HERCA

Heads of the European Radiological protection Competent Authorities

Emergency Preparedness

HERCA-Approach for a better cross-border coordination of protective actions during the response in the early phase of a nuclear accident; development and practical testing

Approved on the occasion of the 13th HERCA Board meeting on 12 June 2014 in Vilnius

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The HERCA-Approach has the potential to improve the coherence of the response in case of a nuclear accident with impact on territories of other countries and to be used as guidance to implement Article 99.1[1] and 99.2[2] of the EU-BSS. It also fulfils recommendation N°12.7.b of the ENCO[3] study and it further addresses some of the other recommendations.

1 Art. 99.1. Member States shall cooperate with other Member States and with third countries in addressing possible emergencies on its territory which may affect other Member States or third countries, in order to facilitate the organisation of radiological protection in those Member States or third countries.

[2] Art 99.2. Each Member State shall, in the event of an emergency occurring on its territory or likely to have radiological consequences on its territory, promptly establish contact with all other Member States and with third countries which may be involved or are likely to be affected with a view to sharing the assessment of the exposure situation and coordinating protective measures and public information by using, as appropriate, bilateral or international information exchange and coordination systems. These coordination activities shall not prevent or delay any necessary actions to be taken on a national level.

[3] Review of Current Off-site Nuclear Emergency Preparedness and Response Arrangements in EU Member States and Neighbouring Countries ENER/D1/2012-474.

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ASN – Autorité de Sûreté Nucléaire; **BABS** - Bundesamt für Bevölkerungsschutz; **BfS** – Bundesamt für Strahlenschutz; **BMLFUW** - Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management; **BMU** – Bundesumweltministerium; **BNRA** – Nuclear Regulatory Agency; **CSN** - Consejo de Seguridad Nuclear; **DRP** – Division de la Radioprotection; **EC** – European Commission; **ENSI** - Swiss Federal Nuclear Safety Inspectorate; **FANC/AFCN** – Federal agency for nuclear control; **GR** - Icelandic Radiation Safety Authority; **GRS** – Gesellschaft für Reaktorsicherheit **ILT** - Inspectie Leefomgeving en Transport; **IRSN** - Institut de Radioprotection et de Sûreté Nucléaire; **minez** - Ministerie van Economische Zaken; FANC/AFNC – Federaal Agentschap voor Nucleaire Controle. **NCRRP** - National Center of Radiobiology and Radiation Protection; **NRPA** – Norwegian Radiation Protection Authority; **OFSP** – Federal Office of Public Health; **ONR** - Office for Nuclear Regulation; **OSSKI** - National Research Institute for Radiobiology and Radiohygiene; **PHE** - Public Health England; **RPII** - Radiological Protection Institute of Ireland; **SNSA** - Slovenian Nuclear Safety Administration; **SSM** - Swedish Radiation Safety Authority; **STUK** - Radiation and Nuclear Safety Authority;

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Content

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HERCA-Approach for a better cross-border coordination of protective actions during the response in the early phase of a nuclear accident; development and practical testing

Executive Summary

The Association of the Heads of the European Radiological protection Competent Authorities (HERCA) established its "Working Group on emergencies' (WGE) in June 2011. The mandate of the WGE covered all types of nuclear accidents. With regard to accidents originating from within the boundaries of the HERCA member countries the overall aim of the WGE was to come up with practical and operational solutions leading to a uniform way of dealing with any serious radiological emergency situation, regardless of national border lines. From December 2012 on, 42 experts (from 23 European countries) in nuclear safety, emergency preparedness and radiological protection of the WGE have worked aiming at fulfilling this mandate. As a result, they have proposed a response mechanism for the early phase of an accident for a better cross-border coordination of protective actions, called the "HERCA-Approach" which was approved by the Board of HERCA in June 2014. In developing the approach, the WGE started off by investigating what others had done or were doing, has taken advantage of this work and built on it. It has also acted in a complementary way to these activities, with the aim of reaching maximum mutual benefits. In this context, a representative of the European Commission has participated as observer in these activities and most recently an observer from the IAEA.

The HERCA-Approach recognises that in European countries, efficient emergency preparedness and response arrangements have been established for many years and are tested and challenged regularly. They allow authorities to issue recommendations for effective public protective actions. In the development of such arrangements, each European state defines its own priorities and objectives in planning for nuclear emergencies directly affecting its own territory, and the international and EU radiological protection frameworks leave large margins of freedom for setting national criteria for intervention. Emergency planning has evolved in all states over many years, mostly without giving great priority to cross-border issues. This has led to differences, sometimes significant. Should a nuclear emergency occur in Europe, these differences can potentially have a significant effect, especially if the location of the emergency is close to a national border. Internationally populations would feel unequally protected, depending on where they live. Aligning protective actions along adjacent national borders is therefore highly desirable.

In the early stages of an accident the uncertainties in terms of dose estimation and overall radiological impact are very large. The status of the reactor, the estimation of the amount and type of radioactivity released (the source term), and the dispersion conditions are very likely to be poorly understood in the first hours. The role of the decision-maker is to arrive at appropriate health protection measures taking into account these uncertainties. This inevitably leaves room for flexibility in decisions, even where there is a rigid national framework. The HERCA-Approach makes use of this freedom for coordination between neighbouring countries in order to align early decisions across borders. As a result, the respective national arrangements do not necessarily need to be changed. Instead, the prevailing differences are respected and are taken into account, and the response is based on 'compromise' solutions which are understandable and explainable in each given situation.

The HERCA-Approach on emergencies relies on the following principles: mutual understanding, coordination and mutual trust. It does not aim at proposing a uniform cross border framework to deal with such situations. The main strategy is to aim at an alignment of the response between neighbouring countries, or neighbouring territories. The HERCA-Approach comprises mechanisms of early information exchanges allowing neighbouring countries to align measures for protective actions by using as far as possible the existing dedicated bilateral and international arrangements.

The HERCA-Approach is divided into 3 steps, the preparedness phase, the early phase and the later phase (development of a common situation report). The approach contains the main principles and leaves necessary margins of freedom for detailed implementation:

- In preparedness the aim is to achieve and maintain a shared understanding of the existing national emergency arrangements through the improvement of bilateral or multilateral arrangements, the testing of these arrangements and the implementation of improvements.
- In the early phase of an accident, the proposed HERCA-Approach foresees rapid information exchanges by using as far as possible the existing dedicated bilateral and international arrangements, including the exchange of liaison officers as appropriate. If the response is thought consistent, the neighbouring countries can recommend to their governments to follow these recommendations, ie adopt the principle that in the first hours, **"we do the same as the accident country".**
- In the later phase a common situation report, accepted by all impacted countries, will further support coordinated protective actions.

The HERCA-Approach has been tested and validated against concrete and realistic accident scenarios in NPP's that are close enough to national borders. Therefore a workshop was organized in September 2013. The workshop showed that in case of a sufficient information exchange most countries would be able to recommend to their decision-makers during the very early stages that the advice of the accident country should be followed. Other conclusions of the workshop will be taken into account when developing the guidelines for the implementation of the HERCA-Approach into the national arrangements.

The HERCA-Approach has the potential to improve the coherence of the response in case of a nuclear accident with impact on territories of other countries and to be used as guidance to implement Article 99.1[4] and 99.2[5] of the EU-BSS. It also fulfils recommendation N°12.7.b of the ENCO study and it further addresses some of the other recommendations.

The HERCA-Approach is an incentive approach that comprises the necessary mechanisms for countries to exchange adequate information and to achieve compromise solutions on a voluntary basis during an emergency allowing for coherent and coordinated protective actions.

[4] 4 Art. 99.1. Member States shall cooperate with other Member States and with third countries in addressing possible emergencies on its territory which may affect other Member States or third countries, in order to facilitate the organisation of radiological protection in those Member States or third countries.

[5] [5] Art 99.2. Each Member State shall, in the event of an emergency occurring on its territory or likely to have radiological consequences on its territory, promptly establish contact with all other Member States and with third countries which may be involved or are likely to be affected with a view to sharing the assessment of the exposure situation and coordinating protective measures and public information by using, as appropriate, bilateral or international information exchange and coordination systems. These coordination activities shall not prevent or delay any necessary actions to be taken on a national level.

Definitions

Accident country:	The country where the nuclear or radiological emergency has taken place.
Affected countries:	The countries that are not the accident country where protective actions need to be considered because of a transborder radiological contamination.
HERCA countries:	Each country represented through one or more authorities within HERCA.
HERCA members:	Each authority who is a member of HERCA.
Impacted countries:	Countries that are not necessarily affected countries but which need to issue recommendations for their own citizens in the affected area, including travel arrangements.

List of acronyms

AtHLET:	Ad hoc High-Level European Task force.
EMERCON:	Emergency Convention.
EP&R:	Emergency Preparedness and Response.
EPM:	"Early Phase Messages" the first message and the subsequent updates distributed by the accident country in the early phase.
EU-BSS:	COUNCIL DIRECTIVE 2013/59/EURATOM of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom.
HERCA:	Association of the Heads of the European Radiological protection Competent Authorities.
IAEA:	International Atomic Energy Agency
IEC:	Incident and Emergency Centre
MFA:	Ministry of Foreign Affairs.
NPP:	Nuclear Power Plant.
TSO:	Technical Support Organisation.
USIE:	Unified System for Information Exchange on Incidents and Emergencies.
WENRA:	Western European Nuclear Regulators' Association.
WGE:	HERCA working group on emergencies.

1. Introduction

The Association of the Heads of the European Radiological protection Competent Authorities (HERCA) [1], identified as early as 2007 the need for an improved and harmonized cross-border approach in response to nuclear emergencies. A working group of HERCA was therefore established and issued a document on emergency preparedness "Practical Guidance – Practicability of Early Protective Actions" [2], which included the definition, aim and rationale of three early protective actions (sheltering, evacuation and thyroid prophylaxis), the planning phase, the intervention phase and the lifting of protective actions. Risk/benefit considerations and linked protective actions (e.g. food restrictions that need to be taken at the same time) were also discussed.

Subsequently the HERCA 'working group on emergencies' (WGE) concentrated its activities related to European nuclear emergency situations on mechanisms to improve the response to such an event. Key factors comprise the achieving of a more rapid exchange of information and the improvement of the coherence of national responses, including balancing radiation protection and social issues.

The present document deals with the development and testing of a response mechanism for the early phase of an accident, called the "HERCA-Approach". The testing of the approach during a dedicated workshop resulted in good progress, but also revealed several difficulties. The second part of this document presents and discusses those difficulties. Solutions for improvements are proposed, including concrete steps to be implemented through national, bilateral and multinational arrangements.

2. Brief analyses of the given situation

Each European state defines its own priorities and objectives in planning for nuclear emergencies directly affecting its own territory, and the international and EU radiological protection frameworks leave large margins of freedom for setting national planning criteria for intervention. Emergency planning has evolved in all states over many years, mostly without giving great priority to cross-border issues. At the same time, the international framework for planning and response has changed. This has led to differences, sometimes significant, in:

- Criteria for intervention levels for introducing protective actions (defined in terms of projected dose).
- Types of protective actions.
- Operational intervention levels (action levels based on measurements).
- Methods for assessing source terms.
- Methods for radiological impact assessment and dispersion modelling.
- Definitions of emergency planning zones.

In addition, there are differences between the concepts, e.g.:

- The implementation of protective actions can be based on assessments and calculations or triggers.
- The reference level and dose criteria are for planning purposes or also for response.
- The levels are legally binding or guidelines.
- There are national differences in the interpretation of international guidelines.

Should a nuclear emergency occur in Europe, these differences could potentially have a significant effect, especially if the location of the emergency is close to a national border. Figure 1 illustrates schematically how a particular protective action could be implemented when the decision is purely based on national considerations.

In each individual country, the decision is in line with the national plan and the legal framework, and it is well balanced and justified for the situation in the country given the national framework. However, internationally, populations would feel unequally protected, depending on where they live. An unbalanced cross-border implementation of one or more protective actions would lead to distrust in governmental decisions and potentially to panic. Attempts at explanation of the rational for such differences to the affected populations are not likely to be successful during the crisis. Aligning planning for protective actions along adjacent national borders is therefore highly desirable (see figure 1).

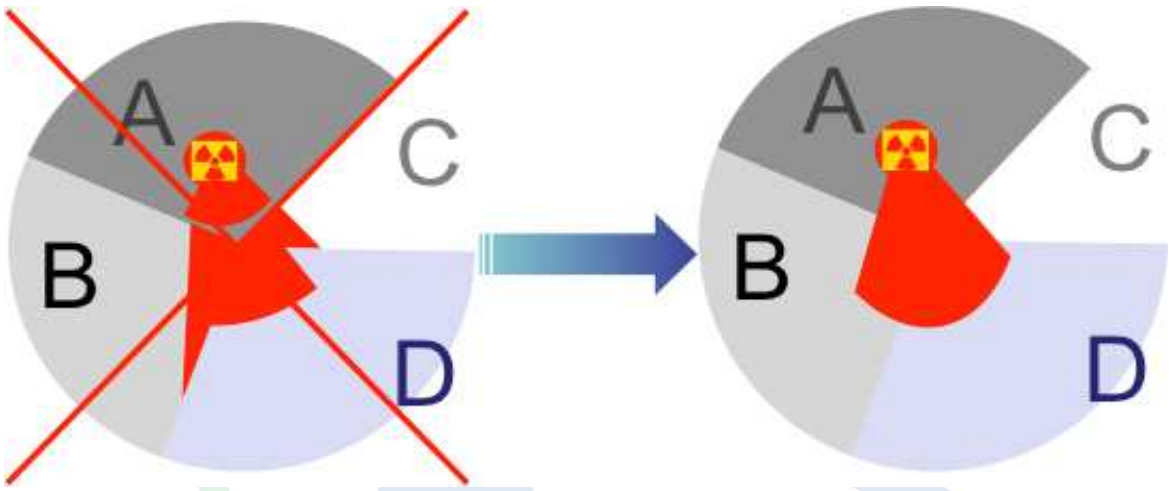

Figure 1: Country A has a nuclear emergency close to the borders of three others countries. All four countries are affected. Each country decides on a particular protective action individually. The protective action applies to the areas marked in red, for each country. The aim is to align protective actions.

3. The HERCA-Approach for the early phase

From December 2012, the WGE, in cooperation with members of WENRA, developed a new "HERCA-Approach", relying on the following principles: mutual understanding, coordination, mutual trust and alignment of recommendations for decisions between neighbouring countries, or neighbouring territories, as the main strategy. The Board of HERCA had approved these principles on the occasion of its 10th meeting in Paris (30-31 October 2012). The basic aim is to develop mechanisms for implementing protective actions during an emergency in a consistent way along national borderlines but without – necessarily - changing the respective national arrangements. Instead, the prevailing differences are respected and are taken into account, and the response is based on 'compromise' solutions that are understandable and explainable in each given situation.

In the early stages of an accident the uncertainties in terms of the overall radiological impact are very large (see also figure 2).[6] The role of the decision-maker is to arrive at appropriate health protection measures despite this uncertainty. This inevitably leaves room for flexibility in decisions, even where there exists a rigid national framework. The WGE believes that this freedom can be

[6] WENRA and HERCA established the AtHLET taskforce that started in March 2014 to agree on common principles for advice in the early hours of a severe nuclear emergency. The difference between both approaches is that the HERCA-Approach deals with accident scenarios with sufficient information for a technical assessment, whereas the AtHLET taskforce focuses on severe accidents where either no or not enough reliable information for a technical assessment is available or the rapid development of the accident does not leave sufficient time.

used for coordination between neighbouring countries in order to align early decisions across borders.

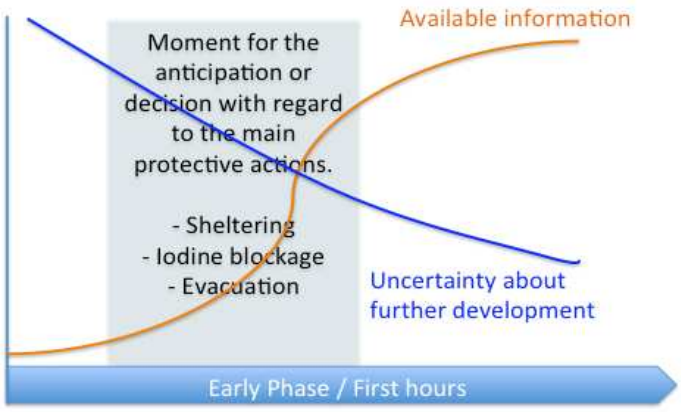

Figure 2: Factors influencing emergency decisions in the early phase of an accident.

For the early phase of an accident, the proposed HERCA-Approach comprises mechanisms of early information exchanges allowing neighbouring countries to align measures for protective actions by using as far as possible the existing dedicated bilateral and international arrangements..

This objective is in line with article 99 of EU-BSS calling for Member States to cooperate with other Member States and with third countries in addressing possible emergencies on their territory which may affect other Member States or third countries, in order to facilitate the organisation of radiological protection in those Member States or third countries.

The HERCA-Approach is divided into 3 steps, the preparedness phase, the early phase and the later phase (development of a common situation report). The approach contains the main principles and leaves necessary margins of freedom for detailed implementation. Compared to an earlier version, the approach below has been updated following the discussions at the workshop and the subsequent WGE meetings.

In preparedness

- Develop or improve already existing bilateral or multilateral arrangements, following a graded approach (ie the greatest priority is given to arrangements with the closest countries, and less urgent priority is given to countries at greater distances), with the goal of achieving and maintaining a shared understanding, taking into account the following:
    - National organizations:
        - General arrangements and information.
        - Stakeholders are involved in the emergency situations.
        - Facilities or reactors technologies.
    - National Emergency arrangements.
    - National strategies.
    - National expertise:
        - Assessment methods and tools (diagnosis, prognosis, environmental impact, etc.),
        - Information needed to understand correctly the products of national expertise (ie this may be available on restricted webpages – see below).
    - Arrangements regarding information exchange (what kind of information, ways to exchange it) during the accident and the deliverables (contents and frequency):
        - Forms, maps, technical and radiological data.

        - Information regarding countermeasures already implemented or planned to be.
        - Media information or press statements.
    - Trans border coordination mechanisms for protective measures in the response phase.
    - Communication policies to explain discrepancies in protection measures.
    - Joint public communication campaigns.
- Test arrangements and implement improvements.

Early phase / First hours

- The accident country should provide and update information required to the understanding of the situation and make available on-site and off-site assessments, using bilateral, multinational and international arrangements.
- Exchange of liaison officers and access to restricted websites may be arranged.
- Based on the information provided by the accident country and knowing the accident country's emergency arrangements, the neighbouring countries should be able to verify quickly if the response in the accident country is consistent with these arrangements.
- If the response is thought consistent, the neighbouring countries can recommend:
    - To their governments: if the accident country provides a recommendation for protective measures affecting part of the territory of the neighbouring country, to follow these recommendations ie adopt the principle that in the first hours, **"we do the same as the accident country".**
    - To their embassies: to protect their own nationals living in the accident country, by following the recommendations delivered by the authorities of the accident country.
- If the response is highly inconsistent, the neighbouring countries will urgently try to agree on an alternative position, which, together with their reasons, will be communicated to the accident country. The neighbouring countries should inform the competent authorities in the other European countries of their provisional position and the results of coordination.

Development of a common situation report

- The development of a common situation report is a major step towards more coordinated protective actions.
- Within the framework of the post-Fukushima action plan, the IAEA is currently developing mechanisms for an independent assessment and the production of a common situation report available for all Member States.
- The WGE will continue to analyse in more depth what has been proposed by the IAEA, and will then identify possible synergies and evaluate the potential for cooperation with the IAEA.

During its 12th meeting on 26-27 November 2013, the HERCA Board unanimously confirmed that the HERCA-Approach fulfils the expectations of the Board in general terms.

4. Cologne WORKSHOP

4.1. Preparation of the workshop

As part of this work, the HERCA-Approach needs to be tested and validated against concrete examples, such as realistic accident scenarios in NPP's that are close enough to national borders. Therefore a first workshop was organized in September 2013. Some realistic accident scenarios in NPPs that are close to national borders were developed. The main goal was to explore whether the HERCA-Approach may potentially work, and also to identify difficulties.

Three scenarios with risks of considerable releases were prepared in advance, allowing participants some pre-preparation. The scenarios chosen were:

- NPP-Loviisa-1: The latest 8-countries exercise in Finland was used. STUK made its 15 situation reports available in English (USIE-format). The scenario was a real-time 12 hours exercise with 3 key moments, where decisions needed to be recommended or anticipated. In this scenario, no territory outside Finland was directly concerned with the main protective actions during the duration of the exercise. The main reason for providing this scenario for the Cologne workshop was to indicate how much information an accident country is able to provide in real time and in English.
- NPP Cattenom: IRSN had prepared a core melt scenario with risk of filtered venting. Detailed information was included in 5 IRSN and 3 ASN messages, the latter ones in the USIE format. The scenario contained two key moments, where decisions needed to be recommended or anticipated. In the earlier stage Germany and Luxembourg were concerned with protective sheltering and iodine blockage. The potentially large releases from a filtered venting threatened the territories of Luxembourg and Belgium where additionally evacuations needed to be considered.
- NPP Emsland: The BfS had prepared a short scenario concerning the NPP Emsland. It did not comprise elaborated technical details on the situation of the reactor, but contained key messages to be shared with the participants. The scenario was limited to the threat phase with a potential release along the border between Germany and the Netherlands (protective actions needed to be considered on both sides of the border). The two countries had agreed on the scenario beforehand.

4.2. Conduct of the workshop

The workshop took place on 24 September 2013 in Cologne at the GRS. 18 participants from 10 countries attended the workshop, during which participants responded to a predefined set of questions for each key moment of the 3 scenarios. The questions were:

1) Would we in reality have informed others that early?
2) Do we understand the information received from the accident country?If not, what is the issue?
3) Is the information consistent?
4) Is information missing? If yes, what?
5) As neighbouring country: Would we be able to align our recommendations with the protective action(s) as proposed by the accident country? If not what are the obstacles or concerns?
6) Would we be able to advice our citizens living in or visiting the accident country to follow the advice for protective actions of the accident country?
7) To those countries who are not a neighbouring country: If we were a very close neighbouring country (within the range of protective actions), would we be able to align our recommendations with the protective action(s) as proposed by the accident country?

Participants provided answers to those questions during the workshop as far as they were able to prepare themselves for the workshop and within the limits of a tight timescale. In particular WGE participants stressed the need for technical support from their national experts. Therefore, after the meeting, workshop participants and all other HERCA-WGE members had the opportunity to provide the missing answers in writing. In total, answers were received from 12 countries.

4.3. Main issues discussed at the workshop

The overall impression from all participants was very positive. The exercise of sitting together and having open and direct dialogues on concrete and relatively realistic accident scenarios was very useful. This gave raise to several interesting discussions.

Most participants thought that in the very early stages they would be able to recommend to their decision-makers that the advice of the accident country should be followed.

More discussion took place with regard to a possible alignment of recommendations for protective actions along national borders. However it has to be noted that the context of the discussion was somehow artificial. To imagine the coordination of protective actions between countries which do not share a common border is indeed difficult (see question 7). One key difficulty in such a discussion is clearly the missing knowledge of the arrangements in the accident country. Discussions concerned issues around the use of definitions and methodologies (for example, in dose calculations), the application of different decision criteria in the accident country and the extension of measures beyond EPZ's, to name only a few examples. Also societal particularities, such as the density of population, are potentially very different, for example between Nordic countries and West European countries.

The configuration of the workshop also permitted the accident country to provide missing information. With such additional explanations, most participants thought it would be possible to recommend to their own decisionmakers to 'do the same as the accident country'. This finding confirms the need for effective pre-emergency arrangements and shared understanding of these between all countries.

In a few countries, it seemed at the workshop, that the possibilities of adjusting recommendations during an emergency to favour coherent protective actions were very limited. These countries are obliged by law to do their own assessments and/or to recommend protective actions based on their own intervention levels. The workshop participants discussed several technical possibilities to overcome these difficulties. However no real solution emerged for these cases.

The WGE has undertaken more in-depth analyses of the workshop after having received all written answers. The main findings of this work are presented and discussed in the following chapter.

5. Main Findings of the workshop

5.1. Findings

The most important findings of the workshop were:

- Mutual knowledge of EPR arrangements is essential to make the HERCA-Approach work;
- Frequent updates by the accident country on the situation are essential for other countries to be able to verify the response in the accident country and are a pre-condition for them to be able to advise their decision-makers to follow the accident country;
- Most countries (not being neighbouring countries) were able to recommend their own citizens in the affected area to follow the advice given by the accident country based on the available information;

- The success of a harmonized approach between neighbouring countries is strongly influenced by bilateral agreements;
- Different values in decision criteria can result in a different advice than the one given by the accident country.

In the following paragraphs, the main elements of those findings are elaborated in more detail.

5.2. Information to be provided by the accident country through its first messages

A limited amount of information is available to be included in the first message. The type of information available for being included in the first message depends on the accident scenario. The present report does therefore not distinguish between the first message and the subsequent updates, but only refers to those in general terms as "Early Phase Messages (EPM)". As a guiding principle, speed and accuracy are considered more important than quantity or completeness of information. Frequent updates are necessary.

Issue	Rational
(Conservative) evaluation of the potential hazard area.	Favours a common understanding and coherent communication internationally. Helps to give early assurance to populations outside this area.
Reports that contain maps, dispersion calculations and pictures.	Useful internationally for communication and similar purpose. Should be annexed to EMERCON forms.
Use of short message systems.	Essential to be used in case the situation changes rapidly (e.g.: update of emergency classification). It is recommended to the IEC to provide such a tool within USIE.
Include other operational measures, such as traffic restrictions, food restrictions, etc.	Important information for direct neighbouring countries (e.g.: hotlines). Helps deciding on travel advice. This possibility is included in the EMERCON forms, both for food and traffic. One may even add "other" measures
Clearly distinguish whether a protective action is, planned, recommended, decided (ordered) or implemented (taken).	The EMERCON form only asks to *"Describe protective actions that are planned, ordered, taken or withdrawn".* There is a need for clarity, in particular informing on recommendations for protective actions.
Prognosis for development, including a worsened case scenario (on a case by case basis).	This seems particularly useful in cases of a cliff edge effect (when consequences could dramatically worsen) or when failure of a further barrier is probable. In other situations such a scenario may be misleading and even favouring differences in decisions across national borders.
All responding countries enter information related to their decisions into USIE	This allows all countries, but in particularly the accident country, to reduce the burden on communication, i.e. the accident country may anticipate public discussions that may be stimulated by decisions taken elsewhere.

Table 1: Issues that are presently not considered by the EMERCON forms but that are worth exchanging through the EPM.

The WGE recommends that all countries should make full use of the USIE system and related EMERCON forms to inform the competent authorities of neighbouring countries and the international community. The workshop confirmed that the type of information foreseen to be exchanged by the EMERCON forms is vital in the early phase. In particular, the accident country should enter information on the classification of the emergency and its basis for declaration as early as available. For the provisional INES classification it should be borne in mind that the INES classification refers to the actual situation rather than to a possible degradation.

Besides, the workshop identified a couple of issues that are presently not considered by the EMERCON forms but that are worth for exchanging through the EPM. Those issues and their rational are given in Table 1.

Restricted websites exist in several countries with up-to-date information concerning the development of the accident. In some cases, authorities from neighbouring countries, the IEC and the EC have access to those sites during an emergency. In other countries, similar projects are under discussion. As a result of the workshop, it seems indeed a very good practice since the direct access to such a restricted website allows the technical expertise organizations in neighbouring countries to follow the situation in a timely manner as it develops. This permits anticipation and preparation for necessary developments and decisions. It also fosters a common understanding of the situation. As such, this finding confirms the HERCA-Approach as given in chapter 3.

A prerequisite for a successful implementation is a consistent mutual or bilateral agreement with the objective of co-ordinating activities in a wider area. A situation where neighbouring countries use the information provided to implement measures unilaterally has to be avoided. Finally, training will be needed before being able to understand the national expertise products.

5.3. Information to be exchanged in preparedness

The workshop demonstrated again how many differences in emergency preparedness arrangements actually exist. Harmonizing all those differences seems highly unrealistic. Therefore the aim of the HERCA-Approach to achieve from the beginning alignment of protective actions during the response, taking prevailing differences in preparedness into account, can be seen to be the correct approach.

As a minimum prerequisite, countries need to have sufficient knowledge of each other's arrangements. In this context, the workshop confirmed that good knowledge of the arrangements in the accident country helps to understand and to agree with decisions taken in that country. It further helps other countries in particular on the derivation of the accident country'srecommendations for their own population. Indeed, neighbouring countries that, during the workshop, knew the arrangements in the accident country well enough could follow the HERCA-Approach more easily.

It also became clear that including this type of information in the first messages is not feasible, unless prepared and discussed beforehand. In that sense, although the HERCA-Approach is purely designed to improve coordination during response, pre-emergency arrangements are vital. Otherwise the statements of the accident country will not be understood and will not be followed.

One possibility to effectively exchange this type of information would be the establishment of country factsheets. Those sheets should be short (approx. 2 pages), visual (to enable information to be found very quickly), factual and concise (ie key words rather than full sentences). The WGE should establish those factsheets and develop an appropriate solution for regular updates and dissemination.

5.4. Bilateral arrangements

The success of a harmonized approach between neighbouring countries is strongly influenced by bilateral arrangements (or multilateral if more than 1 country will be directly influenced by an accident within a certain NPP). This makes it more easy to verify the assessment of the accident country and gives more understanding to the neighbouring countr(y)(ies). Understanding the response of the accident country is very important for advising decision-makers to harmonize their response with the accident country.

Additionally the arrangements shall contain provisions for coordinating the media response and for communicating well in advance about decisions and the reasoning behind those decisions, in particular in those cases when different decisions are unavoidable.

The WGE should develop guidelines for the establishment of these arrangements. Where an NPP is close to more than one other country, multilateral arrangements should be envisaged.

5.5. Key differences and potential obstacles for aligning recommendations for protective actions along national borderlines

Since emergency preparedness arrangements differ widely between European countries, it was to be expected that the verification of the HERCA-Approach against concrete accident scenarios would result in identifying situations where aligning recommendations for protective actions is not realistic. The workshop indeed revealed a few obstacles that may jeopardize the possible success of the HERCA-Approach. On the other hand, such obstacles cannot be generalized and depend largely on the situation and on the country concerned.

Table 2 gives an overview of the main difficulties that were identified. For most cases, it seems possible, nevertheless, to substantially reduce their impact through adapted solutions, as highlighted in the right column of the table.

Difficulties	Improvements to be implemented
Information not correctly understood (e.g.: definition, classification of the emergency different to IAEA, Basis for decisions, etc).	Increase knowledge of national arrangements and assumptions (country fact sheets, see chapter 5.3)
Information too late or too slow, not permitting other countries to prepare for necessary protective actions on the necessary timescale.	Improve quality of first messages (see chapter 5.1); Make use of single short messages to a specific subject or event between the regularly sent EMERCON forms; Grant access to restricted websites with the “national expertise product”.
Different decision criteria, (e.g. action levels or triggers) used by the accident country, not used and/or not known by others.	Increase knowledge of national arrangements (country fact sheets, see chapter 5.3). The workshop has also shown that a good knowledge of the decision criteria used in the accident country helped most other countries to appreciate related decisions and to adapt their response, even if such criteria were otherwise not used.
Different values in decision criteria (e.g.: intervention levels). In a couple of countries intervention levels need to be used on a mandatory basis to trigger protective actions with only minor room for other considerations in issuing recommendations.	The new EU-BSS [3] has introduced the concept of “reference levels” for emergency and existing exposure situations. It allows for the protection of the individual as well as consideration of other societal criteria in the same way as dose limits and dose constraints for planned exposure situations.

	The obligation for the Member States to implement the new EU-BSS gives a unique chance for improved understanding and the implementation of adjustable criteria and the reduction of differences across Europe.
While appreciating different criteria, most authorities limit their considerations to their own territory. (the potential hazard area is not regarded as a whole)	Need for systematic bilateral agreements that allow to look at the potential hazard area as a whole and to coordinate activities effectively during the response between the involved bodies.
In a few countries, recommendations need by law to be based on own independent assessments following strict decision triggers.	There seem to be only a few countries concerned. However in those cases a successful implementation of the HERCA-Approach could be seriously jeopardized. The new EU-BSS may possibly help.
International requirements and recommendations are differently interpreted across Europe. This seems to be a major challenge.	More detailed work needed on listing the basis for each country, e.g. the use of reference levels, the legally binding criteria, the use of triggers. However, the new BSS present possibilities for further harmonisation, as above.
Extendibility of protective measures beyond EPZ's from an operational point of view.	Need for systematic bilateral agreements. It will be important to clearly define operational limitations (how far and how much can be extended) and how the responsibilities are assigned in each country. (In some countries the advisory body considers operational issues when issuing recommendations).
Advices on travel and traffic remain uncoordinated.	Implementation of the recommendations from the HERCA report "Practical proposals for further harmonisation of the reactions in European countries to any distant nuclear or radiological emergency" [4]

Table 2: Overview of the main difficulties that were identified.

6. Summary of the main findings

The workshop has enabled the WGE to clearly identify the following issues that need to be developed and implemented to allow best use of the HERCA-Approach:

- Implement nationally the guidelines included in chapter 5.1 for improving the effectiveness of the first messages.
- Development of country fact sheets;
- Development of a list of issues to be dealt with in bilateral or multilateral arrangements;
- Develop a common understanding of key elements of the new EU-BSS [3] and aim at reducing differences through a coordinated transposition and a better application of international recommendations. The EU-BSS does support such changes as they give the opportunity to review our basic principles of radiation protection in emergency situations.

Additionally, as a result from the workshop, the WGE makes the following recommendations:

- Make use of short message information exchange during the response;
- Countries should consider granting access to restricted websites and exchanging liaison officers;

- Always consider the whole affected area, independent of a national border, when making decisions.
- Aligning protective measures along borders should be a factor in decision-making.

7. Conclusions and further steps

The workshop has demonstrated that the HERCA-Approach has the potential to improve the coherence of the response in case of a nuclear accident with impact on territories of other countries. It was also shown that the approach allows for the assurance – sometimes deemed necessary - that things are done properly in the accident country. This permits in particular to recommend one's own citizens, who stay in the affected area, to follow the advice from the accident country.

A further positive result is the confirmation that the HERCA-Approach, as given in chapter 3, contains all necessary elements, ideas and principles needed.

While it may remain difficult to completely eliminate the occurrence of differences and inconsistencies in the response, the aim of the approach should be that this becomes the exception rather than the rule. In those cases where two countries take unavoidably different approaches, they shall coordinate their media response and communicate well in advance about their decisions and the reasoning behind those decisions. A systematic implementation of the findings of the present report (see summary in chapter 6) will certainly help to significantly improve towards the overall objective of the HERCA-Approach.

8. References

[1] HERCA the Association of the Heads of the European Radiological protection Competent Authorities; Radiation Regulator, Volume 1, Number 1.

[2] Emergency Preparedness. Practical Guidance – Practicability of Early Protective Actions; www.herca.org

[3] COUNCIL DIRECTIVE 2013/59/EURATOM of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom.

[4] Practical proposals for further harmonisation of the reactions in European countries to any distant nuclear or radiological emergency; www.herca.org