

SAFETY CULTURE IN THE PAKS II PROJECT

Contents

| | |
|----------------------------------------------------|----|
| SAFETY CULTURE IN THE PAKS II PROJECT | 1 |
| 1. References..... | 1 |
| 2. Definitions | 1 |
| 3. Safety culture | 1 |
| Background | 4 |
| Principles..... | 6 |
| Individual commitment to safety..... | 6 |
| Management commitment to safety | 8 |
| Management systems | 9 |
| Work Processes (WP) – to be implemented later..... | 11 |

1. References

- Act CXVI of 1996 on Atomic Energy
- HAEA Decree No. 1/2022 (IV. 29.) on the nuclear safety requirements of nuclear facilities and on related regulatory activities
- Directives of the World Association of Nuclear Operators (WANO)
- Management Manual of Paks II Ltd. – PA2 – KK – 001

2. Definitions

- **Safety culture:** Assembly of characteristics and attitudes of organizations and individuals, which establishes that, as an overriding priority, safety issues receive the attention warranted by their significance. (NSC, Volume 10)
- **Safety policy:** A safety policy is a documented, continuously reviewed and updated commitment of the licensee to achieve high level of nuclear safety performance. It is supported by clear, understandably defined safety goals and the provision of resources to achieve the set goals. (NSC, Volume 10)

3. Safety culture

According to the WANO definition, nuclear safety culture is the set of values and attitudes, which, as a result of the commitment of the organisation’s leaders and employees, ensure that safety receives overriding priority over all other competing goals, in order to protect the people and the environment.

Paks II Ltd. has designed its Integrated Management System in a way that supports a strong safety culture and promotes its maintenance and continuous enhancement. The Integrated Management System shall establish a working environment, in which employees can express and raise their safety-related concerns without fear of harassment, retaliation, intimidation or discrimination, and which ensures that such concerns are addressed appropriately.

The Management shall understand the key factors and specifics that support a strong safety culture and shall ensure that these are communicated towards the personnel and understood by employees.

The Management shall formulate such fundamental management principles and support such behaviours that promote the continuous development of a strong safety culture, while also leading by example.

Safety-oriented decision-making shall be promoted and supported in all activities at all levels of management.

At every level of the organisation, leaders of the organisational units shall promote behaviours, values and fundamental beliefs that lead to the development of a strong safety culture. The Management shall implement measures that promote a questioning and learning attitude at all levels of the organisation, and that discourage overconfidence regarding safety.

The Management shall monitor and promote the application of the principles that define the essential factors for achieving and fostering a strong safety culture and shall remain attentive to early signs that may indicate the degradation of these principles and, consequently, of the safety culture itself.

Managers are responsible for maintaining the commitment to nuclear safety among the employees under their supervision, as well as for maintaining an appropriate organisational and safety culture. The employees shall accept the fact that they can be held accountable for their safety-related actions and attitudes.

Safety culture shall be also extended to suppliers and subcontractors.

The traits of a strong safety culture - as interpreted from the WANO model for the preparation and construction phase – are as follows:

- **Individual commitment to safety**
 - Personal accountability
 - Questioning attitude
 - Safety communication
- **Management commitment to safety**
 - Leadership accountability
 - Decision-making
 - Respectful work environment
- **Management systems**
 - Continuous learning
 - Problem identification and resolution
 - Environment for raising concerns

The detailed description of these traits is provided in **Appendix No. 1** hereto.

[Safety policy](#) (Appendix No. 2) of Paks II Ltd. declares the management's commitment to safety and their expectations towards all parties involved, already at the early stages of the Program implementation. The managers shall ensure that the employees are familiarised with the Safety Policy and the fundamental principles of safety culture. The Company operates a self-assessment process to monitor and measure the level of safety culture (*NSC, chapter 5.10.2*).

The Management of Paks II Ltd. has adopted a development programme for maintaining and enhancing safety culture, which includes, among other elements, the actions necessary for implementing the provisions set out in the Safety Policy. The implementation of the actions set out in the safety culture development program is checked within the framework of the management review.

The task of the Quality Management and Development Department of Paks II Ltd. is to assess the level of nuclear safety culture, and to plan, coordinate and implement development program, taking into account the proposals of the leaders of other organisational units.

Appendix No. 1

Traits of a healthy nuclear safety culture as interpreted by Paks II Ltd. for the construction phase of the new nuclear power plant units based on WANO PL | 2013-1 Principles.

Traits of a healthy nuclear safety culture PL 2013-1

Traits of a Healthy Nuclear Safety Culture¹ issued by WANO describes the essential traits and attributes of a healthy nuclear safety culture, with the goal of creating a framework for open discussions and continuing evolution of safety culture throughout the commercial nuclear energy industry. For the purposes of this document, a trait is defined as a pattern of thinking, feeling and behaving such that safety is emphasised over competing priorities. Experience has shown that the personal and organisational traits described in this document are present in a positive safety culture. Conversely, shortfalls in these traits and attributes are a significant contributor to plant events.

Rather than prescribing a specific programme or implementation method, this document describes the basic traits. These traits and attributes, when embraced, will be reflected in the values, assumptions, behaviours, beliefs and norms of an organisation and its members. Ideally, the traits will describe what it is like to work at a nuclear facility and how things are done there. Traits appear in boldface. The attributes clarify the intent of the traits. Utility managers are encouraged to make in-depth comparisons between these traits and their day-to-day policies and practices, and to use any differences as a basis for improvements.

Background

Nuclear safety culture is defined as the core values and behaviours resulting from a collective commitment by leaders and individuals to emphasise safety over competing goals, to ensure protection of people and the environment.

This updated definition was developed to apply broadly across all industries that use nuclear technologies. For the commercial nuclear power industry, nuclear safety remains the overriding priority. Although the same traits apply to radiological safety, industrial safety, security and environmental safety; nuclear safety is the first value adopted at a nuclear station and is never abandoned.

Over the years, watershed events have influenced the safety culture at commercial nuclear power plants. The industry had its first such event in 1979, as a result of the accident at Three Mile Island nuclear power plant. Many fundamental problems involving hardware,

¹ [WANO-PL-2013-1-Pocketbook-English.pdf](#)

procedures, training and attitudes toward safety and regulation contributed to the event.

In 1986, the Chernobyl accident was a stark reminder of the hazards of nuclear technology. This accident resulted from many of the same weaknesses that led to the Three Mile Island accident. In addition, it highlighted the importance of properly maintaining design configuration, plant status control, line authority for reactor safety and cultural attributes related to safety.

Response from industry and regulatory organisations to both these events was sweeping. Improvements were made in standards, hardware, emergency procedures, processes, training (including simulators), emergency preparedness, design and configuration control, testing, human performance and attitudes toward safety.

The 2002 discovery of degradation of the Davis-Besse nuclear power plant reactor vessel head highlighted problems that develop when the safety environment at a plant receives insufficient attention.

Most recently, the 2011 nuclear accident at the Fukushima Daiichi power plant illustrates the importance of thoroughly assessing possible nuclear safety impacts of a hypothetical, yet credible, extreme external event. It also illustrates the importance of emergency response command and control, training and resource availability for such an event.

A theme common in these events is that problems crept in over time, often related to or a direct result of the plant culture. Had these problems been recognised, challenged and resolved, the events could have been prevented or their severity mitigated. The series of decisions and actions that resulted in these events can usually be traced to the shared assumptions, values and beliefs of the organisation.

These events and the notion that culture is a key ingredient in the overall success of the plant, form the basis for this document.

Organisational culture is the shared basic assumptions that are developed in an organisation as it learns and copes with problems. The basic assumptions that have worked well enough to be considered valid are taught to new members of the organisation as the correct way to perceive, think, act and feel. Culture is the sum total of a group's learning. Culture is for the group what character and personality are for the individual.

In addition to a healthy organisational culture, the special characteristics and unique hazards associated with nuclear technology – radioactive by-products, concentration of energy in the reactor core and decay heat – mean each station needs a healthy safety culture.

Nuclear safety is a collective responsibility. The concept of nuclear safety culture applies to every employee in the nuclear organization, from the board of directors to the individual contributor. No one in the organisation is exempt from the obligation to ensure nuclear safety is the highest priority.

The performance of individuals and organisations can be monitored and trended; therefore, performance may serve as an indicator of the health of an organisation's safety culture. However, the health of an organisation's safety culture could lie anywhere along a broad

continuum, depending on the degree to which the attributes of safety culture are embraced. Even though safety culture is somewhat of an intangible concept, it is possible to determine whether a station tends toward one end of the continuum or the other.

Commercial nuclear power plants are designed, built and operated to produce electricity. Safety, production and cost control are necessary goals for the operation of such a plant. These outcomes are quite complementary, and most plants today achieve high levels of safety, impressive production records and competitive costs, reinforced by decisions and actions made with a long-term view taken into account. This perspective keeps safety as the overriding priority for each plant and for each individual associated with the plant.

Nuclear safety culture is a leadership responsibility. Experience has shown that leaders in organisations with a healthy safety culture foster safety culture through activities such as the following:

- Leaders reinforce safety culture at every opportunity. A safety culture's health is not taken for granted.
- Leaders frequently measure a safety culture's health by focusing on trends rather than absolute values.
- Leaders communicate what constitutes a healthy safety culture and ensure everyone understands his or her role in its promotion.
- Leaders recognise that safety culture is not all or nothing, instead it is constantly moving along a continuum. As a result, there is a comfort in discussing safety culture within the organisation as well as with outside groups, such as regulatory agencies.

The traits described in this document are divided into three categories that are similar to the three categories of safety culture in International Nuclear Safety Advisory Group (INSAG)-4, Safety Culture. The categories and their primary traits are as follows:

- Individual commitment to safety
 - Personal accountability
 - Questioning attitude
 - Safety communication
- Management commitment to safety
 - Leadership accountability
 - Decision-making
 - Respectful work environment
- Management systems
 - Continuous learning
 - Problem identification and resolution
 - Environment for raising concerns
 - Work processes

Principles

Individual commitment to safety

1. Personal accountability (PA)

All individuals take personal responsibility for safety. Responsibility and authority for nuclear safety are well defined and clearly understood. Reporting relationships, positional authority and team responsibilities emphasize the overriding importance of nuclear safety.

Attributes:

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|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PA.1 | Standards: Individuals understand the importance of adhering to nuclear standards. All levels of the organisation exercise accountability for shortfalls in meeting these standards. |
| PA.2 | Job Ownership: Individuals understand and demonstrate personal responsibility for the behaviours and work practices that support nuclear safety. |
| PA.3 | Teamwork: Individuals and work groups communicate and coordinate their activities within and across organisational boundaries to ensure nuclear safety is maintained. |

2. Questioning attitude (QA)

Individuals avoid complacency and continuously challenge existing conditions, assumptions, anomalies and activities to identify discrepancies that might result in errors or inappropriate actions. All employees are watchful for assumptions, values, conditions or activities that can have an undesirable effect on plant safety.

Attributes:

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|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| QA.1 | Nuclear is recognised as special and unique: Individuals understand that complex technologies can fail in unpredictable ways. |
| QA.2 | <i>To be implemented later</i> |
| QA.3 | Challenge assumptions: Individuals challenge assumptions and offer opposing views when they believe something is not correct. |
| QA.4 | Avoid complacency: The employees are aware of and take into account the possibility of mistakes, latent issues and inherent risk, even while expecting successful outcomes. |

3. Safety communication (CO)

Communications maintain a focus on nuclear safety. Leaders use formal and informal communication to convey the importance of nuclear safety. The flow of information up the organisation is viewed as just as important as the flow of information down the organisation.

Attributes:

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|------|------------------------------------------------------------------------------------------------|
| CO.1 | Work Process Communications: Individuals incorporate safety communications in work activities. |
|------|------------------------------------------------------------------------------------------------|

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| CO.2 | Bases for decisions: Leaders ensure that the bases for technical and organizational decisions are communicated in a timely manner. |
| CO.3 | Free Flow of Information: Individuals communicate openly and candidly, both up, down and across the organisation and with oversight, audit and regulatory organisations. |
| CO.4 | Expectations: Leaders frequently communicate and reinforce the expectation that nuclear safety is the organisation's overriding priority. |

Management commitment to safety

1. Leadership accountability (LA)

Leaders demonstrate a commitment to nuclear safety in their decisions and behaviours. Executives and senior managers are the leading advocates of nuclear safety and demonstrate their commitment both in word and action. The nuclear safety message is communicated frequently and consistently, occasionally as a stand-alone theme. Leaders throughout the nuclear organisation set an example for safety. Corporate policies emphasise the overriding importance of nuclear safety.

Attributes:

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|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LA.1 | Resources: Leaders ensure that personnel, equipment, procedures and other resources are available and adequate to support nuclear safety. |
| LA.2 | Field Presence: Leaders are commonly seen in working areas of the plant observing, coaching and reinforcing standards and expectations. Deviations from standards and expectations are corrected promptly. |
| LA.3 | Incentives, Sanctions and Rewards: Leaders ensure incentives, sanctions and rewards are aligned with nuclear safety policies and reinforce behaviours and outcomes that reflect nuclear safety as the overriding priority. |
| LA.4 | Strategic Commitment to Safety: Leaders ensure plant priorities are aligned to reflect nuclear safety as the overriding priority. |
| LA.5 | Change Management: Leaders use a systematic process for evaluating and implementing change so that nuclear safety remains the overriding priority. |
| LA.6 | Roles, responsibilities and authorities: Leaders clearly define roles, responsibilities and authorities to help ensure nuclear safety. |
| LA.7 | Constant Examination: Leaders ensure that nuclear safety is constantly scrutinised through a variety of monitoring techniques, including assessments of nuclear safety culture. |
| LA.8 | Leader Behaviours: Leaders exhibit behaviours that set the standards for safety. |

2. Decision making (DM)

Decisions that support or affect nuclear safety are systematic, rigorous and thorough. Senior leaders support and reinforce such conservative decisions having impact on safety.

Attributes:

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| DM.1 | Consistent Process: Individuals use a consistent, systematic approach to make decisions. Risk insights are incorporated, as appropriate. |
| DM.2 | Conservative Bias: Individuals use decision-making practices that emphasise prudent choices over those that are simply allowable. |
| DM.3 | Accountability for decisions: Single-point accountability is maintained for nuclear safety decisions. |

3. Respectful work environment (WE)

Trust and respect permeate the organisation, creating a respectful work environment.

A high level of trust is established in the organization, in part, fostered through timely and accurate communication. Differing professional opinions are encouraged, discussed and resolved in a timely manner. Employees are informed of steps taken in response to their concerns.

Attributes:

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|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WE.1 | Respect is evident: Everyone is treated with dignity and respect. |
| WE.2 | Opinions are valued: Individuals are encouraged to voice concerns, provide suggestions and raise questions. Differing opinions are also encouraged and respected. |
| WE.3 | High Level of Trust: Trust is fostered among individuals and work groups throughout the organisation. |
| WE.4 | Conflict Resolution: Fair and objective methods are used to resolve conflicts. |

Management systems

1. Continuous learning (CL)

Opportunities to continuously learn are valued, sought out and implemented.

Operating experience is highly valued and the capacity to learn from experience is well developed. Self-assessments, training and benchmarking are used to stimulate learning and improve performance. Nuclear safety is kept under constant scrutiny through a variety of monitoring techniques, some of which provide an independent or fresh perspective.

Attributes:

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| CL.1 | Operating Experience: Relevant internal and external operating experience is systematically and effectively collected, evaluated and lessons learned are implemented in a timely manner by the organisation. |
| CL.2 | Self-Assessment: The organisation routinely conducts self-critical and |

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| | objective assessments of its programmes, practices and performance. |
| CL.3 | Benchmarking: The organisation learns from other organisations in order to continuously improve knowledge, skills and safety performance. |
| CL.4 | Training: High-quality training maintains a knowledgeable workforce and reinforces high standards for maintaining nuclear safety. |

2. Problem identification and resolution (PI)

Issues potentially impacting safety are promptly identified, fully evaluated and promptly addressed and corrected, commensurate with their significance. Identification and resolution of a broad spectrum of problems, including organisational issues, are used to strengthen nuclear safety and improve performance.

Attributes:

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|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PI.1 | Identification: The organisation implements a corrective action programme with a low threshold for identifying issues. Individuals identify issues in a timely manner and in accordance with the programme expectations. |
| PI.2 | Evaluation: The organisation thoroughly evaluates issues to ensure that problem resolutions and solutions address causes and extents of conditions commensurate with their nuclear safety significance. |
| PI.3 | Resolution: The organisation takes effective corrective actions to address issues in a timely manner, commensurate with their nuclear safety significance. |
| PI.4 | Trending: The organisation periodically analyses information from the corrective action programme and other assessments in the aggregate to identify adverse trends or conditions. |

3. Environment for raising concerns (RC)

A safety-conscious work environment (SCWE) is maintained where personnel feel free to raise nuclear safety concerns without fear of retaliation, intimidation, harassment or discrimination. Station managers create, maintain and periodically evaluate policies and processes that allow personnel to freely raise such concerns.

Attributes:

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|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RC.1 | SCWE Policy: The organization implements a policy that supports individual rights and responsibilities to raise nuclear safety concerns and does not tolerate harassment, intimidation, retaliation or discrimination for doing so. |
| RC.2 | Alternative process for raising concerns: The organisation implements a process for raising and resolving concerns that is independent of line management influence. Nuclear safety issues may be raised in confidence and with an expectation that they be resolved in a timely and effective manner. |

Work Processes (WP) – to be implemented later

Appendix No. 2

SAFETY POLICY

Paks II NPP Ltd. (hereinafter referred to as Company) is a project company based in Paks, established for the management and implementation of the construction of the new Paks nuclear power plant units, as well as for obtaining the necessary licenses and the operation of the new units.

By issuing the safety policy, the top management of the Company declares the responsibility and commitment regarding the undertaking and enforcing the role of the licensee.

The safety policy and the corporate regulatory documents derived therefrom define the fundamental principles, on the basis of which the Company establishes, ensures, and continuously maintains the conditions and operational practices necessary for enforcing nuclear safety and nuclear security.

All areas of safety - and in particular, nuclear safety and nuclear security - constitute a matter of primary consideration during all decision-making processes and activities of the Company. The top management of the Company provides the necessary resources essential to this end.

As a nuclear licensee, Paks II Ltd. is responsible for nuclear safety and is committed to its continuous improvement. Nuclear safety is in the focus of all the Company's decisions and activities. The Company places a particular emphasis on complying with legislation, international standards, and good practices.

The Company's top management, as the licensee, assumes responsibility for ensuring the compliance with the following nuclear safety objectives during the design, manufacturing, construction, commissioning, and operation of the nuclear facility's nuclear safety systems and system components:

- The protection of individuals and groups of the public, as well as the protection of the environment is ensured against the hazards of ionizing radiation at every stage of the nuclear facility's lifetime.
- The radiation exposure of workers and the public is at all times kept below the established limits and is as low as reasonably achievable.
- The occurrence of operational events can be prevented or averted with a high degree of reliability.
- For all postulated initiating events considered in the design of the nuclear facility, the potential consequences shall remain within acceptable limits, and the probability of accidents shall be sufficiently low.

Regarding the operation and management of the Company, during the selection of managers and colleagues the primary point of view is the professional preparedness and commitment for the task and the involved responsibilities. The tasks and responsibilities of the managers and workers, as well as the procedures for vertical and horizontal communication, information flow, and reporting both within and outside the organisation, are defined and documented.

When carrying out its tasks related to nuclear safety, the Company operates a multi-level control and approval process, the fundamental principle of which is the identification and enforcement of all the requirements and expectations associated with nuclear safety and nuclear security, and

guaranteeing their full implementation during the design, construction and commissioning of the facility, systems and system components.

The Company's top management supports and enables the assessment of nuclear safety and considers both external and internal operating experiences. The Company pays particular attention to the measurement and management of risks related to the construction.

In order to implement the project, the Company employs well-prepared contractual partners possessing a high level of expertise and professional experience, who are recognised within the industry and whose professional competence and commitment to safety are beyond doubt. During the selection of contractual partners, the preliminary assessment of their capabilities, the evaluation of their performance during their activities are carried out on the basis of qualification and assessment founded on nuclear safety and nuclear security requirements.

The top management of the Company is committed to the development and maintenance of a strong nuclear safety culture.

Anyone may report observations or concerns related to a breach of safety. These will be evaluated and investigated by the Company without delay and at the organisational level appropriate to their significance, after which the personnel working on the project are duly informed of the corrective and preventive actions implemented.

The Company cooperates with the parties and institutions involved in the implementation. MVM Paks Nuclear Power Plant is a priority partner. The Company considers the safety of the operating units as a fundamental requirement and cooperates with MVM Paks Nuclear Power Plant Ltd. on all safety-related matters during the preparation and construction of the new units.

Gergely Jákli
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