Development and Implementation of the U.S. Nuclear Regulatory Commission's Safety Culture Policy Statement for Radioactive Materials

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Abstract
In June, 2011, the U.S. Nuclear Regulatory Commission (NRC) issued its final safety culture policy statement, which describes NRC's expectation that individuals and organizations performing regulated activities establish and maintain a positive safety culture commensurate with the safety and security significance of their activities and the nature and complexity of their organizations and functions. The policy statement was developed over a three-year period during which the agency engaged in extensive outreach with a broad range of stakeholders. By providing NRC's experiences and insights on safety culture, we believe there may be opportunities for the NRC to contribute as organizations (e.g., IRPA) embark on efforts to develop tools or standards that could favorably influence licensee efforts to develop a positive safety culture.

This paper describes the NRC staff's efforts to increase awareness of safety culture including a summary of the methods and processes used to engage a wide variety of stakeholders in developing the NRC safety culture policy statement. NRC staff held public workshops to develop the safety culture policy statement, and public meetings to solicit input on the draft policy statement. Members of NRC staff gave presentations at industry conferences, and provided information via publications and NRC's public website to make stakeholders aware of NRC's efforts in the area of safety culture and the development of the policy statement.

Now that the safety culture policy statement is entering the next phase of implementation, outreach, cooperation and interaction with, and among, external stakeholders will become even more important to its success. During this phase, the NRC staff will continue to engage stakeholders in a dialogue regarding the contents of the policy statement and the importance of a positive safety culture in their specific regulated activities. To increase awareness of safety culture, the NRC will continue to share information on safety culture with licensees and co-regulators via web, e-mails, publications, letters, inspections, licensee workshops, and conferences. NRC is also considering initiatives such as reviewing the NRC's current regulations from the perspective of assessing how potentially utilizing the safety culture traits could contribute to a positive safety culture, and potentially considering evaluating safety culture as a root cause in cases of significant poor performance.

Key words: NRC, safety culture, policy statement

I. Introduction

The importance of a positive safety culture has been demonstrated by a number of significant, high-visibility events involving nuclear materials in the United States and the international community. Assessments of these events revealed that weaknesses in safety culture were often an underlying cause or factor that increased the severity of problems.

The U.S. Nuclear Regulatory Commission (NRC) recognizes the importance of licensees establishing and maintaining a strong safety culture — a work environment where management and employees are dedicated to putting safety first. NRC's efforts to increase attention and emphasize the critical importance of safety culture include (1) development of its safety culture policy statement, and (2) continued outreach activities regarding the value of establishing and maintaining a positive safety culture in stakeholder's specific activities.

The staff will present an overview of its work on developing and implementing the NRC's safety culture policy statement at the 13th International Congress of the International Radiation Protection Association (IRPA) in May 2012.

II. Development of the Safety Culture Policy Statement

The NRC has previously addressed aspects of safety culture in two separate policy statements. In 1989, in response to an incident at a nuclear power plant that involved operators sleeping in the control room, the NRC issued a policy statement[1] on the conduct of operations that describes the NRC's expectation that licensees place appropriate emphasis on the personal dedication and accountability of all individuals engaged in any activity that has a bearing on safety in the operations of nuclear power plants. In addition, the policy statement underscores management's responsibility for fostering the development of a safety culture at each facility and creating a professional working environment that ensures safe operations in the control room and throughout the facility. In 1996, following an incident at a nuclear power plant in which workers were retaliated against for whistle-blowing, the NRC issued another policy statement.[2] This 1996 policy statement states the NRC's expectation that licensees will establish a safety-conscious work environment for all employees in the nuclear industry. A safety-conscious work environment is described as an environment in which workers feel free to raise safety concerns without fear of harassment, intimidation, retaliation, or discrimination. A safety conscious work environment is one important attribute of a positive safety culture.

In 2008, the Commission directed the NRC staff[3] to develop a draft policy statement on safety culture that explains the expectations for safety and security culture for *all* NRC licensees. The specific purpose of this task was "to expand the Commission's policy of safety culture to address the unique aspects of security and to ensure the resulting policy is applicable to all licensees and certificate holders."

The Commission directed the staff to review specific issues related to safety culture including evaluation of the following key areas:

- whether safety culture as applied to reactors needs to be strengthened;
- how to increase attention to safety culture in the materials area;
- how stakeholder involvement can most effectively be used to address safety culture for all NRC and co-regulated licensees and certificate holders, including any unique aspects of security; and
- whether publishing NRC's expectations for safety culture and for security culture is best accomplished in one safety/security culture statement or in two separate statements, one each for safety and security, while still considering the safety and security interfaces.

The NRC established a Safety Culture Policy Statement Task Force Group and a Steering Committee to address this direction. The Task Force reviewed and analyzed various information and data sources to inform and develop the basis for the draft policy statement. Sources included information from existing NRC activities in the safety culture area; information and insights from relevant industry activities, international activities, and organizations; organizational research literature; and other high reliability approaches from the industry.

In addition, the Task Force conducted outreach activities with stakeholders to raise awareness of safety culture, to provide information about this activity, and to gather input. A public meeting was held in February 2009 to give stakeholders an opportunity to provide input on the key topics in the Commission direction and on the development of the policy statement. Task Force members also engaged with various stakeholder groups through existing meetings and communication venues.

Based on the information it reviewed and analyzed and the input it received from stakeholders, the NRC staff developed and submitted to the Commission a draft policy statement[4] and recommendations to address the specific issues identified. The draft policy statement contained, in part, the following key messages:

- The NRC, as a regulator, has an independent oversight role through inspection and assessment processes.

- Licensees and certificate holders bear the primary responsibility for safely handling and securing materials; therefore, it is each licensee's and certificate holder's responsibility to develop and maintain a positive safety culture in their organizations and among individuals who are overseeing or performing regulated activities. In this respect:
    - The draft safety culture policy statement addresses *what* is important in a positive safety culture, but does not address *how* licensees should implement the NRC's expectation of safety culture in their organization.
    - The NRC encourages industry to take proactive initiatives in this area.
- To further engage stakeholder interactions, the staff should hold public meetings and develop additional strategies to engage co-regulators and radioactive materials stakeholders.
- The NRC should publish the draft safety culture policy statement for public comment.

Different organizations, regulatory bodies, and industries have different definitions of safety culture, but these definitions have some commonalities. In the draft policy statement, the NRC modified the International Nuclear Safety Group's definition of safety culture to make it more broadly applicable to all licensees and certificate holders (instead of focusing only on reactors) and to acknowledge the importance of nuclear security in addition to nuclear safety. The draft policy statement also included several proposed characteristics of a positive safety focus.

In October 2009, the draft safety culture policy statement was approved[5] for public comment. In its approval, the Commission provided additional direction to the NRC staff, which included the following:

- The staff should publish the draft policy statement for comment no less than 90 days, based on the Commission's recognition that a substantial increment of this time will likely be used just in building awareness of the draft statement and the opportunity for comment.
- The comment period for the draft policy statement should continue to engage a broad range of stakeholders, including co-regulators and other organizations with an interest in nuclear safety, to ensure the final policy statement presented to the Commission benefits from consideration of a spectrum of views and provides the necessary foundation for safety culture applicable to the entire nuclear industry.
- The staff should consider incorporating suppliers and vendors of safety-related components into the safety culture policy statement.
- The staff should seek opportunities to comport NRC terminology, where possible, with that of existing standards and references maintained by those that the NRC regulates.

In November 2009, the draft safety culture policy statement was published for public comment.[6]

As part of the staff's efforts to further engage all NRC-regulated entities, the NRC held a public workshop[7] in February 2010. The objectives of the workshop were (1) to develop a common definition of safety culture and a common set of characteristics/traits that constitute a strong safety culture and (2) to solicit input on the draft policy statement. The workshop was a collaborative effort that included a panel of 16 participants representing a wide range of materials users (e.g., medical, industrial), reactor licensees, fuel-cycle licensees, co-regulators, a Native American tribe, and the public. The NRC took a less active role during the workshop, allowing the workshop panelists to reach alignment, with input from other meeting attendees, on a high-level definition of safety culture and its characteristics/traits. The workshop provided the NRC staff with an opportunity to gain a fuller understanding of what is important to the various stakeholders as they endeavored to develop the definition and characteristics/traits. Workshop panelists developed a definition of safety culture and a set of traits that they believe are significant to a strong safety culture and would be applicable to all types of licensees and certificate holders. There was good cooperation among the workshop panelists who had a healthy respect for differing views, yet were able to develop a definition and set of traits upon which the workshop panelists and attendees agreed.

On September 17, 2010, the NRC published a revised draft policy statement[8] for public comment to give the public an opportunity to comment on the safety-culture terminology—including the definition of nuclear safety culture—and other potential changes to the policy statement. The NRC also held a public meeting[9] on September 28, 2010 to give stakeholders a summary of efforts on the safety culture policy statement initiative and provide a last major outreach effort and the opportunity for public feedback on the revised draft policy statement.

Based on the public comments received on the revised draft policy statement, products of the September 2010 workshop, and additional input from other stakeholder outreach efforts, the staff provided a proposed final policy statement[10] to the Commission in January 2011. On March 7, 2011, the Commission approved the proposed final safety culture policy statement,[11] which was published and became effective on June 14, 2011.[12]

During the nearly 3-year process of developing the safety culture policy statement, the NRC staff achieved a strong sense of cooperation and rapport with the external stakeholder community. This partnership contributed to the openness and transparency of the process and increased the quality and credibility of the end product.

III. Content of the Safety Culture Policy Statement

As part of the development of the NRC's safety culture policy statement, NRC staff sought to develop safety culture terminology, which consists of a definition for safety culture, represented as Tier 1 in Figure 1, and a description of the traits of a positive safety culture, represented as Tier 2. Industry and licensees will address Tier 3 through their specific implementation activities.

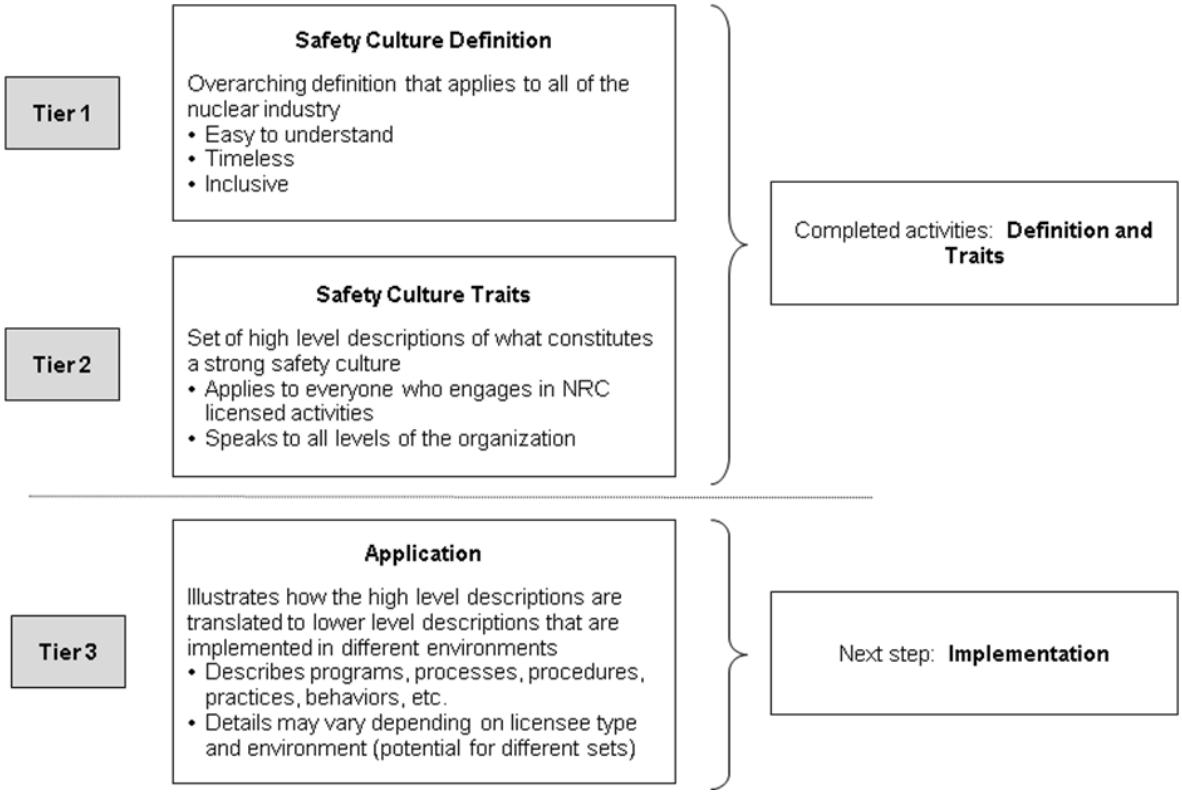

Figure 1. Tiers for Development and Implementation of the Policy Statement

The policy statement provides the NRC's expectation that individuals and organizations establish and maintain a positive safety culture commensurate with the safety and security significance of their activities and the nature and complexity of their organizations and functions. The policy statement is applicable to all licensees, certificate holders, permit holders, authorization holders, holders of quality assurance program approvals, vendors and suppliers of safety-related components, and applicants for a license, certificate, permit, authorization, or quality assurance program approval, subject to NRC authority.

The NRC defines "nuclear safety culture" as the core values and behaviors resulting from a collective commitment by leaders and individuals to emphasize safety over competing goals to ensure protection of people and the environment. Because it is a policy statement and not a regulation, it expresses the Commission's expectations in this area. It is the organization's responsibility, as part of its safety culture program, to consider how to apply the policy statement to its regulated activities.

The NRC's policy statement includes the organizational traits of a positive safety culture with the preface that "[E]xperience has shown that certain personal and organizational traits are present in a positive safety culture. A trait, in this case, is a pattern of thinking, feeling, and behaving that emphasizes safety, particularly in goal conflict situations, e.g., production, schedule, and the cost of the effort versus safety. It should be noted that although the term ''security'' is not expressly included in the following traits, safety and security are the primary pillars of the NRC's regulatory mission. Consequently, consideration of both safety and security issues, commensurate with their significance, is an underlying principle of [NRC's] safety culture policy statement."

The NRC's safety culture policy statement includes the following traits:

(1) *Leadership Safety Values and Actions*—Leaders demonstrate a commitment to safety in their decisions and behaviors;

(2) *Problem Identification and Resolution*—Issues potentially impacting safety are promptly identified, fully evaluated, and promptly addressed and corrected commensurate with their significance;

(3) *Personal Accountability*—All individuals take personal responsibility for safety;

(4) *Work Processes*—The process of planning and controlling work activities is implemented so that safety is maintained;

(5) *Continuous Learning*—Opportunities to learn about ways to ensure safety are sought out and implemented;

(6) *Environment for Raising Concerns*—A safety conscious work environment is maintained where personnel feel free to raise safety concerns without fear of retaliation, intimidation, harassment, or discrimination;

(7) *Effective Safety Communication*—Communications maintain a focus on safety;

(8) *Respectful Work Environment*—Trust and respect permeate the organization; and

(9) *Questioning Attitude*—Individuals avoid complacency and continuously challenge existing conditions and activities in order to identify discrepancies that might result in error or inappropriate action.

The NRC's policy statement also contains the caveat that while there may be traits not included in this Statement of Policy that are also important in a positive safety culture, "[I]t is the NRC's expectation that all individuals and organizations, performing or overseeing regulated activities involving nuclear materials, should take the necessary steps to promote a positive safety culture by fostering these traits as they apply to their organizational environments." Additionally, the policy statement stresses that the traits were not developed to be used for inspection purposes.

IV. Implementation of the Safety Culture Policy Statement

The staff developed an Implementation Plan[13] that summarizes the various activities the NRC staff has completed and planned. The Commission approved[14] the staff's planned activities and initiatives associated with the safety culture policy statement in March 2012. The activities the NRC staff completed that are applicable to users of radioactive materials include the following:

- Educational tools to enhance understanding of the definition and traits of a positive safety culture. These tools include a safety culture brochure,[15] case studies,[16] and posters;
- Presentations at NRC and Agreement States staff meetings, licensee and industry meetings and workshops, international conferences, and other forums with stakeholders in the regulated communities;
- Education and awareness of safety culture by sharing the key messages from the policy statement during licensing and inspection meetings with licensees;
- Newsletter articles and a generic communication to all licensees[17] to share information on the safety culture policy statement;
- Educational tools and information on NRC's methods for outreach and education shared with co-regulators such as the Agreement States;
- Participation in efforts to develop tools or standards that could favorably influence licensee efforts to develop a positive safety culture (e.g., NRC's participation in IRPA's initiative to develop a guidance document for its members on establishing and maintaining a Radiation Protection Culture); and
- Engagement in international efforts to advance safety culture.

The NRC continues to seek ways to engage with stakeholders, licensees, members of the public, and the international community to provide outreach and education on the policy statement. In the radioactive materials area, the NRC staff have planned the following activities:

- Expansion of educational tools, such as additional case studies;

- Continuation of efforts to provide presentations to industry groups with a focus on more local industry/licensee associations to reach more licensees;
- Revision of various licensing guidance documents to incorporate discussion of the safety culture policy statement and traits with examples specific to the licensed modality (e.g., gauges, radiography); and
- Revision of the training and qualification requirements for radioactive materials inspectors and license reviewers to include a requirement for a specific level of knowledge on the safety culture policy statement and traits.

The NRC staff plans to evaluate the effectiveness of its outreach and education activities and consider whether any new activities are necessary and appropriate.

While different groups of licensees vary in their level of awareness and knowledge of the safety culture policy statement, feedback indicates that the policy statement is resonating with those entities involved in NRC-licensed activities as well as the Agreement States. Some licensees have described how they are incorporating safety culture into their programs; for example, they plan to post information and provide training. They are also sharing key messages from the policy statement and providing safety culture brochures and case studies to users of radioactive materials. During inspections, we are finding that licensees are aware of the policy statement.

The NRC has received support on the policy statement and outreach efforts from the Agreement States, who are using similar education and outreach methods. Various industries and professional associations have facilitated the outreach process by sharing information about the policy statement on their Web sites and in newsletters and offering training at industry conferences.

Information on safety culture can be found on the NRC Safety Culture Web site, http://www.nrc.gov/about-nrc/regulatory/enforcement/safety-culture.html.

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