



---

# Definitions and Components of Safety Culture

J. Persensky

Valerie Barnes

Office of Nuclear Regulatory Research

Safety Culture Public Meeting

November 29, 2005



# Definitions of Safety Culture

---

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 – **INSAG-4, 1991**

- What – characteristics and attitudes
- Who – organizations and individuals
- Why – overriding priority is safety



# Definitions of Safety Culture

---

An organization's **values and behaviors** – modeled by its **leaders** and internalized by its **members** – that serve to make **nuclear safety the overriding priority** – INPO, 2004

- What – values and behaviors
- Who – leaders and members
- Why – overriding priority is nuclear safety



# Definitions of Safety Culture

---

The entirety of **attitudes and activities** of various **organizations and individuals** ensuring an **overall priority of safety** related questions and guarantees their appropriate handling - **Hungarian Regulation**

- What – attitudes and activities
- Who – organizations and individuals
- Why – overall priority of safety



# Definitions of Safety Culture

---

The sum of all safety-related **assumptions and norms** that are shared by the majority of an **organization's members**, and which find their expression in **the way safety is actually dealt with** in all areas of the organization (Müller, Brauner, Grote & Künzler, 1998, p. 25) – **Swiss HSK**

- What – assumptions and norms
- Who – organization's members
- Why – the way safety is actually dealt with



# Comparison of Definitions

---

- What – characteristics and *attitudes* (INSAG)  
*values* and behaviors (INPO)  
*attitudes* and activities (Hungarian)  
*assumptions* and norms (Swiss)
- Who – organizations and individuals (INSAG, Hungarian)  
leaders and members (INPO)  
organization's members (Swiss)
- Why – overriding priority is safety (INSAG, INPO)  
overall priority of safety (Hungarian)  
the way safety is actually dealt with (Swiss)



# NRC Definition of Safety Culture

---

## Discussion

Given the similarity among the definitions, the NRC proposes to use the INSAG-4 definition of safety culture, which was endorsed by the Commission in 1989



# Components and Subcomponents of Safety Culture

---

INPO, the IAEA, and other countries further describe safety culture at two additional levels of detail

- “Principles,” “characteristics,” and “criteria” – the **components** of safety culture
- “Attributes” – the **subcomponents** of safety culture



# IAEA\* Components: Safety Culture Characteristics

---

- Safety is a clearly recognized value
- Leadership for safety is clear
- Accountability for safety is clear
- Safety is learning-driven
- Safety is integrated into all activities

\*From the Safety Culture Assessment Review Team (SCART) Draft Guidelines



# INPO Components: Principles of Safety Culture

---

1. Everyone is personally responsible for nuclear safety
2. Leaders demonstrate commitment to safety
3. Trust permeates the organization
4. Decision-making reflects safety first
5. Nuclear technology is recognized as special and unique
6. A questioning attitude is cultivated
7. Organizational learning is embraced
8. Nuclear safety undergoes constant examination



# Proposed NRC Safety Culture Components

---

- Organizational safety accountability
- Safety conscious work environment (SCWE)
- Organizational learning
- Work planning and human performance



# Comparison of NRC, INPO, IAEA at the Component Level

---

Each NRC component and subcomponent is related to a corresponding component or subcomponent from INPO or IAEA; some terminology differs

- Example of consistency
  - NRC’s proposed component, “Organizational learning”
  - INPO’s principle 7, “Organizational learning is embraced”
  - IAEA’s characteristic, “Safety is learning-driven”
  
- Example of apparent inconsistency
  - INPO: leadership selection and development processes
  - IAEA: leadership skills are systematically developed
  - NRC: no related component/sub-component



# Subcomponents of Safety Culture

---

Each “principle,” “characteristic,” or “criterion” identified by INPO, IAEA, and other countries is further described in terms of more detailed “attributes” – the ***subcomponents*** of safety culture

- INPO describes 56 attributes
- IAEA describes 44 attributes
- NRC proposes 16 subcomponents



# Proposed NRC Components and Subcomponents

---

<b>Work Planning &amp; Human Performance</b>	<b>Organizational Learning</b>	<b>SCWE</b>	<b>Organizational Safety Accountability</b>
<ul style="list-style-type: none"> <li>• Work control</li> <li>• Systematic decision-making</li> <li>• Conduct of work</li> <li>• Questioning attitude</li> </ul>	<ul style="list-style-type: none"> <li>• Internal &amp; external operating experience</li> <li>• Self-assessment</li> <li>• Problem identification &amp; resolution/CAP</li> <li>• Continuous learning environment</li> </ul>	<ul style="list-style-type: none"> <li>• SCWE policies</li> <li>• Willingness to raise concerns</li> <li>• Alternative process for raising concerns</li> <li>• Preventing &amp; detecting retaliation</li> </ul>	<ul style="list-style-type: none"> <li>• Safety policies</li> <li>• Accountability &amp; incentive programs</li> <li>• Adequate resources</li> <li>• Organizational change management</li> </ul>



# Comparison of NRC Subcomponents to INPO and IAEA Attributes for Safety Conscious Work Environment

---

NRC Safety Culture Subcomponent	Related INPO Attribute	Related IAEA Attribute
Safety conscious work environment (SCWE) policies	People are treated with dignity and respect.	Management shows a continuous effort to strive for openness and good communication throughout the facility.
Willingness to raise concerns	Employees are expected and encouraged to offer innovative ideas to help solve problems.	An open reporting of deviations and errors is encouraged.
Alternative process for raising concerns	Differing opinions are welcomed and respected. When needed, fair and objective methods are used to resolve conflict and unsettled differing professional opinions.	Management has the ability to resolve conflicts as necessary.
Preventing and detecting retaliation	Personnel can raise nuclear safety concerns without fear of retribution and have confidence their concerns will be addressed.	Relationship between management and staff is built on trust.



# Comparison of NRC Subcomponents to INPO and IAEA Attributes for Work Planning and Human Performance

---

NRC Safety Culture Subcomponent	Related INPO Attribute	Related IAEA Attribute
Work control	Design and operating margins are carefully guarded and are changed only with great thought and care. Special attention is placed on maintaining fission product barriers and defense-in-depth.	Quality of processes, from planning to implementation and review, is good.
Systematic decision-making	When previous operational decisions are called into question by new facts, the decisions and associated underlying assumptions are reviewed to improve the quality of future decisions.	High priority to safety is evident in all decision-making processes; this includes appropriate communication and documentation.
Conduct of work	Plant activities are governed by comprehensive, high-quality processes and procedures.	There is a high level of compliance with regulations and procedures.
Questioning attitude	Personnel do not proceed in the face of uncertainty.	A questioning attitude prevails at all organizational levels.



# Comparison of NRC Subcomponents to INPO and IAEA Attributes for Organizational Learning

---

NRC Safety Culture Subcomponent	Related INPO Attribute	Related IAEA Attribute
Internal and external operating experience	Individuals are well informed of the underlying lessons learned from significant industry and station events, and they are committed to not repeating these mistakes.	Organizational and operating experience (both internal and external to the facility) is used.
Self-assessment process	A mix of self-assessment and independent oversight reflects an integrated and balanced approach.	Internal and external assessments, including self-assessments, are used.
Problem identification and resolution/corrective action program	Anomalies are recognized, thoroughly investigated, promptly mitigated, and periodically analyzed in the aggregate.	Learning is enabled through the ability of the facility to recognize and diagnose deviations.
Continuous learning environment	The organization avoids complacency and cultivates a continuous learning environment.	There is a systematic development of staff competencies.



# Comparison of NRC Subcomponents to INPO and IAEA Attributes for Organizational Safety Accountability

---

NRC Safety Culture Subcomponent	Related INPO Attribute	Related IAEA Attribute
Safety policies	Leaders recognize that production goals, if not properly communicated, can send mixed signals on the importance of nuclear safety. They are sensitive to detect and avoid these misunderstandings.	The strategic business importance of safety is reflected in the business plan of the nuclear facility.
Accountability and incentive programs	The system of rewards and sanctions is aligned with strong nuclear safety policies and reinforces the desired behaviors and outcomes.	Roles and responsibilities for management and staff are clearly defined and understood.
Adequate resources	Equipment is meticulously maintained well within design requirements.	Safety is a primary consideration in the allocation of resources, including time, equipment, personnel and money.
Organizational change management	The effects of impending changes (such as those caused by sale or acquisition, bargaining unit contract renegotiations, and economic restructuring) are anticipated and managed such that trust in the organization is maintained.	Safety implications are considered in the change management process.



# Discussion

---

Is there sufficient commonality between the NRC, INPO, and IAEA components and subcomponents?