IAEA
International Atomic Energy Agency
Atoms for Peace and Development

IAEA APPROACH TO SAFETY CULTURE

Just Culture & Judiciary
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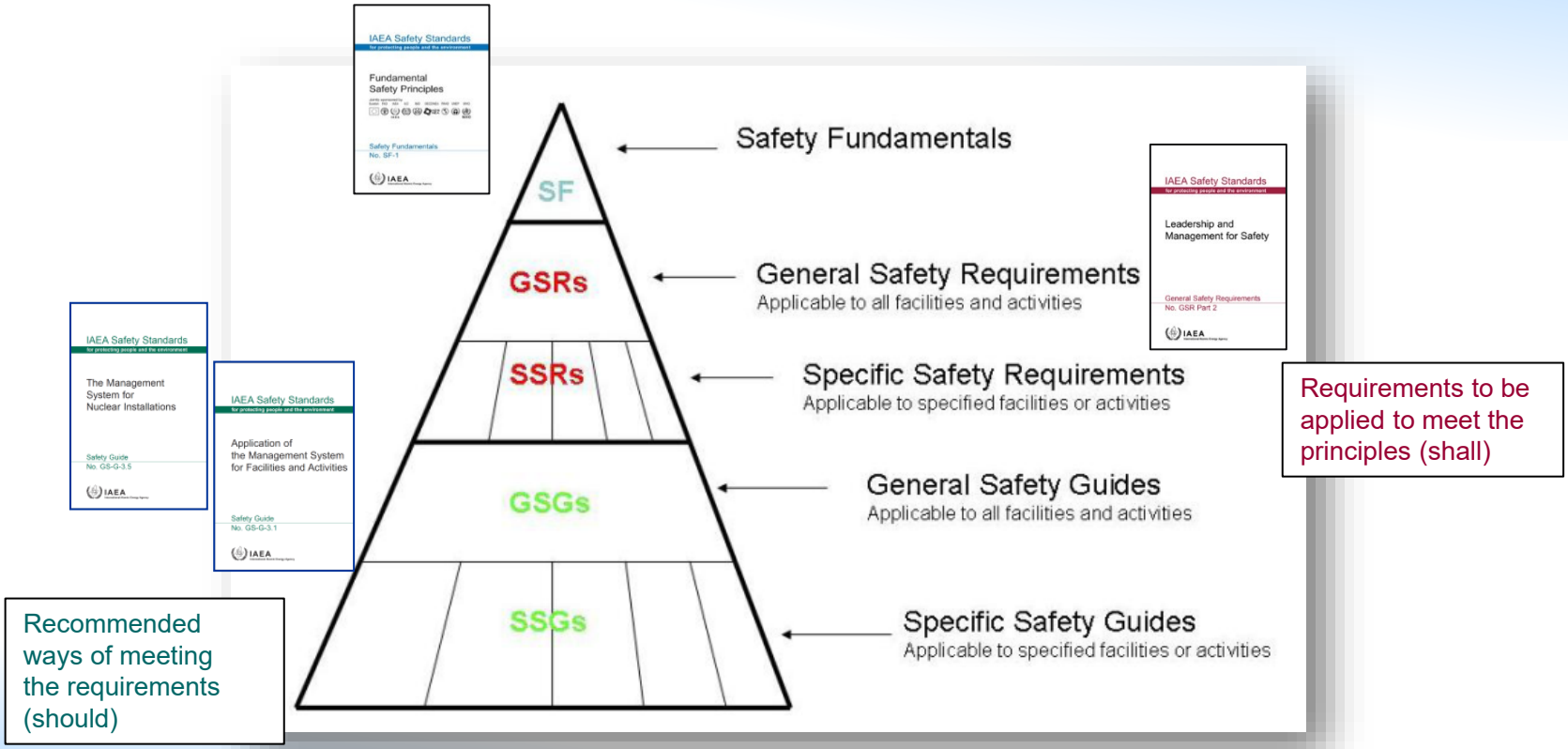
Iva Kubanova
Division of Nuclear Installation Safety (NSNI)
Department of Nuclear Safety and Security (NS)
International Atomic Energy Agency (IAEA)

About IAEA

IAEA Mission & Programmes

The IAEA's mission is guided by the interests and needs of Member States, strategic plans and the vision embodied in the IAEA Statute. Three main areas of work underpin the IAEA's mission: Safety and Security, Science and Technology, and Safeguards and Verification.

IAEA Safety Standards Hierarchy



Requirements to be applied to meet the principles (shall)

Recommended ways of meeting the requirements (should)

IAEA Safety Standards

The IAEA Safety Standards represent international consensus on what constitutes a high level of safety.

They cover all the areas important to the safety of facilities and activities and help member states to comply with international legal instruments on nuclear safety (conventions).

They form the basis for the IAEA safety review services and assistance.

global reference point for a high level of safety

What is unique in nuclear power industry

Physical principle of electricity production from nuclear is unique = chain fission reaction which releases thermal energy but also radiation

Ionizing radiation causes radiation risks:

- ✓during normal operation very low to employees (doses limits, ALARA concept) and to environment (controlled radionuclides releases into air and water); **very high probability versus very low risk**
- ✓during large accidents possible threat to employees, population and environment; accident response planning and measures needed – for example Iodine prophylaxis, sheltering, evacuation, relocation, restriction of agricultural production consumption, etc.; **very low probability versus very high risk**

Materials and media which are close to fission reaction are radioactive – spent fuel + radioactive wastes

Key response to risk rests on **robust nuclear knowledge and competencies, robust and efficient management system** (integrating nuclear safety, radiation protection and many other elements) and **healthy safety culture** and **excellent leadership for safety** in all phases of life cycle

Is Nuclear Safety Special and Unique?

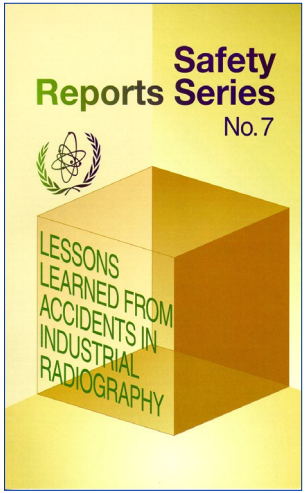
The answer to this is: yes, nuclear safety is special and unique or is certainly significantly different to safety in some other fields.

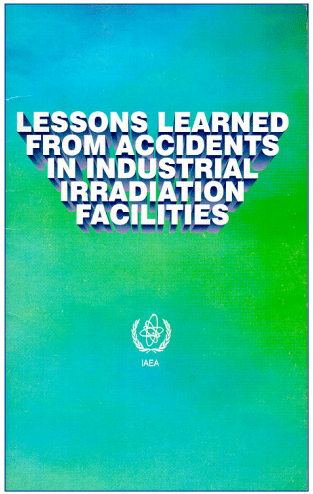
The basic reason is because a nuclear reactor is complex to the point where no one can ever know or recognise whether it is safe or not by observation. The safety of a nuclear plant depends on things like the computer safety analysis that justifies the design, the pedigree of all materials and spare parts purchased and used over very long periods of time, the correct performance of all tests over time, the accuracy and ease of use of procedures, etc. The great majority of the safety barriers are not observable.

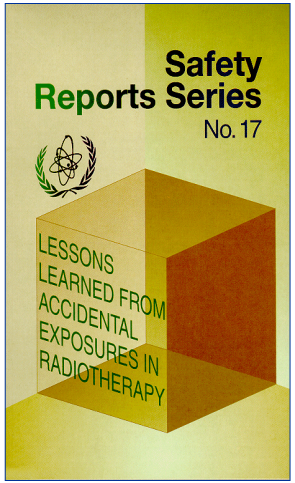
Nuclear safety therefore depends on “Everyone Doing Everything Right all of the Time”.

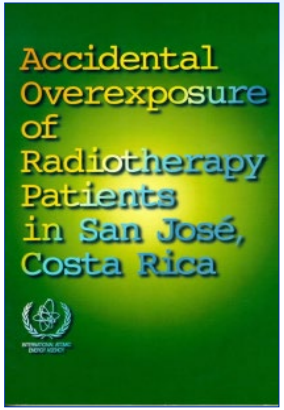
Charles Packer Storytelling and Safety Culture

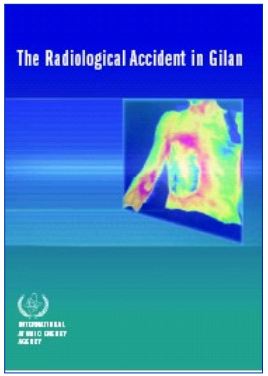
Risks Associated with Industrial Radiography and Patients Radiography

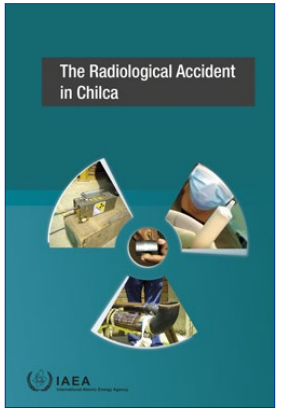












IAEA Safety Culture Characteristics and Attributes (GS-G-3.1, GS-G-3.5)

IAEA Safety Culture Characteristics and Attributes – Current Model

Safety is a Clearly Recognized Value	Accountability for Safety is Clear	Safety is Learning Driven	Safety is Integrated into All Activities	Leadership for Safety is Clear
❑ High priority to safety shown in documentation, communications and decision- making ❑ Safety is a primary consideration in the allocation of resources ❑ The strategic business importance of safety is reflected in business plan ❑ Individuals are convinced that safety and production go 'hand in hand' ❑ A proactive and long-term approach to safety issues is shown in decision-making ❑ Safety conscious behavior is socially accepted and supported (both formally and informally)	❑ Appropriate relationship with the regulatory body exists, which ensures that the accountability for safety remains with the licensee ❑ Roles and responsibilities are clearly defined and understood ❑ There is a high level of compliance with regulations and procedures ❑ Management delegates responsibilities with appropriate authority to enable accountabilities ❑ Ownership for safety is evident at all organizational levels and by all individuals	❑ A questioning attitude prevails at all organizational levels ❑ An open reporting of deviations and errors is encouraged ❑ Internal and external assessments, including self-assessments are used ❑ Organizational and operating experience (both internal and external) is used ❑ Learning is enabled through the ability to recognize and diagnose deviations, formulate and implement solutions and monitor the corrective actions ❑ Safety performance indicators are tracked, trended, evaluated and acted upon ❑ There is a systematic development of staff	❑ Trust permeates the organization ❑ Consideration for all types of safety, security and others is evident ❑ Quality of documentation and procedures is good ❑ Quality of processes, from planning to implementation and review, is good ❑ Individuals have the necessary knowledge and understanding of the work processes ❑ Factors affecting motivation and job satisfaction are considered ❑ Good working conditions exist with regards to time pressures, workload and stress ❑ Cross-functional and interdisciplinary cooperation and teamwork are present ❑ Housekeeping is good	❑ Senior management is clearly committed to safety ❑ Commitment to safety is evident at all management levels ❑ Visible leadership showing involvement of management in safety related activities ❑ Leadership skills are systematically developed ❑ Management assures that there is sufficient and competent staff ❑ Management seeks the active involvement of staff in improving safety ❑ Safety implications are considered in planning and implementing changes ❑ Management shows a continuous effort to strive for openness and good communications ❑ Management has the ability to resolve conflicts as necessary ❑ Relationships between management and staff are built on trust

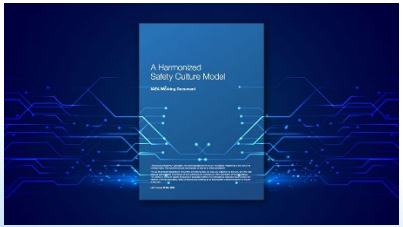
IAEA Safety Culture Model – plan of update

GS-G-3.1 is under revision as DS513 “Leadership, Management and Culture for Safety”

There is a plan to use the harmonized safety culture model as an integral part of the revised guide.

The harmonized model was developed by IAEA, WANO, INPO, the USNRC, and other regulatory bodies with the objective to harmonize many existing approaches

Once safety guide is approved and published, the harmonized safety culture model will replace the current model.



A Harmonized Safety Culture Model 2020

Safety Culture Traits Overview

IR Individual Responsibility All individuals are personally accountable for safety.

QA Questioning Attitude Individuals remain vigilant for assumptions, anomalies, conditions, behaviours or activities that can adversely impact safety and then appropriately voice those concerns.

CO Communication Communications support a focus on safety.

LR Leader Responsibility Leaders demonstrate a commitment to safety in their decisions and behaviours. Leaders are role models for safety.

DM Decision-Making Decisions are systematic, rigorous, thorough, and prudent.

WE Work Environment Trust and respect permeate the organization.

CL Continuous Learning Learning is highly valued.

PI Problem Identification and Resolution Issues potentially impacting safety are systematically identified, fully evaluated, and promptly resolved according to their significance.

RC Raising Concerns Personnel feel free to raise safety concerns without fear of retaliation, intimidation, harassment, or discrimination.

WP Work Planning The process of planning and controlling work activities is implemented so that safety is maintained.

Harmonized Safety Culture Model
10 Traits and 43 Attributes

Individual Responsibility ▪ Adherence ▪ Ownership ▪ Collaboration	**Questioning Attitude** ▪ Recognize Unique Risks ▪ Avoid Complacency ▪ Question Uncertainty ▪ Recognize and Question Assumptions	**Communication** ▪ Free flow of information ▪ Transparency ▪ Reasons for Decisions ▪ Expectations ▪ Workplace Communication	**Leader Responsibility** ▪ Strategic Alignment ▪ Leader Behavior ▪ Employee Engagement ▪ Resources ▪ Field Presence ▪ Rewards and Sanctions ▪ Change Management ▪ Authorities Roles and Responsibilities	**Decision Making** ▪ Systemic Approach ▪ Conservative Approach ▪ Clear Responsibility ▪ Resilience
Work Environment ▪ Respect is Evident ▪ Opinions are Valued ▪ Trust is Cultivated ▪ Conflicts are Resolved ▪ Facilities Reflect Respect	**Continuous Learning** ▪ Constant Evaluation ▪ Learning from Experience ▪ Training ▪ Leadership Development ▪ Benchmarking	**Problem Identification and Resolution** ▪ Identification ▪ Evaluation ▪ Resolution ▪ Trending	**Raising Concerns** ▪ Supportive Policies are Implemented ▪ Confidentiality is Possible	**Work Planning** ▪ Work Management ▪ Safety Margins ▪ Documentation and Procedures

Questioning Attitude

QA. Questioning Attitude

Individuals remain vigilant for assumptions, anomalies, conditions, behaviours or activities that can adversely impact safety and then appropriately voice those concerns.

All employees are watchful for and avoid complacency. They recognize that minor issues may be warning signs of something more significant. Individuals are aware of conditions and alert to potential vulnerabilities and then report them.

Attributes

QA.1 Recognize Unique Risks: Individuals understand the unique risks associated with nuclear and radiation technology. They understand that the technologies are complex and may fail in unforeseen ways with significant consequences.

QA.2 Avoid Complacency: Individuals recognize and plan for the possibility of mistakes, unforeseen problems and unlikely events, even when past outcomes were successful. Individuals recognize that complacency often comes with success and continually strive to avoid it in themselves and others.

QA.3 Question Uncertainty: Individuals stop when uncertain and seek advice. The situation and risks are evaluated and managed before proceeding.

QA.4 Recognize and Question Assumptions: Individuals question assumptions and are prepared to offer different perspectives when they believe something is not correct.

Problem Identification and Resolution

PI. Problem Identification and Resolution

Issues potentially impacting safety are systematically identified, fully evaluated, and promptly resolved according to their significance.

Identification and resolution of a broad spectrum of issues, including human performance and organizational issues, are used to strengthen safety and improve performance.

Attributes

PI.1 Identification: A method for collecting issues is implemented. The issues collected are not only major issues but also minor issues as they may become major issues. Individuals identify issues in a timely manner. Self-reporting is expected and valued by the organization.

PI.2 Evaluation: Issues are thoroughly evaluated to determine underlying causes and whether the issue exists in other areas. Issues are evaluated in an appropriate time frame.

PI.3 Resolution: Identified issues are corrected as appropriate. The effectiveness of the actions is assessed to ensure issues are adequately addressed. Important lessons are shared.

PI.4 Trending: Issues are analysed to identify possible patterns and trends. A broad range of information is evaluated to obtain a holistic view of causes and results.

Raising Concerns

RC. Raising concerns

Personnel feel free to raise safety concerns without fear of retaliation, intimidation, harassment, or discrimination.

The site creates, maintains, and evaluates policies and processes that allow personnel to raise concerns freely.

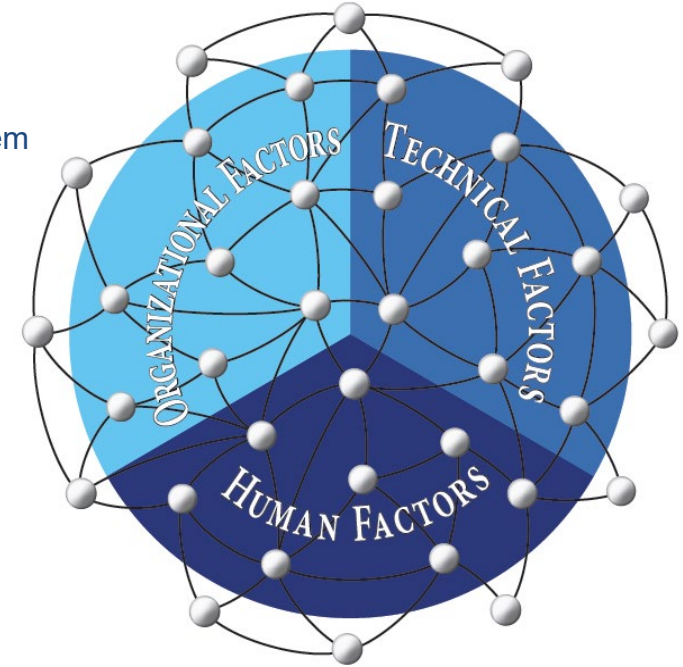
Attributes

RC.1 Supportive Policies are Implemented: The organization clearly states and effectively implements a policy that supports an individual's rights and responsibilities to raise safety concerns. The organization does not tolerate harassment, intimidation, retaliation or discrimination for raising concerns.

RC.2 Confidentiality is Possible: The organization implements at least one method for raising and resolving concerns that is confidential and independent of line management influence. Timely feedback is provided to the concerned individual.

The Systemic Approach to Safety

Organizational Factors (OF):
- Vision and objectives
- Strategies
- Integrated Management System
- Continuous improvements
- Priorities
- Knowledge management
- Communication
- Vendor and suppliers
- Work environment
- Culture



Technical Factors (TF):
- Existing technology
- Sciences
- Design
- PSA/DSA
- I/C
- Technical Specifications
- Quality of material
- Equipment reliability

Human Factors (HF):
- Human capabilities & Skills
- Human constraints
- Perceived work environment
- Motivation
- Individuals understanding
- Emotions
- Social environment

"Systemic Approach" is an approach relating to a system as a whole in which interactions between technical, human and organizational factors are duly considered. Same concepts with different labels: systems view, holistic safety, system safety, socio-technical system

Systems View on Safety - Examples

Traditional safety management	System assumptions
Human error is the *cause* of trouble – the enemy of safety	Human error is a *symptom* of trouble deeper inside the organization – system complexity is the enemy of safety
Assigning blame is necessary for safety when investigating accidents	Assigning blame threatens safety – focus should be on understanding how the system behaviour as a whole contributed to the event
To develop the system we need to develop the humans working in it, by e.g. training	To develop the system we need to develop the conditions and environment in which people work
Accidents are caused by chains of directly related events, which are caused by human errors	Accidents are complex processes involving the entire sociotechnical system
People cause accidents	People create safety – in interaction with technology and organizations
Best way to learn about safety is to check how many things are going wrong	Best way to learn about safety is to learn how the system really behaves

based on Dekker 2011, Leveson 2012

Summary

- IAEA does not use “just culture” term but uses just culture attitudes expressed in safety culture characteristics/traits and attributes
- So called blame-free approach is used as a basic approach in the industry but not addressed in IAEA Safety Standards; certain limitations of blame-free approach are frequently discussed by Member States
- IAEA Safety Standards include requirements to foster strong/healthy safety culture and assess it regularly

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Thank you ☺

i.kubanova@iaea.org