

POLICY ISSUE (Notation Vote)

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SECY-05-0187

FOR: The Commissioners

FROM: Luis A. Reyes
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SUBJECT: STATUS OF SAFETY CULTURE INITIATIVES AND SCHEDULE
FOR NEAR-TERM DELIVERABLES

PURPOSE:

The purpose of this paper is to update the Commission on the staff's plans and activities to enhance the agency's oversight of operating reactors to more fully address safety culture. It also informs the Commission of the staff's schedule for accomplishing the remaining tasks.

SUMMARY:

Following the Davis-Besse Nuclear Power Station (DBNPS) reactor vessel head degradation, the staff received recommendations from several sources, including the Davis-Besse Lessons Learned Task Force, the General Accounting Office, and members of Congress, which related in part, to the agency's oversight of safety culture. The Commission's Staff Requirements Memorandum (SRM)-SECY-04-0111, directed the staff to undertake a number of activities to enhance the Reactor Oversight Process (ROP) to more fully address safety culture. This paper reports on what has been accomplished to date to enhance the ROP, and on additional activities to be completed in the near future.

The staff has made progress toward enhancements of the ROP's treatment of substantive cross-cutting issues; revisions to the "Identification and Resolution of Problems" inspection procedure; and the ROP baseline inspection and plant assessment processes, which are discussed in Attachment 1 of this paper.

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The safety culture initiatives will be completed in two phases. Phase 1 provides for near term development and implementation of ROP enhancements and associated training for inspectors. Phase 1 (to be completed in March 2006), includes reviewing the ROP to identify those features that provide or could be enhanced to provide insight into a licensee's safety culture; modifying aspects of the ROP based on that review; developing and beginning to implement a methodology for documenting and assessing the information; developing and beginning to implement a process to determine the need for a specific safety culture evaluation for plants in the degraded cornerstone column of the ROP; and developing and beginning to implement training activities on the modified aspects of the ROP.

Phase 2 of the approach will complete enhancements to the ROP and the associated training. Phase 2 (to be completed by January 2007) would include ROP enhancements as needed, to provide insights on safety culture; developing guidance for inspectors in conducting a specific evaluation of safety culture; and completing training on the additional modified aspects of the ROP.

There has been and will continue to be frequent stakeholder involvement through public meetings and the safety culture web page. With consideration to stakeholder input the staff will evaluate and incorporate appropriate enhancements to the ROP.

The staff will inform the Commission on the accomplishments to date and the schedule for completing the remaining safety culture initiatives in March 2006.

BACKGROUND:

Staff has undertaken several initiatives to enhance the oversight of safety culture within the ROP. This work was initiated based on direction received in response to a root cause underlying the DBNPS reactor vessel head degradation:

The Davis-Besse Lessons Learned Task Force report recommended, in part, that the staff "Review the range of NRC baseline inspections and plant assessment processes, as well as other NRC programs, to determine whether sufficient programs and processes are in place to identify and appropriately disposition the types of problems experienced at the DBNPS. Additionally, provide more structured and focused inspections to assess licensee employee concerns programs and safety conscious work environment."

The General Accounting Office Report (GAO-04-415) "Nuclear Regulation - NRC Needs to More Aggressively and Comprehensively Resolve Issues Related to the Davis-Besse Nuclear Power Plant's Shutdown," (May 2004), states: "Develop a methodology to assess licensee's safety culture that includes indicators of and inspection information on patterns of licensee performance as well as on licensees' organization and processes. NRC should collect and analyze this data either during the course of the agency's routine inspection program or during separate targeted assessments, or during both routine and targeted inspections and assessments, to provide an early warning of deteriorating or declining performance and future safety problems."

Based on the above, the staff sought Commission direction with regard to the development of possible options for enhancing the oversight of Safety Conscious Work Environment (SCWE) and Safety Culture 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. In SRM-SECY-04-0111, dated August 30, 2004, the Commission directed that the staff:

- Enhance the ROP treatment of cross-cutting issues to more fully address safety culture.
- Include as part of its enhanced inspection activities for plants in the Degraded Cornerstone Column of the ROP Action Matrix, a determination of the need for a specific evaluation of the licensees safety culture.
- Ensure that the inspectors are properly trained in the area of safety culture.
- Follow established processes for revising the ROP, in particular the process for involving stakeholders.
- Interact with our stakeholders in developing a process for making the determination on whether a specific safety culture evaluation is needed and conducting the evaluation.
- Continue to monitor industry efforts to assess safety culture.
- Continue to monitor developments of foreign regulators in the area of safety culture.
- Engage stakeholders by noticing the draft document "Establishing and Maintaining a Safety Conscious Work Environment" in the *Federal Register* for a brief comment period.

Finally, members of the U.S. Senate, in meetings with the Commissioners, and Senate staff in meetings with NRC staff, encouraged NRC to continue to make progress in initiatives in the areas of safety culture and SCWE.

DISCUSSION:

The staff recognizes the need to enhance the treatment of safety culture in the ROP and has already implemented several changes to the ROP which could contribute to strengthening the treatment of safety culture. These improvements, which are provided in greater detail in Attachment 1, include the following:

- Enhancements to the treatment of substantive cross-cutting issues;
- Revisions to Inspection Procedure (IP) 71152, "Identification and Resolution of Problems," and IP 71111.15, "Operability Evaluations;"
- Implementation of a Web-based training course on the Columbia Space Shuttle accident; and
- Enhancements to the ROP baseline inspection program and plant assessment processes.

Additionally, in response to the SRM-SECY-04-0111, direction and the Davis-Besse Lessons Learned Task Force and GAO recommendations, the staff has developed and begun implementing a comprehensive plan to identify, develop, and implement needed improvements to the ROP. The overall objective of this effort is to enhance the ability of the ROP to better detect potential issues related to safety culture.

The staff's approach to addressing the overall objective is to develop changes within the ROP framework consistent with the regulatory principles that guided its development. These principles include being objective, risk-informed, understandable, and predictable. The staff is also guided by the Commission's direction to rely on inspector observations and indicators already available to the NRC, to develop tools that allow inspectors to rely on more objective findings, and to follow the established processes for revising the ROP, in particular the process for involving stakeholders.

The staff established a Safety Culture Steering Committee, a Safety Culture Working Group, and a Working Group Support Team to provide oversight and support to the development and implementation of the approach. The Safety Culture Steering Committee provides policy direction to the overall effort including the objective and approach. The steering committee comprises senior manager representatives from the Office of Enforcement (OE), Office of Nuclear Reactor Regulation (NRR), Office of Nuclear Regulatory Research (RES), Office of Nuclear Material Safety and Safeguards (NMSS), and Region II. The Chair of the steering committee is the Director, OE. The Safety Culture Working Group develops and implements the activities needed to meet the intent of the Commission's direction. The working group comprises representatives from OE, NRR, RES, and NMSS. The members of the working group have knowledge and experience in human factors including safety culture, SCWE, and inspection. The Safety Culture Working Group Support Team serves as a sounding board to the working group and supports the working group with additional expertise, as needed, particularly in the area of inspection. The support team comprises representatives from OE, NRR, RES, NMSS, NSIR, and each of the regions.

With consideration to the overall objective and approach, the staff accomplished a number of activities, described as follows:

Safety Culture Response Plan

The staff developed a comprehensive Safety Culture Response Plan to support the safety culture initiatives. The Plan is organized along the major direction in the Commission's SRM:

- (1) to enhance the ROP's treatment of cross-cutting issues to more fully address safety culture;
- (2) to develop a process to determine the need for a specific evaluation of a licensee's safety culture and a process to conduct the evaluation;
- (3) to ensure that the inspectors are properly trained in the area of safety culture;
- (4) to monitor the industry's and foreign efforts in this area;
- and (5) to follow the established processes for revising the ROP; in particular the process for involving stakeholders.

Commitments

The plan consists of two phases. Phase 1 provides for near term development and implementation of ROP enhancements and associated training for inspectors. Phase 2 of the approach will complete enhancements to the ROP and the associated training. In Phase 1, the staff will complete the following major activities by March 2006:

- Identify safety culture attributes, elements, and associated inspection information and measures for each of the safety culture elements and capture these features in a Safety Culture Attributes Table, i.e., a tool to assess the features of the ROP that can be enhanced to provide insights into a licensee's safety culture;
- Modify those aspects of the ROP that have been identified as providing significant insight into safety culture and begin to implement the changes.
- Develop and implement enhanced guidance for documenting and assessing information collected
- Begin implementing the enhanced guidance for recording and assessing the information;
- Develop agency actions based on the results of the assessment;
- Develop a process to determine the need for a specific evaluation of safety culture for those plants in the degraded cornerstone of the ROP;
- Begin implementing the process to determine the need for a specific evaluation of safety culture for those plants that are in the degraded cornerstone columns of the ROP; and
- Begin implementing training activities on the modified aspects of the ROP.

The staff will inform the Commission in March 2006, on the accomplishments to date and the schedule for completing the remaining safety culture initiatives.

In Phase 2 the staff will complete the following major activities by January 2007:

- Modify and implement the remaining features of the ROP to provide insights on safety culture;
- Develop guidance for inspectors in conducting: a special evaluation of a licensee's safety culture, an evaluation of a licensee's self-assessment, an evaluation of a licensee's third-party assessment; and
- Implement training on the additional modified aspects of the ROP (e.g., the changes to the baseline inspection procedures that were made during Phase 2).

The staff will provide a paper to the Commission in January 2007 reporting on the fully enhanced ROP to address safety culture.

Safety Culture Attributes Table

As indicated above one of the activities in the first phase of the staff's approach is development of the Safety Culture Attributes Table (Table). The Table's purpose is to capture those features of the licensee's organization that are thought to be important to provide insights about their safety culture. It is a tool to enable the staff to assess features of the ROP to determine what features would need to be enhanced to provide insights into a licensee's safety culture.

Using a variety of sources including materials from the Institute of Nuclear Power Operations (INPO), Electric Power Research Institute (EPRI), other industry sources, international sources, and their knowledge and experience in this area, the staff identified specific safety culture attributes, elements, proposed inspection information and proposed measures for the Table. The Table was then screened to revise or delete information based on specific criteria (e.g., whether it meets the regulatory principles of being objective, risk-informed, understandable, and predictable). The staff is engaging internal and external stakeholders to provide feedback/input on the Table, described further below. The Table will be modified based on this input and discussed again with stakeholders at an October 2005 public meeting. The final Table will then be used to assess features of the ROP that could be enhanced to more fully address safety culture.

Stakeholder Interactions

A key aspect of staff's activities is to provide for frequent stakeholder involvement. The staff has taken several steps to date:

- Developed a Safety Culture Communications Plan which identifies internal and external stakeholders, and includes key messages, questions and answers, and a communication activities timeline.
- Solicited input from various stakeholders on safety culture attributes and measures for a matrix prior to the annual Regulatory Information Conference (RIC) that was then discussed at the March 2005 RIC and which was later incorporated into the Table.
- Held a public meeting on August 17, 2005, to discuss the background of the safety culture initiatives, the Safety Culture Response Plan, the Safety Culture Attributes Table, and Next Steps including how we can best involve our stakeholders as we go forward. External stakeholders at the public meeting included representatives from ten utilities, the Nuclear Energy Institute (NEI), the Union of Concerned Scientists (USC), Bechtel, McGraw Hill, Morgan Lewis, and Winston and Strawn. Approximately 15 people participated via teleconference.
- Developed a safety culture Web page (www.gov/what-we-do/regulatory/enforcement/safetyculture.html) that can be linked from NRC's Public Web page. To date, the web page includes relevant definitions, links to background documents, public meeting material, a comment and suggestion feedback form requesting input from stakeholders on the Table, and the summary of the August 17, 2005 public meeting.

- The Response Plan calls for frequent stakeholder interactions throughout the development process. The staff coordinated with industry representatives and representatives from non-governmental organizations to reach agreement on an approach to their involvement throughout the development process. Industry has identified a group of individuals to coordinate with staff on this work. Monthly public meetings are planned, with the next one scheduled for the week of October 24, 2005.
- Met with Congressional staff, at their request, to describe the agency's safety culture activities and respond to their questions. The staff will continue to provide status updates to these Congressional staff on a periodic basis. The next meeting is scheduled for October 2005.
- A member of the working group made a presentation at the industry's Human Performance, Root Cause, and Trending conference in June 2005. The Chair of the support team was on a panel entitled "Regulation of Safety Culture" at the annual American Nuclear Society conference in June 2005. In addition to the opportunity this participation provided for staff to inform industry and other members of the public on the agency's initiatives, it also provided an opportunity for the staff to hear presentations from industry, academia, and consultants on their efforts.
- Presented information on safety culture initiatives at a Division of Reactor Projects/Divisions of Reactor Safety Counterpart meeting.
- Sought and received comments from internal stakeholders on the Safety Culture Attributes Table through office and regional representatives on the Working Group Support Team.
- The Safety Culture Communications Plan provides a timeline of planned interactions with internal stakeholders including at regional Counterpart meetings.

Safety Culture Training

The staff will assess what training is needed, develop the training on the changes made to the ROP during Phase 1 of the effort, and will then implement the training. Another training assessment and implementation will be made during Phase 2 of the effort relative to elements not included in the initial training. As draft products are developed, staff is providing orientation on safety culture and the safety culture initiatives during inspector counterpart meetings. Also, headquarters staff with knowledge and experience in human factors including safety culture and SCWE continue to participate on special inspection teams and provide expertise to the safety culture and SCWE aspects of the inspection (e.g., the Davis-Besse and the Salem and Hope Creek nuclear power plants). These headquarters staff continue to provide guidance to inspectors on safety culture and SCWE on a case-by-case basis (e.g., as they participate on special inspections, they are also providing on-the-job training on safety culture and SCWE to regional inspection staff who are on these teams).

Monitoring Industry and Foreign Efforts in Safety Culture

The staff requested, and EPRI and INPO provided NRC with selected safety culture material that they developed. In addition, two members of the working group observed an INPO Plant Evaluation at two plants, specifically focusing on the safety culture aspects of the Plant Evaluation. As the staff engages with industry stakeholders on the safety culture initiatives, the staff will keep informed about the industry's programs and efforts in this area.

The working group continues to collect information on safety culture efforts from foreign regulators and the International Atomic Energy Agency (IAEA) and the Nuclear Energy Agency (NEA). For example, the IAEA recently issued draft documents in the safety standards series that address safety culture. They are Management System Requirements DS338 and Management System Generic Guidance DS339 and draft Safety Culture Assessment Review Team (SCART) guidelines. The staff are reviewing these documents to determine their potential usefulness to inform the agency's safety culture initiatives. Further, a member of the working group is a member of the NEA's Special Expert Group on Organizational and Human Factors which comprises representatives from regulatory bodies and is focused on human and organizational factors including safety culture and safety management.

Members of the working group briefed regulators from Spain, Korea, and Indonesia during bilateral meetings at NRC headquarters on the NRC's safety culture initiatives and gained information on their safety culture efforts.

Safety Conscious Work Environment

The staff published a proposed generic communication; "Establishing and Maintaining a Safety Conscious Work Environment" in the *Federal Register* on October 14, 2004 (69 FR 61049). The staff revised the generic communication, as appropriate based on comments received; briefed the Committee to Review Generic Requirements on May 24, 2005 on the Regulatory Issues Summary (RIS); and issued the final RIS on August 25, 2005.

CONCLUSION:

The staff believes that the Safety Culture Response Plan activities and products will provide the agency with an enhanced ability to monitor a licensee's safety culture through the ROP. As described in this paper, by March 2006, the staff expects to have made enhancements to the ROP relative to the oversight of safety culture; begun to implement the modified ROP; and, begun to implement a process for making a determination of the need for a specific evaluation of safety culture for plants in the degraded cornerstone column of the action matrix. By January 2007, the staff expects to have completed enhancements to the ROP, and developed a specific safety culture evaluation process for plants in the degraded cornerstone columns that are determined (by the process developed in Phase 1) to have safety culture issues and meet the criteria for a specific evaluation of safety culture.

COORDINATION:

The Office of the General Counsel has reviewed this Commission paper and has no legal objection.

/RA/

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Attachment:
Improvements to the Reactor Oversight Process

IMPROVEMENTS TO THE REACTOR OVERSIGHT PROCESS

As discussed in SECY-05-0070, "Reactor Oversight Process Self-Assessment for Calendar Year 2004," April 25, 2005, the staff incorporated several enhancements to the treatment of substantive cross-cutting issues. The staff revised IMC 0305 "Operating Reactor Assessment Program," on December 21, 2004, to provide more specific guidance for the determination of a substantive cross-cutting issue in the areas of human performance and problem identification and resolution.

In SRM M050525B dated June 30, 2005, the Commission directed the staff to continue efforts to improve the guidance on substantive cross-cutting issues. Also, substantive cross-cutting issues were discussed at the March 2005 Regulatory Information Conference (RIC) and there were lessons learned for staff action after the conclusion of the most recent end-of-cycle assessment review meetings. As a result, the staff plans on issuing a revision to program office guidance in this area. These improvements will be implemented with consideration to the safety culture initiatives reported on in this paper.

Additionally, the staff completed the implementation of several Davis-Besse Lessons Learned Task Force (DBLLTF) recommendations that relate to safety culture, as follows:

- (A) DBLLTF Recommendation 3.2.5(2), "Revise inspection guidance to provide assessments of: (1) the safety implications of long-standing, unresolved problems; (2) corrective actions phased in over several years or refueling outages; and (3) deferred modifications:

Inspection Procedure (IP) 71152, "Identification and Resolution of Problems," was revised to require the resident inspector to perform a screening review of each item entered into the corrective action program. The intent of this review is to be alert to conditions such as repetitive equipment failures or human performance issues that might warrant additional follow-up through other baseline inspection procedures.

IP 71152, also was revised to require a semi-annual review to identify trends that might indicate the existence of a more significant safety issue. Included within the scope of this review are repetitive or closely related issues that may have been documented by the licensee outside the normal corrective action program, such as in trend reports or performance indicators, major equipment problem lists, repetitive and/or rework maintenance lists, departmental problem/challenges lists, system health reports, quality assurance audit/surveillance reports, self-assessment reports, maintenance rule assessments, or corrective action backlog lists.

IP 71111.15, "Operability Evaluations," was revised to include deferred modifications as one of the areas an inspector can assess to ensure that structures, systems, and components are capable of performing their design function.

- (B) DBLLTF Recommendation 3.3.1(1), "Provide training and reinforce expectations to NRC managers and staff members to address the following areas... maintaining a questioning attitude in the conduct of inspections..."

The staff developed a web-based training course based on the Columbia Space Shuttle accident to (1) illustrate the importance of maintaining a questioning attitude toward

safety and the potential negative consequences that can occur when such a questioning attitude is lost or compromised; (2) provide examples of how issues concerning an organization's safety culture can lead to technological failures; (3) provide insights into investigation techniques that can be used to assess safety significant issues or events; and (4) illustrate the importance of a robust corrective action program and highlight the corrective action program weaknesses that contributed to the shuttle accident

- (C) DBLLTF Recommendation 3.3.2(2), "Revise the overall PI&R inspection approach such that issues similar to those experienced at DBNPS are reviewed and assessed. Enhance the guidance for these inspections to prescribe the format of information that is screened when determining which specific problems will be reviewed."

IP 71152, "Identification and Resolution of Problems," was revised to include an inspection requirement to perform a semi-annual review to identify trends that might indicate the existence of a more significant safety issue.

- (D) DBLLTF Recommendation 3.3.4(5), "Review the range of NRC baseline inspections and plant assessment processes, as well as other NRC programs, to determine whether sufficient programs and processes are in place to identify and appropriately disposition the types of problems experienced at DBNPS. Additionally, provide more structured and focused inspections to assess licensee's employee concerns programs and safety conscious work environment (SCWE)."

The staff reviewed the NRC baseline inspection program and plant assessment processes and as a result enhanced the baseline inspection program by (1) requiring the screening of all licensee corrective action items, (2) performing a semi-annual trend review focused

on recurring equipment issues, (3) requiring containment walk downs during outages, (4) reviewing deferred modifications, and (5) evaluating licensee actions when operating with multiple, repetitive, or unplanned technical specification action statements. The staff enhanced the plant assessment process by (1) strengthening the oversight of plants in extended shutdowns, (2) requiring more complete documentation of important staff decisions, and (3) budgeting resources for Inspection Manual Chapter 0350 plants. The staff has also enhanced the Reactor Oversight Process (ROP) by requiring training on boric acid corrosion, stress corrosion cracking, and the importance of a questioning attitude, and requiring annual refresher training on different aspects of the ROP.

This memorandum informs the Commission of the staff's activities that respond to the Commission's August 30, 2004 Staff Requirements Memorandum to enhance the ROP's treatment of cross-cutting issues to more fully address safety culture. Therefore, the Safety Culture Response Plan addresses this DBLLTF recommendation to provide more focused inspections on employee concerns programs and SCWE.