Vocational Narratives of Senior Executive Retirees in a Technical Agency and

Their Sense of Safety in the Workplace

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Ensuring the safe operation of a high-reliability organization is no simple feat (Myers & McPhee, 2006). There are several different aspects that go into making sure that an organization is being operated in a culture that promotes safety and mindfulness (García-Herrero, Mariscal, Gutiérrez, & Toca-Otero, 2013; Novak & Sellnow, 2009). Senior executive regulators play a large role in encouraging an organization's healthy safety culture as they are charged with spreading ideals throughout the industry, along with their legal responsibilities (Hale, Guldenmund, van Loenhout, & Oh, 2010). Additionally, these senior executives are responsible to implement regulatory practices that satisfy the risk tolerance of the community, utilize appropriate methodologies to measure tolerable risk levels, and verify resources available to the industry (Ash, 2010). Decisions concerning safety have been found to be extra-scientific, involving political and social judgments in addition to scientific beliefs (Silva et al., 2007).

While research has been conducted on safety and risk management in technical agencies as well as vocational histories of senior executives, little research has been done to determine how a senior executive's vocation narrative helps him or her develop a safety mindset. An individual's vocational *history* collects data from the individual's perspective covering his or her work history and career story (Harrow & Mole, 2005). What is unique about a vocational *narrative*, however, is that is allows the respondents to use language to construct their accounts of their career. Therefore, the stories chosen and the words used are unique to each individual and reveal what they found to be significant throughout their career story (Rasmussen, 2013). This analysis of vocational narratives allows us to discover the key events and experiences that lead to developing a safety mindset—the goal of this study. Given this goal, a few questions are relevant: What does it mean to have a safety mindset? Do common experiences exist in the process of developing a safety mindset? What does a person need to do in order to develop sense of safety in the workplace? From those inquiries came our guiding research question: How does the vocational history of a senior government executive in a technical agency help contribute to his or her sense of safety and risk management?

Literature Review

While safety and reliability are key operational concerns of many large organizations much is left undiscovered as to its relation to management and vocational histories (Zanko & Dawson, 2012). Connecting these concepts will provide insight as to what experiences and characteristics are necessary in developing a safety mindset. In high-reliability organizations, such as the Nuclear Regulatory Commission (NRC), safety as it pertains to protecting the surrounding community as well as the more immediate concern of the safety of nuclear power plant workers is an essential area of importance. The responsibility of implementing and enforcing safety regulations rely on the organizations' senior executives and the safety culture that they encourage (Shrader-Frechetter & Cooke, 2004; Garcia-Herrero et al., 2013). Research shows that often, a person's decisions regarding safety and the organization he works for come from his own personal social, political, and epistemological predispositions as well as his commitment to the pertaining sector (Silva et al., 2007; Harrow & Mole, 2005). These factors are a product of both the organizational culture from which a person is a part of and from personal vocational histories. Though many studies have shown that effective organizational culture practices have improved workplace safety (Zanko & Dawson, 2012), and others have shown the effects of career trajectories on sectorial commitment (Harrow & Mole, 2005), few explain how these two things relate to one another. This study explores the relationship between a senior executive's vocational history in a technical agency and his sense of safety and risk management in safety-crucial organizations. The results of this study will contribute to the knowledge of occupation health and safety management in high-risk technologies. It will also contribute to the knowledge of developing an understanding for the need of safety measures within the workplace.

Safety Culture and High Reliability Organizations

Safety in the workplace requires the awareness and care for several different aspects of safety. Careful and meticulous monitoring of the human systems and technology in powerful, industrial organizations is crucial to ensuring safety management (Barbour & Gill, 2013). Positive safety culture and mindfulness can be viewed as two related and interwoven aspects of a safety-conscious organization.

Safety culture, defined by Garcia-Herrero et al. (2013) is "that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance" (p. 85). The International Atomic Energy Agency (IAEA) listed these five aspects as: (a) safety is a clearly recognized value, (b) accountability for safety is clear, (c) safety is integrated into all the activities of the organization, (d) leadership for safety is clear, and (e) safety is learning driven (IAEA, 2006). These five characteristics help assure that there is a positive safety culture within the organization.

Similarly, high reliability organizations enact collective mindfulness by focusing on successes, reluctance to simplifying interpretations, sensitivity to operations, commitment to resilience, and appreciation for expertise (Novak & Sellnow, 2009). This collective mindfulness was shown to be positively correlated to the practices of receiving information, sending information, organizational openness and foreground training; all practices that create engagement, representation, and information flow (Novak & Sellnow, 2009). Comparatively, the perception that an individual could influence outcomes in the workplace had an inverse relationship with collective mindfulness (Novak & Sellnow, 2009). Together, collective mindfulness and a positive safety culture led to combating mindlessness and organizational risk factors leading to workplace accidents (Novak & Sellnow, 2009; Garcia-Herrero et al., 2013).

Within the nuclear industry specifically, communication of safety concerns is key (Barbour & Gill, 2013). Though nuclear power plants are privately owned and operated, the NRC oversees operations to ensure that they are being operated safely and within federal regulations. NRC staff on site at the plants and in the NRC regional offices partake in day-to-day status meetings involving the inspections and observations related to safety oversight (Barbour & Gill, 2013). These meetings were characterized as mundane, lacking the environment for storytelling, very structured and serious, and lacking in sarcasm or participants taking the seriousness of safety lightly. This final attribute influenced the others in a way that contributed to strong safety culture and collective mindfulness within the NRC (Barbour & Gill, 2013; Garcia-Herrero et al., 2013; Novak & Sellnow, 2009).

While safety is important in every workplace, it is especially relevant in high-reliability organizations and settings like that of nuclear industry. Highly interdependent workgroups can be considered high-reliability organizations since these group functions to help members avoid injury or accidents (Myers & McPhee, 2006). Workgroup assimilation is an important process to facilitate the processes of trust development, coordination of activities, and cohesive work coordination. Assimilation occurs through a worker's involvement in the organization, trustworthiness, commitment to the group, and acceptance into the group (Myers & McPhee, 2006). Acculturation, as defined by a person's accepting of the organization's culture, norms and values and adapting in order to integrate into the culture, was shown to be a predictor of all four assimilation outcomes in a study done by Myers & McPhee (2006), emphasizing the importance of a person's commitment to the organization. Interdependence of the workgroups comes into play during daily activity and routine when workers run through operations and oversight of the nuclear power plant facility. With each member's own personal safety at a potential risk, the workers are co-reliant and responsible for one another thus, again, emphasizing the importance of communication for achieving high reliability.

Vocational Narratives

The way in which a person tells his or her vocational narrative has implications to how he or she performs. By learning of a person's objective work history as it relates to their subjective career story, patterns and practices emerge revealing underlying sociostructural relations (Harrow & Mole, 2005). In this vein, vocational narratives have the potential to reveal how individuals develop their sense of safety in the workplace.

A study by Harrow and Mole (2005) grouped senior executives' career approaches into three categories describing their commitment to their current sector: vocation, professional-managerial, and contingent. This commitment, as defined as a person's "identification with a target and willingness to work on its behalf" (Myers & McPhee, 2006) is crucial not only in understanding a person's linear progression within the field, but also in understanding his assimilation and attachment to the organization's purpose. Those whose commitment was characterized as vocational were entirely sector-

oriented. Those whose commitment was characterized as professional-managerial possessed skills and abilities that were best for progression within the sector. Those whose commitment was characterized as contingent came upon the sector and had limited commitment to it (Harrow & Mole, 2005). Characteristically, those in the vocational category had a planned career in the sector and made a conscious decision to join and have planned their future accordingly (Harrow & Mole, 2005). Those in the professional-managerial category are committed to their sector and to career progression within the sector (Harrow & Mole, 2005). These two categories are what may be expected of a senior executive in any sector, though there still exist some who become arise to the position through uncharacteristic routes and would not limit their future career choice to the sector (Harrow & Mole, 2005). Often, the more committed to a sector, the more motivated a person is to progress within their field of work (Harrow & Mole, 2005). Commitment is also key in strengthening a safety culture (Garcia-Herrero et al., 2013). As mentioned previously, commitment is one of the key factors in assimilation, a process necessary for interdependent groups in high-reliability organizations (Myers & McPhee, 2006). However, commitment is also an important factor in ensuring the success of safety in a high-reliability organization (Zanko & Dawson, 2012). Vocational narratives are one way to understand how sector commitment is developed through different career trajectories.

A senior executive in the NRC possesses a unique career trajectory. The NRC itself is a structural, hierarchical organization with the five commissioners at the top of the chain who are appointed directly by the President of the United States and confirmed by the U.S. Senate. Monitoring the regional office are the senior regional and regional inspectors of each plant. Following those offices are the positions of branch chief, senior project engineer and project engineers, as well as other technical staff and workers (Barbour & Gill, 2013). Like most organizations, a person rarely starts with much political power or influence, but instead they must work their way up through experience, expertise, and leadership dexterity. Those people who do continue to work their way through the sector through promotions are assumed to know what it means to have a safety mindset, as they are trusted with the responsibility of

overseeing nuclear power plant operations. While the end result (commitment to safety) may be the same for many senior executives within the NRC, the path to get there undoubtedly varies from person to person.

Defined as a career identity, a person's own telling of their professional background is derived from his previous work-related experiences and is comprised of his attributes, beliefs, values and motives (LaPointe, 2010). A career narrative is not merely the particular role that a person has had over the course of his work history, but it is co-constructed, socially situated and performed in interaction (LaPointe, 2010). Told first-hand, it is "a practice of articulating and performing identity positions in narrating career experiences" (LaPointe, 2010, p. 2). It is a way to connect the subjective career that ascribes meaning to career events with the objective career (LaPointe, 2010). The stories in which a person chooses to relate in their career narrative is also important. As Harrow & Mole (2005) explain, "the meaning of career to individuals is constantly being constructed, deconstructed, and reconstructed in the light of both personal and organizational change," and so how a person defines their career and the stories they choose to relate gives insight to their current personal values, as changed over time (p. 80). Referred to as positioning, people can adopt, resist and offer the subject positions made available in discourses, allowing them to create categories to position themselves in thus creating their own identities (LaPointe, 2010). In dealing with risk specifically, it has been found that a person may deal with dilemmas by naming others as responsible for health and safety risks, by personally accepting responsibility as a "risky" worker, or through different rationalities such as environmental and behavioral reasons (Rasmussen, 2013). Rasmussen (2013) argues the importance of examining the attribution of causes for safety risks and measures, as well as the naming conventions a participant uses within their own narrative, as formed and negotiated through social interactions, not as something that exists objectively. Thus, a person's career identity tells the meaning that he or she has drawn from their vocational history and the safety values they possess.

By closely examining a person's own career narrative then, it may become more evident as to which values and beliefs matter as it pertains to nuclear safety, and in what way (Silva et al., 2007). When concerned with safety and risk management, there are several different factors that come into play including scientific evidence, reasoning, and social and political judgment (Silva et al., 2007). Additionally, those who work with the Nuclear Regulatory Commission are faced with decisions affecting their workers, the environment and the surrounding community (Ash, 2010). The decisions include are based off of things concerning the public perception of risk and safety, the environmental effects of the nuclear radiation, the financial accountability of the plant, and the possible long-term affects of every party involved (Ash, 2010). Regulatory practices enforced by senior executives within the NRC must satisfy the risk tolerance of the community, the methodology that is used to measure tolerable risk levels, and the resources available to the agency (Ash, 2010). At the same time however, these executives must also rely on their own good judgment that is a product of their experience, scientific knowledge, social and political judgment (Silva et al., 2007). When decisions are made and safety interventions or new policies are put into place, a study by Hale et al. (2010) found that the most successful ones are accompanied by energy and support, empowerment of the workforce, motivating managers, and a planned, systematic approach.

This responsibility falls into the hands of upper management, or the senior executives. Being able to identify how they characterize their own positioning within their career narratives will give insight to how they have formed their sense of safety in the work place. Given the importance of upper management's safety attitudes on operational performance and the importance of vocational history on safety attitudes, the main research question for this study is as follows: How does the vocational history of a senior government executive in a technical agency help contribute to his or her sense of safety and risk management?

Methods

In a manner similar to Harrow & Mole (2005), this study focuses on the senior executives within a single field of work, in contrast to a wider workforce career study. Specifically, we chose the Nuclear

Regulatory Commission because it is a technical agency that oversees the operations of privately run nuclear power plants to ensure that they are operated safely and within federal regulations and therefore is concerned with safety and risk management. This study chose to interview senior executives for the interest in their longevity with the NRC, their long career history, and involvement in the nuclear industry. They may also be seen as the ideal case for a safety mindset based off of their compliance to the NRC mission: "to ensure the safe use of radioactive materials for beneficial civilian purposes while protecting people and the environment" (USNRC). By reaching the status of a senior executive it may be assumed that people in positions senior to the respondents of this study agreed that they had internalized the mission of the NRC. The study is an exploratory pilot study, and was conducted in a qualitative manner. The qualitative method was ideal for this study because the hope was to gain a better understanding of the respondents' experiences, values, and perspectives as they relate to workplace safety through stories, accounts, and explanations.

All research protocols received approval from the university's Institutional Review Board. We did not offer direct incentive for participation, but participants were offered information about the findings of the study. All interviews were done over the phone, as the respondents live in all different parts of the country, and it was most convenient for both parties. All interviews were audio recorded, with the individual consent of each respondent. Participants (N= 9) in this study were senior executive retirees from the Nuclear Regulatory Commission. Being already a small population to pool from, our participants were all male, college graduates. The number of years each participant worked for the NRC varied from 20-44 years, with the average and median number being 30 years. All of the respondents are relatively recent retirees from the NRC, with some having retired only last year (2013) to others having retired as far back as 1998. Even after retirement, however, most respondents stayed active working with nuclear power as a consultant or other related type of profession. Participants were found using snowball sampling since NRC executive retirees are tightly networked.

Data was collected using interviews in order to obtain the respondents' personal accounts of their career histories and to gain insight into how their safety mindset was developed. Like that of LaPointe

(2010), the interviews were mainly unstructured conversation, aside from the set of questions meant to ensure topics of safety and career history were covered, "providing for an occasion for narrating experiences and doing identity work" (p. 4). Specifically, the interview approach was of the narrative style (Lindlof & Taylor, 2011). A pilot interview was first conducted with a person of similar technical background to that of the respondents. Then, similar to the methods used by Rasmussen (2013), an interview manual was used loosely by the interviewer, with descriptive, generic, exemplifying and comparative questions. Interviews were conducted with the nine respondents with nondirective questions addressing personal background, nuclear power plant experience, various events throughout the respondent's career with the NRC, memorable moments concerning safety, and advice for others in the field. The respondents were assured that they could speak openly and freely, as their interviews are to remain anonymous. Interview questions were divided into six categories: career chapters, key events, significant people, ideal scripts, stresses and problems, and themes (McAdams, 1997). The interviews lasted in length from 67 to 204 minutes, with the average interview lasting 119 minutes. Interviews were then transcribed word-for-word using a professional transcription service. Of these double-spaced, interview transcripts the shortest was 30 pages and the longest was 66 pages, with an average of 44.3 pages. During the interview, notes, memos, and thoughts were jotted down to refer to later while coding.

Data was then analyzed through thematic content analysis using Atlas.ti software. Our research question focused on the elements of a vocational history and how it relates to safety and risk management, therefore coding is necessary to find the common trends and themes (Lindlof & Taylor, 2011). The analysis included two stages of coding: open coding and axial coding. During the open coding, the transcripts were read through several times in order to make sense of what was being said, and the meaning that emerged from the data. Based on the review of literature, a set of codes and themes were generated as a starting point, but the analysis open to Inductively creating new codes. All codes were then cross-coded during the axial coding in which relationships were identified among the open codes, and existing connections were found and characterized (Lindlof & Taylor, 2011). Like the study done by Barbour & Gill (2013), the analysis of the transcripts meant to find reoccurring themes or phrases within

all the career narratives of the senior executives. Similar to Rasmussen (2013), attention was paid to the way in which the respondents used language to construct their accounts of different events throughout their vocational histories.

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Results

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The interview transcripts for the eight senior chief executives presented an interesting picture of trials, tensions, leadership, and learning. In answering the question, "How does the vocational history of a senior government executive in a technical agency help contribute to his sense of safety and risk management?" this study found twelve reoccurring themes. Identifying how senior government executives characterize their own positioning within their career narratives helps give insight to how they formed their sense of safety in the work place. Three overarching, connecting themes emerged: "Learning from Careful Reflection," "Expecting Exemplary Behavior and Work", and "Managing People in High Stress Situations." These themes characterize the importance of sensemaking, lived experience and communication, and the importance as their role as a regulator.

Learning from Careful Reflection

The theme "Learning from Careful Reflection" is made up of the sub-themes "Making a Mistake," "At the Mercy of Technology," "Being Unprepared," and "Learning from Fear". Through their long careers, participants were able to not only play the role of a senior executive, but also of a student that learns from the events and people around them. By reflecting upon their previous experiences and being able to explain their own definition of safety through a sense-making process, these NRC executives have developed a mindfulness that is essential in achieving higher levels of safety performance (Zanko & Dawson, 2012). Participant C best exemplifies this concept:

> So, you basically discuss the problem that everybody has all over the country. And so you become a repository of those experiences either by sharing it from others that share it with you, by reading about it, by discussing it. And you can accumulate a lot of experiences in a short amount of time simply because of what you work on. And I tried to do that. I tried to learn from all that. And it helps you. So, part of it is what we did for many decades there. It forces you to learn a lot (Participant C).

Making a Mistake. Mistakes were a common theme throughout the transcripts. Recalling either a mistake made by themselves or mistakes made by those in the NRC or at other sties, the respondents learned from the errors of the past. These mistakes led to potentially dangerous and disastrous events at the nuclear power plants and served as a lesson in safety for the respondents. For example, one participant asserts:

> And along the way, I made, oh, many mistakes and errors both in the Navy and the NRC, and even since I retired from the NRC as a consultant. And you learn—you probably learn more for the mistakes you made and the errors in judgment than you do from your successes and everything (Participant A).

This demonstrates the importance of reflecting back on past experience or, specifically in the case, mistakes. Recalling mistakes allows for critically examining the contextual conditions of what had happened and where problems occurred in order to prevent them from occurring again in the future. Additionally, Participant G recalls a story about materials exposure from well-logging equipment that had occurred during his work with the NRC:

> Where the radioactive material drilled into a source, evidentially and contaminated many people, houses, rental cars, hotels, restaurants. And, all those involved in that event. And, subsequent to that event, the NRC stepped back and said, "How can we allow this to happen? How did it happen?" (Participant G).

This quote emphasizes the important role that mistakes play in sense-making. While no one ever wishes to make mistakes, they are often inevitable and serve to be great learning experiences that shine light upon the shortcomings of organizations. **At the Mercy of Technology.** Also occurring frequently was the concept of being "At the Mercy of Technology." The respondents would reference a time in which the technology being used was not fully understood. One respondent recalls:

> …A couple of my most defining experiences were in control rooms of reactors where one I was involved—where a reactor had a signal to shut down and it didn't shut down. That's called an ATWS, anticipated transient without scram. And that was a very defining moment when you expect the reactor to shut down and it doesn't (Participant D).

When working with nuclear power plants, concern for safety is a concern for "the safety of the reactor" (Participant D). This theme also included the overarching tone of an overall respect for the power of technology at hand. This was characterized by language that emphasizes the immensity and intricacy of

the reactors. The NRC executives thus developed a mindfulness of the technology that was carried out on

a day-to-day basis. One participant explains:

> So I supposed that was probably an important event for all of us to realize that these technologies have complexities, and they always hold the prospect, the possibility of very serious consequences (Participant F).

Awareness of the technology's potential to err without notice required the NRC executives to

operate the power plant with a high amount of caution. In this case, pre-caution and technological

expertise are essential for having a safety mindset.

Correspondingly, Participant A believes that, "It's a demanding and unforgiving technology. And

you need to treat it that way."

Being Unprepared. Also frequently occurring throughout the vocational accounts was the

concept of preparation. This theme draws attention to events in which the nuclear power plants lacked the

foresight and precaution for disastrous events. One respondent reflects upon Three Mile Island:

> Of course, there's the other side where you wonder about how come they didn't see early on some of the issues that led to the reactor being damaged, and the lack of training, which was something else that eventually got changed in the regulations (Participant C).

The theme about the lack of preparation reveals that participants believed that that knowledge and

expertise are not the only factors when it concerns safety. Through the happenings of power plants within

the NRC and outside of the NRC, participants recognize that a lack of preparation and readiness is all that

it takes for a disaster to occur. This theory's relationship to safety is best illustrated by a quote from

Participant A:

> Do I understand what's going on? Have I thought it through? Have I asked the right questions? Is there a reasonable basis established? So one of the components to that reasonable basis, is there something about testing or analysis that needs to be understood here? Have we actually tested it or are we just relying on the analysis? If the answer to that was just relying on analysis then that's probably when you want to pause and say, "Okay well let's go back and double-check that to make sure we have covered appropriately." It's not just as clean as saying, "Well we did a test and it worked" (Participant A).

When working in high reliability organizations, as in the case with nuclear power plants, being

able to plan ahead and think of all the possible things that could wrong is essential in safely operating a

power plant. This point was pressed upon the NRC executives when reflecting upon times in which

preparation at a nuclear power plant was proven to be inadequate.

Learning from Fear. Several senior chief executives became aware of the need for nuclear

safety through intimidating stories or alarming, historical events. Their apprehension of power plant

crises, in turn, played a crucial role in developing a safety mindset. These various crises include stories of

physical injuries, catastrophic historical events like that of Three Mile Island and Fukishima, among

others. While the respondents may not have witnessed these happenings firsthand, they were still

ingrained into their minds while working with nuclear power. For example:

> So, I remember one of my classmates at nuclear power school woke up in the middle of the night
> with nightmares about the loss of coolant accident. I mean they just hammered that into us
> (Participant A).

> Similarly, a respondent recalls the causes of Three Mile Island and the lessons learned:

> That was a big event. Before then, you kind of take a look at how they designed the systems, the
> equipment, a lot of powers the technical side had. And Three Mile Island kind of highlighted the
> fact of how much the human factors and the organizational factors contributed to the accident.
> And therefore, as a professional, it kind of broadened my eyes and my experience about, yeah, the
> equipment has to be in good working order and … has to be right. But at the end of the day, an
> organization with human beings doing the activities and how that overlapped all the other
> features—how important that was (Participant C).

> These vivid events are important to developing a sense of nuclear safety because they serve as a

constant reminder of what could go wrong if safety procedures are neglected, or inadequate.

The concept of learning from careful reflection comes from reflecting upon the past. Learning

from mistakes, awareness of the unforgiving technology, instances in which you were unprepared, and

memorable crises foreground the importance of sense-making and experience, for developing a safety

mindset.

Expecting Exemplary Behavior and Work

Another overarching theme that became evident was "Expecting Exemplary Behavior and Work."

This theme consisted of the sub- themes of "Being a Leader," "Military Background," "Heroic Stories,"

and "Setting the Standards High." These four themes were centered on the principles of hard work, being

able to make tough decisions, and leading by example. The NRC executives expected such behavior of

worker in the NRC. This relationship is best characterized by:

> You can't have any weak points. So, you either hold up your, you know, your part of the mission or, again, you need to gracefully leave… So, we're talking about the best of the best going in… It became very obvious that this is a, you know, a very demanding, high standards, high expectations organization (Participant B).

Though, in this instance, Participant B is referring to his fellow classmates in the Nuclear Navy,

language such as this was common throughout the participant interviews. Such high standards translated

to high expectations from the NRC executives of their fellow employees, not only to work efficiently and

professionally, but also in a way that would contribute to the safety culture of the NRC.

Being a Leader. The theme of leadership emerged as a strong theme from their career stories.

Labeled as "Being a Leader," these are stories in which the respondent characterizes himself as a leader,

or references leadership qualities in himself or in a colleague. Participant B states plainly:

> And, so, the challenge is what my preoccupation for all my 20 years in the NRC, both developing myself as a regulator and then coaching, mentoring, and teaching, you know, others, my [reports] and my staff how to become better regulators (Participant B).

On the other hand, Participant C enacted his honesty and leadership qualities in a more indirect

manner:

> I always tried to take the time and tell stories and tried to explain [to] people, help them   get it, because I realized how important—you know, when I was doing this for me, then I tried to do for others. And I tried to help them understand the issues and the surroundings and the perspectives. So, it's more dimensions than just the technical dimension. I always tried to do that (Participant C).

Possessing leadership qualities is important in maintaining a strong safety culture, because the

safety of the power plant ultimately does not come down to one person but to all on the workforce. The

NRC executives found that empowering and coaching others in the NRC on the importance of safety in

the workplace was imperative in ensuring a lasting safety culture.

Military Background. The vocational histories also often included the respondents referring

back to their days spent in the military. Although not all of the respondents came from a military

background, seven out of nine of them did, and it seemed to greatly impact the way they interpreted safety. For example, Participant A recalled:

> But at nuclear power school, they made a point that, during the first week of that school, to impress upon us the uniqueness and serious nature of working on nuclear power plants.

Additionally, another respondent found that the Navy instilled certain values that helped him appreciate nuclear safety:

> It's really a reverence for nuclear safety and the importance of it… But it really relates to standards and principles that transcend just the normal rules that we abide by day to day, you know, on a much higher level. So, you come out of the Navy, kind of, with a firm grounding with that (Participant B).

Participant B's use of the word "reverence" in his vocational history further emphasizes the true respect and veneration for nuclear safety that is impressed upon members of the Nuclear Navy and carried into their work in the NRC.

Additionally, the military enforces the importance of training in preparation for potential crises. As Participant D recalls when referring to his experience with explosive ordinance disposal in the Army, "the training kicks in, and your training and about how to protect yourself and how devices are typically constructed." Further stressing the importance of personal protection, Participant D also states, "you do worry about the asset… but that's less important than your team and your self-preservation."

The NRC executives whom come from military backgrounds have learned the importance of following the standards and regulations in potentially dangerous situations in order to protect not only yourself, but also your team and colleagues.

Heroic Stories. "Heroic stories" consisted of accounts in which there was a problem at the nuclear power plant, within the NRC, or with safety regulations and the respondent came along and fixed the problem preventing a potential disaster. Though the types of stories arose less frequently than other themes, the emphasis and significance of these stories still rendered them important enough to be considered a theme. In the first example of a heroic story, we see an instance in which the respondent, working as an employee of a nuclear power plant, confronted a coworker about his indifference toward safety:

And I told him that's what's the problem and he didn't know what I was talking about. I told him. It is a safety issue and you don't recognize it. That's the problem. So there's factors, circumstance, and there's a meaning-ness that surrounds it…It shouldn't matter right that there was no rule. That's not how you do business (Participant A).

Other heroic stories involved stepping up and motivating others to act for safety, without formal authority:

So, I called [the utility] up, and I talked with them, and I said, look, I know and you know that I can't get a finding out of this. But you're going to change that [flood protection] strategy… I said to them, look, I'm going to out you. If you don't fix it…I'm going to out you to the press. I said I'm going to have a public meeting out there, and we're going to talk about this strategy and how stupid it is. So, I'm going to - unless you out yourself first and fix it, I'm going to do it. This is that out-of-the-box stuff, OK? Nobody in NRC would ever do this, right? … And to their credit, on a Saturday, they had a hot dog, a weenie roast at the site. And they explained their strategy to the public, and then they had 200 people there. They explained their strategy to the public and what they were going to fix it.   And the public was all happy-happy-happy, and they called me back the next Monday and said, man, this was the greatest thing ever. It's going to cost us 12 million dollars to fix it, but it's fixed and our public is really happy. We get it. So, those are the things. I don't know how to explain it, but that's the kind of thing. That's why I was a misfit (Participant D).

By recounting these events in their careers, the NRC executives marked these stories as important in developing a sense of safety as it relates to nuclear power. These heroic stories reinforce values and actions that make safety possible. Respondents use them to position themselves as safety advocates, able to utilize their prior training and knowledge in order to respond to a problem quickly and with good judgment, not only affecting the immediate safety of the plant but also further developing the NRC's strong safety culture.

The Need for Preparation. The theme "The Need for Preparation" focuses on the action associated with preparation. Even though is bears resemblance to the theme "Being Unprepared," these two themes were distinct enough to allow for their own categories. "Being Unprepared" focused on the prep work behind nuclear safety and the need for preventative procedures and training, this theme addresses the importance of active training for response readiness. For example, one respondent reflected on the Three Mile Island incident and how his perspective on preparation was impacted:

They thought they were doing the right thing. They had the wrong information They had the wrong understanding. And so, if you look at their actions without listening to what they saw and why they did what they did, you'll probably miss the point of that issue. So, that event kind of colored the rest of my life on how I did things (Participant C).

Similarly, another respondent focused on the precaution that needs to be taken in case unforeseen events occur:

> I think [training] and instilling in the plant operators that this is a big deal when you're operating a nuclear power plant. Things can go wrong. We don't expect them to but they can (Participant A).

The main distinction is that the respondents drew much attention to the notion that you can never fully anticipate what may come in the future. They constructed safety include both safe practices for today and preparedness for the worst possible scenarios.

Setting the Standards High. While reflecting on their time spent working for the NRC, the respondents would often reflect on their appreciation for the high standards set by their organization. Many of the respondents had worked for other organizations, but would talk about the NRC and its concern for safety with veneration. From these stories, the theme of "Setting the Standards High" emerged. As Participant D explains:

> So I took a job with the NRC, and obviously I found a good, solid safety culture at the NRC. And the rest—what's the saying you use? The rest is history. There's a good safety culture. Things were much better with the NRC, trying to do the right things. And so, I ended up staying there .

He continues with an explanation of how NRC safety culture impacted the nuclear industry:

> Now it's an over-simplification, but that's one of the things that we did that we made sure we held their feet to the fire, and just not let them get off on anything that we thought was questionable (Participant I).

Expecting exemplary behavior and work is an underlying value that these NRC senior executives seemed to share. These executives were not only focused inwardly on their organization, but also licensing regulators so they tended to expect higher standards of the nuclear industry. This theme further emphasizes the respondents' narrative sense-making of lived experiences, and how they use their experiences to tell stories about high standards and safety performance and expectations.

Managing People in High-Stress Situations

The final theme, "Managing People in High-Stress Situations," notes the relationship between the sub-themes "Communicating is Key," "Dealing with Tension," and "Working with the Public." These

sub-themes placed an emphasis on communication, and working with people and the tensions that may arise in doing so. With the high pressure to ensure nuclear safety, NRC personnel face tensions in multiple contexts: managing internal conflict, overseeing the nuclear industry, and managing public controversy about nuclear power. Participant B characterizes this situation:

> And people that have, you know, [out sized] egos and who are stubborn, you know, those kinds of behaviors sometimes are engrained in people, and they get in the way of being a good regulator. You spend a lot of—there's a lot of your time dealing with just human nature.

Communicating is Key. Communication was also a common topic throughout the transcripts. The retirees would often tell stories from their careers of poor communication, miscommunication, or stories in which communication was a key factor in success. Whether it is between the NRC and the public, the technical staff and the managerial staff, communication among NRC branches, or communication in general, the importance of communication was emphasized by most respondents. Specifically, one respondent believes that communication and safety are closely related:

> And so the idea was, okay, why can't we just work on a system that incentivizes the employees of the company to identify the issues so they can fix them without worry about getting their bosses in trouble or the company in trouble? Because that employee may hold back on some good information because they're afraid of the consequences (Participant C).

Here, Participant C is highlighting the importance of free and open communication in high-reliability organizations. In order to ensure that the nuclear power plant is running safely, open communication needs to be encouraged (Novak & Sellnow, 2009) and this encourages cohesion and trust which are essential in avoiding accidents (Myers & McPhee, 2006).

When reflecting upon an investigation over unaccounted for nuclear material in the 1970s and the differing opinions on the subject, Participant F stated:

> It wasn't so much the topic as it was, for me, learning that the training differing professional opinions required a lot of thought about how you do that because if you just brush them off they only grow and become more of a threat to the agency and doing its job. So you need to treat them respectfully, fairly, and try to get to the bottom of what's going on…I think [differing opinions] are right at the root of safety conscious just because typically they involved people who are not happy with the safety of this decision or the way something is be approached (Participant F).

Participant F is drawing attention to the importance of communicating differing opinions and how they can often point out decisions within the nuclear industry that might not be as safety conscious as

originally thought. When communication is encouraged, it can contribute to a strong safety culture

(García-Herrero et al., 2013).

Working with the Public. One of the most common themes throughout all the transcripts was

the experience of "Working with the Public." These were stories in which the respondent would reference

times that the NRC had to correspond with the public in some way, or made decisions with the public's

interest in mind. Because of the severity and sensitivity of nuclear power, the NRC often had to

correspond with the public to give them reassurance. For example, when Bill Clinton, acting as governor

of Arkansas, gave a statement to the public about the nuclear plant in that state, one respondent recalls:

> And, so, he did not address, in his press conference when I was standing next to him, he did not address the technical aspects of nuclear safety. He didn't try to convince anybody that, you know, that they shouldn't worry. He dealt with public perception [about safety] (Participant A).

The respondents talk about the importance of the public's perception of the NRC, and the

importance of having their trust. Specifically, Participant C states, "…that credibility and trust is as

important as getting the right technical decision, because if the public or Congress doesn't trust you, it

doesn't matter how right you are."

Participant C goes on to define nuclear safety as something directly related to the safety of the

public:

> I think the best way to define it [nuclear safety] is where you have an outcome that there's no significant consequences to society. In other words, the facilities are operated in a way that there are no releases and no radiation exposure. So, the outcomes of using this technology in such a way that there's no harm to society (Participant C).

The public's perception safety is at the center of nuclear safety. Therefore, these NRC executives

made nuclear safety decisions with not only safety in mind, but also how the decision will be perceived.

Nuclear power is highly technical in nature and communicating NRC decision can prove to be difficult,

but the public's reassurance is crucial in the success of the power plant.

Dealing with Tension. The most frequent theme was the theme of tension. In a highly technical,

complex organization such as that of the NRC, tension is virtually unavoidable. The vocational narratives

included accounts of tension between managerial and technical staff, the tension between inspecting and

doing, the tension between NRC and the public, and a tension from general constraints faced by the organization. An example of this can be seen in Participant D's account of some of the tensions between managerial and technical staff:

> Many of these bureaucrats that are in the NRC, they'll say something because that's just how they feel, what they think. But they've never lived it. So they're liable to say something that is just nonsensical because they don't know what they're talking about.

Participant D is drawing attention to the strain between those with authority and those who have experienced working at a power plant. This type of influence may be described as legitimate, in which the NRC managers have the position authority over the technical staff. Participant D, however, explains the technical staff's indignation to listen to the managers, whom he calls "bureaucrats," because they believe that their own experience should be more influential than position authority.

Additionally, respondents face a tension between the acts of inspecting and doing:

> Some of them were resident inspectors, and you get a lot of people who were resident inspectors. But being a resident inspector is completely different than being an operator and being responsible and actually performing the work. Overseeing the work as a resident inspector is much different than actually doing the work (Participant D).

Again, attention is drawn to the difference between lived experience and unapplied knowledge. While the inspectors know what to look for, those doing the grunt work "… get to feel it. [They] get to smell it, see it. And [they're] responsible for whatever happens when you turn that valve" (Participant D). In other words, the immediate responsibility of carrying out the safety of the reactor falls into the hands of those who are doing, not inspecting.

Another tension is managing conflict with the public:

> You know, an engineer feels that he or she can communicate with another engineer, but they may not feel that they can communicate with a member of the public because the member of the public doesn't speak their language, doesn't know what they are talking about, and the engineer may not want to try to find a more common way of saying what they want to say (Participant F).

In order to assure the public that a nuclear power plant is operating safely, the NRC staff must be able to communicate it in a way that the public will understand. Many respondents talk about the public perception of safety. While risk communication is important, the NRC legitimacy is contingent on the trust and risk tolerance of the public (Ash, 2010).

NRC executives also faced a tension between upholding NRC regulations and procedures and the fact that, often, these regulations and procedures were often inadequate. Participant I illustrates this tension:

> And so [the utility] basically promised to fix [the nuclear power plant in question] if the regulator just gave them the room to fix [the plant]. So, that's kind of the deal that was struck … And so, I didn't agree with that because there were some things that I saw there that were really bad… But there was nothing I could do about it, so there you go.

This tension illustrates the paradox of the respondent's responsibility to work for nuclear safety while also being charged with following legal procedures.

Though each these tensions may "complicate the enactment of safety," these NRC executives learned how to make sense of their situation and nonetheless ensure that the nuclear power plant operated safely (Barbour & Gill, 2014, p. 168).

Conclusion

This study set out to answer the question: How does the vocational history of a senior government executive in a technical agency help contribute to his or her sense of safety and risk management? Vocational narratives position respondents as committed to safety and committed to the mission and values of the NRC. The three major themes of their narratives outline important principles of a strong safety mindset and how a career of intermingling experience with reflection helps to create and sustain a strong commitment to safety.

The first theme was learning from careful reflection. These respondents found that by taking the time to reflect back on the past and make sense of their experiences, they were able to decipher between the safety-conscious decisions that were made and the actions that were made without safety as the main priority. Sense-making puts previous experiences into contextual conditions, thus safety becomes a constructed concept (Zanko & Dawson, 2012).

The second theme was expecting exemplary behavior and work. As stated previously, successful safety cultures are those in which the regulator inspires and motivates the workforce (Hale et al., 2010). This theme drew on the notion that what a regulator allows becomes that best that he or she will receive

from the workforce. What the regulator allows becomes the standard. Therefore, a strong safety mindset involves not only a personal appreciation for safety, but also expecting a high regard for safety from the entire sector's workforce.

The third theme was being able to manage people in high-stress situations. The regulator serves as the overseer of safety and risk management, but they also have to handle different forms of tension and stress. In the midst of the stressors and tensions, the senior executives have learned how to allow for an open communication climate in order to maintain a strong safety culture.

Though not everyone will come to develop a safety mindset in precisely the same way, this study shows the importance of paying close attention to vocational narratives to understand how commitment to safety is created and reinforced. Applicably, technical agencies may look for these qualities when considering promoting someone to senior executive status. Correspondingly, those applying for senior executive status may do so more confidently if they possess these qualities that have helped others achieve a strong safety mindset.

It takes a career's worth of experience to develop a commitment to safety such as that of these senior executives. However, this study has identified some of the process that assist in developing a safety mindset. It has illuminated the common experiences that helped these respondents develop their sense of safety and how they have come to understand them. In the telling of the story itself, the respondents have clarified the relationship between experience and reflection for developing a sense of safety and risk management.

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