



**IRPA**

**INTERNATIONAL RADIATION PROTECTION ASSOCIATION**

# IRPA GUIDING PRINCIPLES FOR ESTABLISHING A RADIATION PROTECTION CULTURE





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FOR ESTABLISHING  
A RADIATION PROTECTION  
CULTURE**

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EXECUTIVE SUMMARY .....	6
<b>1</b> Purpose and scope .....	7
<b>2</b> Introduction .....	8
<b>3</b> Elements and traits of a radiation protection culture .....	9
<b>4</b> Developing a radiation protection culture and criteria of success .....	10
4.1 Evolution of radiation protection culture .....	10
4.2 Culture development and improvement .....	11
<b>5</b> Assessment of radiation protection culture .....	14
<b>6</b> The role of RP professionals .....	16
<b>7</b> Involvement with other stakeholders .....	18
<b>8</b> The role of Associate Societies .....	19
CONCLUSION .....	21
APPENDICES .....	22
<b>Appendix 2</b> Nuclear Regulatory Commission's 9 behavioral elements of a general radiation protection culture ..	22
<b>Appendix 3</b> The IRPA Guiding Principles for Radiation Protection Professionals on Stakeholder Engagement .....	24
<b>Appendix 4</b> Roadmap of IRPA Radiation Protection Culture Guiding Principles .....	25





The purpose of “IRPA Guiding Principles for Establishing a Radiation Protection Culture” is to capture the opinion and standpoint of radiation protection (RP) professionals on the essential components of a radiation protection culture. Developed in an inclusive and consultative approach involving all the stakeholders, this document aims at both fostering a belief in the success of cultural approaches, and providing guidance to help equip radiation protection professionals to promote a successful RP culture in their organisation and workplace. It should help RP practitioners in establishing their own practical guidelines and recommendations, commensurate with their own specific issues and should be owned at the highest management level in organizations.



Embedding RP at a cultural level within an organization is by far the most effective way of delivering the performance to which we all aspire.

The concept of culture relates to the ideas, beliefs and customs that are shared and accepted by people in a society. There are no differences between sectors (medical, nuclear, industry), whereby radiation protection culture can be understood as a combination of habits and knowledge of RP in all its aspects for workers, patients, population and the environment, and in all exposure situations, combining scientific and social dimensions.

There are several possible development stages of radiation protection culture. One such model can be said to include three main developmental stages; basic compliance, self-directed safety

compliance and a behavioral safety system. The objective of any culture development program is to move the organizational and individual behaviors towards the highest stage.

Strong leadership, education and training, establishment of a positive behavior at the working place and proper communication among all practitioners have a definite impact on radiation protection culture. Similarly, learning from events, incidents and near misses is an important part of culture development.

A combination of optimal tools is required to assess the level and quality of radiation protection culture, not only to measure the identified criteria of success, but also to stimulate judgments and observations about positive or negative trends.

RP professionals within an organization must take the central role in supporting management to drive and embed radiation protection culture throughout the organization. In addressing their wider responsibilities, the radiation protection practitioners must be aware that some interaction with wider stakeholders can assist in the development and application of workplace culture.

The IRPA Associate Societies (AS) have a key role in supporting the RP professional who is in the front line in the promotion of RP culture.

Developing a “field culture” in addition to the science, engineering or medical culture is a way to anticipate problems and to obtain the commitment of all employees. Radiation protection culture is a learned way of life.



*IRPA has recognised the importance of establishing a sound radiation protection culture. The objective of this document is both to foster a belief in the success of cultural approaches, and to provide guidance to help equip radiation protection professionals to promote a successful RP culture in their organisation and workplace. This document is an overall policy statement that should help RP practitioners in establishing their own practical guidelines and recommendations, commensurate with their own specific issues.*



The term ‘organisation’ refers to any place where there is work with radiation or decisions impacting radiation exposures are made, encompassing hospitals and medical facilities, nuclear plants, RP regulatory bodies, university and research laboratories, all other users of radiation sources and suppliers of relevant equipment. The purpose of these ‘IRPA Guiding Principles for Establishing a Radiation Protection Culture’ is to capture the opinion and standpoint of RP professionals on the essential components of a radiation protection culture.

At this preliminary stage, it is necessary to establish the difference between the terms “radiation protection culture” and “safety culture”. Depending on the sectors and countries, radiological safety is included either in an overall safety culture or it is a standalone concept. However, there is clearly no opposition between these approaches, where the only difference can be seen through a historical background. For instance, in the nuclear industry, plant safety has always been set as the priority in order to avoid a nuclear accident, which means that the word “safety” currently encompasses industrial, nuclear, radiological and even environmental safety, with a view to contribute to safety overall. Conversely, in the medical sector, radiation protection of both professionals and patients has invariably been put forward as a priority.

Protection focuses on people and behavior (culture) to prevent harm to the worker and others when hazardous equipment is being operated. We need to keep in mind that the hospital sector worldwide is not familiar with the

term “nuclear safety”, which belongs more to the industry, whereas it has a good knowledge of what “radiation protection” means. IRPA being an international body, the target here is to make sure that the RP culture concept is understood and shared by all, without any desire to place both terms in opposition.

Consequently, IRPA has decided to use only the term “radiation protection culture” throughout this document, which will encompass a combination of state-of-the art approaches, including those related to the wider safety culture (such as for instance the approach by the Nuclear Regulatory Commission in the US, or IAEA guidelines).

The decision was made to enhance radiation protection (RP) culture among the RP professionals worldwide because embedding safety and protection at a cultural level within an organization is by far the most effective way of delivering the performance to which we all aspire. As the international voice of radiation protection professionals, IRPA initiated a process which provided a medium for discussion on this topic throughout the world by setting up four working groups (See Appendix 1).

This document is targeted at RP professionals rather than the public at large. The interface between professionals and the public is clearly addressed in these guiding principles in Chapter 7 on stakeholder engagement, but it should also be addressed through RP professionals’ communication to the public and in regulatory requirements.



*At a time of significant developments in the use of ionizing radiation in the medical field as well as in the revival of nuclear industry, the radiation protection profession is facing the challenge of enhancing radiation protection culture throughout the world.*

The generation who developed radiation safety and radiation protection, as applied today, is at a stage in their careers where many are gradually retiring, so it is timely to re-emphasize the importance of RP culture to younger generations. For instance, in the nuclear industry, many nuclear power plants were built around the same time, and the challenge now is to maintain skills. Experience cannot be replaced solely by education and training - the key is in building and sustaining the culture.

Embedding RP at a cultural level within an organization is by far the most effective way of delivering the performance to which we all aspire, in order to:

- give visibility to the fundamentals of RP (science and values),
- promote radiation risk awareness,
- promote shared responsibility among practitioners, operators, management and regulators,
- maintain the RP heritage,
- facilitate its transmission,
- improve the quality and effectiveness of RP.

The RP culture program must impact on all the practitioners who can affect workplace exposure, including RP experts, directors and senior managers, middle level managers and supervisors, the workforce (including contractors), those professionals who work with radiation and, where appropriate, designers and suppliers of equipment. IRPA can only reach this wide audience by working through the RP practitioners and the Associate Societies (AS) – i.e. our members. The RP professionals have to achieve the most difficult of leadership roles – that of indirect leadership of their non-RP colleagues, who in many cases may be their business leaders or managers.







Culture can be considered as a system of endurance of knowledge and expertise, with continuity through education and transfer to the next generation. It is also a combination of conservation and innovation accepted by the group. Based on the IRPA discussions and approved definitions of various types of culture at large in our society, the principal contributions to culture come from three sources: (1) beliefs,

Generally speaking, the concept of culture relates to the ideas, beliefs and customs that are shared and accepted by people in a society. It is also a complex whole, which includes knowledge, belief, art, morals, law, customs, values, symbols, rituals and any other capabilities and habits, acquired by people as members of society that determine appropriate attitudes and behavior.



***Culture is learned, passed on and changed by a pattern of basic assumptions, cultural paradigms, and by groups of people who have shared significant problems, and who have taken in new members. When taught to new members, culture has a stabilizing function, and basic cultural assumptions serve to stabilize a group.***



values, and assumptions of the founders of an organization, (2) learning experiences of group members as the organization evolves, and (3) beliefs, values, and assumptions brought in by new members and leaders. Organizational culture, therefore, is the pattern of basic assumptions invented, discovered or developed by a group who have shared significant problems, solved them, and observed the effects of their solutions. If the solutions have worked well enough, they then are considered valid. Once considered valid, the assumptions are absorbed and accepted by new members as the correct way to perceive, think and feel in relation to those problems, which in turn will contribute to the enrichment of the culture. The longer we live in a given culture and the older the culture, the more it will influence our perceptions, thoughts, and feelings.

We have endeavored to define elements and traits of a radiation protection culture, which encompasses a pattern of knowledge (scientific, technical, ethical, historical, practical...) and behaviors (questioning attitude, personal accountability, integrity, modesty, engagement with stakeholders, openness, and adaptable, transparent, and exemplary behavior). Radiation protection culture is a combination of science, values and ethics (i.e equity), as well as experience. The radiation protection culture principles include the well-established justification, optimization and dose limitation principles, but also include the sharing of competence by training and education.



Ionizing radiation applications can indeed be divided into medical, industrial, and research. However, when it comes to the very principle of radiation protection, there are no differences between sectors (medical, nuclear, industry), whereby radiation protection culture can be understood as a combination of habits and knowledge of RP in all

aspects for workers, patients, populations and the environment, and in all exposure situations, combining scientific and social dimensions. Despite the variety of cultures worldwide, and independently of the specific context and activities considered, all the practitioners involved share common beliefs about the need to care for people and the natural environment. Such beliefs are essential to a sustainable future.

The power of addressing safety at a cultural level within an organisation is widely recognised across many sectors. Many respected international and national organisations and academics have developed models of safety culture, and how to influence it. These models have many common themes and approaches, and it is clear that these common components are broadly applicable across all work sectors, including radiation protection. For example, the US Nuclear Regulatory Commission has identified nine behavioural elements of a general safety culture. The elements are given in the table in Appendix 2, with short notes on their associated behaviors.



#### 4.1 EVOLUTION OF RADIATION PROTECTION CULTURE

There are several possible development stages of radiation protection culture. One such model can be said to include three main developmental stages:

- **Stage 1:**  
Basic compliance system - safety training programs, work conditions, procedures and processes comply with regulations. This is **passive compliance**.
- **Stage 2:**  
Self-directed safety compliance system – workers ensure regulatory compliance and take personal responsibility for training and other regulatory provisions. This emphasizes **active compliance** with the regulations.
- **Stage 3:**  
Behavioral safety system – teaching individuals to scan for hazards, to focus on potential injuries and the safe behavior(s) that can prevent them, and to act safely. This emphasizes **inter-dependence** amongst the workforce – looking after each other's safety

The following table shows a multi-layered approach to the development of a culture, with traits of various types of radiation protection cultures:

Culture Status				
Pathological	Reactive	Calculative	Proactive	Generative
Compliance, but little else	Worry about costs	Focus on current problems	Benchmark and adapt	Benchmark and involve all organizational levels
Audit after accidents	Worry about costs	Regular audits of know hazard areas	Audits are positive & provide help	Continuous informal search for non-obvious issues
No safety planning	Safety planning based on past issues	Emphasis on hazard analysis	Planning is standard practice	Planning based on anticipation of problems and review of process
Training is necessary evil	Training as consequence of accident	Testing of knowledge	Ongoing on-the-job training assessments	Development is a process not an event
Punishment for failure	Disincentives for poor performance	Lip service for positive safety performance	Some rewards for safe behavior	Strong safety performance is in itself rewarding
Employee fired after accident	Accident reports not forwarded	Management goes ballistic when hear of accident	Management disappointed in accident	Top mgmt seen on the floor after an accident to make sure workers okay
Safety costs money	Can afford preventive maintenance	Safety and profitability juggled not balanced	Money counts but safety is right up there	A safe environment makes money

Source : Excerpt from 'Safety and radiation protection culture' - K. Classic, B. Le Guen, K. Kase, R. Vetter, Mayo Clinic, EDF France, International Radiation Protection Association. Adapted from Parker 2006.

The objective of any culture development program is to move the organizational and individual behaviors towards the highest stage.

## 4.2 CULTURE DEVELOPMENT AND IMPROVEMENT

A successful sustained positive radiation protection culture takes a comprehensive effort because the creation of a positive culture encompasses the entire organization, from the top down, and needs to be integrated throughout the organization. These efforts will vary from discovering any problems with your radiation safety program, maintenance of rules and a regulation, testing to make sure education is retained and promoting positive reinforcement. Culture development programs must be designed to fit the particular workplace you are in.

There are at least four ways to impact radiation protection culture:

- Strong leadership focusing on operational radiation protection culture, and modeling, reinforcing and coaching safety behaviors;
- Educating and training the people involved in RP applications;
- Creating positive and total awareness about RP at working places;
- Establishing adequate and proper communication processes among all the practitioners involved in RP applications.

As a general rule, it can be assumed that the usual ways to establish and improve levels of culture include continuous educational processes, access to multimedia (e-learning, applied games, etc.), and effective communication amongst workers, between directors/managers and workers, and between workers, patients and the public. In the field of radiation protection we must be very specific in implementing all the above activities.

The following listings are steps suggested to create, train and sustain a radiation protection program.



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Organizational goals are achieved through leadership by example, with everyone responsible for ensuring that RP is kept at the forefront by:

- making sure that safety is seen as important, not just a word;
- actively participating in quality assurance programs organization-wide (e.g. in the medical field, use of the 'image wisely, image gently' approach), and promoting this participation to the wider community;
- recognizing good radiation practices organization-wide, and making radiation protection culture a part of everyday life from the top down;
- celebrating positive achievements such as positive inspections, no accidents for a time period, and dose decrease over all employees;
- providing for employees to train during work hours, and (when applicable) expecting employees to attend workshops and conferences;
- having no tolerance of poor behavior, and actively supporting radiation safety officials who are trying to do a good job;
- not letting politics influence radiation safety decisions;
- going for clear, concise and sound policies which foster universal compliance with all safety items;
- promoting good health, using correct equipment and properly trained workers;
- emphasizing organizational and worker certifications, advanced degrees and other appropriate professional qualifications and recognition;
- participating in, and training on, referral or appropriateness guidelines/criteria. Promote use of current national or international sources for these guidelines/criteria (ACR, IRQN, NIRS, IAEA, etc.).

By definition, purchasing adequate and appropriate safety equipment is a requirement in all situations.

Within the medical field, there are additional factors to take into account:

- using alternative non-ionizing radiation imaging where practical, especially for children;
- accreditation of all medical equipment – emphasizing to patients that their doses are as low as reasonably or practically achievable;
- reducing radiation exposure for follow-up exams, especially CT;
- promoting weight-based Nuclear Medicine dosing;
- participating in national or international dose registries;
- medical radiation dose or equipment error reporting to national or international incident databases;
- requiring clinical audits from internal and external sources;
- making the most of medical inspections to evaluate the status of radiation protection culture in a given facility (radiotherapy, nuclear medicine, diagnostic x-rays, for instance).

Among the criteria of success, there is also a need for the RP organizations to:

- ensure the presence of effective communication between the personnel and the RP expert, and between the workers and the directors;
- promote and create a positive work environment based on mutual respect, shared understanding and adequate communication among workers and professionals, by creating the conditions for enthusiastic and effective participation in meetings. Where appropriate, such meetings could be open not only to the workers and professionals involved in a RP service, but also to public and other sectors, via for instance,

Local Information Commissions that are held in the vicinity of nuclear power plants, or in awareness campaigns regarding medical exposure and lower doses in radiology (e.g. Image Gently / Image Wisely in the US);

- create the conditions for the professionals to apply the Guiding Principles for Stakeholder Engagement;
- offer access of all RP results to the public, for instance via various websites, for better involvement of the community in radiation safety;
- develop better capabilities and methodologies to listen to and assess public concern;
- collect and take into account requests and suggestions emerging during such meetings, and collecting and elaborating 'level of satisfaction' forms;
- pay particular attention to the application of, and compliance with, the IRPA Code of Ethics by professionals;
- encourage RP professionals, directors/managers and workers to ask for help when confronted with new or unfamiliar RP situations;
- provide a systematic feedback of experience through a system for decision making review, and a procedure of error and near misses communication, reviewing it on a regular basis and encouraging workers to examine the cases without fear of reprisal;
- give specific training to improve how, collectively and individually, professionals improve their communication with interested parties and the public, by both listening and providing information;
- have a common/national language used in oral and written communication, including all operating instructions and procedures.



There are, however, some inherent challenges in the development of radiation protection culture. Amongst other things, these issues relate to:

- the level of consciousness that we are dealing or working with a physical agent that could be dangerous for oneself and the others;
- the level of information and understanding about the harm of ionizing radiation;
- the level of knowledge of how low doses can be harmful to the health;
- the level of knowledge of the objectives of the personnel dosimetry system;

Education and training contribute to a high level of RP culture by addressing the above issues, and also by:

- continued proactive updating for professionals and the general staff, on the evolution of scientific knowledge and related judgments of relevance in RP. Such information can be presented by different means, e.g. newsletters, discussions, etc;
- raising an adequate awareness among people directly or indirectly involved in RP.
- making sure that all radiological aspects are well known to workers, and everybody has the correct training to take care, prevent unnecessary exposure and evaluate RP aspects;
- emphasizing that radiation protection culture is not an established area of knowledge, but one of continuous change and update, not only in its contents, but also in its approaches.

Training is undertaken and updated periodically, and testing is done to evaluate training efficacy.

Learning from events, incidents and near misses is an important part of culture development. Problems need to be prioritized according to

significance: patient, public and personnel safety take priority. When identifying root causes for all problems, feedback must be sought from all parties, and results given to all parties. The pace of retraining should be based on problem severity, and lessons learned are used for future training. There should also be an expectation for employees to take ownership of problems and help with the solution, through their pride in the organization. Workers must be included in problem-solving sessions and asked for suggestions on how to address these problems. Workers may also be asked to help train others, which will promote individual expertise.

Incentives for safe behaviors can be inexpensive and should be considered, based on individuals or groups, and should follow clear rules. Rewards should be granted immediately after good practice is noticed or identified, for instance by setting initial modest dose reduction goals (usually an easy win). This implies tracking radiation exposure and rewarding people who achieve goals.

In their duty to communicate to the public, either through regulatory requirements or through demands by the community, it is in the radiation protection practitioners' interest to factor in the results of major periodic surveys (for instance by national organizations) on the perception of risks, including those of radiation, by the community, and to adjust their communication accordingly.





*This section focuses on the identification of the best and optimal tools required and needed to assess the level and quality of radiation protection culture within an organization. The criteria identified in Section 4 are the elements to be assessed, in order to identify issues and problems opposing the improvement in radiation protection culture, or just to measure the level of radiation protection culture in a given situation.*

The assessment tools of radiation protection culture can be done in several ways, using a combination of quantitative and qualitative tools, so as to not only measure the identified criteria of success, but also to stimulate judgments and observations about positive or negative trends, or even to modify them with a view to determining trends and improvements or negative drifts in radiation protection culture. By considering the areas of use of RP and the ways of impacting radiation protection culture as described above, a list of different tools can be identified as the correct and proper tools to measure and assess the degree of success in establishing and developing radiation protection culture.

The organization's safety tracking arrangements require quality assurance through internal radiation safety audits, wider inspections and audits, and mandatory periodic equipment tests held to industry standards, all performed by competent individuals. Analysis is made of all radiation incidents (including spills, wrong injections, wrong patients, dosimetry outcomes), and the results of all audits performed periodically should be accessible to all personnel. Self-identification and external identification of issues has to be immediate, accurate and fully detailed, with all information available to affected areas. Deficiencies should be addressed quickly, and external vs. internal identification of issues trended at specific intervals. Repetitive problems and the percentage of external issues should be identified on a regular basis. An RP culture

assessment program could for instance provide for the following at local level:

- A formalized procedure to ensure that the workers know the principles of RP at the time of appointment to their role. The number of workers following initial training in RP can be a measurable indicator;
- Check if there is an established internal procedure for refreshing and for updating courses and training provided to workers and professionals. The number of trainees, and their active participation as indicated by suggestions, critical assessment and opinion, can be seen as tools to assess the level of radiation protection culture;
- Formally entrust the position of the RP expert (RSO or equivalent) with the responsibility to teach and refresh theoretical and practical knowledge and RP related duties, and to periodically assess the effectiveness of training;
- Formalized routine questionnaires or self-assessments to evaluate the workers' radiation protection culture;
- In the medical field, random checks via questionnaires filled in by the patients about radiation protection culture;
- Integrate face to face interviews with RP workers and professionals into the education and training process, and as a means to evaluate their actual understanding and to collect their suggestions and opinions;
- Formalized method to capture (beside the training and courses cases), analyze and where appropriate implement suggestions and ideas coming from workers (e.g. conventional suggestion box or discussion fora);
- Check for the existence of a blame-free policy to report and track errors and near misses in an open and constructive way. In case such an approach is not already in place, it should be implemented with the support of an external independent auditor.



Lastly, at the level of third parties involved in the supply of RP equipment, the following tools can be applied:

- Measure the level of radiation protection culture among vendors of ionizing radiation facilities for nuclear medicine, radiotherapy, diagnostic imaging or industrial applications. It is essential to ensure that facilities are designed under the conditions of radiation protection culture. This point may imply the involvement of a regulatory body;
- Establish a procedure requiring that vendors of ionizing radiation facilities or service providers in this area (maintenance, transportation of sources and other

third-party services) should undergo an external independent audit to establish the existence of an appropriate level of radiation protection culture among the staff directly involved;

- Review relevant documents in order to provide information on the level of radiation protection culture.

The assessment tools presented and listed above can be considered for general use and, when applicable, extended to other conditions and situations.

Some further possible assessment tools for application at national level are given in Section 8.







*RP professionals within an organization must take the central role in supporting management to drive and embed radiation protection culture throughout the organization. The development of radiation protection culture must take its place alongside other aspects of safety culture relevant to that organization, but since there is a common basis across all safety culture aspects there should be good intrinsic alignment. Where existing safety or radiation protection culture improvement programs are taking place, the RP professional should seek to ensure that they adequately embrace the RP aspects identified in this guide.*

The RP professional should identify the main stakeholders who need to be involved in the improvement program. Key stakeholders which should be considered (depending on context and workplace) include:

- The workforce (at all levels)
- Senior managers and Directors
- Contractors
- Equipment manufacturers, vendors and suppliers
- Regulators and other authorities
- Medical and health professionals, especially but not exclusively those who are using ionizing radiation,
- Functional leaders and risk managers
- Patients

It is widely recognized that radiation protection culture improvement is heavily dependent on the support and leadership behavior of managers at the highest level within an organization. Ensuring involvement at this level should be high on the RP professional's agenda. Securing inclusion and collaboration across all players will help achieve success. In pursuit of this, the RP professional will need to:

- Display strong personal leadership and motivation
- Develop a narrative on radiation protection in all exposure situations
- Develop relationships with management, the workforce and the regulators
- Consider following the NRC-style approach to develop a policy statement on radiation protection culture (see Appendix 2).

In 2008 IRPA issued Guiding Principles for Radiation Protection Professionals on Stakeholder Involvement which comprises 10 principles (see Appendix 3). From these, principles number 2-5 and 7-9 are especially relevant for the purpose of stakeholder involvement with regard to promulgating radiation protection culture. Those who are engaged in the radiation protection culture process should be aware of this IRPA guidance.

To be successful with the process of developing radiation protection culture and the involvement of the stakeholders, the following points must be taken into account:

- exhibit accountability,
- recognize the purpose of stakeholder involvement,
- understand stakeholder issues and concerns from the beginning,
- build trust,
- practice openness and transparency,
- recognize the evolving role of, and methods for, stakeholder involvement.



In a positive radiation protection culture, employees not only feel responsible for their own radiation protection, they feel responsible for their peers' safety, and the organizational culture supports them acting on that responsibility.

To lead the development of radiation protection culture the RP professional must develop a program to address the following items:

- strategy for implementation,
- an implementation plan,
- define tools and resources and process ownership,
- periodic evaluation and adjustment of the plan.

In the medical sector, the influence of RP professionals is indicated by the increasing consideration for 'image-gently' and 'image-wisely' equipment, compared to the facilities installed a couple of decades ago. Here again, it shows that as early as the design stage, RP must be factored in, for the overall benefit of the patients

and radiation protection culture. Thanks to this positive cooperation with vendors, the exposures from state-of-the art computed tomography scanners (CT scans) have decreased by a factor of 10 over the last 20 years and currently expose patients to a dose below 1 mSv, (for example, using new techniques based on iterative reconstruction or changes in image reconstruction based on optimized algorithms and high-performance computing power)

The goal of the strategy is quite clear - to achieve a positive development of radiation protection culture among all involved parties. However, this general goal has to be underlined by more concrete objectives such as coming up with a definition of radiation protection culture in a way that all people can easily understand.



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*It has become increasingly apparent that it is necessary to enhance public understanding and awareness of radiation risks and protection. The regulatory evolution on transparency (particularly in the nuclear industry), and the communities' expectation of lower radiation risk in the medical sector, have contributed to this awareness, and this is becoming a normal part of the radiation protection practitioners' role.*

In addressing their wider responsibilities, the radiation protection practitioners must be aware that some interaction with wider stakeholders can assist in the development and application of workplace culture. For example, obtaining the confidence and support of stakeholders identified below can help to develop a pride in the workplace, and hence assist in embedding an effective radiation protection culture.

In this case, the wider interested parties are normally all those that are involved in nuclear and radiation affairs, including:

- authorities of different levels, regulatory bodies, competent authorities for special fields of application of ionizing radiation,
- local or national politicians,
- news media,
- academics/researchers,
- citizens,
- special and public interest groups, consumer groups, other non-governmental groups,
- informal opinion makers.

In the medical field special attention should be given to patients, who are members of the

public but who have a close involvement in the radiation practice. Action to engage, explain and obtain informed consent for patients is crucial to a full radiation protection culture in this sector.





*The IRPA Associate Societies (AS) have a key role in supporting the RP professional who is in the front line in the promotion of RP culture. RP professionals have traditionally been focussed on technical and procedural issues, and are not necessarily well equipped with the 'soft skills' necessary to act as a 'change agent' for leading a culture change programme.*

Hence the roles of the AS could include:

- Helping to make RP professionals familiar with the idea of promoting RP culture, by organizing lectures or courses, elaboration and distribution of leaflets and other explaining material;
- Fostering cooperation between the IRPA AS, and exchanging experience of their national implementation of RP culture development;
- Promoting joint information and exchange meetings with all players (operators, regulators, decision-makers, etc.), sharing respective points of view and experiences;
- Giving visibility to the IRPA RP culture initiative (meetings, media, web site, etc), and in particular assisting in the adaptation of the generic guidance so that it aligns with national cultural characteristics;
- Having the various RP associations/ organizations in the country involved at different levels and in different fields (medicine, industry, environment...) to contribute to the creation of one central national contact point to disseminate and share information at national level on experiences in RP culture development;
- Taking the opportunity to encourage participation, and to provide an environment that promotes dialogue, and disseminates information among its members;
- Developing guidance on the type of education and training appropriate for non-RP specialists who need to be engaged on RP culture improvement (eg senior managers, non-RP medical staff etc);
- Disseminating information on the latest developments, strategies and future direction for effective RP;
- Holding public events and meetings with capabilities to attract the public;
- Conducting surveys:
  - At national level for professionals and directly involved people;
  - A program to identify numbers, types and activities of the different professional associations, and to collect the specific activities performed for RP culture improvement;
  - The creation of a single web or multimedia point of contact in common with all the different associations with the aim of developing RP culture among professionals;
  - Taking the opportunity of an application by an individual or a company for membership in an association to conduct a survey on RP culture-related features;
  - Annual survey on numbers and types of training organized at national level on RP culture by the associations or by professionals;
  - A specific questionnaire on knowledge and comprehension of the RP ethical code, to be distributed by the associations among their subscribers.



Each AS could prepare an Action Plan for the implementation of its RP culture programme. This plan corresponds basically with the road map for the IRPA Guiding Principles (see Appendix 4), but it has to be elaborated in more detail by the IRPA AS with respect to local application. The culture is always regional or national, and this has to be reflected through the IRPA AS. There are many ways of bringing RP culture to the RP professionals, and they will differ among the societies. Each society will find its own best suited way, which will also depend of the resources available.

Finally there could be an evaluation of the whole process of the development of RP culture and possibly an adaption or amendment of the implementation plan.

It is important to take into account that the implementation process will take some time. Motivation of society members may be necessary through strong leadership. Also the sharing of positive initiatives and best practices on RP culture for the benefit of all AS could become important: the IRPA congresses should be an ideal platform for exchanges on this topic in the next years or even decades.





Following a process as developed in these Guiding Principles, all persons involved in working with radiation can be directed towards an improved operational focus and, more specifically, to an enhanced engagement on reliability, human performance and organizational effectiveness. This will lead to the development of a “field culture” in addition to the “science, engineering or medical culture”, to anticipate problems and to obtain the commitment of all employees. Radiation protection culture is a learned way of life. It must be an ongoing dialogue among safety professionals, organizational management and the workforce, and between the organization and all relevant stakeholders. Managers and radiation protection professionals play a key role through their presence in the field to coach workers and focus all staff on the operational radiation protection culture.



## THE US NUCLEAR REGULATORY COMMISSION'S SAFETY CULTURE POLICY STATEMENT, INCLUDING NINE BEHAVIORAL ELEMENTS RELEVANT TO A GENERAL RADIATION PROTECTION CULTURE.

The following text is shown as an example of a high level policy statement on safety culture developed by an organization, in this case by the US Nuclear Regulatory Commission. It includes nine behavioral elements relevant to a general radiation protection culture. The nine elements are given in the Table with short notes on their associated behaviors.

IRPA believes that it is helpful for organizations to develop, at the highest level, their own policy statement relating to radiation protection culture, either directly in its own right or as an explicit part of a policy on wider safety culture. Such a statement should be developed in an inclusive and consultative approach involving all the actors, but should be owned at the highest management level of the organization.

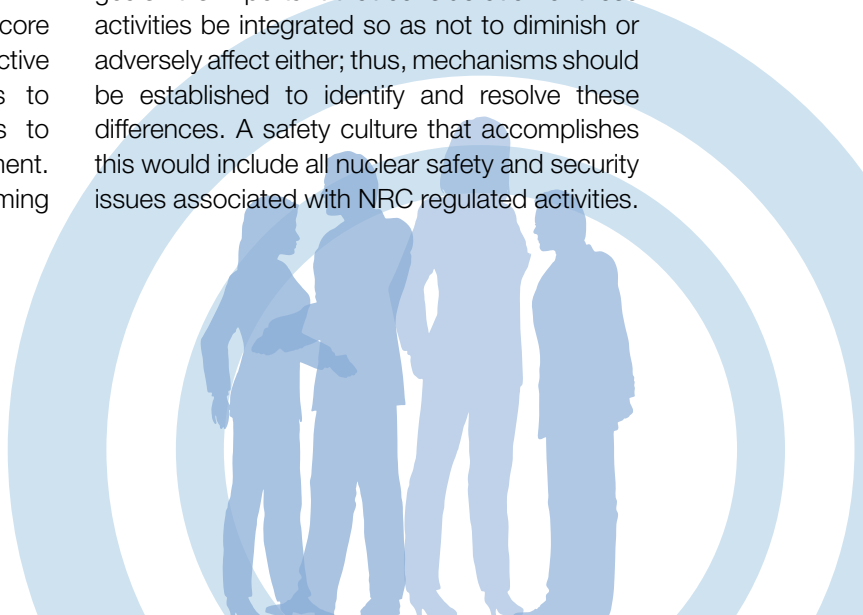
### US NUCLEAR REGULATORY COMMISSION STATEMENT OF POLICY ON SAFETY CULTURE

The purpose of this Statement of Policy is to set forth the Commission's expectation that individuals and organizations establish and maintain a positive safety culture commensurate with the safety and security significance of their activities and the nature and complexity of their organizations and functions. This includes all licensees, certificate holders, permit holders, authorization holders, holders of quality assurance program approvals, vendors and suppliers of safety-related components, and applicants for a license, certificate, permit, authorization, or quality assurance program approval, subject to NRC authority. The Commission encourages the Agreement States, Agreement State licensees and other organizations interested in nuclear safety to support the development and maintenance of a positive safety culture, as articulated in this Statement of Policy.

Nuclear Safety Culture is defined as the core values and behaviors resulting from a collective commitment by leaders and individuals to emphasize safety over competing goals to ensure protection of people and the environment. Individuals and organizations performing

regulated activities bear the primary responsibility for safety and security. The performance of individuals and organizations can be monitored and trended and, therefore, may be used to determine compliance with requirements and commitments and may serve as an indicator of possible problem areas in an organization's safety culture. The NRC will not monitor or trend values. These will be the organization's responsibility as part of its safety culture program.

Organizations should ensure that personnel in the safety and security sectors have an appreciation for the importance of each, emphasizing the need for integration and balance to achieve both safety and security in their activities. Safety and security activities are closely intertwined. While many safety and security activities complement each other, there may be instances in which safety and security interests create competing goals. It is important that consideration of these activities be integrated so as not to diminish or adversely affect either; thus, mechanisms should be established to identify and resolve these differences. A safety culture that accomplishes this would include all nuclear safety and security issues associated with NRC regulated activities.





Leadership Safety Values and Actions	Problem Identification and Resolution	Personal Accountability
Leaders demonstrate commitment to safety in their decisions and behaviors.	Issues potentially impacting safety are promptly identified, evaluated, and addressed and corrected commensurate with their significance.	All individuals take personal responsibility for radiation protection.
Work Processes	Continuous Learning	Environment for Raising Concerns
Planning and controlling work activities is implemented so safety is maintained or enhanced	Opportunities to learn safety methodologies are sought out and implemented.	Personnel feel free to raise safety concerns without fear of retaliation, intimidation, harassment or discrimination.
Effective communication on radiation protection	Respectful Work Environment	Questioning Attitude
Communications focus on safety.  It is important to establish a common language for the work setting, taking into account the practice and the geographic area in which the practice is located.	Trust and respect permeate the organization.	Individuals continually challenge existing conditions and activities so discrepancies that might result in error or inappropriate action are identified.

There may be traits not included in this Statement of Policy that are also important in a positive safety culture. It should be noted that these traits were not developed to be used for inspection purposes.

It is the Commission's expectation that all individuals and organizations, performing or overseeing regulated activities involving nuclear materials, should take the necessary steps to

promote a positive safety culture by fostering these traits as they apply to their organizational environments. The Commission recognizes the diversity of these organizations and acknowledges that some organizations have already spent significant time and resources in the development of a positive safety culture. The Commission will take this into consideration as the regulated community addresses the Statement of Policy.



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## RADIOLOGICAL PROTECTION PROFESSIONALS SHOULD ENDEAVOR TO:

- 1 Identify opportunities for engagement and ensure the level of engagement is proportional to the nature of the radiation protection issues and their context.
- 2 Initiate the process as early as possible, and develop a sustainable implementation plan.
- 3 Enable an open, inclusive and transparent stakeholder engagement process.
- 4 Seek out and involve relevant stakeholders and experts.
- 5 Ensure that the roles and responsibilities of all participants, and the rules for cooperation are clearly defined.
- 6 Collectively develop objectives for the stakeholder engagement process, based on a shared understanding of issues and boundaries.
- 7 Develop a culture which values a shared language and understanding, and favors collective learning.
- 8 Respect and value the expression of different perspectives.
- 9 Ensure a regular feedback mechanism is in place to inform and improve current and future stakeholder engagement processes.
- 10 Apply the IRPA Code of Ethics in their actions within these processes to the best of their knowledge.



