IAEA Safety Standards and Guidance on Safety Culture in the Pre-Operational Phases

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First some social-psychology theory
What are the drivers for our behaviours?
Behavioural drivers

Understanding → Values → Attitudes → Behaviour
Behaviours and culture

Above the surface we find the visible aspects of culture: artefacts, people’s actions, language use.

Most of the culture is below the surface.

Below the surface we find: norms, attitudes, values, basic assumptions of reality and shared understandings.
Organizational culture vs safety culture

Organizational culture

Safety culture

Strong safety culture exist when the shared norms, values and basic assumptions are continuously questioned – are we safe? – what do we not pay attention to? The opposite is when the organization assume we are safe.
Why look at Safety Culture?

Organizational & cultural root causes are consistently identified as cross-cutting contributors to significant events:

- Insufficient understanding of the complexity of ‘reality’ by leaders (‘good news’ cultures, failure to encourage constructive challenge, compartmentalization)
- Insufficient connection and integration across consultant/contractor/vendor network
- Insufficient understanding of nuclear/process safety issues in decision-making and actions
- Normalisation of abnormal conditions or deviations
- Failure to learn from previous events and experiences
- Complacency
- Inability to invite the full intelligence of the organizational members into improvement processes
- Inadequate systemic approach to safety in oversight and supervision
Safety Culture is that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, protection and safety issues receives the attention warranted by their significance.

The 2007 IAEA glossary

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

The internationally agreed IAEA normative framework defines strong safety culture into:
- 5 characteristics
- 36 attributes

Recognized that safety culture is an essential component of the defence in depth and need to be addressed proactively
Safety standards hierarchy

- Safety Fundamentals
- Safety Requirements
- Safety Guides
- Safety Reports

Global reference for a high level of nuclear safety
3.13. “A safety culture that governs the attitudes and behaviour in relation to safety of all organizations and individuals concerned must be integrated in the management system. Safety culture includes:

- Individual and collective **commitment** to safety on the part of the leadership, the management and personnel at all levels;

- **Accountability** of organizations and of individuals at all levels for safety;

- Measures to encourage a **questioning and learning attitude** and to discourage complacency with regards to safety.”
Safety Standards Hierarchy

Safety Fundamentals

Safety Requirements

Safety Guides

Safety Reports

IAEA Safety Standards
for protecting people and the environment

The Management System
for Facilities and Activities

Safety Requirements
No. GS-R-3

IAEA
International Atomic Energy Agency
Safety (Culture) Requirement GS-R-3

“The management system shall be used to *promote and support a strong safety culture* by:

- Ensuring a *common understanding* of the key aspects of safety culture within the organization;
- **Providing the means** by which the organization supports individuals and teams in carrying out their tasks safely and successfully, taking into account the interaction between *individuals, technology and the organization*;
- Reinforcing a *learning and questioning attitude* at all levels of the organization;
- Providing the means by which the organization continually seeks to *develop and improve* its safety culture.”
Safety Standards Hierarchy

IAEA Safety Standards
for protecting people and the environment

Application of the Management System for Facilities and Activities

Safety Guide
No. GS-G-3.1

IAEA
International Atomic Energy Agency
IAEA Safety culture characteristics and attributes (GS-G-3.1)

Safety Culture Characteristics

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

Attributes

- 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)
Accountability for safety is clear

Attributes

- 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
Safety is learning driven

Attributes

• 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 to the facility) is used
• Learning is enabled through the ability to recognize and diagnose deviations, formulate and implement solutions and monitor the effects of corrective actions
• Safety performance indicators are tracked, trended, evaluated and acted upon
• There is a systematic development of staff competencies
Safety is integrated into all activities

Attributes

- Trust permeates the organization
- Consideration for all types of safety, including industrial and environmental safety and security, 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 work 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 and material condition reflect commitment to excellence
Leadership for safety is clear
Attributes

- 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 the change management process
- Management shows a continuous effort to strive for openness and good communications throughout the organization
- Management has the ability to resolve conflicts as necessary
- Relationships between management and staff are built on trust
Safety Standards Hierarchy

IAEA Safety Standards
for protecting people and the environment

The Management System for Nuclear Installations

Safety Guide
No. GS-G-3.5

IAEA
International Atomic Energy Agency
Specific guidance for nuclear installations*

- Further explanation of the five safety culture characteristics and the attributes
- Improving safety culture
- Warning signs of a decline in safety culture
- Concept of interaction between individuals, technology and the organisation
- Assessment of safety culture

* Nuclear power plants, other reactors (research and critical assemblies), nuclear fuel cycle facilities
Examples of Decline in Safety Culture (GS-G-3.5)

- Incidents not analysed in depth and lessons not learned
- Increasing numbers of violations of rules
- An increasing back-log of corrective actions
- Safety concerns of personnel not dealt promptly
- Lack of self-assessment processes
- Poor housekeeping
- Failure to deal with the findings of independent external safety reviews
- Lack of learning — unwillingness to share knowledge and experience with others, or to use the experience of others to improve safety at the installation.
- Organizations become complacent and focus on the successes of the past
IAEA Safety Standards
for protecting people and the environment

Governmental, Legal
and Regulatory
Framework for Safety

General Safety Requirements Part 1
No. GSR Part 1

IAEA
International Atomic Energy Agency
Requirement 1: National policy and strategy for safety

In the national policy and strategy, account shall be taken of the following:

(a) The fundamental safety objective and the fundamental safety principles established in the Fundamental Safety Principles [1];
(b) Binding international legal instruments, such as conventions and other relevant international instruments;
(c) The specification of the scope of the governmental, legal and regulatory framework for safety;
(d) The need and provision for human and financial resources;
(e) The provision and framework for research and development;
(f) Adequate mechanisms for taking account of social and economic developments;

(g) The promotion of leadership and management for safety, including safety culture.
Requirement 11: Competence for safety

The government shall make provision for building and maintaining the competence of all parties having responsibilities in relation to the safety of facilities and activities.

2.34. As an essential element of the national policy and strategy for safety, the necessary professional training for maintaining the competence of a sufficient number of suitably qualified and experienced staff shall be made available.

2.35. The building of competence shall be required for all parties with responsibilities for the safety of facilities and activities, including authorized parties, the regulatory body and organizations providing services or expert advice on matters relating to safety. Competence shall be built, in the context of the regulatory framework for safety, by such means as:

— Technical training;
— Learning through academic institutions and other learning centres;
— Research and development work.
Specific Safety Guidance for Newcomer Countries: SSG-16

IAEA Safety Standards
for protecting people and the environment

Establishing the Safety Infrastructure for a Nuclear Power Programme

Specific Safety Guide
No. SSG-16
The contribution to building safety culture is included as one of the objectives of SSG-16. SSG-16 establishes that

“A safety culture takes time to develop, and the leadership of both the operating organization and the regulatory body should initiate, from the very beginning, programmes and practices to build a safety culture in their respective organizations.”

“As an effective way of establishing a safety culture and promoting the development of leadership for safety, management systems should be implemented that provide structure and direction to the relevant organizations that will have responsibilities for safety, in accordance with GS-R-3.”
In Phase 1, when considering the introduction of a nuclear power programme, SSG-16 establishes that the government should take into account the essential role of leadership and management for safety to achieve a high level of safety and to foster safety culture within organizations.

When identifying senior managers for the prospective organizations to be established, should look for persons with leadership capabilities and an attitude emphasizing safety culture.
Specific Safety Guidance for Newcomer Countries: SSG-16

Safety Culture

- In **Phase 2***, the **regulatory body** and the **operating organization** should
  - start developing and implementing effective management systems in their respective organizations and should promote a strong safety culture
  - develop competences in managing the growth of and change in the organization.
  - make appropriate arrangements for measurement, assessment (both ‘self-assessment’ and independent assessment) and continuous improvement of their management systems.

*Phase 2: ‘Safety infrastructure preparatory work for construction of a nuclear power plant after a policy decision has been taken’ (average duration: 3-7 years). (SSG-16, p 2)*
Specific Safety Culture Guidance for Newcomers

“Nuclear safety begins at project conception, and a primary challenge is to ensure that the practices of a strong safety culture are applied from the outset of a project to avoid both latent and immediate deficiencies.”

“Experience has shown that when the main focus is on technical aspects, project schedule and budget, insufficient attention may be given to human and organizational aspects.”
“In some cases, the inadequate application of safety culture principles and practices in new build projects has been a contributing cause of safety issues during subsequent operation.”

“For example, in one NPP construction project, poor on-site storage conditions for major safety related components resulted in corrosion problems and safety issues related to the long term reliability of the components, and had an economic impact in terms of schedule.”

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The Fundamental Safety Culture Principles in Practice

In short, cultivating strong safety culture means to foster:

- **Commitment** to safety by all (organizations and persons);
- **Accountability** for safety by all (organizations and persons);
- **Questioning and learning attitude** by all (organizations and persons).

And this is a challenging task as there are many other demands on organizations, managers and employees. Many of those contradict these safety culture principles.
A few examples

- Time schedules
- Assurance of shared understandings
- What gets measured gets done
- Business models
- Normal organizational challenges (silos, not my business, power dynamics, communication, decision making)
So what can we do differently already today to cultivate strong safety culture?
Shared Space
To Invite the Organizations Intelligence into the Shared Space

To tap into the **wealth of knowledge**, experience and insight in the organization, and to build shared understanding that supports safe behaviours and good performance.
Shared Space Characterized by

- Working relationships that support trust
- Decrease of power dynamics
- Mutual respect
- Openness – free flow in sharing of thoughts and ideas
- Enables individuals to express views related to their inner thoughts and feelings about a particular issue without fear of recrimination or exclusion
- Shared space goes deeper than sharing facts
- Dialogue instead of discussion/argumentation
What makes the difference….

- Debate
- Discussion
- Dialogue
Shared space and safety culture

Instead of “I am right - you are wrong” “Do as tell you”

Use inquiring questions to surface assumptions and understandings:
• Why?
• How do you understand it?
• What is your perspective?
• What is your feeling about this?

Management for Safety
Formal Framework

Activities & Practices
Actual Behaviours

Attitudes

Values

Shared Understanding
Comprehension
Basic assumptions
Importance to surface the assumptions

Culture is stronger than the technical factors. As humans we easily get "blind" and socially conformed.

Therefore it is of key importance to create a good shared space which support the basic assumptions to surface and to periodically perform safety culture assessments.
Aligning the organization to perform safely and continuously improve through shared space
Systemic View on the National Nuclear Infrastructure

- Governmental Ministries
- Regulatory Body
- Licensee
- Media
- Suppliers
- Universities
- Professional Associations
- Standards Organizations
- Lobby Groups
- Competing Energy Providers
- Work Unions
- Interest Groups
- Vendors
- Energy Markets
- International Bodies
- Technical Support Organizations
- Waste Management Organizations
There are myriads interaction ongoing moment by moment and some of them can play a significant role in safety – therefore it's important to be cultivate mindfulness through continuous good shared space.
...Thank you for your attention
Some Self-Reflecting Questions on Safety Culture in the Pre-Operational Phases
Dialogue: Strategy and Culture in Pre-Operational Phases

Pia Oedewald, Senior scientist
VTT Technical Research Centre of Finland

IAEA Workshop on safety culture and security culture in the Pre-Operational Phases
UAE  March 11-13 2014
Practical recommendations for establishing a strategy for safety culture (1)

- Consider the **size and organizing** of the project network, what is manageable?
- Even though culture always develops gradually by itself, take a **proactive and early approach** to safety culture facilitate its development into a good direction
- Introduce a **organizational development approach** to safety culture: safety culture cannot be adopted by the network during the contract process, it needs time and systematic effort to develop. Safety culture is not just one component.
- **Define** what is the role of safety culture in pre-operational phases and communicate it - otherwise there will be varied interpretations on the topic, e.g. people focus solely on occupational safety challenges
Practical recommendations for establishing a strategy for safety culture (2)

- Remember that safety culture is not only about valuing safety but knowledge and understanding the functionalities of the technical systems one is working with, and the safety principles are a crucial part of the safety culture. If people do not understand what the risks are and how their work relates to safety, no amount of positive safety attitude will help the project.

- If you talk about the importance of safety culture make sure you act accordingly. If safety culture is not at a good level, is there really a willingness to act on it in your organisation, e.g. to stop activities?

- Be fair and acknowledge the financial consequences of the safety requirements in the contracts.
Practical recommendations for establishing a strategy for safety culture (3)

- Pay attention to national and profession based culture differences. Your important messages will be interpreted differently by different individuals.
- Make sure that all parties feel free to express their concerns.
- Find ways to overcome the language barriers.
- Utilize expertise to anticipate human and organizational factors phenomena. Do not expect that an experienced operations manager or a safety engineer is good at anticipating challenges in multicultural co-operation or evaluating the safety culture in different working groups. Many safety culture issues can be identified early if systematic evaluations and initiatives are taken by competent experts.