U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Safety Culture: A Regulatory Perspective

Commissioner George Apostolakis
CmrApostolakis@nrc.gov
U.S. Nuclear Regulatory Commission

PSAM 10
Seattle, WA
June 7, 2010

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Progress is being made (Reactors)

- Random hardware failures
- Common-cause failures
- Human errors (First Generation)
- Human errors (Second Generation)
- Safety culture

NRC Oversight

Uranium Mining

Uranium Conversion

Uranium Enrichment

Power Reactors

Transportation

Storage

Waste Disposal

Medical/Industrial

New Reactors

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Why do we care?

Nuclear Materials

- A Medical Facility failed to report 97 medical errors out of 116 prostate cancer treatment procedures performed between 2002 and 2008
- Overall root cause included elements of safety culture
  - Inadequate management oversight
  - Poor decisions were not challenged and employees assumed the responsibility for a safe and adequate program belonged elsewhere
  - Failure to communicate concerns about the implants
  - Overall system did not demonstrate a commitment to safety

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Why do we care?

Fuel Process Facilities

- Numerous violations of NRC requirements, some of which were characterized as willful
  - In addition to corrective actions, the licensee conducted an independent safety culture assessment via a third-party
  - Implemented a plan to address the findings and recommendations, including independent assessment of the implementation plan

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Roles

- Licensee management has primary responsibility for establishing and maintaining a positive safety culture

- NRC has independent oversight role

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

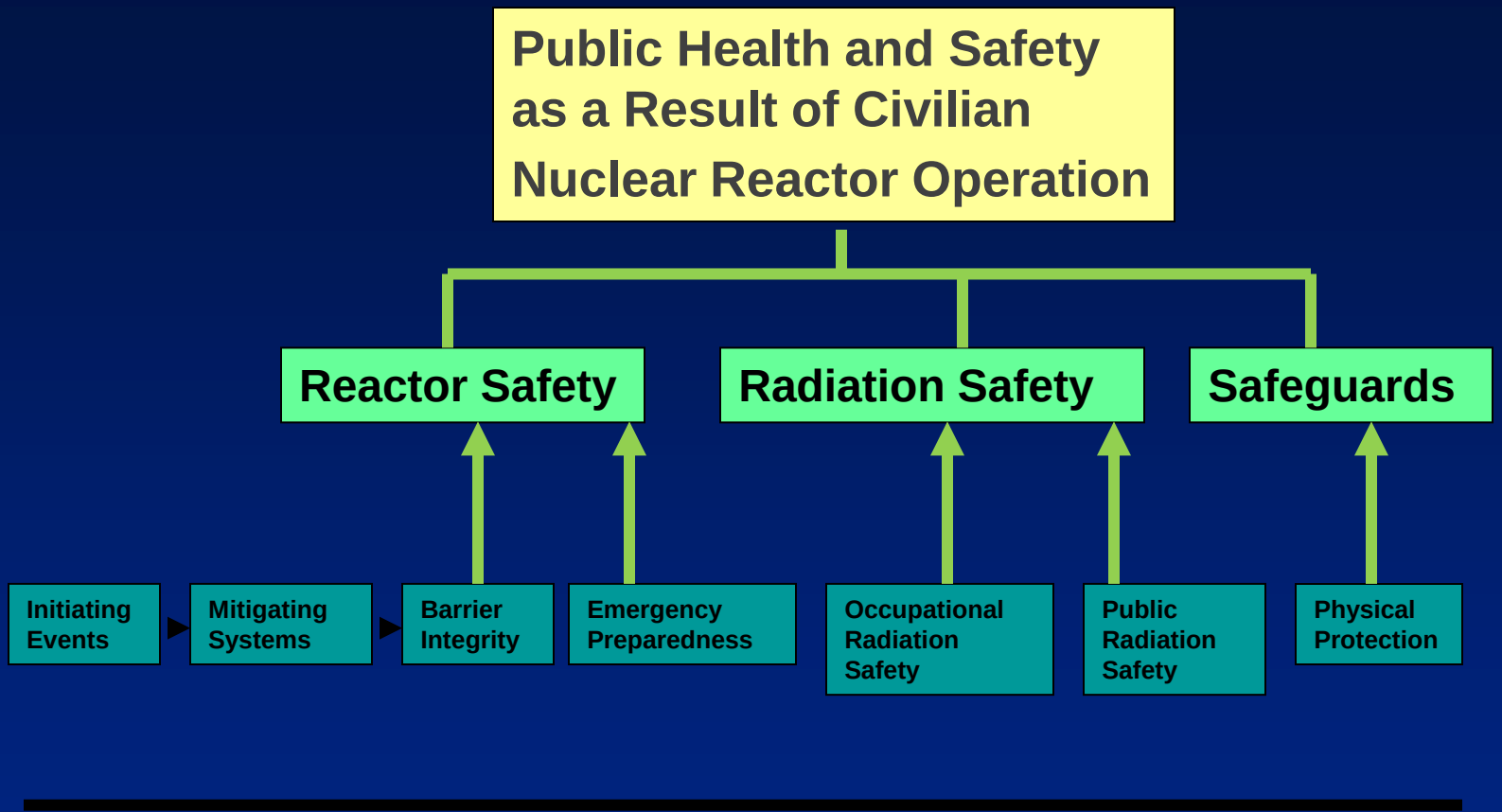
Commission Actions

- Conduct of Operations (1989)
  - Control room operators were found sleeping on shift
  - Expectation of a positive safety culture at nuclear power plants

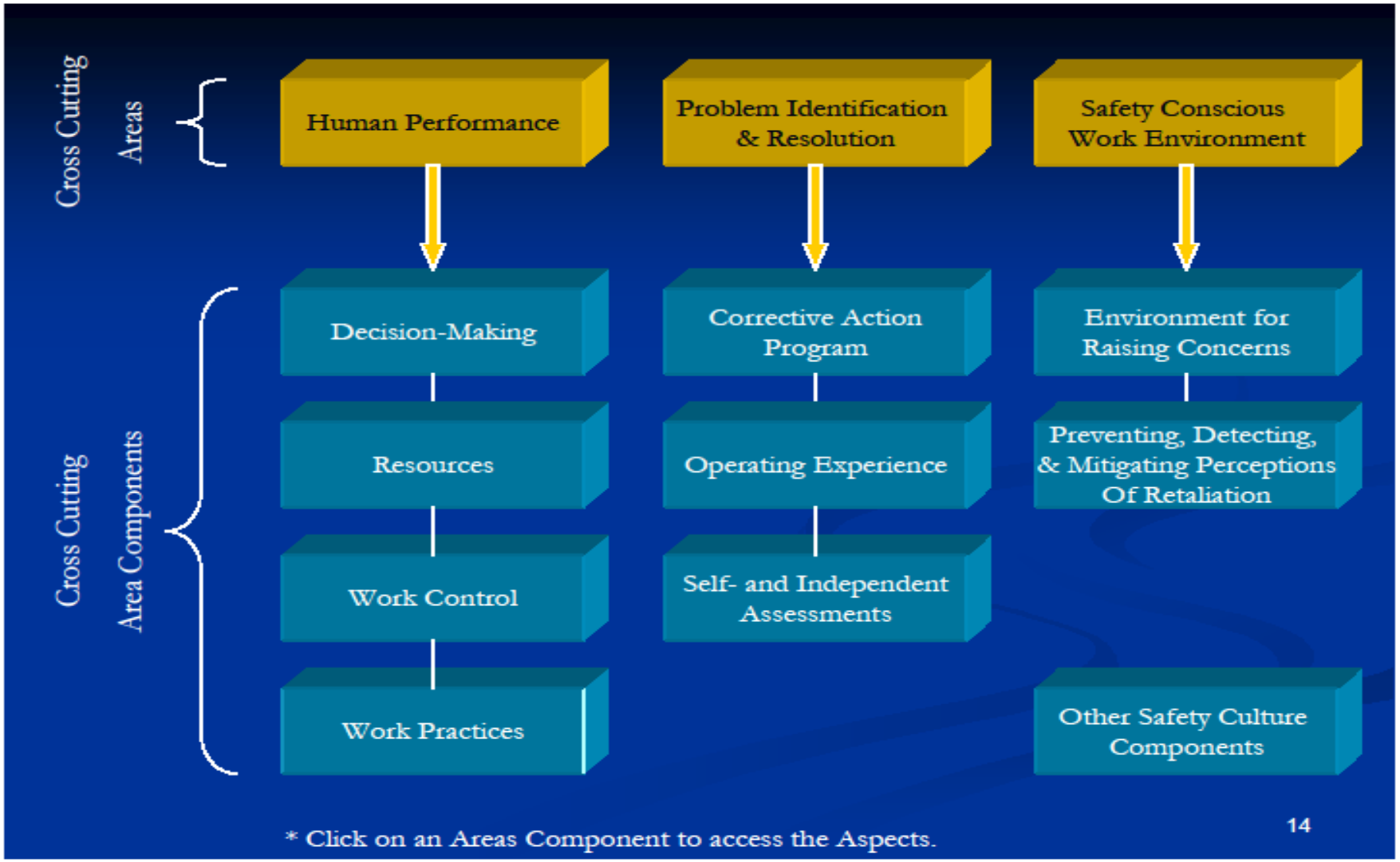
- Safety Conscious Work Environment (1996)
  - Environment in which employees feel free to raise safety concerns, both to their management and to the NRC, without fear of retaliation

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Reactor Oversight Process



ROP Safety Culture Components



Decision-Making:

Licensee decisions demonstrate that nuclear safety is an overriding priority. Specifically (as applicable):

H.1.a

H.1.b

H.1.c

Inspection Guidance Decision-Making

H.1.a

The licensee makes safety-significant or risk-significant decisions using a systematic process, especially when faced with uncertain or unexpected plant conditions, to ensure safety is maintained. This includes formally defining the authority and roles for decisions affecting nuclear safety, communicating these roles to applicable personnel, and implementing these roles and authorities as designed and obtaining interdisciplinary input and reviews on safety-significant or risk-significant decisions.

H.1.b

The licensee uses conservative assumptions in decision making and adopts a requirement to demonstrate that the proposed action is safe in order to proceed rather than a requirement to demonstrate that it is unsafe in order to disapprove the action. The licensee conducts effectiveness reviews of safety-significant decisions to verify the validity of the underlying assumptions, identify possible unintended consequences, and determine how to improve future decisions.

H.1.c

The licensee communicates decisions and the basis for decisions to personnel who have a need to know the information in order to perform work safely, in a timely manner.

Other Safety Culture Components

- Accountability
- Continuous Learning Environment
- Organizational Change Management
- Safety Policies

Accountability

Management defines the line of authority and responsibility for nuclear safety. Specifically (as applicable):

a. Accountability is maintained for important safety decisions in that the system of rewards and sanctions is aligned with nuclear safety policies and reinforces behaviors and outcomes which reflect safety as an overriding priority.

b. Management reinforces safety standards and displays behaviors that reflect safety as an overriding priority.

c. The workforce demonstrates a proper safety focus and reinforce safety principles among their peers.

Continuous Learning Environment

The licensee ensures that a learning environment exists. Specifically (as applicable):

a. The licensee provides adequate training and knowledge transfer to all personnel on site to ensure technical competency.

b. Personnel continuously strive to improve their knowledge, skills, and safety performance through activities such as benchmarking, being receptive to feedback, and setting performance goals. The licensee effectively communicates information learned from internal and external sources about industry and plant issues.

Organizational Change Management

Management uses a systematic process for planning, coordinating, and evaluating the safety impacts of decisions related to major changes in organizational structures and functions, leadership, policies, programs, procedures, and resources. Management effectively communicates such changes to affected personnel.

Safety Policies

Safety policies and related training establish and reinforce that nuclear safety is an overriding priority in that:

a. These policies require and reinforce that individuals have the right and responsibility to raise nuclear safety issues through available means, including avenues outside their organizational chain of command and to external agencies, and obtain feedback on the resolution of such issues.

b. Personnel are effectively trained on these policies.

c. Organizational decisions and actions at all levels of the organization are consistent with the policies. Production, cost and schedule goals are developed, communicated, and implemented in a manner that reinforces the importance of nuclear safety.

d. Senior managers and corporate personnel periodically communicate and reinforce nuclear safety such that personnel understand that safety is of the highest priority.

e. Documentation and Follow-Up Actions

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Example of Findings

- In a 2008 regulatory inspection, it was discovered that during the replacement of a safety-related 125 VDC station battery breaker in 2004, electrical connection integrity was not adequate to ensure that the equipment would be able to perform its safety function (thus the condition existed for four years)

- The resources component in the *human performance area* was assessed to contribute to this performance deficiency because the licensee failed to establish adequate procedures and programs related to electrical connection integrity

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Important notes

- The ROP is risk informed and performance based
- There is no attempt to define a “good” safety culture

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

2008 Commission Direction

- Expand the Commission's policy of safety culture to address the unique aspects of security
- Ensure the resulting policy is applicable to all licensees and certificate holders
- Other issues to address:
  - Whether safety culture as applied to reactors needs to be strengthened
  - How to increase attention to safety culture in the materials area
  - Effective use of stakeholder involvement
  - One or two policy statements for safety and security?

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Draft Safety Culture Policy Statement (May 2009)

- **Draft definition of safety culture:**
  - **"That assembly of characteristics, attitudes, and behaviors in organizations and individuals which establishes that as an overriding priority, nuclear safety and security issues receive the attention warranted by their significance."**

- **Safety and security are equally important in a positive safety culture**
- **Licensees and certificate holders are responsible for developing and maintaining a positive safety culture**

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Response to Commission Questions

- **Current ROP process is effective; process continues to be refined in accordance with self-assessment process**

- **Further stakeholder interactions needed:**
  - **Public meeting**
  - **Outreach to Agreement States**
  - **Develop strategies for engaging materials stakeholders**

- **One policy statement should be issued emphasizing that safety and security are treated equally**

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Workshop Definition

Nuclear safety culture is 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.

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Next Steps

- The NRC staff will respond to the public comments and develop the final policy statement
- The final policy statement will be submitted for Commission approval in March 2011
- Once approved, the focus will be on implementation
  - External – oversight programs
  - Internal – NRC's own safety culture

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

To find NRC's publicly available documents, go to the "Electronic Reading Room" at:

www.nrc.gov