

Radiation Protection

Policy Issues in Radiological Protection Decision Making

Summary of the 2nd Villigen Workshop

NUCLEAR ENERGY AGENCY
ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

ORGANISATION DE COOPÉRATION ET DE DÉVELOPPEMENT ÉCONOMIQUES

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FOREWORD

Contemporary society has become increasingly interested in participating in public decision making on health, safety and environmental protection issues. As governments have tried to better understand society's interests, and to better integrate societal needs in decision-making processes, it has become possible to begin identifying common policy issues and lessons.

Trends in the nuclear industry mirror those observed for broader governance questions, and public interest in some issues can be extremely high. Within the radiological protection community, these stakeholder issues have moved steadily to the forefront of policy discussions, and clearly form key elements in decisions regarding the development and implementation of radiological protection policy.

Results stemming from the work of the NEA Committee on Radiation Protection and Public Health (CRPPH) on the details and implications of stakeholder involvement in radiological protection decision-making processes have been reported in the Committee's 1994 Collective Opinion *Radiation Protection Today and Tomorrow*, the proceedings of the workshop held in Villigen, Switzerland, in January 1998 on *Societal Aspects of Decision Making in Complex Radiological Situations*, and the proceedings of a second workshop held in January 2001, also in Villigen, on *Better Integration of Radiation Protection in Modern Society*.

Based on this experience, and specifically on the results of the 2nd Villigen Workshop, Dr. John Paterson prepared for the CRPPH this summary of policy-level experience and lessons in radiological protection decision making. It was reviewed and approved by the Committee and is now offered to the international radiological protection community as input to assist governments in better integrating radiological protection into modern society.

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1. INTRODUCTION

The health risks arising from exposure to ionising radiation have been recognised since early in the last century. As sources of such radiation have been identified or developed and scientific knowledge about the nature of the risks has increased, an internationally accepted system of radiation protection has evolved. A characteristic of this system has been its independence from other arrangements designed to ensure the protection of both public health and the environment, e.g., in the field of toxic chemicals. The system historically has been based on a high degree of scientific and technical expertise reflecting the complexity of the issues with which it was designed to cope. As new situations have arisen, the system has been extended, the aim always being to maintain a unified approach capable of dealing with all eventualities. In recent years, however, this approach has increasingly been questioned. From one narrower, technical perspective, it is perceived to have produced a radiation protection system that is now too complex and possibly even incoherent. From a broader, social perspective, this complexity and possible incoherence is a symptom of a wider problem relating to the system's failure adequately to reflect societal concerns and objectives.

Put most simply, there is now less willingness on the part of the public to leave important decisions solely to governments, regulators and industry. The idea that a democratic mandate, renewed perhaps only once every four or five years, is sufficient for public authorities to respond to the wide array of issues that now fall within their ambit is increasingly challenged in the context of a world that is perceived to be more complex, interdependent and rapidly changing than ever before. What holds true for public actors such as governments and regulators applies *a fortiori* to industry whose "mandate" (or "licence to operate") has always presented more problems with regard to concepts such as legitimacy and accountability. In these circumstances, the public's desire to be more closely involved in decision making is increasingly matched by a willingness on the part of public authorities and industry to operate in a more transparent manner and to engage stakeholders in decision-making processes.

This shift is also apparent in the field of radiation protection where a pure reliance on expertise is no longer regarded as sufficient to meet societal expectations. This, however, presents a significant challenge to all of those

involved in the field. Accordingly, recent years have seen ongoing debate within the radiation protection community over how to communicate theory and practice to the wider society, over how to engage it in the process of decision-making, and over how to clarify the role of experts. The framework of the international system of radiation protection has thus already begun to be re-examined with a view to identifying areas where changes and improvements could be made so as to address societal concerns in the current context. This process has already borne fruit and is ongoing. The nuclear industry is of course one area where the weight of societal concerns has been most keenly felt and the industry has responded with a series of initiatives designed to better understand and appropriately address the needs of the range of stakeholders.

The changes that are taking place in different parts of the system of radiation protection can be characterised as an evolution towards a *democratisation of knowledge and of decision-making processes*. In this context, several of the Nuclear Energy Agency (NEA) standing technical committees of the Organisation for Economic Co-operation and Development (OECD) have demonstrated an interest in looking more closely at this evolution. For example, a Working Group of the Committee on Radiation Protection and Public Health (CRPPH) held the First Villigen Workshop on the subject in 1998 (Proceedings published as *The Societal Aspects of Decision Making in Complex Radiological Situations*, OECD/NEA, 1998). The CRPPH Working Group on Risk Management also addressed these issues. In 2000, the Radioactive Waste Management Committee (RWMC) conducted a Forum on Stakeholder Confidence in 2000, and developed an ongoing series of papers and workshops in this area recognising that public involvement is a key aspect to be considered during the development of a safety case for deep geologic disposal of high-level radioactive waste. Finally, the Committee on Nuclear Regulatory Activities (CNRA) held a workshop titled, “Investing in Trust: Nuclear Regulators and the Public”, to investigate the stakeholder aspects of nuclear regulation.

In order to contribute further to this area, focusing on radiation protection situations, a joint workshop (the Second Villigen Workshop) was convened to discuss the range of issues surrounding the evolution towards a democratisation of knowledge and of decision-making processes. The full proceedings of the Workshop are also being published, but this brief report provides an overview of the key themes emerging from the meeting. Beginning with a closer examination of the emerging expectations of society towards risk policies, it then moves on to attempt to provide a more adequate characterisation of the new context of risk governance. The valuable experience that has already been gained in stakeholder involvement in risk assessment and management is then reviewed before tentative conclusions are drawn in the form of the key features of any attempt to achieve a better integration of radiation protection in society.

2. UNDERSTANDING EMERGING SOCIETAL EXPECTATIONS TOWARDS RISK POLICIES

Examples of just how important it is for public authorities and for industry to improve their understanding of the ways in which society's expectations are changing with regard to risk policies are not hard to find. Recent years have seen some very striking instances of the effective failure of traditional risk assessment and management arrangements. Almost the paradigm case is that of the decommissioning of the Brent Spar oil installation by Shell in the UK sector of the North Sea. The facts of this case are well known but it is worth looking more closely at certain aspects that have a particular significance for current concerns. First of all, it is important to remember that the company had fully complied with all the regulatory requirements for the decommissioning of the installation and had received approval from the UK government for its planned deep-water disposal in the North Atlantic. Furthermore, a key aspect of receiving approval was the conduct of a detailed engineering analysis to arrive at the Best Practicable Environmental Option (BPEO). Consultation was a key element of the process – the company had to consult with interested parties while the government had to inform its counterparts under the OSPAR convention.

Notwithstanding the apparent rigour of the regulatory arrangements, when the decision was announced it was greeted with unprecedented criticism from a range of sectors including NGOs, the public at large and other governments. The fact that, ultimately, the original disposal plan was widely accepted to have been the best option available at the time should not serve as a distraction from the key lesson of this case. However effective the existing regulatory arrangements turned out to be in arriving at an environmentally sound disposal plan, those arrangements did not enjoy public confidence. The response of the different actors to this situation is telling. While the UK government insisted on the integrity of the approved disposal plan, Shell, against the government's wishes and to the annoyance of many scientists, delayed abandonment and effectively went back to the drawing board. It commissioned an independent survey of the installation, securing stakeholder agreement for methods in advance and demonstrated that NGO claims about toxic waste were grossly exaggerated. Significantly, however, even before the

results of the survey were known, the company announced a new strategy involving an international engineering competition, an open communications approach and dialogue with stakeholders. In other words, it had recognised that irrespective of the scientific answer to the problem of disposal, the previous regulatory approach had completely failed to take account of public concerns. It also recognised that certain questions did not have a purely scientific answer and that value judgements were involved. The net effect of the exercise, of course, was the recommendation and approval of a new BPEO in the form of quay development in Norway – a plan that enjoyed the support of all stakeholders.

Nor is this by any means an isolated case, for all that it had a particularly high profile. Mention could also be made of concerns in recent years over genetically modified organisms in food, the potential uses of genetic engineering in humans, the siting of mobile telephone masts and, of course, a range of issues relating to the nuclear industry including the disposal of radioactive waste, the causes of leukaemia clusters around nuclear installations and the transport of spent fuel for reprocessing. The challenges facing the nuclear industry have been particularly acute, perhaps not least because of the extent to which early expectations have not been fulfilled. Far from power that is “too cheap to meter”, there is a public perception that they have had foisted upon them an energy source whose downside outweighs any benefits, for example in terms of low CO₂ emissions. The result of this disaffection has been especially severe in countries such as Germany and Sweden where public pressure has resulted in government commitments to abandon nuclear power. And even in countries such as the US and the UK where there has been no such decision, *de facto* moratoria are in place. A representative of the German Environment Ministry at the Workshop admitted candidly that “The history of nuclear energy in Germany ... is also the history of a failed relationship between experts and the public”. Other countries, at least until comparatively recently, would probably have to reach a similar conclusion.

In short, society’s expectations with regard to policy towards risky technologies have changed significantly over the past fifty years, and perhaps most dramatically over the past decade. Arrangements for the development and implementation of such policy may well fit with traditional theories from the disciplines of law, political science and engineering regarding democratic legitimacy, the delegation of power and the role of the expert. They may, however, no longer fit with a policy environment that is considerably more complex than those theories allow. As the cases mentioned above amply demonstrate, the stakes are high for the radiation protection community as it seeks to recognise and accommodate these changed and changing expectations.

3. THE NEW CONTEXT OF RISK GOVERNANCE

The symptoms of changed societal expectations may therefore be quite clear in the form of the crises faced by public authorities and industry when tried and tested regulatory arrangements suddenly appear to lose public confidence. But if progress is to be made towards regaining that trust and confidence and towards the avoidance of serious crises, then a better grasp of the new context of risk governance is required. A number of speakers at the workshop, coming from a range of backgrounds, focused on this issue and characterised the change in terms of a definite *shift* from one state of affairs to another across a variety of dimensions.

- *From the risk denial/catastrophe dichotomy to a more reasoned and realistic understanding of risk.* There are certainly indications that at times the risk denial/catastrophe dichotomy persists. Thousands of deaths annually on the roads pass without general comment while a few deaths in a rail crash provoke a public outcry. In other words, as regards rail travel, the public perception seems to be that there must be total safety and any failure in this regard is seen as a disaster. Generally speaking, however, there is evidence that the public is increasingly aware of the fact that zero risk is not possible and that every decision, whether at the policy or at the personal level, involves a balancing of possible risks and desired rewards. In this context, assurances from experts or regulators that something is safe is now less frequently regarded as an expression of total safety than as an assurance that something is *safe enough*. This of course begs the question of the methods and criteria used to reach that conclusion, and has implications for the policy process as a whole.
- *From an emphasis on risk perception to an emphasis on social trust.* While regulators and experts had, therefore, been focusing on how different *risks* were perceived, whatever the scientific picture, as a means of understanding adverse public reactions, there is now a greater need to focus on the public perception of the *process of making policy about risks*. In other words, it is not a question of

factoring in “irrational” fears but of considering how public trust in the policy process can be fostered.

- *From a top-down approach to risk governance to an approach based on mutual trust.* In practice, this means a shift away from an approach to risk governance that could be characterised as “top-down”, with regulators and experts “announcing” solutions, to one where there is a more *dialogical* process involving much greater openness about assumptions, methods and value judgements.
- *From expert-led to pluralistic decision making.* It could be said that in this new model, experts and regulators no longer decide *for* the public but rather decide *with* them. This can be a difficult and controversial concept to grasp for all concerned, raising as it does issues such as the status of scientific knowledge, access to information, the appropriate role of the expert, and the precise location of responsibility for decision making.
- *From the concept of acceptable risk to that of accepted risk.* As difficult as this new approach seems to be as soon as one moves from the level of theory to the level of practice, the gain that may be realised in terms of a shift from *acceptable risk*, where that is ultimately the decision of experts, to a position of *accepted risk*, where there is broad understanding of the risks that must inevitably be run if desired societal rewards are to be achieved, is clear.
- *From a societal (utilitarian or teleological) ethical focus to an individual (deontological) ethical focus.* In other words, the shifts demanded in policy making on risk issues reflect the shift in political philosophy more generally in the past 50 years. A just society is now understood less in terms of a utilitarian calculation of the common good and more in terms of respect for individual rights. Similarly, risk policy must be less about the aggregation of populations and more about considering the position of individuals in specific risk contexts.

There is always a danger, of course, in trying to define the characteristics of something as nebulous and as open to dispute as “the new context of risk governance” of becoming overly technical and academic. Do any of these impressive sounding shifts have any relevance to the real-world day-to-day task of radiation protection? Or are they simply the product of academics and consultants for whom theoretical rigour may be more important than practicality? For one thing, despite lively debate and the passionate expression of a range of views, there was widespread acceptance at the Workshop of a sea

change in societal expectations that could be characterised very much in the terms expressed above. Nor was this a finding that suddenly emerged at the Workshop; reports from the first meeting of the NEA Radioactive Waste Management Committee Forum on Stakeholder Confidence and from the CNRA Investment in Trust Workshop confirmed that this is an understanding that now permeates the radiation protection community. More importantly, in terms of practicality, it is often the nuclear industry and its regulators who have taken steps towards addressing changed societal expectations with innovative approaches to the development of risk policy.

4. EXPERIENCE IN STAKEHOLDER INVOLVEMENT IN RADIOLOGICAL RISK ASSESSMENT AND MANAGEMENT

Given the innovations in addressing changed societal expectations that have been undertaken by a variety of actors in the radiation protection community, a key focus of the Workshop was the opportunity to hear about and discuss experience to date. A unifying theme of the innovative approaches developed is the active involvement of stakeholders, but they cover a wide variety of radiation protection situations and range from society-wide priority setting, through industry-wide openness to societal concerns, to local-level responses to specific problems.

High level

- *Stakeholder involvement and public participation in development of future policy.* An example of the highest-level response is the US Environmental Protection Agency's ongoing project *The Future of Radiation Protection* conducted in conjunction with the Institute for Alternative Futures. This project explores the most important radiation-related challenges that may emerge during the next 25 years and the role of stakeholders in influencing future decisions to meet those challenges. The method adopted was to begin by conducting interviews and small group discussions with over 125 "thought leaders" in the radiation protection community with a view to producing a range of views about possibilities for the future. These views were then synthesised into four scenarios detailing how radiation protection issues might develop, from highly desirable futures to those beset by problems and crises. The scenarios are not intended to be predictions about the future, but rather tools to help people think broadly about radiation protection in the future and about the prospects for improved methods of stakeholder and regulator intervention. The scenarios were then used as a framework for discussion in a number of sessions with participants from industry, science, environmental groups and government agencies concerned with radiation issues. An encouraging result of these

discussions has been the identification of common ground among the different participants through agreement on “principles for guiding action”. The principles (pollution/exposure prevention, public right-to-know, total accounting, risk harmonization/cumulative risk assessment, inclusive science, adaptation of policies to local circumstances, and “stewardship” or taking account of future generations) are seen as offering a common language for communicating with stakeholders about the regulatory decision making process, and the chance to overcome traditional divisions and revitalize the field of radiation protection.

Medium level

- *Stakeholder dialogue.* British Nuclear Fuels plc (BNFL), which is responsible for a range of nuclear facilities in the UK, has for many years operated Local Liaison Committees covering each of its sites. These bring together the company, local political representatives, local government and the regulatory authorities. The committees, which conduct their business in public, are a means of ensuring first hand contact among the stakeholders on areas of mutual interest from employment issues to emergency planning. In 1998, however, the company embarked on a much more ambitious industry-wide exercise, the BNFL Stakeholder Dialogue as a means of informing the company’s environmental decision making. With the assistance of an independent charity, the Environment Council, stakeholder groups including the company, unions, NGOs and all levels of government agreed ground rules and identified issues and concerns to be addressed by the process. A representative Task Group was established to consider the way forward and recommended that the first issue to be addressed should be Waste and Discharges. Groups then discussed this issue, produced Interim Reports and submitted their findings to a plenary meeting of the Main Group. The resulting Reports have been published on the internet and carefully reflect areas of agreement and disagreement. Nor have these been simple paper exercises. They have been utilised by BNFL in compiling inputs into the UK’s National Discharge Strategy and the RWMAC inquiry into the waste management implications of reprocessing operations. A measure of the general satisfaction with the outcome of the initial exercise is the establishment of two further groups to consider the more contentious topics of Spent Fuel Management and Plutonium.

- *Consensus Conference on Radioactive Waste.* In May 1999, 200 delegates attended a four-day UK consensus conference on radioactive waste management organised by the UK Centre for Economic and Environmental Development (UK CEED) and supported by the government, industry and environmental groups. The event brought together a citizens' panel of 15 people, randomly selected to represent a cross-section of the British public, together with the major players in the debate. The aim of a consensus conference is to enhance the policy process by opening a dialogue between the public, experts and politicians. The four-day conference saw the panel cross-examine expert witnesses from organisations such as NIREX, British Nuclear Fuels plc, the Ministry of Defence, Greenpeace and Friends of the Earth in public session. The findings of their investigations were put together in a report containing detailed recommendations for government and industry and presented to the Minister on the final day. The key strength of the consensus conference approach was its ability to contribute the views of *informed citizens* to the policy process. It provided a valuable insight into the way in which issues were framed and prioritised by the public and identified their concerns and the means by which they might be examined and resolved. The process also served to stimulate wider and better-informed public debate. The consensus conference on radioactive waste was a generally acknowledged success and has proved influential in industry and government circles.
- *Stakeholder involvement in emergency preparedness.* Faced with evidence that there is in France a generally low level of understanding of the nature and magnitude of nuclear risks, IPSN has embarked upon an ambitious information project as a foundation for stakeholder involvement in emergency preparedness. Drawing on data from sociological studies and from a "barometer of opinion" exercise, it is developing a CD-ROM that aims to address public concerns and provide information in a clear, comprehensive and understandable manner. The CD-ROM, which will be widely distributed and may in time lead to an internet service, is also motivated by a recognition that such information must be seen to come from credible sources if it is to be accepted. The CD-ROM is, however, only a first step. The information it contains will serve as a support for debate and discussion and help to build a better mutual understanding between experts, public and politicians. The ultimate goal is the progressive development of a common risk culture and the overall improvement of nuclear risk management strategies.

- *Stakeholder pre-involvement in the post accident management of rural areas.* In 1995, the National Radiological Protection Board published an assessment of the applicability of a range of agricultural countermeasures for use in the UK. The study recommended that, for the purposes of contingency planning, a working group should be set up to bring together key groups that would be involved in intervention in rural areas following a nuclear accident. This idea was then taken forward by government and in 1997 the Agriculture and Food Countermeasures Working Group was established. Participation is at a senior level by those involved in making policy decisions. The original membership has now been expanded, and of the 22 representatives, 11 are currently from NGOs. The group has met on five occasions and has successfully addressed all of its terms of reference. In particular, it has established communication links between those organisations that have not previously collectively considered the implications of contamination of the food chain. Further, members of the Group are kept up to date on remediation issues through the distribution by the technical secretariat of recent, relevant published scientific papers, published scientific reports and unpublished state-of-the-art progress reports. The Group has also successfully debated the practicability of a wide range of remediation options and, despite a diversity of opinion, has generally reached a consensus. Crucially, the group continues to accrue a good working knowledge of remediation issues and has been successful in promoting mutual trust and respect between its members. So successful has it been indeed, that its strategies have attracted interest from those dealing with non-nuclear contaminants.

Local level

- *Pluralistic evaluation.* When two studies were published in 1995 and 1997 suggesting an increase in the incidence of leukaemia among children and young adults living near the La Hague nuclear reprocessing plant there was intense local concern. The French government ordered a radiological study and the Nord-Cotentin Radioecology Group (GRNC) was established. This group was innovative in that it was composed not only of experts, both French and foreign, but also of members of NGOs and was set the objective of making the broadest possible systematic critical analysis of the situation. Apart from its multi-disciplinary composition, the group also ensured wide support from the outset by maintaining contact

with the local population in general through the Local Information Commission and with a specific pressure group, the *Mères en colère*, through ongoing direct contact. This contact included, for example, public participation in environmental radioactivity measurements made for the study by a group performing an international inter-comparison exercise. These expert measurement teams were invited to stay with local inhabitants during the work, thus further enhancing trust in the results. After two years of work, the group concluded that the number of cases of leukaemia attributable to all sources of ionising radiation between 1978 and 1996 was less than one. The conclusion was widely accepted, even by the most vociferous local pressure group, because of the credibility the GRNC possessed as a result of its composition and its openness to the public.

- *Opening and operating a nuclear waste disposal facility.* The challenges facing the US Department of Energy's Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico were considerable. As the first facility of its kind and designed for the deep geologic storage of transuranic waste from the country's nuclear weapons programme, public concerns for human and environmental safety were significant. The fact that the WIPP began to receive waste in 1999 is testament to the success of the Department of Energy's efforts in meeting public concerns. That, on its technical merits alone, it could have begun receiving waste as early as 1988 is testament to the patient and inclusive process by which the Department achieved that objective. The precise approach adopted during the past 25 years is detailed and comprehensive, and its key themes include openness, partnership with stakeholders from an early stage, and a willingness to learn from both success and failure. The result has been, in addition to an operational facility, an ongoing increase in public support.
- *Stakeholder involvement in remediation programmes in a uranium mining area.* In 1990, after the political change in East Germany, public concern regarding the radiological legacy of 45 years of uranium mining and milling in a densely populated area led to the launch of a huge remediation programme costing approximately DM13 billion. Half of the remediation programme has now been completed. Since its implementation, the public attitude has changed from one of profound concern about a significant danger to health and a mistrust of all planned activities to one of acceptance of the remediation programme and increased confidence regarding the radiological hazards. While the dramatic change in the political and

socio-economic climate undoubtedly contributed to public acceptance, the remediation project was characterised by the provision of complete information to the public, an open and inclusive approach to decision making and the adaptation of the process to local conditions. The success of this approach has led to its extension into decision making about the post-remediation phase involving further authorities and local representatives.

5. CONCLUSIONS

As the examples cited in the previous section show, there is widespread recognition within the radiation protection community in a range of countries of the need to change the way in which policy is developed and implemented. Whatever terminology may be chosen to describe the shift that has taken place in public expectations and thus the context within which radiation policy must be elaborated, it is evident that this evolution has been discerned and is being acted upon. A striking feature of the innovative examples discussed at the Workshop was, however, the extent to which they had been developed, by and large in an ad hoc manner in response to the needs of a given situation whether at the highest level of priority setting, or at the most local level regarding a specific situation. For all that this has been largely successful as a result of the commitment of all the stakeholders to the various processes, there is clear merit in the widespread dissemination of best practice and of lessons learned from successes and failures. As mentioned above, therefore, the full proceedings of the Workshop will be published, allowing access to much fuller accounts of these processes. But in concluding this brief report, it is worthwhile to attempt to summarise some of the key lessons emerging from the Workshop as the radiation protection community continues to strive to meet societal expectations and remains sensitive to the dynamic context of risk governance.

- Perhaps the clearest lesson to emerge from the workshop is the need to **foster mutual trust** between the radiation protection community and society as a whole. This can be done in a variety of ways, but in each case the challenge for public authorities and experts is to identify the obstacles that stand in the way of mutual trust and to develop means of overcoming them.
- There is no single blueprint for achieving this objective, and those involved must be sensitive to individual circumstances and **develop context-specific approaches**.
- Despite the need for context-specificity, certain principles must guide the development of innovative approaches including **openness, inclusiveness, and a focus on developing procedures in**

common so that even if there is ultimately an agreement to disagree, all outcomes will merit respect.

- A significant challenge in developing such new approaches is the **clarification of roles**. There is frequently confusion about the respective roles of experts and political actors with regard to advice and decision making. Political actors can, for example, act as if scientific advice constitutes an instruction to decide in a particular way, while experts can sometimes encourage this perception. A strict separation is probably impossible and certainly undesirable given the range of decisions at all levels that require to be made on radiation protection issues, but more open and inclusive procedures will call for a greater awareness of roles and responsibilities.
- As significant as this last challenge is, some assistance can be derived from a proper **understanding of the nature of scientific rationality**. Insofar as it is kept in mind that science produces *knowledge* and not *certainty*, it is easier to see where advice ends and where a political decision begins. At the point of decision, there is an implicit acceptance to act as if knowledge were certain, with all that this implies for risk and responsibility. For example, where stakeholders are directly involved in decision making, this can help to focus attention on the responsibility that is the concomitant of participatory rights.
- The fact that the point of decision constitutes such a decisive step in “converting” uncertain knowledge to an apparent certainty highlights the need for any innovative approach to radiation protection to adopt an explicitly **learning orientation**. Any engagement with stakeholders cannot be a once-and-for-all exercise but must envisage a future in which circumstances will change, whether in terms of the state of scientific knowledge or of societal attitudes and expectations.
- Nor is the need for a learning orientation confined to the possibility, indeed the probability, of change. It must be integral to any inclusive arrangement from the outset because it is fundamental to achieving the key objective with which this final summary began: *mutual trust*. In other words if an approach to radiation protection which involves stakeholders is to fulfil its potential, it must be established in such a way as to encourage **mutual learning** where all concerned are able to learn from their interactions. This new information must then be factored into ongoing development of common solutions that enjoy general approval.

In many respects, the lessons described above can appear obvious. But, as the examples cited on section 2 above demonstrate, it is often only after a crisis point has been reached that they are actually put into practice. The challenge for the radiation protection community globally is to adapt to the new context of risk governance before its hand is forced by crisis in order that any potential crisis is averted. As the examples outlined in section 4 above indicate, in many instances it has risen to this challenge and transformed it into an opportunity to foster trust that may have been wavering under traditional arrangements. The community as a whole must learn from and build upon the best practice presented at this Workshop in order to ensure the better integration of radiation protection in modern society.

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