

NUCLEAR SAFETY CULTURE

Guidelines

SI-NSC-001

Safety Guides provide recommendations and guidance on how to comply with the safety requirements, indicating an international consensus that it is necessary to take the measures recommended (or equivalent alternative measures). The Safety Guides present international good practices, and increasingly they reflect best practices, to help users striving to achieve high levels of safety. The recommendations provided in Safety Guides are expressed as 'should' statements.

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SCOPE

This document provides guidelines for dealing with concepts related to 'nuclear safety culture'.

These concepts must be shared with all STF-LOTERIOS (henceforth STF-LOT) personnel employed in quality activities related to the construction of nuclear power plant parts.

NUCLEAR SAFETY CULTURE

The entire STF-LOT organization (including suppliers) involved in the construction of components for nuclear power plants, i.e. with responsibility for product safety, must develop a safety culture aimed at

- 1) Preventing human error;**
- 2) Benefit from the positive aspects of human action.**

The safety of nuclear power plants depends first and foremost on those who designed, built and operated the plant in the past.

Those responsible for design and manufacture have a major influence on the safety of nuclear power plants.

They are primarily responsible for the quality of the product, the design or manufacture of a component and the installed equipment.

1) THE MEANING OF NUCLEAR SAFETY

"Nuclear Safety" is the set of provisions (software, meaning people, and hardware, meaning means and organization) at all stages of activity: from design to production (and for power plants to the operation and decommissioning of nuclear installations) to protect people and the natural environment from the release of nuclear products and radiation under all circumstances for:

- *Ensuring the normal operation of facilities;*
- *Prevention of accidents and injuries;*
- *Limiting the consequences of an accident or injury;*

2) SAFETY CULTURE

The safety culture is the set of characteristics and attitudes of STF-LOT and its suppliers.

It requires that the priority safety requirements in the manufacture of components for Nuclear Installations receive the attention they deserve according to their importance.

3) BASIC REQUIREMENTS FOR SAFETY CULTURE IN STF-LOT

The safety culture is based on the provisions that establish the policy and procedures to be observed in order to achieve quality and thus meet product safety objectives.

4) CONSEQUENCES OF THE SAFETY CULTURE IN STF-LOT

The consequences of the safety culture at STF-LOT - and at its suppliers - must guarantee not only the production of the required products according to the QUALITY ASSURANCE MANUAL and Quality Procedures, but also:

- ✓ for the Leadership:
 - a. **Understanding** the context of supply and the impact of the product in service, with regard to safety.
If the use function of the product and safety aspects are not clearly defined in the technical documents, it is the responsibility of STF-LOT to request clarification from the customer.
 - b. **Identify** the processes and human resources required to make those concerned aware of the importance of their contribution to safety.
- ✓ for the staff, follow a strict approach to:
 - a. *Understanding the safety context of its activities;*
 - b. *anticipate problems;*
 - c. *Interrupting, if necessary, their activities and requesting support;*
 - d. *Inform about difficulties encountered;*
 - e. *Suggest improvements to implement activities based on previous experience.*

RESPONSIBILITY & NUCLEAR SAFETY CULTURE

1) EVERYONE IS PERSONALLY RESPONSIBLE FOR NUCLEAR SAFETY

RESPONSIBILITIES AND AUTHORITIES FOR NUCLEAR SAFETY ARE WELL DEFINED AND CLEARLY UNDERSTOOD.

Interfaces, reporting, positions of authority, personnel involved and financial resources are defined and support nuclear security responsibilities. Company policies emphasize the essential importance of nuclear security.

Characteristics:

- a) The line of authority and responsibility for nuclear safety is defined from the Board of Directors down to the individual employee. For each of these positions, down to the employees, roles, responsibilities and authority are clearly expressed in writing.
- b) Support functions, such as human resources, business activities and financial planning, also contribute, through their role, to nuclear safety.
- c) People with their professional skills, values and work experience are regarded as the most valuable asset of the nuclear organization. The organization is consistent with the requirements of maintaining safety and reliability.
- d) Leadership periodically takes measures to strengthen nuclear safety, including production and site visits to assess first-hand the effectiveness of management.
- e) The STF-LOT organization, starting with the GM (General Manager), is the primary source of information and the only source of guidance. Other parties, such as commissions, inspectors and external consultants, who provide information essential for effective self-assessment, are not allowed to undermine or compromise the concepts of authority and responsibility.
- f) All personnel understand the importance of compliance with nuclear safety regulations. All levels of the organization exercise appropriate controls of deficiencies in compliance with the requirements.
- g) The relationship between STF-LOT and customers may not obscure or reduce the line of responsibility for nuclear safety.
- h) The reward and penalty system is aligned with strong nuclear safety policies and reinforces behaviors and results.

2) LEADERS DEMONSTRATE COMMITMENT TO SAFETY

THE GENERAL MANAGER AND ALL SUBORDINATES ARE THE FIRST ADVOCATES OF NUCLEAR SAFETY BY DEMONSTRATING THEIR COMMITMENT BOTH VERBALLY AND FACTUALLY.

Characteristics:

- a) Managers and supervisors practise visible leadership in the field, taking an interest in problems, instructing, mentoring, and applying procedures. Deviations from expected results are promptly corrected.
- b) Leadership considers employees autonomous in understanding and analysing problems.
- c) Managers and supervisors provide adequate control during safety-relevant tests.
- d) Managers and supervisors are personally involved in training that reinforces workers' behaviour.
- e) Leaders recognise that production targets, if not communicated correctly, can send mixed signals about the importance of nuclear safety. They must be vigilant in detecting and avoiding these misunderstandings.
- f) Expected results, potential problems, alternative plans, and acceptance criteria for important operational decisions are communicated to workers in a timely manner.
- g) Informal opinions in the organization are encouraged to define safety behaviour and the influence of meeting high standards.
- h) The selection and evaluation of managers and executives consider their ability to contribute to the consolidation of the nuclear safety culture.

3) TRUST MUST PERMEATE THE ORGANISATION

A HIGH LEVEL OF TRUST IS ESTABLISHED IN THE ORGANISATION, ALSO ENCOURAGED THROUGH TIMELY AND ACCURATE COMMUNICATION.

There is a free flow of information, where issues are collected and addressed. Employees are informed of measures taken in response to their concerns.

Characteristics:

- a) People are treated with dignity and respect.
- b) Staff are allowed to raise nuclear safety concerns without fear of reprisal and to trust that their concerns will be addressed.
- c) Employees are expected and encouraged to offer innovative ideas to help solve problems.
- d) Different opinions are welcomed and respected. When necessary, fair and objective methods are used to resolve unresolved conflicts and different professional opinions.

- e) Supervisors are able to answer employees' questions honestly and openly. They are recognised as an important part of the management team, crucial for translating the safety culture into practical terms.
- f) the effects of sudden changes (such as those caused by contract renegotiations or economic reorganisations) are anticipated and managed in such a way that trust in the organisation is maintained.
- g) Senior Managers' incentive programmes reflect a trend towards high security performance.
- h) Complete, accurate and truly information is provided to inspectors, auditors and security authorities.
- i) Managers regularly communicate important decisions to workers and their motivations, in order to build trust and strengthen a healthy safety culture. Worker understanding is regularly checked.

4) DECISIONS CONSIDER SAFETY FIRST

PERSONNEL ARE SYSTEMATIC AND RIGOROUS IN MAKING DECISIONS THAT SUPPORT THE SAFETY OF ITEMS AND COMPONENTS.

Operators are officially mandated with operational authority and understand the resulting expectations when faced with unforeseen or uncertain conditions.

Managers support and reinforce conservative decisions.

Characteristics:

- a) The organisation maintains a competent workforce to support a wide range of operational and technical decisions.
- b) Leaders, managers, supervisors and staff clearly understand and respect each other's roles in the decision-making process.
- c) Staff apply a rigorous approach to problem solving. When understanding is incomplete, conservative interventions are undertaken.
- d) Unambiguous responsibility is maintained for important safety decisions, allowing evaluation and feedback as soon as problems are detected.
- e) Dialogue and open meeting are encouraged when security issues are being assessed. Full discussion and healthy conflict are recognized as a natural consequence of the diversity of expertise and experience.
- f) Decision-making procedures reflect the ability to distinguish between 'permissible' and conservative choices.
- g) When previous operational decisions are called into question by new events, decisions are revised to improve the quality of future decisions.

5) THE ATTITUDE OF HAVING 'DOUBTS' IS ENCOURAGED

INDIVIDUALS DISPLAY A DOUBTFUL ATTITUDE BY CONSIDERING ALTERNATIVE HYPOTHESES, INVESTIGATING ANOMALIES AND CONSIDERING POTENTIAL NEGATIVE CONSEQUENCES OF PLANNED ACTIONS.

This attitude is formed by the understanding that accidents are often due to a series of decisions and actions that reflect flaws in the organisation's shared assumptions, values and behaviour. All employees are alert to conditions or activities that may have an undesirable effect on the safety of the product.

Characteristics:

- a) While the standard expectation is to achieve positive results from day-to-day activities, the possibility of errors and worst-case scenarios arising is recognised. Therefore, contingency plans are developed to deal with these possibilities.
- b) Anomalies are identified through in-depth specific study cases, periodically analyzed and promptly mitigated.
- c) Staff must not proceed in the face of uncertainty.
- d) Workers identify conditions or behaviour that have the potential to degrade operating and design margins. Such circumstances are promptly identified and resolved.
- e) Employees are aware that complex technologies can fail unpredictably. They are aware that latent problems may exist, and therefore make conservative decisions.
- f) Intellectual curiosity is appreciated. Opposing views are encouraged and taken into consideration.

6) ORGANISATIONAL LEARNING IS WELCOMED

OPERATIONAL EXPERIENCE IS HIGHLY VALUED, AND THE ABILITY TO LEARN FROM EXPERIENCE IS WELL DEVELOPED.

Training, self-assessment and corrective actions are used to stimulate learning and improve performance.

Characteristics:

- a) The organization avoids complacency and cultivates an environment of continuous learning. The attitude that 'it can happen here' is encouraged.
- b) Training upholds management standards and expectations. In addition to bringing knowledge and specialization, trainers are dedicated to instilling nuclear safety values.
- c) Individuals are well informed of the lessons from important events in the industry and are committed to not repeating these mistakes.
- d) Root cause analysis is effectively applied to identify and correct the fundamental causes of events.

- e) Processes are established to identify and resolve latent weaknesses in the organization, which can make even minor events worse if not corrected.
- f) Employees know that problems with nuclear safety implications are a priority, must be followed up and resolved quickly.

7) NUCLEAR SAFETY IS UNDER CONSTANT EXAMS.

SUPERVISION SERVES TO STRENGTHEN SAFETY AND IMPROVE PERFORMANCE.

Nuclear safety is kept under constant control through a variety of monitoring techniques, some of which provide independent 'insight'.

Characteristics:

- a) A mix of self-assessment and independent supervision reflects an integrated and balanced approach. This balance is periodically reviewed and adapted to the needs.
- b) Periodic evaluation of the safety culture is conducted and used as a basis for improvements.
- c) The pitfalls of focusing on a narrow set of performance indicators are recognized. The organization is alerted to detect and respond to indicators that may signal declining performance.
- d) The insights and perspectives provided by Quality Assurance, evaluation, the concerns of employees and independent supervisory staff are valued.
- e) Managers and the GM are periodically informed of the results of group supervision activities in order to gain knowledge of the safety performance on the installation.