HERCA

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HERCA Working group on Emergencies

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Guidance document on the HERCA-WENRA-Approach: Supplementary Glossary of Concepts

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Title: **Guidance Document on the HERCA-WENRA Approach: Supplementary Glossary of Concepts**

Summary: This guidance document relates to identification and clarification of those parts of the "HERCA-WENRA Approach for a better cross-border coordination of protective actions during the early phase of a nuclear accident" (HWA) which are, or may be, interpreted differently based on lessons learned from the implementation of the HWA.

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HERCA Guidance
HERCA-WENRA-Approach: Supplementary Glossary of Concepts

1. Common understanding of the main concepts of the HWA

This guidance document relates to identification and clarification of those parts of the "HERCA-WENRA Approach for a better cross-border coordination of protective actions during the early phase of a nuclear accident" (HWA) [R1] which are, or may be, interpreted differently based on lessons learned from the implementation of the HWA.

HERCA members have initiated several national and regional activities to promote the implementation of the HWA. These initiatives have shown that some of the main principles of the HWA are interpreted in different ways. Therefore, in order to strengthen efforts to promote the implementation of the HWA to achieve coherent and coordinated protective actions between neighbouring countries and territories in emergency situations, the present document aims to clarify key concepts of the HWA to support mutual/common understanding.

Most of the concepts in this document are used by countries to self-assess their national status of implementation of the HWA.

2. Concepts of the HWA

2.1 Bilateral agreements/arrangements

Many countries have bilateral agreements with neighbouring countries on cooperation and/or information exchange on EP&R related to nuclear emergencies. However, experience has shown that these agreements are usually of a very general nature and do not contain detailed provisions. In order to be in line with the objectives of the HWA, these agreements may need to be complemented in an appropriate way with more detailed arrangements to enable coordination of decisions on protective actions during a nuclear emergency.

The HWA highlights the objectives and importance of bilateral arrangements on pages 16, 20, 21, 24, 26 and 41. Additionally, the HERCA document "Guidance for Bilateral Arrangements" approved by the Board of HERCA on 10 November 2015 [R2] gives guidance on the development and implementation of such arrangements in support of the HWA to facilitate a comparable level of protection of the populations on each side of the border through the alignment of the protective actions, the coordination of communications, the sharing of resources/capabilities and an increase in the mutual knowledge and understanding of respective EP&R systems.

In order to achieve these objectives, the following key topics from the document "Guidance for Bilateral Arrangements" (2015) should be incorporated as a minimum in the bilateral agreements (or supporting arrangements/documents):

- A commitment from the parties to coordinate actions taken in response.
- An agreement that the parties will aim to align protective actions along borders.
- How the parties will consider the whole affected area, independent of a national border, when making decisions [see also concept 1.7 below].
- How the parties will consider the emergency situation over time (early and later phase) [see also concept 1.9 below].
- Clear assignment of mechanisms and responsibilities (e.g. for coordination, for decision making, for exchange of information)

Each country with multiple neighbours should consider possible differences between neighbours.

Other practical elements that should be incorporated, as appropriate, in bilateral agreements (and supporting arrangements/documents) are described in detail in the HERCA document "Guidance for Bilateral Arrangements" (2015).

The bilateral arrangements should be kept up to date and improved as necessary.

2.2 Testing of bilateral EP&R arrangements

The HWA refers to the importance of testing bilateral EP&R arrangements on page 16.

Recurrent organization of and participation in cross-border exercises is the most suitable method for testing of these arrangements. It is a two-way process, i.e. for neighbouring countries it is expected that both countries periodically, within the framework of national nuclear emergency exercises, actively participate in such exercises.

Two aspects, which are equally important in the concept of "recurrent participation in cross-border exercises", are "active involvement" and "observation". "Active involvement" in an exercise involves

testing cross boundary interfaces, decision-making processes, information exchange flows and coordination mechanisms in the respective countries. During active involvement, the appropriate crisis management structures should be activated in the participating countries, enabling them to test at least the decision making process in line with the bilateral arrangements. For “observation” of exercises, either representatives of the neighbouring country assist as observers in the exercise country, or the neighbouring country activates parts of its crisis structure in order to receive information. This purpose of “observation” in exercises is to primarily foster mutual understanding and awareness of challenges or areas for improvement in cross-boundary emergency management.

2.3 Involvement of civil protection

On page 7, the HWA recognizes the need for including other relevant stakeholders such as civil protection authorities in the implementation process of the HWA.

The objective of the involvement of civil protection authorities is to achieve broad support at a national level for the implementation of the HWA. This concept should be understood as cooperation between the main national and regional authorities/organisations with responsibility for the development of radiation emergency plans and those in charge of emergency decision making.

2.4 Trans-border coordination mechanism for protective actions in the response phase

The HWA takes into consideration uncertainties concerning the overall radiological impact for coordination between neighbouring countries to align protective actions across borders (page 7 of the HWA). In the early phase (page 19 of the HWA and concept 1.9 below), when decisions need to be taken quickly without sufficient time for active coordination, the aim of the coordination mechanism is to achieve alignment of protective actions following the principle “we do the same as the accident country” (in the sense that protective actions should be consistent and will not change just because there is a national border; see also concept 1.7 below). The HWA applies the term “accident” to designate any event that causes an emergency situation.

At a later phase [see also concept 1.9 below], or when decisions do not need to be taken urgently, the coordination mechanisms for protective actions defined in the bilateral arrangements should include a two-way bilateral information flow to strengthen a shared understanding of the situation and facilitate the alignment of protective actions along a border (e.g. compromise solutions, coherent public communication, timing of decision making, optimisation, etc.).

This coordination should take place at all levels, starting with the expert bodies in charge of the assessment of the situation, then between the decision makers and finally the bodies/organisations responsible for the implementation of the agreed protective actions.

For the coordination mechanism to be effective, smooth and efficient during the response (early phase and later phase) it needs to include at least (see also concept 1.1 above):

- Allocated responsibilities for cross border issues (who talks to whom and identification of the associated communication channels);
- The concrete definition of the ways for exchanging information;
- Type, status (such as official, to be validated, unofficial…) and timing of information to be exchanged;
- A communication mechanism that enables the resolution of cross border issues at all the levels defined above.

2.5 Use of country fact sheets

Country fact sheets (CFSs) [R3] should be an integrated part of the national EP&R documentation (communicated, well known and understood by all concerned parties) and available in all relevant locations (e.g. in the crisis centres). The HERCA procedure for editing and distributing of CFSs should be followed.

2.6 The alignment of protective actions along borders

On page 29, the HWA report states, “Aligning protective actions along borders should be a factor in decision-making”. When making decisions on protective actions, the HWA main goal of alignment along a national border should be taken into consideration by the accident country and the neighbouring country, along with other factors that may comprise *[see also concepts 2.4 and 2.7]:*

- Radiological aspects;
- Efficiency of the protective actions;
- Timing and feasibility;
- Availability of resources;
- Aspects of the local environment;
- Economic aspects;
- Social and ethical aspects.

The HWA underlines for both accident and neighbouring countries the importance of alignment of protective actions along a national border in decision-making.

2.7 Consideration of the whole affected area

The HWA report (page 29) recommends that the whole affected area is always considered when making decisions on protective actions (in the sense of the area eligible for protective actions).

A protective action may be easier to implement on one side of the border than on the other side, thereby tempting that country to make the decision to implement through consideration of only their national situation. For example, in an emergency it could be challenging to implement the same protective action in the country on the other side of the border due to differences in infrastructures for response, different population densities or specific industries/infrastructures (chemical plants, hospitals, prisons, retirement homes). In this case making the same decision on protective actions could result in more harm than good. In order to avoid such a situation, involved parties from neighbouring countries should therefore evaluate at the preparedness phase along different emergency scenarios how a common protection strategy for the full affected area could be applied, independent of national borders. It is important for each neighbouring country to understand the position of each other, rather than to have separate evaluations.

In the early phase, decisions are based on the protection strategy, developed in the preparedness phase. In the later phase of the accident [see also concept 1.9 below], the possibilities for neighbouring countries to coordinate their protective actions increase as they have more time to consider optimisation within the full affected area.

2.8 Exchange of liaison officers

The aim of exchanging liaison officers between the accident and neighbouring countries during exercises and in the event of an emergency is to contribute towards improving relations, creating more confidence and improving mutual understanding. The HWA (e.g. chapter 3 page 21) also highlights the important role of a liaison officer. To achieve this goal, one or more liaison officer(s) should be sent to the emergency response crisis centre (of the safety authority, the decision maker or both) to facilitate the exchange of information between authorities or organizations in both countries. If appropriate, the liaison officer could be a person from the embassy. The associated objectives are (1) to avoid or limit misunderstanding, (2) to anticipate issues of common interest and (3) to enhance the communication by facilitating information exchange in both directions. Liaison officers shall not take part in the decision-making process and should not disturb or interfere with the emergency management in the accident country or neighbouring country.

It is also recommended that detailed requirements (knowledge, skills and attitudes) and arrangements for the liaison officer such as terms of reference, mandate, mission, training, obligations, the methods and frequencies of interactions and practical arrangements are defined.

2.9 Meaning of the terms "early phase" and "later phase"

The terms "early phase" and "later phase" are not defined in the HWA. These and other terms describing phases of a nuclear emergency, such as the terms "urgent phase", "early phase", "urgent response phase" or "early response phase" are not defined in IAEA GSR Part 7 [R4] either. The present section provides an overview of HWA and IAEA terminology comparing the phases of response.

In the context of the HWA1, the terms "initial phase/stage" and "early phase/stage" are exchangeable and should be understood as "in the first hours", where decisions need to be taken rapidly with insufficient time for discussion with neighbouring countries and the coordination mechanism is "automatic" alignment of the pre-planned protective actions.

The "later phase" refers to the time after these first hours, when the decision making process allows for bilateral consultation. This would also apply during a long pre-release phase. The response phase encompasses the early and later phase.

To date, the only IAEA document which refers to "urgent response phase" and "early response phase" is GSG-11 (published in March 2018) [R5] about arrangements for the termination of a nuclear or radiological emergency, cited below:

Urgent response phase:	The period of time, within the emergency response phase, from the detection of conditions warranting emergency response actions that must be taken promptly in order to be effective until the completion of all such actions. Such emergency response actions include mitigatory actions by the operator and urgent protective actions on the site and off the site. The urgent response phase may last from hours to days depending on the nature and scale of the nuclear or radiological emergency.
Early response phase:	The period of time, within the emergency response phase, from which a radiological situation is already characterized sufficiently well that a need for taking early protective actions and other response actions can be identified, until the completion of all such actions. The early response phase may last from days to weeks depending on the nature and scale of the nuclear or radiological emergency.

[1] See the HWA page 8 ("Step 2 In the early phase of an accident [….] i.e. adopt the principle "We do the same as the accident country" in the first hours of the accident"), page 15 ("In the early stages of an accident […] be poorly understood in the first hours"), page 16 ("In the early phase of an accident, the proposed HERCA-WENRA Approach […] i.e. adopt the principle that in the first hours, "we do the same as the accident country".), page 21 ("Early phase / First hours" and "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 i.e. adopt the principle that in the first hours, "we do the same as the accident country").

It is therefore misleading, in the HWA context, to associate the terms “early phase” and “later phase” with any IAEA terminology used in current IAEA publications. Figure 1 compares the IAEA and the HWA-terms.

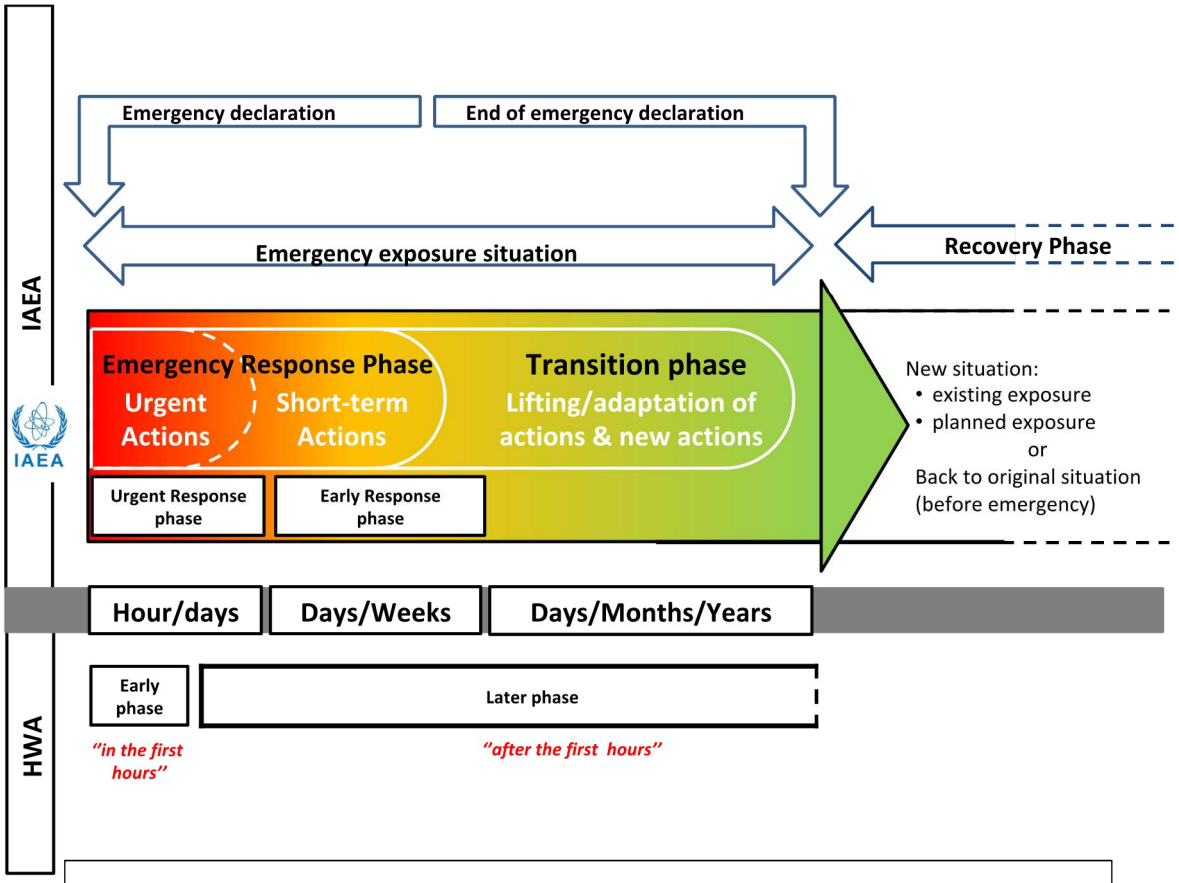

Figure 1: Overview of HWA and IAEA terminology comparing the phases of response, adapted from IAEA-GSG – 11 [R5]

2.10 Judgement evaluation factors

The HWA was developed in the aftermath of the accident in Fukushima with the aim of improving the response and cross-border coordination during the early phase of a nuclear accident. It aims at improving the coherence of the response between neighbouring countries, relying on the principles of mutual understanding, coordination and mutual trust. “It does not aim at proposing a uniform cross border framework” to deal with nuclear emergencies. The approach was published in a common report of HERCA-WENRA in October 2014 and is made of two parts, Part I and Part II.

Following the accident in Fukushima and the widespread gamut of reactions it triggered by national governments around the world, HERCA and its Working Group on Emergencies initiated the development of an approach focusing on the transboundary harmonization of protective actions in

a nuclear emergency. The results of these efforts are summarized in Part I. Later in the process an Ad hoc High-Level European Task Force (so called AtHLET) was established by WENRA and HERCA to identify shared principles on how to address such an extreme situation as the Fukushima accident (great uncertainty in a severe accident) resulting in what is now known as Part II of the HWA.

Part I of the approach, recommends that arrangements are in place in preparedness to foster mutual understanding, knowledge and trust, and in the early phase/first hours it recommends the principle that neighbouring countries do the same as the accident country if its response is thought consistent (see also concept 1.7 above).

Part II is meant to draw on the experience in Fukushima which saw Japanese authorities with established and previously tested response arrangements confronted with a severe accident situation (nuclear power plant badly hit by tsunami, loss of power, communication breakdown) with great uncertainty on the effective plant status, the urgency, type and extent of protective actions to be implemented. Part II of the report proposes a general approach for dealing with the early phase of the highly improbable case of a severe accident requiring rapid decision for protective actions but with no or limited access to information that would otherwise be expected or required for an assessment of the plant status and subsequent informed decisions on protective actions to implement.

As such, Part II addresses (possible) shortcomings of national emergency arrangements prior to the Fukushima accident and is to be understood as a call to assess and improve the robustness of these national emergency arrangements. Part II recommends that each country with nuclear power plants incorporates a simplified scheme using three Judgement Evaluation Factors (JEFs, see page 42 of the HWA report) in their operational assessment procedure/organisation to deal with specific, extreme situations for which the access to plant status information and data within a reasonable amount of time is either not possible or severely impaired/limited.

Countries should develop their approach with regard to the use of JEFs in a transparent way within the national decision making process, including the definition of criteria for triggering a JEF-case. Whatever the national approach is regarding decisions on protective actions in a severe accident, compliance with HWA Part II can be achieved by demonstrating that the national approach is (1) robust enough to cope with situations where there is limited access to information and data and that in such cases (2) protective actions are implemented in line with HWA Part II.

Figure 2, a graphic transcription of Part II of the report, may support the implementation of the HWA.

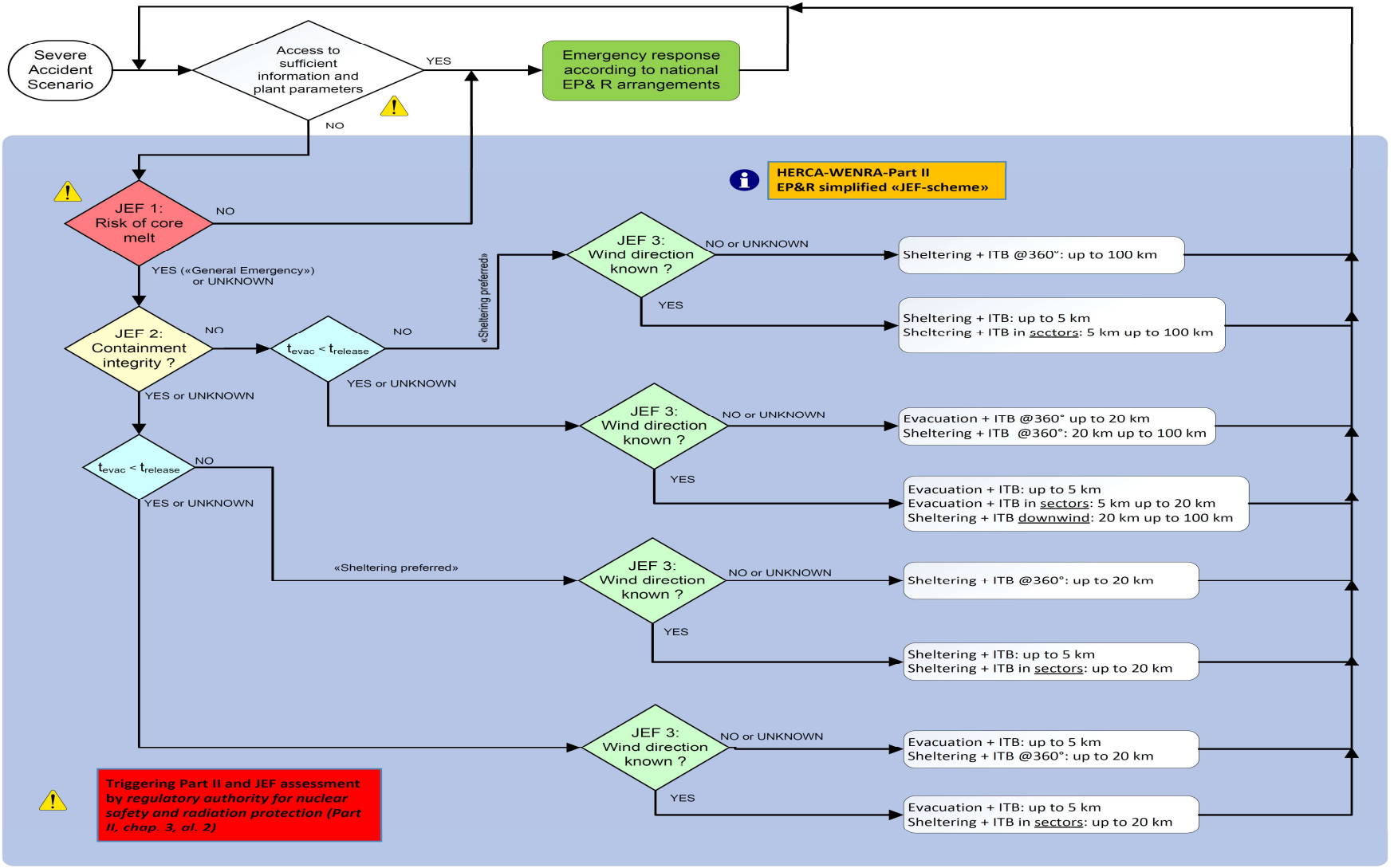

Figure 2: Graphic transcription of Part II of the HWA report

Though it is understood that the national implementation of such a simplified scheme can be achieved in various ways and to various degrees, a few (possibly obvious) guardrails, which do not differ from the emergency management principles, apply in the implementation:

- The criteria used for triggering the simplified scheme proposed by Part II (or an equivalent scheme) should be clear and not subject to interpretations. In this respect, the use of “no or insufficient information” to describe the situation to which a Part II scheme would apply has proven to be confusing or even misleading. Along with the increasing awareness of the importance of an uninterrupted flow of information out of the nuclear facility under any conditions, with the widespread use of redundant and diverse communication means such as e.g. satellite phones, situations meeting the above condition become less and less probable. On the other hand, “no or insufficient information” conditions almost always prevail at the beginning of an emergency or even the first hours of an emergency. The clarification provided here is that the simplified scheme proposed in Part II was not intended to be a general purpose approach for rapid decision making for all kinds of severe accident emergencies under any conditions. Even with all communication lines up and working, gathering the information and assessing the data from the plant, providing a first assessment, takes a certain amount of time. The key point or entry criteria for applying the simplified scheme proposed by Part II, next to a known or presumed severe accident condition at the site, is thus not “no or insufficient information”, but rather “no or insufficient information” AND “no or impaired/limited access” to the required information in a timely manner or reasonable amount of time. This is a slight but essential nuance.

- The absence of a dose prognosis is not an adequate criteria for triggering Part II since (1) as stated above, a lack of data and reliable information is inherent to many emergencies at the beginning and Part II would (or could) be indiscriminately applied using such a criterion, and because (2) dose prognosis is a derived quantity, potentially time consuming to establish, and not directly related to plant condition such as symptom or event based Emergency Action Levels (EALs) recommended by IAEA for preferred use for triggering or initiating e.g. an off-site response. Hence, the availability of a dose prognosis in case of a presumed nuclear emergency is neither an adequate nor a useful criterion for a response organisation and bears the risk of disproportionate response in an emergency, causing more harm than good.

- The responsibility for applying the simplified scheme for decision-making should be clearly allocated within the accident country as part of its protection strategy, which is, as opposed to neighbour countries, solely qualified for initiating a response following a simplified scheme. The report also clearly points out that the Part II mechanism should be initiated by a competent organization such as the regulatory authorities for nuclear safety and radiation protection. Such an organization would inherently bring along the required technical expertise to assess or judge both (1) whether the conditions for a simplified scheme apply (see above) and (2) plant status related criteria such as EALs (or JEFs according to Part II) for determining/recommending appropriate protective actions. This is even more important as relying on non-expert organizations for triggering a simplified scheme bears the risk of disproportionate response in an emergency, potentially contradicting fundamental principles such as the one established by GSR Part 7 in 4.29 that each protective action …shall be demonstrated to be justified (i.e. to do more good than harm), with account taken not only of those detriments that are associated with radiation exposure but also of those detriments associated with impacts of the actions taken on public health, the economy, society and the environment. Generally, in case of a severe accident, the accident country should communicate in line with bilateral arrangements on what basis the assessment is performed (e.g. if JEFs are applied or not).

- JEF 1 is described as a factor assessing the “risk of core melt”. As such, taken literally, the factor is inadequate for (1) the probability and hence the risk of core melt is given at any time during the lifetime of a nuclear power plant, only the size of the risk varies and because (2) it is too unspecific, not transparent and prone to subjective judgement for decision making potentially affecting large parts of the population. In order to be useful and adequate for emergency response organizations, the risk of core melt, in line with IAEA guidance, should be assessed on the basis of one (or more) plant related conditions or observables. A commendable example in this respect would be the example of France, using the time to uncover the core for assessing the risk of core melt.

2.11 General strategy to extend protective actions

On page 9 HWA recommends that a general strategy should be defined in order to be able to extend protective actions. For clarification see separate dedicated document “HERCA-WENRA Approach: Strategies for extension of evacuation, sheltering and ITB protective actions” (H23-9b, 16/05/2019) [R6].

2.12 Robust communication means

"Robust communications means" should be established to allow for information exchange from the affected site to and between the key organisations of the accident country involved in the evaluation/assessment of the situation and the body(ies)/organization(s) with responsibility for making decisions on protective actions [see Section 8.5 of the HWA Part II].

In that sense, "robust" must be understood as a reliable way of exchanging information (voice, data) between key organisations. Redundancy and/or diversification, as well as regular testing and verification, are necessary to ensure that at least one of those dedicated means of communication is always operational in all situations, even in severe adverse ones (in case of internal or external hazards, including malicious acts). Mobile satellite capacity in addition to the usual communication lines is an example of how the overall robustness of the communication infrastructure can be improved and the reliability of exchanging information increased.

3. Conclusions

To strengthen efforts to promote the implementation of the HWA to achieve coherent and coordinated protective actions between neighbouring countries and territories in emergency situations, the present document clarifies key concepts of the HWA to support mutual/common understanding.

4. References

[R1] HERCA-WENRA Approach for a better cross-border coordination of protective actions during the early phase of a nuclear accident (HWA) – www.herca.org

[R2] Guidance for Bilateral Arrangements (2015) - www.herca.org

[R3] Country fact sheets (CFSs) - www.herca.org

[R4] Preparedness and Response for a Nuclear or Radiological Emergency: IAEA - General Safety Requirements No. GSR Part 7 – www.iaea.org

[R5] Arrangements for the Termination of a Nuclear or Radiological Emergency: IAEA General Safety Guide 11 – www.iaea.org

[R6] "HERCA-WENRA Approach: Strategies for extension of evacuation, sheltering and ITB protective actions" (H23-9b, 16/05/2019)