U.S. Nuclear Regulatory Commission
Safety and Security - Policy and Oversight

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Abstract. The NRC recognizes that it is important for all organizations performing or overseeing regulated activities to establish and maintain a positive safety culture. The NRC's approach to safety culture is based on the premise that licensees bear the primary responsibility for safety. The NRC addresses safety and security through expectations detailed in policy statements, procedures and regulations, including the NRC's Safety Culture Policy Statement (SCPS), the Reactor Oversight Process (ROP), and the Allegation and Enforcement Programs.

The NRC's SCPS sets forth the Commission'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 SCPS is not a regulation. It applies 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.

Regulatory oversight of safety and security is conducted through the Reactor Oversight Process (ROP) which is the NRC's program for assessing the performance of operating commercial nuclear power reactors. In 2004, the NRC took steps within the ROP to strengthen the agency's ability to detect potential safety culture weaknesses during inspections and performance assessments. In 2006, guidance and procedures for inspecting and assessing aspects of licensees' safety culture, which includes security, were included in the ROP. The ROP uses inputs from performance indicators and inspection findings to develop conclusions about a licensee's safety performance. Performance is evaluated systematically and on a continuous basis through planned inspections, and assessment meetings.

In addition to the ROP, the NRC's Allegation Program and Enforcement Program can address safety culture, if necessary, through the use of chilling effect letters (CELs) and, in certain cases where there is a violation of NRC regulations with a nexus to safety culture, can issue confirmatory orders (COs). The NRC generally issues a CO as part of the enforcement Alternative Dispute Resolution (ADR) Program. These programs and actions are applicable to all NRC licensees, applicants and vendors, and can be used to address safety culture issues, if appropriate, based on safety and security concerns.

Key Words: safety culture, security, oversight, policy statement

1. Introduction

The NRC addresses safety and security for NRC licensees, applicants and vendors through policies, programs, and regulations, including the Safety Culture Policy Statement (SCPS), the Reactor Oversight Process (ROP), and the Allegation and Enforcement programs. This paper discusses how the SCPS addresses both safety and security, and how safety and security performance is assessed through the ROP for operating power reactors, and through the Allegation and Enforcement programs for material users and vendors, as well as operating power reactors. Finally, this paper includes illustrative examples of security/safeguards inspection findings tagged to ROP safety culture aspects, and security/safeguard findings resulting in Alternative Dispute

Resolution (ADR) and Confirmatory Orders (CO), which are part of the Allegation and Enforcement programs.

2. Safety Culture Policy Statement

2.1. Background

Following the terrorist attacks of September 11, 2001, the Commission issued orders enhancing security at facilities whose operations, if attacked, could impact public health and safety. During the early years of implementation of these security enhancements, several violations of the Commission's security requirements were identified in which the licensees' failure to cultivate a positive safety culture impacted the effectiveness of the licensees' security program. The most visible of these violations involved inattentive (sleeping) security officers in a "ready room" while on shift at a nuclear power plant. Most of the weaknesses in the licensees' security programs involved inadequate management oversight of security, lack of a questioning attitude within the security organization, complacency, barriers to raising concerns about security issues, and inadequate training of security personnel.

2.2. Commission Direction

In February 2008, the Commission issued Staff Requirements Memorandum (SRM)-COMGBJ-08-0001, "Staff Requirements—COMGBJ-08-001—A Commission Policy Statement on Safety Culture," dated February 25, 2008, Agencywide Documents Access and Management System (ADAMS) Accession No. ML080560476), directing the NRC staff to expand the Commission's policy on safety culture to address the unique aspects of security and to ensure the resulting policy is applicable to all licensees and certificate holders [1]. The Commission directed the staff to answer several questions, including whether publishing the NRC's expectations for safety culture and security culture would be better accomplished in one safety/security culture statement or in two separate statements while still considering the safety and security interfaces.

In response to Commission direction, the NRC staff reviewed domestic and international documents related to safety culture and considered NRC lessons learned. Additionally, the staff sought insights and feedback from external stakeholders. This was accomplished by providing information in a variety of forums, such as stakeholder organization meetings, newsletters, and teleconferences, and by publishing questions developed to address Commission direction in Volume 74 of the *Federal Register* (FR), page 6433 (74 FR 6433, February 9, 2009), "Safety Culture Policy Statement Development: Public Meeting and Request for Public Comments" (ADAMS Accession No. ML090260709) [2]. Mindful of the increased attention to the important role of security, the staff also sought input from participants at a workshop, conducted in February 2009 (ADAMS Accession No. ML090930572) [3], on whether there should be a single safety culture policy statement or two policy statements addressing safety and security independently, while considering the safety and security interfaces. On May 18, 2009 (ADAMS Accession No. ML091130068), the NRC staff provided a single safety culture policy statement in draft for Commission approval [4]. The draft policy statement acknowledged the importance of safety and security, and the interface of both, within an overarching culture of safety. In SRM-SECY-09-0075

(ADAMS Accession No. ML092920099), the Commission directed the staff to encompass security within the statement [5]. The NRC issued its SCPS in the *Federal Register* on June 14, 2011 (74 FR 34773) [6].

The SCPS applies 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. Agreement States, Agreement State licensees and other organizations interested in nuclear safety are encouraged to support the development and maintenance of a positive safety culture, as articulated in the Statement of Policy.

2.3. Statement of Policy

The Statement of Policy sets forth the Commission'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 Commission agreed that an overarching safety culture addresses both safety and security and did not need to single out "security" in the definition. However, to ensure that security is appropriately encompassed within the Statement of Policy, the staff added a preamble to the traits and retained the robust discussion of security, including the importance of considering the interface of safety and security that was included in the draft Statement of Policy, as follows:

> Organizations should ensure that personnel in the safety and security sectors have an appreciation for the importance of each, emphasizing the need for integration and balance to achieve both safety and security in their activities. Safety and security activities are closely intertwined. While many safety and security activities complement each other, there may be instances in which safety and security interests create competing goals. It is important that consideration of these activities be integrated so as not to diminish or adversely affect either; thus, mechanisms should be established to identify and resolve these differences. A safety culture that accomplishes this would include all nuclear safety and security issues associated with NRC regulated activities.
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> Experience 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 this Statement of Policy.

3. Reactor Oversight Process

The ROP is the NRC's program to inspect, measure, and assess the safety and security performance of operating commercial nuclear power plants and to respond to any decline in their performance.

3.1. Regulatory Framework

The NRC's regulatory framework for reactor oversight is a risk-informed, tiered approach to ensuring plant safety. The framework has three key strategic performance areas: reactor safety, radiation safety, and safeguards. Each strategic performance area contains seven cornerstones that reflect the essential safety aspects of facility operation. Within this framework, the NRC's ROP provides a means to collect information about licensee performance, assess the information for its safety significance, and provide for appropriate licensee and NRC response [7].

3.2. Strategic Performance Areas and Cornerstones of Safe Operation

The ROP is anchored in the NRC's mission to ensure public health and safety in the operation of commercial power plants. The objective is to monitor performance in three broad strategic areas: 1) reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), 2) radiation safety for both plant workers and the public during routine operations, and 3) protection of the plant against sabotage or other security threats. To measure plant performance, the oversight program focuses on seven specific "cornerstones," which support the safety of plant operations in the three broad strategic areas. These cornerstones are: Initiating Events; Mitigating Systems; Barrier Integrity; Emergency Preparedness; Public Radiation; Occupational Radiation; and Security.

3.3. Cross-Cutting Areas

In addition to the cornerstones, the ROP features three "cross-cutting" areas, so named because they affect, and are therefore part of, each of the cornerstones: 1) *Human Performance* - This element monitors the licensee's decision-making process, availability and adequacy of resources to ensure nuclear safety, coordination of work activities, and personnel work practices, 2) *Problem Identification and Resolution* - This element monitors the licensee's corrective action and operating experience programs, and the licensee's self and independent assessments, and 3) *Safety-Conscious Work Environment (SCWE)* - This element monitors an environment in which workers feel free to raise nuclear safety concerns without fear of harassment, intimidation, retaliation, or discrimination. The review and assessment of these cross-cutting elements have an important role in the ROP.

3.4. Overall Description

For each cornerstone, the NRC develops findings from inspections and licensees collect performance indicator data. The NRC evaluates inspection findings for safety significance using a significance determination process and compares performance indicators against prescribed risk-informed thresholds. The agency then assesses the resulting information and determines an appropriate response using the guidelines in an action matrix. Responses can include supplemental inspections for selected issues or enforcement actions on significant inspection findings. The NRC communicates the results of its performance assessment and its inspection plans and other planned actions in publicly available correspondence, on the NRC Web site, and through public meetings with each licensee [8].

3.5. Measuring and Inspecting Nuclear Plant Performance

The NRC measures nuclear plant performance by monitoring objective performance indicators and by conducting the NRC inspection program. Monitoring and inspection closely focus on those plant activities having the greatest impact on safety and overall risk. In addition, the NRC conducts both periodic and annual reviews of the effectiveness of each utility's programs to identify and correct problems. Performance indicators use objective data to monitor performance within each of the cornerstone areas. The utilities generate the data that make up the performance indicators and submit these data to the NRC quarterly. Each performance indicator is measured against established thresholds that are related to their effect on safety. While performance indicators can provide insights into plant performance in selected areas, the NRC's inspection program provides a greater depth and breadth of information for monitoring and assessing plant performance. The inspection program is designed to verify the accuracy of performance indicator information and to assess performance that is not directly measured by the performance indicator data.

3.6. Using Performance Indicators

Evaluation of Performance Indicator Data

Each plant operator reports performance indicators to the NRC quarterly. Following compilation and review by NRC staff, the NRC posts performance indicators on the NRC Web site. The NRC staff evaluates performance indicator data and integrates the data with inspection findings to develop an assessment of licensee performance. Each performance indicator is measured against the criteria using a color-coded system for safety performance: *Green* indicates performance within an expected performance level, where the associated cornerstone objectives are met; *White* represents performance outside an expected range of nominal utility performance, but related cornerstone objectives are still being met; *Yellow* indicates related cornerstone objectives are being met, but with a minimal reduction in the safety margin; and *Red* signals a significant reduction in safety margin in the area measured by the performance indicator.

The NRC staff evaluates and integrates the performance indicator data with findings of the NRC inspection program to provide a broad assessment of the plant's safety performance. The staff uses the significance determination process to determine the safety or security significance of inspection findings. This process provides an initial screening to identify those inspection findings that do not result in a significant increase in plant risk (a "green" finding): *Green* indicates a finding of very low safety or security significance; *White* indicates a finding of low to moderate safety or security significance; *Yellow* indicates a finding of substantial safety or security significance; and *Red* indicates a finding of high safety or security significance.

Security Cornerstone Performance Indicators

Nuclear plant operators report performance indicators quarterly. The NRC staff reviews and posts the results on the NRC's Web site. The security performance indicators are not publicly available.

The security cornerstone is an important component of the ROP, which includes various security inspection activities the NRC uses to verify licensee compliance with Commission regulations and

thus ensure public health and safety. In SRM-SECY-04-0191, "Staff Requirements—SECY-04-0191—Withholding Sensitive Unclassified Information Concerning Nuclear Power Reactors from Public Disclosure," dated November 9, 2004 (ADAMS Accession No. ML043140175), the Commission determined that specific information related to findings and performance indicators associated with the security cornerstone will not be publicly available to ensure that security-related information is not provided to a possible adversary [9]. Security inspection report cover letters are available on the NRC Web site; however, the Web site will does not display security-related information on the details of inspection finding(s).

3.7. Graded Approach/Safety Culture

As noted above, the NRC evaluates the performance of nuclear power reactor licensees on an ongoing basis via performance indicators and regular inspection activities. The NRC uses the action matrix to designate a licensee's level of oversight based on its overall performance. Licensees in column 1 of the action matrix are subject to the NRC's baseline inspection program. If declines in performance are noted based on performance indicators or the result of inspection activities, then a licensee may move to columns 2, 3, or 4. For column 2, the NRC considers safety culture as part of Inspection Procedure 95001, "Supplemental Inspection for One or Two White Inputs in a Strategic Performance Area," dated August 24, 2016, (ADAMS Accession No. ML15223B348) [10], which includes assessing the licensee's root cause evaluation for the performance deficiency to verify that it appropriately considered how culture may have contributed to the deficiency. For column 3, the NRC considers safety culture as part of Inspection Procedure 95002, "Supplemental Inspection for One Degraded Cornerstone or Any Three White Inputs in a Strategic Performance Area," dated February 9, 2011, (ADAMS Accession No. ML102020532) [11], which includes NRC staff conducting an independent root cause evaluation and may include a request for the licensee to conduct an independent assessment. For column 4, the NRC considers safety culture as a part of Inspection Procedure 95003, "Supplemental Inspection for Repetitive Degraded Cornerstones, Multiple Degraded Cornerstones, Multiple Yellow Inputs or One Red Input," dated December 18, 2015, (ADAMS Accession No. ML15188A400) [12] which includes NRC staff requesting an independent safety culture assessment and performing its own assessment of safety culture.

As licensees move to different columns in the action matrix, oversight increases. Cross-cutting aspects (CCAs) are assigned to NRC inspection findings when performance deficiencies have potential cross-cutting causal factors. The NRC assigns a cross-cutting issue (CCI) through its assessment process when a cross-cutting theme exists and the NRC has concerns about progress in addressing the issue. Although the presence of CCAs or the assignment of a CCI may indicate a potentially degraded safety culture, the NRC draws conclusions about safety culture based on the results of licensee and NRC safety culture assessments conducted by qualified staff, not based on the presence of CCAs or CCIs.

3.8. Inspection Programs

The NRC oversight program uses a variety of NRC inspectors who monitor plant activities. The program includes baseline inspections common to all nuclear plants. The baseline inspection program, based on the cornerstone areas, focuses on activities and systems that are "risk

significant" (in other words, those activities and systems that have a potential to trigger an accident can mitigate the effects of an accident or can increase the consequences of a possible accident). The inspection program also reviews the CCIs of human performance, the safety-conscious work environment, and problem identification and resolution (how the utilities find and fix problems). The NRC will perform inspections beyond the baseline at plants with performance below established thresholds, as assessed through information gained from performance indicators and NRC inspections. The NRC may also perform additional inspections in response to a specific event or problem that may arise at a plant.

The NRC uses qualified safety culture assessors to conduct safety culture assessments when a plant is in column 2 or 3 of the action matrix. These assessors are qualified under Inspection Manual Chapter 1245, "Qualification Program for New and Operating Reactor Programs," Appendix C12, "Safety Culture Assessor Training and Qualification Journal," dated February 1, 2016 (ADAMS Accession No. ML16020A397) [13].

Examples of Security/Safeguards Inspection Findings Tagged to ROP Safety Culture Aspects

NUREG-2165, "Safety Culture Common Language," issued March 2014 (ADAMS Accession No. ML14083A200) [14], and NRC Inspection Manual Chapter 0310, "Aspects within the Cross-Cutting Areas," dated December 4, 2014 (ADAMS Accession No. ML14337A018) [15], describe the cross-cutting areas and CCAs and provide examples with reference to the safety culture traits, attributes and examples. The following are four examples of safety culture "tags" that are tied to inspection findings within the ROP and are ultimately trended and analyzed to determine when a licensee has a cross-cutting theme in an area that would result in a CCI. Each example references the "area" and "aspect" from Inspection Manual Chapter 0310, as well as the Trait, Attribute and Example from NUREG-2165.

(1) In the cross-cutting area of Human Performance (H), and in the Procedure Adherence aspect (H.8), the following is an example of an inspection finding:

Human Performance H—Procedure Adherence H.8: Licensee failed to ensure that personnel followed procedures regarding control of safeguards material. Supporting Example (Safety Culture Trait with applicable Attribute and specific Example number from Attribute behavior examples in NUREG-2165): Work Processes, WP—Procedure Adherence, WP.4. Example 1 under WP.4 —Individuals follow procedures.

(2) In the cross-cutting area of Human Performance (H), and in the Resources aspect (H.1), the following is an example of an inspection finding:

Human Performance H—Resources H.1: The licensee failed to implement a testing program to ensure that security systems were capable of performing their intended functions. The licensee failed to maintain accurate procedures for testing the intrusion detection system by failing to incorporate a test method for a specific threat tactic. Supporting Example (Safety Culture Trait with applicable Attribute and specific Example number from Attribute behavior examples in NUREG-2165): Leadership Safety Values and Actions, LA—Resources, LA.1. Example 4 under

LA.1—Leaders ensure tools, equipment, procedures, and other resource materials are available to support successful work performance, including risk management tools and emergency equipment.

(3) In the cross-cutting area of Human Performance (H), and in the Avoid Complacency aspect (H.12), the following is an example of an inspection finding:

Human Performance, H—Avoid Complacency, H.1: An employee who alarmed a walk-through metal detector was not challenged by security staff until inspectors raised the issue. Licensee staff failed to recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes. Supporting Example (Safety Culture Trait with applicable Attribute and specific Example number from Attribute behavior examples in NUREG-2165): Questioning Attitude, QA—Avoid Complacency, QA.4. Example 3 under QA.4—Individual contributors perform a thorough review of the work site and planned activity every time work is performed rather than relying on past successes and assumed conditions.

4. Allegation and Enforcement Programs

In addition to the ROP, the NRC's Allegation Program and Enforcement Program can address safety culture, if necessary, through the use of chilling effect letters (CELs) and, in certain cases where there is a violation of NRC regulations with a nexus to safety culture, can issue COs. The NRC generally issues a CO as part of the enforcement ADR Program. These programs and actions are applicable to all NRC licensees, applicants and vendors, and can be used to address safety culture issues, if appropriate, based on safety and security concerns.

The NRC issues CELs when it has concluded that the work environment is "chilled" (i.e., workers perceive that the licensee is suppressing or discouraging the raising of safety concerns or is not addressing such concerns when they are raised). A CEL is a public way for the NRC to communicate with the licensee, the public, and the licensee's employees. The intent of such action is, in part, to prompt the licensee to act to mitigate the chilling effect that the discriminatory act or other event has caused. Through the identification of cross-cutting issues, safety culture assessments in supplemental inspections, or findings of discrimination or chilling effect, the NRC typically documents the concerns publicly, and the licensee responds to the concerns with planned corrective actions. The NRC's Allegation Program includes guidance on the agency's SCWE policy and issuance of CELs and is available on the NRC's Web site [16].

The NRC may also use its ADR Program [17, 18] to resolve discrimination and wrongdoing cases or other specific cases subject to enforcement action through mediation rather than through the NRC's traditional enforcement processes [19]. Enforcement ADR is available to licensees (including contractors and employees) and the NRC for resolving wrongdoing or discrimination cases in which the NRC has concluded that enforcement may be warranted. Enforcement ADR is also available for escalated non-willful (traditional) enforcement cases with the potential for civil penalties (not including violations associated with findings assessed through the ROP). Through the ADR process, the NRC and the licensee agree upon and document the licensee's planned actions, which then typically become the basis for a CO and often includes safety culture as an element, if warranted.

Example of Security Inspection Findings, with Safety Culture Elements, resulting in ADRs and COs

(1) An NRC investigation determined that a security manager at the commercial nuclear power plant willfully failed to follow the security plan procedures when he assigned a security supervisor to assume a security post without verifying the supervisor's qualifications. Further, a security supervisor willfully failed to follow security plan procedures when he assumed the security post without verifying qualifications.

The licensee requested ADR, and the NRC and licensee ultimately agreed to a CO. Elements of the CO pertaining to safety culture included: 1) Verification of Training Credentials for Both Staff and Management, and 2) Strengthen Safety Culture, which included the SCPS traits of Leadership Safety Values, & Actions, Problem Identification & Resolution, Personal Accountability, Work Processes, Environment for Raising Concerns, and Questioning Attitude.

5. Conclusion

The NRC considers both safety and security as part of the SCPS; therefore, a separate policy statement for security culture is not necessary. The NRC's ROP addresses both safety and security and any inspection findings are tagged with a safety culture aspect, where appropriate. Safety culture issues, which include security concerns, can also be addressed through the NRC's Allegation and Enforcement programs with ADR and a CO.

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