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A Realist Ethnography of Nuclear Security Officer Culture

A dissertation submitted

by
Douglas J. Evans

to
Benedictine University

in partial fulfillment of
the requirements for the
degree of

Doctor of Philosophy
in
Organization Development

This dissertation has been
accepted for the faculty of
Benedictine University.

James D. Ludema, PhD Chair	March 31, 2014
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Peter F. Sorensen, PhD Committee member	March 31, 2014

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Abstract

This realist ethnography describes the heretofore unexamined culture of commercial nuclear power security officers over a one-year period from an active participant observer's perspective. Data include field notes taken during observations at various sites and 15 interviews with security leaders working at or who had recently worked at 12 different commercial nuclear power plants and had previously worked at a dozen other commercial nuclear power plants, thus representing a broad overview of the commercial nuclear security culture. The data also include more than 58 unclassified documents from these sites, industry organizations, and regulatory agencies. An analysis of the data reveals 16 key themes that are characteristic of the nuclear security officer culture.

The study describes how, although safety and security are of paramount concern at a commercial nuclear plant, the cultures of security workers and safety workers differ significantly. Not only is the nuclear security officer culture different from that of the safety culture at the same plant, but it often conflicts with it in its attitudes, goals, procedures, supervision, and job satisfaction. The commercial nuclear security officer culture is unique in many ways, including the isolation of security officers—institutionally, physically, and socially—from the other plant workers; their working conditions and benefits; their need to work oftentimes long, boring, unpredictable shifts and carry heavy equipment to remote sites; and their responsibility to respond immediately and, if necessary, with deadly force, even putting their lives on the line.

Supplementing the data analysis, and in keeping with a realistic ethnography, are a series of vignettes describing the typical day in a nuclear security officer's life.

The study also points out differences between the commercial nuclear security culture and that of the private non-nuclear security cultures. The study concludes with recommendations for improving the commercial nuclear security officer culture and for future research into a culture we know little about but whose members are invested with one of the greatest responsibilities in our country—protecting us from potential acts of terrorism perpetrated on nuclear plants and the resultant exposure to the effects of nuclear waste, which can last for generations.

Keywords: *nuclear, security, culture, safety, supervision, parapolice, paramilitary*

Dedication

This work is dedicated to my wife of more than 30 years, Carol. Together we have shared so much.

Acknowledgments

I want to thank Cohort 7 at Benedictine University, especially Joe Hamilton, Ph.D., who provided me much needed encouragement.

My son Andrew's administrative assistance was invaluable.

I would also like to thank the many nuclear security professionals who spent their valuable time sharing their commercial nuclear security experiences with me.

Also, my thanks go out to Christine Peterson, Ph.D., for her help and advice.

And last, but not least, I would like to thank my dissertation committee and especially W. Daniel Nilsson, Ph.D., who provided much needed guidance on how best to present the vast amount of information that resulted from this research project and, together with his wife, Beth A. Nilsson, Ph.D., gave me inspiration to complete my study.

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Chapter 1: Introduction

This chapter provides an overview of this research study. It describes the background of the commercial nuclear security industry located in the United States (U.S.), states the research purpose, discusses the significance of the research, describes the researcher's experience, and summarizes the methodology. A list and definitions of key terms used frequently throughout this paper appear at the end of this chapter so that the reader can easily refer to them.

Overview

The commercial nuclear security officer's job was transformed as a result of the U.S. response to the September 11, 2001 terrorist attacks on the World Trade Center in New York and at the Pentagon in Washington DC. For example, the numbers of officers that comprise the security forces at these commercial nuclear power plants have significantly increased (NRC, 2008) and thus nuclear security has emerged as one of the largest departments at each commercial nuclear power plant. Commercial nuclear power plant security has transformed into a highly armed and highly trained paramilitary force with the authority to arrest and the authority to use deadly force (NEI, 2001). Additionally, since 2004 each of the 64 commercial nuclear power plant sites in the U.S. has invested upward of $75 million in security infrastructure upgrades (NEI, 2013a).

The security officer's mission to protect the health and safety of the public by defending against radiological sabotage will last longer than the 40-year life of their respective power plants (NEI, 2012c). It will last as long as there is concentrated nuclear material that can be used for radiological sabotage, which for the highly radioactive materials such as used nuclear fuel, will be for hundreds of generations of security officers and for thousands of years (NRC, 2007). These unstudied, armed, highly compensated, and paramilitary nuclear security officers are largely invisible to the public because of the veil of secrecy under which they work. All of these factors highlight the importance of studying the nuclear security officer culture.

Statement of the Problem

Despite the importance of these officers, the culture within which they work has not been studied. Recently, however, their role in protecting the health and safety of the public has been elevated, their numbers have significantly increased, and there is a growing awareness of their importance in protecting nuclear waste for many generations. These factors highlight the need for studying the human side of the commercial nuclear security officer culture since these officers are empowered to use deadly force in protecting our security and safety. Knowing more about this culture—what characterizes it and how it can be influenced, managed, and improved—should be of concern to not only scholars, but also those involved in nuclear security and those affected by it, which means every one of us.

Purpose

The purpose of this research was to answer the question, "What is the culture of the commercial nuclear security officer?" Or, to phrase the question a bit differently, "What is the culture in which the U.S. commercial nuclear security officer lives?" The research reported herein takes the form of a realist ethnography.

Significance of the Study

Scholars

This study is significant to scholars because it is the first time that the culture of a unique group of paramilitary security officers has been examined, and in doing so, this research adds commercial nuclear security officer culture to increasingly growing body of research on organizational culture. In addition, the study compares two cultures: that of the *commercial* nuclear security officer and that of the larger *private* security officer cultures that have been identified in previous studies, thereby investigating whether these cultures share common occupational traits.

In examining how espoused beliefs and values are interpreted and reflected by the commercial nuclear security officers in the field, this study has implications for those who make and regulate policies and procedures in both the commercial and private power industries.

Practitioners in Nuclear Security

Practitioners in the commercial nuclear power industry and U.S. government nuclear facilities can gain from this study in that it highlights the differences between the

commercial nuclear *security* culture and the commercial nuclear *safety* culture. It also provides useful insights into the best practices of how the commercial nuclear security industry is attempting to manage these differences in culture.

Practitioners in Other Private Security Organizations

Practitioners in private security organizations can also gain from this study in that it identifies the differences between a paramilitary security organization and a parapolice organization, and it illuminates some of the management controls that might be useful to the management of security officers in other industries.

Summary of Methodology

As a scholar practitioner, I collected information through my own active participation and observation of security officers in the field, examination of appropriate nuclear security related artifacts, analysis of important nuclear security related documents, and interviews of appropriate key commercial nuclear security leaders.

Researcher Background

As a practitioner for the last 30 years, I have had experience with both Department of Defense and commercial nuclear power plants. My involvement in nuclear power started in 1982 when I entered the U.S. Navy Nuclear Power Program with bachelor's degree in engineering from Purdue University. In 1995, following multiple supervisory and senior management positions in both sea and shore navy nuclear power related assignments, I left the active duty military and entered the field of commercial nuclear power, where I held various mid-level and senior management positions in engineering, maintenance, chemistry, and operations. In 2005 I was

provided the opportunity to be a senior leader in a nuclear security organization. My new assignment was as the security operations manager for a 12-site nuclear fleet with nuclear power plants in Illinois, Pennsylvania, and New Jersey. As manager, I was responsible for helping the sites with improving their human performance and industrial safety, developing common solutions to regulatory and security functional issues, performing oversight functions at the facilities, and promulgating common governance through uniform procedures and policies.

It took just a short while to recognize that nuclear security was different from any other organization that I had been a part of, and seeing these differences spurred a parallel study of organization development and a detailed examination of the nuclear security officer culture. This immersion into the nuclear security culture began during the period of time—the first decade of the twenty-first century—when the industry was going through profound change, namely when commercial nuclear power sites were building security infrastructure and hiring for the post 9/11/2001 attack on the World Trade Center in New York and the Pentagon in Washington, DC.

After about three years in this corporate role managing several private sites, I accepted an assignment as the site security manager for a commercial nuclear power plant, which afforded a more intimate and in-depth look at how nuclear security fits into the overall organization of a commercial nuclear power plant site and the day-to-day life of the nuclear security officer. I held this position for about two years.

I was then hired as the security manager for a troubled nuclear power plant at another company. Human performance and industrial safety were significantly weaker than what I had seen in the fleet operation, and the site was operating with significant safety challenges to its work environment. We went through major organizational changes, including reorganization, downsizing, and layoffs, all the while improving safety consciousness within the work environment, improving human performance, and improving the security department's industrial safety record.

My participation in the field during this study was at times as a spectator or passive observer and at times as an active participant as a senior security manager. As a scholar and practitioner in the field of commercial nuclear security, I am uniquely positioned to perform participant observation of the group and have a high level of trust with a significant number of key commercial nuclear security actors. I also have been immersed in the day-to-day lives of the commercial nuclear security officers for about five years.

Overview of the Dissertation

In order to best present the information, this dissertation is divided into seven chapters. As previously discussed, chapter 1 provides an overview of the study.

Chapter 2 provides a summary of the key points drawn from the research literature that best pertain to the culture of the commercial nuclear security officer. These sources include background information on culture, high reliability organizations,

private security officer culture, nuclear culture, commercial nuclear power safety culture, nuclear security culture, and the topic of power. There are also key points provided on how to obtain the business outcomes of productivity, profitability, retention, and customer satisfaction and some culture-influencing methods to sustain a high performing organization.

Chapter 3 explains the design and methodology used for this realist ethnography, including the selection of subjects and the conduct of the informed-consent interviews, and the selection of the locations for the field observations of key social situations. It also describes what data were obtained from the interviews, field observations, and key artifacts and documents, and the security and confidentiality of the subjects, institutions, and data.

Chapter 4 provides a realist ethnography description of the culture in which the commercial nuclear security officer works. The chapter consists of two sections. The first is a timeline of a typical 15-hour door-to-door shift-work workday. The second section is a series of vignettes that describe the six security post types that the commercial nuclear security officers are most often assigned to during a typical workday and the key social interactions that take place at these posts.

Chapter 5 describes the 16 key themes that emerged as a result of the data analysis described in chapter 3 and how these themes affect the commercial nuclear security officer's culture. These key themes include frictions between the subculture of

commercial nuclear security and the commercial nuclear power culture. There are also positive themes.

Chapter 6 provides an analysis of the information provided in chapters 4 and 5. It discusses the importance of this study's key findings and their relationship to the literature, including the relationship of the commercial nuclear security officer culture to that of the private security officer culture, and evidence of how commercial nuclear security organizations are seeking to achieve the highest performing cultures possible.

Chapter 7 describes what obstacles may have affected this research, how I attempted to mitigate these obstacles, and what directions for future research this study suggests.

Definition of Terms

This section lists and defines key terms used frequently throughout this paper so that the reader can easily refer to them.

Artifacts. The surface level at which culture can be studied is the artifact level, which includes all phenomena that one can see, hear, and feel when one encounters a new group with an unfamiliar culture. Artifacts include visible products of the group, such as documents and written procedures, language, clothing, manners of address, emotional displays, published lists of values, and observable rituals. Artifacts are easy to observe but difficult to decipher (Schein, 2004).

Attentiveness aids. Attentiveness aids are authorized electronics such as computers, radios and IPODs and reading materials such as books or magazines that are used by

a security officer to reduce the chance that the boredom of the job will result in the officer falling asleep.

Basic underlying assumptions. Basic underlying assumptions are at the deepest level of culture and are shared by the group but are often taken for granted (Schein, 2004).

Behavior. Behavior is an observable manner of behaving or acting.

Belief. A belief is an opinion or conviction based on confidence in the truth or the existence of something not immediately susceptible to rigorous proof.

BRE. A BRE is a bullet resistant enclosure, which is a type of security post normally occupied by one officer. A similar term is hardened defensive position (HDP).

CFR. The Code of Federal Regulations (CFR) is the codification of U.S. general and permanent rules and regulations. CFR Title 10 (energy), Part 73, contains a majority of the commercial nuclear power plant security requirements imposed by the NRC (GPO, 2013).

Culture. Culture is a pattern of shared basic assumptions that are learned by a group as it solves its problems. When a group's external adaptation and internal integration work well enough to be considered valid, these assumptions are taught to new members as the correct way to perceive, think, and feel in relation to those problems. To understand a group's culture, one must attempt to get at its shared basic assumptions and one must understand the learning process by which such assumptions came to be (Schein, 2004).

Espoused beliefs and values. The middle level at which culture can be studied is espoused beliefs and values, including those beliefs and values concerning what ought to be, as distinct from what is (Schein, 2004).

HDP. An HDP is a hardened defensive position, a type of security post normally occupied by one officer. A similar term is bullet resistant enclosure (BRE).

IAEA. The International Atomic Energy Agency (IAEA) is an international organization that promotes the peaceful use of nuclear energy as well as nuclear security standards and their implementation (IAEA, 2013).

Information power. Information power refers to the control of information. It involves both the access to vital information and the control over its distribution to others (Yukl, 2010).

INPO. The Institute of Nuclear Power Operations (INPO) is an organization that sets performance objectives, criteria, and guidelines industry wide for nuclear power plant *operations*. Its goals are to promote operational excellence and improve the sharing of operational experience among nuclear power plants, which does not include *security*. The INPO is funded entirely by the U.S. nuclear industry (INPO, 2013).

NEI. The Nuclear Energy Institute (NEI) is a lobbying organization whose objectives include ensuring the formation of policies that promote the beneficial uses of nuclear energy and technologies in the U.S. and around the world. These policies include commercial nuclear security policies (NEI, 2013).

NRC. The U.S. Nuclear Regulatory Commission (NRC) is a U.S. governmental organization that regulates commercial nuclear power plants (NRC, 2013a) and other nuclear organizations.

Outcome power. Outcome power is the ability to bring about outcomes (Dowding, 1996).

Permissibleness. Permissibleness refers to the difficulty or ease with which permission to conduct research may be granted. There are three types of permission levels for granting research access (Spradley, 1980):

> **Free-entry** research can be done without seeking permission.
>
> **Limited entry** permission must be obtained from one or more people prior to conducting the research.
>
> **Restricted entry** has a high probability that permission to conduct research will be extremely difficult or impossible to obtain.

Because of my role as a scholar practitioner, I was able to obtain permission that most people would find impossible to obtain, including permission to enter restricted entry areas.

Post. A post is a position or station to which a person, such as a security officer, is assigned for duty.

Proprietary security. Proprietary security refers to a security organization that is owned and managed by the nuclear power plant company rather than a *contract* security organization that performs security services for the nuclear power plant through a security contract.

Protected area. The protected area is an area of the commercial nuclear power plant encompassed by physical barriers and to which access is controlled by the commercial nuclear security officer.

Search train. A search train is a series of machines such as x-ray, bomb detector and metal detector that people pass through to be screened for prohibited items and contraband prior to entering a nuclear power plant. The search train is similar to that which one experiences when being searched in an airport.

SIFT meeting. A Security Improvement Focus Team (SIFT) is a meeting where officers meet to identify, prioritize and work on resolving security officers concerns.

Skip meeting. A skip meeting is a meeting held between the security manager and a small group of security officers to discuss security officers' concerns. Supervision and other management are not present at this meeting, that is, these levels of supervision or other management are skipped.

Social power. Social power is the power to deliberately change the incentive structure of another actor to bring about or help bring about outcomes (Dowding, 1996).

Social situation. A social situation requires actors, activities, and a place (Spradley, 1980).

Theme. A theme is a distinct, recurring, and unifying idea that is drawn from one or more of the data sources of participant observation, field observation, artifact review, document review, or semi-structured interviews.

Value. A value is the moral principle and belief or accepted standard of a person or a social group.

Vignette. A short literary essay or sketch.

Vital areas. Vital areas are special areas within the protected area where commercial nuclear security officers enforce additional access controls.

Chapter 2: Literature Review

This chapter provides a summary of the key points drawn from the research literature that best pertain to the culture of the commercial nuclear security officer. These literature sources include information on the current state of the commercial nuclear power industry and commercial nuclear security. This section also includes references on the topic of culture and power, and the macro-cultures under which the micro-culture of nuclear security resides.

Commercial Nuclear Security Background

Importance of Nuclear Power

Approximately 20 percent of the U.S. electrical power generation comes from nuclear power plants (EPA, 2012)**,** which makes the U.S. reliant upon the electricity these plants produce. Commercial nuclear power plants are a part of the U.S. critical infrastructure (DHS, 2012). Commercial nuclear power plants have been reported in the media as targets for terrorist activity (CNN, 2002). A commercial nuclear power plant, if attacked by terrorists, could result in the loss of billions of dollars of investment in the facility itself, cripple the U.S. economy due to the loss of electrical power generation, and risk the health and safety of the public through the toxic radiation that the population could be exposed to as a result of such an attack (NEI, 2013a). The cost of building a new nuclear power plant is in the billions of dollars and could take up to six years to build (Info.Net, 2012). Bickerstaffe and Pearce

(1980) note that nuclear power has a unique and broad range of societal concerns, including ". . . proliferation, terrorist abuse, routine health damage, the social perception of 'low probability-high damage' accidents, civil liberties and obligations to future generations. Nuclear power combines them all" (p. 320).

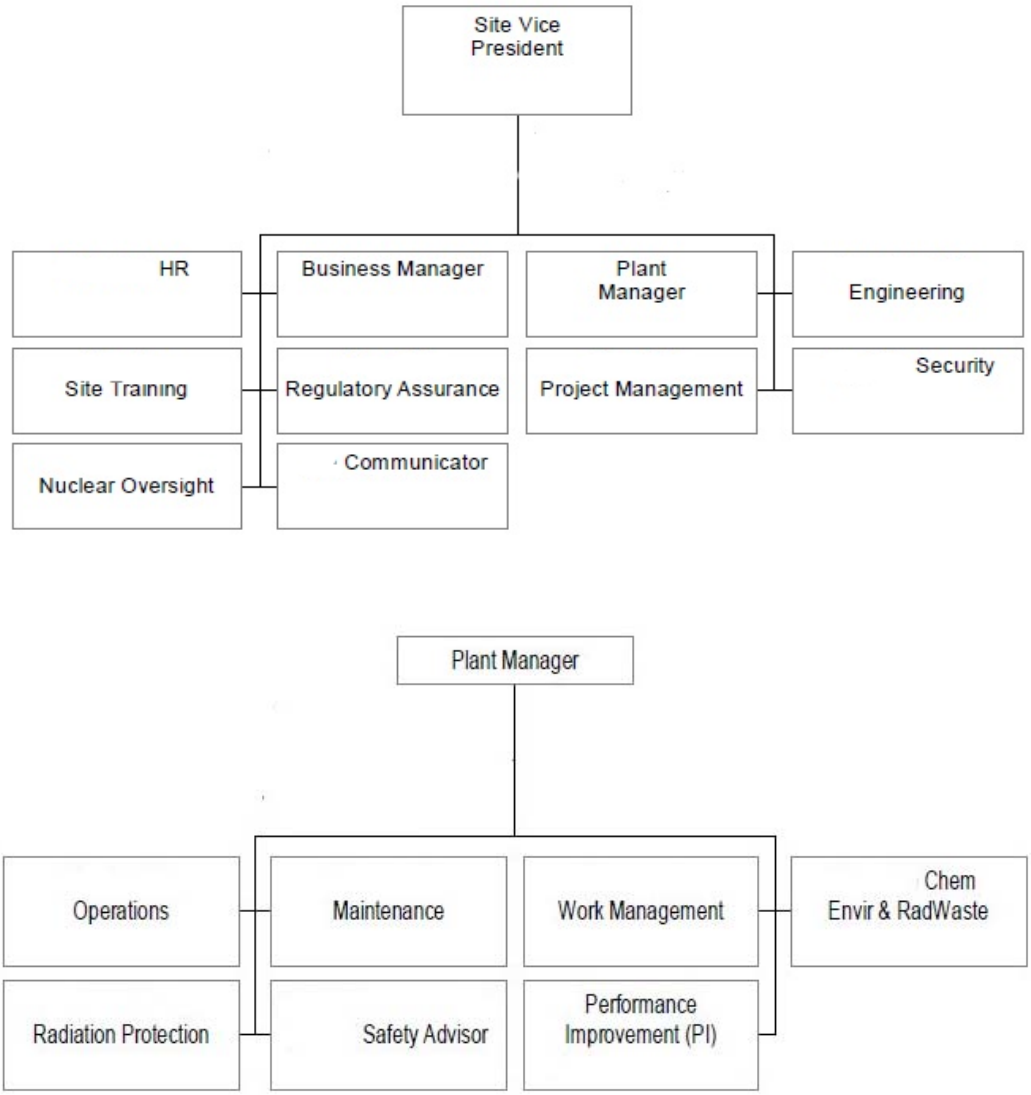
Because of the unique and broad range of concerns related to commercial nuclear power, it undergoes the highest level of government and public scrutiny.

Importance of Commercial Nuclear Security Officers

The mission of the commercial nuclear security officer is to protect the health and safety of the public against radiological sabotage (GPO, 2013). The two main sources of radioactive materials they protect are the fuel in the nuclear reactor and the spent nuclear fuel contained in the spent fuel pool or in dry cask storage, both of which are located primarily at the site of the nuclear reactor.

The nuclear security department is often the largest or one of the largest departments at a commercial nuclear power plant station. According to the Nuclear Energy Institute (NEI, 2012a), the nuclear energy industry has 8,000 paramilitary security officers at 65 sites, which is an average of 123 officers per site. *Power Magazine* (Peltier, 2010) states that the average number of workers per site is about 1,100. Using these two averages, commercial nuclear power security officers (which does not include supervisors, staff, and managers) comprise an average of about 11 percent of a site's population. With these others included (that is, supervisors, staff, and managers), the security personnel for an operating nuclear power plant site make up

about 15 percent of the site population. For the organizational structure of a typical commercial nuclear power plant of about 1100 workers and its average size of departments. Figure 1 provides a common organizational structure for a commercial nuclear power plant and depicts the myriad commercial nuclear power plant departments. The top part of the figure depicts the departments reporting directly to the site vice president, the senior executive on site. The security department is one of these departments. In the bottom half of the figure, the departments reporting directly to the plant manager are depicted. In this common organizational structure, the plant manager is the second most senior executive on site and is directly responsible for the field or line functions other than security.



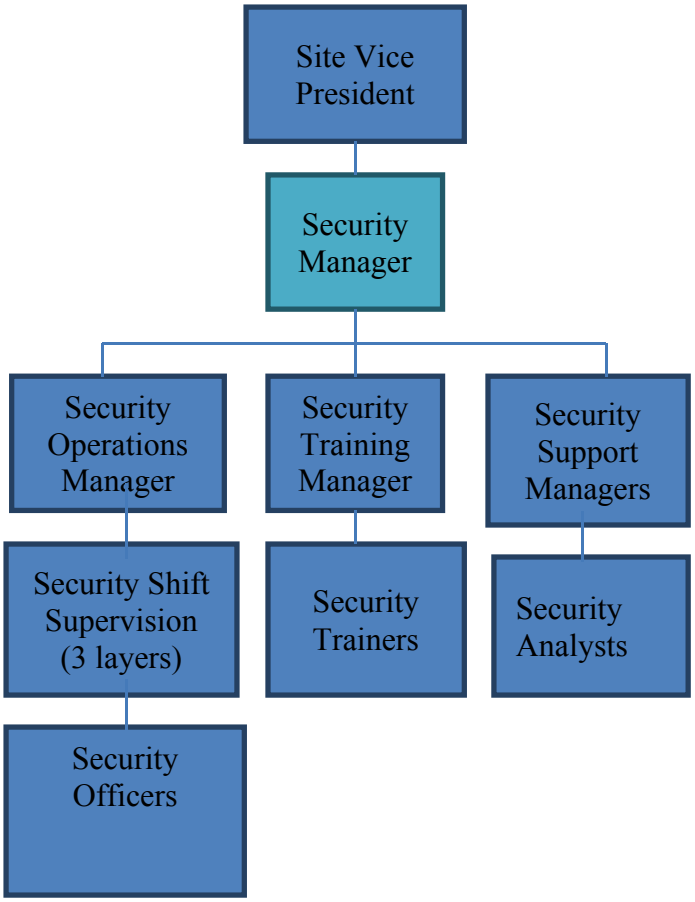
Approximate work force sizes:

Plant Manager >50% Engineering >15% Others >15%

Engineering >12% Security >15%

Figure 1. Organizational Structure of Typical Commercial Nuclear Power Plant

The organizational structure of a typical commercial nuclear security organization is depicted in Figure 2. The security director or manager often is a direct report to the site vice president, the senior executive at the commercial nuclear power plant. The security department is similar to the operations department in that it has a vast operations branch driven by a large number of 24-hour-per-day, 7-days-per-week shift workers. The security department organization is unique in that it has its own training branch.



Note: Only the physical security function of the security organization is depicted. Commercial nuclear power security organizations can also include other functions such as fire response, cyber security, access programs, and others.

Figure 2. Security Functions of a Typical Nuclear Power Plant of a Major Utility

Security Officer's Role

Many of the significant changes with commercial nuclear security took place in the fall of 2004 in response to security orders issues from the NRC. Others were completed in 2010 as a part of changes to the Code of Federal Regulations, Section 10, Part 73 (10CFR73) driven by the National Energy Policy Act of 2005 (EPA, 2005). These changes affect how commercial nuclear security officers guard both the

nuclear waste and the operating nuclear power plants. With the radioactive life of nuclear waste lasting possibly hundreds of years, the security officers are crucial to maintaining the site's security and safety.

Storage of Nuclear Fuel and Waste

Per the NEI (NEI, 2012b), used nuclear fuel in storage is distributed throughout the U.S. as depicted in Figure 3.

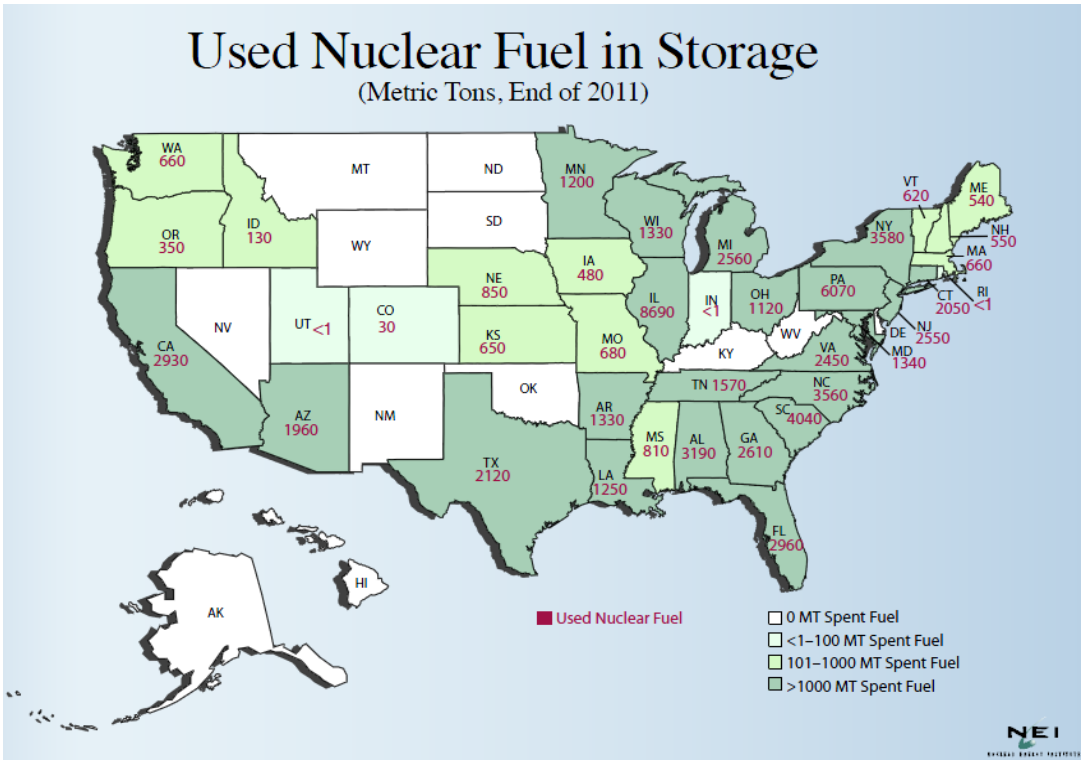


Figure 3. Used Nuclear Fuel in Storage

Low-level radioactive waste consists of items that have come in contact with radioactive materials, such as gloves, personal protective clothing, tools, water purification filters and resins, plant hardware, and wastes from reactor cooling-water

cleanup systems. It generally has levels of radioactivity that decay to background radioactivity levels in less than 500 years. About 95 percent decays to background levels within 100 years or less (NEI, 2012c).

High-level radioactive waste is uranium fuel that has been used in a nuclear power reactor and is "spent" or is no longer efficient in generating power to the reactor to produce electricity. Spent fuel is thermally hot as well as being highly radioactive, requiring remote handling and shielding. Radioactive isotopes will eventually decay, or disintegrate, to harmless materials. However, while they are decaying, they emit radiation. Some isotopes decay in hours or even minutes, but others decay very slowly. Since the only way radioactive wastes finally become harmless is through decay, which for some isotopes contained in high-level wastes can take hundreds of thousands of years, the wastes must be stored in a way that provides adequate protection for a very long time (NRC, 2007).

Culture

Schein (2004) defines *culture* as a pattern of shared basic assumptions that were learned by a group as it solved its problems of external adaptation and internal integration that has worked well enough to be considered valid and, therefore, is taught to new members as the correct way to perceive, think, and feel in relation to those problems. Culture can be examined from three different levels: artifacts, espoused beliefs and values, and basic underlying assumptions.

Artifacts

Artifacts include visible portions of the organization, including the organizational structure, policies and procedures, newsletters, written communications, improvement plans, standard meeting agendas, vision statement, mission statement, and process documents, and the language recorded in the interviews conducted as a part of this study. The same artifact may have different relevance depending upon the specific culture being examined. For example, computer laptops found on a security post are primarily used as attentiveness aids, whereas computer laptops found in a business office are used primarily for more mainstream business purposes such as generating reports.

Espoused Beliefs

Espoused beliefs include the group's strategies and goals, philosophies, and slogans. According to Schein, this second level of culture also cannot adequately describe the culture of the group because there are cases in which people will say what they want to do but, when given the opportunity to act, will behave differently than what the espoused belief might require of the individual. Espoused beliefs come in the form of policy statements, department policies and procedures, and posters visible to the officers. The common espoused beliefs in the commercial nuclear security industry include the best practices documents that are generated by the NEI, the Code of Federal Regulations sections that pertain to commercial nuclear security, and the nuclear safety culture traits promulgated by the INPO.

Basic Underlying Assumptions

Basic underlying assumptions are described as being at the heart of a group's culture, and the other two layers of culture, artifacts and espoused beliefs, cannot be completely understood without understanding these basic underlying assumptions. However, discovering them is exceptionally challenging because although the assumptions are often obvious to the group, they are not easily discovered by an outsider. One way of discovering them is to monitor what new persons to the group are taught. Nevertheless, some underlying assumptions are not revealed to new members until they are accepted by the group.

Macro-culture Overlap

The commercial nuclear security culture contains cultural elements from other strong macro-cultures. Although these cultures are discussed in later sections of this study, they are depicted in Figure 4. This graphic representation suggests how these cultures overlap with one another. For example, the commercial nuclear security culture should share some elements of culture with the private security culture, and is a sub-culture most aligned with the commercial nuclear power plant safety culture.

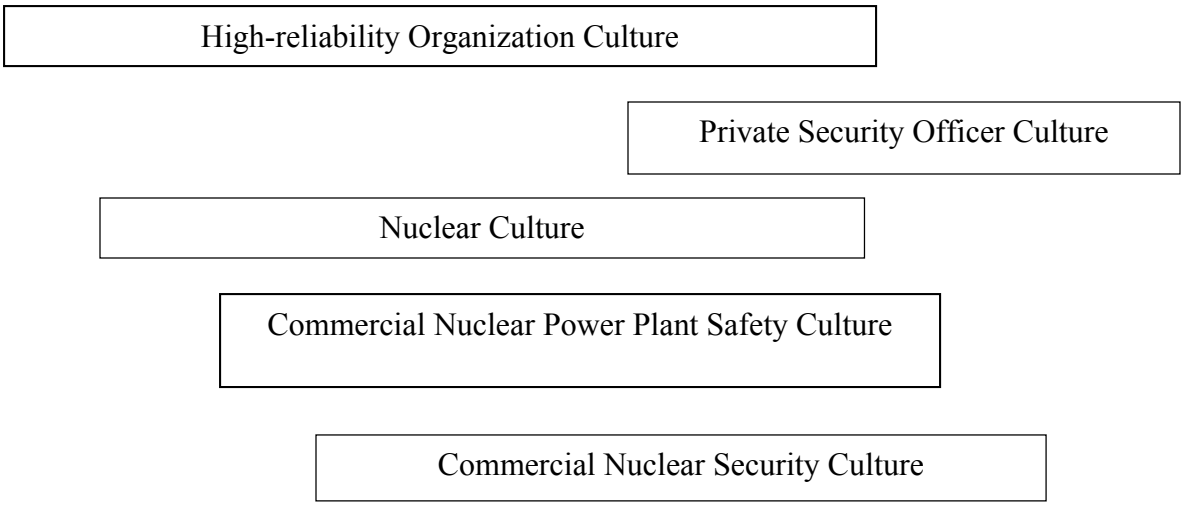


Figure 4. Overlap of Traits in Different Safety and Security Cultures

High-reliability Organization Culture

As shown in Figure 4, the commercial nuclear power security culture is a subculture of the larger culture of high reliability organizations (HROs). In part, HROs are complex organizations with a low tolerance for failure (Weick & Sutcliffe, 2007). These types of organizations are characterized by the following behaviors:

- They track small failures. That is, they are preoccupied with failure. They treat any lapse as a symptom that something may be wrong.
- They resist oversimplification. Superficial similarities between the present and the past may mask deeper differences that could prove fatal. (The devil is in the details.)

- They remain sensitive to operations. The organization has good situational awareness and is attentive to the front line workers, who are performing the work for the organization.
- They maintain a commitment for resilience. This type of organization keeps errors minimal, can recover from errors quickly, and has an above average capability of learning as an organization.
- They have deference to expertise. Decision-making is pushed down and out to people with the highest expertise rather than to the person with the highest rank.

Since the authors use commercial nuclear power as an example organization in their high-reliability organization studies, one can expect that the subculture of nuclear security officers that are a part of the larger station organization would exhibit many or most of the behaviors of a high-reliability organization.

Private Security Officer Culture

Commercial nuclear security is a subset of the larger private security occupation and as such, should share some of the cultural traits of the private security occupational culture. Although police culture has been widely studied, security officer culture is largely unstudied (Button, 2007), and in the unique case of commercial nuclear security officers, there are no existing studies.

Private security officer culture was examined by Button (2007) in his case study of two sites located in the United Kingdom. His conclusions include the following cultural observations:

- Many security officers desire to be something else or to be somewhere else. The structural factors that influence this trait often are the working environment and poor status of the security officers.
- The officers' moans and bravado stem from poor working conditions that seem to be the norm since they are endemic to the industry as a whole.
- The officer culture exhibits traits of solidarity, isolation, and inferiority, driven by structural factors including danger, fear, isolation, and perceived low status of the job.
- The officer trait of machismo is driven by a male working-class culture, combined with the officers' occupational role of surveillance.
- The officers exhibit traits of suspicion and risk-based minds, which are driven by their training and occupational role.

This study of private security officers identifies attributes of the private security officer culture for security officers that were engaged in private policing in the United Kingdom. The similarity of these traits with those described in chapters 4 and 5 of this dissertation suggests that there are common occupational culture traits for private security officers of which commercial nuclear security officers are a subset, and that these traits are not unique to officers in only the U.S. Finding common cultural traits

broadens the potential direct applicability of this study to other nuclear and non-nuclear private security officer groups.

A study by Rigakos (2002), conducted at a large private security firm in Canada, also touched on private security culture. Some key elements of private security culture that he found include the following:

- The officers resist the apparatuses of control.
- They have a "wannabe" orientation from dependent uncertainty and status frustration.
- The officers' bravado and caution stem from conditions of dependent uncertainty, status frustration, and a fear of being swarmed by angry mobs.
- The officers engage in constant risk taking and/ or risk aversion, resulting in a strong occupational ethic of interdependence in the face of immediate or impending dangers.
- A heavy reliance upon fellow officers is present and as a result the officers internalize subcultural norms relating to emergency response and risky incidents. This results in frustration, isolation, and unceasing emotional anxiety.
- The officers have an unbridled distain for the officer surveillance monitoring system and for the officers who overproduce.
- The officers think there is some sneaking about by management, and they deem it to be devious and to show distrust.

- The officers think there is a double standard between management and officers with regard to punishments for poor performance.
- Although officers accept management oversight, they are concerned that it may sometimes be arbitrary.
- Officers feel isolated and think that they get little respect from the public or the police.
- Officers feel akin to the French Foreign Legion insofar as they feel a need to look only to one another for support.

The Rigakos study identifies cultural traits of private security officers from a security organization in Canada. The traits are often similar to the cultural traits of the commercial nuclear security officer that are identified in chapters 4 and 5 of this dissertation, suggesting that there are common occupational culture traits for private security officers. But too, the sometimes different job functions of these Canadian security officers result in different job pressures, such as the risk of being swarmed by angry mobs, which are sometimes quite different from that of the commercial nuclear security officer. Thus, although this study supports the idea that there are common occupational cultural traits for private security officers, there are unique differences, too, because of the differences in the work performed by these different work groups.

A study of the private security sector primarily in the United Kingdom by Gill and Howell (2012) contained several conclusions with relevance to the security officer culture:

- Over two-fifths of the people surveyed from the broad security industry conceded that security was a "grudge purchase," meaning that clients resented purchasing the services.
- Proprietary security was consistently preferred to contract security for quality, but more respondents thought that contract security offered better value.
- The status of security in organizations was viewed as lower than some other functions, including procurement and facilities management.
- When the suppliers were asked why people left contract security work in their area of security, they mentioned three crucial reasons: poor pay, limited opportunities for development, and a feeling among staff that they weren't appreciated.
- Security officers felt their efforts went unrecognized and unappreciated by both management and the wider public.

This study provides further cultural insights for private security primarily in the United Kingdom, although many of the security companies that were surveyed have an international presence. The study also provides insights on how other, non-security people perceive security, including the theme that security is a "grudge" purchase—meaning that managers often resented purchasing security services. With the exception of poor pay, these cultural traits coincide with those of the commercial nuclear security officer culture, as identified in chapters 4 and 5 of this dissertation, thus providing further credence to the idea of common occupational private security

cultural traits and, by extension, applicability of this dissertation's findings to a broader industry than that of the limited commercial nuclear security industry.

Nuclear Culture

Nuclear culture has been described in many studies. Loeb (1982) discusses de-sensitivity to nuclear issues at the Hanford reactor sites. Cameron and Lavine (2006) discuss the nuclear culture and cleanup of the Rocky Flats nuclear weapons plant. Jungk (1976) discusses the events following the Three Mile Island disaster. The navy nuclear culture from which the post Three Mile Island commercial nuclear security culture was influenced is discussed by Bierly III and Spender (1995). Rees (1994) highlights the change in regulation in the civilian nuclear power industry as a result of the Three Mile Island accident. Misumi, Wilpert, and Miller (1999) focus on developing an effective nuclear safety culture.

Nuclear power affects the average citizen because of the extremely high investment, production, and maintenance costs of the facilities. Jungk (1979) observed that although the plants have limited lives (on the order of 50 years), the waste they produce may last for many thousands of years and be hazardous to all human life. Because of the high costs and long-term effects of nuclear energy, the organizations who support commercial nuclear policy are represented by a very powerful pro-nuclear lobbying contingent. With our national discourse regarding nuclear power being as highly charged and polarized as it is, any perceived negatives from this study could be met with sharp criticism.

While the general public still regards nuclear power with some skepticism and fear, this attitude seems to be changing even as those in the industry seem to have become inured to the dangers. For example, a study of the Hanford Nuclear Reservation (Loeb, 1982) found that people working with radioactive materials gradually become desensitized to the hazards of the technology with which they are working. However, the result is not just potential errors and environmental contamination. More significantly, people learn to live with the hazards they have created, hazards that the average population would not tolerate. Even having security officers guard hazardous waste near their hometowns, rather than transporting it to a remote and centrally guarded facility, does not seem to bother many people anymore. Also, a significant number of people have a personal stake to ensure that nuclear power succeeds because many states have many nuclear power plants and other nuclear-related infrastructures, such as laboratories, training facilities, colleges, and regulatory agencies that employ a significant portion of the state population in the nuclear-related industries.

Taken as a group, these authors describe the nuclear culture, of which commercial nuclear power and commercial nuclear security are both a part. They also help to highlight the need for the study of commercial nuclear security officers. Not only do they provide the context for the limitations of the present study and how the study might be perceived by some interested parties or stakeholders, but the authors also help to illuminate whom the stakeholders might be, such as the regulators, industry

lobbying groups, anti-nuclear power groups, and neighbors of the commercial nuclear power plants.

Commercial Nuclear Power Safety Culture

The Institute of Nuclear Power Operations (INPO) was created as an industry self-regulatory organization as a result of the accident at Three Mile Island. Originally it was staffed primarily with retired navy nuclear trained officers who had their roots in the navy nuclear power program. The INPO initially emphasized that commercial or civilian nuclear power plants needed to adopt the nuclear navy's principles, which emphasized excellence, as opposed to the principles of the commercial nuclear power plant, which tended to emphasize power production. This power production culture originated from the commercial fossil power plant companies and the employees who built and operated the first commercial nuclear power plants (INPO, 2012; Rees, 1994).

The INPO has promulgated the espoused beliefs and values for the commercial nuclear industry in the form of traits and attributes for the commercial nuclear power safety culture. Because these traits and attributes are integrated into the daily nuclear power plant operations and are monitored by the INPO and the NRC, they are expected to be observed also in the nuclear security officer culture. As noted by the INPO (2012), the traits, when they are embraced, will be reflected in the values, assumptions, behaviors, beliefs, and norms of an organization and its members.

The INPO also identifies that, ideally, the traits will describe what it is like to work at a nuclear facility and how things are done there. For the commercial nuclear power industry, nuclear safety remains the overriding priority and although the same traits apply to radiological safety, industrial safety, security, and environmental safety, nuclear safety is the first value adopted at a nuclear station and it is never abandoned. See Appendix A for an abbreviated listing of the INPO safety culture traits.

NRC Safety and Security Culture

The Nuclear Regulatory Commission 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. The NRC also has promulgated a safety culture policy statement (NRC, 2012), which states that organizations should ensure that personnel in the safety and security sectors have an appreciation for the importance of both, emphasizing the need for their 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 therefore important that consideration of these activities be integrated so as not to diminish or adversely affect either.

IAEA Nuclear Security Culture

The U.S. is a member of the International Atomic Energy Agency (IAEA). This organization has published the espoused beliefs and values of the nuclear security culture (IAEA, 2008). In the view of the IAEA, a nuclear security culture is the assembly of characteristics, attitudes, and behaviors of individuals, organizations, and institutions that serves as a means to support and enhance nuclear security. It further defines *nuclear security* as the prevention and detecting of, and response to, theft, sabotage, unauthorized access, illegal transfer, or other malicious acts involving nuclear or other radioactive substances of their associated facilities. The IAEA goes on to describe the differences between a nuclear security and a nuclear safety culture.

The nuclear safety culture and the nuclear security culture share the objective to limit the risk resulting from radioactive materials and associated facilities. They accomplish this goal by common principles, including a questioning attitude, rigorous and prudent approaches, procedure adherence, effective communication, and open, two-way communication.

Both cultures take into account the risk of inadvertent human error, but nuclear security also puts emphasis on deliberate and malicious acts. Because of this additional focus, it requires different attitudes and behaviors including confidentially of information and efforts to deter deliberate and malicious acts. By contrast, the nuclear safety culture emphasizes the need to share information openly because of the need for transparency and dialogue. Another difference is that the security culture

requires that individuals respond immediately to confirmed or perceived threats and restrict communication to authorized persons with a need to know. Additionally, in contrast with the key organizations in the safety culture (e.g., operations department), many organizations involved in the nuclear security culture have little technical knowledge about the nuclear facilities or the radioactive materials that are contained within them (IAEA, 2008).

The following figure (Figure 5) depicts the IAEA espoused beliefs and values of the nuclear security culture. Note that the nuclear security culture includes many other nuclear industries in addition to commercial nuclear security and that commercial nuclear security in the U.S. does not directly use this model. See Appendix B for an abbreviated listing of the IAEA nuclear security culture traits, which are also depicted in the following figure:

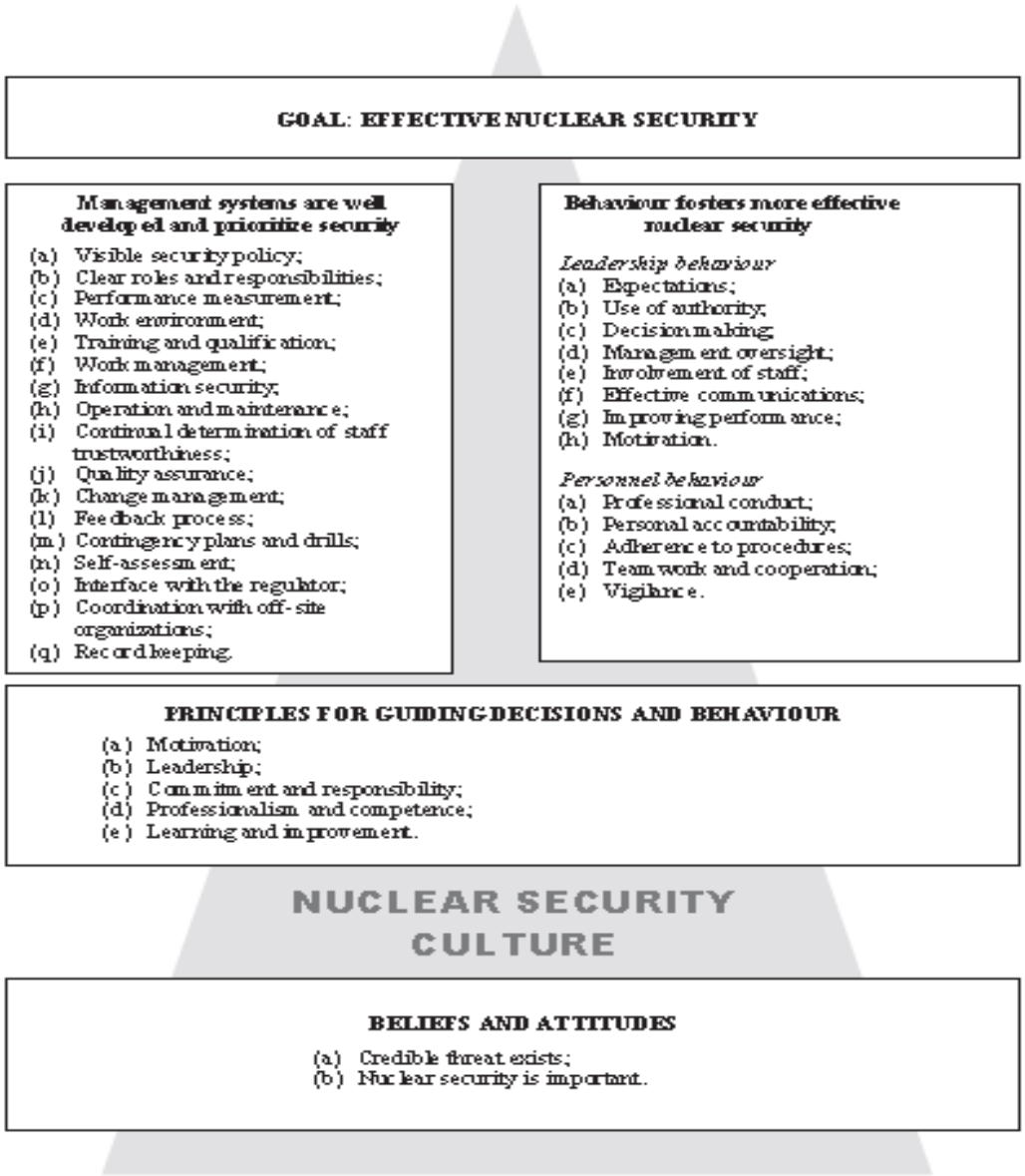


Figure 5. IAEA Nuclear Security Culture Traits

Commercial Nuclear Security Culture

Some common traits of the nuclear security culture can be found in all commercial nuclear power plants for three main reasons: a common set of regulations that are

enforced by the NRC; a common lobbying group, the NEI, which assists in developing common policies; and the adoption of the INPO nuclear safety traits by all commercial nuclear power plants.

Common Regulations Enforced by the NRC

The Code of Federal Regulations is the codification of U.S. general and permanent rules and regulations. CFR Title 10 (energy), Part 73, contains a majority of the commercial nuclear power plant security requirements imposed by the NRC. In these regulations is the design basis threat, the threat that all commercial nuclear power plants are regulated to defend against.

Per 10 CFR 73.1, the design basis threat is a determined violent external assault, attack by stealth, or deceptive actions, including diversionary actions, by an adversary force capable of operating in each of the following modes: a single group attacking through one entry point, multiple groups attacking through multiple entry points, a combination of one or more groups and one or more individuals attacking through multiple entry points, or individuals attacking through separate entry points, with the following attributes, assistance, and equipment:

1. Well-trained (including military training and skills) and dedicated individuals, willing to kill or be killed, with sufficient knowledge to identify specific equipment or locations necessary for a successful attack;

2. Active (e.g., facilitate entrance and exit, disable alarms and communications, participate in violent attack) or passive (e.g., provide information), or both, knowledgeable inside assistance;
3. Suitable weapons, including handheld automatic weapons, equipped with silencers and having effective long-range accuracy;
4. Hand-carried equipment, including incapacitating agents and explosives for use as tools of entry or for otherwise destroying reactor, facility, transporter, or container integrity or features of the safeguards system; and
5. Land and water vehicles, which could be used for transporting personnel and their hand-carried equipment to the proximity of vital areas; and
    a. An internal threat; and
    b. A land vehicle bomb assault, which may be coordinated with an external assault; and
    c. A waterborne vehicle bomb assault, which may be coordinated with an external assault; and
    d. A cyber-attack.

The nuclear regulatory commission ensures that each site can protect itself against such a threat in various ways, including running a triennial force-on-force mock attack against each nuclear power plant (NRC, 2013b).

Nuclear Energy Institute Common Policies and Guidance Documents

The NEI's objectives include ensuring the formation of policies that promote the beneficial uses of nuclear energy and technologies in the U.S. and around the world.

These policies include commercial nuclear security policies. One such security policy is the general security plan template that has been adopted by each of the commercial nuclear power plants, with some plant-specific differences. The policies also enable the sharing of security operating experience from station to station and good practices guidance documents for the industry to adopt.

Adoption of the INPO Nuclear Safety Culture Traits

All commercial nuclear power plants have voluntarily adopted the commercial nuclear power safety culture traits published by the INPO. (See Appendix A for an abbreviated listing of the INPO nuclear safety culture traits.)

Power

In rational choice theory, human individuals or groups can be modeled as actors who choose from a choice set of possible actions in order to try to achieve desired outcomes. An actor's incentive structure comprises the actor's beliefs about the costs associated with different actions in the choice set, and the likelihoods that different actions will lead to desired outcomes (Dowding, 1996).

This framework can be used to model a wide range of social interactions where actors have the ability to exert power over others, such as in the case of an armed and uniformed commercial nuclear security officer. For example, a powerful actor such as a security officer can take options away from another's choice set, can change the relative costs of actions, and can change the likelihood that a given action will lead to

a given outcome, or might simply change the other's beliefs about the incentive structure.

Outcome Power

Outcome power is the ability to bring about outcomes. To bring about an outcome, an officer might use coercion, threats, weapons, and other techniques to reach a desired outcome, such as removing an unruly person from the nuclear power plant. Because of his or her physical tools, including uniform, specially marked vehicle, official badge, and lethal and non-lethal weapons, they possess a level of outcome power that is higher and more obvious than those of other persons in the nuclear power plant. Commercial nuclear security officers have no police powers in that they cannot detain people for reasonable suspicion, but they can arrest people for probable cause. Per 10 CFR 73.1, nuclear security officers are trained to use deadly force as authorized by applicable state law.

Social Power

Social power is the power to deliberately change the incentive structure of another actor to bring about or help bring about outcomes. Social power is in silent employment by nuclear security officers who reside in the highly visible security towers. It also includes the fencing, walls, razor wire, and armed and unarmed security officers at the entry points who are conspicuous in their uniforms and who can be seen before entering the nuclear power plant. These highly visible structures and people act as a visual deterrent or a blazoned display of social power to prevent an attack on the commercial nuclear power plant.

Continuum of Force

The security officers are taught a "continuum of force." One artifact describes this continuum of force in the following order of escalation:

- Officer presence (uniformed presence, armed presence),
- Verbal force (choice of words, tone of voice),
- Intermediate force (pepper spray),
- Physical force (physical altercation),
- Armed force (weapon contact, presentation or taking aim), and
- Deadly force (causing death or great bodily harm).

This continuum of force provides insight into how the commercial nuclear security officer perceives both outcome and social powers.

Power Implementation Tools

Mopas and Stenning (2001) and Button (2007) describe categories of power implementation as "tools of the trade." For the commercial nuclear security officer, these tools of the trade include institutional tools, legal tools, physical tools, linguistic tools, knowledge tools, and personal tools, all of which are summarized for commercial nuclear security in this section. The commercial nuclear security officer's power is unique due to the different tools provided to this unique group of private security officers.

Institutional Tools

The private company that employs the commercial nuclear security officer empowers the officer with the authority to search people upon condition of entry and to take

action, including deadly force to prevent radiological sabotage. Site-wide signs and posters reflect the legitimacy of the security officer's power. Often the vehicles that the security officers drive and the uniforms that they wear contain the company's name and logo, which further legitimize the institutional power given to the security officers.

Legal Tools

Nuclear security officers are what Button (2007) would refer to as "semi-empowered security officers" in that they can exclude an individual's entrance to private property, remove an individual from private property, enforce conditions on private property, and search an individual on condition of entrance to private property. These legal tools are provided through state-specific legislation and through the Code of Federal Regulations, 10CFR 73. For example, in the state of California, California Penal Code, Code 197 identifies that homicide by any person is justified "when necessarily committed to apprehend any person for any felony committed." Code 12031 authorizes uniformed security guards to carry loaded firearms. In the California Civil Code, Code 847 provides that deadly force may be used when necessary to prevent certain enumerated felonies (such as mayhem, arson, exploding a bomb, or any felony in which the defendant uses a firearm). Code 50 provides that "any necessary force" may be used to protect from wrongful injury to one's (including a business) person or property. Commercial nuclear security does not routinely use the term "legal tools;" rather, it focuses on the more common military term of "rules of engagement" or ROE. Federal guidance for commercial nuclear power plants with regard to legal

tools is reflected in an NRC information notice (NRC, 1989) and states that the NRC considers use of deadly force justifiable in protecting nuclear power reactors against radiological sabotage if there is reasonable belief that an act of radiological sabotage will be perpetrated unless deadly force is used to prevent it. The notice lists the following situations and circumstances that could justify the use of deadly force when protecting nuclear power reactors:

- Defending against violent armed assault
- Defending against armed attack by stealth
- Defending against attackers employing explosives and/or incendiaries
- Defending against perceived armed attack

State laws vary in what they permit. In most states, civilian security forces are restricted in the weapons they can use and in their authority to detain and search intruders (NEI, 2001).

Physical Tools

Nuclear security officers are provided with tools that are unique to their job classification, most of which non-security employees are prohibited from possessing. They are also armed with a variety of weapons to defend against a design-basis threat. The weapons and ammunition may include the following (GPO, 2013):

Weapons

- Semiautomatic rifles
- 12-gauge shotguns

- Semiautomatic pistols or revolvers

Ammunition

- 18 rounds per handgun
- 100 rounds per semiautomatic rifle
- 12 rounds each per shotgun (00 gauge and slug)
- Ammunition available on site—two (2) times the amount for each weapon listed above

Equipment

- Helmet, combat
- Gas mask, full face
- Body armor (bullet-resistant vest)
- Flashlights and batteries
- Baton
- Handcuffs
- Ammunition/equipment belt
- Binoculars
- Night vision aids, e.g., hand-fired illumination flares or equivalent
- Tear gas or other nonlethal gas
- Duress alarms
- Two-way portable radios (walkie-talkie) two channels minimum: one operating and one emergency

- Uniform(s)

Linguistic Tools

Linguistic tools refer to the language used to obtain an outcome. In the case of the security officer, it is to obtain a security-related outcome. For example, the security officer might say, "Get down, stay down!" or "Stop or I'll shoot!" These phrases are referred to as *verbal force* in the continuum of force discussion in this study. These phrases, spoken by a uniformed and armed security officer, are much more likely to elicit the intended outcome than if spoken by another plant employee. Also, although there are no barriers to entry, security officers are the only group on site who most likely uses *10-codes*, codes that are intended to enable brief and standardized radio traffic. Many of the 10-codes are standard between local law enforcement agencies, such as 10-4, which means message received, but they are not standard across the U.S. Most plant employees do not know some of the common security 10-codes, such as 10-33, which often means "Emergency!"

Knowledge Tools

Knowledge tools refers to the knowledge of the outsiders and general employees about the legal authority of another group. For example, station employees know that security has the authority to use deadly force, but few know that security does not always have the right to arrest or to detain people. So if security were to ask the average person to do something (e.g., Stay in this room until the police get here.), the average person would comply even though they have no legal obligation to do so.

The security officers can use this knowledge to their advantage when interacting with suspicious people.

Personal Tools

Some of the security officers are massive, with heights exceeding 6 feet 4 inches and a weight of more than 300 pounds. A few of them have been professional fighters in the competitive ring and many are battled-hardened veterans. Even though hand-to-hand combat is not taught as a part of the nuclear security officer training program because the risk of physical confrontation is very low, many of the security officers have received extensive training of this sort before they became nuclear security officers. In contrast to their engineering peers at the station, the security officers tend to have high social skills and enjoy working with people; that is, many tend to have charisma. It is common to see an officer carrying the bearing of confidence, straight talk, physical fitness, and clean-cut appearance of his or her former military career, and these physical tools of bearing promote site-worker respect for the officer's outcome power.

Another way to examine the culture of the commercial nuclear security officer is to look at how the culture leads to better outcomes. Here, it may be helpful to look at how some of the research on business outcomes since these may be closely tied to commercial nuclear security organizations, which in effect are also businesses.

Productivity, Profitability, Retention, and Customer Satisfaction

In the book, *First, Break All The Rules* (Buckingham & Coffman, 1999), the authors describe a study based on a meta-analysis of performance data from over 2,500 business units and opinion data from over 105,000 employees. From this analysis, they concluded that six of the survey questions they asked had the strongest links to the business outcomes of productivity, profitability, retention, and customer satisfaction. These questions included the following:

1. Do I know what is expected of me at work?
2. Do I have the materials and equipment I need to do my work right?
3. Do I have the opportunity to do what I do best every day?
4. In the last seven days, have I received recognition or praise for good work?
5. Does my supervisor, or someone at work, seem to care about me as a person?
6. Is there someone at work who encourages my development?

Since these six questions have the strongest links to the previously mentioned business outcomes, one would expect to be able to find best-practice evidence of these areas of concern during the present study. Evidence of this linkage is discussed later in the results of this study.

Values as Expressed Through the Rewards System

Kerr and Slocum (2005) discuss how the reward system might be used to maintain, transmit, and influence culture. Reward systems are concerned with performance and rewards. In their context, rewards include bonuses, salary increases, promotions,

stock awards, and perquisites. The values and beliefs of an organization can be reflected in what behaviors are rewarded. During this study, I collected information on how the rewards systems are used to promote desired behaviors of officers in a commercial nuclear security environment. Rewards are described in subsequent chapters.

Security-oriented Cultures and High-reliability Organizations

As previously noted, commercial nuclear security operates alongside other groups in the high-reliability organization of the commercial nuclear power plant. In her study of high-reliability organizations, Rousseau (1989) identified two types of cultures. One she identifies as *a satisfaction culture*, with the following norms:

- Achievement—Members set challenging but realistic goals, establish plans to reach these goals, and pursue them with enthusiasm.
- Self-actualization—Members value creativity, quality over quantity, and individual growth.
- Humanistic/ helpful—Members are expected to be supportive and constructive, participative, and open to influence in their dealings with one another.
- Affiliative—Members place a high priority on constructive interpersonal relationships and are friendly, open, and sensitive to the satisfaction of their workgroup.

The organizations characterized by their members as excellent or ideal took the form of satisfaction cultures.

In contrast, those organizations whose members experienced as less than ideal took the form of *security-oriented cultures*, which also happened to predominate the high-reliability organizations that she studied. The security-orientated culture is fearful, and it faces two kinds of fears. The first is task-based fear driven by a comprehension of the technology, and its risk and potential catastrophes. The second is sociopolitical-based fear, which is reflected in the members' beliefs regarding anticipated consequences of failure from the social and political entities of which they are a part. Members in a security-oriented culture have negative beliefs and attitudes concerning member satisfaction, a desire to stay in the organization, their perception of how well a person fits into the organization, and role clarity.

Ways to Influence Culture

The literature on organizational culture is replete with studies that have confirmed the methods of influencing culture already discussed, but some of these studies also identify additional ways that culture can be inculcated. This section touches briefly on three well-known scholars in this field and highlights the conclusions of their studies.

Yukl

Yukl (2000) identifies the following ways to influence organizational culture:

<u>Leadership Behavior</u>
Espoused values and visions

Role modeling and attention

Reactions to crises

Programs, Systems, Structure, and Cultural Forms
Design of management systems and programs

Criteria for rewards and personnel decisions

Design of structure and facilities

Symbols, rituals, ceremonies, and stories

Ford and Ford

Ford and Ford (1995) assert that change is a phenomenon that occurs within communication and that change is created, sustained, and managed in and by communication. They identify four types of communication or conversations that can facilitate change: initiative conversations, conversations for understanding, conversations for performance, and conversations for closure. Because of the continuous change nature of the high reliability organization, which is focused on understanding and resolving even the smallest failures, effective communication is key to ensuring that changes are effective.

Pasmore and Friedlander

Pasmore and Friedlander (1982) discuss the negative effects of hierarchy and the benefits of involving employees in organizational problem solving. The nuclear security officer organization is hierarchical because of a perceived need for command and control during a crisis. Because of this, in the present study, the data were

examined for evidence of processes that might mitigate the negative impact of the hierarchical organization.

All of these authors discuss how culture can be influenced. In the case of commercial nuclear security, because of the highly technical and high reliability organizations in which they exist, it was anticipated that many of these culture-influencing processes would be found to be embedded in the commercial nuclear security officer culture. Indeed, many of these processes or traits that are necessary in order to sustain key aspects of the culture were found to be reflected in this study's data and are discussed in chapter 6.

With this literature background providing a research context for this study, the next chapter discusses its design and methodology.

Chapter 3: Methodology

Although organizational culture has been a popular area of scholarly research in the last two decades, the unique culture of commercial nuclear security officers has not been studied. The purpose of this realist ethnography is to help fill this gap, not only because it adds to the body of research in organizational culture, but also because nuclear security officers are invested with the important powers and responsibility of protecting us from nuclear materials that will be with us for many generations to come.

Research Design

This research is presented in the form of a realist ethnography of the commercial nuclear security officer. According to Creswell (2007), an ethnography is a qualitative study that focuses on an entire cultural group of people who have been with each other so frequently that they have formed a shared pattern of behaviors, beliefs, and language. As a method, ethnography involves extended observations of the group through participant observation and interviews of group participants.

Realist Ethnography

The particular type of ethnography used for this study is realist ethnography because it provides an objective account of the studied population; it reports objectively on the information learned from the participants at a site; and it reports on what was observed or heard from the participants. The realist researcher also reports objective

data in a measured style, uncontaminated (as much as possible) by personal bias, political goals, and judgment. The research report provides the mundane details of everyday life among the people studied and provides the participants' views through closely edited quotations.

Ethnographic Method

The procedures for conducting an ethnography come from Creswell (2007) and Van Maanen (1988). Although Creswell notes that there is no single way to conduct research in ethnography, some basic steps are common to most ethnographic studies. An overview of the ethnographic method is in Appendix C. The following are the steps I followed in my particular study:

1. I determined that realist ethnography was the most appropriate type of ethnography of all the different types of ethnography for the information that I desired to present from the group participants.
2. I selected the participant group of commercial nuclear security officers in the U.S. I decided not to select the commercial nuclear security officers at only one station because I wanted to focus on the cultural issues common to the occupation rather than on the cultural traits specific to one region. The reason for using this focus was so that the study might be more useful to more scholars and practitioners than it would be if it examined only one region. Additionally, I wanted to discover linkages between the commercial nuclear security culture and the larger private security culture so that any common occupational culture traits could be discovered.

3. I conducted an analysis of the culture-sharing group by determining the social situations and actors most common to the group and by observing the actors in these key settings. I looked for what people do (behaviors), what they say (language), and the tension between what they do and what they should do.
4. Fieldwork was conducted at the site where the group lives and works. Field research data included participant observation, field observations, collection of unclassified artifacts and documents, and semi-structured, informed-consent interviews.
5. The fieldwork data were analyzed to create a description of the commercial nuclear security officer culture and resultant themes.

Results

The results chapter of this study (chapter 4) starts with a day in the life of a typical nuclear security officer and then, through a series of vignettes, explores the officers' posts, key social interaction places, and actors and activities. The next chapter (chapter 5) then provides a list of the main themes that emerged from the coding of the semi-structured interviews, participant observations, formal field observations, and artifact and document analyses that most affect the culture in which the nuclear security officer lives. Finally, the last chapters (chapters 6 and 7) conclude with a discussion of each of the key themes and the study's implications for researchers, practitioners, and regulators. The ethnography thus provides a holistic cultural portrait of the group based upon the views of the participants and interpretations of the researcher.

Research Strategy

Subjects

The experience levels, source cultures, and reasons for selections of the interviewees appear in Appendix D. Overall, a diverse population of volunteer interviewees was selected in order to obtain the broadest set of data possible so that the results would be applicable to commercial nuclear security in the U.S. as a whole, rather than to just one U.S. nuclear reactor site. The selections included primarily senior and key commercial nuclear security managers who have worked or are working at a variety of commercial nuclear power plants. The intent was to select the people who could best identify the basic underlying assumptions for commercial nuclear security culture because they see the tensions between how commercial nuclear power asks the officer to behave and how commercial nuclear security officers actually do behave. To reduce the potential for power-influenced conversation, none of the volunteers was from the population that was working with me or that was subordinate to me. Many of people interviewed had started out as commercial nuclear security officers and had been promoted through the ranks into their senior positions.

Type of Interviews

One-on-one, face-to-face, semi-structured interviews were used because this method provides the richest, fullest communication value and the ability to fully flesh out the interviewee's thoughts. This type of interview was found to be the most practical to net the most useful information. The interview questions (Appendix E) were developed based on the literature review and some pilot interviews. Further refinement of the questions was completed during the iterative interview process. All

interviewees provided informed consent. The interview protocol included information regarding the purpose of the study; a disclosure of confidentiality; a listing of the interviewee's rights during the study, including the right to participate or withdraw from the study; and the use to which the study would be put. The informed consent letter given to interviewees is included in Appendix F.

Method of Recording

A digital recorder was used for all of the 15 interviews and all recordings, which totaled more than 15 hours. They were transcribed in order to code the themes and sub-themes and optimize the ability to add the interviewee's own words into the realist ethnography through carefully selected quotations. The longest interview was nearly 3.5 hours; the shortest was 27 minutes, and the average interview was 60 minutes.

Location

The interviews took place during periods when managers congregate during industry events such as at conferences and meetings. Some of the interviews took place at or near my home. The institutional agreement precluded conducting interviews at the site where I had been authorized to conduct the field observations. Because the institutional agreement also precluded interviewing active employees of my current company, the interviews were conducted with volunteers from other companies and very recently retired security managers (i.e., less than a month).

Field Observations

Access

Due to access restrictions, only one site was selected for formal field observations. An institutional agreement was developed and approved with this institution, which requires that this site's identity be kept confidential. (See Appendix G for a redacted copy of the Institutional Agreement for Study letter used to obtain approval from the nuclear facility.) To augment this part of my research, in reporting my results I later on include some anecdotal information from my previous experience as a participant observer at a multitude of commercial nuclear power plants, but I do not identify any of these specific sites.

Determination of Security Officer Social Situations

For the field observation site, I first mapped out a typical day for a officer to determine the security social situation locations (Spradley, 1980), permissibleness, predominant key actors, activity frequency, and applicability of those activities to the majority of the officer population (see Appendix H). Based on these factors, locations at the site where field observations might best be conducted to net the most data were identified.

Selection and Performance of the Field Observations

Selection criteria for the field observations included an attempt to maximize simplicity, accessibility, unobtrusiveness, permissibleness, and frequently occurring activities (Spradley, 1980). The following field observation locations were selected, and it was at these locations where I conducted 10 hours of passive field observations, which produced about 36 pages of field notes:

Vehicle Access Control Point

Checkpoint where people enter the site by vehicle, also known as a vehicle access control point. This location is free entry to limited entry depending upon the duration of the observation. Any member of the general public can approach a vehicle access control point, but only authorized people can stay for an observation or be allowed access through it. Many nuclear power plant sites are configured in such a way that many or most of the plant employees must pass through a vehicle access control point that is guarded by security officers. This post is similar to the access facility post where people walk through on foot in that the security officer is the first site employee seen by most employees coming to work or people visiting the station. It was thought that this high-visibility job assignment, or post, would provide rich data.

Access Facility

The access point is where people enter the site on foot, also known as the access facility. This location is limited entry in that it is accessible to only site employees or authorized visitors. A majority of the site population works inside the fenced-in area of the nuclear power plant, called the protected area. In order to gain access to the protected area, employees and visitors must first pass through security in a fashion similar to the one people experience when going through security at an airport. Since security officers are the first employees whom the station employees see every day, I thought that this high-visibility job assignment, or post, might also provide rich data.

Shift Brief

The daily shift brief is limited entry and was selected for field observations because this is where all the officers collect for the only time during their workday. Each shift of officers (most of the site work schedules are for 12-hour shifts for commercial nuclear power plant security) gathers together in a briefing room. Some officers arrive early and can thus be observed talking unguardedly with other security officers. The brief takes about 20 minutes, during which time the briefing leader interacts with the officers to communicate, align, and motivate them for current and ongoing issues or activities. Field observation was conducted during the daily shift brief because this is the only time security officers come together as an entire group. Again, I thought that the data collection for this activity would be unique and valuable.

Roving Patrols

Roving patrols are security officer job assignments that include vehicle patrol and foot patrol. These positions are restricted entry. Some officers perform patrols of key security equipment, structures, and components to ensure that they are maintained secure. Some officers are assigned to vehicle patrols to observe and report items of concern, and some are assigned personnel or vehicle escort duties. These officers are highly mobile, which is very different from the sedentary officers in the remote and isolated posts. I speculated that a field observation of this type of post would provide different rich data from which the basic underlying assumptions of security culture could be identified.

Fixed Post

A fixed post is an isolated job assignment location. These areas are restricted entry. Most security officers spend a majority of their time alone in an isolated post. Since one of the security culture traits is vigilance, I thought that observing the fixed post—how officers maintain vigilance and pass their time—might be key to discovering some basic underlying assumptions of the commercial nuclear security officer culture.

Alarm Station/Command Post

Often supervisors are assigned to the alarm station/command posts, which are the restricted-entry posts that are in constant communication with all the officer posts in the field and, thus, they make a good selection for a field observation in order to net the greatest amount of culture-related data.

Additional Social Situations

The standard security department meeting schedule was reviewed and a total of 42 additional key social interaction situations that affect the security officers or security management were identified. I observed these social situations multiple times each, collecting pertinent artifacts and documents, which were later analyzed for cultural traits. In addition to the artifacts and documents, a total of 56 pages of analysis and an additional 73 pages of field notes were generated regarding these. The social situations included standard meetings and briefings, and key processes. Refer to Appendix I for a list of these additional social interactions.

Additional Security Officer Thoughts

I was an active participant as the manager for 10 different skip meetings in 2013 alone, where other layers of management and supervision were "skipped" and only the officers were present with me to discuss their concerns. I took advantage of these meetings, for the purposes of my research. On average, six officers participated in each meeting and the meetings took about one hour each. More than 20 pages of field notes were gathered from these meetings.

Field Notes

No digital recording was conducted during the field observations due to security restrictions. To the maximum extent possible, a laptop was used to rapidly record notes. For the other situations, hand-written field notes, compiled immediately after the field observation, were used.

Artifacts and Documents

Using the above activities, 58 unclassified artifacts and documents were gathered that I determined would be key to obtaining data that might best identify the underlying assumptions of the commercial nuclear security culture. Of these artifacts, several were physical objects, such as the security officer gold-colored badge and the security token coin. The rest were documents, such as newsletters, written communications, improvement plans, standard meeting agendas, vision statement, mission statement, and process documents, all of which totaled more than 1000 pages. A listing of these types of artifacts, along with a brief description of each, is contained in Appendix J.

Data Collection and Analysis

Data Collection

Data were collected from the interviews, field observations, artifacts, and document reviews.

Data Analysis

Data analysis was conducted through a two-step process, as described by Creswell and Clark (2007). Soon after the data were collected through the interviews or passive field observations, the data were transcribed and coded in ATLAS TI to identify the emergence of major categories within the data. After coding two interviews, I had a list of more than 200 codes in Atlas TI, which I re-reviewed and consolidated and redefined. At this point I also went back to my literature review and developed another several dozen codes, which also resulted in changes to the initial codes. These base codes were then reduced to themes. A second person, a code checker, was used to validate or adjust the themes and related categories. (See Appendix K for the directions to the code checker.)

Interview Questions

Questions for subsequent interviews were refined to address emerging themes. Buckingham and Coffman (1999) identified six questions that they found to be associated with the business outcomes of productivity, profitability, retention, and customer satisfaction. Evidence of best practices to address these questions were identified in the data and are included in the chapter 6 discussion of this study.

Ethnographic Structure and Validation

Structure

Based upon an analysis of the data described above, a realist ethnography was constructed in accordance with principles derived from the work of Creswell (2007) and Van Maanen (1988). The structure of the ethnography is primarily of a descriptive narrative following this general pattern:

- Description of the culture that was observed in the vignettes reported in Chapter 4.
- Analysis of the data from my perspective into the key themes reported in Chapter 5.
- Analysis of the data from the larger scholarly research perspective in the discussion of Chapter 6.

Validation

This realist ethnography was written to meet the validation criteria identified by Creswell (2007) in accordance with the following:

The clear identification of a culture-sharing group

In the case of this study, the culture sharing group is the commercial nuclear security officers in the United States.

The specification of cultural themes examined in light of this culture-sharing group

The cultural themes of this culture-sharing group that were identified in the data are provided in chapters 4 and 5. Chapter 4 focuses on the day-to-day life of security officers, while chapter 5 provides a detailed description of the 16 key themes.

A detailed description of the cultural group

A detailed description of the cultural group is described beginning in the chapter 4 timeline of a day in the life of a typical commercial nuclear security officer and is further detailed in the subsequent vignettes in the same chapter. These vignettes concern key posts where security officers typically assigned and the social situations that typically take place at these posts. Furthermore, the 16 key themes of this culture-sharing group are contained in chapter 5 and provide additional in-depth description.

The identification of themes that derive from an understanding of the cultural group

Chapter 5 provides an in-depth description of the key themes that were derived from an understanding of this cultural group. These key themes include frictions between the subculture of commercial nuclear security and the commercial nuclear power culture. There are also positive themes.

The identification of issues that arose in the field and that reflect the relationship between the researcher and the participants, the interpretive nature of reporting, and the sensitivity and reciprocity in the co-creating of the account

In the section on Mitigating the Obstacles in chapter 7, I describe my position as a leader and as an active participant while conducting the research, and I explain how my bias was mitigated.

An overall explanation of how the culture sharing group works

This overall explanation of how the culture-sharing group works appears in the discussions in chapter 6. It also identifies common occupational culture traits between the private security officer culture and the commercial nuclear security officer

culture. Best practices to maintain a high-performing nuclear security officer culture are also identified.

Data Security

All recorded interviews were transcribed by the researcher. All audio files, transcripts, and field notes are kept confidential in a password-protected computer by the researcher. The names and identities of all study participants and research sites will be kept anonymous in any hard-copy transcripts or field notes used by the researcher, in the dissertation itself, and any subsequent publications. For legal purposes, the raw data has been downloaded to a flash drive and will be maintained by my dissertation advisor, for secure double-locked storage and ultimate disposal after a period of seven years.

Chapter 4: A Day in the Life of a Nuclear Security Officer

This chapter provides, in the format of a realist ethnography, a description of the culture in which the commercial nuclear security officer works. The chapter consists of two sections. The first is a timeline of a typical workday so that the reader can gain a better understanding of the sequence and content of the vignettes that follow. The second section is a series of vignettes that describe the posts that the commercial nuclear security officers are most often assigned to during a typical workday and the social interactions that take place at these key posts.

Timeline of a Typical Workday

3:45 a.m. Officer Jones wakes up. His wife is still asleep. He showers quickly, dresses, eats a quick breakfast, retrieves his prepared lunch and dinner from the fridge and puts them in his backpack. His backpack is bulging with the meals and other items he wants to bring to work to carry with him throughout the day. With the college textbooks and other "attentiveness aids," his backpack often weighs more than 20 pounds. Attentiveness aids are authorized electronics and reading materials that are used by a security officer to reduce the chance that the boredom of the job will result in the officer falling asleep.

4:20 a.m. He drives his motorcycle to work, which takes about one hour.

5:20 a.m. Officer Jones parks in the non-designated area of the parking lot. The designated areas, which are closer to the plant, are for senior managers, the regulator, and corporate executives. By driving a motorcycle he gets to park closer to the plant than he would if he were driving a car. He walks on the black asphalt plant access road and sees some of the other shift-working officers who are also on their way to the shift brief ahead of him and headed to the building that contains the officers' locker room. He goes to his locker to retrieve his hard hat and other plant protective equipment and begins the walk to the access facility.

5:28 a.m. He enters the access facility, processes through the search train to be searched for prohibited items and contraband by the night shift officers. He stands in line for the armory, which opens at 5:30, the start of the payday. This is the first opportunity he has to talk with his fellow officers.

Commercial nuclear security officers are hourly employees and can make between $17 to more than $33 dollars per hour normal-time work rate depending on the site or company that employs them. When one considers an overtime rate of 15%, which pays at 150% of the normal-time work rate, commercial nuclear security officers in 2013 often made between $55k and $82k per year, and some have been known to have made more than $100k per year if his or her overtime burden was higher.

5:30 a.m. The armory door opens and small groups of officers are invited in under supervisory oversight to arm-up with pistols. The hard hats and backpacks are left outside of the armory.

5:32 a.m. Now armed with his pistol and ammunition, Officer Jones gathers his backpack and protective equipment and walks to the briefing room to wait for the shift brief to begin. It begins when the last armed officers arrive from the armory. When a security officer is fully laden with equipment and weapons, he or she is carrying 28 pounds, and this does not include their personal items carried in his or her backpack.

5:40 a.m. The shift brief begins on time and ends about 5:50. No managers talked today so the brief was short. Sometimes the security manager will come to the brief and make a presentation that can last an additional 15 minutes or more.

5:50 a.m. Officer Jones walks to his first job assignment, most often called a "post," and conducts turnover with the officer posted there from the night shift. He notices that the post stinks of breakfast sausage.

He changes posts every 2–4 hours to a new work assignment. This change of posts is called "post rotation." Today all of his post assignments are isolated and remote from the rest of the station workers. He is posted by himself and sees other officers only a

few minutes at a time when conducting turnover of his post to another officer. Sometimes, but not today, he is assigned foot or vehicle patrols, or vehicle or people escort duties, which provide a much higher amount of activity.

On post, he eats his lunch and supper that he brought from home in his backpack. Most posts have both a microwave and a small refrigerator. But few, if any, have water or any hygiene facilities such as sinks or toilets.

6:20 p.m. The night shift relief officer arrives for turnover. He's later than usual because a manager spoke at the shift brief. At most commercial nuclear security organizations, a 12-hour shift is common, but the 12 hours do not include turnover time.

6:25 p.m. Officer Jones arrives at the armory to disarm. There is no line so he's let right in. The payday ends when he is disarmed.

6:30 p.m. After exiting the access facility and stopping off at his locker to put away his hard hat and other protective equipment, he walks to his motorcycle to begin his trip home.

7:40 p.m. Officer Jones walks through the door at his home. Traffic on the way home is worse than coming to work. From door to door, his workday was more than

15 hours. He's tired because this is the third day in a row he's worked this schedule, but tomorrow is a day off. He's scheduled to work security for another company at the local racetrack for the day. The NRC work-hour requirements do not cover commuting time or second professions.

A *vignette* is defined as a short literary essay or sketch. What follows is a series of short vignettes that describe key places of security officer social interaction. Their purpose is to provide a more intimate view of security officer culture than what appears in the key themes discussed in chapter 5. Each of the locations—vehicle access control point, access facility shift brief, roving patrols, fixed post, and alarm stations—was carefully selected for its richness in social situation. A field observation was performed at each one of these sites in order to provide a detailed description.

Vehicle Access Control Point

Significance

The vehicle access control point is one of the few posts where more than one officer is posted at a time and where officers can converse with one another face-to-face. It is also called the checkpoint. Any member of the general public can approach a control point, but only authorized people can stay for an observation or be allowed access through it. Many nuclear power plant sites are configured in such a way that many or most of the plant employees must pass through one in their vehicle on their way to the nuclear power plant parking lots.

The social situations at this post are significant because it is one of the few places where the security officers are very visible to the station employees and where the station employees routinely interact directly with the security officers.

Description

The officers at the checkpoint are posted to ensure that only authorized vehicles, cargo, and people enter into controlled areas of a commercial nuclear power plant. They identify that people are authorized for entry by doing "face-to-badge comparisons." They search vehicles and cargo to keep contraband and prohibited items out of the controlled areas. They keep watch to ensure that no one tampers with the vehicle barriers, and they report suspicious activity. They do these activities during rain, snow, sleet, hail, wind, and extremely hot and cold temperatures. When the weather is extreme, people still need to have access to a nuclear power plant, even if it is just for emergency access to ensure the station's emergency response plan can be carried out. Many sites, but not all, have installed canopies where vehicles can drive under and stop to be searched out of the way of the hot sun or the vertical rain. But most do not have anything to mitigate the horizontal wind or rain.

This vehicle checkpoint has a small canopy and a fairly large "shack" in which the officers sit when there are no vehicles to process. Five people are present in this 8' x 8' shack, outfitted with bullet resistant windows, through which one can view the vehicle access control point search area. The uninitiated would call bullet resistant glass, bullet proof, but a security officer would scoff at this term, as nothing is ever

really bullet proof. No vehicles are waiting outside the shack in the vehicle search area to be searched. Two chairs are present and there are visible semi-automatic rifles, key tools for deadly force. A sliding door opens to the outdoors and another door opens to a toilet.

The officers' backpacks are strewn about on the floor. One of them has a pink ribbon tied around the backpack's handle located at the top of the pack, similar to the way one might flag one's luggage to be readily identified in an airport luggage carousel. One of the officers is a female. Four of them wear the black colored officer's uniform. All are wearing a holstered pistol. A supervisor is wearing color: a blue shirt with khaki trousers. Four are minorities (two are African American, one is Hispanic, one is Filipino), and one is white. Two of the officers are conducting a post turnover, while the supervisor is doing a "post check," a supervisory observation of the employees on post to ensure that all requirements are being met. The officers talk about their gear, asking each other what the other possesses in order to ensure each has what they are required to have, including weapons, ammunition, and protective equipment. They talk about the pace of the post. Traffic is dying down. Rush hour is over. The air in the post smells of strong, sweet, toilet disinfectant.

It Takes Three to Search

One officer in the shack who is standing behind the bullet resistant glass is clearly observing the search officer outside the shack while the search officer searches a vehicle. In another post, perched high above, and unseen from this location, another

security officer is also observing the search area. These observing officers are the search officers' back-ups. Thus it takes a minimum of three officers to search a vehicle. The other officers with me are talking about how exposed they feel while posted as search officers.

Some sites have redesigned their checkpoints to eliminate them altogether. Headcount and subsequent cost reduction were the main drivers, not officer protection. Senior NRC and utility security personnel point out conflicts such as these as being the difference between regulated security and real-world security. At some facilities only a few vehicles need to go through a vehicle checkpoint whereas at others, nearly all traffic has to go through a vehicle checkpoint. These differences are caused by terrain, topography and/ or prior design by the engineers who put the barriers in place. These differences between the regulatory requirements and real-world security are referred to by the NRC and security management as *regulatory security* versus *real world security*, and they recognize that the two are sometimes not the same.

Authority to Search

Drivers approaching the shack may notice a sign to the driver's right side of the vehicle that states that entry onto the private company property where the nuclear power plant is located is contingent upon the employee's or visitor's consent to have their vehicle, person, and personal effects be searched at any time. It also states that, "Firearms, explosives, incendiary devices, and other weapons are prohibited, except for authorized personnel. Possession of alcoholic beverages or unlawful drugs or drug

paraphernalia is similarly forbidden." A similar sign is located inside the access facility in front of the search train. The Code of Federal Regulations requires the searches.

Further up the road, beyond the shack, are additional signs that state that, "The willful unauthorized introduction of any dangerous weapon, explosive, or other dangerous instrument or material likely to produce substantial injury or damage to persons or property into or upon these premises is a Federal crime." The fences are marked with octagon shaped signs that state, "WARNING DO NOT ATTEMPT TO ENTER. This facility is Protected by an Armed Security Force. Trespassers Risk Serious Injury or Death. KEEP AWAY. Fence is Alarmed and Extremely Dangerous." In black silhouette behind the mixture of red, black, and white letters is the shape of a helmeted person holding an assault rifle.

Cost Pressures

Each security post staffed with one officer results in the hiring of almost five people when you consider the need to cover four shifts, officer training, vacation, and other time-off benefits. The all-in officer costs when benefits and wages are considered can approach a half million dollars per post in 2013 dollars, depending on the make-up of the officer's compensation package, which can vary considerably from site to site. Overstaffing by even one post to ensure there are enough officers to minimize the traffic delays during rush periods can have a significant budget impact. A checkpoint, staffed with a minimum of three officers for each shift is expensive.

Some of the equipment the security officers use is old fashioned when compared with what is available. One such item is a mirror on a pole that is used to look under the vehicle's undercarriage. The mirror often becomes dirty with mud and dust and eventually scratches to make it more difficult to use. They get replaced periodically. But as with all things technology based, improvements are expensive and spending money on security can be difficult to sell to utility executives whose orientation and upbringing are focused on making electricity or "making megawatts." The question the managers and executives ask when faced with such a request is, "Will it save headcount?" For an undercarriage search device, the answer would be no. Such a device might make each vehicle search a minute quicker, resulting in shorter lines of vehicles waiting to be searched, but the time savings is much more difficult to quantify in dollars. More important is the potentially enhanced security risk when the mirror may not be doing the job adequately because it is scratched up beyond its useful life.

Often Unpredictable Work Schedule

The officers are talking about shift work, about how the schedule is changing again, this time to put more officers on the 12-hour shift. They talk about overtime. One of them wants a lot more because he says he wants to save the additional money for an earlier retirement. He looks to be about 30.

Fear of Becoming Contract Security

The conversation shifts and the four officers talk about their worry of becoming contract security. Security officers often bring up this topic. Security managers are

careful never to say "never," but the industry trend is to make security proprietary rather than contract. The officers are worrying because three different nuclear power plants have recently announced their closure due to different financial issues, and the nuclear industry is trumpeting the need to be cost competitive with natural gas. Everyone knows that contract security, with its lower wages and lesser benefits packages, is less expensive than proprietary security.

Industrial Safety Impact on Security

Cars drive up. They stop. Their drivers roll down their driver's side windows and they show their badges to the officer posted in the traffic lane. The officer conducts a face-to-badge comparison even if the employee is known to the officer to ensure that he or she is only allowing access to authorized people. The officer is wearing nothing special. Just his officer's uniform. At some facilities the officer wears an orange reflective vest so the oncoming car will be less likely not to see the officer and run into him or her with their vehicle. Some of the officers at those sites complain that the vest makes them a better shooting target.

Security Officer Visibility and Abuse

The first person someone sees going down the access road on their way to work is security. The security officer's uniform and demeanor is noted by a lot of people. Since the officer is in uniform, they are "security" and when someone has a complaint about an officer, it rarely comes with a name—it comes with "Security did so and so." One security officer told me a story about how the officers used to have individualized and numbered gold-plated badges. These were eliminated partly as a

cost-saving measure and partly to provide the officers a degree of anonymity. They didn't like having their badge number reported.

Site employees are sensitive to people touching their personal belongings, which includes officers searching their personal vehicles. One vehicle is being searched. The driver steps out of his vehicle and opens all of its doors and compartments. Then he steps over to the waiting area, all the while intently watching the officer search his vehicle, leaning forward, anxious and seemingly ready to run forward to intervene. The officer inside the booth is attentive to what is going on too—watching the search, the vehicle, the surroundings, and the driver. A story is often told how one manager, still working at the station, verbally abused a security officer for putting fingerprints on his car's newly completed wax and shine job. Officers sometimes suffer such verbal abuse, but more often the negative reaction by site employees to the security officers is coldness in the form of lack of eye contact, silence, and the occasional anonymous complaint.

This is a security service post. When there aren't enough security officers to do all the required work, perhaps due to too many officer call-offs or due to poor scheduling, this post can provide officers to ensure that the physical security minimum staffing needs are met. Consequently this post might not be fully staffed with extra people to deal with high traffic periods, which include rush hours and shift changes. Without the extra officers, a long backup of vehicles results, and the occupants may be late for

work, which could cause other issues. Tardiness for shift personnel, including operators, is managed tightly. Security officers are viewed by the station as doing a good job on a day-to-day basis when the lines are short, the delays are minimized, no one has gotten hurt, regulatory requirements have been met, and the post has kept out of the lime light. But in the absence of attacks, it's difficult to measure good security, which concerns the protection of the health and safety of the public against radiological sabotage, not just good customer service.

Slips, Trips, and Falls

The officers at the post are constantly looking up the access road that leads to the shack for situational awareness. They need to be alert to vehicles driving down the road undetected. At night, the area is well lit so that oncoming vehicles can easily been seen. A year or so ago, one officer was preoccupied with looking down the approach path to the checkpoint and was walking at the same time. He stepped off the curb, tripped and fell and broke his ankle.

Slips, trips, and falls are the most common security officer injury. Thus, there are restrictions on running, continual admonishments and training to "keep eyes on path," and management's desire to stage as much of the officer's equipment as possible to lighten the officer's burden and to streamline their body profile. The desired result is that if an officer does trip, he or she will recover and not fall and get injured.

Emergency Operations

Even the officers' shift brief focuses on this vehicle access control point. They are asked as a group at the brief, "What do you do if a vehicle fails to stop?" The officers mummer, "Push the emergency raise button," which puts a crash-proof barrier in front of the driver in just a few seconds, keeping the vehicle out of the controlled area. There are other places to "push the button," but the officer posted in the shack who stands behind the bullet resistant glass is one of the persons authorized to do so.

Keeping the Posts Clean

One of the officers, a woman, is sweeping the floor. She remarks that she has never seen the contracted cleaning company cleaning the post and when they do, she says, it's superficial. The post is grungy. She shrugs her shoulders.

Access Facility

Significance

All employees must enter through an access facility on foot in order to reach the nuclear power plant; this access point is similar to the one might experience in going through security at an airport. This location is accessible only to site employees or authorized visitors. It is similar to the vehicle checkpoint in that it is one of the few posts where more than one officer is posted at one time, where officers can converse with one another, and where station employees routinely interact with the security officers. Security officers are the first employees that the station employees see every day as they process through the facility. Not all sites have a vehicle access control point, but all sites have at least one access facility.

Description

The room is rectangular with a high ceiling, perhaps over 12 feet high. It has thick, greenish colored windows on three of four sides. It reminds me of aquarium glass, which is fitting, because the station employees refer to this room as the "fishbowl" or "bubble." Not only can we see out in most directions, but also site employees can see us, like fish on display in an aquarium. We're sitting at a long desk that runs parallel and up against the front windows. Each pane is separated with a navy-grey steel column about six inches wide. The windowless wall and door into the room is to our backs. The desk is covered with various types of equipment, including several hand-type radios (walkie-talkie type), telephones, power strips, and computer screens. One of the computer screens displays the company web page. The other two have the hollow images of x-ray pictures that have been transmitted from one of the three x-ray machines outside of the room, perhaps 20 feet away and in front of us. Vertically located in the front of the table's entire length and below the window is a soft surface and various papers have been push-pinned into it.

The X-ray

The x-ray images displayed on computer screens are for the moment unchanging and are a reminder of what has recently gone through the x-ray machines. They remain unchanged until replaced by other images from newly arriving people's belongings. The colors of the image denote the density of the materials, the darker colors being more dense and the lighter less dense. Organic materials such as food or explosives can be determined from the various colors. Most of the colors displayed are shades of light brown, orange, yellow, and black. Even simple items that are put through the x-

ray are not obvious to the untrained eye. It takes special training to recognize what one is seeing and this training is provided during the new security officer classes. The officer who is remotely running one of the x-ray machines and who is in the fishbowl with me shows me some of the more obvious-to-identify items, including keys and such. But when he starts to show me the more complex images, I become quickly lost.

Life in the Fishbowl

The fishbowl windows give us a good view of everything in front of us. The views include people coming and going from the access building. Both the entrance and the exit have four turnstiles each. It takes a few seconds for each person to go through the turnstiles as they place his or her right hand in the biometric readers and wait for the audible click of the turnstile, a greeting of sorts, as their hand geometry is accepted by the turnstile he or she is attempting to use, and the turnstile unlocks for passage. The people entering and exiting do not look at us or speak to us.

The officer with me stands up to begin the process of monitoring a rush of people coming in through the search train. Security staffing can be tricky. The department needs to be nimble and open extra search lanes during the rush periods to preclude the lines from becoming too long. Staffing too many highly visible officers during inevitable idle periods results in the perception by the executives and plant workers that security is overstaffed and can result in pressures to downsize to reduce station costs.

A woman processes through the search train. The dual-mounted colored display of the x-ray next to me shows the secrets of the items that she has with her and has just put onto the x-ray conveyor belt. I see a key, a zipper, and lots of things that I cannot distinguish with my untrained eye. The officer presses a button and says, “Okay, Mona,” greeting the woman going through the search train by name. Mona continues through the two screening devices with her hard hat on. The officer asks, “Is that it for today?” Mona gets closer to the thick glass window and says, “No, there’s lots going on today.” She’s thin, older, appears to be in her late 50s and is a construction worker who works for another company that has security infrastructure contract work. She exits the area through the entrance turnstiles to our left.

“They unloaded enough barbed wire, razor wire,” the officer states. He says this out loud, apparently to himself, or maybe to me. To be heard from outside of the “bubble” where we are sitting, one has to talk loudly, almost shout, to penetrate the thick boundary of the bullet resistant glass. The sound actually carries through the open key tray holes—the ones that similarly give access to a movie ticket salesman. There is a sound system that one can use to talk to people in the area directly in front of us, and there are two different speakers. But the sound system doesn’t work, and people have grown accustomed to talking through the glass.

A plant worker enters the entrance turnstile with his backpack and receives the expected greeting from the turnstile he has selected. “Click,” the turnstile responds. A

second officer enters the fishbowl. He is much larger in size and has a full head of hair. Although the two are dressed similarly the first cuts more of an imposing figure due to his apparent physical fitness. Comparing the two officers, the first looks like a security officer; the second looks like someone's friendly grandfather.

Officer-to-Officer Communications

Another officer enters the screening equipment area outside of the fishbowl in front of us. An alarm goes off, and she turns to her left and points at the pistol strapped to her right leg. She is waved on by the second officer with me, who uses his right hand in a come-forward motion. No words are spoken through the glass.

Security Work-arounds

"Is this too long to actually get in?" the first officer asks me. He is describing the vehicle search area and how not all the vehicles that he needs to search can fit in it. Since the time when the area was designed, the length of the trucks on the road has been allowed to increase. So when larger vehicles come to the site, the officers need to be able to recognize the longer vehicles to ensure they put them in the search area a certain way or they will not fit. He describes to me how difficult this sometimes is to accomplish.

There is a fan blowing because the work area is warm. The officer tells me it's because he thinks the controls for the temperature are upstairs. I find the controls in a locked box over my right shoulder. The temperature is 78 degrees F, which is too warm for comfort. Two more people wearing hard hats are screening through the

machines. One, without looking at us sitting behind the glass, raises his right hand as if to signal the officer operating the x-ray. The two do not make eye contact. I assume the gesture means to turn on the x-ray belt so the employee's items will start the screening process through the x-ray. I ask the officer what the hand signal means. He doesn't know. It is a curious exchange among the three of us.

The fishbowl is lit by six institutional-sized florescent light banks, and the four bulbs of each are diffused through a plastic diffuser plate. The room is bright. The lights from our room reflect off the glass in front of us, making reflective light images on the ceiling in the room that we are observing.

The officers at this post are dressed in shades of light grey and black, including black, eight-inch boots and grey trousers. This officer has a black bag strapped to his left leg and black work gloves with grey palms are clipped to one of the bag's straps. Much of the black belt encircling the officer has various shaped pouches containing all sorts of equipment. Hooked to his belt on his back left hip and back right hip are two different radios. He's wearing a black shirt with the company logo and two suspenders with phone, radio microphone, and ear insert for the radio clipped to his right suspender. His pistol is strapped to his right thigh.

Frequent Radio Communications

The walkie-talkie radios are very heavy and brick-like in shape. They each contain numerous knobs, buttons, and dials that can be tuned to many different channels. I hear a female voice on the radio calling out numbers followed by the words "radio

check." After a voice answers each set of numbers, with "loud and clear," she sends out another set of numbers followed again by the words "radio check." This process has been going on for several minutes. There is silence on the radio for a few minutes and then a radio announcement is made, stating there are 30 minutes being left to look at the overtime list. No one replies to it. It appears to be more of a broadcast.

Around the window edges there are clips where window shades apparently used to reside. One officer says the shades were there to eliminate the now obvious glare from the florescent lights described earlier. He doesn't know why the shades were removed, though he says he's worked here for 12 years. The first officer says shades would not be good if an officer were standing because then you couldn't see the "bubbles." He stands up and I stand beside him. I ask "bubbles?" He says, "Yes, the globes," which are mirrored surface hemispheres mounted in the ceiling. I stand to see, and he is right. The mirrored hemispheres display the reflected images of areas in front of the screening equipment.

The fishbowl contains some weapons and ammunition. The first officer picks up one of the many notebooks of various-colored spines to the left of the desk and is paging through it. He appears to be mostly looking at shift schedules. There are no people screening in at the moment. He settles back in his chair, hands crossed, and right foot tapping.

Unique Security Language

One officer says, “They got that gate open by delta.” The other responds with, “I’m going to golf.” They speak in a language of acronyms and with a phonetic alphabet. Other stations also speak the language of the 10-code, where “10-4” means okay. The security language can be confusing to other station personnel. For example, often security refers to the multitude of doors in the nuclear power plant by their unique security identification numbers, while the plant operators will refer to the multiple of doors in the nuclear power plant by their unique equipment part numbers (EPNs), which are the same numbers that are used by maintenance to track maintenance on a particular component in the plant. There are two names for the same door.

Shift Brief

Significance

The daily shift brief is where all the officers meet together as a group for the only time during their workday. Prior to each shift of security officers going to work, they all gather together into a briefing room. Some officers arrive early and can thus be observed talking unguardedly with other security officers.

Description

Often Unpredictable Work Schedules

It’s 1710, nearly 20 minutes before the security shift brief is to start, and there are already 11 security officers present in the room. One new hire officer is talking to his supervisor. He originally was going to be on the other night shift crew but got a call from work just the night before to report today, the last day of this crew’s work schedule before a three-day off period. Some of the oncoming shift officers are lucky

because they have volunteered to work extra hours on their day off to make extra money either at a time-and-a-half rate or a double-time rate depending on the circumstances of the overtime. Some may be unlucky in that they have been "forced" to work because no volunteers were available or volunteers weren't made known of the opportunity. Security work schedules are constantly changing in support of station needs and officer call-offs. So the security officer's personal work schedule is often unpredictable.

Culture Traits of Shiftwork

It's the last day of work before a period of time off, so the officers and supervisors call this workday "my Friday," despite the fact that it's actually a Tuesday. "This is my Friday," said with a look of joy, signals that the person is not working his or her days off. "Sorry, this is my Monday" is often used by shift supervision as a response to someone asking a question that requires knowledge of recent events. The supervisor might not know enough to answer a question because of a weak turnover of the information or just because they haven't yet gotten up to speed on the issue. It's said with a hint of apology and fatalism as if it's just expected that people coming back on his or her Monday couldn't be expected to be fully up to speed with the current issues, despite the electronic leashes of email, pager, and blackberry that are provided to supervision and management. Shift work comes with a significant communications challenge of ensuring that people are kept up to date on day-to-day mundane changes and on issues that have arisen since the people have last worked.

Officers, Not Guards

It's a common practice to refer to commercial nuclear security guards as *officers,* although NRC regulations refer to them as *guards*. Those who refer to them as guards are often quickly corrected, even interrupted, with an emphatic, "officers!" often with a scolding tone by those in the know. The term *officer* is generally thought by the nuclear industry to be more professional and respectful than *guard.* This thought stems from a concern that nuclear security officers be afforded a higher level of respect than the "guard" stereotype would otherwise allow and that the term *officer* is a reflection of this added respect. During their workday, the security officers often introduce themselves as "officer" (e.g., "Officer Jones") to managers in their own department and to nearly everyone outside of their department, thus foregoing their own personal nick names or given names.

Black—the Color of Security

The 24' x 50' briefing room's predominant color is black, the color of security. The hard, plastic, black chairs with silver metal legs, the black uniforms, and the black, hard, plastic-coated floor make up the center of the room. The chairs in the briefing room are arranged in rows, which face the narrow dimension of the room and the rows are spilt with a walkway up the center. In the front of the room are a projection screen and a podium. The chairs are surrounded on four sides with off-white walls and dropped-ceiling white tiles embedded with two bulb florescent light fixtures. The lighting in the room could be improved. Officers spend only 20 or so minutes in the briefing room per workday, from whence they leave and walk to their first posting of the day. Each of the shift briefs takes place in this room, and there is normally only

two per day, one for the day shift and one for the night shift. Nuclear security at most commercial nuclear sites is worked in 12-hour shifts.

Culture Trait of Tardiness Control

A common process for shift turnover includes having the oncoming security crew arrive and wait outside the armory door until an appointed time. At that time the armory doors open and officers in small groups and under supervision enter to be armed with his or her assigned pistol. The officers then walk to the briefing room to wait until the others have been similarly armed and arrive for the brief. This process, waiting to have the brief until after the officers are armed, has advantage in that it provides some acknowledgement and allowance that from time to time officers are going to be a few minutes late. The slightly tardy officer just gets into the line outside of the armory, with perhaps only a little impact from the supervisor with the watchful eye. But missing the shift brief, also called guard mount, can have serious consequences at some sites.

> I actually had a case where I terminated somebody for being one minute late, and the licensee's lawyer was mentioning that a labor judge would have problems with this. My retort to that was, if he served in the U.S. Army he'd understand that one second late to guard mount, you might as well be a year late. (Interviewee 8)

At this site, being late to guard mount resulted in discipline wherein the officer was terminated. Discipline of this magnitude would most likely not occur in work groups that do not work shift work.

The security shift crew's senior leader, called the security shift supervisor, walks up to the podium. He's wearing a bright aquamarine colored polo shirt and tactical khaki trousers, the kind that security contractors often wear. They can be special ordered from the many tactical clothing stores online such as Five Eleven. His clothing is adding color to the room. The few supervisors are dressed in uniforms unique to their status, which include dark blue shirts and the tactical khaki trousers. They are not as colorful as the security shift supervisor. Color appears to be the reward of rank. The walls too have some color as most of the space on them from one's knees to head is covered with various posters, white boards with information written on them with mostly black marker. There are pictures too, one of which is an overhead 3' x 14' Google-earth-like view of the nuclear power plant. At the top of one white board reads in 6" capital black letters, "RECENT REPAIRS." There is a short list of security equipment, but it does not include the briefing room lighting. Another reads in 6" capital black letters, "INTEL UPDATES."

Desire for Some Anonymity

There's list of some acronyms written on one of the white boards with their respective definitions, including MSO, member of the security organization. When human-performance related events occur at the power plant, they are often attributed in writing to a work group in the form of a hand-out or email. The acronym MSO provides the officers a degree of anonymity that is not normally afforded them due to their highly distinguishable uniform. The term MSO could mean security officer, security supervisor, or security staff member, so using the term gives some of the

officers less of a feeling of being singled out, even though when MSO is used in the context of a human performance event, it's nearly always refers to a security officer.

Other posters on the wall are titled "Security Standards of Conduct," "Requirements for Assuming Duty," "Talk TO US ANYTIME, ANYWHERE OUR DOORS ARE OPEN, EMPLOYEE CONCERNS PROGRAM," "Security Division Clock Reset," "Day Shift Crew Clock," "Night Shift Crew Clock," "Swing Shift Crew Clock," and "Staff Crew Clock." The clocks are 1 day, 5 days, 12 days, 32 days, and 47 days, reflecting that a human performance clock of some sort is being reset fairly often.

Management Expectations—Measuring Human Performance

Clocks are used by the nuclear power plant to measure time between human performance related events. Crew clocks are reset for the lowest level or least severe events, division clocks are reset for the next highest events, and station clocks are reset for the highest events. A crew clock reset might be for someone not showing up for required training. A division clock reset might be for a regulatory violation such as an officer falling asleep on post. A station clock reset might be for a person getting hurt so badly as to require time off from work because the employee can no longer meet the essential functions of his or her job. A large number of days between clock resets can be cause for pride and celebration. There are positive messages, too, including plaques with the pictures and names of the most recent quarterly top rifle and pistol shooters, several award certificates for the most recent peer-to-peer awardees, and safety good-catch awardees.

The officer's conversations wax and wane, and the topics include their gear, recently changed foot patrol rover checks, and the day's weather. It's projected to be hot today and the officers are discussing age, heat stress, and the potential for swapping security checks with the younger officers. There are frequent and short bursts of laughter. They talk about work-related topics such as "checks" and topics of home, family, and racing cars.

Uniforms with Individuality

The officers are dressed in black boots, trousers, and shirts. Although the color of the black shirt is similar, the cuts vary. Some have slogans or emblems for HU (short for human performance), and others for safety. Many shirts carry the logo for Under Armor, a popular sports brand. Their shirts are not uniform except for the color black. When the officers put on their gear, their shirts are mostly covered by the black tactical vest, which is used to carry various equipment, such as non-issued knives, issued flashlights, and ammunition clips for assigned weapons. Some of the officers wear subdued American flags on their tactical vests. Once in a while, a patch with the word *Infidel* is worn, only to be removed when a supervisor or manager demands it be taken off. Most of the people in the room are men.

There are two women officers and one woman supervisor. Overall, the group is younger than middle aged. The hair of the minority group of grey haired men contrasts nicely with the black uniforms. Tattoos are visible on several of the younger men and the tattoos vary in their sizes and density. Some peek below their short-

sleeved shirts, others cover their arms, and still others glance above the collar on the side of their necks. Some of them are pictures of dragons or tribal designs. Many of the officers sport goatees, kept short by the necessity of it not interfering with the gas mask they must be able to wear as a part of their gear.

The Ongoing Conversation about Professionalism

What does and does not look professional is discussed frequently by the more senior officers who have seen both gradual and abrupt shifts in grooming and clothing standards. Inoffensive tattoos are allowed as professional, as are one earring per ear for men and women. A neat appearance such as clean clothing with no holes has always been required. Haircuts are expected to be non-controversial, and from time to time, someone will push the boundary by coming in with something as radical as a Mohawk cut. In previous times, no tattoos were allowed, and for men no earrings and no ponytails were allowed, but times have changed. The ones who haven't changed their attitudes with the times sometimes vent their dissatisfaction via anonymous complaints to the senior managers or executives.

The security shift supervisor begins his briefing and uses a microphone to project his voice. The officers are silent and still. The words on the PowerPoint presentation from the front projection screen are too small to see in the back of the room or on the monitors half way back. The leader says he's not going to read the words and no one objects. He paraphrases what's on the slide, and starts to go onto the next topic. The security shift supervisor starts with an industrial safety message, which includes a

description of the station's most recent injury and the lessons learned from it. He covers a nuclear safety culture message on treating people with dignity and respect. He pauses to ask if there is anyone who wants to recognize someone for a good job from the last shift they completed together. One officer volunteers and thanks one of the other officers for being helpful the day before during a door test that just didn't seem to be going right, but, with assistance, worked out just fine.

The supervisor covers the planned security activities for the day and the out-of-service equipment. He asks them how they would respond to various scenarios at the vehicle checkpoint. The security officers murmur, "Push the emergency raise button."

Roving Patrols

Significance

Roving patrols include vehicle patrols and foot patrols. The officers assigned to these patrols are highly mobile and involved in physical activities that are very different from the vast majority of sedentary officers assigned alone to the isolated and remote posts in that they have opportunities to interact with many of the other workers from the station population. The officers involved in these posts are more likely to have to use the continuum of force on a day-to-day basis.

Description

Maintaining Proficiency for the Critical Tasks

Security officers are expected to be able to perform all of the approximately 22 functions of their jobs, called *critical tasks*, each day they work. Some sites ensure

that the officers rotate through each post type so that the officers can maintain proficiency in all of their critical tasks. Roving patrols for commercial nuclear power plants perform continuous surveillance, observation, and monitoring of the owner-controlled area to detect and deter intruders and ensure the integrity of physical barriers or other components and functions of the onsite physical protection program.

Vehicles Used for Patrol

Often a portion of this continuous surveillance is a vehicle patrol. The vehicle patrol drives company-issued vehicles, more often than not white trucks, which are obvious to identify because they are often equipped with police car style lights, spotlights, and/or have the word *security* painted in large letters on the side doors. Some security officers think that having the word *security* on the door of the vehicle makes them "a target." The vehicle patrol is especially desired by officers during good weather days because of the independence and freedom that the post offers.

A lot of people of different sizes and shapes need to drive these vehicles. Constantly used, they are often dirty and smell like they need to get sent out for deep cleaning. They are in near continuous movement except when officers might take brief breaks to patrol on foot or to conduct turnover with another officer. The high level of use and frequent turnover of this rolling post cause an extreme amount of wear on it. The vehicle starters often fail, as do the seat adjustment levers and tracks. The seats rip due to gas mask pouches, weapons belts, and weapons. The tires wear out sooner because the road surfaces, such as gravel, are often extreme.

Vehicle Size Restrictions and Obviousness

Some vehicle cabs aren't big enough for big people, especially security gear-laden big people, and the big officers complain about it. Big officers often wear tactical vests, and items in the pouches of the tactical vests cause their chests to bulge out further. Consequently the big, laden officer cannot fit comfortably into a small-cabbed vehicle even if equipped with a steering wheel with tilt capability. Golf carts, with their smaller turning radiuses, are more fitting for such an environment and have been employed at some sites, but some officers feel that they erode their security officer status. The golf carts lack the security lettering, intercom system, police-style lights, and spotlights. It's more difficult to look official in a golf cart.

Vehicle Patrol and Social Power

The vehicle patrol is largely intended to provide a security presence to deter an attack (i.e., to make people think twice) before attempting an attack on a nuclear power plant. From the perspective of the outsider, the two-hour or so job assignment consists of driving slowly around the station perimeter.

Foot Patrol's Physicality

Armed security foot patrols periodically check external areas of the protected area, including physical barriers and vital area portals. They conduct patrols of all accessible areas containing security sensitive equipment. In contrast to the other jobs to which a security officer can be assigned, this job is very physical. The foot patrol officers walk up and down stairs while carrying up to 28 pounds of gear and observe the condition of, or "check," security infrastructure items such as fences, gates, walls,

doors, and key station equipment. There are many plant buildings that the officers patrol at a commercial nuclear power plant. They could include the two reactor buildings, the auxiliaries building, the turbine building, and the outdoor protected areas. Some of the buildings might have nine different floors and dozens of rooms. The checklist of items that they check during these patrols can be more than a dozen pages long with an item to check for each line on the page.

These officers are constantly moving. This particular officer has about five sheets of paper on a clipboard. Each line on the paper represents an object, door, or barrier that the officer is required to check on a periodic basis. As each item is viewed, the officer checks it off from the checklist. The order for checking is not fixed. He has deviated from checking items in sequence on the page multiple times so far. He walks quickly past steel pipes, bundles of wire, pumps, and large 20-foot cylinder shaped tanks, some placed vertically and some placed horizontally. He passes by large breaker panels, pausing to read name plates from time to time, quietly making a mark on one of the sheets of paper, and continuing through this labyrinth of steel, concrete, and wires. He wears hearing protection, squeezed soft rubber type material that has been pushed into his ear canals, a hard hat, and safety glasses. Even with this hearing protection, some rooms are loud with sounds caused by water flowing through pipes, pumps at labor, and monstrous industrial sized fans. In some rooms the light is harsh from dozens of sometimes flickering florescent lights. Some rooms are dim.

Foot Patrols and Social Power

Foot patrol officers also employ social power in that they are providing a visible officer presence, which is a deterrent to people who might otherwise create a security incident. The foot patrol officers are the most likely officers to be dispatched by the alarm station to respond to an alarm or to a potential disturbance. Thus, they have to use the legitimate power with which they have been awarded as a result of their position. Commercial nuclear security officers have no police powers in that they cannot detain people for reasonable suspicion, but they can arrest people for probable cause. They also are authorized to use a continuum of force, which includes force up to and including deadly force, should it be required. To implement these powers, the officers are most likely armed with a pistol or other lethal weapon, pepper spray, and handcuffs. Being so obviously armed, some people who interface with the security officer while he or she is on patrol can feel a sense of intimidation, even when no intimidation is intended.

The primary deadly force weapon for the officer who has been dispatched is the pistol. When the pistol has a round in the chamber, it's called "hot" or "carrying hot," and when there is no round in the chamber, it is called "cold" or "carrying cold." Carrying hot or carrying cold is left up to the utility to decide and manage.

Industrial Safety and the Pistol

The officer-preferred method to control the pistol is to have it issued to him or her cold and then, under supervision, load it; that is, make it hot. This method ensures that the officer gets frequent opportunity to manipulate the pistol and is comfortable

that his pistol is, in fact, hot, but it risks a “negligent discharge” should the officer make an error and pull the trigger, which has been known to happen, especially when unloading the pistol improperly. For the risk adverse nuclear power plant, firing a pistol by accident, or a negligent discharge, is a significant safety concern.

Most security officers think that if they are expected to use their handgun, they should carry it hot. After all, a pistol is used for “close quarters” combat, and the extra time used to load a pistol could make a difference in the officer’s defense. But often the decision to carry the pistol hot or cold is made by a utility executive with limited security experience. A utility executive once yelled at me because he thought it was ridiculous that security officers were routinely carrying hot pistols into the control rooms of the nuclear power plants.

A Culture of Secrecy

Some security activities are classified as SAFEGUARDS, which creates a culture of secrecy. The NRC requires that SAFEGUARDS information be limited to specially qualified people, including security people, and that the access to these materials be limited to those with a need to know. But many times, what security does is not classified. Conversations with plant employees are often limited because the security officers often don’t know what they should or can share. As a result, they put up a wall of “I can’t talk about that, it’s SAFEGUARDS.” Often, unknown to the officer, this statement just isn’t true. It’s the easy and better-safe-than-sorry answer. But once

the easy answer is given, it increases the station employee's ignorance of what they can and cannot know about security.

Influence of the NRC Inspector

Officers do not like to carry the gas mask pouch and often ask management to find a way for them not to carry it. The problem with the gas mask pouch is that it hangs from the waist belt to the left or right leg and makes the body profile bulge about nine inches in that particular portion of the body. This arrangement is extremely inconvenient due to the ease with which the pouch gets caught when going through doors, getting into vehicles, and sitting in chairs. A few sites have figured out ways to resolve this officer concern by staging the gas masks in key locations. One regional NRC inspector in the western U.S. was noted to say, "I'll never let that [staging the gas masks] happen." Regional inspectors sometimes disagree with each other, and often different regions have different interpretations despite the central office's attempts to make regulation consistent. A security officer once asked a regional NRC in the Midwestern U.S. why the mask had to be carried, and the inspector said, "Don't ask me, we don't require it. " This incomplete answer caused officer-to-management issues because the officers were then convinced that management wasn't doing all they could do to resolve the officers' concern. Individual NRC inspector's opinions often influence policy and procedures. Utilities call this influence "regulation by inspection."

Attentiveness Aids and Interference

Provided they get their patrols done on time, an officer on foot patrol is free to stop at the bathroom, visit the cafeteria whenever he or she likes, and relieve other officers in the fixed posts so they can have a "bio break" or "chow break." This foot patrol officer decides to stop by the personal computer that is set up for his post so he can use it to log into the company LAN to do his time reporting. When he gets there, the computer is being used by an extra officer who has no work assignment and who is using the computer as an attentiveness aid and is watching a YouTube video. Feeling a little rushed to be on his way to his next checkpoint, the foot patrol officer asks the extra officer if he can get on the computer for just a few minutes. The response is an angry "No!" The foot patrol officer shrugs his shoulders and heads back to continue his patrol. The downside of attentiveness aids is that some of the officers begin to behave as if the activity of using the attentiveness aid is their job assignment.

Fixed Post

Significance

The isolated and remote posts are where the majority of the officers spend their workday posted alone. The remote post locations make it a challenge for maintenance and cleaning of the post, and for supervisory and management oversight. Typically the officer's only job assignment while assigned to these posts is to be vigilant. Largely unsupervised, the officers in these posts are entrusted with a higher level of responsibility to do the right thing even when the supervisor is not watching.

Description

I've journeyed to and entered into more than 150 tower posts in the last four years. They have a multitude of names, depending on the site or style. The names include *hardened defensive position, HDP*, pronounced as "ach dee pee," *bullet resistant enclosure, BRE*, pronounced as "bree" or "bee are ee," *bullet resistant cylinder, BRC*, pronounced as "bee are cee," *fighting position, tower, bunker*, and probably others. Each tower post is designed to have an armed officer, protected from blast and bullet, able to effectively defend the facility. Each has gun ports or window-like openings so the officer can use his or her weapon effectively. Some slide, some push, and some are just gaping holes, ready to have a weapon inserted. The weapon(s) are normally contained in racks inside the structure where they can be quickly grabbed and employed by the posted officer. The number of people inside a tower is limited because the rooms are small. Having more than about four people in the room can interfere with the officer's ability to function, and the ventilation systems don't support habitability for more than a few people.

Preparing for a Post Assignment

Officers carry a lot of personal items. Sometimes what they carry reflects whatever they think they'll need at the posts they think they will be going to during the day. Other items, such as textbooks and a laptop, might be to facilitate educational studies and thus reflect what might be the officer's long-term goals. Others reflect a need to be entertained, including hand held games, music devices, and iPads. Some bring large coolers with multiple meals and drinks contained in them. It would not be unusual to see an officer laden with nearly 40 pounds of personal items carried by

hand and by backpack on his way to work. Other than the meals and clothing, the items carried, including electronics and books, are often referred to as "attentiveness aids." Officers need something to do. They can't just sit and stare for their 12-hour shift and reasonably be expected to remain either awake or vigilant.

Challenge of Being Vigilant

There are multiple processes in place to help the officers stay vigilant, or attentive. In addition to attentiveness aids, their days are scheduled to include visits by management to the posts, called *post checks*, required responses to radio calls called *radio checks*, and post rotations to different assignments, called *post rotations*. Security management evaluates each post for which attentiveness aids are appropriate for the post. A post that needs a high degree of ongoing vigilance, such as a checkpoint, will have fewer attentiveness aids authorized for use. A post that needs a lesser degree of vigilance, such as an isolated and remote tower, has a much larger variety of authorized attentiveness aids.

Swapping Posts

The differences in authorized post attentiveness aids from post to post often result in officers wanting to swap posts. For example, an officer may have a strong desire to do homework for a class or to watch DVD movies. Or maybe an officer feels a bit tired and needs a higher level of stimulation than what some posts might offer for that day or night. But swapping posts is often discouraged, because if an officer is always swapping to a low-activity post, it can affect his or her overall proficiency for the critical tasks, which each officer is required by regulation to be able to perform on a

day-to-day basis. Supervisors are often inconsistent in deciding when a swap is appropriate, and this inconsistency is a source of officer frustration.

Unpredictable Work Schedule and Attitudes Toward Attendance

Security officers pay close attention to the post schedule. For example, based on a reading of the post schedule that was made available the day before, the officer expects to be posted inside for the first four hours, outside for a few hours, and then to an external, elevated post. So the officer layers his or her clothing because cold weather is predicted and brings in a couple of textbooks. But the post schedules often change at the last minute for a number of reasons. The end result is that where an officer thinks he or she is going to be posted the next day may not, in fact, be at all like reality. The officer may get posted at the personnel access facility and to personnel escort where neither the additional clothing nor the textbooks will be of any use at all. They instead will be a source of frustration because of the extra baggage that is now being carried around all day.

Officers stationed on post look forward to their end-of-day relief. Some posts can be reached in just a few minutes by the oncoming officer. Other posts can take up to 15 minutes to reach. Depending on one's appetite for overtime (relief is often conducted at a time-and-a-half rate), the late relief can be a blessing or a curse. Late reliefs are a common officer complaint or concern, especially for those who have fixed end-of-shift responsibilities, such as picking a child up from childcare or participating in a car pool.

Most of the fighting positions are elevated, some up to 60 feet in the air. To reach the post, metal steps or treads are most common. The step of one's foot echoes through the metal structure upon ascent and descent. Upon reaching the summit, some sort of heavy closed door or hatch prevents further travel. A radio is often used to call the post to gain access to it. But often, too, the visitor is announced to the post by the vibration of the heavy access door at the bottom of the tower being opened and closed, which sends vibrations through the structure. Or similarly, the visitor is announced by the vibrations caused by his walking as he climbs the metal stairways up to the tower, or by the clunking sound as the visitor turns the door handle and uses the sound as a sort of door chime to request entry.

The officer on the inside of the structure opens the door. The room is simply a metal box hung high in the air with thick bullet resistant glass windows all around it. At night it is often dark due to reduced lighting, and during the day it is bright because of the four bullet resistant windowed walls.

Inside one of these posts are the physical tools of the craft: rifles, pistols, and ammunition. The amount of ammunition in the post and its equipage depends on how the post is being used in the strategy of defense. Some contain a lot more ammunition than others. Many posts have binoculars, other special monitors, or hand-held devices to see approaching people far below. Some posts are equipped with computers, AM/FM radios, and/or iPods. In addition to the hand-held "duty radio," there might

be a public announcement system and telephone system. The volumes of the attentiveness aids are kept low to ensure the officers can hear their "duty radio." Radio checks come over the duty radio to ensure the officers are alert. Most posts have refrigerators and microwave ovens. If the station is attacked, the officer is expected to make his or her weapon(s) ready and if necessary, open a gun port and shoot the enemy.

They entertain themselves with YouTube, Netflix, and personal items on their smart phones. Eating for entertainment is a concern. The sedentary life of a tower post can be unhealthy. They communicate from post to post using social media, telephone, or other communication devices. They see other people during post turnover, which can happen every few hours. They also get visits from supervisors and sometimes management during posts checks, which can happen multiple times during a shift. They rarely interact with other station personnel from these posts. Being lofted so high into the air, with a clear view of the perimeter of the site, they see what happens down below, in the water, along the beach, and in the parking lots. Little escapes their notice. During an attack on the station, the post might receive a call from one of the two alarm stations.

Two officers in an isolated and remote tower are conducting turnover. The first officer listens to the other officer talk about his kid's soccer game, and then the second talks about his pregnant wife. There is one chair in the post, so the two of

them are standing. As the two officers talk, both are looking out of the thick, bullet-resistant glass windows. They talk about equipment status and the gear they should each have.

The view is often breathtaking from these towers—countryside views, lake views, river views, and beach views—due to the often remote locations of the commercial nuclear power plants. People outside of the power plants apparently don't know how visible they are to the officers in the towers. Officers sometimes swap lewd stories of what they see.

Bathroom breaks or "bio breaks" can be an issue. Lofted high in a tower can make it difficult to get a volunteer to come up to provide needed relief. Also, the distance from tower to bathroom, coupled with inclement weather, can result in some tower reliefs for "bio breaks" to take a significant amount of time. Some towers have emergency chemical toilets that can be used. One station made a deal with the union to allow supervision to relieve officers for emergency "bio breaks." Rotation relief officers, officers who can be called for breaks, partially address this issue, as do post rotations. Ideally, posts are rotated frequently enough so that officers can find a bathroom before going to the next post.

Some posts are cold in the winter due to the wind that blows through cracks in the gun ports. Extra heaters can be found in those posts, and sometimes people have

additional clothing or blankets to use to keep warm. In the summer it can be so hot that the air conditioners can't keep up with the heat load from the sun beating down on the structure, the body heat of the officer, and the wind leaking through the gun ports. In this case the posts are rotated more frequently to manage the heat stress. What might have previously been a two-hour post rotation becomes a one-hour post rotation or a 30-minute post rotation. Sometimes when one of the air conditioners fails, it's easy to convince the maintenance department to send people out to get it repaired, but other times it is not.

Maintenance and Cleaning Challenges

Getting items fixed in these remote towers can be a challenge. The cleaning staff doesn't like to climb a 60-foot spiral staircase, and it's challenging for them to bring up enough cleaning supplies to do meaningful cleaning. An officer watching a DVD may not appreciate the interruption and on his own volition, contrary to management expectations, waive the cleaning for that week. It's like a campsite in that people are expected to leave it cleaner than they find it and to take out one's own trash. But shift-to-shift cleaning supplies are not always available, and some people just don't care if the post is clean or not. There is friction between officers as a result of unacceptable post conditions caused by smells and by what another leaves behind, the mess another has made in the microwave, and the general griminess of the post. The deeply embedded dirt comes as no surprise when one considers the use of each post by a myriad of people in 24/7 operations.

Management Expectations

The company local-area network contains information pertinent to the officer. This information includes procedures, development materials, training modules, and required reading—the monthly newsletter. Post orders detail what is expected of the officer at the post. Each officer carries the security officer handbook, the excellence guidebook, and the safety handbook. They know what is expected of them.

Radio Checks

With the turnover and brief social interaction complete, the second officer relieves, or takes over responsibility for the post. The first officer gathers his belongings and exits through the heavy metal door, which closes with a heavy sounding clang of metal upon metal. The hand-held radio in the post comes alive with sound. A 30-minute cycle of radio checks has started and the second officer groans. Each post is required to acknowledge the check on the radio with a "10-4" or a "loud and clear" as the post is called. Some battle-hardened veterans have distain for these frequent radio checks. They feel that the radio checks demonstrate a lack of trust with the officers. They didn't do such frequent radio checks in the military even when serving in hostile areas.

But for the electric utilities that require them, the radio checks serve several functions. Radio checks give verification that the officer in the post is attentive and okay and that the radio system is working. There is also the hope that the officer will feel less isolated and alone. More importantly, they're pretty much an industry standard, and a security manager has an uphill battle to fight should he or she want to

do something radically different and be challenged by his executive, who most likely knows little about security.

Reluctance to Report Low-level Issues

With the radio check complete, the second officer settles into his post, sits back, and begins to read his novel. The phone on the wall rings, and he answers it. “I can see you. . . .” a high pitched and disguised voice on the other end of the phone says, which is followed by a giggle and the sound of the connection being severed. The phones don’t have caller ID, and the tracing of phone calls between posts is not in the current station software. Prank phone calls have been a problem lately, especially for the newly hired officers. New phones are being installed in the posts to reduce the anonymity of the calls in an attempt to stop them. A prank phone call of the above magnitude, free of sexual or racially charged language, will most likely go unreported as would a particularly sloppy officer who leaves trash on post. These posts are largely unsupervised and the security officers who are assigned to these posts are entrusted with a higher level of responsibility to do the right thing even when the supervisor is not watching, even when being encouraged by a second officer to not do the right thing.

Alarm Stations

Significance

There are two security alarm stations at a commercial nuclear power plant. The first is called the central alarm station, or CAS, and the second is called the secondary alarm station, or SAS. At some commercial nuclear power plants, the alarm station posts are

assigned to security officers and at others to supervisors. These posts are in constant communication with all the officers in other posts or in the field.

Description

Unpredictable Work Schedule

The alarm stations are making radio calls announcing that overtime is available for people on the 8-hour shift to "hold over" because they had too many people call off for the next shift. Officers working the 12-hour shift can't volunteer because the NRC work-hour rules prevent them from working additional hours today. Only the few people that have been working an 8-hour shift are eligible.

The CAS is bullet resistant, located within the protected area, and is itself within a vital area. Also, the interior to the CAS is not allowed to be visible from the perimeter of the protected area, which generally means this facility has no windows, which makes the room feel industrial due to the florescent lighting and seem more remote and isolated. You can start work in CAS in the dark of the winter morning and leave it during the dark of the winter evening and see the sun on only the many camera displays visible on the CAS closed-circuit television monitors. The CAS has a microwave, refrigerator, and a bathroom facility. It's a self-contained workspace. The SAS is often designed to the same requirements. These stations monitor the status of the intrusion-detection system equipment, designed to give warning when people are attempting to gain unauthorized access to the station. They house the

people who assess alarms, initiate and coordinate an adequate response to an alarm, summon offsite assistance, and provide command and control.

Challenges of CAS and SAS Assignments

The knowledge, skills, and abilities to work in these posts are quite a bit above that which is required of an officer in other post assignments. The people in the alarm stations are often stationed alone and need to be able to prioritize tasks, follow the schedule, complete a multitude of sometimes complex tasks, and reference a multitude of procedures during the day. The job can be overwhelming because of the demands of the job and the high activity level, especially on a day when the environmental conditions (e.g., surf, hot sun, rain, or snow) are causing nuisance alarms. In one case, a talented officer was selected to be a supervisor and started his training in the alarm stations, only to ask his manager if he could be demoted back to officer about three months later. The stress of the new position was too much for him. He had grown accustomed to the lower activity of the security officer's post assignments and wanted to return to the life of a security officer even though he would lose his newly gained security pension, which is available to only supervisors and above in the management structure.

The alarm stations are required to always be staffed with at least one trained and qualified alarm station operator. Since the alarm operator must not be assigned other duties or responsibilities that would interfere with the ability to execute his or her required functions, supplemental staffing is often supplied to one of the stations to

help with the workload. For some sites, the alarm station operators are supervisors. At others, the alarm station operators are security officers.

Need for Supervisory Development to Include the Alarm Stations

Having a supervisor who has never been an alarm station operator generally results in the supervisor not being adequately developed for the security shift-supervisor role, the top position on shift. Some company interpretations of labor law result in the alarm station operators being exempt employees because they dispatch officers to investigate alarms and supervise such things as radio checks and foot patrol rounds. Some sites ensure that the alarm station operators are supervisors because in case of a labor action, operator positions are not easily filled, which leaves the site more vulnerable to the labor action. It's easier to train and replace officers or borrow officers or supervisors from another site and make them officers at the affected site than it is to try to bring people in to be trained as alarm station operators.

A Culture Trait of Suspicion

In security there is a trait of suspicion, as demonstrated in the process by which each alarm station operator is not allowed to change the status of a detection point or deactivate a locking or access control device at a protected or vital area portal without the knowledge and concurrence of the alarm station operator in the other alarm station. Also, operators in both alarm stations are required to be knowledgeable of the final disposition of all alarms.

All on-duty security force personnel maintain continuous communication with an individual in each alarm station. They do this through radio or microwave transmitted two-way voice communication, either directly or through an intermediary. The alarm station operators also have a conventional telephone service between local law enforcement authorities and the site, and a system for communication with the control room.

A Culture Trait of Isolation

Managers from other departments rarely, if ever, enter the alarm stations. When people other than security go into the alarm stations, it's usually just to repair broken equipment. This alarm station is humming with electronics and the operator is processing alarms through the keyboard interface to a computer terminal. More than a dozen camera views, some fixed and some changing every few seconds, can be viewed. The radio system is alive with ongoing activities with security officers who are in the field testing some of the security equipment.

There are 19 separate monitors of different sizes, each larger than a desktop computer monitor screen. The average is about 1.5' x 2' wide. Nine different camera views are displayed on most monitors. Other monitors are black screens, filled to the left side with white text. To the right is sometimes green, yellow, and red text, which, by the color noted, displays the status of alarms. People's disembodied voices, radio communications, are constantly being broadcast over a speaker system.

The safe that contains the SAFEGUARDS materials is located in this room. The materials include the security plan and response plans for security events at the station. The operator is busy. A second officer "badges" into the room by sliding his security badge through the security badge reader outside of the door and he's greeted with an audible click. He says nothing as he sits down at a second terminal and begins reading a procedure that was already up on the screen.

Use of Nuclear Human-Performance Tools

You can see it is light outdoors by the images on the closed-circuit camera monitor displays. Some of the images are black and white and shades of grey. Others are in color. Some are thermal images, the rainbow-colored shapes of people walking down a road.

The second officer and the operator talk about a delivery vehicle that has just been searched and is about to enter the protected area once the gate is open. They open the gate using three-way communications, "open gate 3 Alfa" says the operator. "Understand. Open gate 3 Alfa" says the second officer. "That's correct," says the first officer. The second officer places his right index finger on the nameplate that says "gate 3 A" and pauses. He pushes the button and the gate that is simultaneously being monitored on the screen opens. The second officer is practicing "point STAR," pointing at an object prior to manipulating it, Stop, Think, Act, Review. It's the same process that they use in the control room to control the reactor. Security operators have embraced much of the nuclear power culture for high human performance.

Following these techniques, three-way communications, and point STAR have demonstrated improvements in human performance.

There is a lot of paper on the horizontal surfaces. And there are papers hanging from the walls. The voices from the radio traffic broadcasting continue. Frozen images of fences, vehicles, and water flows, display on the computer screens.

Chapter 5: Key Themes

Overview

This chapter presents the key themes manifested by the nuclear security officer's culture. They were developed from the participant observations, passive field observations, semi-structured interviews, and artifact analysis. The key themes include frictions between the subculture of commercial nuclear security and the commercial nuclear power culture. There are also positive themes.

The key themes are as follows:

Theme 1: Organizational isolation

Theme 2: Officer isolation

Theme 3: Officer abuse

Theme 4: Hiring manager assumptions

Theme 5: Attitudes towards employment

Theme 6: Attitudes towards staffing

Theme 7: Unpredictable work schedule

Theme 8: Industrial safety impact on security

Theme 9: Management expectations

Theme 10: Teamwork

Theme 11: Opportunities for officer involvement

Theme 12: Gender in security

Theme 13: Maintaining physical requirements

Theme 14: Working conditions

Theme 15: Celebrating accomplishment

Theme 16: Supervision

Theme 1: Organizational Isolation

Overview

The first theme is the security organization's feeling of isolation from the rest of the nuclear power plant, despite the plant having put some mitigating processes in place. This feeling of isolation is even greater if the security organization is a contract security organization. Other factors that drive the feeling of social isolation include the difference in the day-to-day mission of the security organization as compared with the missions of the other site organizations, the lower technical experiences and education of the security organization members, the authority of the security organization to enforce unpopular rules and regulations, the sometimes unequal benefits received by the security officers as compared with the rest of the station population, the ignorance of other organizations of what security does, and sometimes the failure to include the security organization in station processes and decision-making.

Description

Two Basic Management Models

There are two basic management models for commercial nuclear security. The first model is a *proprietary security model* in which usually all the security department

employees, most likely the largest single work group at a nuclear power station, report to the nuclear power company leaders and receive benefits similar to those of the other company employees, with the frequent exception of pension for the security officers. This model is the most popular one because it allows direct influence over security officer culture.

> My company doesn't have a clue how to run a security force, not a clue. The concept that we have people who are empowered, trained, and expected to shoot people, and maybe get killed in the process to defend the plant, is totally not in consonance with any of my company's core values. (Interviewee 8)

This interviewee suggests that although the proprietary security model is the most popular, the nuclear power company's core values may not be in alignment with those required to have the most effective security force. This concern and the higher cost associated with having a proprietary security force are the reasons contract security is used at many commercial nuclear power plants.

The second model is *contract security management* in which the security officers report to on-site contract security leadership, who manages a nuclear security contract with the nuclear power company. Limited numbers of nuclear power company managers work alongside the contract security leadership and are responsible for the security officers' performance through indirect leadership and contract oversight. They also manage the security regulatory and programmatic controls. The advantage of this model is that the contract security companies have stronger core competencies

in security, and contract security can cost significantly less for the commercial nuclear power company because security contractors often receive lower wages and benefits.

Contract Security Isolation

The disadvantages of the contract security model are that some contract security values conflict with those of the commercial nuclear power company, and the contract security organization's social isolation from the rest of the station is significantly more prevalent than if they were a proprietary security organization. Being in a contract security organization is the most significant factor driving the security organization's social isolation from the rest of the station organizations. When a contract security organization is transformed into a proprietary security organization, the members report that they note significantly more inclusion and less social isolation. To them, being a member of a contract nuclear security organization is like being "the red-headed stepchild."

Mission Isolation

The security organization is primarily focused on the mission of protecting the nuclear power plant. The rest of the large station organizations are primarily focused on working together for the mission of safely generating electricity. The day-to-day focus of these two groups can be conflicting.

> Security has always been the red-headed stepchild of the station. Some people just hate security. We don't put any pulses on the lines to make electricity. We're not out there to fix a pump. (Interviewee 7)

The interviewee suggests that since the nuclear security organization is not routinely involved in the station's efforts to safely generate electricity that security is often viewed as a lesser station organization. The other work groups are closer to each other, and more a part of the station family.

Technical Isolation

An overall lack of technical skills in the security organization results in security being isolated from the rest of the site's more technically orientated population.

> I think that the technical folks on the site aren't going to recognize them as an equal because they don't have that education and that background. (Interviewee 4)

This interviewee suggests that the lower security organization member's technical skills and experiences result in the rest of the station organization members not thinking of the security organization as an equal. The differences in technical experiences and education are very apparent when security organization members are asked to participate with other station organizations.

> I didn't even know what *picocuries* were and I go, "Can you guys explain this to me?" And I laughed and I felt really stupid because I really don't know what [they] were talking about and I [had] to help with [the] report. (Interviewee 1)

This interviewee from security explains how it felt to be assigned to work on an integrated team with other station employees on a non-security related issue. The interviewee did not regret the decision to work on the team, but did not realize how much of a technical gap there was between the security organization and other organizations until participating in this cross-organizational assignment. The

technical isolation is sometimes reduced by sending senior security supervision through a month-long plant operations course so they can learn the basics of plant operations and better communicate with the rest of the station population.

> I've seen now three, counting myself, security managers who have an operations background, but only three. It's not the typical because normally most security managers that I know of sometime in their life they were a security officer. (Interviewee 8)

This interviewee indicates that there has been some industry effort to hire nuclear plant operations background personnel as security managers in an effort to reduce the technical isolation, but that it is more likely that the security manager has been promoted up from being a security officer.

Authority Isolation

Security has the task of being the authority group that enforces unpopular rules and regulations to control access of people, vehicles, and cargo into the nuclear power plant in order to protect it. But these rules and regulations often impede people from what they want to do, such as getting to work promptly. Also, some station employees feel intimidated by the weapons carried by the security officers. Being the authority organization that enforces the rules and regulations creates isolation between the security organization and the rest of the station organizations.

Unequal Treatment Isolation

Companies that transform their contract security organization into a proprietary security organization often keep costs lower by not offering the security officers the same pension benefits as the other site employees. At least one in seven commercial

nuclear power sites has the situation in which, unlike the rest of the station population, their relatively new proprietary security organization officers do not have a pension benefit. These unequal benefits isolate the security organization from the rest of the station organizations.

Lack of Understanding Isolation

Much of what the security organization does on a day-to-day basis is hidden from view and discussion from the other station organizations; therefore the other station organizations do not understand what the security organization does on a day-to-day basis. This lack of understanding can be driven by the sometimes classified nature of security work, a tendency for secrecy, and the remote locations in which security work takes place as compared with the work of the other station organizations. Another reason is that unless there is an impact to the other station organizations, security functions just aren't a part of the other organizations' day-to-day conversations.

In response to this lack of understanding, some stations have developed communication plans with targeted messages to increase the value and understanding of the security organization members. These communications plans include posters and monthly news articles in the station or company newspapers. In the effort to educate the other site workers, multiple sites and NEI have used video presentations to advertise to the rest of the site what security people do for the station.

Lack of Inclusion Isolation

The social isolation experienced by the security organization is less when the security organization is treated as a partner with the other station organizations.

> The facilities that do treat security as a true partner with all the other departments tend to have better performing security programs. There is no doubt about it that those that don't give security the same amount of attention, hold them to the same expectations, and hold them as a true partner, they struggle a little bit. (Interviewee 9)

This interviewee claims that the stations that treat the security organizations as a partner by giving the security organization a seat at the table for station management processes and decision-making tend to have the better performing security organizations. Similarly, some sites have elevated the position of the security manager to security director so that the role has equal footing with the rest of the station. Thus the security director can participate in the same level discussions as the rest of the site directors.

Theme 2: Officer isolation

Overview

The nuclear security officer is socially isolated from his or her own nuclear security organization and from the other station organizations. The reasons for this additional isolation include the impact of shift work and the common practice of non-rotation of shifts, which results in the same people chronically working the night shift. The uniforms they wear and the weapons they carry further identify and isolate them from the rest of the station population. But the most significant isolating factor is that the majority of the security officers are assigned alone to remote and isolated posts.

Description

The previous theme concerned the social isolation felt by the members of the security organization as compared with the other station organizations. This related theme identifies that the security officers also feel additional social isolation, including isolation from their peers in their own organization, and thus are further isolated from the other station employees.

Shift Work Isolation

Most commercial nuclear security officers work a 12-hour shift. The 24-hour day is divided into two shifts, the day shift and the night shift. Shift work is socially isolating.

> They see when the site has a party, for example, a thousand people are given the day off and they all go someplace and they go do whatever they're doing whether it's off site or on site. Security guys can't do that. They have to work shift. If you're a night shifter, you're home sleeping when they're doing that. If you're on your day off, yeah sure you can come in on your day off, but who wants to do that? (Interviewee 9)

This interviewee notes that the working security officers often can see the station party taking place at the nuclear power plant, but unlike the engineers who can just stop doing work for the day to attend it, they can't go to it because of the nature of security work. Many other shift workers such as those from the operations department are similarly left out of some significant station-teaming activities.

Night-shift Isolation

Many of the commercial nuclear power plants do not rotate the security shifts. This non-rotation adds to the isolation of the security officers assigned to the night shift.

Because the night shift has significantly less activity, fewer other station personnel are present and therefore the opportunities for social interaction with the other work groups are much less.

Uniform Isolation

A uniform's intent is to provide the security officer with visual evidence of social power and, as a result, the uniform and the weapons they carry isolate the security officer from the rest of the site population.

> They are very visible only because of the uniforms and what they carry. So, they're in everyone's eyesight regardless of what they are doing. (Interviewee 13)

This interviewee notes that the visibility of the security officers is high because of their uniform and the weapons they carry and, as a result, the officers as individuals and security as an organization are probably more likely to be recognized for punishment and rewards.

Post Isolation

The majority of the security officers are posted alone in isolated and remote posts away from other security officers and the other station workers. These posts not only result in the security officers feeling more isolated and alone, but they also contribute to a culture of fatigue and boredom.

> When I first started, I felt very isolated. Very much and then it kind of wore out I guess after a while. It just was very lonely feeling. I was sitting somewhere unfamiliar. I guess [that] was part of it. I worked midnights so it was dark and quiet. Nothing's going on. (Interviewee 2)

This on-post isolation is often mitigated by conducting post rotations every hour or two and frequent radio checks between posts. It's also sometimes managed by limiting the number of posts that are assigned to only single individuals and by using ready rooms where officers can stand their posts together. Various management programs are also in place to limit the officers' isolation from the rest of the station population. These include period visits to the posts by supervision, shift brief visits by managers from other departments, and meals with groups of security officers and the site's executive teams to open lines of communication.

> We made sure that whenever there was a site picnic or cookout or something like that, that the security guys all got fed first. I made sure that we had arrangements made up in advance so that the food was put together and I didn't get whatever was left over at the end, you know, hauled away in the cart just before it hit the trash can and we made sure that we had stuff packaged up for them and they were getting to eat at the same time that the rest of the crowd was getting to eat. (Interviewee 10)

This interviewee notes that his station was careful to ensure that the security officers who were working the day of a site celebration were not ignored and got to play at least a minor part in the celebration but not as an afterthought.

Theme 3: Officer Abuse

Overview

Nuclear security officers are often seen being idle by the other station organizations and, as a result, they often feel disrespect from the other station organizations. Unlike other security industries, commercial nuclear security officers are not exposed to

assaults or threats of violence from the general public, but they are exposed to infrequent verbal abuse and more frequent ostracism and coldness.

Description

Perceived Idleness and Disrespect

Nuclear security officers are often seen by the station population as being idle. The security officer's main function is to wait for an attack and then to defend the nuclear power plant, so there is a lot of idle time, which leads to a greater risk of becoming bored and falling asleep—one of the worst things that a security officer can do. One way officers maintain an adequate level of attentiveness so that they will not fall asleep is to use what are called "attentiveness aids" such books and television. These aids, however can lead to only more disrespect because the other station employees see not only the apparent idleness of the security officers, but also see them reading books and watching television. Thus, they get the impression that the officers don't work hard and have it too easy. The security officers report feeling disrespected by some station employees.

No Assaults or Threats of Violence

From all the people I interviewed and all the companies that they represent, there have been no assaults on or threats of violence to commercial nuclear security officers from the general public in at least the last 10 years and most likely much further back than that. From time to time security officers get into arguments with one another, but this too is infrequent nationally. This lack of violence from the public

and other station departments is very different from that which is reported by industrial security companies in the literature review.

Low Verbal Abuse

From time to time, security officers will suffer some amount of verbal abuse from visitors to the nuclear power station, such as vendors and less frequently station employees. The reported incidents are fewer than once per year per station. This attribute is also very different from that which is reported by industrial security companies in the literature review.

More Frequent Ostracism and Coldness

The most common abuse that the security officers suffer is ostracism and coldness. Everyone interviewed had a story to tell on this topic.

> You had a security officer and a plant personnel, and we'd be at some sort of function and they would be laughing and joking and having a good time and "What department are you from?" "I'm from security." They'd like turn and walk and not even say another word to them. Turn and walk away. (Interviewee 3)

This interviewee tells the story of a security officer at his plant who was at a company party and when the security officer identified himself as such, he was immediately rejected from the social interaction. More frequently than ostracism, the security officers deal with employees, including the rare executive, at the vehicle checkpoint and access facility who display coldness and an unwillingness to provide even a minimum of social politeness such as a brief hello.

Theme 4: Hiring-manager Assumptions

Overview

This theme concerns the sometimes contradictory opinions of the managers who are seeking the best possible security officer candidates. They agree that they want to hire people who will stay. Many think that former military personnel make good candidates and that former police officers often make poor candidates. The number of women in a site's commercial nuclear security organization can be between near zero and a third of the station's security force, depending on the site manager's hiring assumptions. Thus, commercial nuclear power plants can have very different levels of experience in their security organizations and very different percentages of gender balances.

Description

Managers do not agree on where to find the best commercial nuclear security officers. Security officer attrition averages range from about 8 to 12 percent per year, so most nuclear power stations have new-hire training class about once per year.

Desire for People Who Will Stay

Hiring practices and manager concerns reflect a desire to hire people who will stay longer.

> I look for folks that are going to stick around for a while. You know, looking for the folks that were family, tried to find somebody who had family, always looked for people who were intelligent. (Interviewee 7)

This interviewee who has no security experiences other than commercial nuclear security reflects the desires of many of the managers to hire local people, often with

no military, police, or other armed security experience. The local people often come with a higher initial and continuing training need because of the numerous weapons qualifications required of a commercial nuclear security officer. However, because they are local, they may have more incentive to stay on the job.

Former Military As Good Candidates

Many of the sites believe that the best candidate for a security position has at least some previous weapons-carrying employment, preferably former military experience.

> Typically what makes a good candidate, which I can tell you from past experience, is somebody that has at least some military background. Law enforcement in some cases is good. In some cases not so good because you've got to break bad habits. (Interviewee 8)

This interviewee reflected the opinion of the majority. People with previous military background are a preferred source of commercial nuclear security officers, and former police often do not work out well because they are used to more activity than what commercial nuclear security provides on a routine basis. Nonetheless, because of the remote locations of some of the commercial nuclear power plants, the applicant pool usually doesn't contain many former military personnel.

Typical Security Organization

If there is a military base nearby or there is a recruiting strategy that emphasizes the desire to hire only people who have had previous weapons-carrying employment, the security force will have much fewer women in it because fewer women have these experiences. A common security force is made up of about one-third people with

some sort of previous security experience, one-third people from other occupations, and one-third with no prior significant employment.

Sites Preferring Battle-hardened Veterans

There has never been a terrorist attack on a commercial nuclear power plant in the U.S. This fact is not lost on the commercial nuclear power security force or on the plant executives, and it is one of the drivers for some sites to prefer to hire only battled-hardened military veterans in case that day comes.

> Would you really feel comfortable going to bed at night ….and you've got right now what percent of that have seen action? If the flag goes up, or whatever you want to say, and you're going to be in the fight and you replace that with a bunch of people that just came out of shoe sales so to speak. (Interviewee 14)

This interviewee makes a comparison between two nuclear power sites. The first, his own, is comprised mostly of military veterans who have seen a lot of action in war. The second site, the one that he visited, had a large population of people who have seen no action. His view was that if the flag were to go up, meaning should the power plants be attacked, he would be much more comfortable having the veterans defend the plant.

Theme 5: Attitudes Toward Employment

Overview

This theme concerns the longevity attitudes of the officers who join commercial nuclear security. All are attracted by the high wages and benefits. Some come intending the job to be long-term employment. Some come with the intent to leave

one day. Some find themselves trapped in a job that they don't want because the high wages and benefits can't be found in another, more desirable profession.

Description

Commercial nuclear security is a paramilitary organization focused on plant protection. The detailed reasons that people are attracted to this profession are numerous, but they include the high wages and benefits. Other studies have attempted to describe the attitudes towards employment (McLeod, 2002; Michael, 2002) and although there are some similarities, there are more differences.

Types of People Attracted to the Job

Stepping stones

People hire into commercial nuclear security to take advantage of the new employee security training, and the frequently generous utility education benefits. These "stepping stones" intend to use this education as a stepping stone to employment in another security field, such as the police, Federal Bureau of Investigation, or the border patrol.

Pensioners

People hire in to commercial nuclear security upon their retirement from another security organization such as the military or police to augment their pensions. These "pensioners" are attracted to the paramilitary security occupation because of its familiar reporting structure, armament, and training.

Family Supporters

People, especially in the rural areas, hire into commercial nuclear security intending to make it a career because the wages and benefits are high enough to support a family. These “family supporters” are amongst the more desirable employees because it is assumed they will stay longer.

Paramilitary Being Military Enough

People seeking something similar to the military or the police but who left these organizations due to the higher stresses in those organizations come to paramilitary commercial nuclear security because it’s “military or police enough” or familiar and less rigid. These “paramilitary is military enough” people seek to work with people who have backgrounds similar to their own.

People on the Go

Often people hire into commercial nuclear security intending only to stay until something better comes along or because they were laid off from their desired profession. These “people on the go” intend to stay until the economy improves and they can be rehired into their preferred profession.

Feeders

Increasingly people are hiring into commercial nuclear security with the intent of finding another job in the commercial nuclear organization, such as operations or accounting, or to find a job in the larger utility organizations. Utilities often employ tens of thousands of people in multiple professions and the job opportunities are higher for those already working in the company. Some utilities purposely hire people into security as “feeders” to other nuclear power plant work groups. But unfortunately

the term also has other connotations. One security officer overheard a human resources employee refer to security as a "feeder group" and thought she meant it as an insult, as in the phrase "bottom feeder group." His interpretation of this assumed insult promptly spread through the officer ranks, resulting in officer outrage that human resources was being disrespectful to the security officers.

Platinum Handcuffs

Many find that they don't like the job or are ready to leave, but due to their financial situation, are not able to leave. Some of the officers call this predicament, "platinum handcuffs."

> There are a lot of security officers who truly hate their job, but they know that they're not going to go out and find another job that starts out at 18 dollars per hour. (Interviewee 15)

This interviewee notes that although there may be different reasons for joining commercial nuclear security, many of the people, such as the stepping stones and the people on the go, find that the high wages and benefits trap them into a career that they may not have intended to stay in for long.

Theme 6: Attitudes Toward Staffing

Overview

This theme concerns the drivers for security's minimum and supplemental staffing, the unintended consequences of overstaffing, the impacts of attrition, and how officers lost by attrition are replaced.

Description

Minimum Security Staffing and Supplemental Security Staffing

A site's security officer staffing is a function of the site's protective strategy, which sets the minimum security officer staffing required by the NRC and the services that the nuclear power plant site wants security to support, which sets the supplemental security staffing.

The site's protective strategy is highly reliant upon the site's terrain. For example, a site located in the center of a large flat, treeless field with no buildings, located along the perimeter of the security fence is easier to defend and this site's protective strategy will require fewer officers for protection than sites without this ideal terrain. A general rule of thumb is to ensure that weapons that are shooting fields of fire will overlap (Whitehead, Potter, & O'Connor, 2007), and this overlap is a significant factor in setting the minimum security staffing. Commercial nuclear power plants are prohibited by the NRC from dropping below minimum security officer staffing, and if this should happen, the utility is required to take prompt actions to restore staffing and make reports to the NRC. Most likely this failing will prompt regulator actions and negative publicity to the company.

The sites with higher security service demands, such as personnel and vehicle escort, search, and access controls require more officers to perform these services. For example, efficient sites have only one personnel access point through the security fence. The security officers and supervisors who perform these extra security services

are referred to as supplemental officers. When the number of supplemental officers is low, some security services can be curtailed or stopped entirely which can result in long lines of cars or people waiting to get searched, which subsequently leads to irate employees. Most irate calls to the security manager are in response to a lack of expected security services, especially during the morning rush period or during an outage period when a high number of contractors add to the number of people needing to enter the site. Lack of security services can quickly cost the company a lot of money because of station work-delays, but efficient security services are not regulated by the NRC.

Security Infrastructure Often an Inefficient Back-fit Design

Physical security for the current commercial nuclear power plants has largely been a back-fit effort, because the terrain, nuclear power plant, and buildings were already in place when many of the security requirements were first implemented. Thus inefficiencies and the resultant frustrations associated with inefficiencies abound and affect both minimum security staffing and supplemental security staffing.

Supplemental Officers Sometimes Used to Meet Minimum Staffing

It is a common occurrence to "rob Peter to pay Paul." That is, if the security manager finds that the shift staffing for the day is short on minimum staff officers, he or she curtails or shuts down a security service. This curtailment may include disrupting planned station work support because the now freed-up officers are needed elsewhere to meet the minimum staffing requirements. The training requirements for the minimum staff officers and the supplemental officers are the same.

Overstaffing the Security Shift

To avoid regulatory scrutiny for going below minimum staffing and irate employee reactions for having too few supplemental security officers, the security manager staffs extra officers on shift. As a result, the shift is often overstaffed with extra officers who have no planned work assignments. A security officer who is a part of this overstaffing will often introduce himself or herself as, “I’m extra.” From a cost perspective, the goal for security staffing is to have just enough extra officers scheduled for the day to cover for the unanticipated equipment issues and officer call-offs. The officers and supervisors know that overstaffing occurs, and this overstaffing has multiple unintended consequences.

Unintended Consequences of Overstaffing the Shift

Overstaffing is common knowledge and encourages a culture of many officers feeling that someone will be present to cover for them, should they not want to go to work and call-off. The second unintended consequence is that station workers in need of security services see security services as being flexible with plenty of security officers to go around and expect their unscheduled security needs to be met. This dynamic creates a continuing struggle to meet unscheduled security services, especially on the many days when the overstaffing just meets the security officer call-off burden and the net result is that there are no extra officers.

Security Officer Call-offs

Some officers call-off for various stated reasons, including family emergency and sickness.

> I think operators tend to be, and I'd hate for any of my security guys to hear this, higher professionalism and commitment there than your average security guy because I think they have a higher recognition of the impact it has on their fellows. They're smaller crews. You've got an Ops crew of five or six guys and they know they need an X number of guys here and if I call off it's going to have this impact. (Interviewee 10)

This interviewee notes that the security culture includes more incidents of call-offs when compared with the gold standard of the operations department because of a perception that their absence doesn't have much of an impact on the other security officers on shift.

Company Policies That Entice Poor Behaviors

Some company policies with regard to sick time benefits (e.g., use it or lose it, but don't use it if you aren't sick) result in the unintended consequences of employees calling off from work to use this perceived entitlement rather than lose the time.

Hiring New Officers Due to Attrition

Increased Shift Overtime Due to Attrition

The common schedule is a 12-hour non-rotating shift schedule with four self-relieving crews. Self-relieving crews are staffed so that crew members can schedule time off, including such things as training, military reserve duty, and vacation. There are more officers available to cover the time off needs on the day a new employee security officer class graduates and is assigned to the security shifts. Over the next year, the individual officer's work burden gradually increases due to attrition until the next new hire class is put on shift.

Length of New-hire Training: 3–4 Months

The security training that new hires receive to be a commercial nuclear security officer is regulated by the NRC and includes a significant amount of weapons training, which could include handguns, assault rifles, and shotguns, as well as non-lethal force weapons such as pepper spray. The general nuclear training requirements include radiation protection fundamentals, emergency plan requirements, general security requirements, chemical hazards, and industrial safety fundamentals.

> Most people don't even realize we have a 3–4 month training program and most people, I think, really believe that we hired someone off the street and in two weeks they're standing post. (Interviewee 15)

This interviewee points out that the training program is rigorous and takes months to complete. Thus the time to recruit, hire, and train delays getting extra people on shift, should attrition be more than anticipated.

Theme 7: Unpredictable Work Schedule

Overview

The security officer's number one concern is how overtime is allotted and how often it needs to be worked. This theme concerns the need for and impact of overtime, especially forced overtime, the impact of shiftwork, and the nuances and impact of the industry preferred 12-hour shift. Overtime and shiftwork conspire to make the security officer's work schedule unpredictable.

Description

Need for Overtime

Cost pressures keep the total number of security officers low. Attrition drives the number of security officers even lower. It is not possible to recruit, hire, and train additional officers to minimize unforeseen staffing burdens, which can last for months at a time. For security services to be flexible, there needs to be a pool of extra officers to use for security services that are above and beyond the normal, and this is the primary reason for officer overtime. One recent advertisement for an armed nuclear security officer (see Appendix M) stated, "Overtime should be expected; normal range is 10 to 20%" (G4S, 2013). The planned and unplanned need for overtime work is the main reason for the security officer's often unpredictable work schedules.

Overtime and How It Is Allotted

There are always some officers who want more overtime because of the extra money and the ones who want the most are often referred to as "overtime whores." Some officers want no overtime at all, perhaps because they have a second income from a military pension, or they want a social life or time with family. Some deal with the inflexible childcare provisions of the single parent or the dual income family. Others share childcare responsibilities with a security officer on another crew.

The best processes to award overtime include an emphasis on using volunteers, a focus on trying to even out the overtime amongst all officers, and a fair procedure to follow when overtime needs to be "forced" to meet the shift staffing requirements.

Fairness requires that the forced overtime burden be shared amongst all officers. The amount of overtime that can be worked is capped due to government "work-hour rules," the intent of which is to minimize fatigue issues at nuclear power plants.

Impact of Overtime

What is clear is that if officer staffing-shortages result in large amounts of overtime, security officer performance suffers. The impacted performance is evident in subjective areas such as morale and in objective areas such as attrition, allegations made to the NRC, industrial safety accident rate, and human performance error rate. Some companies have business performance metrics for attrition, call-offs, and overtime, and they use these metrics in an effort to minimize the costs associated with each.

Impact of Shiftwork

Commercial nuclear security has a culture that is shared with other shift workers from other industries. One symptom of this shiftwork culture is a fear of answering the phone because it might be someone from work calling to assign forced overtime. Another cultural trait is fatigue.

Personal Life

New hire officers don't experience the full impact of the shiftwork schedule until they qualify. The new-hire employees can't fully grasp the shift work schedule until their first full day or night of shift assignments and then are assigned forced overtime for the first time. The new-hire class officers work a 40-hour week until they graduate. Normally their schedule is an 8-hour day shift, and most likely the trainees are not

eligible for overtime. The actual work period with its briefs and turnovers will be longer than the new-hire employees imagine it will be. The first time one of these new-hire employees calls his or her significant other with the news that he or she needs to work on the day off that they had planned to be together will most likely take some of the shine off of the new job.

Long Commute Times

A long door-to-door workday and long commute distances are common. Due to the high station wages and benefits, many security officers will travel up to 100 miles to come to work. The number of employees with long commutes is very often significant. These long commute distances were not what was envisioned by the NRC when they published the work-hour rules nor were they considered by companies when they established the 12-hour shifts.

> You're not going to find that kind of a paying job unless you have a great deal of education or unique craft, or you just flat out work 12, 14 hours a day, six days a week. So for many of them, it is the ideal balance between time with your family and enough money to survive. So they'll drive quite a ways for that. (Interviewee 5)

This interviewee suggests that because of the high wages and benefits, people are willing to drive long distances to work in security at a commercial nuclear power plant. But these long distances contribute to a very long workday, often up to about 15 hours door to door.

Time for Training

The shift work-schedule also makes it difficult to find time to train for more than requalification or recertification. By its design, the 12-hour shift schedule has self-

relieving crews where small groups of officers can be taken off shift to conduct a limited amount of recurring training on a quarterly or trimester basis. A common complaint for security officers is that security does not teach during training; rather, the training centers on requalification or recertification. The nature of the security officer's job is that they are required by the NRC to be able to perform all of their job functions, also called critical tasks, on any given day. The officers must maintain the qualifications necessary to perform each of them. Thus, officer training needs to have a significant emphasis on recertification of these critical tasks.

But the officers would like to have training on non-critical task-related security topics such as plant operations, operating experience, security threat assessments, and interview techniques. They also request additional time on the range to practice their shooting skills. Management would like additional time to train the supervisors on management and leadership topics. But training time is limited due the shift schedule, and some just-in-time training is completed by using "read-and-signs" or the material is covered at a shift brief. A "read-and-sign" is normally a document that summarizes a change in policy or procedure that is read and signed by the officer to demonstrate that the officer has read and understands it. One corporate senior executive described the culture of security as a "read-and-sign organization," because officer knowledge retention of "read-and-sign" information is often low.

> We are not designed with respect to a training program that the other departments have where they can dedicate training time during a normally scheduled work week. We do not have that option because of

> our shift schedules. It would have to be done on an overtime basis, which we don't support. (Interviewee 11)

This interviewee points out that security forces often do not have the dedicated training time that other station departments have. To find additional training time would require more overtime, which is capped by the NRC work-hour rules.

Experiential Learning

Another impact of the shift work is the uneven experiential learning of the fixed crews. Most often, the 8- and 12-hour shift schedules are fixed and the security officers do not rotate from day shift to night shift. The general practice is that the assignment of shifts, or "shift picks," are done by the officer's seniority. Because it is less desirable, the night shift tends to collect the less experienced and junior officers.

> The day shift is going to get the activity, so they're going to get the operational experience. Evening shift, not so much, and then the night shift hardly any at all. (Interviewee 6)

This interviewee is at one of the very few sites that use an 8-hour work shift. He notes that not only do the back shifts tend to collect the more junior officers because of the way shift picks are done, but he also notes that the people on the back shifts are less likely to learn from experience because of the low number of security support activities on the back shifts.

Theme 8: Industrial Safety Impact on Security

Overview

This theme concerns the need for security to go into harm's way, to train the way that they're going to fight, yet to do so in a workplace nuclear power culture that highly values excellent industrial safety performance.

Description

The nuclear safety culture includes promoting an environment where employees can raise nuclear safety concerns without fear of retaliation. The culture also includes a high regard for nuclear safety, radiological safety, and industrial safety. Industrial safety is where the paradox lies.

Unsafe Acts in a Safety Culture

Going in harm's way is an unsafe act. The security force is unique when compared with the rest of the station employees in that their mission is to protect the plant, but that mission can conflict with industrial safety values. Protecting the plant requires fit people under stress to perform unsafe acts, which include going into harm's way to engage attackers with deadly force.

> Nobody else is expected to necessarily die in defense of the plant. Now we're not supposed to die, but that's always a possibility, so that in and of itself separates the security force from anybody else on site. The rest of the site doesn't have that appreciation. They don't understand it. (Interviewee 8)

This interviewee notes that security personnel feel they are separate from the rest of the site organizations because as a part of their job, they are essentially being asked to die in defense of the plant. This defense culture results in the security officer's

attitude toward industrial safety being different from that of the rest of the station employees in that many see a value conflict in good industrial safety as compared with good security

Seconds to Make a Decision to Shoot

An officer needs to decide to shoot or not to shoot based on their training and what they see and hear, rather than on what others tell them. The decision to shoot must be made in a matter of seconds.

> Security officers, when a contingency happens…bad guy jumps the fence or whatever, they have to remember off the top of their head, *I have to go to this point, I have to go to that point, I have to remember my responsibilities, I got to remember to put on my protective gear.* All those things. They have to remember, snap to, and run and get out there. And, oh by the way, an event for the operator he's got minutes or even you know at least minutes if not tens of minutes or hours to get through something. Security…seconds. (Interviewee 7)

This interviewee notes that the security officer who is under stress during an attack needs to quickly remember what they have been trained to do and to make the correct decision on how to respond in the matter of seconds. Even the gold standard of the operations department people have much longer to make a decision. This quick-decision requirement factors into the difference in the way that security officers perceive industrial safety risk.

Risks for Industrial Safety Injuries

Managers from every department invest energy and focus on keeping a good industrial safety accident rate and present their industrial safety performance in a multitude of meetings in front of peers from other departments and with senior station

managers and executives. Energy and focus are necessary because opportunities for security officers to get injured are numerous.

> They're given jobs that are, you know, largely prone to lots of opportunities for errors, but also injuries. They're running drills, they're walking a lot, they're bending a lot, they're carrying weapons and walking through halls, and opening and closing, and messing with big heavy doors, gates, locks, and those kinds of things. They drive a lot; 24/7 security vehicles are going. Lots of opportunities for accidents and injuries. (Interviewee 10)

This interviewee describes the various physical activities that the security officers are engaged in 24 hours per day, 7 days per week, and, as a result, the officers are at risk for accidents and injuries.

Focus on Industrial Safety

The nuclear culture is risk adverse and tolerates only the highest performance in industrial safety. Industrial safety is measured and compared with other nuclear power stations across the U.S. Sites with poor industrial safety performance are penalized not only by their parent company with reduction in discretionary bonuses for their employees but also by the INPO in their index and ranking of performance of the commercial nuclear power plants. This high focus on industrial safety influences the way that security is performed.

> If you're in the military or law enforcement you expect security or you expect those guys to possibly have a minor injury in training. Their philosophy is, *You get hurt a little bit in training, but that prevents you getting hurt much worse in a real situation.* For us, because there haven't been any real situations, they don't see that need to train to that level. (Interviewee 10)

This interviewee notes that other parapolice or military organizations appear to have a higher tolerance for industrial safety injuries than does commercial nuclear security because of a perceived need to perform higher intensity training.

But training isn't the only security activity that is influenced by the organizational focus on industrial safety. For example, defensive strategies are sometimes designed so that officers do not need to run to implement the strategy because running puts an officer at risk for serious injury from tripping and falling. As much as possible, security equipment is staged so that security officers do not have to carry it in the course of their duties because carrying a lot of weight can cause chronic injuries. Security patrol routes are designed to be along "safe paths" to minimize the opportunity to trip and fall or to drive into an obstacle. Officer posts are designed to be more sedentary to reduce the probability for trips and falls in the plant. Foot patrol frequency is reduced to only that which is necessary. Training intensity is reduced to minimize the chance of injury. Gym facilities on post are rarely provided because of the fear of officer injury. Pistols are carried cold and manipulated infrequently instead of being carried hot, thus allowing the officers to maintain greater familiarity with their weapons.

Impact of Work Injuries

This organizational industrial safety focus has significant impact on the work life of those who are injured. One security supervisor injured himself when he "ran as fast as he could" during a fire drill. Because of the severity of the injury, which rose to the

level of a station clock reset, the injury was a point of station discussion by all departments on a daily basis until the topic was replaced by the next injury about six months later. Station employees sometimes joke under their breaths, “If you find me injured, please ensure you throw me over the fence” because they know the high accounting they will need to undergo should the injury occur at work.

Theme 9: Management Expectations

Overview

This theme concerns how management expectations are taught to the commercial nuclear security force and how they are monitored to ensure that they are understood and met. It also concerns how even small deviations from management expectations are reported, tracked, trended, and resolved. There are also concerns about how daily feedback from station employees can result in behaviors that may be detrimental to good security.

Description

Teaching Management Expectations

During the new employee classes, the newly hired security officers learn what is expected of them through review and study of more than 70 security-related policies and procedures and a myriad of company general policies and procedures. They also learn through class lectures, on the job training, and task performance evaluations. During the task performance evaluations, each officer must perform graded tasks to the satisfaction of a certified task performance evaluator to become certified in the task. Tasks can range from using the x-ray machine, personnel search, weapon

qualification, and vehicle search. There are about 22 critical tasks that the students need to complete before they can be qualified as an armed nuclear security officer. Continuing security training is completed through a systematic approach and includes the security officers recertifying on the critical tasks once per year.

> The way I see nuclear security these days is up and above local law enforcement. It's unique, but they're the elite of the basic security officers out there. I think they're better qualified, better trained, than a lot of the law enforcement officers out on the streets these days. (Interviewee 9)

This interviewee comments about how the commercial nuclear security officer training program is thought to produce a very highly trained security officer, even better trained than some law enforcement officers. Commercial nuclear security officers include former Transportation Safety Administration (TSA) officers, former sheriffs, and former police officers, and they are sometimes led by retired Federal Bureau of Investigation (FBI) employees, so discussion of the differences are common.

Procedure Use and Adherence

Expectations continue to be enforced through a culture trait of "procedure use and adherence," which is monitored through the field behaviors of the security officers.

> We do provide a lot of oversight. We're one of the largest groups when it comes to observations done. We're out in the field a lot, from myself on down. Eight hours of observation per month have to be documented. (Interviewee 12)

This interviewee describes the supervisory and management oversight of nuclear security officers in the field as a part of the formal station observation program.

Supervisors and managers demonstrate a culture trait of oversight by spending time in the field doing formal observations of security officers' behaviors to ensure that management expectations are understood and are being carried out.

> They have to be on their A game all the time. Every day when they're sitting around the x-ray machine they have to have their A-game going because they never know when someone is going to be slipping something through. (Interviewee 7)

This interviewee notes the management expectation that security officer always have high performance or a cultural trait of vigilance because of the unpredictable nature of a potential security threat. Management and supervisory oversight in the field is used to maintain this high performance.

Corrective Action Program

Deviations from procedures are expected to be reported to supervision and recorded in the nuclear power plant's corrective action program, a program required by the NRC for the entire station to ensure that even the smallest defects are tracked, trended, and resolved. These are cultural traits of reporting problems and problem resolution. Corrective actions to prevent recurrence for issues are formally developed and implemented. Effectiveness reviews are conducted to ensure that the corrective actions are effective.

Daily Feedback

While conducting uneventful screening activities hour after hour, an officer is more likely to receive feedback for good or poor customer service than for excellent security work, such as a detailed contraband search.

> The primary function is defending the plant and also providing customer service. In meeting regulations, we're providing a service to the employees in the search trains for example. So, it's a lot of interaction with the site population. And a lot of positive comments come from the site population because the officers understand this is a service we are providing. But at the same time, they get to know the people. So, when they come in, they're smiling, they're greeting, and there is interaction with the site population. The drawback to that is…you can become too complacent, too comfortable, too. So, now and then stuff can get in. So you gotta be careful. There is a fine line between the customer service you are providing and then becoming so relaxed that you aren't paying attention to your job. (Interviewee 13)

This interviewee identifies the concern that security officers can become too close to the site worker population and as a result become complacent or too comfortable and not pay adequate attention to the security officer's primary duties. He identifies a cultural trait of positive feedback for good customer service.

Theme 10: Teamwork

Overview

There is a theme of teamwork in security for two main reasons. The nuclear safety culture trait of procedure use and adherence and the large number of procedures that the security officers are encouraged to do from memory encourage mutual support and teamwork. The second is that the successful defense of the plant during drills and exercises requires that the security officers perform as a team. There is some evidence of security officer reluctance to report their fellow officers for low-level infractions because of the need for teamwork and because of isolation-driven solidarity.

Description

Aiding Each Other for Procedure Use and Adherence

The commercial nuclear security culture includes a trait of procedural compliance. Procedures are divided into three categories: continuous use, reference use, and informational use (INPO, 2009). Most of the more than 70 security-related policies and procedures are designated as informational use, which means they are within the knowledge and skills of experienced individuals and the user may complete the task from memory. However, the user is responsible for performing the activity in accordance with the procedure.

> There is also a culture there of helping each other out because of all the procedures that you have to follow. In security, failure to follow a procedure can have significant consequences on your employment status. (Interviewee 6)

The interviewee states that security officers are expected to know many procedures. But they use some of them infrequently because they are assigned some of the more complicated posts or complicated activities on an infrequent basis. Some procedures are located at the security officer's post so that he or she can refer to them to help remember all the things he or she needs to do. Many of the procedures are not immediately accessible and can be inconvenient to obtain and thus the security officers don't always refer to them when they should. Commercial nuclear power security is highly regulated and, as a consequence, errors caused by not following policies and procedures are highly visible to the organization, station, and regulator. The interviewee also states that not following a procedure can have a significant impact on the officer, including discipline and termination of employment. Thus,

security officers often rely on each other to verify or remember what the policies and procedures require them to do, rather than referring back to them.

Aiding Each Other in Defense of the Plant

A force-on-force drill or exercise is performed to demonstrate the officer's ability to defend the nuclear power plant and to simulate combat between a mock adversary force and the nuclear power plant's security force. The adversary force attempts to reach and simulate damage to significant systems and components (referred to as "target sets") that protect the reactor's core or the spent fuel pool, which could potentially cause a radioactive release to the environment. The licensee's security force, in turn, attempts to interdict the adversary to prevent the adversary from reaching target sets and thus causing such a release (NRC, 2013b).

> Generally it takes one drill for somebody who is not gelling with the team to either realize themselves is not as important as the team or they will never get it and they will leave security. (Interviewee 5)

The drills and exercises are run on a quarterly basis per security shift (GPO, 2013). This interviewee states that security officers quickly realize during these drills and exercises that they need to be part of the team in order to succeed. The drills and exercises test the security officer's ability to work as a team to adequately defend the station. Poor performance on drills and exercises can have an impact similar to that of employment status.

Officers Reporting Issues Involving Other Officers

The nuclear safety culture includes a trait of problem identification and resolution, which includes security officer identification of noncompliance issues completely, accurately, and in a timely manner. This day-to-day reporting of issues includes the need for security officers to report mistakes that they identified with their peers' behaviors and performance.

> I think that they would be less inclined to report a fellow officer for doing something inappropriate…. I think they do, for lack of a better word, cover for each other. From time to time you do see somebody reporting another officer, but I think that's more rare. (Interviewee 8)

This interviewee, who was in the minority group, believes that there is a reluctance for officers to report one another. This reluctance is thought to be driven by two factors, first being the teamwork requirement for the security officers to be able to do their jobs effectively. The second is that the security officers, since they are isolated and uniquely responsible for protecting the plant, feel the need for solidarity, which is similar to what in the police culture is known as "the thin blue line."

Theme 11: Opportunities for Officer Involvement

Overview

This theme concerns the efforts of security management to provide opportunities for security officers to get involved. Management demonstrates that the officers' opinions matter and work with the officers to make improvements.

Description

During a typical workday, most of the security officers are assigned alone to isolated and remote posts. Some stations are designed differently and have a handful of

officers posted to one or more ready rooms instead of the isolated and remote posts. The few officers not assigned to these isolated and remote posts or ready rooms perform more physically active assignments such as searching people or vehicles, or performing vehicle or foot patrols. Thus the security officers, the highly trained paramilitary force, complete their initial training courses and certifications, and then, for the most part, are primarily asked to sit and wait.

> You're on the assembly line and at the end of the day you're thinking, I did my part. We made our quota to make 1500 saws, or whatever it is. Or if you're a homebuilder and you walk away, well there is a home. In security, nothing happened and we documented it, and we go home and it was successful and all is well. (Interviewee 6)

This interviewee identifies that the nuclear security officer job has little tangible evidence of a successful day's work. This lack of measurement highlights the challenge of providing meaningful opportunities for security officers to do what they do best every day, especially in the absence of attack.

Making Opportunities to Involve the Security Officers

Commercial nuclear power plants have discovered various ways to provide opportunities for security officers to do what they do best every day. These opportunities include qualifying all commercial nuclear security officers to the same qualification level, rather than having different classifications of security officers perform specific tasks. For example, officers are scheduled for post rotations from low-activity posts to high-activity posts on a periodic basis so that they don't spend day after day in a low-activity post such as a tower. Upgrade programs have been put in place so that officers can perform some supervisory tasks such as serving as alarm

station operator during a supervisor's absence. Collateral duties have been assigned to the officers, such as being a procurement specialist who can order such things as new weapons or training supplies. Officers are given procedure changes to review or procedures to re-write in an effort to make the processes more streamlined and/or officer friendly. On shift, officers can obtain special qualifications such as those for equipment tester or forklift driver.

> The officers you know, if you include them, they'll help you figure out the shortcuts. (Interviewee 7)

This interviewee points out that by including the security officers in solving problems, not only do they get a chance to do what they do best every day, but also the result is a better and more efficient processes.

Demonstrating that Officers' Opinions Matter

Since the officers are together as a group only during the short daily shift-brief and then spread out throughout the site and mostly posted alone, gathering their opinions can be time consuming and difficult.

> If you're talking, you're open, you're honest, you're straight-forward and you're telling them what is going on and you're telling them truthfully from the heart, *this is it*. And you're keeping them in the know and you're listening to them and you're taking what they're giving you and you're putting some value in it and showing them that you're going to make some changes. It works miracles. (Interviewee 15)

This interviewee reflects on the importance of open and honest communications with the security officers and finding ways to gather the officers' opinions and then to demonstrate that these opinions matter by making changes. He further reflects that

making changes based on the officer's opinions can result in significant organizational improvements including morale and efficiencies. Ways to gather these opinions include having the supervisor canvas their employees for their opinions on topics, formal surveys, and the use of security improvement focus teams (SIFTs).

Security Improvement Focus Teams (SIFT)

Many sites use improvement focus teams where officer representatives meet together periodically to discuss items of officer concern and prioritize them for resolution. The officers then go back to their assigned crews to gather the opinions of the peers. The team then meets again with supervisors and managers to resolve the identified issues. In this fashion, officer issues are identified, officer opinions are made to matter, and the officers are engaged in solving the issues that they have identified.

Theme 12: Gender in Security

Overview

This theme identifies that the majority of commercial nuclear security officers are male and discussions of violence are commonplace. Uniforms and equipment are procured to a unisex standard that favors men. Some security managers prefer to hire only battled-hardened military veterans, and this orientation tends to exclude women. Although there may be initial skepticism, when tested, women's performance on the job is good.

Description

The majority of the security force is comprised of men, and women comprise from only a few to nearly one-third of a site's security force. The security officer mission

to defend the plant from attack, and the weapons and other tools employed to succeed in this mission, result in frequent discussions alluding to violence.

> I believe a good sock in their face is better than a smile, you, know, when it comes for security. Because guess what? I don't want you to be my friend. I want you to have all your crap right. All this friend stuff? Can you do it and do your job? (Interviewee 14)

This interviewee expresses his concern that there be a separation between security and the rest of the station population in order to have effective security. His choice of violence-laden words to express this thought is not atypical.

Physical Nature of the Job

The nuclear security officer positions require a higher level of physical capability because of the foot patrols and the site's defensive strategies.

> It's more of a guy culture because when you think of security or law enforcement or something, you think of it as a guy's job because of carrying a gun, having to go to the range and shoot. The physical stuff you have to do. I mean this stuff [pointing to the equipment carried on the interviewee's body] is not light and you know running everything we have to do, you don't see a lot of women ….in these kind of positions. (Interviewee 1)

This interviewee, a woman, suggests that women are less likely to be attracted to the nuclear security officer field because similar professions of security or law enforcement have traditionally been male, and that the physical requirements of the position are not appealing to many women.

The Unisex Standard

Equipment such as uniform items is often procured to a male or unisex standard, which favors a man's body proportions.

> I asked this young female, "Does that fit? "No." "Would you wear it?" "No." (Interviewee 8)

This interviewee was asking a female security officer about the bulletproof vest that was available for her to use. But because of her small size, she knew the vest would not fit and thus she would not opt to put it on in an attack.

Preference for Battled-hardened Veterans

Battle-hardened veterans sometimes look negatively toward hiring anyone other than other battle-hardened veterans, largely because they feel that only veterans like themselves can be counted on in the time of an attack. There are few women who are battled hardened.

> They were really moms. You know, like Brownies. Let's go to Brownies after work today. You know, moms. If you would have said, "port arms," they would not know if you were talking left, right, ….nothing. They had no clue. And you're sitting there, looking and going, I'm glad that that nuclear plant is 20 miles from my house, and not this one, because I think those places pretty much would be taken with people with sticks. (Interviewee 14)

This interviewee was from a station that hired mostly battle-hardened veterans and few women in security. He visited a station that had about one-third women in their security force and he did not have high confidence, based on the high number of women that he saw, that they would be as successful in defending an attack because he didn't view them as strong or militaristic enough.

Women's Security Performance

In 2004, responding to new requirements from the NRC, the number of security officers in commercial nuclear security increased significantly and the training and

qualification standards increased and became much more paramilitary. Many of the original employees had no previous military experiences upon which to draw.

> I've seen the stereotypical housewife. Hates jails, hates guns, hates the whole military part of it, but she's still there after eight years. Then I watched her in a drill and as soon as the action started, she forgot all that fear, forgot all that, "Oh, I hate guns" and "I'm afraid I'll mess up" stuff and engaged without hesitation. I have a lot of confidence in our officers. (Interviewee 5)

This interviewee emphasizes the discrepancy between his own stereotypes of women and the high standards to which they rose when performing their jobs. Commercial nuclear security undergoes a rigorous testing and inspection program that is led by the NRC, and the nuclear power stations have to prove they can defend against the design basis threat (NRC, 2013b). There have been no identified concerns with the utility hiring practices, which in many cases give women equal access to the positions.

Theme 13: Maintaining Physical Requirements

Overview

Security officers are concerned that they may not be able to reach retirement age because they perceive the physical fitness requirements to be more difficult to meet as the security officers get older. Unlike many other station employees who can be accommodated with less physical employment should they lose some physical capability, security officers must continue to meet all of the physically demanding requirements to maintain their employment. This concern is further exacerbated because many security officers, unlike most other station employees, are not provided a pension.

Description

To maintain employment, security officers must meet the minimum job functions of the commercial nuclear security officer. These functions include the physical requirements of being able to carry approximately 28 pounds of security related equipment up and down stairs, to open heavy doors, to see out of both eyes, to hear, to speak, and to shoot with both hands. In contrast to other site workers, these physical requirements are stringent.

Age-related Concerns

At many stations the main security officer concern is the potential inability to meet the physical requirements year after year.

> The top one is being able to physically meet the requirements to keep their job. I know that for a fact. That is something that they worry about a lot. (Interviewee 10)

This interviewee identifies that the top security officer concern is being able to meet the physical requirements of the nuclear security officer. These requirements include the need to pass an annual physical fitness test, a physical examination, and various weapons qualifications. There is very little work available for security officers who cannot meet the security officer essential job functions, so the inability to pass the required tests and qualifications can result in a loss of the officer's employment.

> I had two people retire from the security force since I've been here, but only two. Most of them fall apart, run into heart problems, put them on long-term disability, and after the sufficient time has gone by, they're terminated. (Interviewee 8)

This interviewee explains that it is difficult for security officers at his site to reach retirement age because of the inability of many of the security officers to meet the physical requirements as they get older.

No Pension

Unlike commercial nuclear security, other physically demanding organizations, such as police departments, fire departments and the military, offer retirements to their employees after 20 years of service in recognition that older people find the physical requirements more difficult to meet.

> [The officers say,] "We come in and do this for 20 years. Our knees start to give out and it gets tougher and tougher to meet the physical quals. We deserve a retirement." So far they haven't been getting it, and I'm sure that it's appropriate that they should. (Interviewee 8)

This interviewee identifies that it becomes more difficult for the security officers to meet the physical requirements as they get older and that some security organization are trying to bargain for a 20-year retirement. Currently, at many stations, security officers have a 401K savings program but, unlike other station employees, have no pension.

Encouraging Security Officers to Find Other Work

The physical demands of the nuclear security officer make it more of a risky profession if an employee wants to work until traditional retirement age.

> When I talk to individuals about it I encourage them to build their skills over those 20 years and be able to market themselves to move into a job that is less physically demanding, a little more sedentary, a little more of an office job. (Interviewee 10)

This interviewee points out that the nuclear security officers at his site are encouraged to build skills over their nuclear security officer career so they can find less physically demanding work when they get older. A limited amount of less physically demanding work can be found by moving into nuclear security supervision or staff.

Theme 14: Working Conditions

Overview

The security officer's working conditions are often a concern to the security officers. One concern is the general work environment, which includes the physical environment of heat or cold, cleanliness, post accessibility, and post habitability. Another concern are the delays and challenges associated with getting security equipment repairs and maintenance completed. Some officers are also troubled about the limited physical protection provided for some supplemental security officers, in that they often are not afforded the same protection that the minimum staffing officers receive.

Description

The working conditions for the security officers are sometimes sub-standard when compared with the rest of the nuclear power plant's employees.

> If facility maintenance is maintaining and keeping clean the cafeteria and the offices that the rest of the employees work in, but yet they're not taking the same vigilance to maintain the officer's working locations, then that's not treating them as a true partner. Those sort of things start to grate on security officers. They get the mindset that they're not cared about, and that impacts their morale, which impacts their performance, which impacts attendance and everything else. (Interviewee 9)

This interviewee identifies not only what challenges he has in getting his station to tend to the cleaning of the security posts and to get timely repair and maintenance of his security equipment, but also how such lack of vigilance in these matters negatively affects attitudes and overall performance.

General Work Environment

As alluded to previously, the remote posts have physical environmental challenges. Most posts are designed to withstand bullet impingement and many are also bomb-blast resistant. As a result, they ventilation systems and therefore must rely on air leakage from the outside for fresh air. On a cold, windy day or a hot day, the fresh air entering the post is often greater than what the heater or air conditioner can mitigate. On a calm day, when the fresh air leakage is low, the odors from the microwave and bodily functions linger. And it's not just the tower posts that present environment challenges; it's also the outside conditions. Officers search vehicles, cargo, and people outdoors in the bitter cold and wind of winter and the oppressive heat and humidity of summer. Officer complaints about their protection or relief from the environmental conditions are common.

The remote locations of the posts make cleaning and maintaining them a challenge. The posts are sometimes located high in the air, some up to 60 feet and only accessible via multiple flights of external metal stairs or internal, narrow, and winding staircases. Officers travel up and down these stairways often laden with up to 28 pounds of security-officer related equipment and untold pounds of personal items

such as lunches and attentiveness aids. Most posts are not equipped with water or toilets, and officers must rely on a "bio break" from a break officer. If the break officer is not timely or is unavailable, and the post officer can't wait, there may be emergency chemical toilets or a plastic coke bottle that has been known to be inadvertently left behind full of urine. The trashcan has been used for emergency defecation and, if the officer misses the mark, can result in the post being uninhabitable until cleaned.

Getting Equipment Repaired

A nuclear power plant prioritizes the plant equipment to be maintained based on guidance promulgated by the INPO (INPO, 2010). But because the guidance doesn't include security equipment under the category of plant equipment, it's up to the site's security manager to convince the site to properly prioritize the security equipment repairs. Often the time invested in repairing security equipment can be a source of frustration for the maintenance department because it is not included in the metrics for commercial nuclear power plant work control. Rather, it's performed with resources that could be applied to manage the metrics. As a result, there is constant friction between the security department and the rest of the station over the struggle to get security equipment repaired.

> The equipment isn't working right and now there is a line. It's the security officer's fault. Not the maintenance program or the people that are keeping it up or the fact that the equipment is 30 years old. It's the security people's fault. (Interviewee 9)

This interviewee points out that station employees can be affected by delays in getting to work when the security equipment isn't operating properly, and often the blame for the equipment outages is assigned to the security personnel rather than to the work control process that doesn't adequately address security equipment repair priorities.

Protecting Supplemental Security Officers

Some security officers express concern about the protection of the supplemental security officers when they are not a part of the security infrastructure's design. The NRC requirements focus on the protection of only the minimum staff security officers because these officers need to be protected so they can survive to defend the station from attack. But officers who are performing security services, such as many of the search officers, are often not a part of the minimum staffing requirements and are therefore left to be protected by the companies that employ them, and often with mixed results. Perceiving a lack of protection leads the security officers to think that their nuclear power plant executives do not actually care about them as individuals.

Theme 15: Celebrating Accomplishment

Overview

This theme describes what commercial nuclear power plants do for individual, group, and station recognition and celebration of accomplishments to reinforce or sustain good performance.

Description

Commercial nuclear power uses an accountability model that places value on coaching to correct or adjust behaviors and to reinforce or sustain behaviors. Rewards, recognition, and celebration of accomplishments serve similar purposes to reinforce or to sustain good performance. There are three basic categories of recognition or celebration: individual recognition, group recognition, and station recognition.

Individual Recognition

Individuals who identify issues or gaps in performance are often rewarded with a certificate or other token by security supervision or management.

> If they find something that is pretty important and relevant to nuclear safety especially or some significant industrial safety concern, we will recognize them with some type of monetary award, whether it's a gift card or it's some kind of free meal. (Interviewee 11)

This interviewee describes how rewards and recognition are used to sustain good performance when a security officer identifies an issue related to nuclear or industrial safety. Good performance is recognized in other ways too. For example, quarterly marksmanship awards are given in the form of a certificate. The officer's picture and name are put on a plaque, and the names of previous award winners going back three years appear on the plaque. The station's security newsletter often contains the names of those who were recognized for good performance. Individuals are also recognized for high of performance by using individual multipliers for annual cash incentives.

Group Recognition

The security organization, similar to other station organizations, celebrates group accomplishment and good performance. For example, at each security shift brief the leader asks for "any recognition items?" When this question is asked, officers or supervisors will volunteer examples of things that happened on a previous shift that were particularly good and thank the people responsible. Often the positive feedback is met with a round of applause.

Group recognition can be security management recognizing a significant security milestone, such as reaching one year accident free and talking to the entire group about the efforts it took to reach that milestone. An award meal or shirts emblazoned with the milestone achievement or some other token is given out for such good performance.

Station Recognition

The station celebrates the accomplishment of higher-tier goals and milestones and significant group or individual performance. For example, the station celebrates the completion of a successful outage period that met the industrial safety and production goals. The security organization participates in this celebration by ensuring that meals and gifts are brought to the offices, where they are posted. The officers are thanked by the senior security leadership for their contributions. Station recognition and celebration are also accomplished through a station multiplier related to meeting end-of-year station and company goals, and this multiplier is applied to annual cash incentives for station employees. Another way that station recognition is

accomplished is by having the station executives show station appreciation. For example, the senior executive will have a quarterly award ceremony and meal where he invites high-performing small groups or individuals to celebrate their good performance.

Theme 16: Supervision

Overview

Security operates in a command and control hierarchy with a minimum of seven layers of authority. Communications in this structure can be challenging because of a culture of adhering to the chain of command to resolve an issue; that is, never skipping the layers of authority to communicate above one's supervisor. Communicating downward is also problematic because new supervisors can be promoted and receive little supervisory training to help them in their new role, and current supervisory continuing training is often very limited.

Description

Supervisors are challenged by their limited ability to interact face-to-face with their remotely posted security officers. Interaction with security management is also a struggle for the supervisors because of the shift work schedule. Day shift supervisors are very busy doing security support tasks for the nuclear power plant and find they have limited time to interact with their assigned officers.

<u>The Command and Control Hierarchy</u>

One nuclear power executive recently said, "Security is stuck in that command and control model." From the top nuclear employee to the officer, there is a minimum of

seven layers in the nuclear security reporting structure. These layers include the chief nuclear officer, vice president, security manager, security operations manager, security shift supervisor, security supervisor, and security officer. Plus, there are other nuclear security organizational structures with even more layers. Security officers and managers speak of "command and control" and demonstrate a cultural trait of strict adherence to the levels of authority to communicate and to resolve issues. This trait is especially strong for many of the former military personnel. Thus communications from the security officers to layers of authority in the organization higher than their immediate supervisors can be limited without a deliberate effort to address this issue.

Rapid Promotions Without Leadership Training

It's possible to be promoted from security officer to a senior supervisor in a short period of time, especially because promotion to supervision doesn't necessarily require any leadership training.

> In the first six months I was promoted to Sergeant, which would have been the first level of supervision. Six months after that I was promoted to lieutenant, which was an assistant shift leader. Then two years later to shift leader. (Interviewee 7)

This interviewee notes that he was promoted to the first-level of supervision within six months of starting the job, which is not uncommon. Additionally, he had no previous supervisory experience to fall back on when he got promoted.

> I had no formal training for leadership, really. I would say that when I started here at 21 years old, I had a few supervisors that were really dirt bags, so I could learn, and say I would never be like that. *I would never do this, I won't do that.* And I had ones that did things that I saw were developing others. I saw they were making other people feel

> better. I saw they got the job we needed to get done, so I stole that and embellished or whatever into that way of doing things. (Interviewee 14)

This interviewee reports that during his career as a security supervisor he received little training in leadership and relied on emulating the good qualities that he saw in other supervisors and avoiding the flaws he saw in others. He learned how to be a supervisor primarily through on-the-job training.

Developing the Supervisors

The gulf between the knowledge and skills to be a security officer and those needed to be a security supervisor is often very wide. For example, many stations require that the alarm station operator positions, the most technically challenging security positions, be staffed with supervisors. But not only does the newly promoted supervisor need to perform well in the alarm stations, but also he or she needs to develop supervisory skills.

> We have a thing that we call quarterly training for supervisors that, that hasn't been done in six or seven years. You know, eight years. And it's all because of, you know, business needs elsewhere for the most part. (Interviewee 14)

This interviewee notes that at this station what is supposed to be recurring quarterly training to improve the leadership and supervisory skills of supervisors is overlooked.

Impact of Not Investing in Supervisors

Lack of investment in creating more effective supervision can have significant organizational impact. The supervisors are key to ensuring the officers know what is

expected of them and that the officers have the necessary materials and equipment. They are pivotal in ensuring the officers are provided opportunities to do what they do best every day and are provided recognition and praise for good work. They meet with each security officer to encourage the officer's development and ensure that someone at work is demonstrating care about each officer as a person.

> We let five of them [supervisors] go in a very short period of time. And that was after I had been there for over a year trying to work with them and get them up to speed. And then they were just going to continue to do it their way, or the old way…I will tell you it was overnight change. The officers almost applauded getting rid of those people. They were so obnoxious. Apparently, you didn't really know how bad the officers were being treated. (Interviewee 7)

This interviewee was brought in as a change agent to help turn around a troubled nuclear security organization. He found poorly developed supervision and, as a result, ended up having to dismiss many of the supervisors in order to turn the security organization performance around.

Making the Supervisor Job Appealing

Officers can be put off by the difficult trials of the supervisory function. It is technically complex, and supervising other people in a challenging environment can seem formidable. As a result, not all those who might become good supervisors apply for the position.

> I've taken a few people aside and asked them, "Why haven't you applied for supervision? Because I think you'd be good at it." I throw the carrot out in front of them and say, "Oh by the way we do have a pension in management that you don't have right now." (Interviewee 15)

As this interviewee mentions, unlike security supervision, the security officers in his company do not have a pension, so he therefore uses, with some success, the pension as an enticement to have officers volunteer to become supervisors.

A summary of the NEI attributes of effective security appear in Appendix L. What is noticeably missing is effective supervision.

Chapter 6: Discussion

This chapter discusses the importance of this study's key findings and their relationship to the literature. It discusses the importance of understanding how the results of this study can be used to enhance the nuclear security culture and why doing so is important. It identifies that there are common cultural traits across the private security officer continuum, which includes commercial nuclear security, and therefore the best practices in developing and maintaining a high performance security organization are likely to be applicable to the entire private security occupation, despite the business that the security organization supports.

The chapter also reviews best-practice information in six areas of inquiry that have been shown in previous studies to have the strongest links to the business outcomes of productivity, profitability, retention, and customer satisfaction. It explains that at the heart of a continuous change effort is effective communication and what best practices are associated with that communication. Lastly, the chapter concludes with a model of a high-engagement nuclear security culture..

Enhancing the Nuclear Security Culture

Schein makes a link between the need for cultural understanding and effective leadership:

> The bottom line for leaders is that if they do not become conscious of the cultures in which they are embedded, those cultures will manage

> them. Cultural understanding is desirable for all of us, but it is essential to leaders if they are to lead. (Schein, 2004, p. 23)

For commercial nuclear security managers to improve their commercial nuclear security culture, not only do they need to understand it, but they also need to be adept at changing it when it is dysfunctional. The International Atomic Energy Agency (IAEA) stresses the importance of the human factor within the entire nuclear regime:

> Ultimately, therefore, the entire nuclear security regime stands or falls because of the people involved and their leaders, and it is the human factor, including management leadership, that must be addressed in any effort to enhance the existing nuclear security culture. (IAEA, 2008, p. 4)

Key to enhancing the nuclear security culture, then, are leaders and leadership, which, as this study points out, has not been addressed sufficiently. A culture cannot develop until the people do. Therefore in this discussion, not only will the results of this culture study be examined, but also the best practices that were noted during this study of how commercial nuclear security officer culture is influenced.

Role of Commercial Nuclear Security Officer

The commercial nuclear security officer's role is defined as protecting the health and safety of the public from radiological sabotage. They do this by protecting property. This orientation is much narrower than that of the private security officers described in the studies completed by Button (2007), Mopasa and Stenning (2001), and Rigakos (2002). The following table (Table 1) summarizes categories of security for commercial nuclear security versus private security organizations.

Table 1. Nuclear Security vs. Private Security

Categories of Security	Commercial Nuclear Security	Typical Private Security Organizations
Physical security of the nuclear plant	YES	NO
Physical security of the non-nuclear infrastructure (e.g., remotely located training building)	NO	YES
Personnel security including violence in the workplace	NO (YES if related to the protected area)	YES
Information systems security	NO (YES only for classified information)	YES
Cyber security of the commercial nuclear facilities	NO (but do support the program)	NO
Cyber security of the non-nuclear infrastructure	NO	YES
Investigations of potential or suspected criminality	NO	YES
Loss prevention	NO	YES
Traffic control/Parking control	NO	YES
Executive protection	NO	YES
High wages and benefits	YES	NO
Interaction with public	Very low for most posts	Can be high
Risk of daily physical abuse by the public	Very low to non-existent	Can be high

Commercial nuclear security refers to itself as being paramilitary, rather than parapolice. The paramilitary designation is used because the protection mission is similar to what the military would do for military force protection, including a fixation on rules of engagement for deadly force.

The Private Security Continuum

Button (2007) suggests that security officers can be largely attributed with an orientation either towards one end of a continuum, starting with "watchman" to the other end of the continuum, "parapolice," as shown in Figure 6.

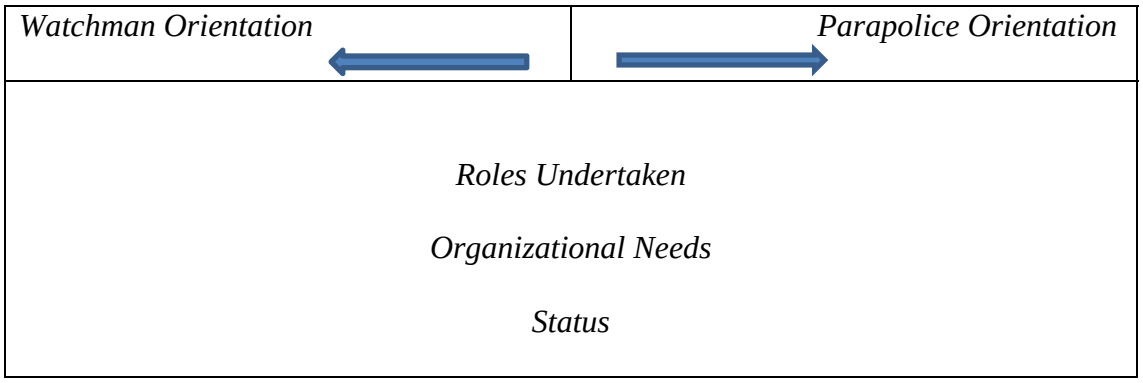


Figure 6. Orientation of Private Security

Whether the private security officer's orientation is toward the watchman or the parapolice depends upon the workplace they operate in, the organization's needs, the nature of the assignment, and the aspirations of the officers.

The Nuclear Security Continuum

As suggested by the present study, the nuclear security officer's orientation is different. Despite their higher level of training and weaponry, the paramilitary commercial nuclear security officer falls somewhere to the right of the middle of the continuum, as shown in Figure 7, but not as far right as parapolice.

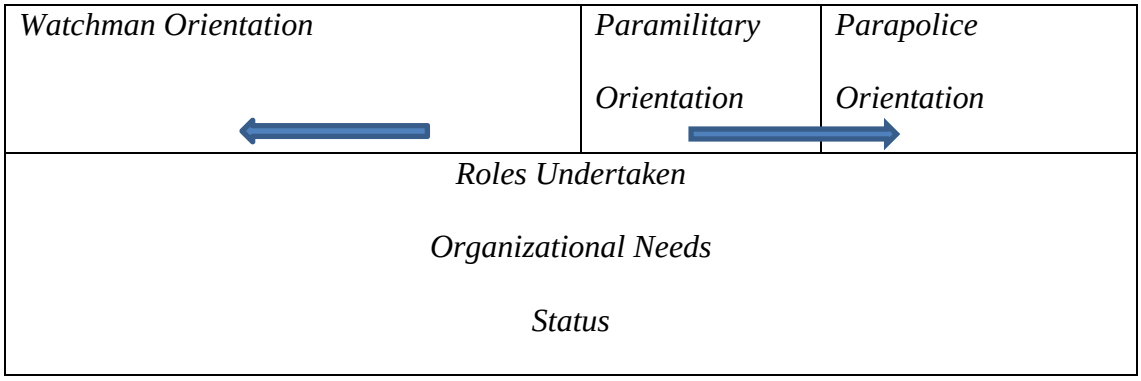


Figure 7. Orientation of Nuclear Security Officer

However, it is not to the level of parapolice orientation, which is characterized more by security task variety and physicality. The role that the paramilitary commercial nuclear security officer is asked to perform is narrower in scope than the previous studies of parapolice.

Chapters 4 and 5 describe the commercial nuclear security officer culture and key themes. The present discussion summarizes some of the organizational structural challenges that can help improve the nuclear security culture.

The Case for a Private Security Occupational Culture

Despite some differences, such as wages and benefits, the breadth of job tasks, the amount of training provided, and daily exposure to violence, commercial nuclear security shares some cultural traits with the rest of the private security occupation. The commercial nuclear security culture tends to overlap with that identified in studies performed by Button (2007) and Rigakos (2002) in the following areas:

- **Dissatisfaction with the job.** Exhibited by the trait of security officers desiring to be something else or to be somewhere else. The structural factors for this trait include organizational and officer isolation and attitudes towards employment.
- **Feelings of envy and unequal treatment.** Exhibited by the trait of complaints related to poor working conditions, driven by structural factors that other employees have noticeably better working conditions, including workspaces, benefits, and work schedules, and that they have better-maintained job-related equipment.
- **Sticking together.** Exhibited by the trait of teamwork and solidarity driven by structural factors that include isolation, needing to know large amounts of information, organizational and officer isolation, the view security is often seen by the other employees as a "grudge purchase," and competition for key resources such as funding and maintenance-worker time.
- **Male chauvinism.** Exhibited by the trait of machismo, which is driven by the male working class culture, the occupational role of surveillance and protection, the tools of the trade (weapons and physical prowess), and traditional gender roles.
- **Hyper-vigilance.** Exhibited by a trait of suspicion and risk-based minds, driven by training, regulatory requirements, and the security officer's occupational role to seek out and report suspicious activity.

The present study suggests that private security officers, whether they be watchperson, paramilitary or parapolice and despite which industry that they support, share many cultural traits and that there is some significant degree of shared common occupational culture for the private security officer occupation. Because of this shared occupational culture, best practices identified in one private security organization that are indicative of developing and maintaining a high performance culture have a high probability of being applicable to another private security organization that supports a different line of business.

Influencing Security Culture for Productivity, Profitability, Retention, and Customer Satisfaction

As highlighted in the literature review of chapter 2, in the book, *First, Break All The Rules* (Buckingham & Coffman, 1999), the authors conducted a meta-analysis of performance data from over 2,500 business units and opinion data from over 105,000 employees. From this analysis they concluded that six questions that they asked had the strongest links to the business outcomes of productivity, profitability, retention, and customer satisfaction:

1. Do I know what is expected of me at work?
2. Do I have the materials and equipment I need to do my work right?
3. Do I have the opportunity to do what I do best every day?
4. In the last seven days, have I received recognition or praise for good work?
5. Does my supervisor, or someone at work, seem to care about me as a person?
6. Is there someone at work who encourages my development?

As a part of this study, during my analysis of the interviews, artifacts, and documents, I looked for the best practices that commercial nuclear security has in place to obtain the best possible answers to these questions. The best practices were sought out so that I could create a model for establishing a high-engagement culture in nuclear security for the practitioner, so that he or she can use it to develop a high performing security organization. The key elements of this model include external factors, individual factors, supervisory leadership factors, and management systems. These dimensions are enabled through effective communications.

Question 1: Do I Know What Is Expected of Me at Work?

Commercial nuclear power plant security officers are taught procedural adherence. They participate in initial hiring, training, and continuing training, which includes drills and exercises, and they are given many procedures to follow. Security officer procedure adherence is monitored in the field by supervisors and managers through formal field observation programs. Problems noted during these field observations are required by the regulator to be entered into the station's corrective action database so that these problems, and what was done to address them, can then be referenced by other site oversight groups and the regulator. The regulator conducts periodic inspections to ensure that regulatory requirements are being met and that any problems noted have been resolved to the regulator's satisfaction.

Knowing what is expected was discussed in theme 9, management expectations. There are many processes and monitoring mechanisms in place to ensure that people

know what is expected of them. The information burden is high, as is the number of procedures and policies to follow. The requirements can be complex and therefore supervisory engagement is required to reduce security officer confusion, especially since the majority of the security officers don't get a chance to use many of the procedures on a day-to-day basis when oftentimes they are stationed in remote and isolated posts.

In addition to procedure adherence, nuclear security officers rely on each other to ensure that tasks are completed correctly. This need for teaming is discussed in theme 10, teamwork. Additional items in place to ensure that people understand what is expected of them include a security-specific vision and mission statement, which can often be found posted in the security briefing room and classrooms where the security officers congregate.

Measuring Security Performance to Establish Accurate Performance Expectations

Determining what Buckingham and Coffman (1999) call "accurate performance expectations" can be difficult because measuring the security organization's performance in the paucity of objective measures is a challenge. Perhaps the most significant measurement is the lack of attacks to date; that is, the targets are so hardened as to have influenced the incentive structures (Dowding, 1996; Lukes, 2005) of any would be attackers to the point where they view that an attack would be unsuccessful. Dess and Robinson (1984) discuss the challenge of measuring organizational performance in the absence of objective measures. They note that

obtaining accurate economic performance data is often a problem in two salient research settings: business units of multi-industry firms and privately held firms.

Commercial nuclear security is another area where obtaining accurate economic performance data is problematic. The reason is that unlike other commercial nuclear departments, such as engineering and operations, there are no nationally recognized metrics for the economics or performance of commercial nuclear security. The second is that security economics and performance data tend to be closely held, and the utilities are reluctant to share the information because of the perceived security sensitivity of the data. Even the site headcount of security officers is not shared from site to site because of the security sensitivity of the information.

For an individual site, on a day-to day basis, the few objective measurements for performance are regulatory compliance and industrial safety. The NRC publishes their findings of their baseline inspections and triennial performance tests to the public on an annual basis in a non-security sensitive format (NRC, 2013b), which lacks the detail necessary to run a business. Unlike the parapolice organization described by Rigakos (2002), there are no investigations to perform, arrests to be made, and little opportunity to find ways to improve the efficiency of security. Costs are largely linked to total headcount and whether or not a site has contract security or not. The total headcount between sites can vary significantly, where one site can be

several times larger in the total headcount of security officers just based on the way the security infrastructure was designed.

For example, I had the advantage of working at one site that had a small security headcount relative to the rest of the fleet of which I was a part. I then hired into a site that had nearly three times the security headcount that I had previously experienced. The site performance data differences were just as striking in the areas of security regulatory performance and industrial safety performance. The security staff at the new site were not aware of the significant differences in these areas: headcount (i.e., economics), regulatory performance (i.e., human performance), and industrial safety performance (e.g., injury rate) as compared with an average operating fleet-owned commercial nuclear power plant. In these three areas were enough data to demonstrate that the commercial nuclear security culture needed significant change in some areas. The reluctance and difficulty of sharing security performance and economic information among commercial nuclear power plant sites enabled this lack of understanding.

Monitoring Performance Expectations

Accurate performance expectations are monitored in a number of ways. One site uses a monthly scorecard that depicts monthly progress towards the annual security goals. These goals include limiting the number of industrial safety injuries, key security project milestones, financial goals, and regulatory goals, all of which were developed using a facilitative process with senior security shift leadership and staff. The security

crews and security department track human event free clocks, as discussed in the shift brief vignettes. Each security officer conducts a one-on-one discussion with his or her assigned supervisor to discuss performance on a one- to two-month basis. Security officer performance reviews are done at mid-year and at the end of the year to discuss company, site, department, and individual goal achievement, individual development plans, and more subjective discussions about the officer's reflection of the company values. The performance expectations are also reflected in rewards and recognition, which are discussed in theme 15, celebrating accomplishment. On a day-to-day basis, the commercial nuclear security officer knows what is expected of him or her. A common compliant, however, is when expectations change, the change management is sometimes not effective and a security officer, posted alone in an isolated and remote post, finds out late, perhaps only through a discipline process, that the procedure or policy has changed.

Question 2: Do I Have the Materials and Equipment I Need to Do My Work Right?

Working conditions are discussed in theme 14 and include general work environment concerns and the challenges in getting security equipment repaired. There is also a brief discussion of the differences between "real-world security" and "regulatory security" in the vehicle-access control-point vignette. Wagner and Harter identify that not providing employees with adequate materials and equipment can result in job stresses, which can result in them behaving poorly with family or friends.

> A full two-thirds of American workers who say they aren't adequately supplied also report bringing job stress home with them. Among those

> who say they have what they need to do their work, only one in four reports being grumpy at home. (Wagner & Harter, 2006, p. 23)

Individuals' Perceptions Affects Thoughts about What Materials and Equipment Are Needed

It's a management challenge to ensure that the security officers are provided adequate materials and equipment because of differences in the way that the security officers perceive the security threat. Increasingly the security officers are hired from the former military ranks, whose members have lived in real-world security and find regulatory security nuances frustrating. They don't fully understand the reasons for the differences between real-world security and regulatory security or they think that the differences are illogical based on their personal experiences in war.

From time to time a newer employee, most often one who used to work in an elite military unit, will write an unsolicited report detailing how he or she would improve the security of the commercial nuclear facility. The report is generated out of real concern by a real-world expert not as familiar as he or she should be with the limitations of regulatory security. The reports often reflect conservative changes that go unimplemented due to lack of regulatory necessity and cost. The differences in the backgrounds of the security officers and the extremely limited intelligence information regarding the threat to the commercial nuclear power plants result in significant differences in what is thought to be adequate and inadequate types of materials and equipment.

The answer to the question of whether or not an officer has the materials and equipment to do his or her job right is likely to fall along three categories of materials and equipment concerns:

The Materials and Equipment to Meet the Regulated Security Role

The first category of concern is materials and equipment to execute the regulated security role in protecting the health and safety of the public against radiological sabotage. This type of materials and equipment includes the search equipment, the bullet resistant posts, and the weaponry.

The Materials and Equipment to Meet a Threat Greater Than the Regulated Security Role

The second category of concern is materials and equipment that the officer feels he or she needs to meet a threat greater than what the regulator requires the utility to protect against but which might be the threat that the officer is convinced that the utility should protect against based on the officer's perception of the potential threat. This type of materials and equipment includes the search equipment, the bullet resistant posts, and often more significant weaponry. It often also includes protection of the supplemental officers.

Day-to-day General Work Environment Materials and Equipment

The third category of concern is related to material and equipment for the security officer's day-to-day job, such as personal protective equipment for industrial safety, ballpoint pens, operating air conditioners, and cleaning supplies.

Convincing Officers of the Regulatory Security Role

The risk of attack to a nuclear power plant is classified information and none of the employees at a commercial nuclear power plant hold security clearances to the level where they can be told the risk by the regulator. That is, the information power (Yukl, 2010) of the security manager and his staff are low. They do not have the opportunity or ability to obtain the information to satisfy the security officer's questions to the degree that they would like to discuss them, and they therefore lack leadership legitimacy in this area of experience. The security manager enters into conversations with the security officers in new-hire training and on a daily basis to assure them that the regulator who is located thousands of miles away is keeping watch over such concerns and will change the regulatory requirements to address additional threats, should the risk to commercial nuclear security evolve to warrant the changes. Real-world examples of this issue can't be discussed due to the security sensitivity of the issue. But to give the reader a concrete picture of this issue in overstated and cartoonish fashion, one officer might think a pistol is an adequate weapon based on his or her perception of the regulator-stated risk to a commercial nuclear power plant, while another thinks a tank is necessary equipment because of his or her perceived risk from real-life experience.

Providing Materials and Equipment on a Day-to-day Basis

Theme 11 introduced the concept of the security improvement focus team (SIFT), where security officers meet periodically to discuss officer concerns and with the help of security management prioritize their concerns and work through them to resolution. The process of the SIFT team often identifies material and equipment

issues that can be readily resolved. Since nuclear security tends to have people from varied backgrounds, the meeting participants identify many solutions to the officer's day-to-day concerns. As technology evolves, and especially because proprietary security does not have the support of a security company that contract security most likely has, benchmarking and industry conferences fill a necessary gap in the identification of best practices and optimum materials and equipment. Commercial nuclear security, being a part of the commercial nuclear power culture, has a formal benchmarking process where security staff and officers go to such events and other stations to formally identify the best practices.

Security officers have a computerized reporting system for the generation of "condition reports" where they are encouraged to identify gaps in materials and equipment and suggestion items. These reports are entered into the electronic CAP (corrective action program) database where they can be tracked, trended, and resolved. Many sites review each of the condition reports that were generated by the security officers since the previous workday so they can resolve the officers' general work environment concerns such as material and equipment issues as rapidly as possible, often within the same day for such things as a broken chair or refrigerator or lack of cleaning supplies. The best organizations have an open stock of personal protective equipment, such as hard hats and safety goggles, and have ready access to such things as flashlight batteries.

Rather than providing deep cleaning supplies and equipment for the posts, some site best practices include having cleaning contracts in place for the cleaning contractor to deep clean the posts from time to time, rather than relying upon the good will or personal standards of the security officer. At some sites the post air-conditioning and heating system equipment is monitored by post thermometers. Policy guidance states the actions to be taken if the post gets too hot or too cold, including post abandonment for the extreme temperatures, rather than responding to somewhat vague terms of "too hot" or "too cold" and/or showing disregard for the officer's comfort by requiring them to be posted in the extreme temperatures. This close monitoring aids in better communication with the maintenance personnel who are often tasked with the equipment's repair.

Question 3: Do I Have the Opportunity to Do What I Do Best Every Day?

Impediment to a Security-oriented Culture in a High-reliability Organization

Rousseau (1989) notes that the successful operation of high-reliability systems, of which commercial nuclear security is a part, involves the use of extensive control systems involving complex webs of information, hierarchical referral of critical decisions, redundancy in personnel, and performance routines. Due to its paramilitary mission, commercial nuclear security officers are increasingly being recruited directly from the military and, more significantly, many of the commercial nuclear staffs are comprised of former military personnel. She also explains that the military is often the labor market source for high-reliability operators because the predominant

characteristics of the military personnel are adherence to procedures, dedication to high standards, and reliance upon the organization's hierarchy in decision-making.

High reliability organizations are often comprised of security-oriented cultures. Working in a satisfaction culture most likely positively impacts individual efficacy and satisfaction, whereas working in a security-oriented culture corresponds negatively to member satisfaction, a desire to stay in the organization, their perception of how well they fit within the organization, and role clarity.

> It is unlikely that individuals can remain long in organizations controlling their members through Security-oriented mechanisms, one reason for frequent rotation of military personnel and regular off-line training program for nuclear plant operators. (Rousseau, 1989, p. 300)

Being a part of a security-oriented control system is recognized as being extremely stressful. Some organizations recognize this stress and design in frequent rotations, such as in the case for military personnel and for off-line training for the nuclear plant operators. For the commercial nuclear security officer, post rotations provide some daily relief. But the majority of the officers are not afforded any rotation or off-line training pattern similar to that afforded to the nuclear plant operators.

> With security, I think the shift work gets to them. I think you see more guys calling off sick. You see more guys who suddenly their minor injury becomes more and they have to go out for a couple of weeks and they finally get the break that they couldn't get any other way (Interviewee 10).

This interviewee suggests the security officers call off to get time away from the shift work schedule. More study would need to be done to determine if the reason for the

need for the break is actually due to the need to distance themselves from the security-oriented culture for a period of time and if this potential issue is significant enough to warrant adaptation of a schedule similar to that which the operations department uses with time for off-line training. Perhaps adopting a new schedule would have a positive impact on attrition as well.

Shift Schedule Limitations

In addition to addressing anxiety, the typical security work schedule is limited in its ability to address the performance of technical, cultural, and supervisory skills training with shift supervision due to the shift schedule that is in place. Most commercial nuclear security organizations are in four 12-hour shifts. Where no fifth shift is provided, it is difficult to get security shift-supervision together to perform necessary training. This schedule issue has most likely manifested due to the increase in complexity of commercial nuclear security that began after the post 9/11/2001 attack on the World Trade Center.

Limitations of a Hierarchical Organization

The commercial nuclear security organizations have a hierarchical structure that is driven by the need for a command and control model during emergency response, and the isolated and remote posting of individual security officers. This hierarchical structure makes multi-level collaboration more difficult. The need for a command and control model is driven by the short timelines to respond to an attack in contrast to other work groups who have the time to make more collaborative decisions during events. The isolated and remote posting of security officers is sometimes driven by

the site defensive strategy but, more often, is driven by not adequately addressing the human factors in the strategy design. Some sites further hinder officer involvement by having multiple, up to four, different pay categories for commercial nuclear security officers, effectively increasing the layers in the hierarchical structure. These pay categories might include watch person, armed security officer, armed responder, and CAS and SAS operator. Multiple job classifications hinder the ability to have officers rotate posts so they aren't stuck with a boring post all day. In their action research to increase employee involvement in problem solving, Pasmore and Friedlander (1982) note that, "The clash between the need of mature adults and the treatment they receive in hierarchical organizations can produce serious tension and even physical effects" (p. 361).

Mature adults can experience adverse consequences, including dissatisfaction, anxiety, serious tension, and even physical effects under conditions of limited participation and limited individual discretion of innovation. Commercial nuclear security uses various means to mitigate the adverse effects from security-oriented and hierarchical cultures. Opportunities for attempting to shift to more of a satisfaction culture involving greater employee participation were discussed in theme 11.

Some stations use a security duty-team concept for off-normal events. When there is an off-normal event, such as suspicious activity, shift supervision uses their training and existing procedures to respond to it. The training program supports this kind of decision-making through quarterly and annual drills and exercises, and table-top

exercises. After the event, or during a lull in the activity, the security duty team is notified of the issue through sending out a page and an announcement for a duty team challenge teleconference. In this way the shift supervision is provided maximum autonomy to solve problems and to present their plans for further resolution of the problem with the senior staff on the duty-team call. The shift and staff team up to solve problems and hear each other's opinions on the best way to proceed. This teaming approach enables active learning for all the participants.

Question 4: In the Last Seven Days, Have I Received Recognition or Praise for Good Work?

In their study on managing corporate culture through rewards systems, Kerr and Slocum (2005) state their belief that the reward system represents a particularly powerful means of influencing an organization's culture: "Much of the substance of culture is concerned with controlling the behaviors and attitude of organization members and the reward system is a primary method of achieving control" (p. 130).

The rewards that Kerr and Slocum refer to in their article are significant awards such as bonuses, salary increases, promotions, stock awards, and perquisites. As identified in the interviews and the artifact and document analysis of this study, although these significant rewards also exist in the commercial nuclear security culture, many lesser rewards and recognition also serve to encourage desired behaviors to maintain, transmit, and influence culture. These rewards and recognition are a part of the accountability model, which is reflected in Figure 8, which represents the accountability model used by multiple nuclear power plants.

Figure 8. Model of Supervisor and Individual Accountability

Note that the model takes into consideration both the positive and the negative, both building on strengths and trying to correct weaknesses (Luthans & Youssef, 2007). Coach to reinforce or to sustain, which appears in the model on the right side, is the feedback between the supervisor and the employee, and includes rewards, recognition, and praise for good performance. Yukl (2010) contends that the failure to recognize contributions and achievements sends a message to people that they are not important. Buckingham and Coffman (1999) similarly point out that, "At its simplest, a manager's job is to encourage people to do more of certain productive behaviors and less of other, unproductive behaviors" (p. 154).

The supervisor is the key manager to influence culture through feedback to the individual officer. He or she encourages the officers to do more of the productive behaviors and fewer of the unproductive behaviors. The general methods that security

management and the security supervisors use to reward and recognize desired behaviors were discussed in theme 15.

Question 5: Does My Supervisor, or Someone at Work, Seem to Care about Me As a Person?

It's a significant challenge to demonstrate to a security officer who is posted alone in an isolated and remote post that someone at work cares about him or her as a person. The opportunities to have a meaningful face-to-face conversation, from human being to human being are limited. The key person to demonstrate this caring is the assigned supervisor. The challenges of developing supervisors are discussed in theme 16. Supervisors must be trained and understand their responsibilities concerning being responsive, talking to the security officers periodically, and following up on the officers' concerns. Theme 15 discusses celebrating accomplishment, which includes positive coaching to reinforce or sustain. This positive feedback provides demonstrable evidence of caring.

On a day-to-day basis, caring is demonstrated by conducting post checks and during the post checks having meaningful but, by necessity, short conversations. In addition to the post checks, supervisors are most often assigned to the same shift schedule as their assigned officers and talk to them on a daily basis to ensure that officers' concerns are being resolved. Some sites allow the security officers, on a seniority basis, to pick their supervisors to minimize the chance of communication issues between supervisors and officers.

Skip meetings are held between the manager and the security officers on a periodic basis, where officer comments and concerns are the topic of the meeting. In this fashion, upward communications are less likely to be distorted and a realistic appraisal of the operational status can be made by the manager (Rousseau, 1989). The security officers are provided a voice and the manager, in responding to the officers' concerns, can gain trust.

Question 6: Is There Someone at Work Who Encourages My Development?

On an annual basis, written individual development plans are created by the supervisor and officer, and these plans are reviewed and facilitated by security supervision on a one- to two-month frequency. From theme 5, attitudes towards employment, we know that many security officers want to do more than to be posted alone in an isolated and remote post. They want opportunities to develop and to potentially move up the ranks or even out of security into another profession or into another department within the company. These individual development plans are key to ensuring that the security officers feel that someone is encouraging their development. But even with the development plan in place, without a larger site-commitment to developing the security officers, there are limited opportunities to facilitate officer involvement and even fewer if providing these opportunities are not a management focus item. Effective supervision is key to ensuring that the development plans are detailed and facilitated to the degree that the affected officer is actually developed. The limitations on supervisory development were discussed in theme 16.

In my many Skip meetings that I have held with security officers, a common complaint is that the security officers don't see the selection of officers for development assignments as being fair. In my conversations I find that the officers are often unaware of the process; that is, it is a mystery to them and therefore they don't trust it. They also can give past examples of unfairness of up to ten years ago that have not been forgotten. Lastly, some supervisors are much more engaged in facilitating officer development than are others. Some supervisors demonstrate caring and some do not. Development assignments can include special classes and on-the-job training, including items such as those addressed in theme 11.

To address the issue of fairness, at least one site uses a selection board process for officer development assignments. When an opportunity arises, such as a need to conduct a remote search at another site or to fill a temporary position on staff for a change management project, officers can apply to be selected for the assignment. The selection criteria, which may include that the opportunity be included in the officer's individual development plan, is contained in a policy guide that is readily available for reference by all security officers and staff. By using a selection board and a written policy, it is more likely that the process is viewed as fair to the officers.

Company education reimbursement programs don't always reflect the sorts of courses that the security officers are interested in taking. The gatekeepers for the larger company education reimbursement program can't always see the link between

producing electrical power and taking a tactical shooting course offered by the local sheriff's office. One site has a special education reimbursement fund to reimburse for security related training that the large company may not encourage by lack of reimbursement. Similar to the selection board process, security officers apply to be considered for this type of reimbursement.

Role of Effective Communications

According to Ford and Ford (1995), a frequent breakdown in the change process occurs when participants fail to create enough shared understanding because their communication is insufficient or incomplete. The commercial nuclear security organization is in continual change due to the high reliability organization that it is a part of and which it supports and also due to the constantly shifting environment that affects commercial nuclear power. Thus the challenge required to maintain or change the culture is how to have a full and complete conversation with each shift-work officer who is posted to an isolated, remote post and whose time in shift brief is limited by work-hour rule regulations. These security organization structural challenges necessitate a detailed communications plan with high reliance upon pre-prepared communications, prepared supervision, and effective supervisor-to-officer interactions to ensure that the full and complete conversations for understanding take place. Supervisors, then, become the focus of management engagement to ensure they first understand the changes and are able to have the kind of conversations necessary to sustain or improve the security officer culture.

Some best practices for effective communications include the following:

- Daily or weekly recorded phone messages that the security officers can dial from post or from home
- Use of bulletin boards in the security meeting areas
- Use of electronic information security department intranet website
- Monthly security newsletter
- Monthly one-on-one conversations between supervisors and officers
- Shift post-check conversations between supervisors and officers
- All-employee briefs
- Night orders
- Shift-brief targeted messages written by senior managers
- One-on-one conversations between managers and supervisors, and supervisors and officers ("trickle down") for significant issues
- All-supervisors team-alignment meetings on a monthly or quarterly basis
- Weekly all-shifts senior supervision alignment meetings via teleconference
- Monthly meetings with individual senior supervisors with the security manager to discuss alignment topics
- Off-site alignment and teambuilding meetings with shift supervision
- Supervisory team alignment training prior to quarterly exercises
- Required reading
- Training curriculum review committee/training needs analysis

- As-needed talking points generated by senior security management for emergent events
- Senior manager addresses at shift briefs
- Senior manager video messages that can be viewed on post computers
- Goal setting and status communication
- Security improvement focus team (SIFT) meetings where selected officers can have conversations for full understanding
- Skip meetings between the security manager and the security officers where selected officers can have conversations for full understanding
- Small-group meetings with security officers and station leadership where selected officers can have conversations for full understanding

By using these communication tools and processes, leaders seek support for a proposed change and seek to minimize resistance to it. Security leaders often speak of discussing a change "7 times, 7 different ways" to optimally include security shift personnel, and especially security officers, so that a change effort has maximum opportunity for success.

Model of a High-Engagement Nuclear Security Culture

Figure 9 shows a simplified model for a high-engagement nuclear security culture, with the details of that model described in this section. The model includes external factors, individual factors, supervisory and leadership factors, and management systems. These four dimensions are enabled through effective communications. These

factors include the themes that need to be addressed for resolution, such as in the case of hiring assumptions, themes that need to be mitigated to limit their negative impact on culture, such as unpredictable work schedule and factors that need to be sustained or enhanced such as celebrating accomplishment.

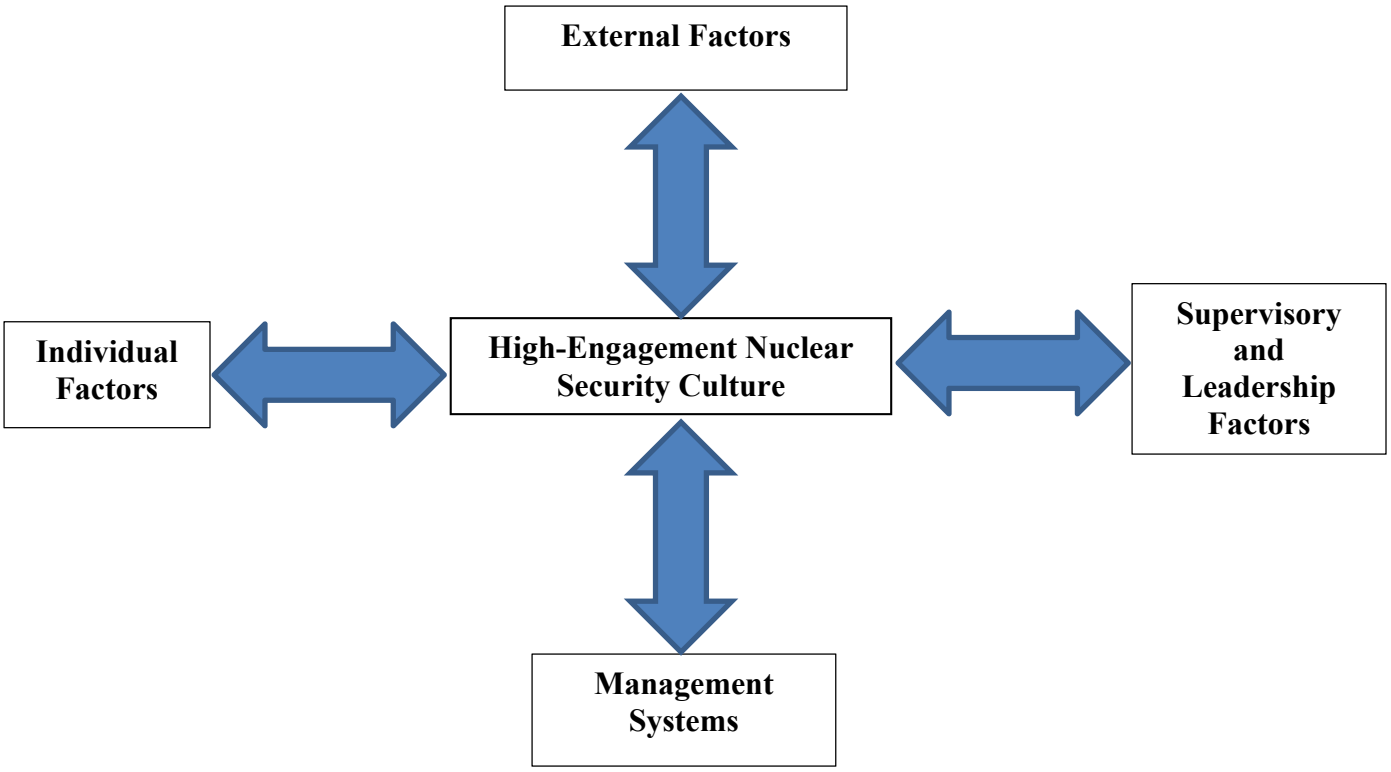


Figure 9. Model of a High-Engagement Nuclear Security Culture

Note: The arrows represent two-way communication.

The factors in Figure 9 also include key findings in the literature for a high engagement culture such as the six questions identified by Buckingham and Coffman (Buckingham & Coffman, 1999) that they found that had the strongest links to the business outcomes of productivity, profitability, retention, and customer satisfaction:

External factors are those significant external issues that affect the culture in which the security officer works, but are largely not able to be changed, but perhaps mitigated by the practitioner. Individual factors are those cultural traits that are largely influenced by the individual security officer and a knowledge of these factors provides management the opportunity to address them with the individual officer. Supervisory and leadership factors include the expectations of the supervisor and the number of themes and six key questions related to supervision clearly identify that the supervisory role is key in developing a high-engagement nuclear security culture. Management systems include those policies and procedures that are key to ensuring that the culture in which the security officer lives and works is positively affected.

External Factors

- Regulatory requirements, including secrecy
- External stakeholder opinion (e.g., individual inspector)
- Common private security occupational culture traits
- Occupational culture of commercial nuclear power
- Nuclear industry related events (e.g., Fukushima)

Individual Factors

- Knowing what is expected at work (theme 9 and question 1)
- Attitude towards employment (theme 5)
- Process rigor and discipline (e.g., procedural adherence)
- Desire or willingness to perform
- Skills and knowledge
- Teamwork (theme 10)
- Individual accountability

Supervisory and Leadership Factors

- Knowing what is expected at work (theme 9 and question 1)
- Expectations of supervisors (themes 15 and 16)
    - Ensuring officers know what is expected of them (question 1)
    - Ensuring the officers have the materials and equipment that they need (question 2)
    - Officer involvement (question 3)
    - Providing coaching per the accountability model (question 4)
    - Demonstrating that the officers are cared for (question 5)
    - Encouraging officer development (question 6)

Management Systems

- Shift schedules and allocation of overtime (themes 6 and 7)
- Facility design (theme 8)

- Working conditions, including materials and equipment (themes 7, 12, 13 and 14)
- Mitigation of organizational and officer isolation (themes 1, 2, and 3)
- Hiring manager's assumptions (theme 4)
- Facilitative leadership, officer involvement and selection (theme 11)
- Supervisor and officer development and succession planning (question 6)
- Effective training program

Summary and Conclusion

The commercial nuclear security officer culture is important to understand because these officers, whose culture has not been studied to date, protect the health and safety of the public from radiological sabotage and because nuclear waste is going to be with us for many generations. Because the commercial nuclear security officer culture shares some traits with the private security officer occupational culture, it can be understood within a broader context, and best practices for resolution, mitigation, sustainment, or enhancement can most likely be shared from security organization to security organization despite supporting different industries. The common cultural occupational traits include dissatisfaction with the job, feelings of envy and unequal treatment, sticking together, male chauvinism, and hyper-vigilance.

In this study 16 key themes were identified that include frictions between the subculture of commercial nuclear security and the commercial nuclear power culture.

There are also positive themes. The themes uncovered in this research study include the following:

Theme 1: Organizational isolation

Theme 2: Officer isolation

Theme 3: Officer abuse

Theme 4: Hiring manager assumptions

Theme 5: Attitudes toward employment

Theme 6: Attitudes toward staffing

Theme 7: Unpredictable work schedule

Theme 8: Industrial safety impact on security

Theme 9: Management expectations

Theme 10: Teamwork

Theme 11: Opportunities for officer involvement

Theme 12: Gender in security

Theme 13: Maintaining physical requirements

Theme 14: Working conditions

Theme 15: Celebrating accomplishment

Theme 16: Supervision

The themes include issues to resolve, mitigate, and sustain or enhance. These themes, and the commercial nuclear security best practices associated with the answers to the six questions identified by Buckingham and Coffman (1999) that had the strongest links to the business outcomes of productivity, profitability, retention, and customer

satisfaction provide the foundation for the model of a high-engagement nuclear security culture that is presented in this study. This model identifies four categories of factors that most affect a high-engagement nuclear safety culture: external factors, individual factors, supervisory and leadership factors, and management systems. Key to this model are (a) effective communication to sustain or enhance the nuclear security officer culture and (b) the security officers' supervisors who effect positive responses to each of the six questions.

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Chapter 7: Limitations and Implications for Future Research

This chapter describes what obstacles may have affected this research, how I attempted to mitigate these, and what directions for future research this study suggests.

Mitigating the Obstacles

In putting together this research topic, I came across an interesting article by Manning and Van Maanen (1978) regarding the obstacles they faced while doing their policing ethnography. At that time I thus similarly analyzed the obstacles to my proposed research in order to ensure they were mitigated to the greatest extent possible.

Power Structure

My active participant position in nuclear security is, and was at the time of the study, that of a senior manager. There are multiple layers of managers and supervisors between my position and the officer in the field. Thus, because of the power imbued in my position, interviews with officers may not have provided the most candid of views. The mitigation for this issue was to ensure that people from outside my company were interviewed and that many of the people interviewed held similar senior manager positions in their own organizational structures; that is, that they were trusted peers.

Preconceived Notions about Security Officers

Despite being a member of three different commercial nuclear security organizations over the last seven years, I am still a technical manager from a source culture other than commercial nuclear security. Having never been a security officer of any kind, but having preconceived notions of what security officers do, I had the challenge of maintaining a neutral ethnographic perspective. This concern was mitigated by interviewing a broad selection of appropriate key nuclear security leaders to provide the most accurate interpretation of the nuclear security culture.

Security Fraternity

There is a social fraternity amongst my security officers. Some meet and go to bars after work and discuss "management." In my current company and my background would screen me out of the competitive pool to even apply to be a commercial nuclear security officer because I do not have the required years of armed security experience. I do not share their prior police or war experiences. To many of them, I am considered an outsider. This concern was also mitigated by interviewing a broad selection of appropriate key nuclear security leaders to provide the most accurate interpretation of the nuclear security culture. But, too, many of those who were interviewed share a mutual trust with me because of our previous work together and the close connections within the commercial nuclear security industry at the manager level. Additionally many of them started out as commercial nuclear security officers and can speak from first-hand experiences of what it was like to be a commercial nuclear security officer.

Occupational Secrecy

Much of what nuclear security officers do is not secret, but why they do it is often secret. Nuclear security, if performed under 10CFR73, classifies some security knowledge and activities as SAFEGUARDS information, which cannot be made public, and if it is made public, the offender and the offending company can suffer significant civil penalties. Still other security activities are classified as "security sensitive," which also carries some risk of civil penalty if inadvertently disclosed. Some of what is gathered during participant observation data collection runs the risk of being classified under these two categories and if classified as such, is not able to be published. This issue is a significant barrier to those with no access to the critical actors because it causes the critical actors to not want to speak to those not authorized for security sensitive information for fear of inadvertently divulging it.

My position in the organization is unique in that I am one of the few who is authorized to determine what is and what is not security information and therefore occupational secrecy is not a direct hindrance to my research; rather, it is an indirect one. The indirect concern stems from nuclear security stakeholder nervousness of discussing nuclear security matters with anyone, largely due to the risk of civil penalties. This concern drives the need for the anonymity of the plants and persons used in this study, and are a significant driver for involving as few people as possible in the data collection who work for my current company. For example, no surveys were administered, and no SAFEGUARDS or security-related information was discussed in this study.

Environmental Turbulence and Danger

When this study was conceived a few years ago, the environment was very different. The world outlook on nuclear power was a bit brighter than it is today, in that the Japanese multiple reactor meltdown had not yet occurred. Although the outcome from this big event hasn't stopped commercial nuclear power, it did significantly slow the nuclear renaissance that was expected to occur. Thus we are in a heightened state of concern with regard to current and future nuclear investments. One way culture develops is through shared learning and the Japanese multiple reactor meltdown is one example of an ongoing probable cultural shift in commercial nuclear power that affects commercial nuclear security. These culturally impacting environmental changes happen every few years.

Polarized Stakeholders

Technically complex, emotionally charged, and ever in the news, commercial nuclear power has droves of legal personnel, lobbying organizations, governmental agencies, politicians, executives, and managers interested in the operations of commercial nuclear power. Some are engaged in protecting the huge capital investment and some are engaged in attempts to shut down the plants. Any study of commercial nuclear security has the potential for significant stakeholder backlash. Presenting a balanced study free of classified information or security sensitive information is very important in order to minimize backlash. Peers were used to ensure that security sensitive information was not discussed in this study, and informed consent and an institutional agreement were used to minimize the potential for backlash.

International Applicability

Another potential limitation is the selection of the participants. In this study, the participants are from the U.S. commercial nuclear power industry. A nuclear event in any country can affect the worldwide nuclear industry. Examples of this issue are highlighted by the meltdown at the Chernobyl plant in Russia and with the Tsunami at Fukushima Daiichi plant in Japan. Thus, including participants from other countries could have enhanced the study, but in all likelihood, the cultural differences in other countries would have influenced the common themes and findings of this study.

Implications for Use of This Study

Scholars

This study is the first-time illumination of the culture of a unique group of paramilitary security officers and adds commercial nuclear security officer culture to academic discussion. It compares the commercial nuclear security officer culture to the larger private security officer cultures that have been identified in previous studies and reveals that the two share some common occupational culture traits. In learning more about nuclear security, the likely benefits are better theory, research, and policy regarding commercial nuclear security and the private security industry as a whole. Scholars can also use this study's findings to help students enhance their learning, leadership skills, and careers.

Regulators

This study could be used as an aid to develop new federal regulations to help ensure higher levels of safety for the commercial nuclear plant, the plant's employees, and surrounding communities. The regulators can also use the findings to find ways to improve the security organization's culture.

Public Policy Makers

In adding a realistic approach for improving the public's knowledge of how the security officer functions, the policy maker can develop better long-term strategies and policies for the public.

Practitioners in U.S. Government Nuclear Facilities

By better understanding the lives of U.S. commercial nuclear officers, government security practitioners at both nuclear storage and generation facilities may be able to improve their security cultures.

Practitioners in the Commercial Nuclear Power Industry

This study highlights the commercial nuclear security culture. It also provides useful insights into the best practices of how the commercial nuclear security industry is attempting to optimally manage the commercial nuclear security culture. In learning what works and does not work when addressing nuclear security officer needs, the nuclear practitioner may be able to find better ways to help ensure safe, reliable plant operation. In addition, the leaders may find ways to improve communication with the security officers and thereby improve the security culture.

Practitioners in Private Security Organizations

For the practitioner in other private security officer organizations, this study helps to identify how a paramilitary security organization differs from that of a parapolice organization, and it illuminates some of the management controls that might be useful for the management of security officers in other industries. In learning more about how the nuclear security organization functions, the non-nuclear security leaders may be able to apply some of the findings to their organizations to enhance their positive security culture.

Implications for Future Research

The following questions would be useful for future research:

- Do security officer call-off rate and attrition positively correlate to the supposed burnout from the security-oriented culture of the high-reliability organization?
- Are lesser rewards, such as tokens and public thanks, just as effective in influencing culture as greater rewards, such as raises and promotions?
- Does the implementation of a more operations-department-like shift schedule, which includes periods of training time off from shift work, for security officers positively affect security call-off rate or attrition?

The following activities would be useful for future research:

- Surveying a group of commercial nuclear security officers to determine the strength of the culture-centered themes of this study would be worthwhile considering for future research.
- The openness of bringing up issues to your superiors in Japan could be quite different than in the U.S. and thereby change the findings. Expanding the participant pool to include commercial nuclear security officers from other countries would also be worthwhile considering for future research.
- There are other paramilitary nuclear security groups such as those that protect the Department of Energy nuclear sites. Expanding the participant pool to include these officers would be worthwhile considering for future research.
- Although this dissertation provides a significant amount of data with regard to how key security leadership and security officers perceive how non-security people perceive security, further study is warranted, including how non-security people actually perceive security.

Appendix A: INPO Safety Culture Traits (INPO, 2012)

Individual Commitment to Safety

Personal Accountability

All individuals take personal responsibility for safety. Responsibility and authority for nuclear safety are well defined and clearly understood. Reporting relationships, positional authority, and team responsibilities emphasize the overriding importance of nuclear safety.

Questioning Attitude

Individuals avoid complacency and continuously challenge existing conditions, assumptions, anomalies, and activities in order to identify discrepancies that might result in error or inappropriate action. All employees are watchful for assumptions, values, conditions, or activities that can have an undesirable effect on plant safety.

Safety Communication

Communications maintain a focus on safety. Safety communication is broad and includes plant-level communication, job-related communication, worker-level communication, equipment labeling, operating experience, and documentation. Leaders use formal and informal communication to convey the importance of safety. The flow of information up the organization is seen as important as the flow of information down the organization.

Management Commitment to Safety

Leadership Accountability

Leaders demonstrate a commitment to safety in their decisions and behaviors. Executive and senior managers are the leading advocates of nuclear safety and demonstrate their commitment both in word and action. The nuclear safety message is communicated frequently and consistently, occasionally as a stand-alone theme. Leaders throughout the nuclear organization set an example for safety. Corporate policies emphasize the overriding importance of nuclear safety.

Decision-making

Decisions that support or affect nuclear safety are systematic, rigorous, and thorough. Operators are vested with the authority and understand the expectation, when faced with unexpected or uncertain conditions, to place the plant in a safe condition. Senior leaders support and reinforce conservative decisions.

Respectful Work Environment

Trust and respect permeate the organization, creating a respectful work environment. A high level of trust is established in the organization, fostered, in part, through timely and accurate communication. Differing professional opinions are encouraged, discussed, and resolved in a timely manner. Employees are informed of steps taken in response to their concerns.

Management Systems

Continuous Learning

Opportunities to continuously learn are valued, sought out, and implemented. Operating experience is highly valued, and the capacity to learn from experience is well developed. Training, self-assessments, and benchmarking are used to stimulate learning and improve performance. Nuclear safety is kept under constant scrutiny through a variety of monitoring techniques, some of which provide an independent "fresh look."

Problem Identification and Resolution

Issues potentially impacting safety are promptly identified, fully evaluated, and promptly addressed and corrected commensurate with their significance. Identification and resolution of a broad spectrum of problems, including organizational issues, are used to strengthen safety and improve performance.

Environment for Raising Concerns

A safety-conscious work environment (SCWE) is maintained where personnel feel free to raise safety concerns without fear of retaliation, intimidation, harassment, or discrimination. The station creates, maintains, and evaluates policies and processes that allow personnel to freely raise concerns.

Work Processes

The process of planning and controlling work activities is implemented so that safety is maintained. Work management is a deliberate process in which work is identified, selected, planned, scheduled, executed, closed, and critiqued. The entire organization is involved in and fully supports the process.

Appendix B: IAEA Abbreviated List of Nuclear Security Culture Traits (IAEA, 2008)

Management Systems

Visible security policy
This document should establish the highest expectations for decision-making and conduct, and should be supported by an atmosphere of professionalism in the security field. For security, there is the particular need to ensure that staff members understand that adherence to the policy is expected of all personnel. These expectations include protecting information, being aware of potential security concerns and threats, and being vigilant in reporting security incidents. These general expectations can be established through a documented code of conduct.

Clear roles and responsibilities
A significant part of establishing an effective nuclear security management structure is the clear definition of roles and responsibilities. Members of all organizations need a clear understanding of "who is responsible for what" in order to achieve the desired results. It is particularly important to review and update this responsibility system when organizational change is being planned and executed.

Performance measurement
Quantified measures of nuclear security performance, with associated goals, are essential in establishing management expectations and in involving staff in achieving the desired results.

Work environment

The physical and psychological work environment has a large impact on how staff members perform their tasks and comply with nuclear security requirements. In some instances this has a direct impact while in others the impact is less direct.

Training and qualification

An effective nuclear security culture depends upon staff having the necessary knowledge and skills to perform their functions to the desired standards. Consequently, a systematic approach to training and qualification is required for an effective nuclear security culture.

Work management

All work must be suitably planned in order to ensure that nuclear security is not compromised.

Information security

Controlling access to sensitive information is a vital part of the security function. Accordingly, the organization must implement classification and control measures for protecting sensitive information.

Operations and maintenance

A wide variety of security systems are used to achieve nuclear security objectives. These include, for example, accounting and control, physical protection, and computer management systems. Nuclear security system equipment will require ongoing operation, periodic maintenance, and occasional modification and replacement. In all cases, it is necessary to ensure that the intended function of the

system is not compromised or that, if systems must be removed from service, compensatory measures are in place.

Determination of staff trustworthiness

Any security barrier or procedure can be defeated with insider cooperation. Therefore, effective processes for the determination of trustworthiness and for the mitigation of insider threats must be in place.

Quality assurance

The security function of an organization is important and requires the same degree of rigor, control and assessment as any other major program area. Therefore, standard quality management practices should be applied. Documented evidence of the benefits of quality management initiatives can convince security personnel that quality service helps gain trust and support for the organization and the people in it.

Change management

Many organizational problems and failures arise from the inadequate management of change. This is true of changes in equipment, procedures, organizational structures, and roles or personnel. Therefore, the organization should have effective processes in place to understand, plan, implement, and reinforce change as it applies to the security function.

Feedback process

An organization that can learn from its own and the experience of others will be able to continuously improve its nuclear security performance. In order to do this

effectively, processes must exist for obtaining, reviewing, and applying experience from internal and external sources.

Contingency plans and drills
The nuclear security system must be in a continuous state of readiness to handle security events at any time. An important element of the system is the set of contingency plans used to respond to attempted or successful malicious acts or to address a breach of protection. Appropriate and realistic drills and exercises must be conducted periodically.

Self-assessment
There must be a system of self-assessment that includes a wide range of assessment programs, root cause analyses, performance indicators, lessons learned and corrective action tracking programs that can be used for nuclear security.

Interface with the regulator (and law enforcement bodies)
Effective nuclear security often involves several regulatory and law enforcement bodies. A constructive working relationship with each regulatory or law enforcement body is therefore important to ensure that information is exchanged regarding important nuclear security matters. This involves not only the relationship between the regulatory body and the regulated organization but also policy making and other bureaucratic considerations.

Coordination with off-site organizations
Frequent staff and management level communication is accomplished with local and national organizations involved in nuclear security. Written agreements are in place

with appropriate organizations to facilitate assistance, communication, and timely response to incidents.

Leadership behavior

Expectations
Leaders must establish performance expectation for nuclear security to guide staff in carrying out their responsibilities.

Use of authority
Management establishes the responsibility and authority of each position within the nuclear security organization. Authority should be clear and documented.

Decision making
The process through which an organization makes decisions is an important part of the nuclear security culture. Adherence to formal an inclusive decision making processes demonstrates to staff the significance that management places on security decisions and improves the quality of decisions.

Management oversight
An effective nuclear security culture depends upon the behavior of the individual and such behavior in turn is very strongly influenced by good supervisory skills.

Involvement of staff
Performance is improved when people are able to contribute their insight and ideas. Mechanisms should be in place to support this objective for nuclear security.

Effective communication

An important part of an effective nuclear security culture is to encourage and maintain the flow of information throughout the organization.

Improving performance

In order to avoid complacency, an organization should strive to continuously improve nuclear security performance. Leaders should establish processes and show by personal example and direction that they expect workers to look for ways to learn and improve.

Motivation

The satisfactory behavior of individuals depends up on motivation and attitudes. Both personal and group motivational systems are important in improving the effectiveness of nuclear security.

Personal behavior

Professional conduct

All organizations involved with nuclear security need their personnel to adhere to high standards of professionalism.

Personal accountability

Accountable behavior means that all workers know their specific assigned tasks related to nuclear security (i.e., what they have to accomplish by when and what results should be achieved) and that they either execute these tasks as expected or report their inability to do so to their supervisor.

Adherence to procedures

Procedures represent cumulative knowledge and experience. It is important that they are followed to avoid repeating errors that have already been identified and corrected. It is also important that procedures are clear, up to date, readily available, and user friendly so that personnel do not resort to departing from the approved methods.

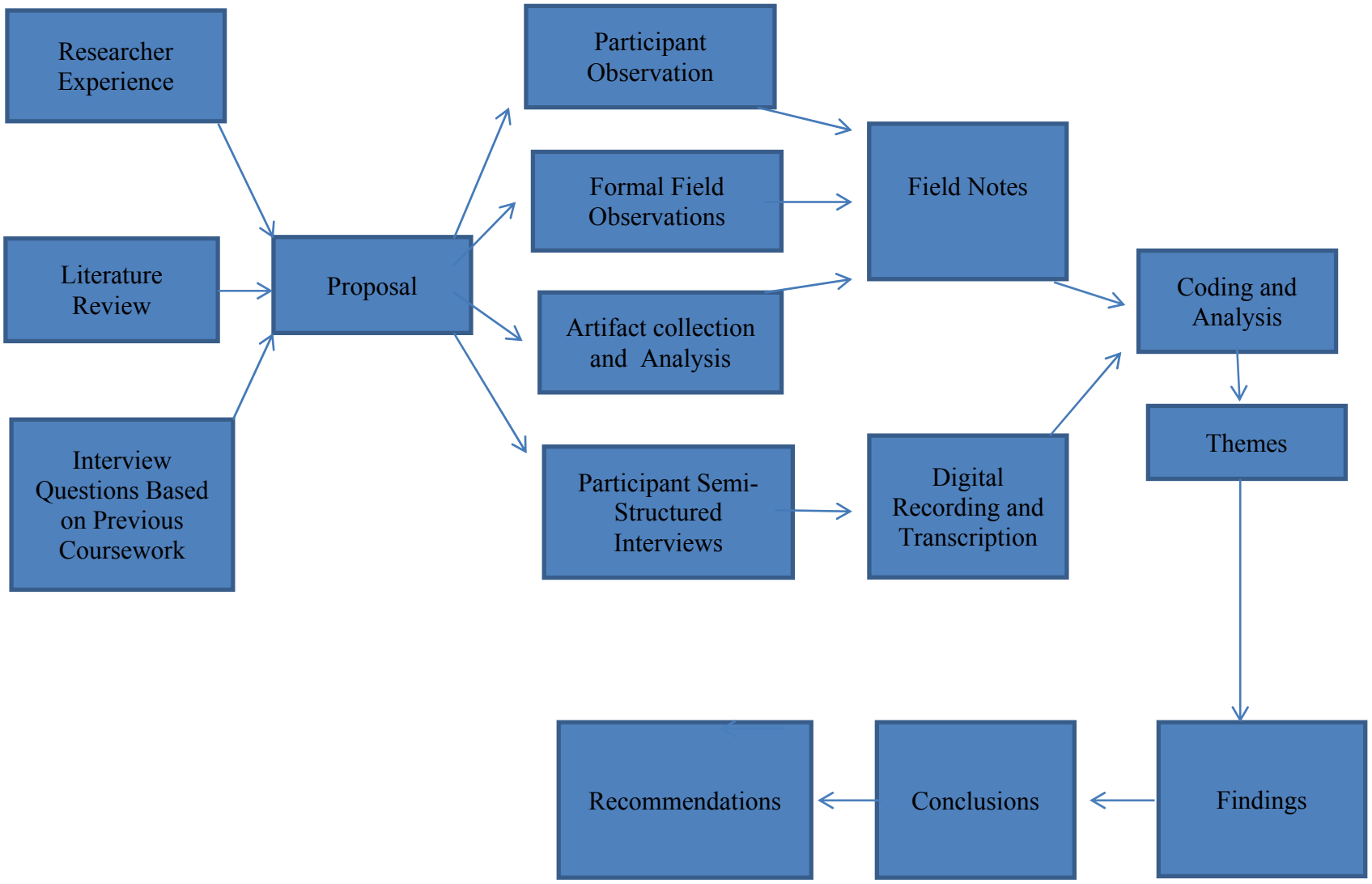
Teamwork and cooperation

Teamwork is essential. An effective nuclear security culture can best be formed in an organization where there is extensive interpersonal interaction and where relationships are generally positive and professional.

Vigilance

Security depends on the vigilance and observational skills of staff. Prompt identification of potential vulnerabilities permits proactive corrective action. An appropriate questioning attitude is encouraged throughout the organization.

Appendix C: Ethnographic Process



Appendix D: Interviewees

	Commercial Nuclear Power Security (CNPS) Experience	Source Culture	Commercial Nuclear Power Experience Outside of Security	Years CNPS	College Education	Plant	Reasons for Selection
1-	Assistant security shift supervisor, security officer	Local	No	6	No	Alfa	CNPS experience and female perspective
2-	Security supervisor, security officer	Local	No	8	Yes	Alfa	CNPS experience and recent officer experience
3-	Security operations supervisor, security supervisor, security officer	Local and previous service industry	No	11	No	Alfa	CNPS experience
4-	Site security manager, security supervisor	Police and fire	No	>20	Yes	Bravo	2 other plants as site manager and many other plants for oversight. Senior CNPS experience. Trust
5-	Senior security staff, security supervisor, security officer	Air Force	No	13	No	Charlie	CNPS experience.
6-	Senior security staff, security supervisor, security officer	Local	No	10	No	Delta	CNPS experience.
7-	Senior security manager	Local	No	>20	No	Echo	1 other plant as a senior manager. Senior CNPS experience. Trust.

8-	Site security manager	Navy	Yes	6	Yes	Foxtrot	Senior CNPS experience. Outside of security experience.
9-	Security executive, senior security manager, security supervisor and security officer	Local	No	>20	Yes	Golf	More than 20 other plants for oversight. Senior CNPS experience. Trust.
10-	Site security manager, supervisor, security officer	Air Force	No	>20	Yes	Hotel	1 other plant as site manager and several other plants for oversight. Senior CNPS experience.
11-	Site security manager, security supervisor	Local	No	>20	Yes	India	2 other plants as site manager and several others for oversight. Senior CNPS experience. Trust.
12-	Site security manager	Marine	No	9	No	Juliet	Senior CNPS experience
13-	Senior security manager, security officer	Marine	No	>20	No	Kilo	Senior CNPS experience. Trust
14-	Security shift supervisor, security officer	Army	No	>20	No	Kilo	CNPS experience. Trust
15-	Site security manager, security shift supervisor, security officer	Army National Guard	No	>20	Yes	Lima	1 other plant as site manager and more than 10 others for oversight. Senior CNPS experience. Trust

Appendix E: Interview Questions

1. What do you think about, how do you feel, when you prepare to come to work. What do you most often reflect on? Please provide me an example.

2. Tell me about how you feel about your job. What do you find most satisfying? Least satisfying? Please provide me an example.

3. How well do you think security officers fit in with the larger station population? Please provide me an example.

4. I'd like you to think 10 years out —it is 2021.. What are you doing, and what has it taken to get you there?

5. Are the expectations for you as a security officer/ supervisor different than for those of other employees at the station? Can you give me an example?

6. How do you define culture? Is there a security-unique culture at the station? Can you give me an example?

7. What attracted you to the nuclear security profession? What do you find most rewarding? What would you like to change? Please provide an example.

I am continuing to further my understanding of nuclear security officer. Is there anything else you can tell me? What am I missing? Do you have some examples that you can share?

Appendix F: Informed Consent Letter

To: Potential Interview Participant

From: Doug Evans

Subject: Informed Consent to Participate in Study

Date: _____

Dear: _____

I am a PhD student at Benedictine University and am researching the culture of the commercial nuclear power security officers.

This research will add to the body of knowledge about commercial nuclear security officers and security officers in other industries. This study is being conducted in part to fulfill requirements for my Organization Development PhD degree in the Organization Development Department at the graduate school of Benedictine University in Lisle, Illinois.

Thank you for your willingness to participate in the interview. Your time and involvement is profoundly appreciated. The results of this interview will be anonymous and it will be seen only by individuals associated with the dissertation, which include the interviewer, a code checker and the dissertation committee. Segments of the interview may be included within the dissertation; however, these segments will be anonymous.

The dissertation is a published document, and publishable articles may be developed from the results of this study. You have the following rights, should you agree to be interviewed.

- Interviewees have the right to review transcripts of their interviews
- Interviewees have the right to review drafts of the dissertation to ensure that their viewpoints are properly interpreted.
- Interviewees will be informed of the study results upon analysis of the data.
- Participation in this study is voluntary, and interviewees involved in the study have the right to withdraw at any time before the dissertation is finalized.

- Interviewees have the right not to answer any questions he or she does not want to answer.
- If at any time the interviewee does not want to continue the interview, he or she may decline to continue.

The entire interview will take approximately one to two hours. To maintain the essence of your words for the research, I will digitally record the interview and take notes. This is done for data analysis. The recording will be transcribed by the interviewer and kept confidential in a password-protected computer. All individual identification will be removed from the hard copy of the transcript. Participant identity and confidentiality will be concealed using coding procedures. For legal purposes, data will be copied onto a flash drive and delivered to a Benedictine University faculty member for secure and ultimate disposal after a period of seven years. Dr. Jim Ludema is the Benedictine University faculty member who will secure and ultimately dispose of the information. His information is at the end of this form.

Excerpts from the interview may be included in the final dissertation report or other later publications. However, under no circumstances will your name or identifying characteristics appear in these writings. If, at a subsequent date, biographical data were relevant to a publication, a separate release form would be sent to you.

Please sign this form on the line provided below to show that you have read and agree with the contents. An electronic signature is acceptable.

_____

Your signature above

The study has been approved by the Institutional Review Board of Benedictine University. The Chair of Benedictine University's Institutional Review Board is Dr. Alandra Weller-Clarke. She can be reached at (xxx-xxx-xxxx). The chairperson of this dissertation is Dr. Jim Ludema. He can be reached at (xxx-xxx-xxxx) for further questions or concerns about the project/research.

Sincerely,

Douglas J. Evans

Benedictine University

Appendix G: Redacted Institutional Agreement for This Study

Doug Evans
[redacted]

[redacted]
Site Vice President
[redacted]

Dear [redacted]

I'm working on a dissertation in pursuit of a PHD in Organization Development for Benedictine University, in Lisle, Illinois. The dissertation is a Realist Ethnography of the commercial nuclear security officer culture.

As a part of the dissertation I am interviewing security managers and officers from many other sites across the United States to gain their insights into security culture and would like to supplement their insights with non-intrusive participant observation activities that I would conduct at [redacted]

I would like to conduct these participant observation activities, which will include producing written records of observations of the cultural aspects of the nuclear security officers at [redacted] including artifacts, behaviors and underlying beliefs, for a total about 12 hours during the months of October and November of 2012. The activities to be observed include those that officers commonly participate in during the course of their work day, including arrival at work, shift brief, arming up, standing watch on post, and securing for the day. It's important to note that I've monitored these activities at more than a dozen locations in the United States since 2005 and as such, the final dissertation won't reflect [redacted], rather, it's a composite view of nuclear security culture. The participant observations at [redacted] are just providing current information and related insights.

No current employees of [redacted] will be interviewed. No company assets will be used. There will be no interference with work duties and I will not conduct the observations during my scheduled work periods. The company will have the right to review and refuse the inclusion of information obtained during participant observations at [redacted] but not information obtained from other referenced sources, such as publically available documents and interviews of non-[redacted] employees.

The dissertation and written records will not include any proprietary, security sensitive or security classified information. [redacted] will not be mentioned in the dissertation nor will any employees be identified by name in the dissertation. I'm not reviewing any proprietary information and I'm the most qualified person in [redacted] to determine what is and is not security sensitive or security classified information so no other company reviews are necessary, but are welcomed

[redacted]
October 21, 2012
Page 2

The Institutional Review Board of Benedictine University has asked me to provide a letter from [redacted] authorizing me to conduct these participant observation activities. Request that you authorize me to perform the activities outlined above for [redacted] on the footer below.

Sincerely,

Doug Evans
Security Manager, [redacted]

Approved Disapproved (circle one)

Name: [redacted]

Title: Site Vice President [redacted]

Signature: [redacted]

Date: 10/24/2012

Appendix H: Social Situations, Actors, and Locations

Security Social Situations Locations	Permissibleness	Predominant Key Actors					Activity Frequency	Activity Frequency (applies to entire group)
		Security Officers	Security Supervision	Security Management	Other Station Personnel	Non-Station Personnel (e.g., public)		
Car Pools	Restricted -entry	X					Daily or more frequently	No
Vehicle Entrance Searches	Free-entry	X	X	X	X	X	Daily or more frequently	No
Access Facility people searches	Limited-entry	X	X	X	X	X	Daily or more frequently	No
Arm Up in armory	Restricted-entry	X	X	X			Daily or more frequently	Yes
Shift Briefs	Limited-entry	X	X	X			Daily or more frequently	Yes

Security Social Situations Locations	Permissibleness	Predominant Key Actors					Activity Frequency	Activity Frequency (applies to entire group)
		Security Officers	Security Supervision	Security Management	Other Station Personnel	Non-Station Personnel (e.g., public)		
Remote and Isolated Posts	Restricted-entry	X	X				Daily or more frequently	Often Yes
Foot Patrols	Restricted-entry	X	X		X	X	Daily or more frequently	No
Vehicle Patrols	Restricted-entry	X					Daily or more frequently	No
Lunch Rooms	Limited-entry	X			X		Daily or more frequently	No
Unarm in armory	Restricted-entry	X	X	X			Daily or more frequently	Yes
SIFT Meetings	Restricted-entry	X		X			Monthly	No
Alarm Station/ Command Post	Restricted-entry	X	X	X			Daily or more frequently	No

Security Social Situations Locations	Permissibleness	Predominant Key Actors					Activity Frequency	Activity Frequency (applies to entire group)
		Security Officers	Security Supervision	Security Management	Other Station Personnel	Non-Station Personnel (e.g., public)		
Skip Meetings	Restricted-entry	X		X			Monthly	No
Safety	Limited-entry	X	X	X			Monthly	No
Physical Fitness Tests	Restricted-entry	X			X		Annually	Yes
Periodic Training	Restricted-entry	X	X				Quarterly or more frequently	Yes
Drills and Exercises	Restricted-entry	X	X	X	X		Quarterly or more frequently	Yes
New Hire Training	Restricted-entry	X					Annually	Yes for new hires
Remote Searches	Restricted-entry	X	X				Infrequently	No

Appendix I: Additional Key Social Interactions

1. Post turnover
2. Security shift brief
3. Pre-job brief
4. Security shift activities report
5. Post checks and radio checks
6. Work control coordination meetings
7. Security written observations of behaviors in the field
8. Security management and supervision alignment meeting
9. Security duty team emergent issues page and or duty team call
10. Weekly stand-up meeting
11. Weekly senior security staff meeting
12. Weekly security shift supervisor alignment call
13. Security duty team observations
14. Security tele-message
15. Security Improvement Focus Team (SIFT) meeting
16. Skip meeting between officers and the security manager
17. Operational alignment bulletin discussion
18. Security newsletter (monthly)
19. Security staff and crew safety meetings
20. One-on-one meetings
21. Management day in the field
22. Station management review meeting
23. Security staff and crew management review meeting
24. Security curriculum review committee
25. Small group meeting with station leadership
26. Nuclear Oversight Board
27. Security council
28. Supervisor meeting/training
29. Management brief/all hands security briefs
30. Nuclear oversight audits
31. Week- long self-assessments
32. Week-long NRC inspections
33. All hands station meetings
34. Discipline action review board
35. Procedure review meetings
36. Developmental position selection boards

37. Behavioral based interviews—interview panel
38. HURB- Human Performance Review Board
39. Annual exercises
40. Department and crew human performance clock resets
41. Celebrations

Appendix J: Artifacts List—Documents and Objects

Artifact Name	Format	Description	Related Theme
1. Security officer handbook	Word File and soft-cover pocket-sized booklet 89 pp	Handbook of items of interest to security personnel and especially security officers. Content includes: 1. Security organization • Mission and vision statements. 2. Administration • Medical • Work Hour Rules • Disability management 3. Requirements of security personnel • Fitness for duty • Daily self-checks and uniforms 4. Vehicle barrier and gate operations 5. Procedure references 6. Security equipment nomenclature to enable reporting broken equipment 7. Training • Weapons nomenclature • Range rules • Firearms safety 8. Corrective action program 9. Safety Conscious Work Environment 10. Security Improvement Focus Teams	2, 8,9,10

Artifact Name	Format	Description	Related Theme
		11. Power of arrest 12. Use of force and rules of engagement 13. Definitions 14. Lists of nuclear security fundamental behaviors 15. Quick reference cards for key security activities • OCA rover responsibilities • Vehicle access control point searches • Search and inspection • Operation of the explosive detector • Independent spent fuel storage installation security operations • Protected area vehicle search and escort • Protected area and vital area patrols • Protected area and vital area emergency access • Requirements for access and protection of safeguards materials Portable soft covered booklet that officers keep on their person and take from post to post. As such, it gets read more often than most security documents, gets revised, and is more likely to reflect officer feedback and what is important to the officers and to the organization. It supports understanding some of the security activities in which the actors partake.	
2. Skip and SIFT meetings actions list	Word File 15 pp	List of the open and closed actions for items that the officers had as concerns at one point in time. In 2011 officers voted on their top 5 concerns from which problem statements were developed and action plans were put into place to close the gaps. The gaps	5,7,14

Artifact Name	Format	Description	Related Theme
		reflect common shift work related concerns. Based on benchmarking, many of the specific questions listed after these top 5 concerns are nuclear security industry concerns and reflect cultural frictions with the nuclear security organization	
3. SIFT charter	Word File 4 pp	The Security Improvement Focus Team (SIFT) charter identifies in broad terms how the SIFT functions.	11
4. Standard Meeting Agenda	Word File 2 pp	Requirements for Every Meeting: 1. Take Two for Safety and Nuclear Safety Culture Message of the Day 2. Action Scribe 3. Timekeeper 4. Meeting Skeptic (Meetings should end 10 min. before the hour to accommodate travel between meetings) Meeting efficiency is important as observed by the focus of each meeting (stated behaviors, process and outcomes)	8,9
5. Security communication plan	Excel File 12 pp	This plan identifies the recurring and special communications for one period of time for security at a nuclear power plant.	1,8,9,15

Artifact Name	Format	Description	Related Theme
		Key messages • Supervision needs to be the first line of communication for the officers • Security is a critical part of our success of the station	
6. Daily staff meeting agenda	Word File 2 pp	This agenda identifies the recurring topics that are discussed during the daily staff meeting. The purpose of the meeting is to review daily Security concerns so that we can align on responses and ensure we're all working efficiently to resolve them. The meeting is run by the Security Shift Supervisor and therefore focuses on Security operations. Senior managers from other Security functions are present to support and remove barriers to success. Requirements for Every Meeting: Ground Rules: ▪ We start/end our meetings on time ▪ We will adhere to the agenda ▪ We stay on task; no side conversations ▪ We check egos at the door ▪ We will be prepared to discuss our required actions at meeting ▪ We listen to others and don't interrupt.	8,9,15

Artifact Name	Format	Description	Related Theme
		▪ We attack the problem, not the person-—"no blame game" ▪ We operate on consensus ▪ We identify actions that result from decisions ▪ We show mutual respect ▪ We bring closure to decisions ▪ We will keep our own notes during the meeting	
7. Plant daily brief	PDF File 1 p	This communication brief gives an example of what is promulgated in the daily plant or station communication brief. Note standard focus of Nuclear safety culture trait review Industrial safety review	8,9
8. Station all hands meeting	Power Point File 15 pp	This presentation gives an example of what is covered at the station all hands meetings. The standard format includes: • Nuclear safety trait review • Topical discussions (from time to time a security topic) • What we need from you • Q&A • Wrap-up	8,9

Artifact Name	Format	Description	Related Theme
9. Weekly staff meeting agenda, vision statement and rules for working together	Word File 7 pp	This agenda gives an example of the recurring and specific topics covered at the weekly staff meeting. It also provides the security vision statement and rules for working together for the security organization. This artifact provides the vision and ground rules for how the senior part of the organization desires that the organization behaves • Alignment of the senior security management team around key issues, educate the team on what others are working on for mutual support and to eliminate silos Vision Statement • In 2014 the security upgrades are in place and XXXX security human performance and safety are recognized as the best xxxx as measured by xxxx metrics and a successful xxxxx triennial Force on Force. • XXXX security talent is recognized by outside of xxxx security organizations as evidenced by their requests for our assistance. They pick us to benchmark. • Succession planning and people development is robust and we've multiple candidates for key leadership positions. • Security department is recognized by the station for their implementation of Facilitative Leadership, in that the leaders are collaborative, strategic, receptive and flexible.	8,9
10. Security standard meeting schedule	PDF File 1 p	This is a snap-shot in time of what the security recurring meeting schedule looks like at one station There are a multitude of standard security and standard station meetings that fill up the workday. This standard meeting schedule provides an at-a-glance	9,10

Artifact Name	Format	Description	Related Theme
		depiction of the security activities discussed in this dissertation	
11. Shift activity report	Word File 6 pp	This redacted report gives an example of what gets reported by the senior manager on shift to the senior security staff. Note the general topics of: • # of days w/out OSHA • Overtime/Call-Offs • LETS Program • HU/Safety Events • UNQ MSO (HU/Safety) • MSO Impacts • PAIDS/EWZ/Equipment • Compensatory Posting • Patrols/Observation • Unplanned Comp Post • Chemical Deliveries • Work Control/Schedule • Security Projects • Security Inspections • SSS Shift Tasks • Ops Focus Active Actions • Communications/Misc It reflects the items that management feels are most important to be reported from the shift and which items need to be turned over from shift to shift.	9,10

Artifact Name	Format	Description	Related Theme
		• It also reflects a piece of the complexity of nuclear security	
12. Final agenda National Nuclear Security Conference (NNSC)	PDF File 4 pp	This is the final agenda for the national nuclear security conference, which was the location of a field observation. Items of note are • Cyber security • ISFSI rulemaking • Changing political environment • Sharing of operating experience from region to region • Changes in integrated response with the FBI • Changes to the security training recommendations • Triennial force on force update (most significant NRC inspection) • Security inspection performance with the NRC These are the agenda items from the most recent national nuclear security conference and therefore reflect the most significant current items in commercial nuclear security. These national issues eventually become site concerns.	9
13. Duty team notification process	PDF File 6 pp	This process document details the functioning of the security duty team	10,16
14. Security team safety guideline	PDF File 10 pp	This process document details the functioning of the industrial safety program for security	8

Artifact Name	Format	Description	Related Theme
15. Peer-to-peer observation program	Word File 2 pp	This process document describes how the peer-to-peer observation program for a station works. Peer-to-peer observation programs encourage employees to seek out gaps in behavior and correct them between peers. Since the program is anonymous, participation is rewarded, rather than specific results.	8,11
16. Security procedure of the month program	PDF File 3 pp	This process document describes the procedure of the month program. There are more than 70 security procedures, many of which concern the daily activities of security officers. Security officers are graded each year on their ability to perform the "critical tasks" contained in these procedures. Unlike control room operators who can often use a procedure line by line to do his or her daily work, security officers need to perform a higher percentage of their procedures from memory or from checklists. The procedure of the month program takes some of these more critical procedures and ensures that people review them thoroughly from time to time so that gaps to performance do not develop.	9
17. Security excellence plan	Word File 7 pp	This document details an excellence plan for the security group for one snapshot in time. **Safety** 1. Zero OSHA recordable injuries resulting from Human Performance Error **Regulatory Excellence** 1. Improve the safety conscious work environment in 2013.	8,9,10

Artifact Name	Format	Description	Related Theme
		2. Complete NRC inspections in 2013 with no greater than green findings. **Industry Excellence** 1. Reduce Security Division Human Error Clock Resets from 2012. 2. Reduce Return to Service time for Out of Service Security Equipment. Blue or Green in all Security Equipment Metrics (Measured monthly) **Long-term Station Operations** 1. Change to security infrastructure are planned to reduce burdens associated with compensatory measures The four pillars for the station improvement plan also included safety, regulatory excellence, industry excellence, and long term-station operations. Each of the categories had a specific improvement plan with assigned metrics to determine success. Such detailed plans are typical of high-reliability organizations and the commercial nuclear power plant safety culture.	
18. deleted			
19. Generational differences	Power Point File	This presentation provides information on generational differences. At least one of the interviews went into detail about how the current generation of security officers is very different from that of the previous generations	5

Artifact Name	Format	Description	Related Theme
	20 pp		
20. Approach to discipline	Power Point File 10 pp	This presentation provides some insight on investigations, and recommendations for discipline are identified and how discipline is only awarded after multiple reviews.	9,16
21. Deleted			
22. Rules of engagement and deadly force lesson	Word File 22 pp	This lesson plan discusses rules of engagement and deadly force for a nuclear power plant. Given a list of terms, the Security Officer should be able to define or paraphrased each of the following: Deadly Force (Lethal Force), Less than Lethal Force, Good judgment, Security Event, Rules of Engagement, Threat Situation, Suspicious Behavior, and Reasonable Force. Define or paraphrase the five circumstances when deadly force would be authorized as outlined in SONGS Rules of Engagement. Define or paraphrase the two circumstances describing the use of less than Lethal Force as outlined in SONGS Rules of Engagement.	1,9

Artifact Name	Format	Description	Related Theme
		Define or paraphrase the Security Officers responsibilities when confronted with protecting the property or the safety of personnel as outlined in SONGS Rules of Engagement.	
23. Nuclear security officer ,	PDF 1 p	This job posting, which was obtained from a job hunting website, provides an employer's perspective on what they are looking for in perspective nuclear security officers	4,6
24. Deleted			
25. Deleted			
26. Duties and responsibilities of the security organization	Word File 17 pp	This document describes the duties and responsibilities of the security organization personnel.	9
27. Security officer essential function Job Analysis	Word File 5 pp	This document describes the essential job functions of a nuclear security officer.	2,6
28. Deleted			
29. Deleted			
30. Shift brief grading sheet	Word File 2 pp	This document provides a grading sheet for the security shift brief.	9
31. Safety good	Word File	This document provides an example of a safety good catch award.	8

Artifact Name	Format	Description	Related Theme
catch blank	1 p		
32. Selection process for personnel enrichment	PDF File 6 pp	This process document describes how the selection process works for personnel enrichment opportunities.	11,16
33. Corrective Action Program (CAP) screening	PDF File 43 pp	This process document (Corrective Action Program—CAP) describes how gaps are prioritized for investigation and for resolution.	9
34. Combined human performance and industrial safety pocket guide	Pdf file 118 pp	This booklet provides the human performance tools (e.g. peer check, STAR-Stop, Think, Act, Review, procedural adherence) that are expected behaviors for nuclear workers. The other half of the book provides brief guidance for various industrial safety topics (about 50 topics), such as ladder safety, driving safety, reporting accidents.	8,9
35. LETS guidelines	PDF File 2 pp	This process document describes how the leadership engagement trending system works for supervisory and management field observations of craft	16
36. Human Performance clock resets	PDF File 70 pp	This process document describes how human performance issues are tracked and trended for department and site overall human performance health.	10
37. Manager day in the field	Word File 2 pp	This document describes how the manager day in the field for oversight of assigned departments functions.	16
38. Mission Statement	Jpeg FILE 1 p	Gives the mission statement	9

Artifact Name	Format	Description	Related Theme
39. Monthly one-on-one	Word File 1 p	This document illuminates the topical categories of what is discussed in a one-on-one meeting between an employee and his or her supervisor or manager.	16
40. List of procedures	Excel File 6 pp	This document provides the names and numbers of the security procedures at one nuclear power plant.	9
41. Security fundamentals	PDF File 2 pp	This document provides the nuclear security fundamental behaviors expected at a nuclear power plant. These fundamentals also appear in the security handbook.	1,2,8,9, 10,14,16
42. Shift brief template	Power Point File 12 pp	This document provides a template for the security shift brief.	9,15
43. Certificate of recognition template	Word File 1 p	This document provides an example of a recognition template.	15
44. Slogan on token- coin	Power Point File 1 p	This document provides slogans that are important to the security organization.	9
45. Facilitative Leadership (FL)posters	PDF File 6 pp	This document provides the posters for FL, or the behaviors expected of facilitative leaders.	9,15
46. List of security pulse surveys	Word File 1 p	This document provides the topics of surveys sent to security officers over about a 1 year period to gather their formal input.	11
47. Officer gold colored plated badge	Physical object	This token is a badge that is worn by many security officers at one nuclear power plant.	9
48. 2012/2013	Mix of PDF	These documents reflect items of concern and of interest to the security	1, 2, 6,

Artifact Name	Format	Description	Related Theme
security newsletters and special communication	Files, Hard copies, Word files and Publisher Files 138 pp newsletters 61 pp info updates	department over about a 1.5-year period.	7, 8, 9, 10, 11, 13, 14, 15, 16
49. Facilitative leadership manual	PDF File 174 pp	This document describes the behaviors of the facilitative leader.	16
50. Security procedure review process	PDF File 4 pp	This document describes the process which is used to gain maximum appropriate involvement in security procedure reviews so the products turn out with the highest quality and with the maximum amount of buy-in	9, 11
51. Security selection process for personnel enrichment	PDF File 16 pp	This document describes the transparent, fair, legal and ethical process by which officers can be selected for additional duties.	9, 11, 16
52. deleted			
53. Turnover guideline	PDF File 6 pp	This document describes the correct process for turnover of a post, which is a security focus area	9, 10

Artifact Name	Format	Description	Related Theme
54. Curriculum Review Committee (CRC) agenda	Word File 14 pp	This document provides an example of a security CRC meeting agenda	9, 11
55. HU and safety bi-weekly MRM	Word File 2 pp	This document provides an example of a security Human Performance (HU) and safety station bi-weekly Management Review Meeting (MRM) report, which is reported out to the rest of the station for challenge.	9, 10
56. Deleted			
57. Deleted			
58. Deleted			
59. Deleted			
60. NOB agenda	Word file 3 pp	This document provides an example of a typical nuclear oversight board /nuclear safety review board agenda.	1, 9
61. Post checks guideline	PDF file 29 pp	This document describes the process to follow to perform adequate post checks.	16
62. SSS conference call agenda	Word file 2 pp	This document provides a typical SSS conference call agenda.	16
63. Station MRM metrics list	Excel file 2 pp	This document lists the various metrics that are reviewed as a part of the station Management Review Meeting (MRM) and some security metrics are listed as a part of this document.	1, 9
64. Weekly Stand-up	PDF file 1 pp	This document provides an example of what a weekly stand-up meeting might include.	8
65. Discipline Action	PDF File 2 pp	This document describes how security performs a discipline action review board in order to have consistency in discipline as well as being fair, legal, and ethical.	9, 16

Artifact Name	Format	Description	Related Theme
Review Board (DARB)			
66. Security Management Review Meeting (MRM)	Word File 4 pp	This document provides the agenda for a typical security management review meeting performed at the staff level.	9, 16
67. Operational Alignment bulletin	PDF File 9 pp	This document provides an example of an alignment bulletin.	8, 9
68. Security website	None	Security department has its own intranet website, which contains links and documents of security concern.	8, 9
69. Security information boards	none	These are pictures of various security information boards.	9, 15
70. The value of the nuclear security officer videos	MP4 Video	Industry (NEI) Video touting the importance, purpose, and functioning of commercial nuclear security.	1
71. Station P Security Video	Windows Media Audio/ Video File	Station Papa video touting the importance, purpose, and functioning of the site's commercial nuclear security organization.	1
72. Station S	Windows	Station Sierra video touting the importance, purpose, and functioning of the	1

Artifact Name	Format	Description	Related Theme
Security Video	Media Audio/ Video File	site's commercial nuclear security organization.	

Appendix K: Instructions to the Code Checker

1. Familiarize yourself with the Appendix B introduction and interview questions.
2. Read each passage of text in the transcribed interviews and passive field observations.
3. As you read the passages, think about the research question. What do you see in each passage about the culture in which the nuclear security officer lives and works? Do you see tensions between what the security officers ought to do and what they actually do?
4. For each passage, note your observations in the right margin of the documents provided.
5. We'll meet to discuss your observations and arrive at consensus.

Appendix L: Attributes of Effective Security (NEI, 2001)

1. PHYSICAL AND MENTAL FITNESS
Security officers must meet stringent physical standards, be free of psychological disorders and substance abuse problems, and must undergo criminal background checks.

2. SECURITY KNOWLEDGE
Certain general knowledge of security procedures and skills is important, no matter what type of facility the security officer is protecting. This includes use of equipment and weapons, general tactics, general procedures, self-defense and knowledge of legal authority.

3. ALERTNESS, MOTIVATION, AND ADHERENCE TO REQUIREMENTS
Maintaining an alert security force capable of supporting long periods of routine activity without any hostile activity is essential. Techniques used to maintain alertness include the integration of training and drills, rotation of assignments, and the introduction of varied activity into the security officer's schedule.

Adherence to requirements is the willingness to enforce unpopular rules and procedures. This is a complex issue that must be fostered by effective management methods. The nuclear energy industry's strong safety culture fosters strict compliance with rules and procedures.

4. LEGAL AUTHORITY: WEAPONS, DETENTION, SEARCH AND USE OF FORCE
Security officers must have clear authority under the law to detain and search intruders and to use deadly force, if necessary, to protect public health and safety. They also must be equipped with, and authorized to use, weapons and equipment that are adequate for the threat and defensive strategy being used.

5. SECURITY WORKFORCE STABILITY
The 90 percent retention rate for the industry's security forces is an excellent indication of the stability of the current workforce.

6. PHYSICAL BARRIERS AND OTHER PROTECTION
Physical barriers to entry, electronic aids, plant layout, defensive positions, and personnel protective equipment all enhance security force effectiveness. These physical features affect the number of armed responders needed. Increased use of physical features may reduce the number of responders needed for a given threat but may impact plant operations. There are frequent conflicts between the needs for security and free access of the plant for safe operations.

7. DETERRENT IMAGE

The industry's security programs combine strong physical security features with highly trained paramilitary security professionals. Both features are highly visible and provide a strong deterrent to anyone considering attacking a nuclear power plant.

8. COMPATIBILITY WITH NORMAL OPERATIONS

Nuclear power plant security forces are extremely well integrated into the normal day-to-day operations of the facility. The security officers and staff work closely with reactor operators and other plant staff to help ensure the safe and efficient operation of the facilities

9. LIAISON WITH LOCAL OFFICIALS

Close liaison with local officials is an integral provision of the security regulations and, in fact, has been implemented effectively by the industry.

10. CHAIN OF COMMAND AND CONTROL DURING CRISIS

Security forces also are extremely well integrated into the emergency operations of the nuclear facilities.

Appendix M: Armed Nuclear Security Officer Job Posting

OPEN POSITION ANNOUNCEMENT

Armed Nuclear Security Officer (Listing SS07033)

ANNOUNCEMENT DATE: July 26, 2013
LOCATION/DEPARTMENT: Wadsworth, TX
TRAINING WAGE (Pre-certification) $12.59
FLSA CATEGORY: Hourly
SALARY RANGE: $16.29-22.94
RELOCATION: None

POSITION FUNCTION: Provide physical protection of nuclear power generating facilities against intrusion and acts of sabotage. Conduct armed stationary, foot and/or vehicle patrol (interior and/or exterior). Control access and/or egress of personnel, materials and vehicles. Monitor CCTV, plant surveillance equipment and alarm systems. Compose reports. Deter criminal activity, misconduct, and safety violations. Perform other duties as specified in nuclear training and qualification plan and post orders.

BASIC QUALIFICATIONS:

Candidates must meet all of the following basic qualifications for this position:

- Be at least 21 years old or minimum age required by your State
- Pass any State-required training or other qualifications for licensing
- Be able to work scheduled shifts (12 hour, 10 hour rotating or fixed)
- Have access to reliable transportation
- Not use illegal drugs. You must be able to pass a drug and alcohol test with negative results (except when undergoing documented medical treatment)
- Be able to pass an extensive background check, including criminal history, personal references, employment and education verifications, and Department of Motor Vehicle and credit checks, Pass a State licensing test as you will be driving a company-owned or client-provided vehicle
- Be able to provide, upon job offer, a DD214 discharge document with discharge status indicated, if you were in the military
- Be able to successfully complete all training required for the position
- Be able to operate a radio or telephone equipment and/or console monitors and surveillance equipment.
- Demonstrate an ability to interact cordially and communicate with the public
  - Pass the following, post-offer: Pearson Reid Reading and Arithmetic Index and Security Officer Profile test
- Pass the following, post-offer in accordance with the code of federal regulations for armed nuclear security assignment (10CFR, Appendix B):
  - MMPI – Psychological testing
  - Physical Exams, including vision and hearing, in accordance with nuclear regulatory requirements and site training and qualification plan
  - Physical fitness (agilities) test in accordance with site training and qualification plan
  - Firearms qualification with handgun, shotgun and rifle per client contract and site training and qualification plan
  - Nuclear site specific training and testing providing general knowledge of nuclear power generation science and principles, plant rules and regulations, communications, and access. In addition, this training and testing will include radiation worker principles including respirator training, fit and dress out.

PREFERRED QUALIFICATIONS:

Nuclear security, military, security, law enforcement, supervisory experience or higher education.

APPLICATION PROCEDURE: (As of 9/17/12) If you plan to apply for this position please notify your immediate supervisor.

1st time internal career center visitors: To access the career center, please visit http://usajobs.g4s.com/allJobs & follow instructions to set up account if you are a first time user.

Managers: Employees must be informed of this opening. Please post this notice in a conspicuous location for at least 10 days & forward it via email to all personnel who do not have a G4S Secure Solutions (USA) email address.

G4S Secure Solutions (USA) is an Equal Opportunity Employer M/F/D/V and an Alcohol- and Drug-Free Workplace

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