



Legacy Implications of Today's Regulatory Challenges

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Introduction and Background

Academic Background

- Bachelor of Science, 1988, Virginia Tech
 - Double Majors in Psychology and English, Minor in Sociology
- Master of Science, 1991, Virginia Tech
 - Industrial and Systems Engineering, Human Factors Engineering Option



Executive Leadership Certification and Training

- The Institute for Ethical Leadership, Rutgers Business School, Newark, NJ
 - Executive Ethical Leadership Certificate (2015)
- John F. Kennedy School of Government, Harvard University, Boston, MA
 - Strategic Management of Regulatory and Enforcement Agencies (2009)
- Nicholas School of the Environment, Duke University, Durham, NC
 - The Law of the National Environmental Policy Act (2008)
 - Implementation of the National Environmental Policy Act (2006)



American Nuclear Society

- Secretary, Advanced Reactors Working Group
- Member, Risk-informed, Performance-based Principles and Policy Committee
- Member, Working Group for ANS Standard 57.11, "Integrated Safety Assessments for Fuel Fabrication Facilities"





Career in Nuclear Regulation and Policy



US Nuclear Regulatory Commission (1991-2021)

- Reactor Engineer Intern (1991-1993)
- Project Engineer, Region II, Atlanta, GA (1993-1995)
- Resident Inspector, Catawba Nuclear Station (1995-2001)
- Reactor License Renewal Project Manager, NRC HQ (2001-02)
- Senior Materials Engineer, Reactor License Renewal (2002-03)
- Special Assistant and International Liaison, (July 2003)
- Technical Assistant for Enforcement (2003-05)
- Technical Assistant (Reactors) to Commissioner Jeffrey Merrifield (2005)
- Chief, Environmental Branch B, Reactor License Renewal (2005-07)
- Chief, Projects Branch 2, Reactor License Renewal (2007-08)
- Chief, Performance Assessment Branch, Inspection & Regional Support (2008-14)
- Member of the NRC's emergency response team, Fukushima Daiichi (2011)
- Chief, Security Training and Support Branch, Security Operations (2014)
- Senior Policy Advisor, Division of Preparedness and Response (2014-2015)
- Branch Chief, Project Aim Team, Executive Director for Operations, (2015-16)
- Senior Project Manager, New Reactor Licensing (2016-2021)



Senior Policy Advisor, Breakthrough Institute (2022-2023)



The Keys to a Rosy Future

- Nuclear energy is crucial to public health and safety
- NRC's mission is to enable the safe civilian use of nuclear materials
- NRC faces a new crisis and needs to think differently
- Modernizing regulation of nuclear safety and security is a cultural challenge
- NRC must modernize to keep pace with innovation
- Current NRC staff positions and practices present legacy challenges for the next generation



The Vital Importance of Nuclear Energy

- Why is nuclear energy crucial to public health and safety?
 - Alternatives are often dirty and harmful to people and the environment
- Why is NRC's mission to enable the safe civilian use of nuclear materials?
 - The *Atomic Energy Act of 1954* declared “the development, use, and control of atomic energy shall be directed so as to make the maximum contribution to the general welfare... improve the general welfare, increase the standard of living, and strengthen free competition in private enterprise.”
 - The *Energy Reorganization Act of 1974* declared “the general welfare and the common defense and security require effective action to develop... all energy sources to meet the needs of present and future generations, to increase the productivity of the national economy and strengthen its position in regard to international trade, to make the Nation self-sufficient in energy, to advance the goals of restoring, protecting, and enhancing environmental quality, and assure public health and safety.”



History Repeats Itself in 2023?

- What crisis does NRC face, and why?
 - Long-standing organizational culture
 - History of being reactive, not proactive
 - Risk-averse and resistant to change
 - Another looming “Near-death Experience”?
- Why is modernization a cultural challenge?
 - Early history of inspection and oversight
 - Towers Perrin Report (1994)
 - Congressional Hearing (1998)
 - Commission policy governing risk-informed, performance-based regulation (1999)
 - In SRM-SEY-98-144: “... the Commission is advocating certain changes to the development and implementation of its regulations through the use of risk-informed, and ultimately performance-based, approaches.”
 - “The transition to a risk-informed regulatory framework is expected to be incremental.”
 - Transition to Reactor Oversight Process (ROP) in 2000
 - 9/11 reversed security oversight efficiencies gained under the ROP (2001)
 - Progress toward modernization of licensing frameworks stalled (2001 to 2019)



Photo of Diablo Canyon by Michael A. Mariant, AP



Nuclear Energy Innovation and Modernization Act (NEIMA) of 2019

- Why and how must NRC modernize to keep pace with innovation?
 - To satisfy NEIMA, NRC must complete the work it began in the late 1990s
 - Modernization means applying risk-informed and performance-based principles to regulatory decision-making
- What flexibility is NRC offering for new and advanced reactors?
 - Existing 10 CFR Part 50 and Part 52 remain deterministic and prescriptive
 - The industry began develop the Licensing Modernization Project (LMP) (2009)
 - NEI submitted the LMP (NEI 18-04) for approval under 10 CFR Part 50 (2018)
 - NRC endorsed NEI 18-04 under 10 CFR Parts 50 and 52 (2020).
 - Exemption Requests
- What flexibility is expected in the future?
 - 10 CFR Part 53 (before the Commission)
 - Borrows heavily from existing regulations
 - Codifies LMP with additional requirements for operational programs (e.g., ALARA and Facility Safety Program)
 - Limited stakeholder involvement, regulatory posture inconsistent with “Openness” Principle of Good Regulation
 - Preliminary rule does not satisfy NEIMA



Legacy Challenges for All Reactors

- Broad deference to NRC as an “independent” Federal agency
 - What are NRC’s incentives to transform and accept very low levels of risk?
 - What are the consequences of failing to deliver nuclear energy’s benefits and protections for Society and the environment?
- Inconsistent application of the Principles of Good Regulation
- Current NRC staff positions and practices threaten the economic viability of all reactors
 - Oversight of nuclear safety
 - Oversight of nuclear security



Legacy Challenges in Safety Oversight

Reactor Inspection Program

- In September 2022, NRC leadership proposed to continue to conduct Problem Identification and Resolution (PI&R) team inspections every two years rather than every three years.
 - What Principle(s) of Good Regulation is (are) cited for this proposal?
- In March 2023 NRC staff issued a memorandum revealing that it expended resources to perform an analysis and proposing to add safety culture inspections to NRC's baseline inspection program. (See ML22340A452).
 - Who paid for this effort?
 - What Principle(s) of Good Regulation were supported?
 - Where in the baseline inspection program does NRC propose offsetting reductions and efficiencies?



Legacy Challenges in Security Oversight

Security Assurance Standard

- Perpetuation of “high assurance” language in draft rule language, guidance and other regulatory products defies prior Commission direction.
 - *In implementing the NRC's regulatory program, either in **developing new regulations**, inspecting licensee compliance with regulations, or executing the FOF program... “high assurance” of adequate protection... is equivalent to “reasonable assurance”... The NRC should not be applying a “zero risk” mentality to security any more than we should be doing so with respect to safety. The staff should operate under this paradigm and **eliminate ambiguity on this point** in its guidance documents or other internal directives, instructions, or training materials, to the extent such ambiguity exists. (SRM-SECY-16-0073, ML16279A345)*
- This defiance is a persistent cultural problem that only strong leadership can solve



Legacy Security Challenges (continued)

- High assurance footnote does not legitimize defiance of Commission direction
 - Limited-scope revision of Part 73 adopts the “high assurance” standard
 - SECY-18-0076, “Options and Recommendations for Physical Security for Advanced Reactors”
 - Regulatory Issue Summary (RIS), “Personnel Access Authorization Requirements for Non-Immigrant Foreign Nationals Working at Nuclear Power Plants”
 - Enforcement Guidance Memorandum (EGM) 2020-001, “Enforcement Discretion Not to Cite Certain Violations of 10 CFR 73.56 Requirements”
 - Reg Guide 5.71, “Cybersecurity Programs for Nuclear Power Reactors”
 - High assurance appears 40 times, reasonable assurance appears 3 times



Solution: Principles-based Leadership

Accountability of NRC to the Principles of Good Regulation

- **Independence**

Nothing but the highest possible standards of ethical performance and professionalism should influence regulation. However, independence does not imply isolation. All available facts and opinions must be sought openly from licensees and other interested members of the public. The many and possibly conflicting public interests involved must be considered.

- **Openness**

Nuclear regulation is the public's business, and it must be transacted publicly and candidly. The public must be informed about and have the opportunity to participate in the regulatory processes as required by law.

- **Efficiency**

Regulatory activities should be consistent with the degree of risk reduction they achieve. Where several effective alternatives are available, the option which minimizes the use of resources should be adopted.

- **Clarity**

Regulations should be coherent, logical, and practical. There should be a clear nexus between regulations and agency goals and objectives whether explicitly or implicitly stated

- **Reliability**

Systems interactions, technological uncertainties, and the diversity of licensees and regulatory activities must all be taken into account so that risks are maintained at an acceptably low level. Once established, regulation should be... reliable and not unjustifiably in a state of transition.