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The Safety Culture of an Effective Nuclear Regulatory Body

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The Safety Culture of an Effective Nuclear Regulatory Body

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The mission of the NEA is:

- to assist its member countries in maintaining and further developing, through international co-operation, the scientific, technological and legal bases required for a safe, environmentally friendly and economical use of nuclear energy for peaceful purposes;
- to provide authoritative assessments and to forge common understandings on key issues, as input to government decisions on nuclear energy policy and to broader OECD policy analyses in areas such as energy and sustainable development.

Specific areas of competence of the NEA include the safety and regulation of nuclear activities, radioactive waste management, radiological protection, nuclear science, economic and technical analyses of the nuclear fuel cycle, nuclear law and liability, and public information.

The NEA Data Bank provides nuclear data and computer program services for participating countries. In these and related tasks, the NEA works in close collaboration with the International Atomic Energy Agency in Vienna, with which it has a Co-operation Agreement, as well as with other international organisations in the nuclear field.

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Cover photos: June 2015 NEA Workshop on Challenges and Enhancements to the Safety Culture of the Regulatory Body (NEA, 2015); Regulatory officials observe inspection of new CANDU fuel bundles at the Darlington Nuclear Generating Station, Clarington, Ontario (CNSC, 2015).

Foreword

The Nuclear Energy Agency (NEA) Committee on Nuclear Regulatory Activities (CNRA) is an international body made up of senior representatives from nuclear regulatory bodies. The committee guides the NEA programme concerning the regulation, licensing and inspection of nuclear installations with respect to safety. It acts as a forum for exchange of information and experience, and for review of developments which could affect regulatory requirements.

The NEA has produced a series of regulatory guidance reports, known as "green booklets", which are prepared and reviewed by senior regulators and provide a unique resource on key nuclear regulatory issues. The booklets examine various regulatory challenges and address the major elements and contemporary issues of a nuclear safety regime. (See Appendix 1 for a complete list of reports.)

As part of discussions at its June 2014 meeting, the CNRA reviewed and approved the green booklet on *The Characteristics of an Effective Nuclear Regulator* (NEA, 2014) noting that the characteristic of "safety focus and safety culture" was one of the four fundamental principles from which all regulatory body actions should be derived. The CNRA therefore agreed that the topic of the safety culture of the regulatory body was an important area for further work and that a green booklet on the safety culture of an effective nuclear regulatory body would be a timely and appropriate addition to this resource on key contemporary nuclear regulatory issues. A senior-level task group (STG) was thus established with the remit to prepare a regulatory guidance document on the safety culture of an effective regulatory body.

Although the audience for this report is primarily nuclear regulatory bodies, the information and ideas herein are also expected to be of interest to stakeholders involved in the nuclear industry. The NEA believes that it could be of special interest to countries looking to begin a nuclear energy programme, which have yet to develop well-established regulatory regimes. The NEA also encourages and challenges all established regulatory bodies to use this report as a benchmark and to continually strive to enhance their effectiveness as they fulfil their mission to protect public health and safety.

The characteristics developed in this report are not exhaustive and are intended to complement other work, for example by the International Atomic Energy Agency (IAEA) and others, in this constantly developing area. It is important that each regulatory body develop its own frame of reference, using this report as a basis against which it can carry out its own self-assessment and benchmarking.

This report was prepared on the basis of discussions and input from members of the Senior-level Task Group on the Safety Culture of an Effective Nuclear Regulatory Body, as well as the outcomes from the June 2015 NEA Workshop on Challenges and Enhancements to the Safety Culture of the Regulatory Body (NEA, 2015), which was organised by the CNRA with the support of the NEA Committee on the Safety of Nuclear Installations (CSNI) and the NEA Committee on Radiological Protection and Public Health (CRPPH). Information was also taken into account from a wide array of documents produced by the NEA, its member countries and other international organisations.

Mr Lennart Carlsson (Sweden) chaired the meetings and work of the senior-level task group. Members of the STG were Mr Benoît Bernard (Belgium); Mr Robert Lojk (Canada); Ms Kaisa Koskinen (Finland); Ms Anne-Cécile Rigail (France); Ms Gisela Stoppa (Germany); Mr Ferenc Lorand (Hungary); Mr Masahiro Aoki (Japan); Mr Kenichi Fujita (Japan); Ms Hiroko Takada (Japan); Mr Takaaki Kurasaki (Japan); Dr Young Sung Choi (Korea); Mr Martin Smit (Netherlands); Ms Tatiana Bogdanova (Russia); Mr Alexander Sapozhnikov (Russia); Mr Alexander Smetnik (Russia); Mr Rafael Cid Campo (Spain); Mr Lars Axelsson (Sweden); Mr Lennart Carlsson (Sweden); Dr Anne Edland (Sweden); Dr Cornelia Ryser (Switzerland); Ms Miriam Cohen (United States); Mr Ben Ficks (United States); Ms Andrea Valentin (United States); Ms Adriana Nicic (International Atomic Energy Agency); Ms Aurélie Lorin (Nuclear Energy Agency); Mr Takayoshi Nezuka (Nuclear Energy Agency); and Dr Len Creswell (NEA Consultant).

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1. Executive summary

The fundamental objective of all nuclear safety regulatory bodies is to ensure that, within their respective countries, activities related to the peaceful use of nuclear energy are carried out in a safe manner, consistent with appropriate domestic and international safety principles and with full respect of the environment. In order to effectively achieve this objective, the nuclear regulatory body requires specific characteristics that will allow it "to do the right thing well and efficiently". A healthy safety culture within the regulatory body is a fundamental characteristic of an effective regulator (NEA, 2014).

Although the national regulator plays an essential role in each country, operating experience has shown that accidents may impact other countries and may involve other national regulators. Safety is therefore not bounded by national borders. The implications of this global nuclear safety approach should be taken into account when addressing the safety culture of the national regulator.

It is also important to emphasise that, although the mission of the regulatory body is to provide oversight on nuclear safety, the prime responsibility for the safety of a nuclear installation remains with the licensee or plant operator.

The regulatory body nevertheless has an important responsibility in assuring that the licensee meets its primary goal of ensuring the safety of nuclear installations. The regulatory body, along with many other stakeholders, is embedded in a wide system, which shares common societal values and norms. By directly and indirectly interacting with each other, all participants of this system mutually influence their respective safety cultures. By nature of its role, one of the stakeholders who most deeply influence the licensees' safety culture is the regulatory body. With its regulatory strategy, the way it carries out its daily oversight work, the type of relationship it cultivates with licensees, the values it conveys and the importance it gives to safety – in short, with its own safety culture – the regulatory body profoundly impacts the licensee's safety culture and its sense of responsibility for safety. Hence, the regulatory body needs to be conscious of its own safety culture's impact on the safety culture of the organisations it regulates and oversees in order not to hamper those organisations' willingness and efforts to take on their primary responsibility for safety. For this reason, it is paramount that the regulatory body not only consider safety culture as a matter of oversight, but also as a matter of self-reflection. It should actively scrutinise how its own safety culture impacts the licensees' safety culture. It should also reflect on its role within the wider system and on how its own culture is the result of its interactions with the licensees and all other stakeholders.

A regulatory body should have public safety as its primary focus and a healthy safety culture is essential in this regard. Such a safety culture should encompass

individual staff members, leaders and the organisation as a whole. The International Nuclear Safety Advisory Group's report on the safety culture, INSAG-4 (IAEA, 1991), was originally written for operators but the concepts apply equally well to regulatory bodies, although their roles are different. The definition of safety culture in the International Atomic Energy Agency (IAEA) safety glossary (IAEA, 2007) is derived from INSAG-4 as follows: "Safety culture is that assembly of characteristics and attitudes in organisations and individuals which establishes that, as an overriding priority, protection and safety issues receive the attention warranted by their significance."

This Nuclear Energy Agency (NEA) regulatory guidance report identifies and describes five principles and their associated attributes that underpin and support the safety culture of an effective nuclear regulatory body. Each of the characteristics – the principles and the attributes – discussed in this report is a necessary feature of the safety culture of an effective nuclear regulatory body, but no one characteristic is sufficient on its own. It is the combination of these characteristics – the principles and the attributes – that leads to a healthy safety culture within the nuclear regulatory body.

The five principles which are adopted in this report are:

- Leadership for safety is to be demonstrated at all levels in the regulatory body.
- All staff of the regulatory body have individual responsibility and accountability for exhibiting behaviours that set the standard for safety.
- The culture of the regulatory body promotes safety and facilitates co-operation and open communication.
- Implementing a holistic approach to safety is ensured by working in a systematic manner.
- Continuous improvement, learning and self-assessment are encouraged at all levels in the organisation.

A regulatory body which applies these principles and the associated attributes described in this report should have a continuously developing and constantly improving safety culture that makes a significant contribution to the ability of a nuclear regulatory body to be effective. The safety culture of an organisation can also build an atmosphere where many positives are seen and which helps to build pride in belonging and commitment to the organisation with all those involved.

The report concludes that the following elements support a healthy safety culture within the regulatory body:

- Excellence in leadership for safety at all levels of the organisation to demonstrate the importance of prioritising safety above all else.
- Strong sense of personal accountability so that everyone takes personal ownership of their actions and decisions with respect to safety.
- Formal direction on safety culture (i.e. a clear corporate policy on safety culture in the form of statements, guidance or a code of conduct).

- Staff who are aligned and engaged: a healthy safety culture is supported by staff who know what they are doing.
- Open and transparent communication, internally and externally.
- Informed, balanced accountability that encourages open and honest reporting and respects safety information.
- A comprehensive and systemic approach to the regulatory environment which is a complex and interdependent system that requires a holistic approach to its management.
- A clear and appropriate regulatory framework.
- Continuous improvement and learning: an open, adaptable and learning attitude in technical, regulatory and organisational areas helps avoid complacency by continuously challenging existing conditions and activities.
- Self-assessment: assessment of the safety culture of the regulatory body supports continuous improvement. At the same time, more work is needed in the development of assessment methodologies and appropriate performance indicators.
- Benchmarking to ensure consistency with peers, share experiences and support a global safety approach.

Many challenges exist to regulatory bodies' safety culture which must be recognised, understood and overcome (e.g. maintaining the main focus on safety, addressing external pressures, adapting to an evolving system, maintaining competence, managing an emergency situation). In addition, safety culture cannot survive solely on goodwill and good attitude. It needs to be nourished by adequate resources, competence and support programmes such as management systems.

This report concludes that a regulatory body with a healthy safety culture maintains its focus on safety and makes safety its overriding value. In addition, when the regulatory body demonstrates a healthy safety culture, it positively influences the behaviour of licensees and enhances the confidence of all stakeholders.

This regulatory guidance booklet on the safety culture of an effective nuclear regulatory body provides a unique resource to countries with existing, mature regulators and can be used for benchmarking as well as training and developing staff. It will also be useful for new entrant countries in the process of developing and maintaining an effective nuclear safety regulator.

2. Introduction

The fundamental objective of all nuclear safety regulatory bodies is to ensure that, within their countries, activities related to the peaceful use of nuclear energy are carried out in a safe manner; the prime responsibility for the safety of a nuclear installation remains with the licensee or plant operator. However, the regulatory body itself has an important responsibility in assuring that the licensee meets its primary goal of safety of nuclear installations. The regulatory body, along with many other stakeholders (such as the licensees, manufacturers and contractors, research institutions, technical support organisations, international organisations, as well as governmental organisations, non-governmental organisations, the media and the public) are part of a large interconnected and inter-related system, which shares common societal values and norms. By directly and indirectly interacting with each other, all participants of this system mutually influence their respective safety cultures. Therefore, the safety culture of the regulatory body is important, among other reasons, for the effect it can have (both positive and negative) on the industry and those responsible for safety (NEA, 1999).

Definitions

In this report, the "safety culture" is considered as "the assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, protection and safety issues receive the attention warranted by their significance" (IAEA, 2007). This statement was originally written by INSAG (IAEA, 1991) to be applied to operators, but these concepts could be applied equally well to regulatory bodies, although their roles are different.

In this report, the term "healthy" was adopted to qualify the safety culture but the qualification can be adapted as appropriate to the circumstances.

For the purpose of this report, the following definitions are used:

- Principles: fundamental, primary and accepted basis of conduct from which all actions are derived.
- Attributes: qualities that identify or describe an organisation that results from the actions of the organisation.

In the context of this report, the nuclear regulatory body should be considered in the widest sense and encompass: relevant parts of government, national inspection and licensing authorities, the technical support organisations and any other organisations involved.

In addition, the regulatory body's mission of ensuring nuclear safety should be seen, as appropriate, to include radiological protection and environmental protection.

Leaders and managers

Both leaders and managers are embedded throughout organisations with staff at all levels taking on both of these roles from time to time. Leadership is about winning the hearts and minds of people to achieve a common purpose by providing vision and strategic direction, and creating an atmosphere (a culture) within the organisation. Management is about implementing the processes and following the path set by the vision and strategic direction.

Management systems and safety culture

A management system is needed to ensure an organisation works properly and efficiently. It also helps to enable and develop the safety culture (NEA, 2006), and so it is important that essential actions concerning safety culture are integrated into the organisation's management system and that the management system should maintain coherence of these concepts. In particular, self-assessments and reviews of safety culture should not only be triggered by external peer reviews but should be an integral part of the overall management cycle. The principles and attributes set out in this report are complementary to a management system and are considered necessary to develop, maintain and improve the safety culture of the regulatory body. These characteristics should be considered and addressed during the development, implementation and operation of the regulatory body's management system and relevant processes.

An interconnected system

The regulatory body profoundly impacts the licensee's safety culture and its sense of responsibility for safety. Hence, the regulatory body needs to be conscious of its own safety culture's impact on the safety culture of the organisations it regulates and oversees in order not to hamper those organisations' willingness and efforts to take on their primary responsibility for safety. For this reason, it is paramount that the regulatory body not only consider safety culture as a matter of oversight but also as a matter of self-reflection. It should actively scrutinise how its own safety culture impacts the licensees' safety culture. It should also reflect on its role within the wider system and on how its own culture is the result of its interactions with the licensees and all other stakeholders.

Self-reflection

Like the tip of an iceberg above the water's surface, only a small portion of the elements that make up a safety culture (of both licensees and regulatory bodies) can be readily perceived. In the case of the regulatory body, these elements are, for instance, the shared behaviours of the inspectors when doing their oversight work

and interacting with the licensee's employees, or the regulations and requirements issued by the regulatory body. The largest part of the cultural elements – such as attitudes, values, beliefs and deeply rooted assumptions shared by the regulatory body's employees – cannot be seen or otherwise directly perceived. They constitute the part of the iceberg below the water's surface. They are not tangible and are often even unconscious, but they essentially determine the behaviour and tangible artefacts above the surface. Self-reflection activities of the regulatory body should therefore not be limited to an analysis of daily oversight practices and of regulations, but should also aim at identifying and debating attitudes, values and beliefs held and shared by the regulatory body's employees, in order to assess how they can positively or negatively impact the licensees' safety culture.

National culture's influence on the safety culture

National culture is one of the elements that should be considered in fostering and enhancing an organisation's safety culture. The characteristics of organisations with a strong safety culture are the same the world over. However, an organisation that wishes to foster and enhance these characteristics needs to design its programme to fit the unique culture of that organisation. National culture will be one of the influences on the organisation's culture, and on the likely success or failure of improvement programmes.

The effect of national culture to safety culture of an organisation is twofold. Firstly, the individuals working in an organisation always execute some features of their national culture (e.g. certain values or social norms) in their work behaviour. Secondly, national culture is embedded in the societal structures around nuclear safety (e.g. legislation, education, roles of different stakeholders) which may affect the organisations' activities to a great extent.

National cultures are evolving continuously. The culture, cultural values and the cultural changes depend on the history and origins of the countries, even the climate and environment where the cultures have evolved around the globe have influenced the cultural characteristics. Nowadays also more and more globalisation is influencing the national cultures. These are factors that should be taken into consideration when analysing and developing nuclear safety culture. For example, the cultural trait of individualism versus collectivism and the status quo versus innovation can tend to differ between countries. If the trend of collectivism is strong, it is important to clarify the accountability of individuals on the process of decision-making. Similarly, if the trend of the status quo is strong, it is necessary to establish a climate within the organisation of continuous change to be able to foster the continuous improvement of activities.

It is important that characteristics of national culture should not be viewed as an impediment to safety culture but rather as characteristics and cultural strengths to be aware of and to be used and fostered in developing safety culture. It is therefore useful for organisations, where possible, to compare experiences and benchmark with similar organisations from their own country as well as internationally.

Focus in time

The culture of the regulatory body should create a balance between the importance people give to the past, present and future. Excessive focus on one of these time frames to the exclusion of others can create problems. For example, a lack of awareness of past accidents could lead to a certain insouciance; refusal to accept any current risk that could lead to a reduction of future risk may be the results of an excessive focus on the present and a wish to maintain the status quo; wishful thinking and over confidence can cause the future to be discounted. The degree to which national cultures, mindsets and behaviours cause people and organisations to be oblivious to the past and discount the future differs among countries. However, these are universal issues that should be addressed by all organisations. A balance in relation to the focus in time should be found when planning activities and employees' work. The need to have a balanced focus on defining risks (past), extracting potential risks (present) and examining the challenges for the future (future risk) is an important feature of the safety culture.

3. Principles and attributes for the safety culture of an effective nuclear regulatory body

The following principles and attributes constitute a framework for a healthy safety culture within a nuclear regulatory body.

Principle 1: Leadership for safety is to be demonstrated at all levels in the regulatory body.

Leaders perform essential functions in organisations. The quality and actions of leadership have widespread consequences for an organisation's safety culture and its performance. Leaders significantly affect an organisation's safety culture through the priorities they establish, the behaviours and values they model, the reward systems they administer, the trust they create, and the context and expectations they establish for interpersonal relationships, communication and accountability. Leaders also exert significant influence on change initiatives. They have the power and responsibility to set strategy and direction, align people and resources, motivate and inspire people, and ensure that problems are identified and solved in a timely manner. A lack of commitment or clear communication about what is important to the organisation can create a conflict for employees who must then decide between potentially competing messages. This leads employees to make their own interpretations, thereby increasing the probability of negatively affecting the organisation's safety culture. It is clear that behaviour matters and that leadership behaviours which support the safety culture are critical. Leaders should establish an organisational culture that fosters a healthy safety culture.

Attributes:

a) "Safety first" is a guiding principle in the regulatory body.

The prioritisation of safety over other competing requirements should be ingrained in the culture of the regulatory body. Organisations demonstrate their commitment to safety by promoting behaviours, and by implementing policies and practices that support a healthy safety culture. This could include a policy statement outlining key positive traits such as leaders' safety values and actions, problem identification and resolution, personal accountability, internal communication, continuous learning, a questioning attitude and an environment conducive to raising concerns. These traits describe patterns of thinking, feeling and behaving that emphasise safety, particularly in situations when safety goals could conflict with schedules or budgets. To ensure engagement from all staff of

the regulatory body, policy elements should be promoted as core values of the organisation, championed by leadership and reinforced through internal communications and activities.

b) All leaders throughout the regulatory body demonstrate a commitment to safety in their decisions and behaviours.

In day-to-day decision making, all leaders of the regulatory body effectively prioritise the consideration of safety over other matters (e.g. time pressure) with a high degree of integrity, transparency and consistency. This includes behaviours and interactions with all staff of the organisation. Safety culture is eroded when a decision-making process leaves a majority of its staff or the stakeholders out of the discussion.

c) Leaders create an environment for positive development of the safety culture.

An important responsibility for leaders at each level is to create an atmosphere of free and open exchange of views and ideas as well as one of raising concerns. Therefore, it is crucial to allow criticism, and to accept and be open to different opinions. All views, concerns and ideas should be valued – even in cases where they do not lead to any change or uncover any issue(s).

There should be a relationship of trust between leaders and staff so that staff feel comfortable raising safety concerns, and leaders should support staff members in making safety related decisions. Leaders should also show confidence in staff members and defend staff member's decisions, if appropriate. When a leader (or manager) overrules a staff member's opinions or decisions, they should take full accountability and explain why the decision was overruled.

Leaders should respond to questions and information from staff openly and honestly and should maintain good relationships with their staff. In particular, any self-reporting of mistakes by them or those of others should not lead to retaliation, intimidation, harassment or discrimination.

Leaders should ensure that safety consciousness is a priority throughout the organisation. Candidates for safety relevant leadership positions should therefore be selected and evaluated with due consideration of their demonstrated ability to foster a healthy safety culture.

d) Leaders clearly define individual roles, responsibilities and authority.

Leaders are enabled by the organisation to define roles, responsibilities and authority, as well as a code of ethics within the regulatory body. They also ensure that these are clearly communicated and understood. Managers appropriately delegate responsibility and authority to promote ownership and accountability. As a consequence, all staff members have a clear understanding of their individual role(s) in day-to-day operations and in emergency situations. The responsibility assigned to individuals is defined and documented in sufficient detail to prevent ambiguity. The definitions of the authority and responsibility of individuals should be regularly reviewed to ensure that there are no omissions or overlaps, and no problems of shared responsibilities.

e) Leaders ensure that the necessary resources are available to meet the safety mission.

Leaders strive to strategically plan and ensure the prerequisites for the regulatory body – such as effective technical independence and the availability of sufficient resources – to ensure that its mandate is continuously met. Appropriate support systems (e.g. information technology and administration) should be provided to enable all staff to execute their functions. The necessary resources are essential to fulfilling the safety mission, and their availability demonstrates commitment to enhance the safety culture.

Principle 2: All staff of the regulatory body have individual responsibility and accountability for exhibiting behaviours that set the standard for safety.

Personal accountability reflects the fact that individual staff members accept responsibility and take ownership of their performance and the role they have in nuclear safety. In organisations with healthy safety cultures, individuals have a strong sense of accountability for safety and behave accordingly.

Attributes:

a) Personal commitment to and accountability for safety from every staff member, at all levels of the organisation.

Accountability can motivate mindfulness, attention to detail and self-assessment, and it can contribute to improving nuclear safety. In order for accountability to become a fundamental part of an organisation's safety culture, everyone should take personal ownership for his or her actions and decisions. Reinforcement of this accountability can come from managers, but also from co-workers, the public, other influential leaders, and an individual's own personal values and standards.

b) A strong sense of collaboration and co-ordination of activities across the organisation.

Individuals and work groups should communicate and co-ordinate their activities within and across organisational boundaries to ensure nuclear safety is maintained. Individuals should also demonstrate a strong sense of collaboration and co-operation in connection with projects and operational activities. They should work as a team peer-checking and ensuring that safety practices are followed, actively coaching new personnel and sharing tools and publications. Individuals should strive to meet commitments and collaborate in order to contribute to organisation's goals.

c) The need for moral courage and agility in doing the right thing.

Individuals should have the necessary support to raise safety concerns and to withstand undue pressure due to conflicting interests which may have a negative impact on safety. Staff of the regulatory body should exhibit moral courage and agility and should not feel constrained in making the right decision, even if this decision challenges or puts them in conflict with a licensee or other stakeholder. Moral courage can be developed through a supportive environment, expertise and

encouragement from leaders and colleagues which helps strengthen confidence in decision making.

Principle 3: The culture of the regulatory body promotes safety, and facilitates co-operation and open communication.

In order to ensure and promote nuclear safety, the regulatory body needs to foster co-operation within its own organisation. A regulatory body with a healthy safety culture provides a respectful, collaborative working environment which is supportive of open, honest and free dialogue, and where staff are able to freely raise concerns.

The regulatory body needs to build trust by being open and transparent in its dealings and when communicating internally with its staff and with external stakeholders such as licensees, the public and the wider regulatory community.

Attributes:

a) Openness and transparency.

In order to build trust and confidence, both internally and externally, the regulatory body should communicate and consult in an open and transparent manner, and fully engage with its staff and stakeholders. The scope and nature of these activities should be such that it is clear how the regulatory body's mandate is being discharged, and why and in what manner decisions are made. The allocation of communication resources should be undertaken in a balanced way based on considerations of risk and public needs so as to ensure that safety is the primary focus.

b) Clear organisational commitment to co-operation.

Co-operation and dialogue at all levels of the regulatory body's organisation (including technical support organisations, where applicable) fosters engagement and alignment. Open communication also ensures that regulatory staff are able to work effectively, with a more complete and integrated common understanding of safety issues. Likewise, co-operation and dialogue with other regulators, government entities, international organisations and non-governmental organisations ensures that the regulatory body is engaged and knowledgeable of both the latest thinking and positions on safety. Failure to adequately share, discuss and analyse uniquely held expertise and experiences compromises collective problem-solving and may result in the inadvertent dismissal of important safety issues or findings.

c) A questioning attitude, and mechanisms to raise differing opinions on regulatory decisions.

Safety is fostered and supported by working environments that promote questioning attitudes, facilitate discussion on safety concerns and are free of any fear of negative consequences. Staff should be encouraged to challenge the way things have traditionally been done. A questioning attitude helps to ensure appropriate decisions are made and bad practices do not become institutionalised.

Good working environments are founded on mutual trust and respect, and support policies and mechanisms for handling differing opinions (for example, non-concurrence and whistle blower programmes) in order to protect and support those who come forward with concerns. It is important that all safety concerns raised are resolved, and that feedback on the resolution of the safety concern is provided to the individual who raised the concern.

d) Promotion of safety and associated knowledge.

Promoting the importance of safety, the dissemination of related knowledge and support of research should be encouraged and made part of the organisational culture of the regulatory body. Also important is the selection of an appropriate regulatory approach as outlined in the NEA Regulatory Guidance Report *The Characteristics of an Effective Nuclear Regulator* (NEA, 2014).

Not all staff of the regulatory body work directly on safety issues, but all indirectly support implementation of the mandate. Consequently, to help ensure that the focus remains on safety, all staff members should understand how their work contributes to safety and the implementation of the organisation's mandate.

Principle 4: Implementing a holistic approach to safety is ensured by working in a systematic manner.

A healthy safety culture is dependent on the regulatory body using a robust, holistic, multi-disciplinary approach to safety. Regulators oversee and regulate complex socio-technical systems that, together with the regulatory body itself, form part of a larger system made up of many stakeholders, with competing as well as common interests. All the participants in this system influence and react to each other, and there is a need for awareness and understanding of this mutual influence.

Attributes:

a) A healthy respect for the consequences of all actions and decisions taken by the regulatory body.

In its decision making process, the regulatory body should apply a conservative approach, by considering the short and long-term potential outcomes. This requires a healthy respect for the consequences of all actions and decisions, or looking beyond the decisions towards the consequences. Such an approach also requires that the regulatory body effectively manage and control the allocation of its resources through, for example, the application of a graded approach, where the regulatory intervention is proportionate and based on the risk and hazards involved. When there are competing requirements and pressures, safety should always be the priority.

b) Clear awareness of roles and responsibilities in relation to licensees.

Regulators and licensees have their own individual responsibilities and accountabilities for safety, which should be clear and recognisable. Licensees should respect and fully co-operate with the regulatory body while the regulatory

body should respect licensees and their processes. Regulatory oversight should help licensees strengthen safety and not unduly interfere in the licensees' own processes so as not to diminish the importance of the licensee's own responsibility for safety. In essence, the regulatory body should not take on the role of the decision maker in relations to safety issues as it should recognise that the primary responsibility for safety rests with the operating organisation. Safety is enhanced when regulators are open to dialogue with licensees so as to better leverage knowledge and understanding which helps to develop better guidance and approaches to safety.

c) A clear regulatory framework.

Safety is enhanced when the regulatory body sets a clear and comprehensive regulatory framework, based on hazards and risk. This framework should not be so detailed as to set up undue constraints. Regulatory requirements and guidelines need to keep evolving in order to incorporate lessons learnt and new developments. The regulatory body should emphasise that licensees have the prime responsibility for safety. This responsibility cannot simply be discharged by complying with the regulatory framework. The regulatory body should encourage the licensee to strive higher, and this policy should be part of the "regulatory framework".

d) Proactivity, adaptability and a holistic approach.

Safety is enhanced when the regulatory body applies proactive, adaptable and holistic approaches to the delivery of its mandate. Such approaches involve effective problem anticipation, good foresight, suitable planning and a capacity to react quickly and properly to changing or new circumstances.

The regulatory body should apply a holistic approach to its work by constantly scrutinising operations for safety, taking into account the performance of the entire system, the interconnection between its parts, its current state and the direction the system is taking. The licensee should be perceived as part of a larger socio-technical system influenced by technical, human and organisational, environmental, economic, political and societal factors. Regulators should strive to do more than simply establish standards; they should consider the performance of the entire system that ensures safety.

e) Recognition of the complexity of safety issues.

Safety issues are complex and involve a number or inter-related factors, activities and groups, whose importance and effect on each other and on safety might not be immediately recognisable. Appropriate monitoring, evaluation and oversight, as well as (where needed) preventative or corrective actions are required to ensure that important indicators of degraded performance or safety are not ignored.

Principle 5: Continuous improvement, learning and self-assessment are encouraged at all levels in the organisation.

INSAG-4 (IAEA, 1991) stresses the importance of commitment to continuous improvement, by regularly performing self-assessments, external reviews and by

developing a learning attitude in order to avoid "blind spots" and identify areas for improvement. Such improvements rely on the competence and professional knowledge of staff in order to be effective.

Attributes:

a) Looking at ourselves in the mirror: safety culture self-assessment and peer reviews.

The regulatory body should take a good look in the mirror to see its own "ways of thinking and ways of doing": its philosophy, policies, processes, procedures and practices. The safety culture self-assessment process itself is as important as its results because it enables exchanges between people from various departments and levels. It may help to identify some assumptions and informal rules that influence and structure the internal decision process.

The self-assessment process comprises a first phase of qualitative evaluation. The findings of this qualitative evaluation are then compared to a set of references, which leads to an action plan. Such an assessment should be performed periodically.

A combination of various tools should be encouraged when performing the qualitative evaluation: detailed questionnaires, analysis of performance indicators, results of panels, reviews of past regulatory decisions, results of team-building projects aimed at representing the main characteristics of the organisation or feedback from licensees and other stakeholders on the regulatory body's safety culture, etc. When using existing tools, these should be adapted to the national culture so that the staff feel free to answer easily and honestly. Some concepts may be difficult to translate directly from an international reference document and thus should be explained, potentially by providing some examples. This self-assessment can be triggered internally or externally and may be supported by international peer reviews or other types of external assessment. It should be considered as an opportunity for discussion and exchange, and particularly for identifying any traits of the national culture that may impact the safety culture of the regulatory body.

b) Learning from experience, fostering exchanges and increasing knowledge.

In order for individuals and organisations to avoid complacency and continuously challenge existing conditions and activities, the regulatory body should develop and maintain an open-minded and learning attitude in the technical and regulatory field.

Systematic training can be an opportunity, beyond the consolidation of competence, to have people from various departments get to know each other and open their minds to other points of view. Interdisciplinary exchanges (internal meetings, conferences, information exchange platforms) should be encouraged. In particular, it is important for the regulatory body to support research programmes and have frequent exchanges with research institutes, technical support organisations and other stakeholders in order to remain up to date on ongoing research and development in the nuclear field, such as: advantages and disadvantages of new technological solutions, developing technologies, materials and components, and human and organisational factors.

International involvement of the regulatory body offers an opportunity to learn from experience (including through case studies of events), identify best practices and try to adapt them to its own organisation. In particular, the development of methodologies for the assessment of the safety culture of nuclear regulatory bodies could enhance and enable the benchmarking and continuous development of the safety culture of regulatory bodies. Sharing of experiences with regulators of non-nuclear sectors could also be beneficial to learn from events in other sectors and discuss commendable practices.

c) Knowledge management to build a healthy safety culture.

As part of the regulatory body's knowledge management programme, careful attention should be paid to the transfer of knowledge and history of nuclear programmes to a new generation of staff. The corporate knowledge of past experience and decision making should be captured (for example, in recordings or databases) and these tools should be easy to use by anyone in the organisation. Appropriate mentoring should also be provided by experts in the oversight of safety.

In order to avoid silos and to foster a common safety culture, management should ensure that people regularly meet, either formally or informally, to share opinions, experiences and knowledge on issues relevant to the areas they regulate.

d) Continuous improvement as a clear value of the regulatory body.

Self-assessment, external reviews and an open, learning attitude are key ingredients for continuous improvement in all regulatory body activities. The regulatory body should be aware of the basis of its organisational culture (values, assumptions and artefacts). It should not only correct its weaknesses but should also focus on maintaining and enhancing its strengths.

The importance of improving the regulatory body's performance should be clear at all levels of the organisation. Commitment to continuous improvement should be reflected in corporate policy, and the regulatory body should devote sufficient time and resources to this continuous improvement loop. In particular, findings arising from self-assessments or external reviews should be addressed in a timely manner with comprehensive action plans.

A specific safety culture expertise should be available to the regulatory body in order to implement assessment processes, facilitate dialogue in the regulatory body and analyse the results. The findings and trends concerning the safety culture of the regulatory body should be periodically communicated to the staff in order to keep the momentum for improvement.

4. Safety culture challenges

External and internal factors create challenges that should be seen as opportunities to strengthen the regulatory body's safety culture. Nevertheless, if not recognised and properly addressed, these factors can weaken the safety culture of the regulatory body.

Some examples of the challenges are presented below:

a) Maintaining the main focus on safety

Maintaining a real consciousness of risks and a focus on the safety priority might be a challenge as the regulatory body could become trapped in habits detrimental to its safety culture.

The regulatory body should not be complacent in relation to the level of safety in the country, believing it to be adequate with no significant risk of accidents. Bureaucratic inertia, which may lead to minimising problems in order not to deal with them or a postponement of difficult decisions, is a tendency that management should be aware of. A certain degree of fear may also exist within the regulatory body that the introduction of new regulatory approaches would cause significant social confusion and foster a perception that existing measures are insufficient, therefore making the regulatory body reticent to implement changes and improvements.

A certain sense of self-importance, complacency or infallibility can result in isolation from other stakeholders and from the international community. In this respect, active involvement of the regulatory body in international exchanges offers both an opportunity for self-examination, peer reviews and benchmarking, which can help the regulatory body to develop awareness of its own strengths and weaknesses and act upon them.

There is also a risk of an erosion of institutional memory over time, unless measures are taken to support knowledge management. It is a challenge to maintain over time the awareness of risks and make sustainable efforts to enhance safety and not to fall prey to the "safety myth" that a severe accident cannot happen again, or at all.

b) Addressing external pressures on the regulatory body

The regulatory body must protect itself against any undue influence placed on it by the industry. Even if the industry is facing competition in its sector, the regulatory body must do its job in a thoughtful, predictable way and not feel pressured to act in such a manner that would jeopardise safety. The regulatory body should avoid any kind of "regulatory capture" situation where its decisions are unduly

influenced by the licensee. Leaders and managers should ensure that schedule pressures do not come at the expense of safety and of internal open debate.

Other stakeholders can also put pressure on the regulatory body (governmental bodies, non-governmental organisations, local communities). It is thus a challenge for the regulatory body to stand firm and maintain its priorities in order to address the safety issues in a way that is commensurate with their significance.

Another challenge linked to the transparency policy is for the regulatory body to obtain complete information from the licensees when they know that this information might have to be publicly disclosed by the regulatory body. The regulatory body needs to find appropriate ways to maintain and foster an open dialogue with licensees under these boundary conditions.

c) Building, maintaining and adapting a regulatory system

The regulatory body has to adapt its oversight system and practices to the specificities of various stages of the installation life cycle and to the maturity of operators (new design, new build, ageing plants, end of operation date known, decommissioning). The regulatory body has also to adapt to changes resulting from the evolution in national policies (e.g. on energy mix). Interacting with builders and licensees from several nationalities is also a challenge when projects and approaches convey these national cultures.

Countries embarking on a nuclear power programme have to create a nuclear regulatory body "from scratch" and have unique challenges in adapting international regulatory approaches to their own situation and culture. These challenges also include funding, lack of any corporate memory and, creating, nurturing and communicating a safety culture vision to a disparate group of multi-national and contract employees. Although new regulatory bodies can benefit from advice and good practices developed by countries with established nuclear programmes, they nonetheless have to take into account differences in national circumstances and adapt these practices to their national culture.

In the case of conflicting goals, incorporating safety and security goals could be a challenge, with transparency and exchanges of information potentially being restricted.

The regulatory body should incorporate provisions for maintaining a healthy safety culture in its management system. When relevant, the safety culture of the regulatory body including its technical support organisation(s) or authorised organisation(s) should be such that the organisational values are shared and that safety priorities are consistent.

d) Maintaining regulatory competence

Since the oversight of the regulatory body covers many subjects, it is critical that the regulatory body develop and maintain its technical independence by ensuring that its staff are fully competent in all relevant technical areas. Moreover, new regulatory missions (new technology and facilities, decommissioning, etc.) also lead the regulatory body to hire new staff as it needs new skills. In all cases, new

staff must be trained, be able to gain experience and be integrated into the safety culture of the regulatory body.

A similar situation exists with staff turn-over, with the added challenge of loss of corporate memory, unless knowledge management provisions are in place. As experienced staff retire or leave the regulatory body, knowledge may be lost. The regulatory body may also lack qualified personnel because of general economic conditions in the country or specific political decisions concerning the nuclear programme. The economic situation in a country could lead to budget and staff reductions in the regulatory body that may preclude the regulatory body from assessing all safety relevant issues.

When allocating its internal resources to the various projects and initiatives, the regulatory body should be careful to give the appropriate attention and energy to long-term issues such as spent fuel and radioactive waste management facilities or the remediation of contaminated territories from past nuclear activities. The proper staff should be hired and trained to deal with these questions, and the involvement of the regulatory body needs to be focussed on the long term.

e) Managing an emergency situation

In the case of an emergency situation, the regulatory body has to perform duties that differ from those of normal operations (although the scope will vary according to the country). It should act with a calm, clear vision, and in an appropriate manner.

Co-ordination with all other organisations involved in the emergency management system can be difficult (conflicting priorities, influence of other organisations on staff). Faced with an unusual event, the regulatory body might not react as expected. It might even experience a kind of “regression” in its safety culture as it loses its points of reference. A special team must be ready to respond to an emergency with sufficient means and the appropriate competence and leadership.

5. Conclusions and recommendations

A healthy safety culture is essential to both licensees and regulatory bodies. A regulatory body with a healthy safety culture maintains its focus on safety and makes safety its first priority. When the staff of a regulatory body demonstrate positive behaviours at all levels, it positively influences the behaviour of licensees and enhances the confidence of all stakeholders. The following elements support healthy safety cultures within a regulatory body:

- **Excellence in leadership for safety at all levels of the organisation**: Good leaders, beyond providing the necessary resources and managerial framework, provide excellence in vision, clear direction and engender strong engagement. Through their own behaviour, they demonstrate the importance of prioritising safety above all else.
- **Strong sense of personal accountability for safety**: Everyone takes personal ownership for their actions and decisions so that accountability becomes a fundamental part of the regulatory body's safety culture. This means that individuals within the regulatory body all have a strong sense of accountability for safety and behave accordingly.
- **Formal direction concerning the safety culture**: Staff need to know what is acceptable and what is not. Therefore, a clear statement on corporate policy concerning safety culture in the form of guidance or a code of conduct should be available to all staff. Additionally, staff and management need guidance for day-to-day operations and decision making, in terms of what risk control systems can be implemented, how to effectively control where resources are allocated and how to make decisions. This should be integrated into the organisation's management system.
- **Staff who are aligned and engaged**: A healthy safety culture is supported by staff who know what they are doing and why they are doing it. They are aligned and engaged towards the same safety objective and regulatory mission. This awareness contributes to the development of a respectful environment that supports open, honest and free dialogue and collaboration, while enhancing an overall sense of belonging.
- **Open and transparent communication**: Good communication practices with all stakeholders builds trust and confidence, within and outside an organisation. Such communication should be supported by transparent, clear, available information concerning regulatory activities, including the decision-making process.
- **Informed, balanced accountability**: An informed, balanced accountability system encourages open and honest reporting and respects safety

information. Such a culture is supported by a working environment which promotes a questioning attitude and facilitates the raising of safety concerns by staff, without fear of retaliation, intimidation, harassment or discrimination.

- **A comprehensive and systemic approach to the regulatory environment**: The regulatory environment is a complex and interdependent system which requires a holistic approach to management. Regulatory decisions need to consider the performance and response of the entire system delivering safety, how the different parts of the system are coupled and the direction the system is taking.
- **Clear regulatory framework**: Safety is enhanced when there are clear and appropriate expectations on safety within the regulatory framework, without undue constraints on the system. Regulators should strive to do more than simply establish and ensure that technical standards are implemented; they should focus on how licensees deliver safety objectives and encourage them to constantly strive for higher levels of safety. The framework should reflect the regulators primary mission to actively promote safety among licensees through the appropriate selection of regulatory approaches and practices that foster the licensees' sense of accountability, as well as their active acceptance and discharge of having the primary responsibility for safety.
- **Continuous improvement and learning**: An open, adaptable and learning attitude in the technical, regulatory and organisational disciplines helps avoid complacency by continuously challenging existing conditions and activities. Different strategies can be applied, including arrangements for formal training, implementing best practices, leveraging research and participating in international activities.
- **Self-assessment**: Assessment of the safety culture of the regulatory body supports continuous improvement. However, given the nature of the safety culture and its inter-dependence with other factors, some thought still needs to be given to the development of assessment methodologies and appropriate performance indicators.
- **Benchmarking**: The regulatory body should look outside to ensure consistency with peers, share experiences and support a global safety approach.

Many challenges exist to regulatory bodies' safety culture which must be recognised, understood and overcome. These challenges include: maintaining the focus on safety under constant pressure and scrutiny from stakeholders; considering economic factors and budget limitations; promoting the need to adapt to changing regulatory environments; complacency; attracting and keeping appropriate resources; interfacing with other regulations and regulators; managing abnormal events and emergency situations; and adapting to other evolving and emerging challenges. The application of the principles and attributes outlined in this report could help turn these challenges into opportunities to further strengthen the overall health of the safety culture of regulatory bodies.

6. References

NEA (2015), "CNRA/CSNI/CRPPH Workshop on Challenges and Enhancements to Safety Culture of the Regulatory Body", Paris, 3 June 2015, www.oecd-nea.org/nsd/workshops/scrb2015/.

NEA (2014), *The Characteristics of an Effective Nuclear Regulator*, Regulatory Guidance Report 16, OECD, Paris. www.oecd-nea.org/nsd/pubs/2014/7185-regulator.pdf.

NEA (2006), "State-of–the-Art Report on Systematic Approaches to Safety Management", NEA/CSNI/R(2006)1.

NEA (1999), *The Role of the Regulator in Promoting and Evaluating Safety Culture*, Regulatory Guidance Report 1, OECD, Paris.

IAEA (2007), *Safety Glossary, Terminology Used in Nuclear Safety and Radiation Protection*, IAEA, Vienna, www-pub.iaea.org/MTCD/publications/PDF/Pub1290_web.pdf.

IAEA (1991), *Safety Culture: A report by the International Nuclear Safety Group*, Safety Series No. 75-INSAG-4, IAEA, Vienna, www-pub.iaea.org/MTCD/publications/PDF/Pub882_web.pdf.

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The Safety Culture of an Effective Nuclear Regulatory Body

The fundamental objective of all nuclear safety regulatory bodies is to ensure that activities related to the peaceful use of nuclear energy are carried out in a safe manner within their respective countries. In order to effectively achieve this objective, the nuclear regulatory body requires specific characteristics, one of which is a healthy safety culture.

This regulatory guidance report describes five principles that support the safety culture of an effective nuclear regulatory body. These principles concern leadership for safety, individual responsibility and accountability, co-operation and open communication, a holistic approach, and continuous improvement, learning and self-assessment.

The report also addresses some of the challenges to a regulatory body's safety culture that must be recognised, understood and overcome. It provides a unique resource to countries with existing, mature regulators and can be used for benchmarking as well as for training and developing staff. It will also be useful for new entrant countries in the process of developing and maintaining an effective nuclear safety regulator.

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