did not invalidate or undermine the conclusions made by the 2014 evaluation.

A total of 44 IP 95001 inspection reports from 2016 onward were also reviewed. Three of the 42 inputs issued in this timeframe had not yet been subject to a supplemental inspection at the time of this review. Two inspections reviewed multiple White inputs and four inspections were unable to close the assessment input(s) until a re-inspection occurred. The review of these 44 inspection reports focused on documentation of significant weaknesses, safety culture issues, extent of condition and cause, review for common cause when multiple issues were present, any inspection findings or violations as a result of the inspection, and the level of effort expended by agency staff.

Figure 3: Annual Average of White Finding Quantitative Risk Results

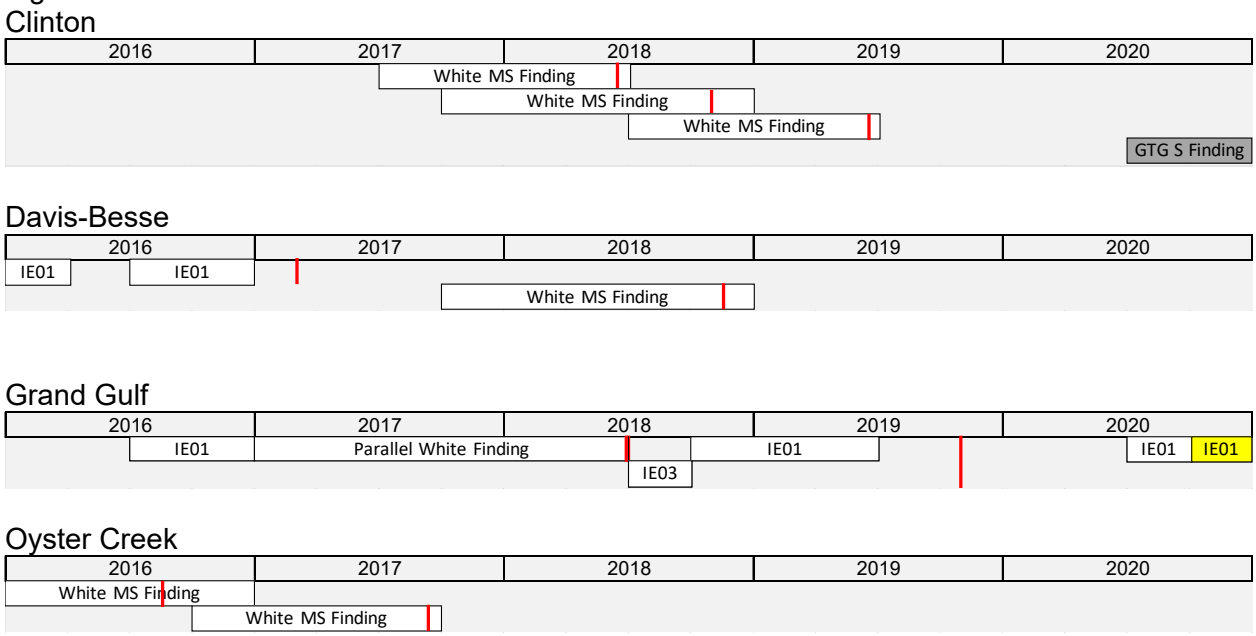


The 44 inspection reports documented 13 Green findings, one parallel White performance indicator inspection finding, and two Green licensee-identified violations. Ten of the Green findings were identified under IP 95001, while the remaining three were identified during Licensee Event Report follow-up under IP 71153, "Follow up of Events and Notices of Enforcement Discretion." Overall, most IP 95001 inspections identified some weaknesses associated with inspection objectives; however, the majority of weaknesses were determined not to be significant such that the inspection objectives were not met.

In addition to the three instances at two sites in which previous Column 3 criteria were met, but not the current Column 3 criteria, two instances in which a new White PI overlapped a previous White PI that had not yet been inspected, but the data had returned to Green, were identified. While this is not defined as overlapping inputs under previous or current IMC 0305 guidance, SECY-19-0067, "Recommendations for Enhancing the Reactor Oversight Process," (ADAMS Accession No. ML19070A036) included a proposed modification that would maintain GTG PIs as an open assessment input until they were inspected and closed, consistent with inspection findings. Under this approach the two instances identified by the team would have met the prior Column 3 criteria and not the current Column 3 criteria. In the interest of assessing the most data possible, these two situations were reviewed in more detail along with the three other instances. Another proposal in SECY-19-0067, to close inspection findings once the supplemental inspection has been completed with all objectives met, could affect how assessment inputs are considered. A review of this change against the assessment inputs issued since 2016 determined that it would not have had an impact on overlapping White inputs.

The more detailed review of the five situations identified (at four plants) is summarized in Figure 4 and included a review for each plant of the overlapping White assessment inputs, the inspection follow-up timeline and results, and downstream plant performance, as well as discussion with staff involved in oversight of the specific facilities. The purpose of the review was to determine whether inspection follow-up via Column 2 instead of Column 3 raised regulatory or safety concerns.

Figure 4: Performance Timeline for Selected Facilities



*Red lines indicate date of 95001 inspection that closed the assessment input

The review found that once the GTG issues were addressed, inspected, and closed at Davis-Besse and Oyster Creek neither site incurred additional GTG inputs in the cornerstone in question and review of MD 8.3 screenings and ASP reports did not reveal other potentially risk significant events. Davis-Besse did receive one additional White finding in the Mitigating Systems cornerstone that the team found was not closely related to the two instances in which the unplanned scrams PI went White. The team observed that the two Oyster Creek issues were not subject to a common 95001 inspection, which would have been appropriate given the 2015 changes to Column 3 criteria and IP 95001. The team was unable to determine through interviews why individual inspections instead of a collective inspection were performed. The team concluded that Column 2 oversight of Davis-Besse and Oyster Creek did not result in undue risk to the public.

The review found that once the GTG issues were addressed, inspected, and closed at Clinton the site did not incur additional GTG inputs in the cornerstone in question. While Clinton received three White findings in the Mitigating Systems cornerstone in less than two years, with two separate overlapping periods, Clinton received three separate 95001 inspections, one for each White finding, instead of one or two larger inspections of multiple inputs. However, the first IP 95001 inspection report documented that the licensee had not yet finished a common cause analysis for the first two White findings and the second and third IP 95001 inspection reports documented reviews of common cause analyses of the multiple White findings. While a common cause review was performed by the licensee and reviewed by the inspectors, individuals involved in oversight of Clinton stated that the focus of the IP 95001 inspections, in hindsight, may have been too narrow. Subsequent performance issues may have some common causal factors with the previous White findings. The individuals noted that, although other inspections identified indications of broader plant performance issues, the ability to conduct an independent extent of condition and extent of cause, which is within the scope of IP 95002 but not IP 95001, may have assisted in more promptly identifying broader programmatic issues that have since become apparent.

The review found that Grand Gulf continued to incur GTG inputs in the Initiating Events cornerstone through the end of the review period. Dating back to 2016 the plant has had a White PI in the Initiating Events cornerstone four times, and the most recent Initiating Events White PI further escalated to Yellow in 4Q2020. A supplemental inspection that reviewed the first White input in 2017 identified significant weaknesses, which resulted in a parallel White PI inspection finding. The input was inspected again in June 2018 and was closed. One IP 95001 inspection performed in July 2019 reviewed two White performance indicators. The inspection identified three weaknesses initially classified as significant weaknesses and one general weakness. The licensee completed actions to revise their evaluations during the inspection and all four weaknesses were re-classified as general weaknesses, which allowed the inputs to be closed. The most recent GTG PI in the Initiating Events cornerstone has not yet been inspected. Individuals involved in the oversight of Grand Gulf stated that licensee performance issues have turned out, based on insights from other subsequent inspection activities, to be broader than what was revealed by the IP 95001 inspections. Inspection follow-up with a broader scope than that of IP 95001 may have assisted in more promptly identifying that the performance concerns revealed by the IP 95001 inspections were in fact more widespread.

Overall, the detailed review of the five instances (at four plants) found some evidence that the Degraded Cornerstone change may have delayed identification or full understanding of performance concerns at some sites, which at least some staff attributed to the more narrow scope of an IP 95001 review of two White inputs compared to the previous IP 95002 review of two White inputs in a cornerstone. In one of the instances the plant did ultimately enter Column 3 a couple years later based on a Yellow assessment input. It is important to note that the ability to operate the facility safely and to maintain adequate protection was never in doubt based on the review of data and stakeholder views. This is ultimately a question of how promptly the staff believes the ROP should respond to indications of declining performance. Since other unrelated ROP changes made in recent years have had a similar effect on the ROP (see, for example, a recent effectiveness review of the Cross-Cutting Issues Program available in ADAMS as Accession No. ML20239A806), it may be prudent to assess recent ROP changes collectively to ensure the oversight program as a whole remains as sensitive and responsive as desired. A previous review for cumulative effects of ROP changes reviewed the 2013-2015 timeframe (ADAMS Accession No. ML16034A346) but additional time and ROP changes since then warrant another review.

During the review of IP 95001 inspection reports, a gap was identified between IP 95001 objectives and guidance. A revised IP 95001 was issued in August 2016 that included changes in response to SRM-SECY-15-0108. That revision added independent assessment of extent of condition and extent of cause to inspection objective 01.02 as follows:

> 01.02 To *independently assess and* [C2] assure that the extent of condition and extent of cause of significant *individual and collective (multiple white inputs)* [C2] performance issues are identified.

Regarding IP 95001, SRM-SECY-15-0108 stated:

> "Additionally, the staff will revise Inspection Procedure 95001 to include additional resources and guidance to be used to review licensee common cause analyses when a licensee has a second White input in the same cornerstone in order to consider the potential for programmatic weaknesses in a licensee's performance."

While the Commission directed that review for common causes be included in IP 95001, no discussion in the 2014 Column 3 working group materials, SECY-15-0108, or the associated SRM points to inclusion of independent extent of condition or extent of cause in IP 95001. Further, there is no associated discussion of independent assessment of extent of condition and extent of cause for multiple White inputs in the Inspection Requirements and Inspection Guidance sections of the IP. Review of the IP 95001 reports since 2016 did not identify discussion of independent extent of cause or extent of condition reviews. This gap between IP 95001 objectives and guidance should be addressed and is discussed in the Recommendations section of this report.

As noted by Commissioner Baran at the September 30, 2020, Commission Meeting that summarized the results of the Agency Action Review Meeting, the industry strongly advocated in favor of revising the Column 3 criteria to three White inputs in a cornerstone rather than two and asserted that we would see a reduction in pushback on White findings as a result. Their views were articulated at length in a document dated August 18, 2014, and available in ADAMS as Accession No. ML14246A465. In describing the proposal, the industry specifically stated, in part:

- The proposal would maintain thorough licensee evaluations and corrective actions associated with each and every White input. Specifically, in response to each White input, licensees would continue to perform a Root Cause Evaluation that assures that the root causes and contributing causes of each White input are identified and understood.
- It is important to note that under this proposal, licensees will continue to conduct the collective reviews currently addressed in NRC IP 95002 when multiple White inputs are received. These collective reviews will continue to be available for NRC review.
- [T]he proposal would likely significantly reduce the number of licensee challenges to potential White findings. Dialogue with industry Regulatory Affairs leaders reflects that the number of challenges/Regulatory Conferences on potential White findings could be cut significantly.
- With this proposal, a licensee in Column 1 facing a preliminary White finding would no longer face the regulatory risk of an additional White input leading to Column 3 and an IP 95002 inspection. Also, a licensee with one White input (Column 2) would no longer face the present disproportionate level of additional regulatory oversight (Column 3) upon receipt of the next White input.

The NEI paper and views contained within were summarized in SECY-15-0108 as follows:

> *The Nuclear Energy Institute (NEI) subsequently submitted a position paper to NRC staff, dated August 18, 2014 (ADAMS Accession No. ML14246A465), reiterating the industry's position that the threshold for transitioning to Column 3 of the ROP Action Matrix (two White findings in a cornerstone) is too low. NEI stated that this threshold motivates licensees to challenge "preliminary White" findings aggressively. As a result, both licensees and the NRC often expend resources on White findings that are not commensurate with their low-to-moderate safety significance.*

There is little objective data available to capture how much licensee disagreement and pushback there is on White findings. The significance of potential and preliminary White findings is extensively discussed with a licensee before the preliminary significance is issued. Once a preliminary significance assessment is formally issued, the licensee has another

opportunity to provide input, which is often exercised. After a final significance determination is made, there is an appeal process available. The team reviewed formal significance appeals of findings, which are listed in Table 1. After a period of several years leading up to the Degraded Cornerstone definition change without a formal significance appeal, two significance appeals occurred in the first two years following the change, both of which were denied. Because the Degraded Cornerstone change and the industry arguments in favor of it are focused on issue significance, the team considered only risk significance appeals and not other formal avenues to appeal or contest, such as contesting the underlying violation or submitting a backfit appeal. Note that the NRC made changes to the appeal process in 2008 by adding prerequisites to accepting an appeal in order to avoid protracted debate on risk assessment assumptions. The data indicate that formal appeals have not impacted outcomes. The team attributes this to the fact that by this point in the process the NRC has carefully considered the finding and that the remaining areas of disagreement are not regarding factual information about the event or issue but rather a reflection of the inherent uncertainties in risk assessment.

Table 1: SDP Appeals

2001	EA-00-208	Callaway	Appeal accepted for review, not granted
2001	EA-01-141	Oyster Creek	Appeal accepted for review, partially granted
2001	EA-01-236	Columbia	Appeal accepted for review, not granted
2002	EA-01-304	Comanche Peak 1 and 2	Appeal accepted for review, not granted
2006	EA-06-132	Vogtle 1 and 2	Appeal accepted for review, not granted
2006	EA-06-199	Oconee 1, 2, and 3	Appeal accepted for review, not granted
2009	EA-09-121	Brunswick 1 and 2	Appeal criteria not met - denied
2011	EA-11-018	Browns Ferry 1	Appeal criteria not met - denied
2016	EA-16-168	Diablo Canyon 2	Appeal criteria not met - denied
2017	EA-17-098	Clinton	Appeal criteria not met - denied

The team discussed licensee pushback on potential White findings with internal stakeholders including risk analysts and other regional staff. Licensees often spend a significant amount of resources to develop their risk perspectives, which the NRC considers in developing the preliminary risk analysis. It is a dynamic and iterative process. Early in the process, the exchange of information and perspectives is helpful to determine the facts of the case. The NRC uses the facts of the finding to develop input assumptions to the risk evaluation, which often involves significant judgment. When the NRC staff and the licensee do not agree on input assumptions and have different perspectives on the risk evaluation despite significant engagement, additional information often becomes much less relevant to the outcome. Final significance determination letters explain in detail the NRC's consideration of licensee information that was submitted formally. In some cases, the NRC has found that the information provided was not influential or had been previously considered by the NRC during the development of the preliminary SDP. This can take on the appearance of making any conceivable argument to see whether something might result in the licensee's desired outcome. This is the unnecessary resource expenditure associated with pushback that impacts both NRC and licensees. In the view of the NRC, the level of effort expended is not always consistent with the significance of the outcome.

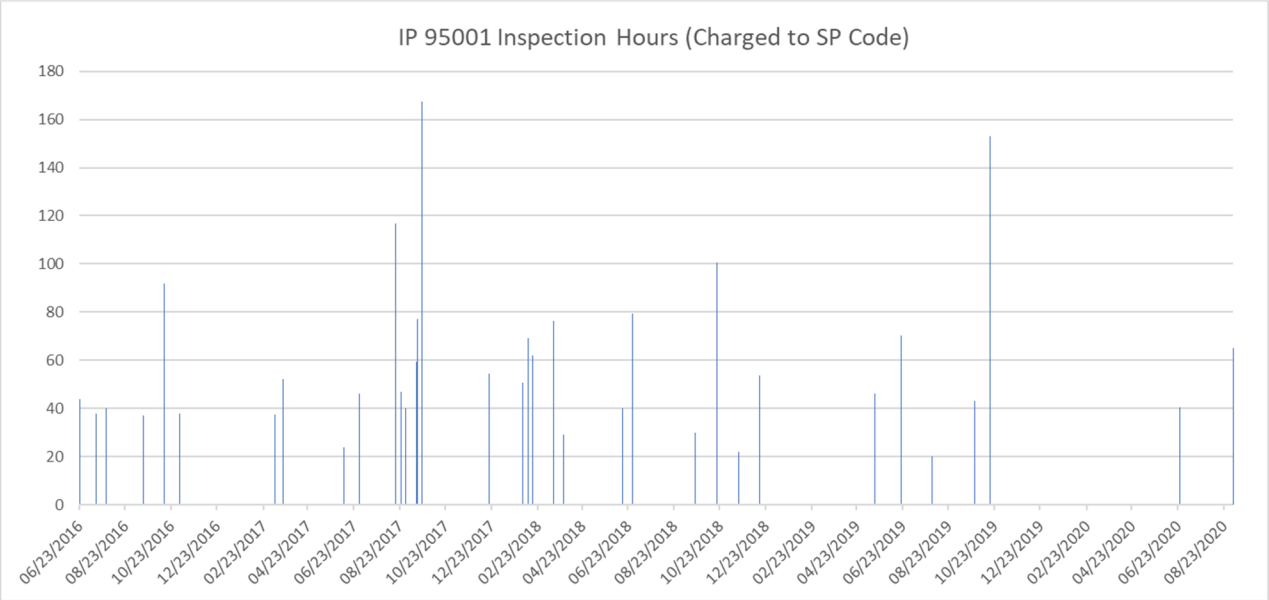
The team provided an opportunity for external stakeholder feedback at the February 24, 2021, ROP monthly meeting (meeting summary available in ADAMS at Accession No. ML21071A139). Industry commented that new motivating factors for ensuring the facts and circumstances are properly understood have developed since 2015 and have driven what staff has seen as a lack of reduction in pushback. Details of these factors were discussed at length

in various ROP enhancement public meetings over the past couple years but, in general, the factors involve a perception among industry stakeholders that White findings have increased in importance as fewer are issued and virtually no Yellow or Red inputs occur. During the meeting, the staff noted that there have been instances in which information is provided that has been previously considered and discussed, and ultimately does not influence the outcome, but nonetheless requires significant staff resources to review and assess. Based on various recent public statements, including at this meeting, licensees appear to be less concerned with efficiency and more concerned about perceptions surrounding White findings, and have indicated that the level of engagement we have seen is likely to continue.

Given the lack of available data that specifically applies to the topic of resource expenditure during the SDP and licensee pushback on White findings, it was difficult to objectively determine whether licensee pushback has increased following the Degraded Cornerstone change, but internal stakeholders widely indicate that it remains at a very high level, even in situations that represent the first potential White input into the Action Matrix and despite the reduction in likelihood to transition to Column 3 due to accumulation of White inputs.

Because widespread internal views are that pushback remains substantial despite the reduced likelihood of progression to Column 3, the team reviewed the resource expenditure of all 95001 inspections conducted since the beginning of 2016, shown in Figure 5. The data revealed no overall change in direct inspection hours charged per 95001 inspection over this time period. Both external and internal stakeholders have publicly acknowledged that a high level of pushback has continued despite the reduced likelihood of moving to Column 3 and no apparent increase in direct inspection resources expended on 95001 inspections.

Figure 5: IP 95001 Inspection Hours from 2016 to 2020



Effectiveness Conclusion

The change made to the Degraded Cornerstone definition in 2015 did not have an adverse impact on safety, though in two of the instances reviewed the change may have delayed recognition of the full scope of causal factors in a licensee's organization. The bases for the

2015 change remained largely valid and the information reviewed did not suggest that a threshold of two White inputs is any more or less valid than three White inputs.

Review of IP 95001 inspection reports since 2016 found that use of the option to review multiple White inputs in a single inspection was inconsistently used. A gap in IP 95001 was identified in that there is no inspection guidance to accompany the independent assessment of extent of condition and extent of cause for multiple White inputs that was added to objective 01.02 in 2016.

Feedback from both internal and external stakeholders indicates that there has been no reduction in pushback on potential White findings since the Column 3 change was implemented, despite the reduced likelihood of reaching Column 3 and no significant increase in the direct inspection resources applied to IP 95001 inspections.

Recommendations

1. Revise IP 95001:

    - Given inconsistent application of IP 95001 to inspect multiple open White inputs, add clarity to the expectation that a single IP 95001 inspection that includes common cause review be conducted when multiple White inputs are open.
    - Determine whether independent extent of condition and extent of cause should be included in Objective 01.02 and ensure guidance is aligned with the objective.

2. A review of the cumulative effects of recent ROP changes should be conducted to ensure the program remains as robust and responsive as designed and intended. This Degraded Cornerstone definition change and unrelated changes to the cross-cutting issues program have impacted agency responsiveness. Numerous other inspection, issue screening, and assessment revisions have also been implemented and should be scoped into an integrated review.

3. This review found at least one instance in which GTG inputs in different cornerstones may have similar causal factors. Under the current Action Matrix structure, White inputs only aggregate if they line up in a common cornerstone or strategic performance area and under the current IP 95001 guidance a review for common causes among two White inputs only occurs if they are in the same cornerstone. This means a plant could incur up to three concurrent White inputs without regulatory review for common causal factors and up to six concurrent White inputs while remaining in Column 2. It is reasonable to postulate that causal factors can result in impacts across multiple cornerstones or strategic performance areas. An assessment is recommended to determine whether removal of the cornerstone and strategic performance area limitations would improve the assessment process. This assessment should also consider whether the existing Action Matrix with five columns could be simplified and incorporate plain language to improve communications of the agency's assessment results and inspection follow-up with external stakeholders.

Raw Data

Table 2: White or GTG Assessment Inputs Since January 1, 2016

Plant/Unit	Finding or PI	Cornerstone or PI	Issue Date	Opened	Closed	Old Col 3 Criteria Met
ANO 2	Finding	MS	02/27/2017	3Q2016	1Q2018	
Browns Ferry 1, 2, 3	Finding	S	07/11/2017	2Q2017	1Q2018	
Browns Ferry 1, 2, 3	Finding	S	03/16/2020	4Q2019	3Q2020	
Brunswick	PI	BI02	N/A	1Q2019	1Q2019	
Catawba	Finding	MS	10/16/2017	3Q2017	2Q2018	
Clinton	Finding	MS	11/27/2017	3Q2017	2Q2018	
Clinton	Finding	MS	02/22/2018	4Q2017	3Q2018	Yes 4Q2017
Clinton	Finding	MS	04/01/2019	3Q2018	1Q2019	Yes 3Q2018
Clinton	Finding	S	11/02/2020	3Q2020	-	
Columbia	Finding	PRS	07/07/2017	1Q2017	4Q2017	
Davis-Besse	Finding	S	11/12/2015	4Q2015	3Q2016	
Davis-Besse	PI	IE01	N/A	1Q2016	1Q2016	
Davis-Besse	PI	IE01	N/A	3Q2016	4Q2016	*3Q2016
Davis-Besse	Finding	MS	04/13/2018	4Q2017	4Q2018	
Diablo Canyon 2	Finding	MS	12/28/2016	3Q2016	4Q2017	
Dresden 3	Finding	MS	02/27/2017	4Q2016	3Q2017	
Fermi 2	Finding	EP	05/11/2017	1Q2017	4Q2017	
Ginna	Finding	EP	09/20/2016	2Q2016	1Q2017	
Grand Gulf	PI	IE01	N/A	3Q2016	2Q2018	
Grand Gulf	PI	IE03	N/A	3Q2018	3Q2018	
Grand Gulf	PI	IE01	N/A	4Q2018	2Q2019	*4Q2018
Grand Gulf	PI	IE01	N/A	3Q2020	-	
Hope Creek 1	Finding	MS	02/06/2017	3Q2016	3Q2017	
Indian Point 3	PI	IE01	N/A	4Q2015	1Q2016	
Monticello	Finding	MS	12/12/2016	3Q2016	2Q2017	
Oyster Creek	Finding	MS	07/06/2016	1Q2016	4Q2016	
Oyster Creek	Finding	MS	04/13/2017	4Q2016	3Q2017	Yes 4Q2016
Peach Bottom 2,3	Finding	MS	12/11/2018	3Q2018	2Q2019	
Perry	Finding	MS	08/24/2017	2Q2017	1Q2018	
Prairie Island 2	PI	IE01	N/A	4Q2015	1Q2016	
Salem 2	PI	IE01	N/A	2Q2016	4Q2016	
Sequoyah 1	PI	IE01	N/A	3Q2015	2Q2016	
Sequoyah 1, 2	Finding	S	12/13/2017	3Q2017	2Q2018	
St. Lucie 1	Finding	IE	04/18/2017	4Q2016	3Q2017	
STP 1, 2	Finding	S	02/09/2017	4Q2016	3Q2017	
Surry 2	Finding	MS	07/30/2020	2Q2020	-	
Vogtle 1, 2	Finding	S	03/16/2016	1Q2016	4Q2016	
Vogtle 1, 2	Finding	EP	04/24/2017	4Q2016	3Q2017	
Vogtle 1, 2	Finding	EP	03/31/2020	3Q2019	2Q2020	
Watts Bar 1, 2	Finding	EP	04/15/2019	4Q2018	3Q2019	
Watts Bar 2	PI	IE01	N/A	2Q2018	3Q2018	
Wolf Creek	Finding	S	12/20/2017	4Q2017	3Q2018	

*Indicates overlapping open GTG PIs awaiting supplemental inspection

Table 3: Risk Significance of Inspection Findings Since January 1, 2016

Plant/Unit	Finding or PI	Cornerstone	Issue Date	Prelim Risk	Final Risk
ANO 2	Finding	MS	02/27/2017	6.3E-6	6.3E-6
Browns Ferry 1, 2, 3	Finding	S	07/11/2017	Deterministic SDP	
Browns Ferry 1, 2, 3	Finding	S	03/16/2020	Deterministic SDP	
Catawba	Finding	MS	10/16/2017	9.7E-6	9.7E-6
Clinton	Finding	MS	11/27/2017	2.5E-6	2.5E-6
Clinton	Finding	MS	02/22/2018	8.0E-6	8.0E-6
Clinton	Finding	MS	04/01/2019	3.8E-6	2.0E-6
Clinton	Finding	S	11/02/2020	Deterministic SDP	
Columbia	Finding	PRS	07/07/2017	Deterministic SDP	
Cooper	Finding			6.3E-6	Green
Davis-Besse	Finding	S	11/12/2015	Deterministic SDP	
Davis-Besse	Finding	MS	04/13/2018	6.49E-6	6.49E-6
Diablo Canyon 2	Finding	MS	12/28/2016	7.6E-6	4.5E-6
Dresden 3	Finding	MS	02/27/2017	6.9E-6	6.9E-6
Fermi 2	Finding	EP	05/11/2017	Deterministic SDP	
Ginna	Finding	EP	09/20/2016	Deterministic SDP	
Hope Creek 1	Finding	MS	02/06/2017	2.0E-6	1.11E-6
Monticello	Finding	MS	12/12/2016	3.8E-6	3.8E-6
Oyster Creek	Finding	MS	07/06/2016	7.0E-6	7.0E-6
Oyster Creek	Finding	MS	04/13/2017	5.4E-6	5.4E-6
Peach Bottom 2,3	Finding	MS	12/11/2018	5.25E-6 7.0E-6	5.25E-6 7.0E-6
Perry	Finding	MS	08/24/2017	8.0E-6	8.0E-6
Pilgrim	Finding			1.7E-5	Green
Sequoyah 1, 2	Finding	S	12/13/2017	Deterministic SDP	
St. Lucie 1	Finding	IE	04/18/2017	2.0E-6	>1E-6
STP 1, 2	Finding	S	02/09/2017	Deterministic SDP	
Surry 2	Finding	MS	07/30/2020	4.78E-6	4.78E-6
Vogtle 1, 2	Finding	S	03/16/2016	Deterministic SDP	
Vogtle 1, 2	Finding	EP	04/24/2017	Deterministic SDP	
Vogtle 1, 2	Finding	EP	03/31/2020	Deterministic SDP	
Watts Bar 1, 2	Finding	EP	04/15/2019	Deterministic SDP	
Wolf Creek	Finding			1.54E-6	Green
Wolf Creek	Finding	S	12/20/2017	Deterministic SDP	

Table 4: List of IP 95001 Inspection Reports Since January 1, 2016

Plant/Unit	Inspection Report	Issue Date
ANO 2	05000368/2017016	11/7/2017
ANO 2	05000368/2018040	4/20/2018
Browns Ferry 1, 2, 3	05000259, 260, 296/2018440	2/20/2018
Browns Ferry 1, 2, 3	05000259, 260, 296/2020440	9/18/2020
Brunswick	05000325/2019040	10/16/2019
Catawba	05000414/2018040	5/23/2018
Clinton	05000461/2016008	3/17/2016
Clinton	05000461/2018040	7/11/2018
Clinton	05000461/2018041	11/28/2018
Clinton	05000461/2019040	7/31/2019
Columbia	05000397/2017011	1/30/2018
Davis-Besse	05000346/2016408	8/10/2016
Davis-Besse	05000346/2017011	4/17/2017
Davis-Besse	05000346/2017040	12/19/2018
Diablo Canyon	05000275, 323/2017008	9/27/2017
Diablo Canyon	05000275, 323/2017040	1/23/2018
Dresden 3	05000249/2017010	7/26/2017
Fermi 2	05000341/2017502	12/29/2017
Ginna	05000244/2016010	11/28/2016
Grand Gulf	05000416/2017013	12/6/2017
Grand Gulf	05000416/2018040	8/1/2018
Grand Gulf	05000416/2019040	11/26/2019
Hope Creek 1	05000354/2017011	8/30/2017
Indian Point 3	05000286/2016009	11/21/2016
Monticello	05000263/2017010	7/21/2017
Oyster Creek	05000219/2016011	8/10/2016
Oyster Creek	05000219/2017008	10/17/2017
Peach Bottom	05000277, 278/2019040	6/27/2019
Perry	05000440/2018040	3/27/2018
Prairie Island 2	05000306/2016009	10/25/2016
River Bend	05000458/2016010	5/25/2016
River Bend	05000458/2016011	8/10/2016
River Bend	05000458/2016012	12/20/2016
Salem 2	05000311/2017011	10/24/2017
Sequoyah 1	05000327/2016008	8/31/2016
Sequoyah	05000327, 328/2018440	5/3/2018
St. Lucie	05000335/2017012	9/20/2017
STP 1, 2	05000498, 499/2017409	9/27/2017
Vogtle 1, 2	05000424, 425/2016406	6/23/2016
Vogtle 1, 2	05000424, 425/2017011	10/13/2017
Vogtle 1, 2	05000424, 425/2020041	7/27/2020

Watts Bar 1, 2	05000390, 391/2019540	9/12/2019
Watts Bar 2	05000391/2018040	1/22/2019
Wolf Creek	05000482/2018440	12/18/2018