

UNITED STATES
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**NRC REGULATORY ISSUE SUMMARY 2006-13
INFORMATION ON THE CHANGES MADE TO THE
REACTOR OVERSIGHT PROCESS TO MORE FULLY
ADDRESS SAFETY CULTURE**

ADDRESSEES

All holders of operating licenses for nuclear power reactors except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

INTENT

The U.S. Nuclear Regulatory Commission (NRC) is issuing this regulatory issues summary (RIS) to provide information to addressees and their contractors regarding changes made to the Reactor Oversight Process (ROP) to more fully address safety culture. No specific action or written response is required.

BACKGROUND INFORMATION

The staff submitted to the Commission, SECY-04-0111, "Recommended Staff Actions Regarding Agency Guidance in the Areas of Safety Conscious Work Environment and Safety Culture," dated July 1, 2004. This paper sought Commission direction with regard to the development of possible options for enhancing oversight of safety conscious work environment and safety culture. The paper noted that a weak safety culture was identified as a root cause of the reactor vessel head degradation at the Davis-Besse nuclear power plant. The NRC's Davis-Besse Lessons Learned Task Force report recommended that the staff review NRC inspections and plant assessment processes to determine whether sufficient processes are in place to identify and appropriately disposition the types of problems experienced at Davis-Besse. On August 30, 2004, the Commission provided direction in a staff requirements memorandum (SRM) on SECY-04-0111 that included the following:

- Enhance the ROP treatment of cross-cutting issues to more fully address safety culture.
- Continue to monitor industry efforts to assess safety culture.
- Include, as part of the enhanced inspection activities for plants in the degraded cornerstone column (referred to as Column 3) of the ROP action matrix, a determination of the need for a specific evaluation of the licensee's safety culture and develop a process for making the determination and conducting the evaluation.
- Continue to monitor developments by foreign regulators.

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The staff submitted to the Commission, SECY-05-0187, "Status of Safety Culture Initiatives and Schedule for Near Term Deliverables," dated October 19, 2005. This paper updated the Commission on the staff's plans and activities to enhance the agency's oversight of operating reactors to more fully address safety culture. The Commission provided direction in an SRM on SECY-05-0187, dated December 21, 2005, that included the following:

- Continue to interact with external stakeholders and build from enhancements already made to the ROP in response to the Davis-Besse Lessons Learned Task Force.
- Develop a process for determining if an evaluation of safety culture is warranted when a plant falls into the degraded cornerstone column of the ROP action matrix.
- Document significant changes to the ROP addressing safety culture in the ROP guidance documents and/or basis documentation.
- Ensure that the resulting modifications to the ROP are consistent with the regulatory principles that guided the development of the ROP.

Following receipt of SRM/SECY-05-0187, the staff held frequent public meetings with external stakeholders and, with the full participation of these stakeholders, developed an approach to enhance the ROP to more fully address safety culture. This resulted in modifications to selected inspection manual chapters (IMCs) and inspection procedures (IPs).

The staff submitted to the Commission, SECY-06-0122, "Safety Culture Initiative Activities to Enhance the Reactor Oversight Process and Outcomes of the Initiative," dated May 24, 2006, which described the status of the staff's activities and plans to enhance the ROP to more fully address safety culture. The staff implemented the changes to the ROP on July 1, 2006.

SUMMARY OF THE ISSUE

Discussion

During the November and December 2005 public meetings, the staff, with the full participation of external stakeholders, used a systematic approach to identify proposed changes to the ROP to more fully address safety culture. As a result of these meetings, the NRC and stakeholders reached alignment regarding the following:

- the definition of safety culture¹
- those attributes or elements that are important to safety culture (i.e., safety culture components)
- needed enhancements to more fully address safety culture
- proposed changes to the ROP based on the identified needed enhancements

¹ The NRC adopted the International Atomic Energy Agency's International Nuclear Safety Advisory Group's (INSAG) definition of safety culture provided in Safety Series No. 75-INSAG-4, "Safety Culture," issued 1991, as "that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear safety issues receive the attention warranted by their significance."

At subsequent public meetings, the staff and stakeholders discussed the details of the proposed changes and descriptions of the safety culture components. As a result of stakeholder feedback, the staff eliminated certain components and revised others, as appropriate, to provide terminology similar to that used by the industry, thereby supporting a common understanding of the safety culture components. The NRC made the draft IPs and IMCs reflecting changes to incorporate safety culture features available to stakeholders through the safety culture web page. The staff considered stakeholder recommendations and suggestions in finalizing the IPs and IMCs.

The changes to the ROP are within the ROP framework and are consistent with the regulatory principles that guided the development of the ROP. Therefore, the agency's oversight activities and their outcomes remain mostly transparent, understandable, objective, predictable, risk informed, and performance based.

The NRC intends the changes to the ROP to achieve the following:

- Provide better opportunities for the NRC staff to consider safety culture weaknesses and to encourage licensees to take appropriate actions before significant performance degradation occurs.
- Provide the NRC staff with a process to determine the need to specifically evaluate a licensee's safety culture after performance problems have resulted in the placement of a licensee in the degraded cornerstone column of the action matrix.
- Provide the NRC staff with a structured process to evaluate the licensee's safety culture assessment and to independently conduct a safety culture assessment for a licensee in the multiple/repetitive degraded cornerstone column of the action matrix.

Key Features of the Modified ROP

The ROP, as modified, continues to provide a graded approach to plant performance issues so that the regulatory response increases as performance degrades and licensees move to the right in the ROP action matrix. The key features of the revised process include the following:

- Inspector development of findings and the assessment of performance deficiencies for cross-cutting aspects are consistent with current practice.
- The staff revised the existing cross-cutting areas of human performance, problem identification and resolution, and safety conscious work environment to incorporate components that are important to safety culture.
- The staff revised IMC 0612, "Power Reactor Inspection Reports," to reference IMC 0305, "Operating Reactor Assessment Program," to ensure that, when the NRC identifies findings with cross-cutting aspects, the agency uses language that parallels the descriptions of the cross-cutting area components in IMC 0305.
- The staff revised IP 71152, "Identification and Resolution of Problems," to modify the existing guidance for inspectors to assess the effectiveness of the corrective action program, the use of operating experience information, and the results of independent and self-assessments. The revised procedure allows inspectors to have the option of reviewing licensee self-assessment of safety culture if performed and directs inspectors

to be aware of safety culture components when selecting samples. The staff also revised the suggested inspector questions in Appendix 1 to better assess the licensee's safety conscious work environment.

- The NRC revised the event response procedures in IP 71153, "Event Follow-up," IP 93812, "Special Inspection," and IP 93800, "Augmented Inspection Team," to direct inspection teams to consider contributing causes related to the safety culture components as part of their efforts to fully understand the circumstances surrounding an event and its probable causes.
- For performance deficiencies that appear to have a safety conscious work environment aspect as a contributor, the staff has provided additional guidance to inspectors on inspecting and documenting these issues. Appendix F to IMC 0612 provides examples.
- The staff revised the assessment process and expected NRC and licensee actions as provided for in the action matrix in response to inspection and performance indicator results as follows:
 - ▶ For the third consecutive assessment letter identifying the same substantive cross-cutting issue with the same cross-cutting theme, the staff modified IMC 0305, "Operating Reactor Assessment Program," to provide an option for the NRC to request that the licensee perform an assessment of safety culture.
 - ▶ For licensees in the regulatory response column, the staff modified IP 95001, "Supplemental Inspection for One or Two White Inputs in a Strategic Performance Area," to verify that the licensee's root cause, extent of condition, and extent of cause evaluations appropriately considered the safety culture components.
 - ▶ For licensees in the degraded cornerstone column, the staff modified IMC 0305, "Operating Reactor Assessment Program," to provide the expectation that the licensee's evaluation of the root and contributing causes will determine whether deficient safety culture components caused or significantly contributed to the risk-significant performance issues. The revised IMC 0305 will allow the NRC to request the licensee to complete an independent assessment of safety culture if the NRC determines that the licensee did not recognize that safety culture components caused or significantly contributed to the risk-significant performance issues. The staff also modified IP 95002, "Supplemental Inspection Procedure for One Degraded Cornerstone or Any Three White Inputs in a Strategic Performance Area," to require inspectors to independently determine whether any safety culture components caused or significantly contributed to the individual or collective (multiple white inputs) risk-significant performance issues.
 - ▶ For licensees in the multiple/repetitive degraded cornerstone column, the staff modified IMC 0305 to provide the expectation that the licensee will perform an independent assessment of its safety culture. The staff is modifying IP 95003, "Supplemental Inspection for Repetitive Degraded Cornerstone or Multiple Degraded Cornerstones, Multiple Yellow Inputs, or One Red Input," to require the staff to (1) assess the licensee's independent evaluation of its safety culture and (2) independently perform an assessment of the licensee's safety culture.

The enclosure provides a full description of the changes to the ROP, including the safety culture components and specific enhancements to the IPs and IMCs.

Implementation Phase-In

The NRC implemented the revised ROP documents on July 1, 2006, except for IP 95003. The ROP uses an annual assessment cycle, with input from inspections that are conducted at preestablished periods that vary based on IPs or in response to identified performance deficiencies or events. Therefore, the NRC is phasing in the ROP changes effective July 1, 2006, as follows:

General

- All event response inspections performed after July 1, 2006, will use the revised IPs (IP 71153, IP 93800, and IP 93812). If an inspection began before July 1, 2006, the inspector would use the existing procedure; if the inspection began after July 1, 2006, the inspector will use the revised procedures.
- If the biennial inspection based on IP 71152 began before July 1, 2006, the inspector would use the existing procedure. If the inspection began after July 1, 2006, the inspector will use the revised procedure.
- The NRC will document cross-cutting aspects of findings in accordance with the revised process as provided in IMC 0612 for inspections that began after July 1, 2006.
- If at the time of the mid-cycle review meetings in August 2006, the licensee has a third consecutive assessment letter with the same substantive cross-cutting issue with the same cross-cutting theme, the NRC will not consider the option of requesting a licensee to conduct an assessment of safety culture. However, if at the end-of-cycle assessment in February 2007, a licensee has a substantive cross-cutting issue with the same cross-cutting theme for three or more consecutive assessments, the staff will have the option of requesting that the licensee conduct an assessment of safety culture.
- When evaluating licensee performance during the mid-cycle and end-of-cycle reviews, the staff considers all information that has been documented through the inspection program. If a licensee has voluntarily conducted a self-assessment of safety culture and the staff has reviewed it using IP 71152 or another procedure, the staff will use the information obtained as it evaluates the cross-cutting criteria provided in IMC 0305, including the possibility of closing a substantive cross-cutting issue.

Regulatory Response, Degraded Cornerstone, and Multiple/Repetitive Degraded Cornerstone Columns of the ROP Action Matrix

- For licensees in the regulatory response column of the action matrix that did not receive supplemental inspection IP 95001 as of July 1, 2006, the NRC will follow the guidance in the revised IMC 0305 and perform the revised inspection. Those licensees in this column of the action matrix that have already received supplemental inspection IP 95001 will not receive an additional IP 95001 inspection using the revised guidance.
- For licensees in the degraded cornerstone column of the action matrix that did not receive supplemental inspection IP 95002 as of July 1, 2006, the NRC will follow the guidance in

the revised IMC 0305 and perform the revised inspection. Those licensees in this column of the action matrix that have already received supplemental inspection IP 95002 will not receive an additional IP 95002 inspection.

- For licensees in the multiple/repetitive degraded cornerstone column of the action matrix that did not receive supplemental inspection IP 95003 as of July 1, 2006, the NRC will expect that the licensee will independently assess its safety culture, and the NRC will perform the revised IP 95003 inspection to both review the licensee's independent assessment of its safety culture and to conduct an independent evaluation of the licensee's safety culture. Those licensees in this column of the action matrix that have already received supplemental inspection IP 95003 and are under a confirmatory action letter will not receive an additional IP 95003 inspection using the revised guidance.

Other Implementation Phase-In Issues

- The staff will not revisit inspection results for recently completed inspections or request licensees to take actions to meet the revised inspection or assessment guidance for past assessment cycles.
- If a licensee commits or is requested by the NRC to perform a safety culture assessment, the licensee will typically provide the results of the requested safety culture assessment to the NRC. The NRC will then make the assessment results publically available. At a minimum, the NRC will document its reviews of licensee safety culture assessments in NRC inspection reports.

As in the past, the staff will continue to have a process available to deviate from those actions described above on a case-by-case basis, consistent with the deviation guidance/criteria in IMC 0305.

Assessment of the ROP during the Implementation Period

The staff implemented the revised guidance on July 1, 2006. The staff will assess the changes to the ROP consistent with the current ROP assessment process in IMC 0307, "Reactor Oversight Process Self-Assessment Program," to determine that the revisions continue to meet the ROP regulatory principles of being objective, understandable, predictable, transparent, risk informed, and performance-based. The assessment will also determine whether the revisions have met the intended objectives and outcomes. The staff will seek opportunities for stakeholders to provide feedback on the implementation of the changes to the ROP (e.g., through the ROP monthly public meetings, external surveys, and regional utility group meetings).

BACKFIT DISCUSSION

The RIS requires no action or written response and is, therefore, not a backfit under Title 10, Section 50.109, "Backfitting," of the *Code of Federal Regulations* (10 CFR 50.109). Consequently, the staff did not perform a backfit analysis.

FEDERAL REGISTER NOTIFICATION

The NRC did not publish in the *Federal Register* a notice of opportunity for public comment on the RIS because the RIS is informational and pertains to staff actions that do not depart from current regulatory requirements and practices.

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CONGRESSIONAL REVIEW ACT

The NRC has determined that this action is not subject to the Congressional Review Act.

PAPERWORK REDUCTION ACT STATEMENT

The RIS references information collection requirements that are subject to the requirements of the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). These information collections were approved by the Office of Management and Budget (OMB) approval number 3150-0011.

Public Protection Notification

The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid OMB control number.

CONTACT

The RIS requires no specific action nor written response. If you have any questions about this summary, please contact one of the technical contacts listed below.

/RA/

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Enclosure: Summary of the Reactor Oversight Process Safety Culture Approach

Note: NRC generic communications may be found on the NRC public Web site, <http://www.nrc.gov>, under Electronic Reading Room/Document Collections.

SUMMARY OF THE REACTOR OVERSIGHT PROCESS SAFETY CULTURE APPROACH

Introduction

The Commission has long recognized the importance of safety culture as reflected in the development and evolution of the inspection program. The Davis-Besse event reemphasized the importance of safety culture and demonstrated that significant problems can occur as a direct result of safety culture weaknesses that are not recognized and addressed early.

Since the Davis-Besse event occurred, the U.S. Nuclear Regulatory Commission (NRC) staff has implemented several improvements to the Reactor Oversight Process (ROP) that relate to safety culture. These improvements include (1) revisions to the plant assessment process to provide more specific guidance on identifying the existence of substantive cross-cutting issues in the areas of human performance and problem identification and resolution, (2) revisions to the baseline (or routine) inspection procedure (IP) on the identification and resolution of problems to require the resident inspector to perform a screening review of each item entered into the corrective action program so as to be alert to conditions such as repetitive equipment failures or human performance issues that might warrant additional follow-up, and to require a semiannual review to identify trends that might indicate the existence of a more significant safety issue, (3) revision to another inspection procedure to include deferred modifications as one of the areas an inspector can assess, and (4) creation and implementation of a Web-based training course for inspectors and managers based on the Columbia Space Shuttle accident, which illustrated, for example, the importance of maintaining a questioning attitude toward safety and how issues concerning an organization's safety culture can lead to technological failures.

These changes provide insights into a station's safety culture while appropriately focusing on licensee equipment performance within the scope of the existing baseline inspection program.

In SECY 04-0111, "Recommended Staff Actions Regarding Agency Guidance in the Areas of Safety Conscious Work Environment and Safety Culture," dated July 1, 2004, the staff provided options for addressing oversight of a licensee's safety culture, including a safety conscious work environment. In an August 30, 2004, staff requirements memorandum (SRM) on SECY-04-0111, the Commission provided direction to guide the staff's activities to enhance the ROP to more fully address safety culture.

A subsequent SRM on SECY-05-0187, "Status of Safety Culture Initiatives and Schedule for Near-term Deliverables," dated December 21, 2005, provided further direction to the staff.

The staff undertook an initiative to respond to the Commission's direction. As part of that initiative, the staff solicited stakeholder input into developing an approach to enhance the ROP to more fully address safety culture that enables the agency to detect a declining plant safety culture earlier. This paper outlines the approach that was jointly developed during a public meeting held on November 29–30, 2005, and was subsequently discussed in public meetings on December 8 and December 15, 2005; and January 18, February 2, and February 14, 2006. The changes to the ROP rely on industry assessments and evaluations by licensees to the extent practical, with staff reviewing results to ensure consistency between these assessments and what the NRC and its stakeholders have acknowledged as features important to safety culture. In addition, the modified ROP allows for the NRC to conduct an independent assessment of a plant's safety culture when there is significant performance degradation. Consistent with the existing ROP

framework, the approach supports the regulatory principles that guided the development of the ROP.

Discussion

This paper is divided into two parts, as follows:

- Part I, “Fundamental Items,” describes the assumptions underlying the changes to the ROP and provides the definition of safety culture and descriptions of safety culture components that have been incorporated into the approach.
- Part II, “Enhanced Reactor Oversight Process Elements,” describes how this initiative modifies the ROP, in terms of baseline inspections, event response inspections, performance assessment, and regulatory responses to degraded performance, to more fully address safety culture.

I. Fundamental Items

Assumptions

The staff based the changes to the ROP on the following assumptions:

- Any issues identified with a licensee’s safety culture will be documented in accordance with the current ROP guidelines.
- The staff will not change the titles of the three existing ROP cross-cutting areas (problem identification and resolution, human performance, and safety conscious work environment). However, it will adjust the contents of each cross-cutting area to better align with the components important to safety culture.
- To the extent possible, the NRC will use existing industry terminology that defines safety culture components.
- The staff will use a graduated or graded response to plant performance issues relative to safety culture, consistent with the existing ROP:
 - ▶ The staff will rely on, to the extent practical, licensee and independent assessments of safety culture with NRC review of those assessments.
 - ▶ If there is significant performance degradation, the staff will conduct an independent assessment of a licensee’s safety culture.
- The changes will remain consistent with the existing ROP framework.

Safety Culture

As part of the staff’s interactions with stakeholders, one of the necessary first steps was to gain agreement on the definition of safety culture. During public meetings in December 2005, participants reached general agreement that the NRC’s proposed use of the International Atomic Energy Agency’s International Nuclear Safety Advisory Group (INSAG) definition of safety

culture, which the Commission had referenced previously, was acceptable and close to the definition that was developed by the Institute of Nuclear Power Operations.

INSAG first published its definition in Safety Series No. 75-INSAG-4, "Safety Culture," issued 1991, as "that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance."

Participants also agreed that safety culture included the following 13 components:

- (1) decision-making
- (2) resources
- (3) work control
- (4) work practices
- (5) corrective action program
- (6) operating experience
- (7) self- and independent assessments
- (8) environment for raising safety concerns
- (9) preventing, detecting, and mitigating perceptions of retaliation
- (10) accountability
- (11) continuous learning environment
- (12) organizational change management
- (13) safety policies

Appendix 1 describes these components. Safety culture components 1–9 above, termed "cross-cutting components," are aligned with the three cross-cutting areas (i.e., human performance, problem identification and resolution, and safety conscious work environment) and replace the existing cross-cutting subcategories or bins. However, the supplemental inspection program applies all 13 safety culture components. This distinction was made because of the following:

- The nine cross-cutting components are currently readily accessible through baseline inspection procedures, while the last four safety culture components listed above (i.e., accountability, continuous learning environment, organizational change management, and safety policies) are not.
- Each of the nine cross-cutting components is closely aligned with the cross-cutting area with which it is associated, while components 10–13 listed above are not closely aligned with a cross-cutting area.
- The cross-cutting components would be considered when an inspector was evaluating the cross-cutting aspect of a potential inspection finding or performance deficiency, as well as provide insight into the licensee's root cause, extent of condition, and safety culture evaluations during supplemental inspections.

II. Enhanced Reactor Oversight Process Elements

The subsections below describe how this initiative enhanced the baseline inspection procedures, performance assessment, cross-cutting areas, substantive cross-cutting issues, event response procedures, and actions for plants in the four columns of the action matrix described in Inspection Manual Chapter (IMC) 0305, "Operating Reactor Assessment Program: Licensee Response, Regulatory Response, Degraded Cornerstone, and Multiple/Repetitive Degraded Cornerstone," to

more fully address safety culture.

Baseline Inspection Procedures

IP 71152, "Problem Identification and Resolution," continues to do the following:

- provide for early warning of potential performance issues that could result in crossing thresholds to higher columns in the action matrix
- help the NRC gauge supplemental response should future action matrix thresholds be crossed
- allow for follow-up of previously identified compliance issues
- provide additional information related to cross-cutting issues that can be used in the assessment process
- determine whether licensees are complying with NRC regulations regarding corrective action programs

The NRC modified IP 71152 to do the following:

- direct inspectors to take into consideration safety culture components when selecting inspection samples
- augment the inspection requirements and guidance for evaluating operating experience, the alternative processes for raising concerns, safety conscious work environment, and licensee self-assessments, including periodic assessments of safety culture
- change the existing guidance for inspectors to assess the effectiveness of the corrective action program, the operating experience program, and the licensee's ability to complete self-assessments

The staff modified IMC 0612, "Power Reactor Inspection Reports," to be consistent with these changes.

Event Response Procedures

For event response, the NRC staff uses IPs 71153, "Event Follow-up," 93812, "Special Inspection," and 93800, "Augmented Inspection Team." The staff enhanced these procedures to direct inspection teams to be sensitive to causal factors related to safety culture components.

Performance Assessment

As described in IMC 0305, the NRC assesses plant performance continuously and communicates its assessment of plant performance in letters to licensees, typically semiannually. The agency posts these assessment letters on the NRC Web site (<http://www.nrc.gov>) on the plant performance summary page for each licensee.

In addition, as described in IMC 0305, the NRC determines its regulatory response for each licensee in accordance with an action matrix that provides for a range of actions commensurate

with the significance of the performance indicator and inspection results. For a plant that has all of its performance indicator and inspection findings characterized as green, the NRC will implement only its baseline inspection program. For plants that do not have all green performance indicators and inspection findings, the NRC will perform additional inspections and initiate other actions commensurate with the safety significance of the issues.

Cross-Cutting Areas of Problem Identification and Resolution, Human Performance, and Safety Conscious Work Environment

Although the NRC did not change the basic structure and titles of the three cross-cutting areas, the agency adjusted them to more fully reflect the components that are important to safety culture that can be readily accessed through the baseline inspection program. The table below provides the three cross-cutting areas, the previous subcategories or bins, and the safety culture components that replaced the previous subcategories. IMC 0305 addresses these changes. The staff also revised IMC 0612 to reference IMC 0305, Section 06.07.c, to ensure that, when an inspector identifies findings with cross-cutting aspects, he or she uses language that parallels the descriptions of the cross-cutting area components in IMC 0305.

CROSS-CUTTING AREA	SUBCATEGORIES	NEW CROSS-CUTTING COMPONENTS
PROBLEM IDENTIFICATION AND RESOLUTION	<ul style="list-style-type: none"> • identification • evaluation • corrective action 	<ul style="list-style-type: none"> • corrective action program • self- and independent assessments • operating experience
HUMAN PERFORMANCE	<ul style="list-style-type: none"> • personnel • resources • organization 	<ul style="list-style-type: none"> • decision-making • resources • work control • work practices
SAFETY CONSCIOUS WORK ENVIRONMENT	<ul style="list-style-type: none"> • none 	<ul style="list-style-type: none"> • environment for raising safety concerns • preventing, detecting, and mitigating perceptions of retaliation

Substantive Cross-Cutting Issues

As described in IMC 0305, in each assessment meeting (both end-of-cycle and mid-cycle), the NRC determines whether a substantive cross-cutting issue exists in any cross-cutting area as follows:

- Findings documented in NRC inspection reports are a major input to the assessment

process. A documented finding is (1) a more-than-minor² NRC-identified or self-revealing issue of concern that is associated with a licensee performance deficiency and (2) a greater than green licensee-identified finding. Licensee-identified findings of very low (i.e., green) safety significance that are not violations of regulatory requirements are not documented in inspection reports and not used in the assessment process. A finding that is greater than green and is associated with a regulatory requirement is a violation and will be documented in an inspection report and used in the assessment process.

- The NRC documents each finding in inspection reports in terms of the performance deficiency associated with the finding and the relationship, if any, between the finding and one or more of the cross-cutting areas. A relationship between a finding and a cross-cutting area would exist if a causal factor of the finding is associated with or similar to any part of the description of the components (i.e., a cross-cutting aspect) within that cross-cutting area. (Appendix 1 provides the component definitions that the inspectors will use for this purpose). The staff revised IMC 0612 to ensure that, when an inspector identifies findings with cross-cutting aspects, they are aligned with the related safety culture components.
- For the cross-cutting areas of problem identification and resolution and human performance, the NRC identifies a substantive cross-cutting issue if all of the following criteria are satisfied:
 - ▶ For the current 12-month assessment period, more than three green or safety-significant inspection findings have documented cross-cutting aspects in the same cross-cutting area. Observations or violations that are not findings are not considered in this determination.
 - ▶ The causal factors for those findings have a common theme.
 - ▶ The NRC has a concern with the licensee's scope of efforts or progress in addressing related performance issues.
- For the safety conscious work environment cross-cutting area, the NRC identifies a substantive cross-cutting issue if any of the following applies for the current 12-month assessment period:
 - ▶ There is a green or safety-significant inspection finding that has a documented cross-cutting aspect in the area of safety conscious work environment. Observations or violations that are not findings are not considered in this determination.
 - ▶ The licensee received a chilling-effect letter.

² Inspectors distinguish between minor and more-than-minor findings as described in Section B-3 of Appendix B to IMC 0612.

- ▶ The licensee received correspondence from the NRC that transmitted an enforcement action with a severity level of I, II, or III, and that involved discrimination, or a confirmatory order that involved discrimination.

Additionally, the finding must meet both of the following criteria in order to have a substantive cross-cutting issue in the area of safety conscious work environment:

- ▶ The associated impact on safety conscious work environment was not isolated.
- ▶ The NRC has a concern with the licensee's scope of efforts or progress in addressing this area's individual or collective performance deficiencies.

The staff may identify substantive cross-cutting issues for any licensee, regardless of its position in the action matrix. As currently described in IMC 0305, Section 06.07.e:

When the NRC identifies a substantive cross-cutting issue in the mid-cycle or annual assessment letter, the licensee should place this issue into its corrective action program, perform an analysis of causes of the issue, and develop appropriate corrective actions. The licensee's completed evaluation may be reviewed by the regional office and documented in the next mid-cycle or annual assessment letter.

For those plants for which the NRC has raised the same substantive cross-cutting issue in at least two consecutive assessment letters, the NRC regional office may request that:

- The licensee should provide a response at the next annual public meeting;
- The licensee should provide a written response to the substantive cross-cutting issues raised in the assessment letters; or
- The region and the licensee hold a separate meeting.

The staff enhanced this provision in IMC 0305 to provide an additional option as follows:

Additionally, in the third consecutive assessment letter identifying the same substantive cross-cutting issue with the same cross-cutting theme, the regional office may also request that the licensee perform an assessment of safety culture. Typically, this evaluation would consist of a licensee self-assessment, unless the recurring substantive cross-cutting issue was associated with deficiencies in the identification or evaluation aspects of the problem identification and resolution program. The regional office should review the safety culture assessment and document the NRC's assessment in the next mid-cycle or annual assessment letter.

Actions in the Licensee Response Column

This initiative proposes no change to actions in the licensee response column of the action

matrix.

Actions in the Regulatory Response Column

As currently discussed in IMC 0305, when a licensee's performance falls into the regulatory response column of the action matrix, "the licensee is expected to place the identified deficiencies in its corrective action program and perform an evaluation of the root and contributing causes."

The NRC reviews the licensee's evaluation in accordance with IP 95001, "Supplemental Inspection for One or Two White Inputs in a Strategic Performance Area." This procedure will continue to provide assurance of the following:

- The root causes and contributing causes of risk-significant performance issues are understood.
- The extent of condition and the extent of cause of risk-significant performance issues are identified.
- Licensee actions to correct risk-significant performance issues are sufficient to address the root and contributing causes and to prevent recurrence.

The staff enhanced IP 95001 to verify that the licensee's root cause, extent of condition, and extent of cause evaluations appropriately considered the safety culture components.

The staff continues with all other aspects of the existing process for the regulatory response column as described in IMC 0305.

Actions in the Degraded Cornerstone Column

As discussed in IMC 0305, when a licensee's performance falls within the degraded cornerstone column, the following occurs:

- The licensee will place the identified deficiencies in its corrective action program and perform an evaluation of the root and contributing causes for both the individual and the collective issues.
- The relevant NRC region will independently assess the extent of condition using appropriate inspection procedures chosen from the tables contained in Appendix B "Supplemental Inspection Program" to IMC 2515 "Light-Water Reactor Inspection Program – Operations Phase."
- The NRC will review the licensee's evaluation using IP 95002, "Supplemental Inspection for One Degraded Cornerstone Or Any Three White Inputs in a Strategic Performance Area."

The staff enhanced IMC 0305 as follows:

- The revised IMC 0305 includes an expectation that the licensee will ensure that its root-cause evaluation determines whether the plant's performance issues were in any way caused or contributed to by any component of safety culture, and whether any opportunities exist for improved performance with respect to those components. The licensee should enter into the plant's corrective action program the opportunities for improved performance identified during this assessment. An independent party may perform the assessment.
- The changes allow the NRC to request the licensee to complete an independent assessment of safety culture, if the NRC identified and the licensee did not recognize that one or more safety culture components caused or contributed to the risk-significant performance issues.

IP 95002 will continue to do the following:

- Provide assurance that the root causes and contributing causes are understood for individual and collective (multiple white inputs) risk-significant performance issues.
- Independently assess the extent of condition for individual and collective (multiple white inputs) risk-significant performance issues.
- Provide assurance that licensee actions to correct risk-significant performance issues are sufficient to address the root and contributing causes and to prevent recurrence.

The NRC enhanced IP 95002 to enable inspectors to independently determine whether any safety culture component caused or contributed significantly to the risk-significant performance issues.

The staff continues with all other aspects of the existing process for the degraded cornerstone column as described in IMC 0305.

Actions in the Multiple/Repetitive Degraded Cornerstone Column

As currently discussed in IMC 0305, when a licensee's performance falls within the multiple/repetitive degraded cornerstone column, "the licensee is expected to place the identified deficiencies in its corrective action program and perform an evaluation of the root and contributing causes for both the individual and the collective issues." This evaluation may consist

of a third party assessment.

The NRC enhanced IMC 0305 to do the following:

- expect the licensee to perform an independent assessment of its safety culture
- enable NRC inspectors to review that assessment
- enable inspectors to independently assess the licensee's safety culture

In accordance with IMC 0305, the NRC will review the licensee's evaluation in accordance with IP 95003, "Supplemental Inspection for Repetitive Degraded Cornerstones, Multiple Degraded Cornerstones, Multiple Yellow Inputs, Or One Red Input." This procedure will continue to do the following:

- Provide the NRC with additional information to be used in deciding whether the continued operation of the facility is acceptable and whether additional regulatory actions are necessary to arrest declining plant performance.
- Provide an independent assessment of the extent of risk-significant issues to aid in determining whether an unacceptable margin of safety exists.
- Independently assess the adequacy of the programs and processes used by the licensee to identify, evaluate, and correct performance issues.
- Independently evaluate the adequacy of programs and processes in the affected strategic performance areas.
- Provide insight into the overall root and contributing causes of identified performance deficiencies.
- Determine if the NRC oversight process provided sufficient warning to significant reductions in safety.

In addition, the NRC enhanced IP 95003 to enable its inspectors to do the following:

- Independently evaluate the adequacy of the licensee's independent assessment of its safety culture.

- Independently assess the licensee's safety culture.

APPENDIX

SAFETY CULTURE COMPONENTS

The U.S. Nuclear Regulatory Commission (NRC) safety culture working group developed the following safety culture components based on its research of industry and international documents and the experience of the working group members. The information on safety culture gathered by the working group was screened to ensure that the information in the components is unambiguous, within the NRC's regulatory purview, provides insights on the components through existing inspection techniques, and is generally applicable to reactor licensees. The NRC's components were compared to both industry and international safety culture attributes to ensure that the staff fully captured concepts appropriate for NRC oversight. In an effort to use language, titles, and nomenclature that are common with the industry, the working group compared the NRC's safety culture components to the safety culture attributes developed by the Institute of Nuclear Power Operations (INPO) and applicable sections of the INPO performance and objectives criteria. Based on this review, the NRC revised some of its safety culture components to be consistent with the INPO language, where appropriate. To address internal and external stakeholder feedback following the December 8, 2005, December 15, 2005, January 18, 2006, and February 14, 2006, public meetings, the working group further revised the safety culture components to enhance their concepts and use language that would better facilitate use of the components under the Reactor Oversight Process (ROP).

The following section describes the cross-cutting area components (i.e., the components of safety culture directly related to one of the cross-cutting areas of human performance, problem identification and resolution, and safety conscious work environment). Next, the paper describes the four additional components that are considered along with the cross-cutting components during the conduct of the supplemental inspection program. The revised inspection procedures and inspection manual chapters further explain how the staff intends the ROP to use these components.

Human Performance

Decision-making - Licensee decisions demonstrate that nuclear safety is an overriding priority:

- The licensee makes safety-significant or risk-significant decisions using a systematic process, especially when faced with uncertain or unexpected plant conditions, to ensure safety is maintained. This includes formally defining the authority and roles for decisions affecting nuclear safety, communicating these roles to applicable personnel, implementing these roles and authorities as designed, and obtaining interdisciplinary input and reviews on safety-significant or risk-significant decisions.

- The licensee uses conservative assumptions in decision-making and adopts a requirement to demonstrate that the proposed action is safe in order to proceed rather than a requirement to demonstrate that it is unsafe in order to disapprove the action. The licensee conducts effectiveness reviews of safety-significant decisions to verify the validity of the underlying assumptions, identify possible unintended consequences, and determine how to improve future decisions.
- The licensee communicates decisions and the basis for decisions to personnel who have a need to know the information in order to perform work safely, in a timely manner.

Resources - The licensee ensures that personnel, equipment, procedures, and other resources are available and adequate to assure nuclear safety. Specifically, those necessary for:

- maintaining long-term plant safety by maintenance of design margins, minimization of longstanding equipment issues, minimizing preventative maintenance deferrals, and ensuring maintenance and engineering backlogs that are low enough to support safety
- training of personnel and sufficient qualified personnel to maintain work hours within working hour guidelines
- complete, accurate, and up-to-date design documentation, procedures, and work packages, and correct labeling of components
- adequate and available facilities and equipment, including physical improvements, simulator fidelity and emergency facilities, and equipment

Work Control - The licensee plans and coordinates work activities, consistent with nuclear safety. Specifically (as applicable):

- The licensee appropriately plans work activities by incorporating:
 - ▶ risk insights
 - ▶ job site conditions, including environmental conditions that may impact human performance; plant structures, systems, and components; human-system interface; or radiological safety
 - ▶ the need for planned contingencies, compensatory actions, and abort criteria

- The licensee appropriately coordinates work activities by incorporating actions to address:
 - ▶ the impact of changes to the work scope or activity on the plant and human performance
 - ▶ the impact of the work on different job activities and the need for work groups to maintain interfaces with offsite organizations and communicate, coordinate, and cooperate with each other during activities in which interdepartmental coordination is necessary to assure plant and human performance
 - ▶ the need to keep personnel apprised of work status, the operational impact of work activities, and plant conditions that may affect work activities
 - ▶ the licensee plans work activities to support long-term equipment reliability by limiting temporary modifications, operator work-arounds, safety systems unavailability, and reliance on manual actions. Maintenance scheduling is more preventive than reactive.

Work Practices - Personnel work practices support human performance. Specifically (as applicable):

- The licensee communicates human error prevention techniques, such as holding pre-job briefings, self- and peer checking, and proper documentation of activities. These techniques are used commensurate with the risk of the assigned task, such that work activities are performed safely. Personnel are fit for duty. In addition, personnel do not proceed in the face of uncertainty or unexpected circumstances.
- The licensee defines and effectively communicates expectations regarding procedural compliance, and personnel follow procedures.
- The licensee ensures supervisory and management oversight of work activities, including contractors, such that nuclear safety is supported.

Problem Identification and Resolution

Corrective Action Program - The licensee ensures that issues potentially impacting nuclear safety are promptly identified, fully evaluated, and that actions are taken to address safety issues in a timely manner, commensurate with their significance. Specifically (as applicable):

- The licensee implements a corrective action program with a low threshold for identifying issues. The licensee identifies such issues completely, accurately, and in a timely manner commensurate with their safety significance.
- The licensee periodically trends and assesses information from the corrective action program and other assessments in the aggregate to identify programmatic and common-cause problems. The licensee communicates the results of the trending to applicable personnel.
- The licensee thoroughly evaluates problems such that the resolutions address the causes and extent of conditions, as necessary. This includes properly classifying, prioritizing, and evaluating for operability and reportability conditions adverse to quality. This also includes, for significant problems, conducting effectiveness reviews of corrective actions to ensure that the problems are resolved.
- The licensee takes appropriate corrective actions to address safety issues and adverse trends in a timely manner, commensurate with their safety significance and complexity.
- If an alternative process (i.e., a process for raising concerns that is an alternate to the licensee's corrective action program or line management) for raising safety concerns exists, then it results in appropriate and timely resolutions of identified problems.

Operating Experience - The licensee uses operating experience information, including vendor recommendations and internally generated lessons learned, to support plant safety. Specifically (as applicable):

- The licensee systematically collects, evaluates, and communicates to affected internal stakeholders in a timely manner relevant internal and external operating experience.
- The licensee implements and institutionalizes operating experience through changes to station processes, procedures, equipment, and training programs.

Self- and Independent Assessments - The licensee conducts self- and independent assessments of their activities and practices, as appropriate, to assess performance and identify areas for improvement. Specifically (as applicable):

- The licensee conducts self-assessments at an appropriate frequency; such assessments are of sufficient depth, are comprehensive, are appropriately objective, and are self-critical. The licensee periodically assesses the effectiveness of oversight groups and programs, such as the corrective action program, and policies.

- The licensee tracks and trends safety indicators that provide an accurate representation of performance.
- The licensee coordinates and communicates results from assessments to affected personnel and takes corrective actions to address issues commensurate with their significance.

Safety Conscious Work Environment

Environment for Raising Concerns - An environment exists in which employees feel free to raise concerns both to their management and/or the NRC without fear of retaliation, and employees are encouraged to raise such concerns. Specifically (as applicable):

- Behaviors and interactions encourage the free flow of information related to raising nuclear safety issues, differing professional opinions, and identifying issues in the corrective action program and through self-assessments. Such behaviors include supervisors responding to employee safety concerns in an open, honest, and nondefensive manner and providing complete, accurate, and forthright information to oversight, audit, and regulatory organizations. Past behaviors, actions, or interactions that may reasonably discourage the raising of such issues are actively mitigated. As a result, personnel freely and openly communicate in a clear manner conditions or behaviors, such as fitness for duty issues, that may impact safety, and personnel raise nuclear safety issues without fear of retaliation.
- If alternative processes (i.e., a process for raising concerns or resolving differing professional opinions that are alternates to the licensee's corrective action program or line management) for raising safety concerns or resolving differing professional opinions exist, then they are communicated, accessible, have an option to raise issues in confidence, and are independent in the sense that the program does not report to line management (i.e., those who would in the normal course of activities be responsible for addressing the issue raised).

Preventing, Detecting, and Mitigating Perceptions of Retaliation - A policy for prohibiting harassment and retaliation for raising nuclear safety concerns exists and is consistently enforced in that:

- All personnel are effectively trained that harassment and retaliation for raising safety concerns is a violation of law and policy and will not be tolerated.

- Claims of discrimination are investigated consistent with the content of the regulations regarding employee protection and any necessary corrective actions are taken in a timely manner, including actions to mitigate any potential chilling effect on others due to the personnel action under investigation.
- The potential chilling effects of disciplinary actions and other potentially adverse personnel actions (e.g., reductions, outsourcing, and reorganizations) are considered and compensatory actions are taken when appropriate.

Other Safety Culture Components

The following describes other safety culture components that are not associated with the cross-cutting areas. These components, when combined with the cross-cutting area components, comprise the safety culture components. Components in this section are considered only during the conduct of the supplemental inspection program, while the cross-cutting area components are considered during the conduct of both the baseline and supplemental inspection programs.

Accountability - Management defines the line of authority and responsibility for nuclear safety. Specifically (as applicable):

- Accountability is maintained for important safety decisions in that the system of rewards and sanctions is aligned with nuclear safety policies and reinforces behaviors and outcomes that reflect safety as an overriding priority.
- Management reinforces safety standards and displays behaviors that reflect safety as an overriding priority.
- The workforce demonstrates a proper safety focus and reinforces safety principles among their peers.

Continuous Learning Environment - The licensee ensures that a learning environment exists. Specifically (as applicable):

- The licensee provides adequate training and knowledge transfer to all personnel on site to ensure technical competency.

- Personnel continuously strive to improve their knowledge, skills, and safety performance through activities such as benchmarking, being receptive to feedback, and setting performance goals. The licensee effectively communicates information learned from internal and external sources about industry and plant issues.

Organizational Change Management - Management uses a systematic process for planning, coordinating, and evaluating the safety impacts of decisions related to major changes in organizational structures and functions, leadership, policies, programs, procedures, and resources. Management effectively communicates such changes to affected personnel.

Safety Policies - Safety policies and related training establish and reinforce that nuclear safety is an overriding priority in that:

- These policies require and reinforce that individuals have the right and responsibility to raise nuclear safety issues through available means, including avenues outside their organizational chain of command, and to external agencies, and obtain feedback on the resolution of such issues.
- Personnel are effectively trained on these policies.
- Organizational decisions and actions at all levels of the organization are consistent with the policies. Production, cost, and schedule goals are developed, communicated, and implemented in a manner that reinforces the importance of nuclear safety.
- Senior managers and corporate personnel periodically communicate and reinforce nuclear safety such that personnel understand that safety is of the highest priority.