

Safety Culture Initiative

Executive Summary

The U.S. Nuclear Regulatory Commission's (NRC's) Safety Culture Policy Statement (SCPS) defines expectations for the industry to maintain a positive safety culture. The nuclear industry monitors and self-assesses safety culture using the guidance in Nuclear Energy Institute (NEI) 09-07, "Fostering a Strong Nuclear Safety Culture," Revision 0, issued November 2010. This initiative helps ensure that the expectations in the SCPS are met. The NRC assesses this initiative as part of its oversight activities, such as during inspections performed under Inspection Procedure 95003, "Supplemental Inspection for Repetitive Degraded Cornerstones, Multiple Degraded Cornerstones, Multiple Yellow Inputs or One Red Input," dated December 18, 2015. The staff concludes that the current industry approach to ensuring a safety culture and the NRC's safety culture oversight program are adequate.

Background

NRC-Led Activities

The NRC has long recognized the importance of a strong nuclear safety culture. In 1989, in response to an incident at the Peach Bottom Atomic Power Station, the NRC issued "Policy Statement on the Conduct of Nuclear Power Plant Operations." This policy statement describes the NRC's expectation that licensees place appropriate emphasis on safety in the operation of nuclear power plants, including personal dedication and accountability of all individuals engaged in any activity that has a bearing on the safety of nuclear power plants. Additionally, the policy statement underscores management's responsibility for fostering the development of a healthy safety culture at each facility and for providing a professional working environment in the control room—and throughout the facility—to ensure safe operations.

In 1996, following an incident at the Millstone Power Station in which workers were retaliated against for whistleblowing, the Commission issued "Freedom of Employees in the Nuclear Industry to Raise Safety Concerns without Fear of Retaliation." This policy statement describes the NRC's expectation that all NRC licensees establish a safety conscious work environment (SCWE) in which workers feel free to raise nuclear safety concerns without fear of harassment, intimidation, retaliation, or discrimination. A SCWE is an important attribute of a strong nuclear safety culture.

In 2002, investigations into the discovery of degradation of the reactor pressure vessel head at Davis-Besse Nuclear Power Station revealed that safety culture weaknesses were the root cause of the event. The NRC made significant changes to the Reactor Oversight Process (ROP) to strengthen the agency's ability to effectively monitor licensee performance and detect potential safety culture weaknesses during inspections and performance assessments. Regulatory Issue Summary 2006-13, "Information on the Changes Made to the Reactor Oversight Process to More Fully Address Safety Culture," dated July 31, 2006, provides information to reactor licensees on the revised ROP. Most notably, the NRC revised the existing cross-cutting areas of human performance, problem identification and resolution, and SCWE to incorporate aspects that are important to safety culture. The intent of the revisions to the ROP was threefold:

- (1) 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.
- (2) Provide the NRC staff with a process to determine the need to specifically evaluate a licensee's safety culture after performance problems have placed the licensee in the Degraded Cornerstone column of the Action Matrix.
- (3) 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.

In 2008, the NRC developed several additional changes to the guidance on oversight of safety culture in the ROP as a result of lessons learned from a supplemental inspection conducted at the Palo Verde Nuclear Generating Station.

The NRC published its final SCPS on June 14, 2011. The SCPS provides the NRC's expectation that individuals and organizations performing regulated activities establish and maintain a healthy safety culture that recognizes the safety and security significance of their activities and the nature and complexity of their organizations and functions. Because safety and security are the primary pillars of the NRC's regulatory mission, consideration of both safety and security issues, commensurate with their significance, is an underlying principle of the SCPS.

In March 2014, the staff published NUREG-2165, "Safety Culture Common Language," which documents the outcomes of public workshops to develop a common language to describe safety culture in the nuclear industry. The purpose of this initiative was to align terminology used by both licensees and the NRC when describing safety culture at nuclear power facilities. These workshops, held in December 2011, April 2012, November 2012, and January 2013, included subject matter experts from the NRC, the nuclear power industry, and the public. The common language was finalized and agreed upon at the January 2013 workshop. The NRC staff uses the agreed-upon common language to implement elements of its programs that provide oversight of regulated activities. The staff incorporated most of the common language into the ROP for operating nuclear reactors. The NRC has documented all changes to its oversight programs, including the ROP, in their associated inspection manual chapters and inspection procedures.

Industry-Led Activities

In November 2004, also in response to events at the Davis-Besse Nuclear Power Station, the Institute of Nuclear Power Operations (INPO) published "Principles for a Strong Nuclear Safety Culture," which describes principles and attributes of a healthy nuclear safety culture as developed by an industry advisory group. In 2009, in partnership with NEI and INPO, the nuclear power industry began an initiative to further enhance safety culture. The industry's process for monitoring and improving safety culture used INPO's principles and attributes of a healthy nuclear safety culture as a framework, as described in NEI 09-07. Through NEI, in partnership with INPO, the nuclear power industry pilot tested a broad initiative to monitor and improve its nuclear safety culture. Four nuclear power plants volunteered to participate in the industry's pilot application of the "Site Nuclear Safety Culture Process," documented in NEI 09-07.

During the Nuclear Strategic Issues Advisory Committee meeting on December 16, 2010, the industry adopted two components from NEI 09-07 for use at each power plant:

- (1) The first component is a nuclear safety culture monitoring panel (NSCMP), which is used at most sites. The NSCMP meets quarterly and is made up of management representatives from most departments and includes the employee concerns manager. The purpose of this panel is to self-assess and monitor trends and “faint signals” of safety culture before they manifest into larger, safety-significant issues.
- (2) The second component is a safety culture leadership team which, at most utilities, meets twice a year. The purpose of this meeting is to glean insights from the NSCMP about the overall health of the station and make decisions related to necessary changes to maintain a positive safety culture.

At a November 2017 ROP public meeting, NEI and other utility representatives gave a presentation about the current monitoring of safety culture industrywide. Most sites still use NEI 09-07, Revision 1, issued March 2014, which provides different options for implementing the monitoring program.

NRC Oversight of Nuclear Safety Culture

Reactor Oversight Process Framework

All nuclear plants are subject to biennial “problem identification and resolution” inspections that evaluate the licensee’s corrective action program, employee concerns program, and SCWE. If inspectors identify deficiencies in any of these areas, the agency may increase oversight of the facility based on the safety significance of the identified issue(s). In addition, the NRC’s resident inspectors stationed at all nuclear plants receive training in safety culture and evaluate the culture of the facility on a daily basis.

Inspection findings and violations are assessed and, if appropriate, are assigned cross-cutting aspects in the areas of human performance, problem identification and resolution, or SCWE. Findings with cross-cutting aspects are evaluated in aggregate during the licensee’s second quarter assessment meetings and end-of-cycle meetings. If a licensee has multiple findings with the same cross-cutting aspect associated with it, the NRC may issue a cross-cutting issue. If the cross-cutting issue exists for a second consecutive assessment period, the agency has the authority to ask the licensee to perform a safety culture assessment or inspect the safety culture more thoroughly.

The NRC’s approach to safety culture assessment uses a graded process. When the plant’s performance begins to decline—exhibited, for example, by increasing trends in safety-significant inspection findings—the level of NRC oversight may be increased. The extent and complexity of the agency’s safety culture assessment increases with the increase in the NRC’s oversight. The NRC’s Action Matrix has five columns that reflect the agency’s response to declining licensee performance. Column 1 requires a baseline level of inspection. The NRC places plants with unacceptable performance in Column 5 and transitions oversight of these plants to the process described in Inspection Manual Chapter 0350, “Oversight of Reactor Facilities in a Shutdown Condition Due to Significant Performance and/or Operational Concerns,” dated March 1, 2018. Plants in Columns 2–4 require increasing levels of safety culture oversight as follows:

- For plants in Column 2, inspectors verify that the licensee's root-cause analysis appropriately considered safety culture.
- For plants in Column 3, the NRC independently determines whether safety culture weaknesses were the root cause or contributing causes of the performance problems and may request that the licensee conduct an independent safety culture assessment.
- For plants in Column 4, the NRC will request an independent assessment and will perform its own assessment of safety culture. Qualified NRC safety culture assessors evaluate the licensee's third-party safety culture assessment and then determine the scope of the NRC assessment based on that evaluation. The NRC assessors conduct the assessment on site and identify and document safety culture themes in the inspection report. The assessors also review the licensee's planned and completed corrective actions to evaluate whether they address the identified safety culture themes and whether the licensee needs to develop followup actions to address any remaining concerns. During this inspection, the NRC assesses the adequacy of the NEI 09-07 NSCMPs and site leadership teams.

Experienced NRC staff members with educations ranging from human factors engineering to sociology/psychology or extensive experience with safety and organizational culture, or a combination of these, conduct the safety culture assessments. In addition, the NRC has a qualification training program specifically designed to qualify employees as safety culture assessors, as described below.

Safety Culture Assessor Training

Qualification as a safety culture assessor requires the completion of a variety of activities, each of which is designed to train a prospective assessor on information-gathering techniques or to practice a skill that may be important during safety culture assessments. When qualified, the assessor will have demonstrated the following competencies:

- understands the history, legal basis, and processes used to achieve the NRC's regulatory objectives in this area
- masters the techniques and skills needed to collect, analyze, and integrate information using a safety culture focus to develop a supportable regulatory conclusion
- demonstrates the personal and interpersonal skills needed to carry out assigned regulatory activities, either individually or as part of a team

The NRC requires all safety culture assessors to complete an assessor qualification interview to evaluate how well an individual can integrate and apply the necessary competencies to field situations.

Public Availability of Safety Culture Information

The NRC maintains a public safety culture Web site at <http://www.nrc.gov/about-nrc/safety-culture.html>. The Web site allows a variety of stakeholders to access materials that provide information on safety culture, the NRC's SCPS, and related activities.

Assessment

The staff has determined that the current process for monitoring and assessing safety culture at nuclear power plants, including the industry's implementation of NEI 09-07, is effective.

The NRC monitors licensee safety culture and maintains an oversight role during the baseline inspection program within the established framework of the ROP. For licensees that have moved into Columns 3 and 4 of the Action Matrix, the NRC conducts a more thorough and diagnostic assessment of safety culture, including a review of the NEI 09-07 initiative and implementation. The staff has confidence that the NRC's oversight activities will identify safety culture issues in a timely manner to allow licensees to take the appropriate regulatory actions, if necessary.

Conclusion

Based on the results of the staff's assessment of this voluntary industry initiative, the staff finds that this voluntary initiative is effective. The staff will continue to monitor performance using the oversight programs described above and will inform the Commission if future performance trends in this area warrant reconsideration of that conclusion.