

Evolving roles and responsibilities in radiological protection

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One of the only truly consistent things in life is the knowledge that things will continue to change. In the area of radiological protection, change is not always fast, and it is not always deep, but it has clearly been present over the past 10 to 20 years. These changes will all have more or less profound effects on the roles and responsibilities of the radiological protection profession. This article presents an initial analysis of these changes, with a view to helping those concerned be better prepared to meet the challenges that may arise.

Society's approaches to protection against ionising radiation have significantly evolved over the past decades. Historically, radiological protection was introduced before the Second World War by the medical community seeking to protect itself and its researchers from the harmful, deterministic effects of ionising radiation, based on the possibility of genetic effects identified in fruit flies. In the years that followed, attention shifted, as a result of Manhattan project atomic weapons research, from medical aspects to the physical description of energy transfer and absorption, and to increasingly sensitive detection of all types of radiation. Early norms for radiation exposure were developed, with deterministic effects being the key focus. However, after the explosions at Hiroshima and Nagasaki, the

cancer-causing potential of exposure to ionising radiation was highlighted, and this has become increasingly central to radiological protection concerns. Over all these periods, knowledge of radiation risk has increased, through both biological and epidemiological studies. Considerable uncertainty remains nevertheless.

Since the social upheavals of the 1960s, the barriers that once surrounded risk assessment and management decisions and decision-making processes, in all areas involving decisions regarding risk management, have increasingly been disappearing. The days when well-meaning public officials and technical bureau-

crats could, to the best of their judgement, make public-protection decisions in isolation are gone. Today, many groups and individuals wish to be involved, at various levels of participatory democracy, in discussions and decisions affecting public health and environmental protection. Individual members of the public subject to particular risks, local and national groups and associations (often called non-governmental organisations, or NGOs), and even federal, state and local government offices not directly responsible for decisions often feel that their views should be taken into account during any public decision-making process, and that their concerns need to be addressed. These individuals and groups, as well as the responsible regulatory authorities, along with the risk-causing facility/process operator when applicable, have come to be known collectively as stakeholders. Stakeholder involvement in decision-framing and decision-making processes involving any and all public, worker and environmental risks is increasingly common in today's world. Stakeholders question the role of science and authorities in risk decision

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Radiological protection has evolved significantly over the past 20 years. Shown above, dose assessments in 1980 (left) and 2000 (right).

making, and demand accountability in decisions regarding the management of risks.

This growing interest in risk-related decisions reflects many different aspects of social and scientific evolution. For example, the media, and the current information-oriented society in general, have made information on risks much more available to everyone. At the same time, the technological promises of post-World War II advances have often not lived up to initial claims, breeding some scepticism of science and public institutions. With this has come the growing realisation that science is only part of “the truth” with respect to judgemental decisions affecting such things as “safety”, “security” and “the environment”. Increasingly, social values emerge as significantly more influential than scientific fact with respect to such decisions. This, in tandem with technology and the availability of information, have made it possible for an individual to manage her or his own risks much more actively.

Many other structural and social changes have also contributed to shaping modern

radiological protection, including:

- The world has become much more of a “global entity”, thus requiring global, social harmonisation in a broad sense. At the same time, cultural and regional specificities must be recognised, such that it is clear that there is no single “risk rationale” to dealing with risks, and there is no inherent social contradiction if the management of risk is not approached everywhere in a comparable or “equal” fashion, particularly in terms of stakeholder concerns and resource allocations.
- Even as global issues become more widely recognised, there is a trend that local contexts are increasingly important to decisions involving radiological risks. Thus policies, regulations and applications are seen through a hierarchical prism, in such a way that, because of local specificities, aspects at the international level can be subsidiary to those at the national level, which can in turn be subsidiary to local aspects.

- The notions of sustainability and intergenerational awareness have introduced a much longer view in any planning discussions. This is particularly relevant in terms of what is meant by “progress”, and with respect to the “margin” within which work can or should take place, the objectives for projects, and the expected speed of projects.
- Environmentalism has continued to grow, to the point where increasingly, and at many levels, there is a link between good public health and a healthy environment. Much of the public demand for a clean environment is thus formulated on the basis of good public health. These notions, both as social values and as scientific facts, are central to many of today’s decisions and decision-making processes.
- There is a growing view that although radiological protection has for some time been fairly independent, it should rather be considered within the broader sphere of public health. In this context, the assessment and management of radiological risks are, as with environmental protection, reformulated to be addressed together with many other risks and issues and to achieve good public health in a balanced fashion.

Changing roles and responsibilities of radiation protection professionals

The slowly evolving social changes described above have formed a new picture of the role of radiological protection, the key to this new outlook being the relationship between “judgement” and “science” as applied to a particular circumstance. In this context, radiological protection (RP) can be seen in a new light.

The RP professional has always been, and continues to be, focused on the scientific aspects of a particular situation being considered, in order to select the “best” public, worker and environmental protection options. This can be characterised schematically as evaluating the identified radiological risks, and optimising protection to reduce risks. However, what was once a rather quantitative, numerically driven assessment of costs (e.g. of implementing protection options, of addressing health risks from any residual doses, etc.) and benefits (e.g. of saved health costs due to dose reductions), has become in some circumstances a more nuanced, qualitative assessment of the overall risks and benefits of the dose-causing activity (or dose-reducing activity in the case of existing or accident-related exposures). This can include:

- a careful categorisation of risks and benefits, attributed as a function of various characteristics: for example the age, sex, geographic location and exposure time frame of the relevant population;
- the “identification” and “highlighting” of judgemental aspects of the assessment such as the selection of critical group habits and characteristics, the use of numerical screening or boundary values in selecting options, the selection of exposure scenarios, and the selection of weighting values, if any, for various parameters.

In this context, the focus of the RP specialist is the use of radiation protection science, at its highest levels, for clarifying the results, implications and nuances of various protection options. The identification of the “best” protection option, which will be recommended to the “decider” as the preferred solution, will clearly be very judgemental in nature. For this

identification, the RP professional will, of course, use personal judgement. However, the judgements of the other relevant stakeholders (e.g. the exposed groups, non-decisional government offices, etc.) will equally be important. Their concerns (such as doses to children, doses to future generations, property values and policy ramifications) will in many cases be those that ultimately drive the risk and benefit assessment. Their judgements (of their benefits, of the various assessment parameters chosen, of the acceptability of any residual risks) will more than likely be those that are most highly considered by the decider in making the final decision.

This characterisation of the role of the RP professional may seem to represent a loss of responsibility in comparison to the more traditional model in which the decider relied much more directly upon the judgement of the RP professional. This new view, however, is far more challenging in the sense that the RP professional must not only bring state-of-the-art RP science to bear on the question, but must also present results in a fashion that is understandable and relevant to the stakeholders and the situation at hand. So rather than this being viewed as a loss of responsibility, it can be viewed as a broadening of responsibility, in that a wider group than just the decider will rely upon the work and judgement of the RP professional.

The refocusing of the role of the RP professional can be seen as the practical application of the theoretical distinction between the role of the decider and the role of the RP specialist. There is a clear process boundary between the decider, who is a government official or a corporate officer legally or contractually responsible for making a decision,

and those providing information for the decision-making process. As discussed previously, decisions are inherently judgemental, but will be based, at least in part, on input from radiological protection specialists. In this context, the role of the RP specialist is then to provide the decider, and stakeholders, with relevant scientific information such as:

- assessments of absolute and relative levels of risk;
- uncertainty assessments;
- sensitivity analyses based on stakeholder-specified parameters;
- assessments of the effects of various RP options.

In many cases, the decider may well be an RP specialist. However, by separating the function of assessment from the function of deciding, the judgemental nature of many of the decision elements in the process will be much more transparently expressed. This will facilitate making any necessary assessment iterations by appropriately identifying the elements that could be modified to yield results that are more relevant to stakeholders.

A particular challenge that this evolution poses to the RP specialist concerns education and training. Traditional engineering and RP science training has focused on technical aspects, yet RP specialists are increasingly being called upon to interact and communicate with diverse stakeholder groups, and to be able to provide technical information to these groups in forms and formats that address stakeholder needs and concerns. Although it will clearly not be necessary to train RP specialists to be “public relations experts”, it is important that they be trained to communicate in both technical and non-technical manners such that their essential messages can be correctly assimilated in decision-making processes.

Development of radiological protection principles and policies

Beyond the clarifying effects that social changes have had on the roles and responsibilities of RP professionals, they have also had profound effects on the way that radiological protection principles are developed, interpreted and reflected in regulation and practice.

Throughout the 20th century, radiological protection principles have been developed by RP professionals, and these principles have been accepted by virtually all governments worldwide. The notion of stakeholder involvement, and of pluralism in decision making, is increasingly important, and may significantly modify the process for the development of these principles. Given the discussion of context in decision making, “prevailing circumstances” may well lead to local decisions. Such flexibility is necessary, but some level of international harmonisation is also needed to the extent that we live in an open world. The balance between international harmony and local specificity must therefore be a central issue in the future development of radiological protection principles.

The question of roles and responsibilities should be viewed in the broader context of an evolving view of international harmonisation in radiological protection. The justification of exposure-causing activities (and the optimisation of protection and restriction of exposure that go along with these activities) is seen in the context of social choices (including, but not limited to, scientific input), which are inherently focused on the situation at hand.

Until the latest discussion of new ICRP recommendations

began in 1999, when the ICRP Chair published a paper discussing “Controllable Dose”, the ICRP process of developing recommendations was exceptionally closed. This reflected the previous reality of radiation protection being solely seen as “good science”, rather than the emerging view of radiation protection as a social judgement informed by good scientific knowledge.

Since the opening of discussions on the new ICRP recommendations, however, the process has significantly changed, in what will most likely be an irreversible fashion. Draft materials are developed by the ICRP, but these are then broadly discussed with various stakeholder groups. Comments are received, and new recommendations are developed taking these into account.

It should be recalled that the recommendations of the ICRP have always required much interpretation in order to transform them into international standards and national regulations. The discussion of draft recommendations, embodied in the new process of recommendation development, will hopefully result in final ICRP recommendations that are more easily translated into practical application in standards and regulations.

But the ICRP is only one of the key stakeholders in radiological protection. The roles and responsibilities of various organisations are essential in the development of scientifically sound, easily applicable approaches to radiological protection. Although the details of roles and responsibilities tend to evolve over time, it appears that for the coming years the key international organisations will play the following roles:

- UNSCEAR: collection and scientific assessment of radiological health risks;

- ICRP: development of RP principles, and consolidation of understanding;
- NEA: development of forward-looking views, input to principle development, interpretation and understanding of key principles for application;
- EC: translation of consensus into EC laws;
- IAEA: globalisation of principles, translation of consensus into world standards;
- WHO/FAO: examination of the RP aspects of public health standards;
- IRPA: diffusion of information (top-down), collection of views from RP professionals (bottom-up).

The role of the CRPPH

The NEA Committee on Radiation Protection and Public Health (CRPPH) has been actively involved in the discussion and development of radiological protection principles, practices and consensus. Within the evolving processes that have previously been discussed, the CRPPH remains a unique resource, with many characteristics and qualities of value to its member countries. Looking both forward and back, those that stand out most significantly include:

- embracing stakeholder dialogue;
- assessing the implications of radiological protection science;
- developing key tools;
- partnering with the ICRP.

While not fully characterising the qualities and work of the CRPPH, these attributes broadly describe the platform from which the Committee will continue its efforts. Its forward-looking, brainstorming approach will continue to evolve to best meet the needs of its members, to serve the radiological protection community, and to help to improve public, worker and environmental health. ■