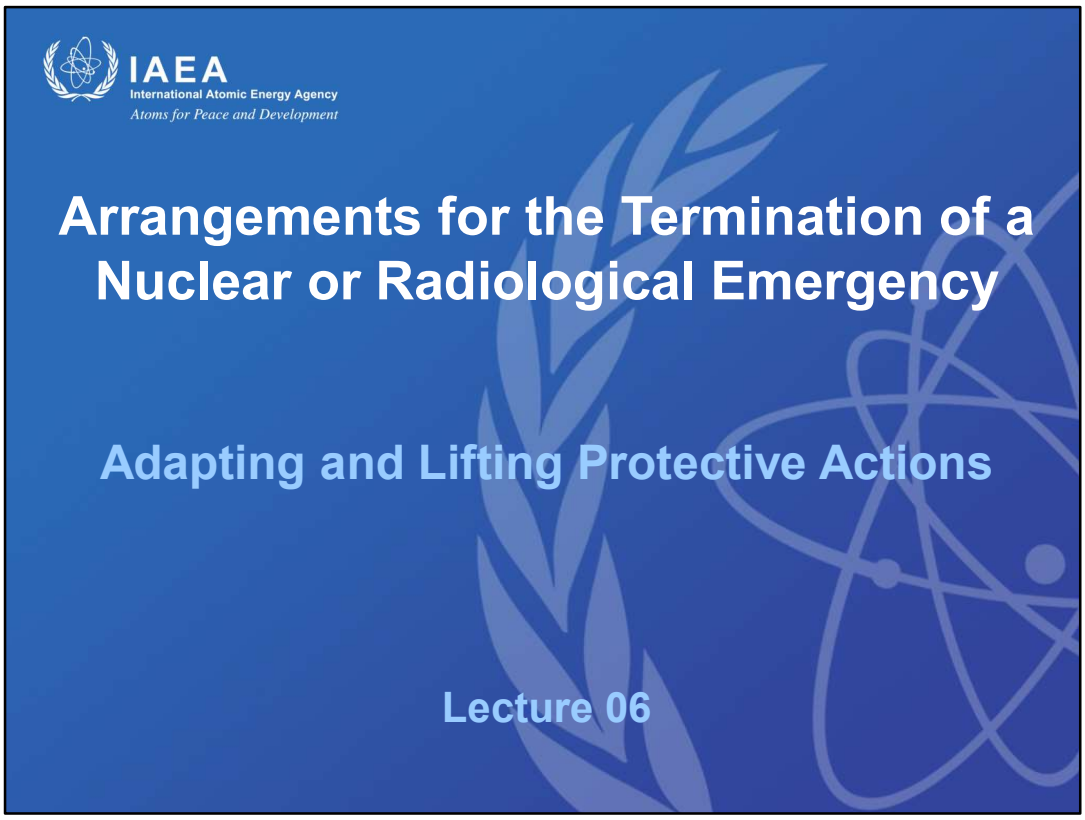
Arrangements for the Termination of a Nuclear or Radiological Emergency



Lecture: 06. Adapting and Lifting Protective Actions

Purpose of the Presentation:

- Present and discuss considerations for adapting and lifting protective actions during the transition phase

Learning Objectives:

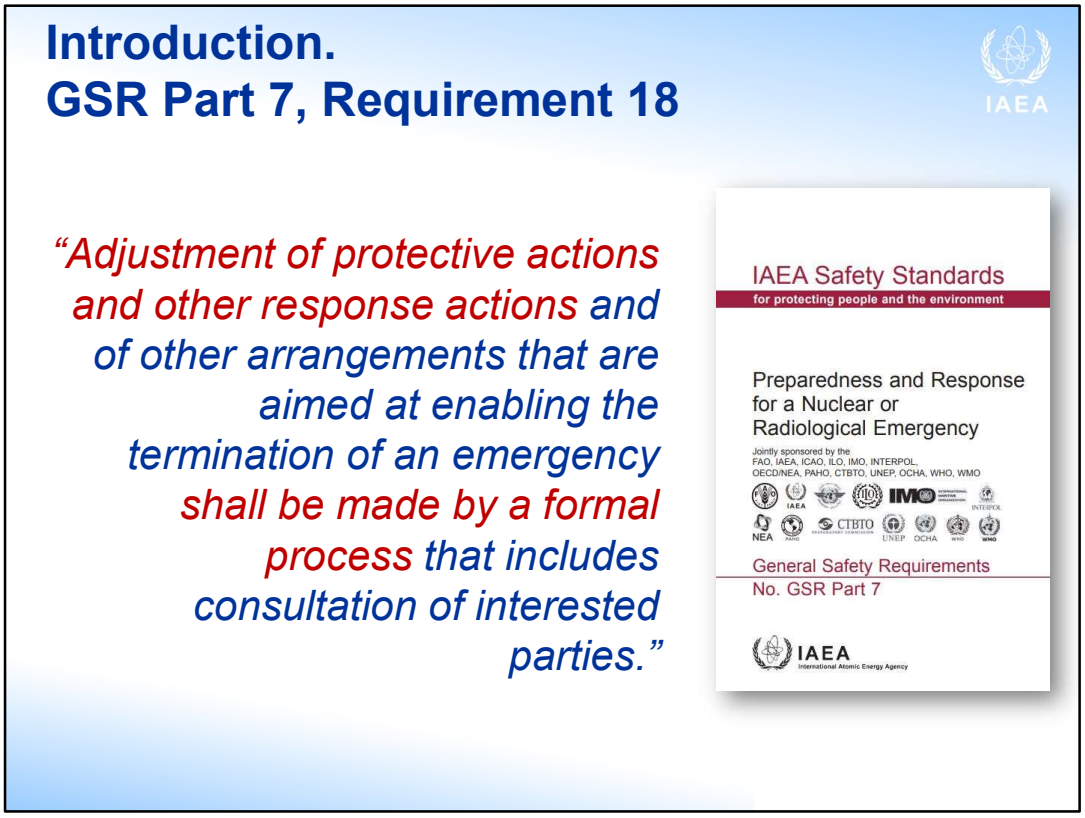
- Recognize when and how protective actions can be adapted and lifted during the transition phase

Duration: 60 minutes

References:

1. International Atomic Energy Agency, Preparedness and Response for a Nuclear or Radiological Emergency, IAEA Safety Standards Series No. GSR Part 7, IAEA, Vienna (2015).

2. International Atomic Energy Agency, Arrangements for the Termination of a Nuclear or Radiological Emergency, IAEA Safety Standards Series No. GSG-11, IAEA, Vienna (2018).
3. International Atomic Energy Agency, Arrangements for Preparedness for a Nuclear or Radiological Emergency, IAEA Safety Standards Series No. GS-G-2.1, IAEA, Vienna (2007).
4. International Atomic Energy Agency, Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency, IAEA Safety Standards Series No. GSG-2, IAEA, Vienna (2011).
5. International Atomic Energy Agency, Criteria for Radionuclide Activity Concentrations for Food and Drinking Water, IAEA-TECDOC-1788, IAEA, Vienna (2016).

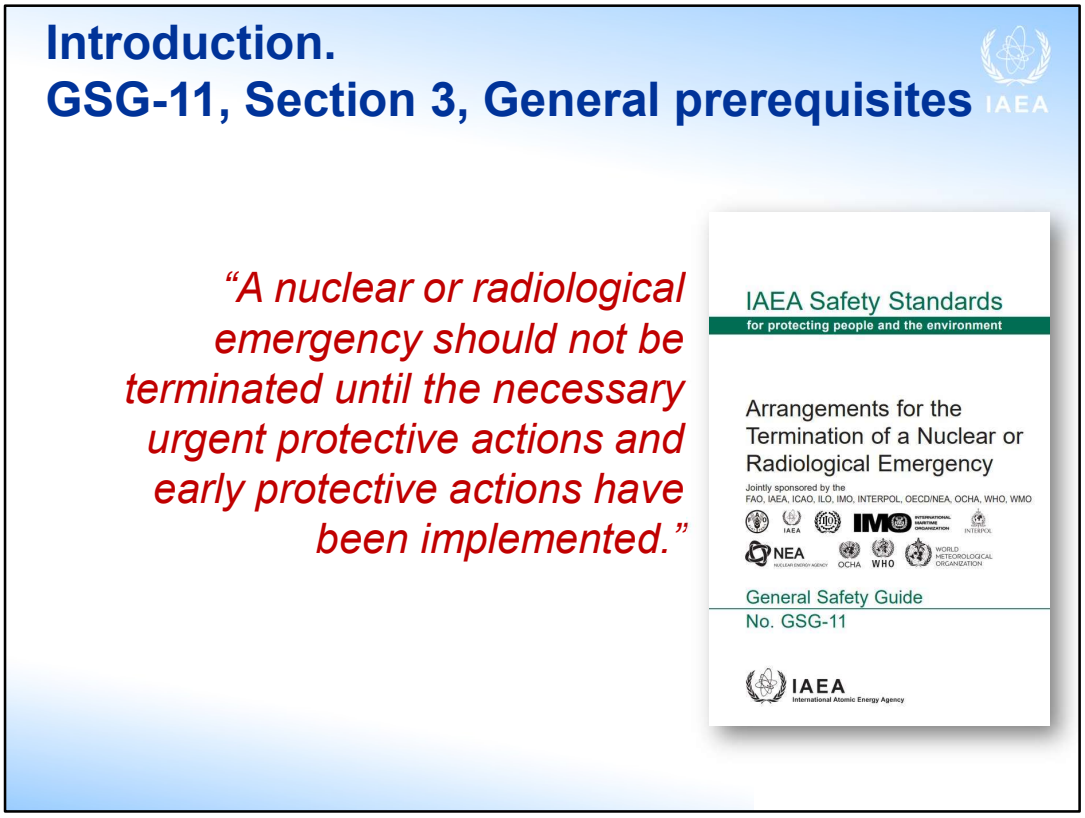


Lecture notes:

Paragraph 5.95 of GSR Part 7 (under Requirement 18: Terminating a nuclear or radiological emergency).

References:

1. International Atomic Energy Agency, Preparedness and Response for a Nuclear or Radiological Emergency, IAEA Safety Standards Series No. GSR Part 7, IAEA, Vienna (2015).



Lecture notes:

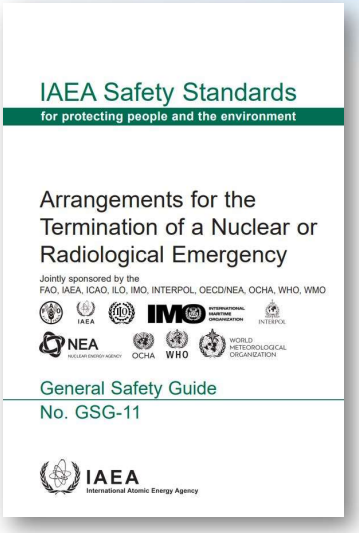
When deciding on the termination of a nuclear or radiological emergency, some of the urgent protective actions and early protective actions (e.g. evacuation) might be already under consideration to be adapted or lifted. Other actions (e.g. restrictions on food, milk and drinking water) might remain in place in the longer term after the termination of the emergency, and some actions, such as iodine thyroid blocking, might already have been implemented and require no further consideration in the transition phase.

Reference:

1. International Atomic Energy Agency, Arrangements for the Termination of a Nuclear or Radiological Emergency, IAEA Safety Standards Series No. GSG-11, IAEA, Vienna (2018).

Introduction.
GSG-11, Section 3, General prerequisites (cont'd)

- Urgent and early protective actions and other response actions might be already under consideration for adapting or lifting during the transition phase.
- Any such change should be discussed and communicated with all concerned parties.



Lecture notes:

When deciding on the termination of a nuclear or radiological emergency, some of the urgent protective actions and early protective actions (e.g. evacuation) might be already under consideration to be adapted or lifted. Other actions (e.g. restrictions on food, milk and drinking water) might remain in place in the longer term after the termination of the emergency, and some actions, such as iodine thyroid blocking, might already have been implemented and require no further consideration in the transition phase.

Before the termination of the emergency, the following should be discussed with and communicated to the public and other interested parties, as appropriate:

- The basis and rationale for the termination of the emergency and an overview of the actions taken and the restrictions imposed;
- The need to adjust imposed restrictions, to continue protective actions or to introduce new protective actions, as well as the expected duration of these actions and restrictions;
- Any necessary modifications to people's personal behaviours and habits; etc.

Purpose

- Present and discuss considerations for adapting and lifting protective actions during the transition phase.

Lecture notes:

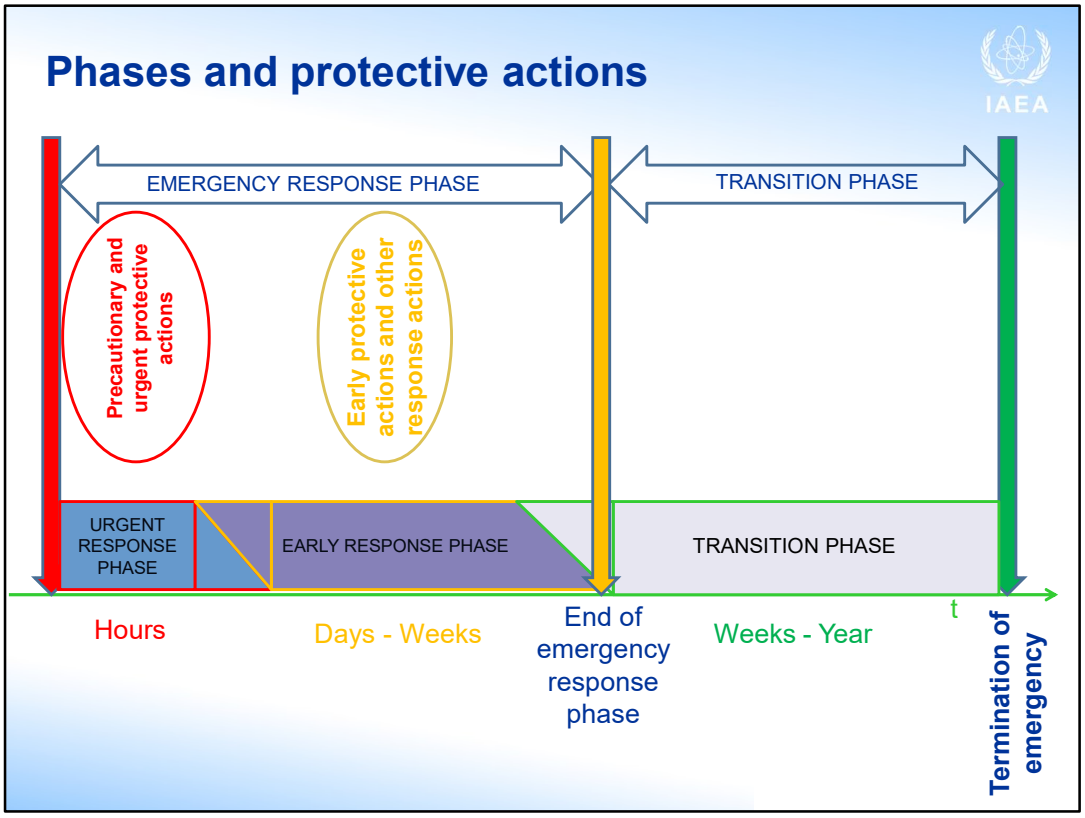
- The transition phase is characterized by a change in approach, from a strategy predominantly driven by urgency to a strategy based on more comprehensive assessments aimed both at reducing longer term exposures and improving living conditions.
- As heard in a previous lecture, the protection strategy already in place will probably need to be adjusted to identify where and for whom new protective actions are necessary; those protective actions that are no longer necessary are then lifted or adapted.
- For example, some of the urgent protective actions implemented as a precaution might be lifted if further assessment indicates that these actions are no longer justified. A decision that certain protective actions are no longer justified might be based on the positive evolution of the situation and the return to safe conditions or it might be based on evidence that the protective action was not necessary because the impact of the emergency was limited.

Learning objectives

- Recognize when and how protective actions can be adapted and lifted during the transition phase.

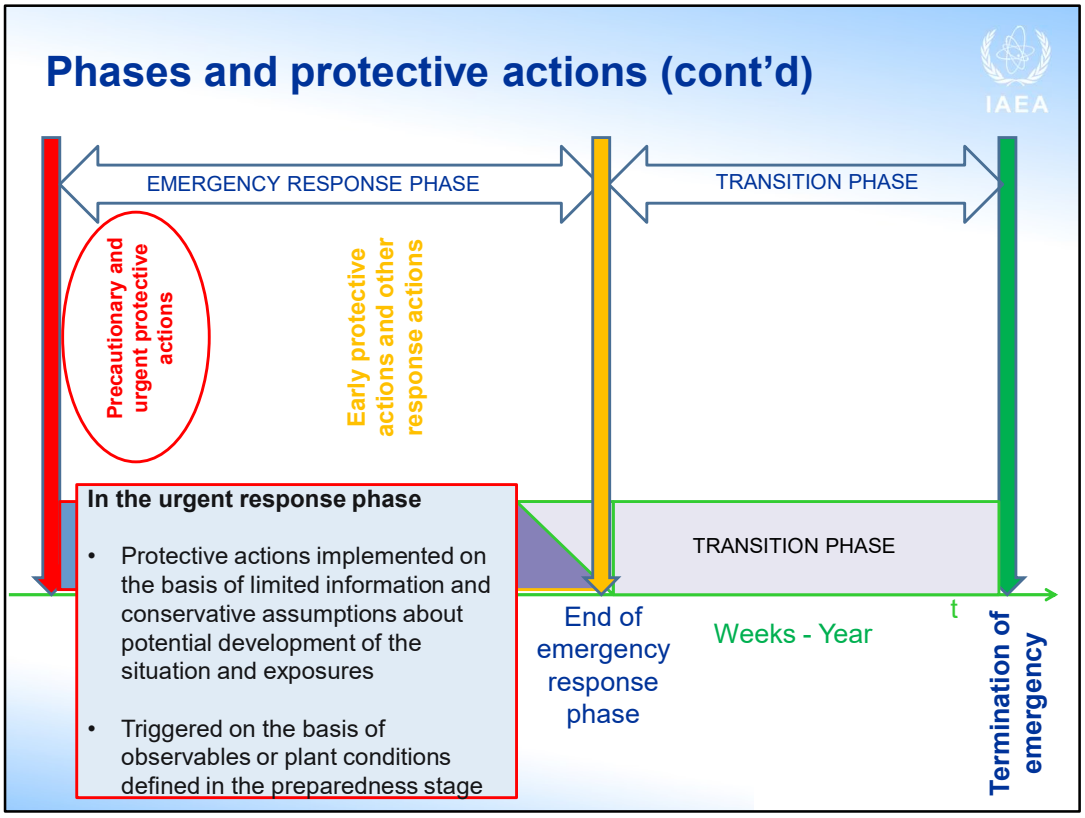
Contents

- Refresher: approaches in different phases and associated protective actions
- General considerations for lifting or adapting protective actions:
  - Practical considerations including the use of OILs and the reference level
- Specific considerations for adapting and lifting the most common protective actions
- Other considerations:
  - Dose reduction measures appropriate for the transition phase
  - Delineation of areas



Lecture notes:

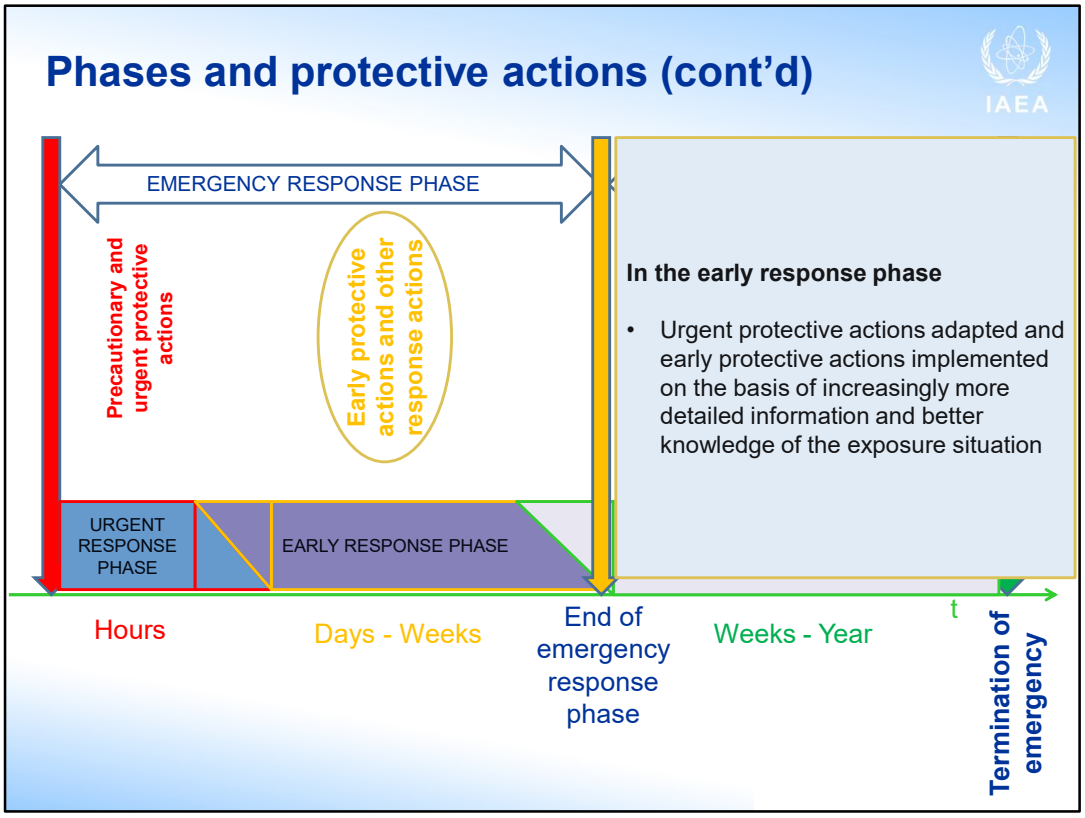
This slide maps out the different phases of an emergency against the different types of protective actions and other response actions that are taken in each phase. Indicative timescales are given for each phase. The need for rapid protective actions to be introduced and the amount of information typically available varies across the phases.



Lecture notes:

The situation for the urgent and early response phases are summarized here:

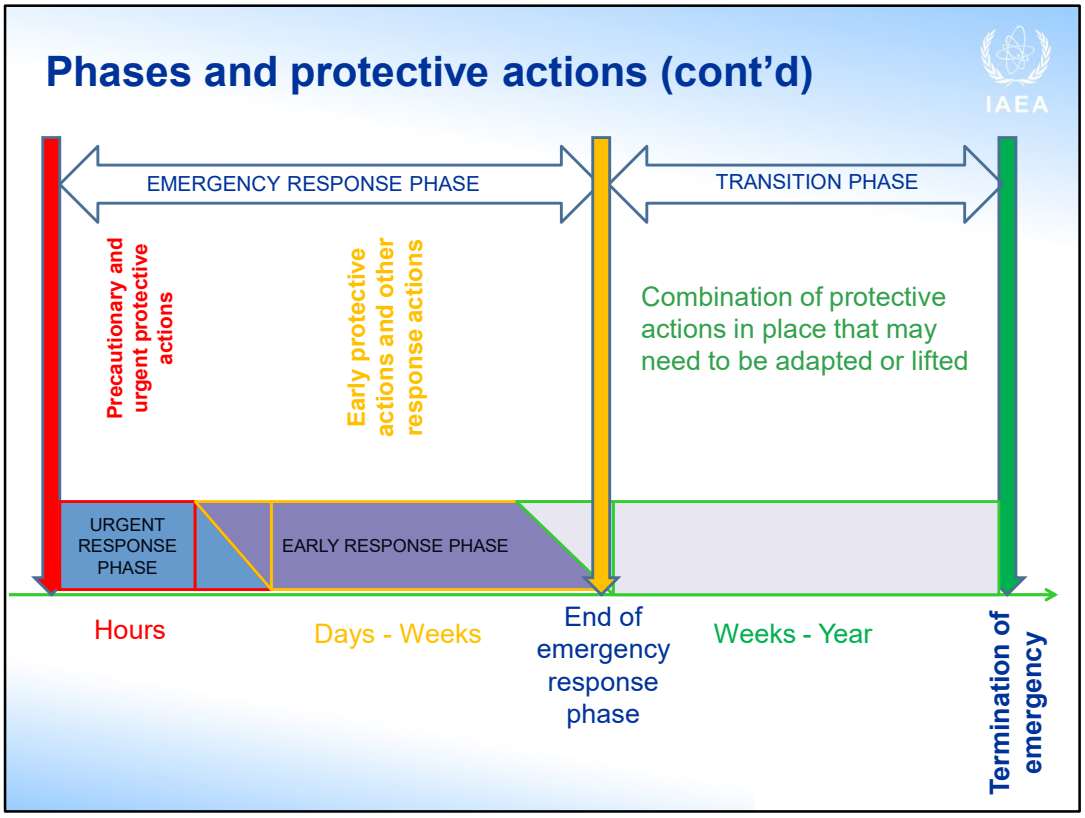
- A decision on taking urgent protective actions is often based on limited information about the emergency and is guided by conservative assumptions about the potential development and impacts of the exposure situation.



Lecture notes:

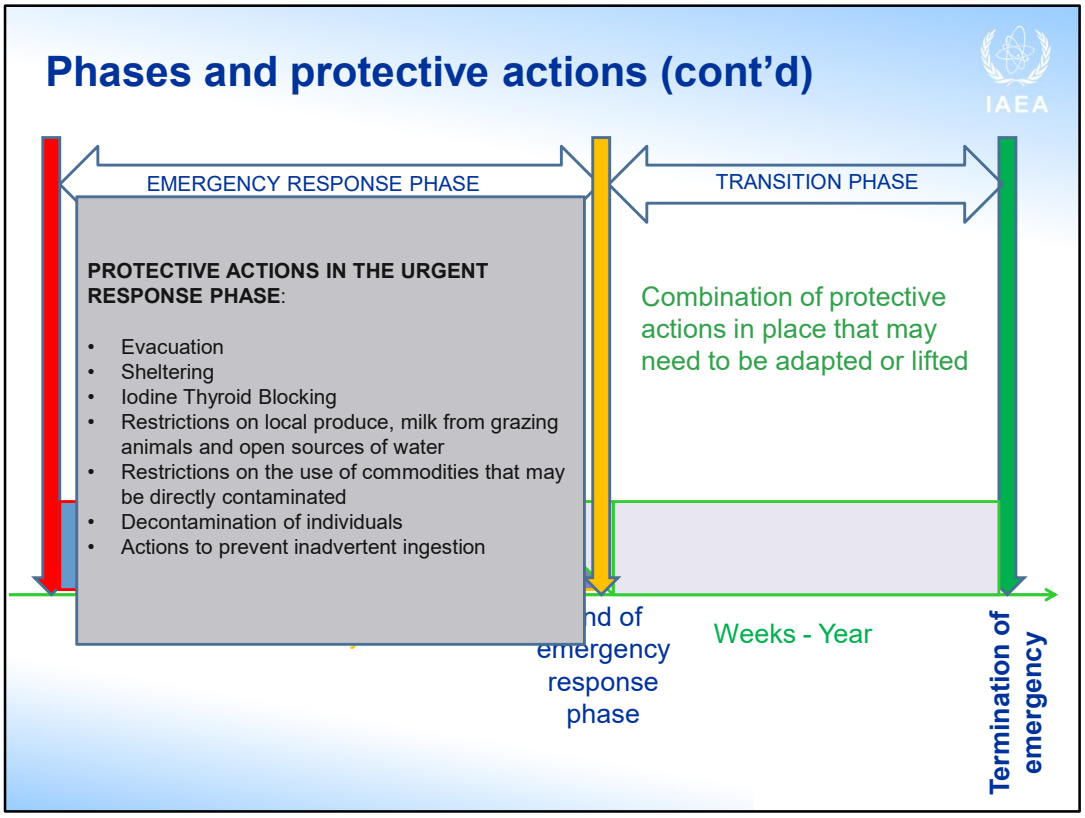
The situation for the urgent and early response phases are summarized here:

- Decisions on the adaptation of urgent protective actions and the implementation of early protective actions are taken on the basis of increasingly more detailed information and better knowledge of the exposure situation.



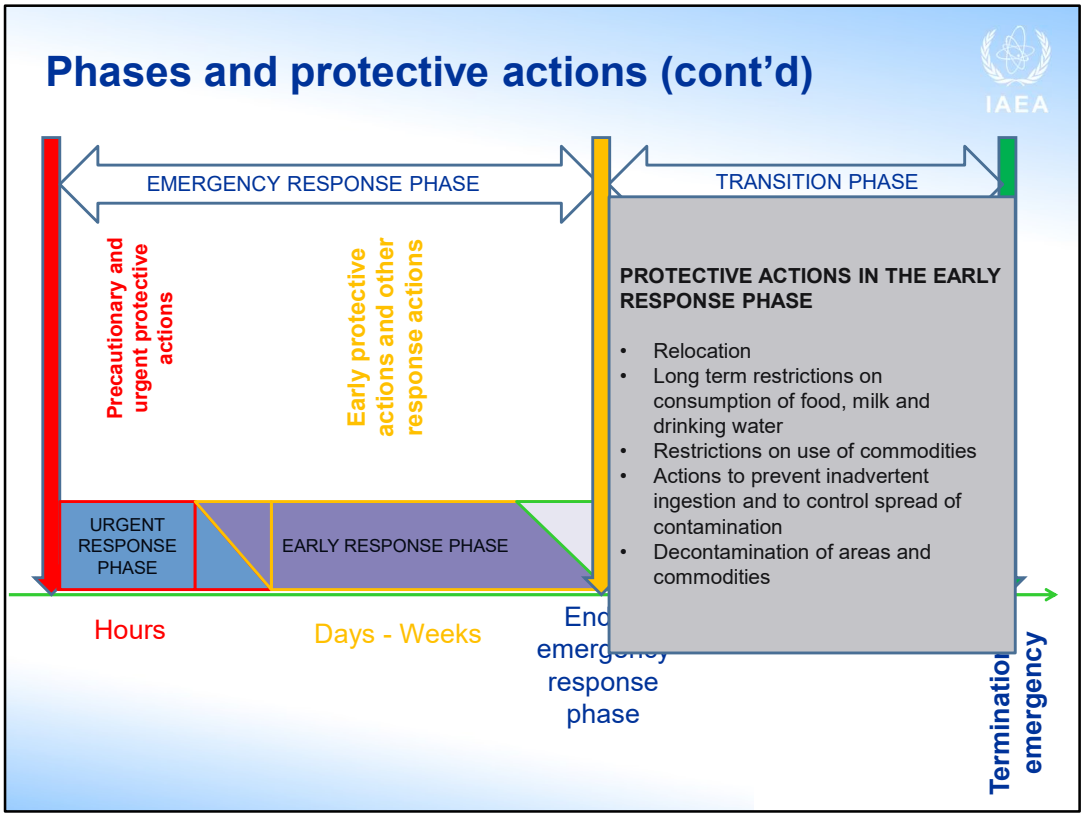
Lecture notes:

Next slides look at the different types of actions that are relevant in the various phases.



Lecture notes:.

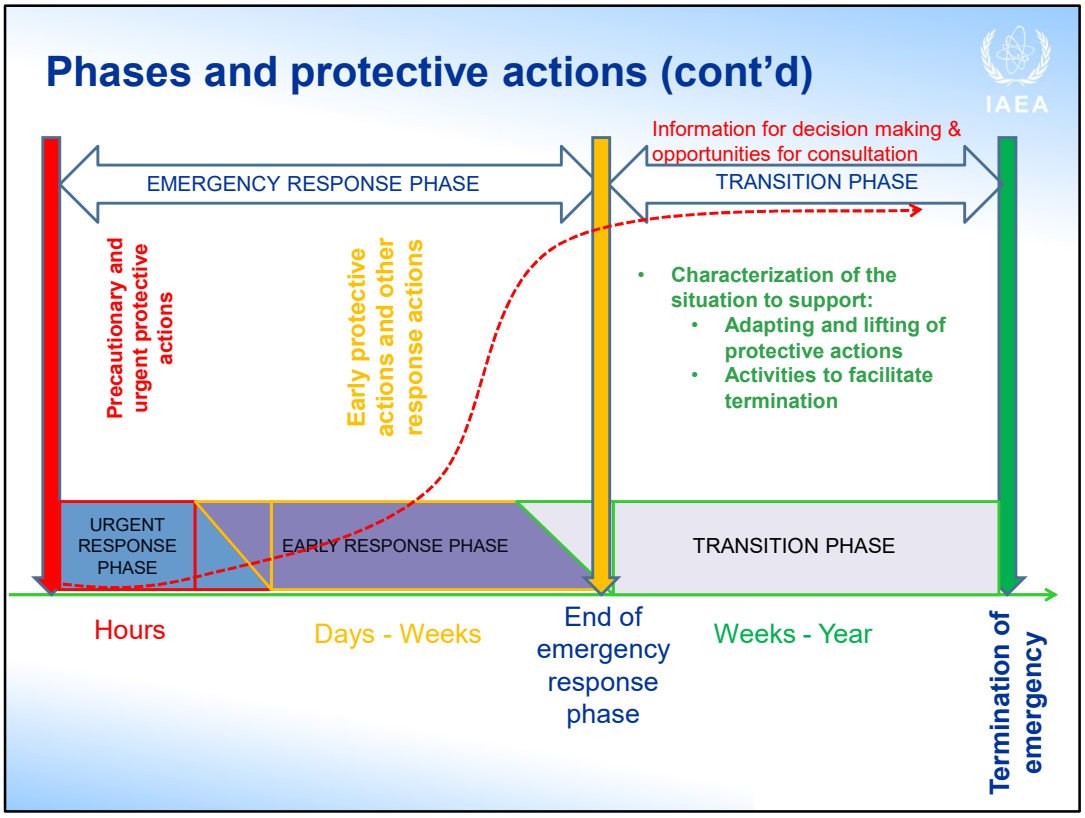
The most commonly considered urgent protective actions are: (a) evacuation; (b) sheltering; (c) iodine thyroid blocking; (d) restrictions on local produce, milk from grazing animals, rainwater or other open sources of drinking water; (e) restrictions on the use of commodities that have the potential to result in significant exposures; (f) decontamination of individuals when appropriate; and (g) actions to prevent inadvertent ingestion. Many of these urgent protective actions may be implemented as a precaution on the basis of observable conditions or plant conditions before the release of radioactive material or before the occurrence of radiation exposures (precautionary urgent protective actions).



Lecture notes:

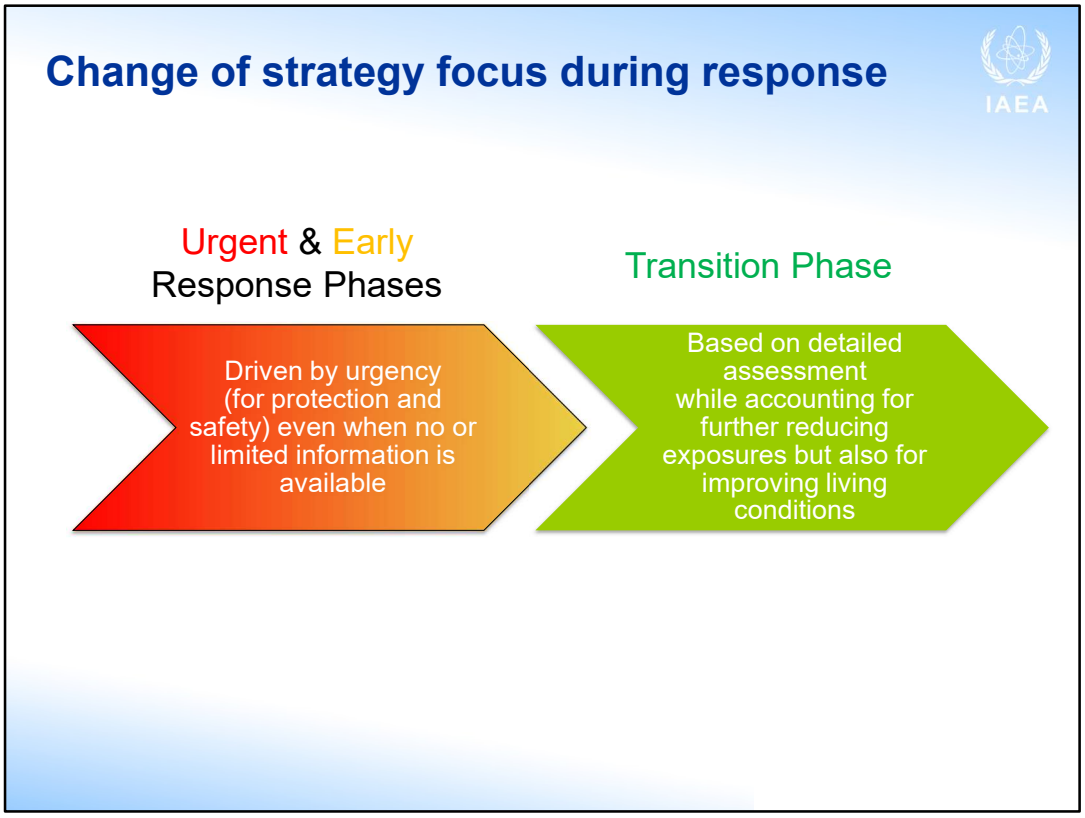
The most commonly considered early protective actions are: (a) relocation; (b) long term restrictions on the consumption of food, milk and drinking water; (c) restrictions on the use of commodities that have the potential to result in significant exposures; (d) actions to prevent inadvertent ingestion and to control the spread of contamination (including access control to areas where evacuation or relocation is implemented); and (e) decontamination of areas or commodities to further reduce the individual doses.

In the transition phase, the protective actions are already in place and some may already be considered to be lifted or adapted.



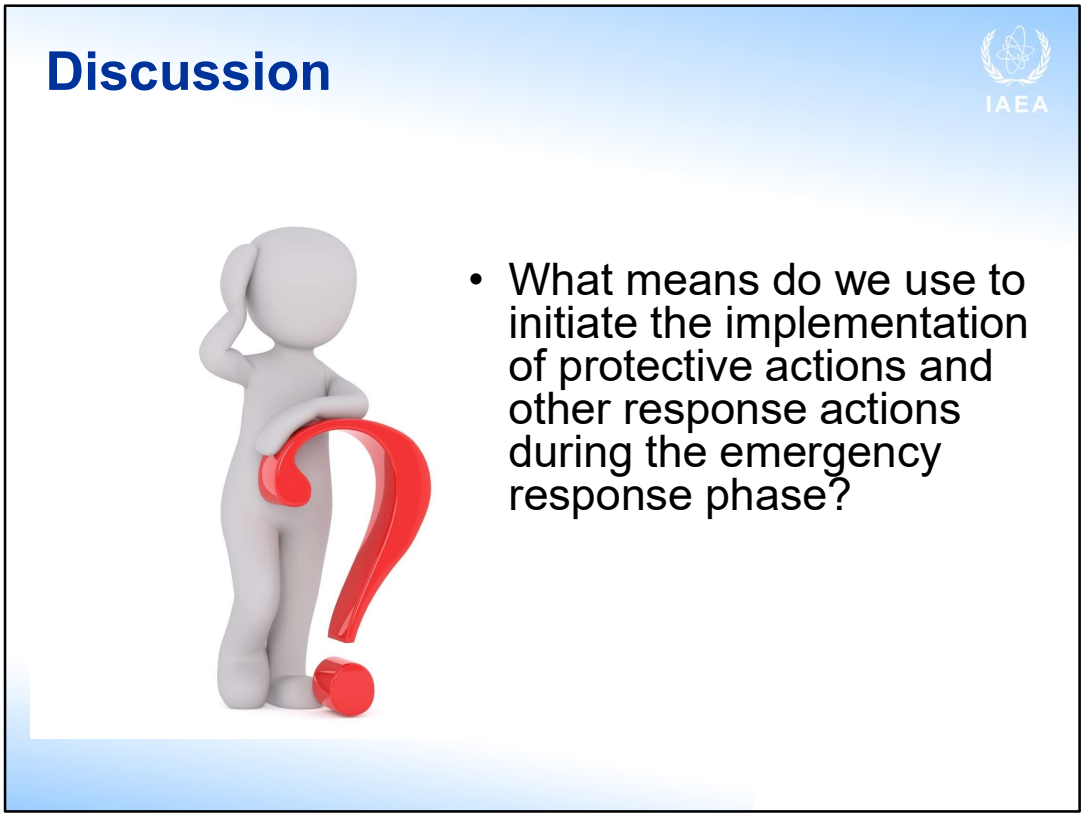
Lecture notes:

A decision on taking urgent protective actions is often based on limited information about the emergency; as we move into the early response phase there is increasingly more detailed information and better knowledge of the exposure situation. The decrease in the urgency of decision making, the increase in the information available and the shift in the goals (to reducing longer term exposures and improving living conditions) mean that the need and opportunities for consultation and the time for decision making increase as we move into the transition phase. An adaptation or lifting of protective actions in the transition phase should be justified and optimized on the basis of the prevailing conditions, with account taken of the results of the detailed characterization of the exposure situation and exposure pathways and a range of radiological and non-radiological considerations.



Lecture notes:

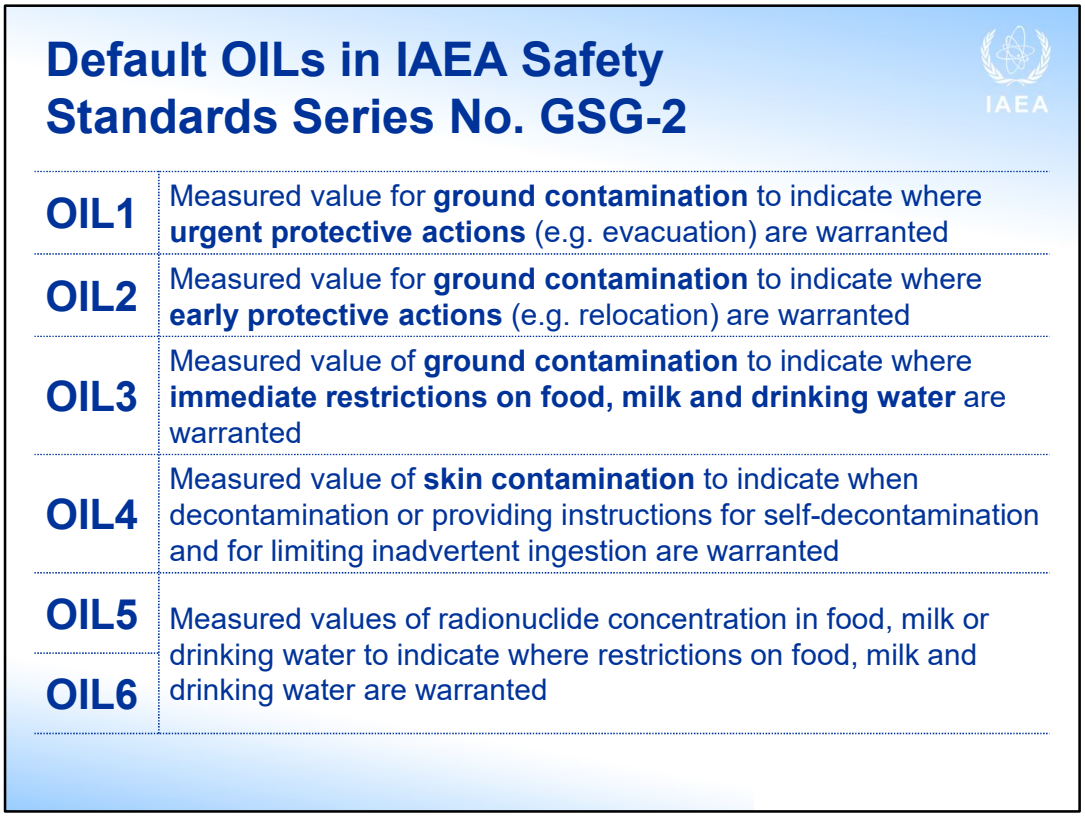
The transition phase is marked by a change in approach, from a strategy predominantly driven by urgency to a strategy based on more comprehensive assessments aimed both at reducing longer term exposures and at improving living conditions.



Lecture notes:

Use this to find out the participants' understanding and knowledge of implementation of emergency response actions and of the role of EALs, OILs and other observables. It will serve as introduction to topics discussed on the following slides.

Allow for about 3 mins. of discussion.



Lecture notes:

In addition to Emergency Action Levels (EALs) or other observable indicators at a site, Operational Interventional Levels (OILs) need to be used in decision making concerning protective actions and other response actions. They are given in terms of directly measurable quantities (in the field or the laboratory) to be used as triggers without need for further assessment. This was discussed in detail in the lecture on the Protection Strategy. GSG-2 provides a set of default Operational Interventional Levels (OILs) which are described here.

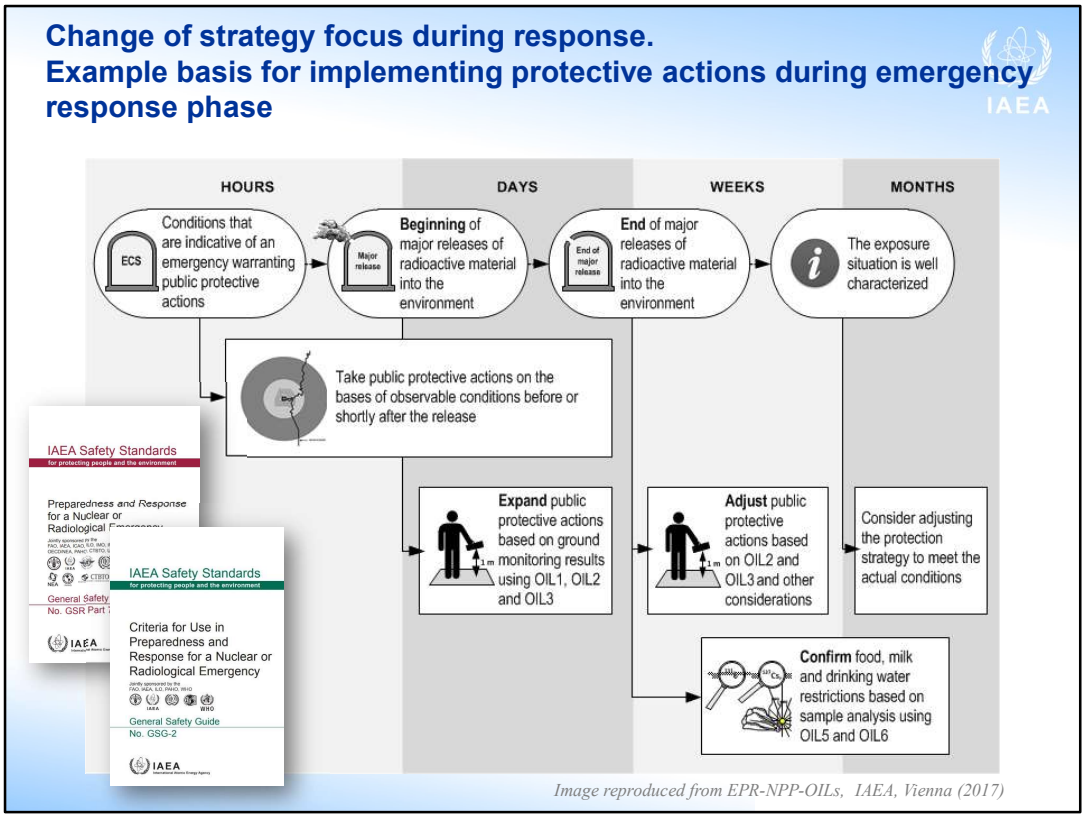


Image reproduced from EPR-NPP-OILs, IAEA, Vienna (2017)

Lecture notes:

This slide gives an overview of how operational criteria, with a particular focus on OILs, are used for implementing protective actions and other response actions as the emergency evolves in the emergency response phase. Precautionary actions are taken before or shortly after the release or exposure based on observable conditions (e.g. EALs). These actions are then reconsidered on the basis of monitoring results as they become available (only after release and exposures occur). This may result already in lifting precautionary actions (e.g. as a result of a positive evolution of the situation) or their expansion beyond areas where precautionary actions were taken. OIL1, OIL2 and OIL3 are used for that purpose, as well as for adjusting the actions even weeks after a major nuclear or radiological emergency.

Once actions have been completed based on the these operational criteria in the urgent and early response phases, and once the greatest risk to the public has therefore been alleviated, there is time for more deliberate assessments.

Lecture notes:

Initially food, milk and drinking water restrictions may be reconsidered on the basis of OIL3 and OIL5, but as sample measurements results become available, OIL6 would be used to identify if restrictions are still warranted or can be lifted as they are no longer justified.

FIG: Role of the OILs provided in this publication within protection strategy, International Atomic Energy Agency, Operational Intervention Levels for Reactor Emergencies, EPR-NPP-OILs, IAEA, Vienna (2017)

Adjusting the protection strategy during the transition phase

- Adjustment of the protection strategy already in place to identify when, where and for whom:
  - New protective actions are necessary;
  - Protective actions are no longer necessary;
- Some protective actions implemented in the urgent and early response phases may continue to be justified and may need to be continued in the longer term;

Lecture notes:

The protection strategy already in place will probably need to be adjusted to identify where and for whom new protective actions are necessary; those protective actions that are no longer necessary are then lifted or adapted. For example, some of the urgent protective actions implemented as a precaution might be lifted if further assessment indicates that these actions are no longer justified. A decision that certain protective actions are no longer justified might be based on the positive evolution of the situation and the return to safe conditions, or it might be based on evidence that the protective action was not necessary because the impact of the emergency was limited.

Adaptation or lifting of protective actions in the transition phase should be justified and optimized on the basis of the prevailing conditions, with account taken of the results of the detailed characterization of the exposure situation and exposure pathways (discussed in the lecture on Characterization of the Exposure Situation) and a range of radiological and non-radiological considerations.

Urgent or early protective actions (e.g. some food restrictions, evacuation/relocation in certain areas) may need to remain in place in the longer term. Not all urgent and early protective actions need to be lifted prior to the termination of the emergency.

Role of Operational Criteria (a reminder). OIL_T

- **OIL_T** to be used as a tool to support:
  - Decision making on lifting or adapting protective actions (what, when, for whom);
  - Implementation of activities to enable the transition to an existing exposure situation by providing a basis to guide simple activities aimed at reducing the residual dose;

Lecture notes:

In the transition phase, OILs based on the generic criteria for taking specific protective actions and other response actions and OILs based on the generic criteria for enabling the transition to an existing exposure situation (referred to as OIL_T in GSG-11 and this lecture) should be used as a tool to support:

- Decision making on lifting or adapting protective actions, including the determination of what protective actions may need to be lifted or adapted, when the protective actions may need to be lifted or adapted and to whom the decision may apply;
- Implementation of activities to enable the transition from an emergency exposure situation to an existing exposure situation by providing a basis to guide simple activities aimed at reducing the residual dose. Examples of such actions include decontamination of an area, restricting access to certain areas or restricting certain outdoor activities.

Role of Operational Criteria (a reminder). OILs

- Additional OILs for the transition phase can be used to initiate considerations for adapting or lifting specific protective actions:
  - Related to OILs used to initiate implementation of these protective actions.
- Such OILs are to be implemented not as a trigger (such as the application of OILs during the emergency response phase) but for screening and informing decisions on adapting or lifting of protective actions.

Lecture notes:

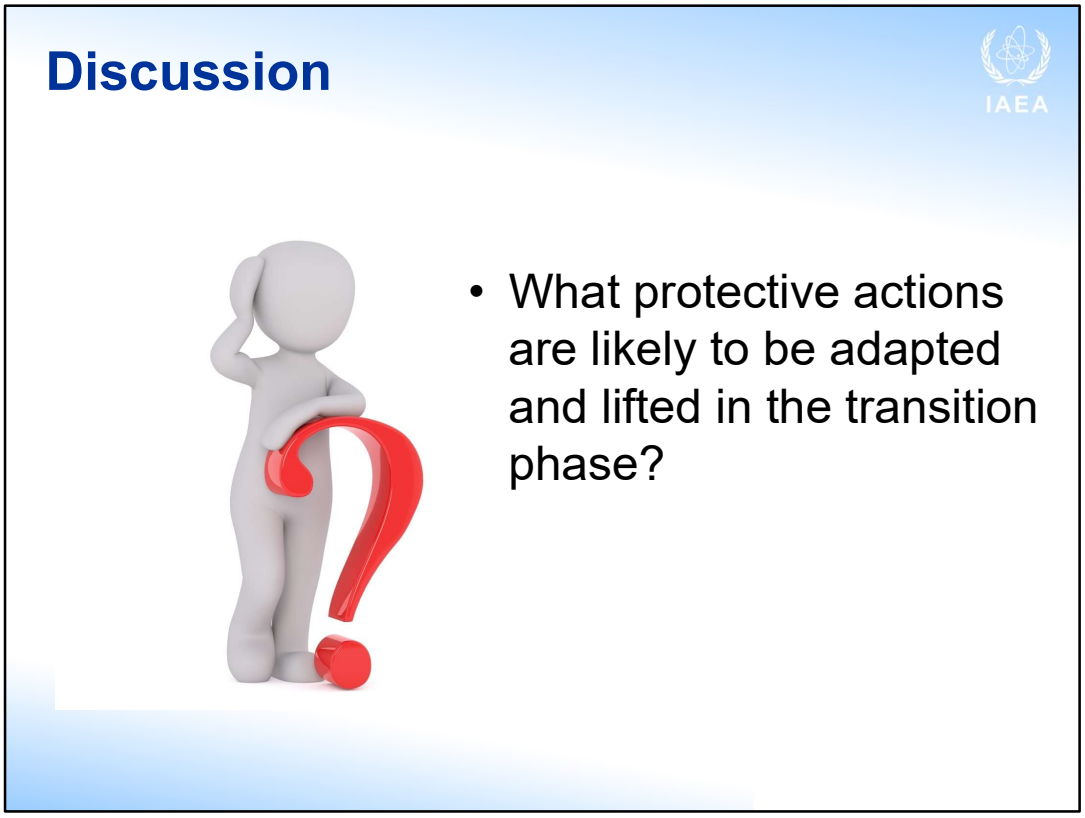
To initiate discussions and enable decisions to be made on the adaptation or lifting of protective actions in the transition phase, OILs should be established at the preparedness stage. The Appendix to GSG-11 provides some relevant OILs and the methodology for the derivation of other OILs. The pre-established OILs should be used to consider which specific protective actions may need to be lifted or adapted, when those protective actions may need to be lifted or adapted and for whom the protective actions many need to be lifted or adapted. After this preliminary screening, the final decision on the adaptation or lifting of protective actions should be based on an assessment of the residual dose from all exposure pathways against the pre-set reference level for enabling the transition.

Decisions on adapting and lifting protective actions

- Final decision based on assessment of residual dose from all exposure pathways and comparison with pre-set reference level while accounting for:
  - Prevailing conditions may vary within an affected area, adapting and lifting protective actions may take place at different times in different locations;
  - Loss of public trust in case of too frequent changes (to be avoided);
  - Consulting and informing the public and other interested parties (why, when & where).

Lecture notes:

As the prevailing conditions may vary within an affected area, consideration should be given to the fact that the adaptation or lifting of protective actions may take place at different times in different locations. Overly frequent changes in the protective actions applied should be avoided, unless such changes would provide significant benefits, as frequent changes could result in a loss of public trust in the decisions of the authorities. And the rationale for changes (and the evidence basis: dose estimates for example) should certainly be explained to help build trust, placing health hazards in perspective. Before the adaptation or lifting of protective actions, the public and other interested parties should be informed about the protective actions that are to be adapted or lifted; the public and other interested parties should be told why, when and where the protective actions will be adapted or lifted and should be advised on how this adaptation or lifting will affect them.



Lecture notes:

Use the discussion as an introduction of the detailed discussion on individual protective actions that follows.

Allow for about 3 mins. of discussion.

Iodine thyroid blocking (ITB)

- A short-term urgent protective action:
  - May be implemented as a precaution, usually in combination with other protective actions.
- Not implemented for prolonged periods:
  - If needed for longer duration (e.g. days), alternative protective actions need to be considered (e.g. evacuation or relocation).
- Not generally implemented in the transition phase:
  - ITB generally adapted or lifted during the emergency response phase.

Lecture notes:

Iodine thyroid blocking is a short term urgent protective action that provides protection for the thyroid against radioactive iodine (so is of particular concern for nuclear power plant emergencies). Iodine thyroid blocking may be implemented as a precaution, although it is not usually a stand-alone action but rather is combined with other protective actions such as sheltering.

Iodine thyroid blocking is not a protective action to be implemented for prolonged periods, although under some circumstances repeated administration of stable iodine might be considered. Whenever there is a need to implement iodine thyroid blocking for a longer duration (e.g. for several days), consideration should be given to implementing evacuation or relocation.

Iodine thyroid blocking is suitable for use in the urgent response phase. Iodine thyroid blocking is adapted or lifted in the emergency response phase.

Sheltering

- Implemented in the urgent response phase even as a precaution:
  - Sheltering may be a transitional action before evacuation can be implemented safely.
- Not appropriate for long periods (more than approximately two days);
- Not appropriate for implementation during transition phase:
  - May be lifted or adapted during this phase.

Lecture notes:

Sheltering is also an urgent protective action that is relatively easy to implement in an emergency, either as a precaution or as an urgent protective action to be taken for a short time until more effective but more disruptive actions (e.g. evacuation) can be safely implemented.

Sheltering should not be carried out for long periods (more than approximately two days). For longer periods of sheltering, issues such as hygiene; food, water and medical supplies; medical, psychological and animal welfare; social isolation, stress; access to information; etc. can become an issue. Sheltering is not appropriate for implementation in the transition phase but may be lifted or adapted during this phase.

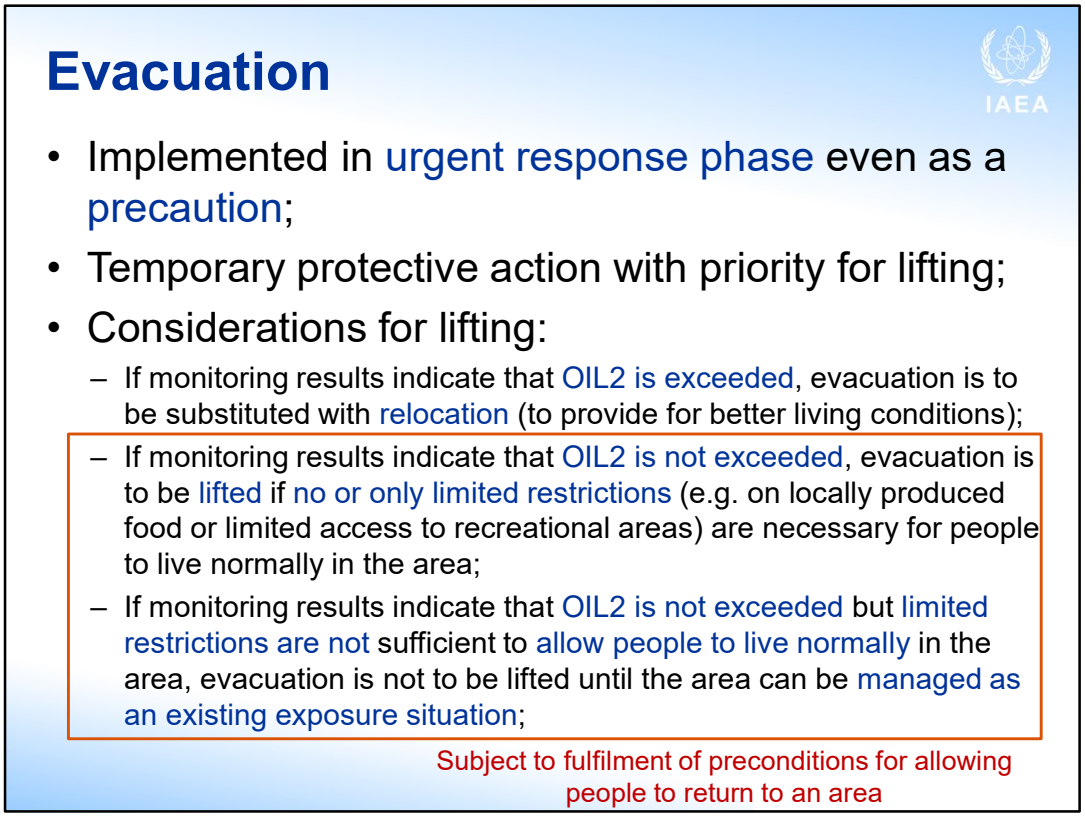
Aspects to consider in adapting or lifting sheltering

- Level of protection offered by buildings;
- Need for simultaneous ITB;
- Medical care and other needs of the sheltering population;
- Need to gradually increase time spent outdoors;
- The need for further protective actions, based on OILs (e.g. evacuation or relocation).

Lecture notes:

Aspects to be considered in the decision to adapt or lift sheltering imposed during the emergency response phase should include:

- The level of protection offered by the types of buildings used for sheltering (shielding factor and tightness against diffusion of outside atmosphere) – the typical type of domestic dwelling varies from country so the level of protection for those 'sheltering in place at home' can vary greatly;
- The need for continued simultaneous implementation of iodine thyroid blocking when appropriate (method for distribution of ITB tablets);
- The medical care and other needs of those sheltered (e.g. the availability of medicines, food supplies, clean clothing and sanitation);
- Any necessity to gradually increase the time recommended for members of the public to spend outdoors until sheltering is fully lifted, with account taken of the need for any instructions to be given on areas to be avoided while outdoors;
- The need for further protective actions based on generic criteria and OILs to replace sheltering (e.g. evacuation or relocation).



Lecture notes:

Evacuation is a protective action 'belonging' to the urgent response phase, which can also be implemented as a precautionary action. Evacuation may be taken as a precautionary action on the basis of observable conditions or plant conditions (i.e. EALs) or as an urgent protective action based on OILs. Because of the temporary nature of evacuation, priority should be given to lifting this protective action. Evacuation is a temporary protective action; in general, those evacuated should be allowed to return back as soon as possible should the situation allow to do so.

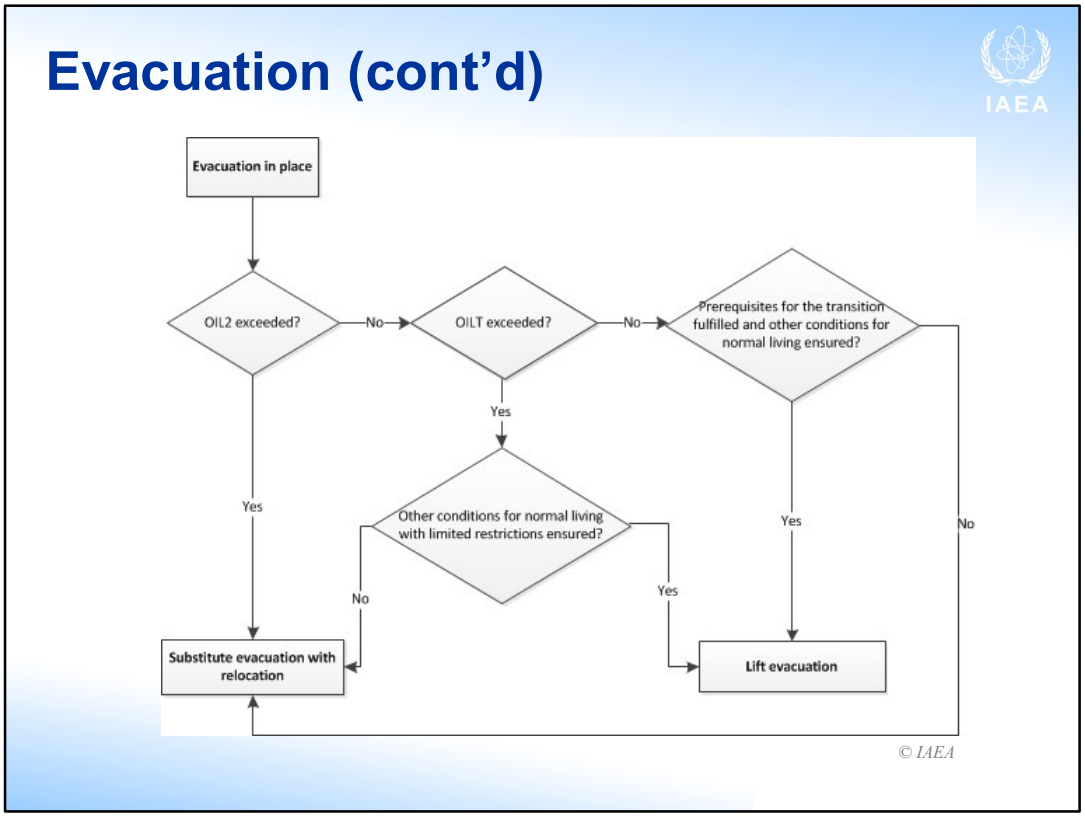
The following aspects for lifting and adapting evacuation need to be considered:

- In an evacuated area where the monitoring results indicate that the projected doses may exceed the generic criteria for relocation (i.e. the measurement results exceed OIL2 of GSG-2 associated with the criterion of 100 mSv/h), evacuation should be substituted by relocation to provide better living conditions for the evacuees.

Lecture notes:

- In an evacuated area where the monitoring results indicate that the projected doses do not exceed the generic criteria for relocation (i.e. the measurement results do not exceed OIL2), evacuation should be lifted if no or only limited restrictions (e.g. restrictions on locally produced food or limited access to certain recreational areas) would continue to be necessary for those people living normally in the area and if the preconditions for allowing people to return to an area (to be discussed later) are fulfilled.
- In an evacuated area where the monitoring results indicate that the projected doses do not exceed the generic criteria for relocation (i.e. the measurement results do not exceed OIL2), but limited restrictions are not sufficient for the protection of the people returning to live normally in the area, or the preconditions for allowing people to return to an area are not fulfilled, evacuation should not be lifted until this area can be managed as an existing exposure situation, after fulfilment of the prerequisites for a termination situation (which includes approaching OILT that corresponds to the criterion of 20 mSv/h) and of the preconditions for allowing people to return to an area.

These options are illustrated on the next slide.



Lecture notes:

See notes on the previous slide.

FIG.: Courtesy of International Atomic Energy Agency

Evacuation (cont'd)

- In allowing people to return, residual doses from all exposure pathways (based on actual circumstances) should be considered, taking account of the limited restrictions in place;
- When substituting evacuation with relocation, people should be granted access to the evacuated area for a short period of time in a controlled manner to prepare for relocation.

Lecture notes:

In deciding whether to allow people to return to these areas, the residual doses from all exposure pathways — based on the actual circumstances — should be considered, with account taken of the limited restrictions continuing to be in place. A comprehensive characterization of the radiological situation (and non-radiological situation) should be carried out to inform this decision. When substituting evacuation with relocation, the people evacuated should be granted access to the evacuated areas for short periods of time and in a controlled manner to allow them to prepare for longer term relocation. A mechanism for surveying and decontaminating (if needed) people's belongings (particularly those of sentimental/cultural/historical value) so they can bring key items with them can assist in this situation.

Relocation

- Implemented in the early response phase:
  - As initial action for certain people or as a replacement to evacuation for others when a return cannot be envisaged in the short term.
- Protective action intended for longer duration (months):
  - Provides better living conditions for those subjected to relocation;
  - Adaptation or lifting less urgent than evacuation, and allows more time for planning.

Lecture notes:

Relocation is generally considered in the early phase when it becomes evident that the return of evacuated population cannot be envisaged in a short time frame (some days up to a few weeks). Relocation is intended for rather long periods (months or longer). Lifting this countermeasure to allow people to return is less urgent compared to evacuation. It may turn to permanent resettlement when the contamination of the place of origin is so high and other conditions are such that return cannot be envisaged for years or more.

Relocation (cont'd)

- Lifted under the conditions applicable for evacuation:
  - Comparison of monitoring data with OIL2 or OIL_T;
  - Realistic assessment of residual doses if people were to return (taking account of any restrictions);
  - Consideration of the effectiveness of limited restrictions to allow normal life;
  - Fulfilment of specific preconditions for allowing people to return to an area.

Lecture notes:

Relocation should be lifted under the same conditions as those applicable to lifting evacuation.

Preconditions for return of people to an area

- Infrastructure and public services restored;
- Clear instructions and advice provided on the restrictions still in place and the recommended changes to behaviour and habits;
- Public support centre(s) and information material for reassurance and psychosocial care are available;
- A strategy established for restoration of workplaces and for provision of social support for individuals who worked in the area;
- Information on the likely evolution of the exposure situation and associated health hazards provided to those returning.

Lecture notes:

The decision of allowing evacuated people to return should not be taken solely on the basis of radiological consequences. Before allowing evacuees to return, a number of non-radiological conditions should also be met that are essential to enable normal living. This includes the restoration of the infrastructure and essential public services such as public transportation, shops and markets, schools, health care facilities, police and firefighting services, water services, sanitation, energy supplies, telecommunication networks, etc. People need to receive clear instructions regarding the restriction(s) still in place and the change of behaviour and habits that are required: for example, changes in land use, no home-grown foods, areas/roads to avoid. Public information centres and information material need to be available for reassurance and psychosocial support. A strategy should have been established for the restoration of workplaces and for the provision of social support for individuals working in the area.

Restrictions on food, milk and drinking water

- Restrictions imposed on food, milk and drinking water often are taken as a precaution on the basis of observable conditions and then adjusted based on OILs;
- Detailed characterization in the transition phase to identify where and for what foods restrictions are either:
  - Justified in the longer term *or*
  - Need to be lifted.

Lecture notes:

Restrictions that were imposed on food, milk and drinking water as a precaution in the emergency response phase on the basis of estimates (e.g. on the basis of EALs or OIL3) and thereafter were adjusted on the basis of OIL5 and OIL6 should be characterized in detail in the transition phase. The purpose is to identify food production areas and foodstuffs that need to remain subject to restriction even in the longer term and to identify those restrictions that need to be lifted. OILs for restrictions of food, milk and drinking water derived on the basis of sampling and analysis (i.e. OIL6) should be used when considering whether to adapt or lift this protective action. This is illustrated on the next slide.

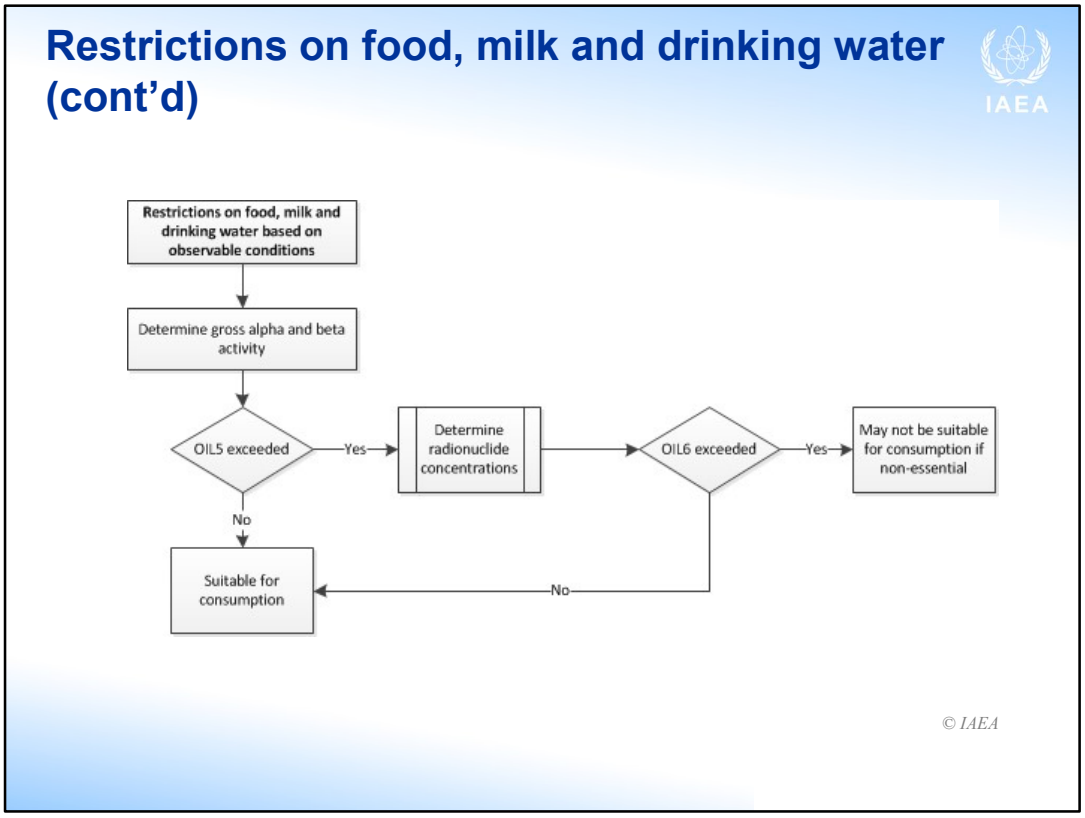
OIL6 in GSG-2 has been derived on the basis of the generic criterion of a projected effective dose of 10 mSv per year and uses extremely conservative assumptions (e.g., on the amount of foods consumed from a particular area). In the transition phase, the actual doses received from the ingestion pathway and their contribution to the residual dose should be estimated on the basis of actual conditions to aid in decision making on the adaptation or lifting of this protective action.

Lecture notes:

Under actual conditions, the contribution of actual doses from the ingestion pathway to the total residual dose is expected to be significantly less than 10 mSv effective dose per year.

For the transition phase, the estimation of doses due to ingestion should be carried out using more realistic consumption data and actual measurements of different foods – this will give more accurate estimates of the doses incurred from this pathway compared to the conservative assumptions used for the emergency response phases. It is also possible that agricultural management options can be used to reduce the radionuclide concentrations in those foodstuffs where they remain high – this may avoid (or limit) the need for food restrictions in the longer term.

FIG.: Photos are taken from https://pixabay.com/, with licence which allows images to be used for free for commercial purposes and no attribution is required.



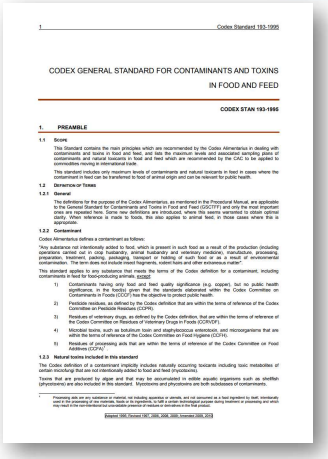
Lecture notes:

See notes on the previous slide.

FIG.: Courtesy of International Atomic Energy Agency

Restrictions on food, milk and drinking water (cont'd)

- International trade expected to be governed by criteria that take into account Codex Alimentarius Commission (in line with GSR Part 7):
  - Applicable after the emergency irrespective of exposure situation (emergency or existing).



1 Codex Standard 193-1995

CODEX GENERAL STANDARD FOR CONTAMINANTS AND TOXINS IN FOOD AND FEED

CODEX STAN 193-1995

1. PREAMBLE

1.1 Scope

This Standard contains the main principles which are recommended by the Codex Alimentarius in dealing with contaminants and toxins in food and feed, and lists the maximum levels and associated sampling plans of contaminants and natural toxicants in food and feed which are recommended by the CAC to be applied to commodities moving in international trade.

This standard includes only maximum levels of contaminants and natural toxicants in feed in cases where the contaminant in feed can be transferred to food of animal origin and can be relevant for public health.

1.2 Definition of Terms

1.2.1 General

The definitions for the purpose of the Codex Alimentarius, as mentioned in the Procedural Manual, are applicable to the General Standard for Contaminants and Toxins in Food and Feed (GSCTFF) and only the most important ones are repeated here. Some new definitions are introduced, where this seems warranted to obtain optimal clarity, in which reference is made to foods, that also applies to animal feed; in those cases where this is appropriate.

1.2.2 Contaminant

Codex Alimentarius defines a contaminant as follows:

"Any substance not intentionally added to food, which is present in such food as a result of the production (including operations carried out in crop husbandry, animal husbandry and veterinary medicine), manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such food or as a result of environmental contamination. The term does not include insect fragments, rodent hairs and other extraneous matter".

This standard applies to any substance that meets the terms of the Codex definition for a contaminant, including contaminants in feed for food-producing animals, except:

1) Contaminants having only food and feed quality significance (e.g. copper), but no public health significance, in the food(s) given that the standards elaborated within the Codex Committee on Contaminants in Foods (CCCF) has the objective to protect public health.

2) Pesticide residues, as defined by the Codex definition that are within the terms of reference of the Codex Committee on Pesticide Residues (CCPR).

3) Residues of veterinary drugs, as defined by the Codex definition, that are within the terms of reference of the Codex Committee on Residues of Veterinary Drugs in Foods (CCRVDF).

4) Microbial toxins, such as botulinum toxin and staphylococcus enterotoxin, and microorganisms that are within the terms of reference of the Codex Committee on Food Hygiene (CCFH).

5) Residues of unapproved acts that are within the terms of reference of the Codex Committee on Food Additives (CCFA).

1.2.3 Natural toxins included in this standard

The Codex definition of a contaminant implicitly includes naturally occurring toxicants including toxic metabolites of certain microfungi that are not intentionally added to food and feed (mycotoxins).

Toxins that are produced by algae and that may be accumulated in edible aquatic organisms such as shellfish (phycotoxins) are also included in this standard. Mycotoxins and phycotoxins are both subclasses of contaminants.

* Processing aids are any substance or material, not including apparatus or utensils, and not consumed as a food ingredient by itself, intentionally used in the processing of raw materials, foods or its ingredients, to fulfil a certain technological purpose during treatment or processing and which may result in the non-functional but unavoidable presence of residues or derivatives in the final product.

Adopted 1995. Revised 1997, 2006, 2008, 2009. Amended 2009, 2019.

Lecture notes:

The implementation, adaptation or lifting of restrictions on the international trade of food, milk and drinking water should take into account established national criteria (that, in turn, take account of the guideline levels contained in the Codex Alimentarius Commission General Standards, which are consistent with GSR Part 7 and GSR Part 3).

Restrictions on food, milk and drinking water (cont'd)

- Public reassurance calls for evidence in food safety such as:
  - Publishing monitoring results with health hazards being placed in perspective;
  - Certification.

Lecture notes:

To reassure the public of the radiation safety of food, milk and drinking water in the transition phase, the relevant authorities should provide evidence of compliance with applicable national regulations. Such evidence should include publishing of monitoring results, including information that places the radiological health hazards in perspective, and, where appropriate, certification of particular foodstuffs for sale. Considerations such as plain language explanations and use of accredited/quality controlled laboratories should be included in planning.

Restrictions on food, milk and drinking water (cont'd)

- Governed by the radiation protection frameworks applicable for existing exposure situation.

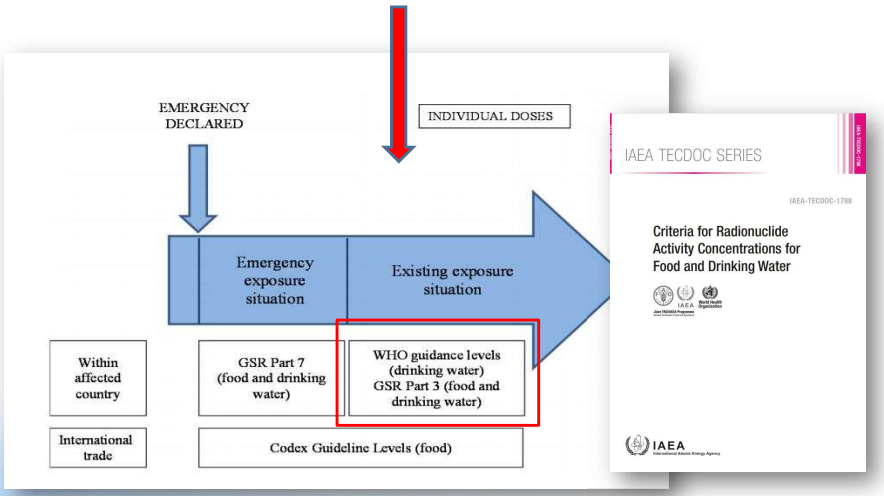


Image reproduced from IAEA-TECDOC-1788, IAEA, Vienna (2016)

Lecture notes:

For existing exposure situations, Requirement 51 of GSR Part 3 requires that specific reference levels be established for exposure due to radionuclides in commodities including food and drinking water, each of which is typically required to be expressed as, or based on, an annual effective dose to the representative person that does not generally exceed a value of about 1 mSv. In addition, the World Health Organization has issued guidelines for drinking water quality that provide guidance levels for radionuclides in drinking water for prolonged situations of exposure resulting from past emergencies. Thus, further restrictions on food, milk and drinking water extending into the longer term in an existing exposure situation might be implemented in order to eventually achieve these levels. The various international guidelines and criteria that apply for drinking water and food in the emergency and existing exposure situations (and for food for export or to be used in the affected country) are explained in IAEA-TECDOC-1788 where this figure comes from.

FIG.: The stage at which international standards or guidance for radionuclides in food and drinking water apply on the basis of individual doses, International Atomic Energy Agency, Criteria for Radionuclide Activity Concentrations for Food and Drinking Water, IAEA-TECDOC-1788, IAEA, Vienna (2016)

Restriction on non-food commodities

- Lifting or adapting restrictions on non-food commodities implemented during the emergency response phase, e.g. as precaution, to be based on more comprehensive information and monitoring results;
- In the transition phase, estimates of the actual dose received from non-food commodities and the contribution to residual dose will inform decision making on adaptation and lifting restrictions.

Lecture notes:

- Decisions on the adaptation or lifting of restrictions on non-food commodities implemented during the emergency response phase as a precaution or based on estimates (e.g. on the basis of EALs or OIL3 of GSG-2) should be based on comprehensive information and actual monitoring results. The purpose is to identify non-food commodities that are justified to remain under restriction even in the longer term and to identify those restrictions that need to be lifted. OILs for non-food commodities derived on the basis of sampling and analysis (referred to in GSG-11 as OIL_C) should be used for this purpose. A methodology to derive default OIL_C values is given in the Appendix to GSG-11.
- In the transition phase, the actual doses received from the use of non-food commodities and the contribution of these doses to the residual dose should be estimated on the basis of the actual circumstances. These estimates should be used to inform decision making on the adaptation or lifting of restrictions on the use of non-food commodities.

Lecture notes:

Requirement 51 of GSR Part 3 establishes the specific reference level for commodities in the longer term in an existing exposure situation as an annual effective dose of about 1 mSv. Further restrictions on non-food commodities extending to the longer term in an existing exposure situation might be implemented to achieve this reference level. However, this discussion goes beyond considerations concerning the termination of the emergency and is thus beyond the scope of this lecture.

Following the Fukushima Daiichi accident, Japanese exports such as personal electronics, cars, etc. arose as an issue for which importing countries had to develop criteria and arrangements.

Restrictions on non-food commodities (cont'd)

- Public reassurance calls for evidence of safety of non-food commodities such as:
  - Publishing of monitoring results, with health hazards being placed in perspective;
  - Certification, as appropriate.

Lecture notes:

To reassure the public of the radiation safety of non-food commodities in the transition phase, the relevant authorities should provide evidence for compliance with applicable national regulations. Such evidence should include publishing of monitoring results, including information that places the radiological health hazards in perspective, and, where appropriate, certification.

Dose estimates for decision making in transition phase

- Estimates on the contribution to residual doses from food or non-food commodities will be used to inform decision making on the adaptation and lifting of restrictions in the transition phase.

Discussion

- Have you established detailed criteria for when and how specific protective actions can be lifted and how this will be done?

Lecture notes:

Allow for about 3 mins of discussion.

Dose reduction considerations in the transition phase

- Actions to prevent inadvertent ingestion and inhalation of resuspended material are needed to reduce dose among those returning to affected area;
- Control of access, decontamination of the area or commodities may be used to enable progressive lifting of protective actions (such as evacuation and relocation).

Lecture notes:

Actions to prevent inadvertent ingestion and inhalation (e.g. washing hands and limitations on playing on the ground or on working in gardens) would be advised during the urgent response phase. However, as a protective action, advice on preventing inadvertent ingestion and the inhalation of resuspended material should also be implemented in the transition phase, on the basis of actual conditions, to reduce the residual dose among those returning to live in an affected area once evacuation or relocation is lifted. Resuspension will be important as a potential pathway in more arid areas or for those working outdoors, disturbing hard surfaces (e.g., those involved in clean-up, farmers, construction workers, etc.).

Long term remediation may be needed after a large scale emergency with significant releases of radioactive material to the environment. However, control of access, decontamination of the area or commodities and other simple dose reduction techniques should be used in the transition phase to enable the progressive lifting of protective actions such as evacuation and relocation. These actions should be considered for implementation beyond the areas where evacuation and relocation were implemented during the emergency response phase and should include areas to which people are returning.

Delineation of restricted areas

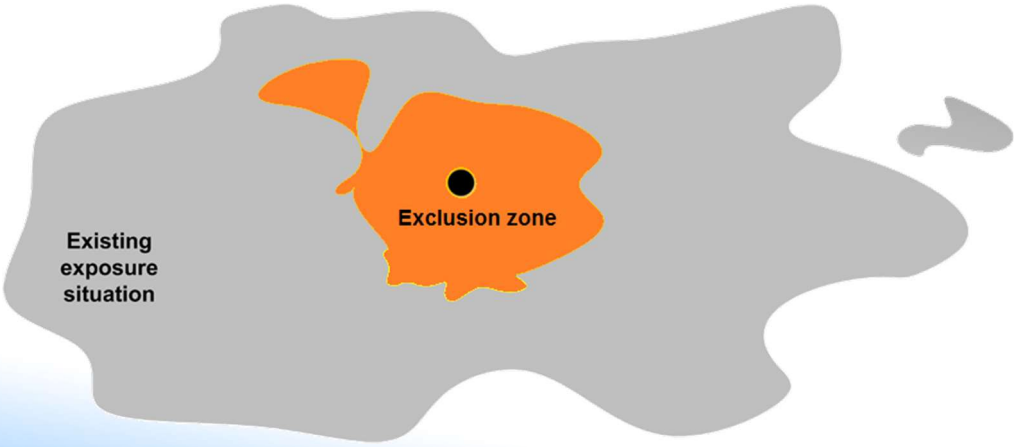
- Areas that cannot be inhabited and where social and economic activity cannot be resumed should be delineated and access controlled:
  - Depends on radiological aspects and other prerequisites and public acceptance of return;
  - Delineation may take account of existing geographical or jurisdictional boundaries.
- Information about delineated areas and measures should be clearly communicated.

Lecture notes:

- Areas for which access and use restriction are confirmed or new areas identified as needing restriction should normally not be opened for people to return, and administrative measures should be put in place to control access.
- Where restrictions are not justified any more, areas should be opened, and people should return to normal life.
- Information about delineated areas and measures put in place to control access should be clearly communicated to all interested parties.
- The decision to delineate areas as unsuitable for inhabitation should involve consideration of radiological aspects along with the other prerequisites; in addition, social factors, such as public acceptance of returning to the area, should also be taken into account.
- Existing geographic or jurisdictional boundaries may also be considered when deciding on the delineation, as this will be easier to communicate to the public/local officials.

Delineation of restricted areas (cont'd)

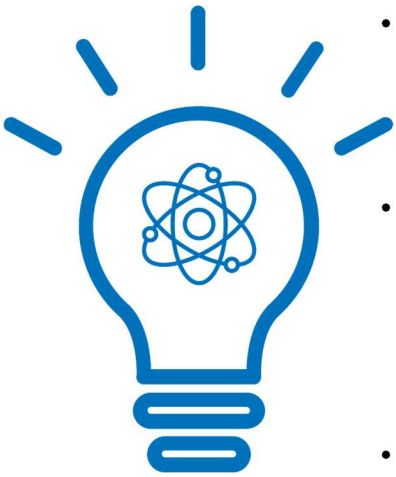
Subject to these measures for access control, the delineation of an area as inadequate for inhabitation should not constitute an obstacle to terminating the emergency.



Lecture notes:

- Those areas identified in the transition phase that cannot be inhabited, and where social and economic activity cannot be resumed, should be delineated.
- Such areas should normally not be opened for people to return to live in, and administrative measures should be put in place to control access.
- Subject to these measures for access control, the delineation of an area as unsuitable for inhabitation should not constitute an obstacle to terminating the emergency – once the necessary control arrangements and notifications are in place.

Summary



- In the transition phase, decisions on adapting and lifting protective actions should be based on an understanding of prevailing circumstances.
- OILs may be used as screening levels in the decision making process, but decisions should be based on realistic assessments of the residual doses and comparison with a pre-established reference level.
- Decisions on adapting and lifting protective actions will involve taking account of the primary objective and prerequisites for termination of the emergency.

Lecture notes:

Summarize the key points from the presentation.

Lecture notes:

Thank you!