

The 4th Russian International Conference on Nuclear Material Protection, Control and Accounting

TOPIC: Nuclear Security Culture



BNL-90545-2009-CP

***Self-Reliability and Motivation in a Nuclear Security Culture
Enhancement Program***

Cary Crawford, Gloria DeBoer, Kara DeCastro, John Landers, and Erin Rogers

*Presented at the Fourth International Conference on Nuclear Material Protection, Control and Accounting
Obninsk, Russia*

October 19-23, 2009

October 2009

MPC&A Cooperative Program Division/Nonproliferation and National Security Department

Brookhaven National Laboratory

P.O. Box 5000

Upton, NY 11973-5000

www.bnl.gov

Notice: This manuscript has been authored by employees of Brookhaven Science Associates, LLC under Contract No. DE-AC02-98CH10886 with the U.S. Department of Energy. The publisher by accepting the manuscript for publication acknowledges that the United States Government retains a non-exclusive, paid-up, irrevocable, world-wide license to publish or reproduce the published form of this manuscript, or allow others to do so, for United States Government purposes.

This preprint is intended for publication in a journal or proceedings. Since changes may be made before publication, it may not be cited or reproduced without the author's permission.

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

Self-Reliability and Motivation in a Nuclear Security Culture Enhancement Program

Cary Crawford¹, Gloria de Boer², Kara De Castro³, John Landers, Ph.D.⁴, Erin Rogers⁵

¹ Pacific Northwest National Laboratory, Washington, USA

² Brookhaven National Laboratory, New York, USA

³ Gregg Protection Services, Inc., New York, USA

⁴ Independent Contractor, Idaho, USA

⁵ Gregg Protection Services, Inc., New York, USA

E-mail address of main author: erogers@greggservices.com

The threat of nuclear terrorism has become a global concern. Many countries continue to make efforts to strengthen nuclear security by enhancing systems of nuclear material protection, control, and accounting (MPC&A). Though MPC&A systems can significantly upgrade nuclear security, they do not eliminate the “human factor.” Gen. Eugene Habiger, a former “Assistant Secretary for Safeguards and Security” at the U.S. Department of Energy’s (DOE) nuclear-weapons complex and a former commander of U.S. strategic nuclear forces, has observed that “good security is 20% equipment and 80% people.”¹ Although eliminating the “human factor” is not possible, accounting for and mitigating the risk of the insider threat is an essential element in establishing an effective nuclear security culture. This paper will consider the organizational role in mitigating the risk associated with the malicious insider through monitoring and enhancing human reliability and motivation as well as enhancing the nuclear security culture.

Elements of Nuclear Security Culture

In 2008, the International Atomic Energy Agency (IAEA) published a Nuclear Security Culture (NSC) Implementing Guide.² In this guide nuclear security culture is defined as “The assembly of characteristics, attitudes and behavior of individuals, organizations and institutions which serves as a means to support and enhance nuclear security.” The guide also asserts that effective nuclear security is based on the belief, shared by all personnel that a credible threat exists. Nuclear security is further enhanced when all personnel share the belief that a credible threat exists and when each staff member assumes personal responsibility to minimize the ever-present threat.

Thus, the IAEA is advocating for accounting for the “human factor” when implementing an MPC&A program to establish a strong nuclear security culture. A nuclear security culture enhancement program is believed to improve the effectiveness of MPC&A by influencing the attitudes, behaviors and beliefs of personnel, by encouraging personal responsibility, and by addressing the human aspect of MPC&A. Elements of a nuclear security culture enhancement program are highlighted below.

Commitment by top management

Key to any culture is the active support of leadership. If top management does not institute nuclear security as a priority, both in policies and in practice, then personnel within that organization will find it difficult to internalize the importance of nuclear security and their role in this process. Effective leaders will ensure that personnel are motivated, and that their role in enhancing nuclear security is valued. Maintaining and improving nuclear security require frequent monitoring. Effective leaders will regularly communicate with personnel at all levels to assess both strengths and areas for improvement in the area of nuclear security. During this communication process they will demonstrate a willingness to hear corrective feedback and act upon this information. Additionally, they will reinforce the culture through their own willingness to submit to all security procedures and monitoring, not seeking special treatment or exemption due to their power and status. Further, effective leaders will communicate organizational needs and challenges to State and regulatory authorities/agencies, facilitating transparency in their organizations nuclear security culture efforts. Successful managers will allocate necessary resources and support to the development of their organization’s nuclear security culture via the methods outlined below.

Education

Individuals can effectively promote nuclear security when the organization is able to make meaningful the threat to nuclear material. Consequently, educating personnel regarding the credibility of threats to nuclear material and the consequences of not providing effective nuclear security is most effective when the information is specific to their work environment.

Malicious insider activity in nuclear facilities is relatively rare. Individuals can easily work for decades in sensitive positions and never encounter a malicious insider. In fact, most nuclear facilities will never experience a breach in security related to fissile material. Consequently, facility managers may not see any way to predict or protect against insider attacks, leading to inaction. The key to revealing specific threats to nuclear security, however, cannot rely upon researching the low base rate activities of known malicious insiders in the nuclear industry. Rather, known risk factors have been extrapolated from researching prior cases of malicious insider behavior not only in the nuclear industry but across various sectors of national security. Essentially, they fall into six categories of aberrant behavior, or behavior that is unusual for the individual or population:

Aberrant Behavior Category:	Examples:
Attendance	<ul style="list-style-type: none"> • Leaves work without permission • Excessive use of sick leave • Frequently late to work • Peculiar and increasingly unbelievable excuses for absences or tardiness • Frequent unscheduled short-term absences (with or without medical explanation) • Non-availability when on-duty or difficulty being found • Frequent requests for coworkers to cover for him/her
Productivity	<ul style="list-style-type: none"> • Misses deadlines and appointments • Unreliable (i.e., cannot be depended on to be where they say or do what they say) • Provides improbable excuses for poor job performance

	<ul style="list-style-type: none"> • Avoids or does not complete job assignments • Work requires greater effort or time than is warranted • Frequently makes mistakes, bad decisions or uses poor judgment • Forgetful • Has difficulty following instructions
Interpersonal Appropriateness/Emotional Stability	<ul style="list-style-type: none"> • Frequently defensive • Overly sensitive to criticism • Blames others for problems • Does not respect appropriate interpersonal boundaries (e.g., borrows money from co-workers) • Harbors and acts on resentments towards co-workers, supervisors and/or organization • Frequently lies and exaggerates • Frequent complaints from co-workers • Frequent mood swings • Typically irritable • Abusive in behavior/communications (e.g., aggressive outbursts, threats or intimidation) • Increasingly irritable with coworkers or others • Argumentative • Unusually suspicious or paranoid • Appearing anxious, nervous, jittery, edgy, or panicked • Giddy, euphoric, unusually energetic • Appearing depressed, expressing thoughts of hopelessness • Inappropriate sexual language or conduct • Often the subject of gossip • Behavior that is out of context or unpredictable • Indecisive, lacking confidence • Withdrawn, isolating from others • Apathy, decreased motivation • Preoccupied with family, financial, legal, or other stresses • Failure to take safety precautions or follow procedures • Unreasonable behavior and demands on others
Cognitive Deterioration	<ul style="list-style-type: none"> • Disorganized habits or work schedule • Preoccupied, frequent daydreaming • Easily distracted, inability to stay focused • Slowed movements, reaction time • Problems with recent memory • Unusual ideas or thoughts • Seems to have poor judgment about capabilities • Lacks insight about declining ability to function • Difficulty staying alert
Physical Deterioration	<ul style="list-style-type: none"> • Frequently appearing exhausted, admits to insomnia • Personal hygiene changes • Multiple physical complaints and illnesses • Significant weight loss or gain • Appears frail or in failing health • Hearing appears impaired

	<ul style="list-style-type: none"> • Physical tremors
Behavioral Deterioration	<ul style="list-style-type: none"> • Personality disorders in general, but Antisocial and Narcissistic specifically • Impulse control disorders • Substance abuse disorders • Legal difficulties • Security infractions

Although the above behaviors do not specifically indicate that someone is a malicious insider, they are indicators that further monitoring and evaluation need to occur. These behaviors do tell us that the individual is somehow psychologically compromised or in distress. As more aberrant behaviors are present, more concern should be present as well. Permanent changes in a person’s demeanor and/or behavior are significant and should not be ignored. Applicants with significant history of or current aberrant behaviors should be screened from consideration of security sensitive positions. Whereas, current employees with significant history of or current aberrant behaviors should be provided counseling and corrective action if necessary.

Organizations must educate personnel regarding the relationship between aberrant behaviors and malicious insider behavior, as this level of specificity will create the needed awareness regarding the credibility of a threat to nuclear security. Additionally, this education must highlight the futility of any organizational effort to monitor aberrant behavior without the assistance of every individual in a position of trust. It should be evident to all personnel that management/leadership will not be aware of many aberrant behaviors until they are well established; however, coworkers will likely be aware much sooner and have the ability to proactively assist one another individually as well as alerting the organization when concerns arise that impinge upon the effectiveness of nuclear security.

Organizations must demonstrate that they will put forth every effort to assist personnel in positions of trust who are exhibiting aberrant behaviors, if coworkers are to trust the system and continue reporting concerns. Distrust of the organization is a significant barrier to creating an effective nuclear security culture. Inversely, personnel self-reporting concerns as well as those noticed amongst coworkers is a sign of a healthy nuclear security culture.

Baseline analysis

Another key element of a nuclear security culture enhancement program includes baseline analysis, not simply relying upon generalization of data from studies of malicious insiders summarized above. In order to further understand the “human factors” affecting nuclear security locally, an organization must perform a baseline analysis to assess previous security incidents, determining common human factors (e.g., depression, substance abuse, financial irresponsibility) associated with such incidents.

Baseline data is relatively easy, inexpensive, and convenient to obtain (e.g., measuring employees’ legal status as a proxy for integrity and/or pliability; security violations as a proxy for disregard for authority). These events occur frequently and can be captured continuously, in contrast to the

capture of low base rate events (e.g., removal of fissile material by a malicious insider), which happen only rarely.

Though these events are not equivalent to malicious insider events, on conceptual or empirical grounds, they can be shown to be substantially connected to actual insider malicious activity. Organizations should request that personnel self-report occurrences of these baseline events as well as monitor their occurrence independent of self-reporting. The findings of this analysis can then be used to further enhance the nuclear security education and monitoring program.

Monitoring program

Organizations should also monitor potentially flawed factors of current and prospective employees (i.e., applicants) and can opt to incorporate a Human Reliability Program (HRP) as an element in their MPC&A Program. Human Reliability Programs in the United States are comprised of managers supervising personnel in positions of trust, psychologists, physicians, personnel security staff, and, most importantly, the HRP participants themselves.

HRP staff work to promote open communication and self-reporting without fear of negative consequences. Personnel security representatives, psychologists, and physicians perform regular assessments, ensuring proper judgment and reliability of all HRP participants. HRP participants have ready access to free and confidential counseling and education programs to assist in mitigating risk factors (e.g., depression) and are encouraged to take advantage of these resources without fear of negative effects upon their occupational status or security clearance.

Monitoring should be a continuous process with regular on- and off-site data gathering regarding violations of both internal policy/procedure (e.g., security violations) as well as societal norms (e.g., arrests). Monitoring is a multidisciplinary process with personnel security staff, psychologists, physicians, and managers sharing all significant findings through their various efforts. Significant life events, which can impact personnel functioning, should also be reported and monitored on a continual basis. Sample events are listed below; however, these may be modified by the organization to fit the culture and baseline data that has been gathered previously.

Significant Life Events:
<ul style="list-style-type: none">• Death of spouse or child• Divorce• Marital Separation• Detention in jail or other institution• Death of a close family member (e.g., parent or sibling)• Major personal injury or illness• Marriage• Marital reconciliation• Major change in health or behaviour of self or family member• Pregnancy of spouse/partner• Gaining a new family member (e.g., through birth, adoption etc)• Major change in financial state• Death of a close friend• Changing to a different type of work• Major change in the number of arguments with spouse (e.g., a lot more or less)• Taking on a significant (to you) debt

- Inability to pay debts
- Major change in responsibility at work (e.g., promotion, transfer, demotion)
- Son or daughter leaving home (marriage, college etc)
- In-law troubles
- Outstanding personal achievement
- Partner beginning or ceasing work outside of the home
- Beginning or ceasing formal schooling
- Major change in living conditions (e.g., new house, renovating)
- Revision of personal habits (dress, manners, association etc)
- Troubles with the boss
- Major change in usual type and/or amount of recreation
- Major change in church or spiritual activities (e.g., a lot more or less than usual)
- Major change in social activities (e.g., clubs, dancing, movies etc)
- Major change in sleeping habits (e.g., a lot more or less)
- Major change in number of family get-togethers (e.g., a lot more or less)
- Major change in eating habits (e.g., a lot more or less food intake)

Assessment of culture

Once the nuclear security culture enhancement program has been implemented, organizations must regularly assess employees' understanding of and commitment to nuclear security. Assessment programs may include (1) appraisals conducted by management, (2) interviews of various levels of the organization, and (3) analysis of performance and incidents. Ultimately, the assessment activities will set the stage for continuous performance improvement, helping to establish which resources, support systems, and appropriate motivational techniques should be made available.

Motivational enhancement and monitoring

The behavior of an individual is often determined by his/her needs. Thus, organizations are encouraged to regularly communicate with personnel to identify the current needs of their employees. Effective managers will understand that individuals are both self-motivated and motivated through external stimuli and may employ the following strategies to enhance motivation within the organization:

Strategies for Motivation:

- Positive reinforcement
- Interesting and challenging work
- Sense of importance to organization
- Access to information
- Involved in decision-making
- Feel like part of a team
- Recognition for achievement
- Effective discipline and punishment
- Rewards based on job performance
- Setting work related goals
- Open communication between employees and their managers

Organizations participating in HRP's may engage in extrinsic motivational techniques (e.g., rewards for self-reporting and early detection) to further enhance nuclear security. Additionally, intrinsic motivational factors (e.g., desire for safety, nationalism), being more powerful and enduring than

extrinsic motivators, are included when presenting HRP and its purposes to participants. It should be noted that managers are the ones that can employ these strategies to motivate their personnel.

In addition to motivational enhancement, it is also important for HRP staff to be watchful for motivational cues that may indicate an individual serving in a position of trust is advancing towards malicious activity. Motivational factors that undermine the nuclear security culture include the unwillingness to report known concerns as well as malicious insider motivations. Information regarding these motivational factors is found below and is also included in the orientation, education, and assessment processes for HRP participants.

Motivations for Unwillingness to Report Concerns:	Example:
Social Influences	“I should mind my own business and not get involved.”
Transfer of Responsibility	“Someone else will report it. It’s not my job. His supervisor should report it.”
Fear of Reaction	“If I report it, management will either ignore it or blow it out of proportion.”
Conflict and Confidentiality	“If people find out or deduce that I reported information, no one will trust me and the working environment will be tense.”
Disbelief	“I can’t believe that she would do something like that. I’ve worked with her for years, and she’s as loyal as you and I.”
Fear of Being Paranoid	“I’m being paranoid – there’s nothing wrong with him. I must be overreacting, and my paranoia will do nothing but get him into trouble.”

Malicious Insider Motivation Category:	Explanation:
Desperate	These are individuals who are in financial crisis for any number of reasons (e.g., providing for family, debt, addiction).
Disgruntled	These are individuals who are angry with their employers and are motivated to harm the employer through malicious acts. Former employees with knowledge of system and current employees may also be a threat in this category.
Greedy/Corrupt	These are individuals with easy access to fissile materials or through their position can influence individuals with easy access to steal fissile materials for the sake of personal gratification of material desires. They are egocentric and have no connection to the impact their actions will have on others.
Ideologue	These are individuals with ideological/political ties to entities in opposition to the organization/state for which they work as a trusted employee.
Coerced	These are individuals who are otherwise patriotic and trusted employees who have been coerced or

	blackmailed into working for the interests of an outside party. They are willing to compromise security in order to protect themselves or others from some form of threatened harm.
--	---

Summary

Organizations that accept the existence of a credible threat to nuclear material, employ management with dedication to establishing and maintaining an enhanced nuclear security culture, continually analyze their current level of nuclear security and nuclear security culture, monitor individuals' reliability and judgment in positions of trust via an HRP, and offer support and motivational techniques to enhance employee job satisfaction, will undoubtedly experience more effective nuclear security than organizations that rely heavily upon MPC&A equipment. In particular, attending to the human factor in strengthening an organization's nuclear security culture is essential for successful deterrence and detection of the malicious insider.

REFERENCES

1. Matthew Bunn and Anthony Wier, *Securing the Bomb: An Agenda for Action* (Cambridge, MA: Belfer Center for Science and International Affairs, Harvard University, May 2004), p. 50, <http://bcsia.ksg.harvard.edu/BCSIA_content/documents/securing_the_bomb.pdf>.
2. IAEA Nuclear Security Series, No 7, *Nuclear Security Culture*, STI/PUB/1347, 2008, ISBN 978-92-0-107808-7.
3. Landers, J.E. (June, 2009). *Mitigating the Insider Threat: Risk Management through Behavioral Science*. Workshop presented to nuclear facility managers in Moscow, Russia.
4. ACCEL Team Development, *Employee Motivation in the Workplace: Theory and practice* (2008), <http://www.accel-team.com/motivation/index.html>.