Module XXIII

Public communication
Background

In 1991, the General Conference (GC) in its resolution RES/552 requested the Director General to prepare 'a comprehensive proposal for education and training in both radiation protection and in nuclear safety' for consideration by the following GC in 1992. In 1992, the proposal was made by the Secretariat and after considering this proposal the General Conference requested the Director General to prepare a report on a possible programme of activities on education and training in radiological protection and nuclear safety in its resolution RES1584.

In response to this request and as a first step, the Secretariat prepared a Standard Syllabus for the Post-graduate Educational Course in Radiation Protection. Subsequently, planning of specialised training courses and workshops in different areas of Standard Syllabus were also made. A similar approach was taken to develop basic professional training in nuclear safety. In January 1997, Programme Performance Assessment System (PPAS) recommended the preparation of a standard syllabus for nuclear safety based on Agency Safety Standard Series Documents and any other internationally accepted practices. A draft Standard Syllabus for Basic Professional Training Course in Nuclear Safety (BPTC) was prepared by a group of consultants in November 1997 and the syllabus was finalised in July 1998 in the second consultants meeting.

The Basic Professional Training Course on Nuclear Safety was offered for the first time at the end of 1999, in English, in Saclay, France, in cooperation with Institut National des Sciences et Techniques Nucleaires/Commissariat a l'Energie Atomique (INSTN/CEA). In 2000, the course was offered in Spanish, in Brazil to Latin American countries and, in English, as a national training course in Romania, with six and four weeks duration, respectively. In 2001, the course was offered at Argonne National Laboratory in the USA for participants from Asian countries. In 2001 and 2002, the course was offered in Saclay, France for participants from Europe. Since then the BPTC has been used all over the world and part of it has been translated into various languages. In particular, it is held on a regular basis in Korea for the Asian region and in Argentina for the Latin American region.

In 2015 the Basic Professional Training Course was updated to the current IAEA nuclear safety standards. The update includes a BPTC text book, BPTC e-book and 2 “train the trainers” packages, one package for a three month course and one package is for a one month course. The” train the trainers” packages include transparencies, questions and case studies to complement the BPTC.

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Editorial Note

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1 INTRODUCTION

Learning objectives

After completing this chapter, the trainee will be able to:

1. Understand why public communication is important.
2. Describe the range of public communication and information activities on nuclear safety.
3. Know that public communication and information activities are also required by IAEA standards.

The Aarhus Convention [1], which is a manifestation of advanced democratic and environmental standards, states that the public of both present and future generations have the right to be informed and to live in a healthy environment. It grants the public rights regarding access to information, public participation and access to justice, in governmental decision-making processes on matters concerning the local, national and trans-boundary environments. It focuses on interactions between the public and public authorities. Public communication is a logical part of the implementation of the Aarhus Convention.

Public communication on nuclear energy and radioactivity must cover a wide range of needs from reassuring the public concerns about nuclear energy up to emergency situations where it acts for the safety of the general public.

Public communication and information activities should promote a rational attitude towards everything connected with nuclear energy and radioactivity and establish trust.

These activities should include:

- encouraging the dissemination of factual information on nuclear issues in schools, science centres and information centres,
- paying attention to and taking note of public concerns which should be addressed in a transparent way,
- informing society about established safety standards and how they are enforced to maintain social trust,
- facilitating the decision-making process on nuclear matters by promptly presenting factual information in a clear manner,
- disseminating information on safety in both routine and emergency situations,
- establishing an information network at both the national and international levels,
- co-operating with other countries and international organizations.

The other goals addressed in this module are what, when, to whom and how to communicate. Feedback information is extremely important – from this we know whether communication is succeeding.
Choosing and knowing the audience is a major factor. A two-way communication process is needed to establish what a particular audience wants to know and in what form they prefer to receive information. This differs depending on the audience and the circumstances. Communication with the news media is a matter of particular importance, as they are both an audience in themselves and a mechanism for communicating with wider audiences.

Generation of electricity in nuclear power plants, management of radioactive waste, transport of radioactive materials, applications of radiation and radioactive substances in medicine, industry, agriculture, and research are subject to numerous safety regulations, standards, recommendations and guides, from national and international sources. National regulatory authorities exist to develop, implement and enforce them, in order to assure the safety of these activities and protection against the risks of ionizing radiation.

However, the general public are largely unaware of:
- the existing mechanisms to assure the safety of radiation sources,
- the actual potential for a radiation-related incident or accident to occur and national and international arrangements made for their protection if an emergency occurs,
- the scale that may be used to rate radiation-related events and accidents.

Public opinion research shows that people would like to know more about nuclear topics and are concerned about safety issues and the capacity of the country to control radiation sources and radioactivity and respond to an emergency if it occurs.

Public communication on nuclear topics is challenging. It is important to remember, at all times, to communicate in plain language without losing the substance of the information.

Public communication in a nuclear or radiological emergency is especially challenging as it may be perceived very differently by experts and the general public. An event that may not be considered to be an emergency to experts nevertheless often causes great concern to the general public. Communicating effectively with the public about radiation emergencies is the key to successful emergency management. It helps in mitigating the risks, supporting the implementation of protective actions, and contributing to minimizing negative psychological impacts. Therefore, the IAEA in its Safety Standards in EPR [2, 3] addresses the arrangements needed for public communications in emergency preparedness and response. In addition, the IAEA has developed guidance on this topic [4].

In its Safety Standard [5] the IAEA also stresses the importance of
public communication and information from the side of the regulatory body. Requirement 36, Communication and consultation with interested parties, requires the regulatory body to promote and establish means of informing the public about the possible radiation risks associated with facilities and activities, and about the processes and decisions of the regulatory body.

Public information activities must reflect the radiation risks associated with facilities and activities, in accordance with a graded approach.

NOTE: The reader of this Module should note that with the exception of public communication in preparedness for and response to a nuclear or radiological emergency, the focus of this Module has a strong regulatory perspective.
2 GENERAL MESSAGES

Learning objectives
After completing this chapter, the trainee will be able to:
1. Explain the basic concepts of nuclear technology which it is important to communicate.
2. Be aware of the existence of safety conventions and international safety standards.

2.1 Basic concepts

There are some concepts of nuclear technology that are important to communicate as they reflect the fundamentals of safety development of nuclear applications. The following explains these concepts:

Safety culture
The implementation of safety culture is a key consideration in ensuring the safe use of nuclear energy. Safety culture has two general components. The first is the necessary framework within an organization and the responsibility of the management hierarchy. The second is the attitude of staff at all levels in responding to and benefiting from the framework.

Learning from experience
Extensive research and study over a long period of time have been invested in learning about and understanding nuclear energy and radiation. This contributes to the development of safer nuclear technologies. In spite of that, incidents or accidents happen, as shown by experience and they need to be communicated to the public. Based on experience gained and on new developments, nuclear technologies continue to be improved.

Nuclear technologies are designed and tested
To make accidents as unlikely and as rare as possible. However, emergencies can happen and the potential for this needs to be communicated to the public as early as possible, also when discussing the introduction of new nuclear technologies. The emergency arrangements in place to keep these technologies safe must be regularly communicated thereafter.

Independent expert review and consultation
Independent experts with recognized high-level credentials review nuclear policy, procedures, operations and new developments to ensure overall safety. Quality, consistency and scientific accuracy are based on the best available knowledge.
Public processes
Public processes, such as informal consultations or formal public hearings, provide opportunities for the public to participate in the discussion about a proposed project which could have some potential for a direct public, economic or environmental impact. During such processes, members of the public have direct access to the authorities as well as to the implementing organization to ask questions, as well as to make their concerns known about the project. Through these processes, the public can influence the project's outcome.

International co-operation
Information about nuclear technologies is shared worldwide to ensure that all nations have access to the best information available. International and national nuclear associations organize conferences and periodic meetings to facilitate the exchange of information and international collaboration.

Safety conventions
Interdependence in the nuclear field calls for legally binding instruments. The International Atomic Energy Agency (IAEA) facilitates the establishment of international conventions on nuclear safety such as:

- Convention on the Early Notification of a Nuclear Accident (1986);
- Convention on the Assistance in the Case of a Nuclear Accident or Radiological Emergency (1987);
- Convention on the Physical Protection of Nuclear Material (1987);
- Convention on Nuclear Safety (1996);
- Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (1997) and
- Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage and the Convention on Supplementary Funding (1997).

International safety standards
Safety and protection issues have been taken into consideration on an international level. The IAEA affirmed the importance of safety in its statute more than 40 years ago and has been working ever since towards international harmonization of safety and radiation protection principles. All nuclear technologies are recommended to meet the minimum standards of nuclear safety set at the international level by the IAEA, which are based on recommendations of the International Commission on Radiological Protection (ICRP).

National regulatory authorities
All nuclear technologies are regulated to ensure that they meet standards that protect public health and safety. The highest priority has been given to safety and protection when establishing national regulations and procedures. Safety and protection issues were
identified and dealt with according to their significance. National regulations are usually based on international recommendations, and their guidelines are often even stricter than the international rules. The regulatory function is effectively independent of the promotion or utilization of nuclear energy and the national regulator has adequate authority, competence and resources to fulfil its assigned responsibilities. It has responsibilities for issuing authorization to use radiation sources, assessing safety conditions and performing inspections. Measures or sanctions may be applied in case of non-compliance with established safety criteria.

2.2 Building competence in public/risk communication: Regulatory considerations

Chapter 3 of the IAEA Safety Report Series No. 79 and the IAEA worldwide spread tool SARCoN (Systematic Assessment of Regulatory Competence Needs for Regulatory Bodies of Nuclear Facilities) [6] offer a competence model for regulators based on a four quadrant model [7]. This four quadrant model identifies the knowledge, skills and attitudes necessary for the regulatory body in line with IAEA safety standards. Communication is recognised in this model as one of the important areas to develop in quadrant 4, relating to the personal and interpersonal skills of the regulators. Training and development of knowledge, skills and attitudes in the area of communication is essential and it is also related to fundamental regulatory values such as openness and transparency [8]. Regulatory training in communication is highly recommended and the key to the effective performance of regulatory functions.
3 FUNDAMENTALS OF NUCLEAR COMMUNICATION

Learning objectives
After completing this chapter, the trainee will be able to:
1. Explain the first rule of communication.
2. Describe the principles which influence people’s perception of nuclear power.
3. Describe specific goals for effective communication.

3.1 Basic rules and values

Just as knowledge of nuclear technologies is needed to reduce the risk of mismanagement of radioactive materials, communication can help to reduce the risk of misunderstanding fed by fear and rumour. It is clear that communications cannot correct a technical error. Also, technical excellence is no guarantee against unsubstantiated fear and the consequences that accompany such fear.

The first rule of communication is honesty and transparency instead of silence and suppression.

Excellence in operation and excellence in communication are mutually reinforcing concepts. To be truly effective, the message must address not only the listener’s wants but must also address their often unspoken needs. Communication connects the message to basic values. These basic values include:
- security,
- safety,
- trust,
- right to choose, and
- freedom.

A long-term relationship with one’s audiences, nurtured over the years, is among the most important investments nuclear professionals can make. It is the foundation upon which to build trust. Without trust and some degree of predictability, one’s relationships can be turbulent or even disastrous. A communications specialist should be employed within the executive committee of the organization to assure his/her expertise is well integrated into the decision-making process of the organization. Experience has shown that not giving communications the same level of importance as operations, finance, or legal functions can have disastrous effects in times of critical importance such as in an emergency.

Communications are a specialized field that should be in the hands of trained communications experts who work in consultation with
experts from the nuclear area. Just as the control of nuclear technologies is a specialized field, so too are communications.

Internal and external communications are equally important. An effective internal communications programme strives to make the organization a team that clearly understands and respects one another’s different, yet equally important roles. This contributes to a more effective organization that can better serve the public interest. An effective external communications programme represents the opinions and expertise of the organization to external audiences, thereby reducing or preventing misunderstanding, and thus increasing safety. The programme also endeavours to understand and to present the opinions and findings of these external audiences to the safety authority, so that these opinions are reflected in the final service offered to the public by the regulatory authority.

Most people only pay attention to nuclear topics when they hear about an emergency. Therefore it is better to assume an audience knows relatively little - positive or negative - about any particular topic. The lack of basic information may be surprising to professionals who work with the subject on a daily basis. The majority of the public do not know what percentage of their electricity comes from nuclear energy and are not able to recognize the radioactive trefoil sign indicating the presence of a radiation field or radioactive material; this has led to several radiological accidents.

People are not impressed with scientific risk assessments that show how safe nuclear energy is compared to other energy sources. They think more about the health consequences of radiation exposure in an emergency than about the probability of its occurrence. Risk assessment should be explained in a context, how it is used to improve safety technology and also in debates with a technically specialized audience.

3.2 Principles of regulatory risk communication

Regulatory risk management of nuclear power must be responsible for not only the physical operation of nuclear technologies, but the public’s perceptions of those technologies and public perception of the regulators themselves. The safe regulation of commercial nuclear power relies not only on careful supervision of the construction and operation of such plants, and the transport and disposal of nuclear waste, but on maintaining the trust of the public in the regulatory authority. Communication plays a vital role in establishing and maintaining public trust.

Because trust is such a vital asset, regulators must constantly communicate the fact that the regulatory authority is responsible for overseeing safe application of radiation sources and nuclear
technology, and is not biased in favour of the nuclear industry.

An important foundation of effective communication about nuclear power is the recognition that people's perceptions are shaped not only by rational fact-based analysis, but by emotion, personal experience, and other human factors. While these influences sometimes lead to public perceptions which the regulatory community can find frustrating and "irrational", such affective influences are nonetheless real and dramatically shape not only public opinion but behaviour as well. Especially during emergencies, public behaviour can be unpredictable and may affect the emergency response. Regulators must therefore accept and understand the psychological roots of public perception in order to effectively communicate with the general public on nuclear power as part of their mandate for overall risk management.

It is particularly important to understand some of the specific characteristics which provoke strong emotional responses in people about nuclear technologies. The following emotional/psychological characteristics play an important role in whether people are more worried about nuclear issues, or less. Communicators should keep these specific factors in mind when they are designing and executing specific communication programmes.

**Trust**

The more people trust the communicator, or the regulatory authority, the less worried they will be. As trust decreases, fear increases. This is why it is imperative that the regulator be neutral about communications regarding nuclear issues, and not be seen as an advocate for or defender of nuclear applications.

**Choice**

When people feel they have some choice as to whether they will be exposed to a risk, they will be less afraid than if they feel the risk is being imposed on them. This is why people are less opposed to facilities that involve some risk which they invite into their communities, compared with how people feel when their communities are designated to be the site of such facilities.

**Control**

When people feel they can physically control what is happening, they are less afraid than when they feel they have no actual control over events. This is different from choice, which is a matter of whether people feel the risk they are taking is voluntary or involuntary. Control relates to how much people feel they can actually do something about the risk as it is occurring. For example, whether a community volunteers to host a waste disposal facility is choice. Control is how they feel if their local community has some say over how the facility actually operates.
Natural or Human-made Risks
Natural risks, such as radon or other sources of background radiation, are not as frightening as risks which are human-made, such as most applications of nuclear technology.

Anxiety
The greater the pain and suffering involved, the greater the fear. In the case of nuclear issues, the health outcome people fear most is cancer, which is widely perceived to be a particularly painful way to die. This helps explain why fear of things that cause cancer is often higher than fear of things that cause death by heart disease, which is statistically more likely. It's not the likelihood, but the nature of the outcome that generates apprehension and concern.

Lack of Understanding
When people are not aware of or can't understand the details of a risk, they are more likely to be subject to fear and apprehension. One of the aspects of radiation that makes it frightening is the simple fact that it can't be detected (without equipment), which makes people more emotionally apprehensive. Similarly, if communication is hard for people to understand, such as communication that uses technical language or too much scientific detail, it will leave people with a lack of understanding and more apprehension.

Risk versus Benefit
The judgements people make about risks are strongly related to trade-offs with benefits. The greater the perceived benefit of a particular choice, the more the mind will play down the risk. Issues of nuclear technology, therefore, should be communicated in part to highlight both the risks and the benefits; not to advocate those benefits, but simply to make clear both sides of such trade-offs.

3.3 Understanding the needs of the public

Nuclear power plant regulators and other authorities with responsibility to protect the public and workers at local, regional or national levels must also recognize that the information the public wants and needs may not be the information the regulator assumes people want or need. Effective communication about nuclear power, or indeed any risk to people's health, must be a dialogue that begins when the communicator tries to understand what the audience wants to know and needs to know, from the audience's perspective. Research on public awareness and attitudes, and to test the efficacy of any communications plan or message, should be built into the overall communication programme.

It is also vital for everyone involved in the regulation of nuclear power to understand that communication is more than words and messages.
Communication is implicit in the actions that regulators take and the policies they adopt. People's perceptions of risk are informed by the way authorities behave, not just by what they say. For this reason, communication needs to have a high priority for senior regulatory policy makers, not just the communications personnel. Senior managers must consider how their actions and policies will be perceived, since these will also bear directly on public perception and behaviour.

3.4 Goals in communicating nuclear issues

Regulators have many goals in communicating about nuclear power, depending on a variety of circumstances. Using communication to establish and maintain trust is vital for every goal that the regulatory agency has. In addition, specific goals of effective communication include:

- **Establishing dialogue**: Stakeholders (participants) should be engaged in the political process. Making and enforcing regulations are government processes. Creating a communication dialogue with those involved during these processes gives people a sense of control in decision-making which will affect their lives. Such communication can help build wider public understanding of and support for the results of the decision-making.

- **Achieving greater public understanding** of nuclear power and other nuclear applications. The more the public understands about nuclear issues, including existing mechanisms for ensuring safety, the easier it will be for the regulator to fulfill its function.

- **Establishing greater public awareness** of the regulator's role. The more the public understands the role of the regulator, and the greater the trust in the regulator's openness, honesty, impartiality and competence, the easier it will be for the regulator to fulfil his function.

- **Improving emergency preparedness, response and recovery**. Regulators (and other authorities with responsibility for protecting the public and workers at local, regional or national levels) usually play an important role in preparing the public for a nuclear or radiological emergency. Effective communication prior to, during, and after an emergency is essential for an effective emergency response and for managing public behavior. Poor communication may result in doing more harm than good, as well as in failing to address public concerns.

- **Internal communication** for organizational efficiency and impact: communication is generally thought of as reaching out to audiences beyond the regulatory organization itself. It is important to remember that communication means reaching various audiences, including internal audiences. An effective internal communications programme makes the entire regulatory
organization into a team that clearly understands and respects one another’s different, yet equally important roles. It also helps keep the separate components of the regulatory organization aware of what the other components are working on. It helps establish consistency in what each member of the regulatory organization says about the organization, or a particular issue, whenever they communicate. This contributes to a more effective organization that can better serve the public interest.
4 COMMUNICATION PROGRAMMES

Learning objectives
After completing this chapter, the trainee will be able to:
1. Describe typical audiences for the communications plan.
2. Explain the basic criteria for the development of messages.
3. Describe communication channels.
4. Describe the generalities of the news media that communicators must consider.

4.1 Communication programme for specific issues

To develop a comprehensive and effective communication programme on specific issues, the basic principles listed in the Fundamentals of Nuclear Communications, Section 3, must be followed. In addition, five elements are needed:
- Clearly stated communication objectives;
- Identification of appropriate audiences;
- Audience opinion research;
- A management plan with clearly stated goals and messages for each audience;
- Communication programme evaluation and flexibility.

Communication objectives
Clearly stated communication objectives should be established and agreed upon within the organization or among organizations. For example, the mission of the regulatory authority is to ensure adequate protection of public health and safety and to protect the environment with regard to the use of nuclear materials and facilities in society. So if a communication programme is being designed to make the public aware of the job of the regulator, the communication objective should be that key audiences recognize the authority as an independent and trustworthy regulator of nuclear technologies protecting public and environmental health and safety.

Identification of audiences
A communications plan needs to identify the audiences it wants to reach. Different audiences have different interests and different information needs. The "general" public is only one audience. The following is a list of typical audiences:
- The media.
- The general public.
- Leaders and decision makers at national, state/provincial and local level, international organizations, business people interested in the nuclear industry.
- Medical and public health professionals.
- Developers, end-users and operators of nuclear technologies and their employees (medical and industrial organizations, electricity
utilities, and their trade associations).
- Academics/researchers in the nuclear area or third-party experts who are not involved in the commercial uses of such technologies or with regulatory activities.
- Academics/teachers not from the nuclear community but experts in related disciplines.
- Other components of the regulatory authority (internal communications) and non-nuclear regulatory authorities (external).
- Other relevant regulatory agencies.
- Special and public interest groups, consumer groups, other non-profit or nongovernmental organizations, including environmental organizations, local and indigenous interests.
- Response organizations in the case of an emergency.
- International community.

Within the overall category "the general public", subpopulations should be identified that are relevant to the programme objectives. (See also Section 5.6 of Module XVI). These might depend on various factors such as age, gender, health status, residential location, position, education, etc.

**Audience opinion survey/research**

As time and other resources allow, research should be done to assess audience needs, interests, and perspectives. This will allow the communicator to shape the specific communication programme more effectively. Learning about people's opinions, values, priorities, levels of knowledge, perceptions, beliefs and expectations will help establish a better long-term relationship between the communicator and audience, and allow the communicator to understand how their organization is perceived by the audience. As part of this research, it is vital to know how much trust the audience has in the authority.

This initial assessment can save both time and money because it focuses attention on the target audience’s requirements and not on what the organization believes are the needs of the target audience. Early identification of questions and concerns helps prioritize and focus communications on **what is most important for the audience**.

**Action plan**

An action plan which incorporates the following elements can be developed, following the guiding principles in Subchapter 3.2:
- Development of goals for each audience;
- Message development;
- Designated spokespeople responsible for communicating the message;
- Identification of appropriate communication channels.
- A schedule for releasing the various messages;
- Assessing the effectiveness of the communications programme as it is being executed, and adjusting the programme...
accordingly. **Communication goals for each audience** including the six components specified above should be developed. Within the overall programme objective, the regulator may have different goals for differing audiences. The communication goal for other regulatory authorities, for example, might be different than the communication objective for the general public. Thus, unique goals should be identified for each audience. Different audiences will have different information needs and interests, and different perspectives on the issue, and may need different messages, delivered by different spokespeople, via differing channels. Within the overall programme objectives therefore, each audience needs its own sub-communication plan designed in accordance with the six action plan areas listed above.

Of course, there will be overlap between these plans. Similar messages, or spokespersons, for example, might be appropriate for various audiences.

**Message development** should be subject to a clear hierarchy: it needs to be established who is responsible for drafting the message, for verifying facts, and for granting timely and final approval. It is important that the senior communication managers have significant say in the final approval of messages. Many regulatory organizations grant this final approval to senior managers above the communications section in the organization's authority structure. Senior managers should indeed give the final approval of important messages, but communication is an important function requiring specific skills, experience, and perspective. Therefore, there should be involvement of professionals with the required skills and experience throughout the development and the approval process.

In developing messages, the communicator should strive to keep in mind that communication is a dialogue which begins when the communicator identifies who the audience is, what they know, what they need to know, and what they want to know. Further, the communicator must always remember that people's perceptions are based on both facts and feelings, which means that respect for people's emotional concerns must be incorporated into messages. Specifically the communicator must keep in mind the emotional reasons which explain people's unique perceptions of nuclear issues, as listed in the Introduction (trust, fear, etc.).

It is useful to identify all the messages that the organization considers important in priority order from the most important to the least important. Each message should be drafted to meet certain basic criteria:

- Each individual message should be brief, only one or two sentences.
- The message should be easily understandable.
The message should acknowledge people's concerns.

In everything the regulatory agency does and says, it is vital to maintain public trust. Therefore it is vital to make clear that the regulator is not a promoter of nuclear technologies, but the organization responsible for making sure those technologies are used appropriately and safely. Regulators should always communicate first, and repeatedly, that they are independent, and their top priority is safety.

In non-emergency circumstances about specific issues or events, messages should include:

- An understandable and full explanation of the situation the communication is about. All relevant details should be included.
- An explanation of the risk involved, if any. It must include understandable explanations of both the hazard and the exposure components of risk; hazard is the radiation source, exposure is the route by which people may come into contact with the hazard and the level of that exposure. The explanation should avoid technical terminology. It should avoid any suggestion of how people should feel about the risk, such as "It's nothing to worry about."
- An understandable explanation of what the regulator is doing about the situation, along with an explanation of the role of the regulator in the specific circumstance, and the regulator's authority or limits to its authority.
- If the situation involves public decision making, the communication should describe the decision making process, and emphasize opportunities for public input.
- If the circumstances warrant, a description of things people can do about the situation (to protect themselves, to prepare for any future emergencies, to participate in a public process, etc.).
- Sources and references from which people can get further information.

While it is helpful in general to communicate information about basic concepts like defence in depth, redundant safety systems, safety culture, and the roles of international organizations and conventions regarding nuclear technologies, such generic information is of lower priority when communicating about a particular issue or event, where the focus should remain on the details of greatest relevance to the audience.

Technical language is not easily understood by the public. Using such language not only leaves the audience uninformed, but can create a feeling in the audience that the communicator is not talking to them in their language, but only to himself in his own language. This, of course, interferes with communication, rather than facilitating it. Examples include terms such as effective dose, shielding, interlocks, half-life, radionuclide, gamma rays, defence-in-depth; abbreviations
and acronyms such as ALARA (As Low As Reasonably Achievable), ICRP (International Commission for Radiation Protection) and TLD (Thermo Luminescent Dosimeter); units and atomic terms such as becquerel, sievert, gray, proton, neutron, electron. Indeed, there is some evidence that not only do people not understand technical terms, but that some terms are understood to mean something quite different from what is intended. These are often words that are in common use with a particular meaning, but have been applied to nuclear technology with a different meaning. Examples of this include the term ‘going critical’ to describe a reactor starting up normally, but the word ‘critical’ more commonly indicates something going wrong (similarly to ‘critical group’ or ‘critical health conditions’), terms such as ‘passively safe’ used to describe reactors with safety systems designed to operate by natural forces, but ‘passive’ carries connotations of inaction or lack of vigilance.

When time and resources allow, messages should be tested in advance on sample audiences, and amended to reflect feedback from that audience research.

Once messages have been approved, all relevant personnel in the regulatory organization should be made aware of these messages. Anyone communicating on behalf of the organization should consistently use these messages. Inconsistency in the messages a regulator uses gives rise to conflict and mistrust, which damages the goals of the organization.

**Designating the spokesperson** is an important factor for a particular communications programme. Trusted spokespersons should be chosen. Trust can be fostered thanks to expertise, decision-making authority, or a proven track record for honesty and openness. The choice of spokesperson will vary depending on the issue involved in the specific communications programme.

Sometimes the appropriate spokesperson should be the senior executive of the regulatory organization, the person in charge. Sometimes the person speaking should be a scientist or technical expert. Sometimes the appropriate person is the member of the communication staff who usually talks to the press and public. Often the best choice is some combination of spokespersons.

It is vital for the credibility of the organization that only authorized persons represent it before the public and in the media. Unauthorized personnel, if confronted by someone from the media, should refer the journalist to the authorized spokesperson. In some cases, only the top official can make statements on behalf of the authority. In other cases, someone with specific technical expertise may be required to respond to a specific event, such as a radiological emergency. It may be advisable to provide special communication training to selected technical staff in order to familiarize them with methods of
Communicating with the public and responding to hostile media questions.

**Communication methods/channels** should be carefully chosen in order to reach the right audiences, and in order to increase trust, since some information delivery channels are more trusted than others. These channels include:

- The news media. Within this broad category are:
  - Television;
  - Radio;
  - Newspapers;
  - Magazines;
  - The internet.
- Social media (Facebook, Twitter, etc.)
- Internet (non-news media, such as websites, email lists, information media like Wikipedia, blogs, social networks, etc.).
- Mail.
- Face-to-face interaction, either one-to-one, in small groups, or in meetings with large groups.
- Third party representatives, such as community leaders, academics, unpaid experts.
- Visits, tours, special events (first-hand experience is the most important communication tool).
- School education programmes.
- Training seminars.

**Relations with the news media**

Just as it is too simple to speak of one audience when talking about communicating nuclear issues, it is too simple to say "the news media" are important channels to reach the public. There are many different types of news organizations, each with its own motivation, practices, deadlines, audiences, and each with its own impact on public awareness of nuclear issues. Communication programmes must consider not how to interact with "the news media", but how to interact with the specific parts of the news media most relevant to and effective for a given programme objective. Usually, several different news media outlets will all be appropriate for a given programme objective.

**Generalities about the news media** that communicators must consider since experience shows it may happen that:

- The news media play up the dramatic, controversial, negative, or frightening aspects of a given issue, or any other aspect that will draw more attention to the story. This must be anticipated and accounted for in all interactions with the news media, including overall planning, message development, and message delivery.
- The news media might shorten and simplify information. In order to minimize the errors they may make, information should already be simplified and shortened when it is given to the news media. Communications personnel should be able to provide
information to the media close to the form in which it will be used. When the media just make a copy/paste of the press release or parts of it, this is an indicator of success.

- The news media might blend or combine the regulator's information with information from other inputs. Communications planning should anticipate what other sources might say to the news media about the issue.
- The news media rarely have the expertise necessary to understand technical issues. While technical information can be given to the media, it must be carefully explained, and the media must be given ample opportunity to ask questions to make sure the information is understood.
- The news media are almost always under deadline constraints limiting how much time they have to find out everything they need to know. The news media outlet in question should always be asked what their deadline is, and the information and access provided well within that deadline if possible. The closer to their deadline they are working, the less attention and thought the news media can give to an issue.
- The news media are almost always under space and time constraints limiting how much information they can include in their stories. While a communicator can and often will supply more information to the news media than will fit in the final story, the communicator must make sure to emphasize the central information they hope will be included in the final story.
- People in the news media do not consider it their job to "educate" the public. They do not think of themselves as teachers fulfilling a civic duty.
- The news media might be skeptical of government organizations. The communicator should be as honest with the news media as possible and try to avoid "spinning" the news and simply provide information in as neutral a way as possible. Manipulating the news media should be avoided and the communicator should be as cooperative as possible.
- Interactions with the news media may cause disagreements. It is the job of the media to challenge official sources of information. Communicators should remain firm about the constraints they may be under. If they can't share certain information, for instance, they should say so, and explain why. If they can't answer a question, they should say so, and explain why.

**Relationship with journalists:** some communication professionals hold regular (either weekly or monthly) briefing sessions. However, most journalists cannot, or will not, attend such sessions. So communicators must assume that the journalists they interact with have a limited background knowledge of the issue. The communicator should be prepared to help journalists get up to date on issues they may know little about. As mentioned above, this should be done by being neutral and informative, avoiding being manipulative or trying to spin or twist or inform selectively. Such an approach damages trust
and makes relations with the journalist worse.

Journalists usually prefer to speak directly to main sources, rather than to a spokesperson. When possible, communicators should facilitate direct contact between journalists and direct sources such as experts or senior authorities within an organization. Communicators should work with these primary sources in advance of any interview or press conference to help these sources prepare for interaction with the media. This preparation should focus on developing messages and practicing delivering them so the communicator is comfortable with those messages when interacting with the media.

Journalists often want physical access to places and files. This too should be accommodated when possible as a means of establishing trust and credibility.

**Media coverage of an issue** should always be monitored by a communications programme. This includes monitoring all external sources of information, including online sources such as blogs and other social media.

Any significant inaccuracies, mistruths, rumours, or other conflicting information should be responded to appropriately. If the discrepancy suggests only a misunderstanding on the part of the journalist, a direct telephone call or e-mail message to the journalist responsible may be sufficient. Sometimes the false report is due to misunderstanding or poor editing, in the rush to publish something quickly. If the discrepancy is truly significant, corrective action of some kind by the journalist should be requested, though corrections in the media are rare. Often, the best corrective action that can be achieved is to challenge the journalist to not make the same mistake again. If the reporter or editor does not correct a significant error, the senior communication manager should take the issue to the senior supervising manager at the news media outlet in question.

Rumours should be dealt with quickly and in the same media in which the rumour occurs, so as to reach the same audiences.

**Communication programme evaluation and flexibility**

Issues play out dynamically, circumstances change, sometimes moment by moment. So the communication programme must be designed to constantly evaluate itself and accommodate changes in the target audiences, messages, delivery channels, and spokespersons. The message may change due to shifts in public opinion, activities of the industry or pressure groups, physical events, related events elsewhere in the world, among many other factors. For example, a local community may be enthusiastic about hosting a waste treatment plant because of the initial perception that a new industry in the region will create jobs and economic development. The arrival or creation of an opposition group may then shift the focus to environmental issues.
Thus the local population may initially have had one view, and as time passes, division in public opinion may develop, which in turn will require specialized messages. Greater openness in many countries’ decision-making processes, especially regarding the licensing and siting of nuclear facilities, will have an impact on a communication programme.

It is important to build an evaluation process into a communications plan. Evaluation is the rudder that provides direction to the ship, and makes it possible to systematically determine to what degree the elements of the programme are working, and where to focus and prioritize resources. Without evaluation, a communications programme will be required to make ‘best guess’ decisions, which in the past have very often proved to be ineffective.

As part of the ongoing evaluation of the communication plan, an analysis of press coverage should be conducted. If the organization releases a statement, data can be gathered on which media (TV, radio, press etc.) report it, whether it was reported accurately, whether other points of view were expressed in the article, such as from industry or environmental organizations and or whether the article was balanced or biased. Over time, it may become evident that certain misunderstandings always appear if certain words are used. If there was misinformation or inaccurate reporting, an analysis can help to demonstrate how a message can be altered to ensure the press carry the desired message the next time.

In evaluation, the organization should develop performance indicators in parallel with its communications performance objectives. The process of developing performance objectives and indicators has proved to be very helpful in systematically thinking through goals and objectives.

### 4.2 Supporting an effective communication programme

This guidance assumes that regulatory organizations already have a designated communications section. Observations are offered here that could strengthen the communication function within a regulatory body.

Communication and the importance of public attitudes and awareness are rarely thought of as critical to the overall goals of the regulatory organization, despite overwhelming evidence that public attitudes play a significant role in the issues a nuclear regulatory organization has to deal with. Public behaviour in case of emergencies may be part of the overall risk that has to be managed.

Also, as a result of the lower priority communication receives when an organization is being structured, communication is reactive rather than
Communication must be proactive about the general operations of the regulatory body, about specific issues the regulatory body is dealing with, about ongoing relationships with partners and other parties involved, and about emergency or crisis preparedness.

Further, the relatively low priority assigned to communications means that communications programmes suffer from inadequate funding. As a result, communications staffing is inadequate, and even when there are sufficient numbers of personnel, lower pay scales fail to attract personnel with a good level of both technical expertise in the nuclear field and experience and ability in communicating.

Budgeting for communication must be adequate to sustain sufficient quality staff and other necessary resources, including those allocated for ongoing stakeholder and community relations.

It is also common in the field of nuclear power that there is a lack of clear translation of technical and scientific information into plain language. But often too much emphasis is placed on this part of the challenge of communicating about nuclear issues. Explaining the facts clearly is not enough. Since people's perception of risk is based on both facts and feelings, simply explaining the facts in an understandable way is insufficient. Communicators should beware the temptation to believe that, if they simply communicate technical language clearly, they have solved their problem.

All these impediments can result in poor communication by nuclear regulators which in turn can impact negatively on the decision-making process covering a wide range of nuclear issues, including the siting of unpopular facilities, the transportation and storage of nuclear materials, response to emergencies, and even public discussion of the place of nuclear power in a nation's energy policy. Poor ongoing proactive communication by regulators (or other authorities with responsibility to protect the public and workers at local, regional or national levels) can certainly limit their effectiveness should emergencies arise, when public trust must already be in place.
5 GOOD PRACTICES

Learning objectives
After completing this chapter, the trainee will be able to:
1. Recognize good practices in communicating about nuclear technologies.
2. Describe the meaning of good practices for communication about nuclear technologies.

Because people's perception of nuclear technology is based on both the facts and their feelings, communication by regulators is more trusted, and therefore more effective, when it accounts for the affective/emotional aspects of people's perceptions. Good practices for communicating about nuclear technologies therefore should:

- **To demonstrate sincere respect** for people's concerns and acknowledge people's concerns, as valid, even if those fears are not supported by the technical facts. The fears are real. Respecting them will establish trust and make subsequent communications more effective.

- **To listen** and not just talk. Truly respecting people's concerns begins by actively listening to and responding to those concerns, and not just trying to talk them out of their concerns. This includes research on public attitudes and concerns as a foundation of general communications, and certainly for communication programmes on any specific issue.

- **To demonstrate competence.** People measure a regulator's trustworthiness more by what they do and how they perform than by what they say.

- **To be open** and avoid secrets. The damage that arises when people find out the communicator has kept a secret, especially about something having to do with their safety, is worse than having admitted whatever it was that was kept secret in the first place.

- **To be honest** and admit uncertainty. It may seem like weakness for the regulator to admit that there are things that are not known with certainty. But this demonstration of honesty establishes trust far more than claiming greater certainty than actually exists, especially if it later becomes clear that the regulator did not know what they claimed to know.

- **To accept responsibility** for mistakes. This demonstration of honesty more than compensates in trust that may have been lost in terms of public confidence because of a mistake.

- **To involve stakeholders** in decision-making. This means more than just listening to public concerns, though that is important as well. It means finding ways to actually share control, creating mechanisms whereby stakeholder input can actually shape decision making. While it may feel counter-intuitive for regulators to give up some degree of control, the establishment of trust by sharing control actually assists the regulator’s ability
to advance the overall agenda of safe operation of nuclear technologies.

- **Not to "spin"**, just inform. The temptation for communicators is to manipulate information to present a selective view. The more obvious this becomes, the more it causes people to be defensive or hostile, as they sense that the communicator is trying to manipulate them. That makes communication less effective. Therefore the communicator must not twist or distort the facts, but present them directly.

- **To be the first to tell**. Communication that defines the terms of the issue is more effective than communication which reacts to circumstances that have been defined by others.

- **To give people things they can do**. The sense of control is very important to how people perceive risk. The more control they feel, the less emotionally mistrusting they tend to be, and the more they will respond to risk based on information rather than emotion.

- **To acknowledge danger**. When risk exists, even a small one, the regulator should honestly acknowledge this. Denying a risk, even when it is very small, gives the impression that the regulator is trying to hide something, or that he is dismissive of people's fears. It should be borne in mind that in many circumstances it is desirable that communication actually instils reasonable concern in people to encourage them to engage in protective behaviour.

- **To avoid comparing risks statistically** that don't compare emotionally. I should be remembered that people perceive risk based on how those threats feel, not just what the facts are. The risk of harm from a man made nuclear incident may be statistically low, but the fear will be greater than fear of natural radiation, even though the statistical level of risk may be higher. Background radiation is natural. Radiation risk from technology is man-made. Man-made risks are more frightening: in psychological terms, the two risks don't compare.
6 COMMUNICATION IN EMERGENCIES

Learning objectives

After completing this chapter, the trainee will be able to:

1. Describe the structure of the Public Information Team.
2. Describe the roles of the authorities in public communication in emergency preparedness and response, and the need for adequate planning.
3. Describe the cycle for organizing and implementing public communication activities.

According to IAEA guidance “experience from nuclear and radiological (radiation) emergencies highlights public communication is one of the most important challenges in emergency management. Sometimes, an event is not considered to be an emergency to experts or responders but is perceived very differently by the general public. Communicating effectively with the public about radiation emergencies is the key to successful emergency management. It will help mitigate the risks, support the implementation of protective actions, and contribute to minimizing negative psychological impacts.” [4]

The need for provision of timely and adequate information in emergency preparedness and response is stressed also in sections 5.6 and 5.10 of Module 16 (Emergency preparedness and response).

6.1 Organization of emergency communications

Public communications is one of key activities of an integrated response system that each state needs to develop. The Public Information Officer (PIO) or team need(s) to be part of a broader command and control system for managing the overall emergency response, allowing different disciplines and functions to work together.

The primary role and responsibility of the PIO or team is keeping the public and news media informed and coordinating sources of official information to ensure a consistent and accurate message is being provided to the public. It is very important to note that depending on the type and severity of the emergency, this role and responsibility may be undertaken by an individual or team. However, regardless of the type and the severity of the emergency, the primary role and responsibility of the PIO or team will remain the same.

The basic structure of the Public Information Team is provided in Figure 6.1 as given in Ref. [4]. The extent to which this structure is staffed and activated in an emergency again depends on the type and severity of the emergency as well as on the public and media interest.
Large scale emergencies attracting great public and media interest are demanding for the PIO/team and may necessitate qualified and trained staff covering different positions in the longer term. “The personal well-being and productivity of staff in an emergency is crucial for an effective response. Ensuring that reasonable shift lengths and frequencies are planned for will help to reduce stress and fatigue. Shifts may need to be in place over a number of days, weeks or months. The public and media can be aggressive and unsympathetic, which can be demanding and strenuous for PIOs. Therefore, planning appropriately by training enough staff for all Public Information Team roles will be beneficial.” [4]

**Figure 6.1:** Basic structure of the Public Information Team.

For emergencies with great public and media concern, adequate preparations need to be made for establishment of a Public Information Centre. This Centre will accommodate the PIO/team and will serve as a location from where media briefings from a single qualified spokesperson or a panel with representatives of all the organizations involved in the response, including representatives of local and national governments (in accordance with their respective roles and responsibilities), are to be provided. This Centre will be one of the emergency response facilities or locations needing to be established to support the emergency response discussed in Module 16 on Emergency Preparedness and Response.

### 6.2 Roles of the authorities

The roles of the authorities are defined in more detail in the IAEA
Local authorities will “…be expected to communicate about what they are doing to respond to a radiation emergency. Residents and the media will seek out local officials for both information and services in all phases of the emergency, but most intensively if there is an evacuation or in the recovery phase, where long term measures may be required for the affected community. They may also be involved with managing the economic impacts on local industry, tourism and property values over the long term.” [4] Therefore, the local community will inevitably need to prepare within their overall emergency arrangements for communicating with the public. With the intention of providing consistent information to the media and public, local and national authorities need to strive for clear allocation of responsibility and for coordination with regard to public communications. It needs to be recognized that local authorities have an in-depth knowledge of the community and can be a source of valuable information to the national authorities.

National authorities must take care to coordinate public communications at the national level, and to avoid contradictory messages and misinformation between the different organizations involved in the response at any level (from operator and local level to national level). The response structure, including the roles and responsibilities of the different organizations involved, should be planned in advance and reflected in all organizational and national response plans. These command and control systems need to be used to ensure the level of inter-organizational coordination that will be required at the national level and need to be responsible for the above mentioned structure necessary to support public communication.

International level of coordination

Each member state and international organization party to the Convention on Early Notification of a Nuclear Accident [9] is required to notify other states (directly or through the IAEA) that may be affected by the emergency and the IAEA. Strictly speaking this notification relates to emergencies that are of radiological safety significance to other states, for example in the event of an accident at a nuclear power plant involving a significant release of radioactive material into the environment. However, experience has shown that the impact of any nuclear or radiological emergency rapidly becomes a regional and global concern and, therefore, effective management requires proper national and international arrangements for sharing reliable information related to the emergency.

In order to ensure that notification and information exchange arrangements are in place at the international level, the IAEA’s Incident and Emergency Centre (IEC) maintains a list of officially designated contact (warning) points and competent authorities of its member states and relevant international organizations. Each member
state and international organization must designate and make known to the IAEA its national 24/7 contact (warning) point and the competent authorities for notification purposes. Contact details are sent to the IEC and copied to the permanent mission to the IAEA. These contact details are thereafter used for notification purposes and exchange of official and verified information regarding nuclear or radiological incidents and accidents through a secure web-based communications platform, the so-called Unified System for Information Exchange on Incidents and Emergencies, or USIE. USIE is also used for reporting by INES National Officers (see Section 7 on INES). The arrangements for notification and information exchange are elaborated in Ref. [9].

In addition to the IAEA, other relevant international intergovernmental organizations (examples include the Food and Agriculture Organizations, World Health Organization, World Meteorological Organizations etc.) have a role through their respective mandate regarding emergency preparedness and response. Coordination among them is ensured through the Inter-Agency Committee on Radiological and Nuclear Emergencies (IACRNE) and its Joint Radiation Emergency Management Plan of the International Organizations [10]. This plan covers coordination of the different response actions of each international organization, including the public communication activities, in order to ensure coordinated and consistent messages are given to the public and news media by the international organizations.

6.3 Planning for public communication in emergencies

“Plans and procedures to deliver the public information response should be developed in advance of any emergency” [4]. These plans and procedures need to cover a broad range of activities to include not only the provision of information to the public but also media monitoring and media relations, public hotlines for questions and monitoring and addressing rumours and misleading information.

“Plans and procedures of the organizations, as well as the national response plan and procedures, should be in place to coordinate public communication activities with regional and/or local authorities. While information may be provided to the public from these different levels, it is vital to the credibility of the response that the information itself be consistent. Plans should identify the roles and responsibilities of the different actors in the public information response. They should include specific mechanisms for coordination of information between all levels, especially local, regional and international.” [4] This coordination needs to arrange for the role and responsibility of the operating organization with regard to public communication in relation to an emergency at a facility or in an activity under its responsibility. One approach to ensuring coordinated and consistent
public information in an emergency is to designate and plan for a single point of public communication that may be activated at the national level.

Planning for effective communication also means identifying the potential audience. “Each emergency will have different audiences and these may even change during an emergency. Audiences can be directly or indirectly involved in the emergency. Some of them may be more clearly and directly affected by the potential risks and consequently are dependent on the information communicated. Others may not actually be exposed to radiation but may claim to be interested or affected by the overall situation.” [4] Thus, looking at potential emergencies at the preparedness stage and planning to address the right target audience with the right information will facilitate the overall response efforts in an actual emergency. Engaging the audience at the preparedness stage as relevant by the respective PIOs in accordance with the established plans and procedures for public communication will contribute in building trust on the part of both the public and authorities.

Figure 6.2 shows the cycle for effective organization and implementation of PIO roles and activities, as described in Ref. [4].

**Figure 6.2:** Cycle for organizing and implementing PIO activities.
Action Guides for various activities in public communication during an emergency are detailed in Ref. [4]. The same publication also provides Information Sheets that may be used by PIOs with regard to communicating with the public in emergency preparedness and response.
Learning objectives
After completing this chapter, the trainee will be able to:
1. Describe the purpose of the INES scale.
2. Describe the three areas of impact by which nuclear or radiological events are classified.

Jointly developed by the IAEA and the OECD/NEA in 1990, the – International Nuclear and Radiological Event Scale – INES [12] serves nuclear and radiation safety authorities and the nuclear industry worldwide in communicating to the general public, media and technical community the safety significance of nuclear and radiological events.

INES has often been compared to other scales used to measure physical properties such as temperature - the Celsius, Kelvin or Fahrenheit scales - or rated events such as earthquakes - the Richter scale. Like these scales, INES also has a sound technical background and can be easily understood.

INES was initially used to classify events at nuclear power plants only. It was subsequently extended to rate events occurring in any nuclear facility and during the transport of radioactive material, thus also covering events related to the overexposure of workers. Since 2008, INES has been extended to events associated with the transport, storage and use of radioactive material and radiation sources. This means that INES covers all nuclear and radiological events irrespective of whether the event occurs within a facility or not.

Since its inception, about 70 states have adopted the scale and have designated INES national officers. Over the years, INES has become a more widely used tool for placing the safety significance of a nuclear or radiological event in perspective. This is where the true success of INES lies, having helped to foster transparency and provide a better understanding of the safety significance of an event.

Events are rated on the scale at seven levels: Levels 1–3 are called "incidents" and Levels 4–7 "accidents". The scale is designed so that the severity of an event is about ten times greater for each unit increase in level on the scale. Events without safety significance are rated Below Scale / Level 0 (see Figure 7.1). Events that are not related to nuclear or radiation safety are not rated on the scale.
Figure 7.1: The INES scale.

INES rates nuclear and radiological events by considering three areas of impact:

1. **People and the Environment;** here the radiation doses to people or the amount of radioactive material released into the environment are considered.

2. **Radiological Barriers and Control;** here events are considered where the primary barriers preventing a large release are significantly damaged, or events where the primary barriers are intact but there is a major spillage of radioactive materials or significant increase in the dose rate.

3. **Defence-in-Depth;** here events without any direct impact on people or the environment are considered, but for which the range of measures put in place to prevent accidents did not function as intended.

Figure 7.2 illustrates some examples of past nuclear or radiological events rated by INES.
<table>
<thead>
<tr>
<th>People and Environment</th>
<th>Radiological Barriers and Control</th>
<th>Defence-in-Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chernobyl, Ukraine, 1986</td>
<td>Significant release of radioactive material to the environment resulting in widespread health and environmental effects</td>
<td></td>
</tr>
<tr>
<td>Fukushima, Japan, 2011</td>
<td>Significant release of radioactive material to the environment resulting in widespread environmental effects</td>
<td></td>
</tr>
<tr>
<td>Kyahlym, Russian Federation, 1957</td>
<td>Significant release of radioactive material to the environment after the explosion of a high activity waste tank</td>
<td></td>
</tr>
<tr>
<td>Windscale pile, UK, 1957</td>
<td>Release of radioactive material to the environment following a fire in the reactor core</td>
<td>NPP Three Mile Island, USA, 1979 Severe damage to the reactor core</td>
</tr>
<tr>
<td>Goiania, Brazil, 1987</td>
<td>Four people died after being overexposed from an abandoned and ruptured high activity source</td>
<td></td>
</tr>
<tr>
<td>Tokaimura, Japan, 1999</td>
<td>Fatal overexposures of workers following a criticality event at a nuclear facility</td>
<td>Saint Laurent des Eaux, France, 1980 Melting of one channel of fuel in the reactor with no release outside the site</td>
</tr>
<tr>
<td>New Delhi, India, 2010</td>
<td>Radioactive material in scrap metal facility resulting in acute exposure of scrap dealer</td>
<td></td>
</tr>
<tr>
<td>Stambolovytsk, Bulgaria, 2011</td>
<td>Overexposure of four workers at an irradiation facility,</td>
<td></td>
</tr>
<tr>
<td>Lima, Peru, 2012</td>
<td>Severe overexposure of a radiographer</td>
<td>Sellafield, UK, 2005 Release of large quantity of radioactive material, contained within the installation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fleurus, Belgium, 2008 Release of Iodine-131 into the environment from the radionuclide production facility</td>
</tr>
<tr>
<td>Atucha, Argentina, 2005</td>
<td>Overexposure of a worker at a power reactor exceeding the annual limit</td>
<td>Cadarache, France, 1993 Spread of contamination to an area not expected by design</td>
</tr>
<tr>
<td>Paris, France, 2013</td>
<td>Overexposure of a practitioner in interventional radiology exceeding the annual limit</td>
<td>Forsmark, Sweden, 2006 Degraded safety functions for common cause failure in the emergency power supply system at the nuclear power plant</td>
</tr>
<tr>
<td>NPP Rajasthan-5, India, 2012</td>
<td>Exposure of two workers in the nuclear power plant beyond the dose constraints</td>
<td>NPP Laguna Verde-2, Mexico, 2011 Reactor trip due to high pressure in the reactor pressure vessel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NPP Olkiluoto-1, Finland, 2008 Fast stop of the main circulation pumps and simultaneous loss of their fly wheel systems during reactor scram</td>
</tr>
<tr>
<td>Colombo, Sri Lanka, 2012</td>
<td>Discovery of consumer goods contaminated with Co-60</td>
<td></td>
</tr>
<tr>
<td>NPP Královo, Slovenia, 2013</td>
<td>Discovery of damaged fuel rods during core unloading and fuel inspections</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 7.2:** Past nuclear or radiological events and their associated INES rating.

**Communicating Events**

The purpose of INES is to communicate the safety significance of an event to the public. However, the rating should be made (or the levels should be determined) based on all the areas of impact, which requires
sufficient information to be available. In some situations, where not enough details of the event are known early on, a provisional rating may be issued. Later, a final rating should be determined and any differences explained. To facilitate international communications for events rated at level 2 and higher that attract wider interest including other such events, the IAEA maintains a web-based communications network (http://www-news.iaea.org/) that allows reporting of the event to immediately be made publicly available. Events rated on INES are also shared through the Unified System for Information Exchange on Incidents and Emergencies (USIE).

Scope of the Scale
INES covers events at nuclear facilities, events involving sources in industry and medicine, events during transport of radioactive material, events in which radioactive sources or packages were lost or stolen, discovery of orphan sources (such as radioactive sources being found in scrap metal) and events involving the unplanned exposure of individuals in other regulated practices (such as processing of minerals).

What the Scale is Not for
It is not appropriate to use INES to compare safety performance between facilities, organizations or countries. The statistically small numbers of events at Level 2 and above and the differences between countries in reporting more minor events to the public make it inappropriate to draw international comparisons.

It is also inappropriate to use INES to initiate protective actions to an emergency or to classify emergencies for the purpose of triggering appropriate emergency response actions.
8 QUESTIONS

1. What is the goal of public communication and information?
2. List some public communication and information activities.
3. Explain some characteristics of nuclear technologies which are important to communicate.
4. What are the international legally binding instruments facilitated by the IAEA? Name two of them.
5. What is the first rule of communication?
6. List some emotional/psychological characteristics that influence people's perception of risk.
7. What are the goals for communicating nuclear issues?
8. List five typical audiences that the communications plan may need to identify.
9. Imagine there is a small leak in the nuclear part of a nuclear power plant and draft a message for the general public.
10. How is a communications programme evaluated?
11. List five examples of good practices for communicating about nuclear technologies.
12. Explain the meaning of one of these good practices for communicating.
13. What is USIE?
14. What is the purpose of the INES scale?
15. Who reports to IAEA about nuclear and radiological events for INES rating?
16. List three examples of events of level 5 or above.
17. Who is primarily responsible for keeping the public and media informed and for coordinating with all sources of official information?
9 REFERENCES


[10] EUROPEAN COMMISSION, EUROPEAN POLICE OFFICE, FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL CRIMINAL POLICE ORGANIZATION, INTERNATIONAL MARITIME ORGANIZATION, NUCLEAR ENERGY AGENCY OF THE ORGANIZATION FOR ECONOMIC AND CO-OPERATION AND DEVELOPMENT, PAN AMERICAN HEALTH ORGANIZATION, UNITED NATIONS OFFICE FOR THE CO-ORDINATION OF HUMANITARIAN AFFAIRS, UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS, WORLD HEALTH ORGANIZATION, WORLD METEOROLOGICAL ORGANIZATION, In cooperation with INTERNATIONAL


[12] INTERNATIONAL ATOMIC ENERGY AGENCY, The International Nuclear and Radiological Event Scale (INES), Information Series / Division of Public Information, 08-26941 / E.


The views expressed in this document do not necessarily reflect the views of the European Commission.