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**Economic Commission for Europe****Meeting of the Parties to the Convention  
on Environmental Impact Assessment  
in a Transboundary Context****Eighth session**

Vilnius, 8–11 December 2020

Items 3 (b) and 8 (b) of the provisional agenda

**Outstanding issues: draft decisions by the Meeting of the Parties  
to the Convention****Adoption of decisions: decisions to be taken by the Meeting of the  
Parties to the Convention****Guidance on the applicability of the Convention to the  
lifetime extension of nuclear power plants****Prepared by the ad hoc working group***Summary*

The draft guidance contained in the present document was prepared by an ad hoc working group as mandated by the Meeting of the Parties to the Convention (ECE/MP.EIA/27/Add.1–ECE/MP.EIA/SEA/11/Add.1, decision IS/2, para. 9), and reflecting the comments made by the Working Group on Environmental Impact Assessment and Strategic Environmental Assessment at its ninth meeting (Geneva, 24–26 August 2020).

The Meeting of the Parties to the Convention is expected to review the draft guidance and agree on its endorsement through its decision VIII/6.



## I. Introduction

### A. Rationale of the guidance

1. The guidance has been developed in the framework of the United Nations Economic Commission for Europe (ECE) Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention).<sup>1</sup> Its objective is to clarify whether and in what circumstances lifetime extensions of nuclear power plants<sup>2</sup> require a transboundary environmental impact assessment in accordance with the Convention. Thus, the guidance aims to assist Parties in the practical application of the Convention and to support the Implementation Committee in reviewing compliance by Parties with their obligations under the Convention, with a view to assisting them in fully meeting their commitments.<sup>3</sup>

2. At its sixth session (Geneva, 2–5 June 2014), the Meeting of the Parties to the Convention endorsed the findings of the Implementation Committee that the extension of the lifetime of the Ukrainian Rivne nuclear power plant, after the initial licence had expired, should be considered as a proposed activity under article 1 (v) of the Convention, and is consequently subject to the provisions of the Convention (decision VI/2). However, the Meeting of the Parties did not endorse the Implementation Committee's opinion on the general applicability of that finding to lifetime extensions of nuclear power plants.<sup>4</sup> Decision VI/2 is thus not considered to be applicable to other cases of lifetime extension of nuclear power plants that do not share identical characteristics.

3. Faced with this situation, Parties that plan to extend the lifetime of nuclear power plants need guidance on whether a transboundary environmental impact assessment procedure is required.<sup>5</sup> Also, the Implementation Committee has expressed an urgent need for guidance for the consideration and the development of findings regarding related cases.<sup>6</sup>

### B. Mandate of the ad hoc working group and preparatory process

4. Prompted by the Implementation Committee's call for guidance, at its seventh session (Minsk, 13–16 June 2017), the Meeting of the Parties decided to establish an ad hoc working group to draft terms of reference for possible guidance on addressing the applicability of the Convention with regard to decisions on the lifetime extension of nuclear power plants.<sup>7</sup>

5. At its intermediary session (Geneva, 5–7 February 2019), the Meeting of the Parties decided to include the preparation of draft guidance on the applicability of the Convention to the lifetime extension of nuclear power plants in the workplan for 2017–2020. It also agreed that the draft guidance should be developed by the ad hoc working group, in line with the terms of reference<sup>8</sup> adopted by the Working Group on Environmental Impact Assessment and Strategic Environmental Assessment at its seventh meeting (Geneva, 28–30 May 2018), and taking into account the views of civil society and other stakeholders. It was decided that the draft guidance should be finalized for consideration by the Working Group at its ninth meeting (Geneva, 24–26 August 2020), before its submission to the Meeting of the Parties

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<sup>1</sup> The Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention) was adopted in 1991 in Espoo, Finland. In force since 1997, it currently has 45 Parties in the United Nations Economic Commission for Europe (ECE) region (see [www.unece.org/env/eia/ratification.html](http://www.unece.org/env/eia/ratification.html)). It is in the process of being opened for accession by all States Members of the United Nations.

<sup>2</sup> “Nuclear power plants” is the term used in the guidance. It carries the same meaning as “nuclear power stations and other nuclear reactors” found in appendix I, para. 2 (b), of the Convention.

<sup>3</sup> See ECE/MP.EIA/4, decision II/4, para. 1.

<sup>4</sup> See ECE/MP.EIA/IC/2014/2, annex, para. 59; and ECE/MP.EIA/2014/L.3, para. 5 (f).

<sup>5</sup> The approach of this guidance to the term “lifetime extension” is reflected in chapter II.

<sup>6</sup> When the guidance was prepared, several cases of the lifetime extension of nuclear power plants were pending before the Implementation Committee, each with their own distinctive features (ECE/MP.EIA/WG.2/2018/2, annex IV, para. 3).

<sup>7</sup> See ECE/MP.EIA/23.Add.1–ECE/MP.EIA/SEA/7.Add.1, decision VII/3–III/3, annex, item I.9.

<sup>8</sup> See ECE/MP.EIA/WG.2/2018/2, annex IV.

for adoption at its eighth session, to be held in Vilnius from 8 to 11 December 2020.<sup>9</sup> At its ninth meeting, the Working Group commented on the draft guidance, inviting the ad hoc group to further work on the draft, taking into account the comments made, with a view to finalizing it for the consideration of the Meeting of the Parties.<sup>10</sup>

6. The following Parties to the Convention nominated representatives to the ad hoc working group: Armenia, Austria, Azerbaijan, Belarus, Belgium, Bulgaria, Canada, Croatia, Czechia, European Union, Finland, France, Germany, Greece, Italy, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine and the United Kingdom of Great Britain and Northern Ireland. The ad hoc working group was co-chaired by Germany and the United Kingdom of Great Britain and Northern Ireland. The secretariat to the Convention supported the work of the ad hoc working group.

7. The ad hoc working group held eight meetings in 2017–2019. In 2020, due to the coronavirus disease (COVID-19) pandemic, three further meetings were cancelled, and work was continued via written procedure and online meetings.

8. In preparing the guidance, the ad hoc working group discussed and took account of the following sources:

- (a) Decisions adopted by the Meeting of the Parties;
- (b) *Guidance on the Practical Application of the Espoo Convention*;<sup>11</sup>
- (c) *Good Practice Recommendations on the Application of the Convention to Nuclear Energy-related Activities*;<sup>12</sup>
- (d) The Environmental Impact Assessment Directive, as amended by Directive 2014/52/EU;<sup>13</sup>
- (e) The judgment in the case *Inter-Environnement Wallonie ASBL and Bond Peter Leefmilieu Vlaanderen ASBL v. Council of Ministers* concerning compliance by Belgium with Directive 2011/92/EU;<sup>14</sup>
- (f) The ECE Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (the Aarhus Convention);
- (g) The Organization for Economic Cooperation and Development (OECD) Nuclear Energy Agency publication entitled “Legal Frameworks for Long-Term Operation of Nuclear Power Reactors”;<sup>15</sup>
- (h) The *IAEA Safety Glossary: Terminology used in Nuclear Safety and Radiation Protection. 2018 Edition*.<sup>16</sup>

### C. General considerations and guiding principles

9. The national legal and regulatory frameworks, including those for nuclear power plants, vary between Parties. Consequently, Parties have taken different approaches to

<sup>9</sup> See ECE/MP.EIA/27/Add.1–ECE/MP.EIA/SEA/11/Add.1, decision IS/2, paras. 6–9.

<sup>10</sup> See ECE/MP.EIA/WG.2/2020/2, forthcoming.

<sup>11</sup> United Nations publication, ECE/MP.EIA/8.

<sup>12</sup> United Nations publication, ECE/MP.EIA/24.

<sup>13</sup> Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment, *Official Journal of the European Union*, L 26 (2012), pp. 1–21; and Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, *Official Journal of the European Union*, L 124 (2014), pp. 1–18.

<sup>14</sup> Court of Justice of the European Union, Case No. C-411/17, 29 July 2019.

<sup>15</sup> Kimberly Sexton Nick and Pierre Bourdon, eds, Nuclear Energy Agency No. 7504 (Paris, Organization for Economic Cooperation and Development Nuclear Energy Agency, 2019).

<sup>16</sup> Vienna, International Atomic Energy Agency (IAEA), 2019. See also the glossary of terms in annex I.

implementing the Convention. As there is no one-size-fits-all approach, when assessing possible cases of lifetime extension, a case-by-case determination through the consideration of the principles and factors laid down in the guidance is recommended.

10. The guidance concentrates on the interpretation of the articles that are relevant for determining the applicability of the Convention to the lifetime extension of nuclear power plants, in particular articles 1 (v), 2 (2)–(4), 3 and 6. These are elaborated upon in detail in chapters III to V below.

11. The guidance focuses only on requirements under the Convention. It does not reflect technical or legal factors in the field of nuclear energy that may allow for a lifetime extension of a nuclear power plant to be carried out. The Convention is a procedural instrument that, subject to certain conditions being met, requires the Party of origin to notify any Party that it considers may be an affected Party as early as possible, for the purpose of ensuring adequate and effective consultations (art. 3 (1)). Where the Convention applies to the lifetime extension of a nuclear power plant, it requires the Party of origin to take due account of the outcome of the transboundary environmental impact assessment in its final decision. The Convention has no other bearing upon the decision of whether or not to extend the lifetime of a nuclear power plant. This decision is taken by Parties in accordance with their sovereign rights by applying their respective national legal frameworks, including nuclear safety requirements.

12. *Option 1* [The guidance does not consider technical provisions and requirements that are outside of the scope of the Convention, such as those related to nuclear safety (decision IS/1, para. 4 (d)).] *Option 2* [Technical provisions and requirements, such as those related to nuclear safety, are outside of the scope of the Convention (decision IS/1, para. 4 (d)) and therefore also outside the scope of this guidance.] Nevertheless, some parts of the guidance will touch upon nuclear safety issues with a view to providing necessary context.

13. In this respect, it must be noted that terms such as “design life” and “periodic safety review” that are used in the guidance have been defined by international organizations such as the International Atomic Energy Agency (IAEA). To ensure consistency, these terms should not be reinterpreted and follow the usual meaning within the given context of the safety standards of IAEA. The guidance lists such definitions in a glossary of terms in its annex I.

14. Notably, Parties must act in keeping with the Convention’s objectives of preventing, reducing and controlling significant adverse transboundary environmental impact (art. 2 (1)) and of enhancing international cooperation in assessing environmental impact, in particular in a transboundary context (preamble). They must also ensure effective implementation of the Convention’s requirements to proposed activities that fall under its scope. The Convention does not apply retrospectively to proposed activities undertaken prior to its coming into force.

15. The precautionary principle, which has been referenced by the Meeting of the Parties,<sup>17</sup> underlies the Convention and guides its interpretation and application. Recalling decision IS/1,<sup>18</sup> Parties that carry out nuclear energy-related activities should do so in accordance with the Convention, in a sustainable manner, taking into consideration the precautionary principle (para. 8 (a)). Therefore, when assessing, for the purpose of notification, which Parties are likely to be affected by a proposed nuclear activity listed in appendix I, the Party of origin should make the most careful consideration on the basis of the precautionary principle and available scientific evidence (para. 4 (b)). In general, even if a

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<sup>17</sup> See, for example, the Declaration on the application of the Convention and the Protocol to nuclear energy issues (ECE/MP.EIA/20/Add.3–ECE/MP.EIA/SEA/4/Add.3, decision VI/5–II/5, para. A.1), adopted by the Meeting of the Parties in June 2014.

<sup>18</sup> See ECE/MP.EIA/27/Add.1–ECE/MP.EIA/SEA/11/Add.1.

proposed activity appears to have a low likelihood of significant transboundary impacts, it may be advisable to notify potentially affected Parties.<sup>19</sup>

16. Parties are encouraged to apply the Convention in an open-minded and proactive manner, in order to best serve its purpose, and, in case of doubt, to interpret the provisions in a way that ensures consistency, taking also into account its objectives.

## **II. Scope of the guidance – understanding of the term “lifetime extension”**

### **A. Factors limiting the lifetime of a nuclear power plant**

17. There are certain factors that may limit the operation of a nuclear power plant. These time-limiting factors can be political, environmental, economic, legislative, safety-related or technical, and may occur individually or collectively.

18. At the time of their construction, many nuclear power plants were typically designed to perform for an expected period of time (for instance, a [minimum] period of 30 to 40 years). However, many of them will be able to operate beyond that period. Currently, more than half of the nuclear power reactors operating in the world have been operating for 30 years or more.

19. From a technical and safety perspective, it is not assumed that there is a time-fixed design life for a nuclear power plant in its entirety. During the operation of a nuclear power plant, many of its structures, systems and components are replaced as part of continuous monitoring, general maintenance work, safety improvement programmes, or when their operational life is reached. Other reasons for their replacement may include ageing, unforeseen degradation, or equipment becoming obsolete.<sup>20</sup> Incidents and accidents can also result in a requirement that additional safety improvements be introduced within a certain period of time, as a condition for continued operation. Such replacements may fall within the framework of the existing licence, depending on the case in question.

20. However, there are some structures, systems and components that are considered irreplaceable or for which replacement is not technically or economically viable. Their design life may therefore determine the design life of the plant in its entirety. According to IAEA, design life is the period of time during which a facility or component is expected to perform according to the technical specifications to which it was produced. However, this period of time is not absolute and may be adjusted over time based on continuous monitoring and extended assessment as well as requalification, as approved by the competent authority.

### **B. Approach to the term “lifetime extension”**

21. “Lifetime extension” is a term without an established legal definition under international law.<sup>21</sup> Without defining it, the term has been used by international organizations such as IAEA, the International Energy Agency and the OECD Nuclear Energy Agency.

<sup>19</sup> See United Nations publication, ECE/MP.EIA/8, para. 28.

<sup>20</sup> One example of large components that have been replaced is that of steam generators in many pressurized water reactors replaced due to stress corrosion in the tubes. Examples of equipment that have become obsolete and needed replacing are instrumentation and control equipment.

<sup>21</sup> The term “lifetime extension” did not exist in the national context of Ukraine in 2011 when the Implementation Committee initiated its consideration of the application of the Convention by Ukraine in respect of units 1 and 2 of the Rivne nuclear power plant. The Committee and, subsequently, the Meeting of the Parties employed that term to describe a process used by the nuclear authority of Ukraine to continue operation of units 1 and 2. In that process, the nuclear authority of Ukraine, based on a periodic safety review and with a view to ensuring a long-term operation of the plant, authorized continuation of operation of those units after the initial licence had expired. For the relevant findings and recommendations of the Implementation Committee, see ECE/MP.EIA/IC/2014/2, annex.

However, other terms such as “long-term operation”<sup>22</sup> or “plant life extensions” are also used by these organizations. Such terms are not to be understood as necessarily interchangeable.

22. The way in which all of these organizations use the term “lifetime extension” does suggest that it describes a prolongation of the operation of a nuclear power plant. The guidance follows a pragmatic approach to this issue and does not use the term “lifetime extension” based on a certain definition, but rather on a common understanding of the term.

23. The Parties to the Convention, in accordance with their sovereign right to regulate nuclear energy and to decide whether or not to include nuclear energy in their own energy mix, have chosen different approaches in regulating nuclear power plants and their lifetime under their national jurisdiction. In some Parties, nuclear power plants have a time-limited licence, while in other Parties plants are licensed for an unlimited period.<sup>23</sup> The validity period of a licence represents one of the factors indicating a lifetime extension. In Parties with unlimited licences other factors may indicate that there is a similar situation. These situations are therefore also included in the guidance as a possible lifetime extension.

### C. Situations understood as a possible lifetime extension

24. The situations described in this section take account of the common understanding of the term “lifetime extension” as described in chapter II, section B above. They aim to ensure broad application of the guidance and to avoid further uncertainty. This section outlines a non-exhaustive list of situations that may indicate a lifetime extension of a nuclear power plant. However, a transboundary environmental impact assessment is only required in these situations if the requirements of the Convention reflected in chapters III–V below are met.

#### 1. Situation 1: The end date of a time-limited licence has been reached, but the plant is intended to continue operation

25. If a licence includes an expiration date, the validity period of that licence may, from a legal perspective, establish its lifetime. A new licence, or extension of the existing licence, may then be regarded as a lifetime extension. If the license renewal occurs early in the operating life, it may not be considered a lifetime extension.

26. The period of time covered by an environmental impact assessment may also be an aspect tied to the validity period of the time-limited licence.

#### 2. Situation 2: The nuclear power plant has a time-unlimited licence, but the design life<sup>24</sup> of irreplaceable safety-critical structures, systems and components has been reached

27. Some safety-critical structures, systems and components of a nuclear power plant are considered irreplaceable and thus their design life may indicate the design life of the plant as a whole. A comprehensive refurbishment or specific comprehensive requalification of these systems, structures and components at that time may be considered a lifetime extension of a nuclear power plant. The period of time covered by an environmental impact assessment may also be tied to the design life of the nuclear power plant.

#### 3. Situation 3: A periodic safety review is carried out in support of the decision-making process for a lifetime extension

28. Over the course of their operation, nuclear power plants are subject to different types of safety reviews, such as periodic safety reviews.

29. Periodic safety reviews are not an indicator per se for a lifetime extension but could, in some cases, be used in support of a decision-making process for a lifetime extension.

<sup>22</sup> See the glossary of terms in annex I to the present document.

<sup>23</sup> Sexton Nick and Bourdon, eds., Nuclear Energy Agency No. 7504.

<sup>24</sup> See the definition contained in paragraph 20 of this guidance.

30. According to the respective national legal or regulatory framework, periodic safety reviews<sup>25</sup> should be carried out at regular intervals, typically of 10 years, and aim to ensure the high level of nuclear safety of the nuclear power plant.

31. A specific periodic safety review towards the end of the established lifetime can be carried out in support of the decision-making process for and may thus indicate a lifetime extension.

**4. Situation 4: Modification of a nuclear power plant not covered by the existing authorization to operate and therefore requiring a licence modification**

32. The (continued) operation of a nuclear power plant may impose safety upgrades or backfitting of safety systems. A modification of a nuclear power plant that is considered as a major change and is not covered by the existing authorization to operate, and requires modification of the authorization to operate, may imply the application of the Convention; this can also coincide with a lifetime extension.

**5. Situation 5: The nuclear power plant has a time-unlimited licence but the time of operation is limited by law**

33. Some Parties may choose to limit the lifetime of nuclear power plants by law. The law may limit the operation to a specified date or it may limit the production of electricity. The lifetime set forth by this law may, from a legal point of view, establish the time of operation of the nuclear power plant. Prolonging that period by changing the respective law may then also be called a lifetime extension.<sup>26</sup>

### **III. Guidance on how to determine if a lifetime extension represents an activity or a major change to an activity and on the characteristics of a major change**

#### **A. Lifetime extension as a “proposed activity”**

34. The Convention applies to proposed activities, which are defined in article 1 (v) as follows: “‘Proposed activity’ means any activity or any major change to an activity subject to a decision of a competent authority in accordance with an applicable national procedure.”

35. This chapter will explore the terminology used in the text of the Convention, in particular the definition of “activity” and “major change to an activity”, and examine how these terms apply in the context of lifetime extension of nuclear power plants.

36. Appendix I<sup>27</sup> to the Convention lists activities that fall within the Convention’s scope. Paragraph 2 (b) reads as follows: “Nuclear power stations and other nuclear reactors, including the dismantling or decommissioning of such power stations or reactors (except research installations for the production and conversion of fissionable and fertile materials, whose maximum power does not exceed 1 kilowatt continuous thermal load).”

37. This description clearly indicates that the operation of a nuclear power plant is within the scope of the Convention. A lifetime extension may either be a new activity or a major change to an existing activity. In both cases, the activity in question is the operation of a nuclear power plant. Lifetime extensions must therefore be considered to be within the scope of the Convention, even though they are not explicitly mentioned in the list of activities.

<sup>25</sup> See the glossary of terms in annex I.

<sup>26</sup> See paragraph 102 of this guidance.

<sup>27</sup> As amended by the second amendment to the Espoo Convention (see ECE/MP.EIA/6, annex VII, decision III/7), which has been in force since 23 October 2017. For the status of ratification of the amendment see [https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg\\_no=XXVII-4-c&chapter=27&clang=\\_en](https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-4-c&chapter=27&clang=_en).

38. If neither case is applicable then, accordingly, a situation understood to be a lifetime extension is not a proposed activity and therefore falls out of the scope of the Convention.

## **B. Lifetime extension as an “activity”**

39. A lifetime extension represents a prolongation of an existing activity rather than an activity in its own right. An exception to this would be if a nuclear power plant where operation has previously been terminated (most commonly due to the expiration of its licence) were to be subsequently brought back to operation. This may be regarded as an activity in its own right.

## **C. Lifetime extension as a “major change” to an activity**

40. The Convention does not define the term “major change to an activity” or provide examples of relevant changes. Parties bear the responsibility for their practical application of the Convention and have discretion to establish their own national requirements and practices to meet their obligations in determining whether a proposed change to an activity that falls under appendix I is major or not.

41. This guidance describes possible changes related to a lifetime extension of a nuclear power plant which may, depending on their nature or scale, be classified as a major change to an existing activity according to the Convention. Whether this is the case or not must be determined on a case-by-case basis.

42. In that determination, particular attention should be given to the Convention’s objective of preventing, reducing and controlling significant adverse environmental transboundary impact.<sup>28</sup> An important factor to consider in this respect is whether the lifetime extension in question, taking account of its specific features, may cause significant adverse transboundary environmental impact.

43. It is important to note, however, that changes covered by the existing authorization to operate do not trigger the application of the Convention. The Convention does not apply retrospectively. This can be derived from article 2 (3) of the Convention, which requires that an environmental impact assessment procedure be undertaken prior to the decision to authorize or undertake a proposed activity.<sup>29</sup>

### **1. Physical works and modifications in the operating conditions**

44. Physical works and modifications in the operating conditions related to the lifetime extension of a nuclear power plant may result in a changed intervention in the environment that was not considered in the initial licensing procedure. Therefore, they may justify the classification of a lifetime extension as a major change to an activity.

45. In practice, most lifetime extensions of nuclear power plants are accompanied by physical works, notably technical changes such as renewal, replacement or updates of systems, structures and components, carried out, inter alia, with a view to ensuring nuclear safety and environmental protection. A lifetime extension may also be linked with modifications in the operating conditions, triggered for example by technical changes or new scientific findings.

46. Where a lifetime extension is combined with major renovation works of a nature or scale that is comparable, with regard to their potential to cause significant adverse transboundary environmental impacts, to that when the plant was first put into service, it must be regarded as a major change.<sup>30</sup> This is the case where the nuclear power plant is subject to large-scale changes such as a comprehensive refurbishment of systems, structures and

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<sup>28</sup> See article 2 (1) of the Convention.

<sup>29</sup> See also chapter I, section C, of the present guidance.

<sup>30</sup> Similar considerations can be found in the Court of Justice of the European Union judgment of 29 July 2019 in Case No. C-411/17, paras. 79 and 80. In making this ruling, the Court did not, however, consider the applicability of the Espoo Convention.

components.<sup>31</sup> One factor that may indicate the scale of the works is the investment costs associated with their implementation.<sup>32</sup>

47. Where a lifetime extension is accompanied by physical works or modifications in the operating conditions of a smaller scale, certain internal or external factors may indicate whether the operation of the modified plant may amount to a major change. [The duration of the lifetime extension should also be taken into consideration.] A non-exhaustive list of illustrative factors that may be relevant to be considered when determining whether a lifetime extension amounts to a major change can be found in annex II to the present guidance.

48. Regarding the variety of lifetime extension cases and their specific features, and taking account of both the individual technical specificities of each nuclear power plant and the different national legal and regulatory frameworks applied by the Parties, this guidance does not intend to draw up a specific list of physical works and modifications in the operating conditions that should generally not be considered as major changes. However, it should be noted that physical works undertaken as part of regular maintenance work or ageing management are not usually regarded as major changes. The same applies to the renewal of components and other works or modifications in the operating modifications [for which significant adverse transboundary impacts on the environment can be reasonably excluded]. Such measures are typically covered by the authorization to operate.

## 2. “Lifetime extension per se”

49. It is unusual for lifetime extensions to be carried out without, inter alia, any associated physical works or modifications in the operating conditions. Nevertheless, irrespective of whether or not there are physical works or modifications in the operating conditions, the operation of a nuclear power plant is faced with a changing environment that occurs over the course of its lifetime and that may not have been considered in the initial authorization to operate. With respect to [the decision on] the lifetime extension, the changed environment, depending on its nature and scale, could constitute a factor that may indicate that the change in the likely impact of the proposed activity could, as such, be classified as a major change.<sup>33</sup>

## 3. Multiple minor changes

50. During their operation, nuclear power plants undergo continuous technical changes or modifications in the operating conditions, inter alia, to comply with findings of regular routine inspections or periodic safety reviews. Such changes or modifications are typically not major when considered in isolation. However, where a number of them occur, either in parallel or over a period of time, they may be regarded, for the purposes of a determination on a case-by-case basis, as one major change that has been split up into multiple minor changes. Their impact on the environment must then be assessed as a whole.

51. [A lifetime extension linked with multiple minor changes may amount to a major change if there is a tangible link between the multiple minor changes and the lifetime extension, demonstrating that the minor changes are part of one complex activity undertaken with a demonstrable intent to extend the lifetime of the nuclear power plant.<sup>34</sup> Technical documents, management plans, investment plans, administrative acts or laws, as well as explanatory memorandums related to administrative acts or laws can be helpful in establishing whether this is the case.]

<sup>31</sup> In its judgment of 29 July 2019 in Case No. C-411/17, the Court of Justice of the European Union found that some facilities were replaced due to ageing and other facilities were updated, paras. 65 and 66.

<sup>32</sup> The costs were also a factor in the Court of Justice of the European Union judgment of 29 July 2019 in Case No. C-411/17, para. 64.

<sup>33</sup> In its findings and recommendations in the case concerning the Rivne nuclear power plant in Ukraine (ECE/MP.EIA/IC/2014/2, para. 59), the Implementation Committee concluded that a major change does not necessarily require physical works. This conclusion was however not endorsed by the Meeting of the Parties (see chapter I, section A) in general. Regarding the case of Ukraine, the Meeting of the Parties specifically decided, however, that even in the absence of any works the Convention should apply for units 1 and 2 of the Rivne nuclear power plant.

<sup>34</sup> Paragraph 43 of this guidance applies accordingly.

## **IV. Guidance on how to determine if a lifetime extension is likely to cause significant adverse transboundary impact**

### **A. Espoo Convention framework**

52. In accordance with article 3 (1) of the Convention, the [decision on the] extension of the lifetime of an existing nuclear power plant would only require a transboundary procedure if such extension was likely to cause significant adverse transboundary impact:

For a proposed activity listed in appendix I that is likely to cause a significant adverse transboundary impact, the Party of origin shall, for the purposes of ensuring adequate and effective consultations under article 5, notify any Party which it considers may be an affected Party as early as possible and no later than when informing its own public about that proposed activity.

53. Unlike many national legislative requirements on environmental impact assessment and administrative practices that establish a priori a list of activities that are regarded as being likely to have significant adverse impact on the environment, any determination to apply the Convention includes a consideration of whether the proposed activity in question is likely to cause a significant adverse transboundary environmental impact.

54. Accordingly, under the Convention, a transboundary procedure will be required for a lifetime extension if a set of cumulative criteria is fulfilled. In determining whether the criteria apply to a lifetime extension, Parties should consider the following, in no particular order:

- (a) What are the possible “adverse impacts” of the lifetime extension?
- (b) Is the lifetime extension “likely” to cause these adverse environmental impacts?
- (c) Are these likely adverse environmental impacts “significant”?
- (d) Are these likely significant adverse environmental impacts “transboundary” and which Parties would be affected?

55. This chapter gives guidance on the interpretation of these criteria with regard to the situations understood to be a lifetime extension of a nuclear power plant, outlined in chapter II above. As a general rule, the same principles that apply to an assessment of the significant adverse transboundary impacts of a nuclear power plant that is proposed to be constructed also apply when considering a proposed lifetime extension, recognizing, however, that the scope of the activity is different.

### **B. Likely to cause significant adverse transboundary impacts**

#### **1. Adverse impacts**

56. The Convention defines the term “impact”, but not the term “adverse impact”. Article 1(vii) reads as follows:

57. In order to identify the possible adverse impacts of a lifetime extension it is necessary to take all relevant environmental impacts into consideration. That exercise must consider the current state of the nuclear power plant and the proposed modifications to be implemented in the framework of the lifetime extension, as well as the state-of-the-environment, including the environment of areas under the jurisdiction of other Parties likely to be affected.

58. *Option 1* [Generally, the extended operation of a nuclear power plant has impacts that are similar to those of a new nuclear power plant considered in its initial operation. Based on nuclear safety terminology, these impacts result from:

- (a) Operational states (also including anticipated operational occurrence);
- (b) Design basis accidents;
- (c) Accidents within the design extension conditions;
- (d) Beyond design basis accidents, including severe accidents with core melt conditions.]

*Option 2* [Generally, the extended lifetime of a nuclear power plant has impacts that are similar to those of a new nuclear power plant considered in its initial operation. These impacts include the following:

- (a) Impacts resulting from normal operation;
- (b) Impacts resulting from accidents.]

59. As laid down in decision IS/1, paragraph 4 (b), when considering whether significant adverse transboundary impacts are likely, the Meeting of the Parties in its intermediary session of 2019 focused on the likelihood of a major accident, an accident beyond design basis or a disaster:

Although the likelihood of a major accident, accident beyond design basis or disaster occurring for nuclear activities listed in appendix I to the Convention is very low, the likelihood of a significant adverse transboundary environmental impact can be very high, if the accident occurs. Consequently, when assessing, for the purpose of notification, which Parties are likely to be affected by a proposed nuclear activity listed in appendix I, the Party of origin should make the most careful consideration on the basis of the precautionary principle and available scientific evidence.

60. In paragraph 8 (a) of the same decision, the Meeting of the Parties emphasized that: “Parties to the Convention that carry out nuclear energy-related activities should do so in accordance with the Convention, in a sustainable manner, taking into consideration the precautionary and polluter pays principles, and respecting international nuclear safety standards and relevant environmental legislation”.

61. Furthermore, in paragraph 8 (b) of the same decision, the Meeting of the Parties emphasized that: “Close cooperation and improved mutual understanding of the practices and needs of other Parties in the field of nuclear energy will facilitate the application of transboundary environmental procedures in full compliance with the Convention and the Protocol”.

62. According to the principles referred to in paragraphs 59–61 above, when considering the likely adverse impacts of the lifetime extension of a nuclear power plant, attention must be paid to a number of factors, including available scientific evidence and international nuclear safety standards, as well as the precautionary principle and the objective of enhancing international cooperation and mutual understanding between Parties. In this context, it has to be emphasized that this guidance must not be interpreted as implying a change in the rights and obligations of a contracting Party under any existing international nuclear-related agreements.

63. *Option 1* [The Party of origin should also apply the Convention and notify potentially affected Parties in cases in which the competent authority comes to the conclusion that the likelihood of certain types of accidents is very low. Whether these types of accidents can be excluded from the scope of the environmental impact assessment or not may then be discussed with the potentially affected Parties to reach a mutual understanding (on risk acceptance limits).]

*Option 2* [All types of accidents, including beyond design basis accidents and design extension conditions, which cannot be practically eliminated<sup>35</sup> or are considered with a high degree of confidence to be extremely unlikely to occur, must be taken into consideration when determining whether the lifetime extension of the nuclear power plant is likely to cause significant adverse transboundary impact on the environment. It is not within the scope of this guidance or the Convention to define which accidents must be considered. It is the responsibility of the relevant competent authorities to assess which accident scenarios and significant adverse transboundary impacts relevant to the nuclear power plant in question have to be considered.]

## 2. Likely

64. Although the term “likely”<sup>[36]</sup> is used throughout the Convention, it is neither defined nor are criteria provided for doing so. The term refers to whether the adverse impact is likely to occur, rather than whether that impact is likely to be significant. It therefore covers any scenario in which significant adverse transboundary impacts cannot be excluded by the competent authorities.<sup>37</sup>

65. The 2017 *Good Practice Recommendations on the Application of the Convention to Nuclear Energy-related Activities*, summarizing good practices reported by some Parties, recommends the following: “Parties of origin are invited to consider the risk of major accidents and/or disasters which are relevant to the project when determining the likelihood of significant transboundary impact.”<sup>38</sup>

66. Decision IS/1 of the Meeting of the Parties, quoted above in chapter IV, section B.1, highlighted that the likelihood of a significant adverse transboundary environmental impact can be very high if the accident occurs, although the likelihood of a major accident, an accident beyond the design base or a disaster occurring is very low. Therefore, when assessing which Parties are likely to be affected by a proposed nuclear activity listed in appendix I, the Party of origin should make the most careful consideration, on the basis of the precautionary principle and available scientific evidence.

67. According to the above, both aspects – the probability of occurrence of accidents and the significance of the impacts resulting therefrom – must be taken into account when considering whether the activity is likely to cause significant adverse transboundary impact. Consequently, the assessment also has to consider the potential impact on the environment of another Party.

## 3. Significant

68. “Significance” is a relevant factor in the process of transboundary environmental impact assessment. However, in the Convention, the term is not defined; nor are any thresholds or criteria provided for doing so.

<sup>35</sup> “The possibility of certain conditions arising may be considered to have been ‘practically eliminated’ if it would be physically impossible for the conditions to arise or if these conditions could be considered with a high level of confidence to be extremely unlikely to arise.” International Atomic Energy Agency (IAEA), *IAEA Safety Standards for protecting people and the environment – Safety of Nuclear Power Plants: Design. Specific Safety Requirements No. SSR-2/1 (Rev.1)* (Vienna, 2016), p. 58, footnote 26. “The phrase ‘practically eliminated’ is misleading as it actually concerns the possible exclusion of event sequences from hypothetical scenarios rather than practicalities of safety. The phrase can also all too readily be misinterpreted, misrepresented or mistranslated as referring to the ‘elimination’ of ‘accidents’ by practical measures (or else ‘practically’ in the sense of ‘almost’). IAEA, *IAEA Safety Glossary: Terminology used in Nuclear Safety and Radiation Protection. 2018 Edition* (Vienna, 2019), p. 172.

<sup>36</sup> The term “likely” also applies if significant adverse transboundary impacts cannot be excluded, as equally underlined for instance, by any relevant nuclear safety-related common understanding, such as Heads of the European Radiological protection Competent Authorities-Western European Nuclear Regulators’ Association, *HERCA-WENRA Approach for a better cross-border coordination of protective actions during the early phase of nuclear accidents* (Stockholm, 22 October 2014).

<sup>37</sup> See ECE/MP.EIA/20.Add.1–ECE/MP.EIA/SEA/4.Add.1, decision VI/2, para. 7.

<sup>38</sup> See United Nations publication, ECE/MP.EIA/24, para. 17.

69. The Parties to the Convention have discretion in determining the significance of adverse environmental impacts. For the purpose of this guidance, it is recommended that significance be assessed in the light of the specific characteristics of the proposed activity in question and its likely impact. This determination should be conducted on the basis of technical expertise and available scientific evidence, taking into account, inter alia, the objectives of the Convention as described in decision IS/1 (para. 4 (b)). The determination should be as objective as possible.

70. Several risks related to the significant adverse transboundary impacts are characterized by a low likelihood. Deriving from decision IS/1 of the Meeting of the Parties, quoted above in chapter IV, section B.1, a systematic evaluation of potential significant adverse transboundary impacts of low likelihood, including from accidents beyond the design basis, is important when assessing the impacts of nuclear power plants. Parties must also take into account impact accumulation from different events that, when considered individually, may appear insignificant.

71. Although the Convention does not directly provide any definition of the term “significant”, appendix III should be applied in this context. The criteria listed in this appendix are also valid for activities listed in appendix I and provide for some general guidance that may serve as a suitable framework for determining the significance of adverse impacts deriving from lifetime extension.

#### 4. Transboundary

72. The term “transboundary impact” is defined by the Convention in article 1 (viii), as follows: “‘Transboundary impact’ means any impact, not exclusively of a global nature, within an area under the jurisdiction of a Party caused by a proposed activity the physical origin of which is situated wholly or in part within the area under the jurisdiction of another Party.”

73. The transboundary nature of an impact will generally vary depending on both the impact itself and the location of the nuclear power plant in question. Some impacts may not be relevant for any other State, others may only be relevant for neighbouring States, while others may have a more extensive reach. Similarly, while impacts from normal operation will mostly only be of a local nature, impacts from accidents may also be transboundary.

74. As regards the location of the nuclear power plant, a plant that is located close to an international border or a transboundary watercourse is more likely to have a transboundary impact than one located elsewhere. As discussed in chapter IV, section B.1 above, the assessment of impacts must consider the state-of-the-environment, including the environment of areas under the jurisdiction of another Party. Changes in the environment of these areas that have occurred since the activity began may affect the transboundary nature of the impacts.

75. [It is noteworthy that safety measures and related improvements aim to limit the probability of occurrence and the effects of accidents. Indeed, certain impacts of nuclear power plants on the environment may have decreased over the years due to modifications or changes made within the limits of the existing licence, thus, safety improvement that is endorsed by the competent authority cannot, by itself, have a significant adverse transboundary impact.]

### C. Notification

76. The individual criteria for “likely significant adverse transboundary impact” are closely linked to the question of who to notify about a proposed activity. The *Good Practice Recommendations on the Application of the Convention to Nuclear Energy-related Activities* emphasize the importance of a wide notification.<sup>39</sup>

<sup>39</sup> See United Nations publication, ECE/MP.EIA/24, para. 28.

77. Decision IS/1 of the Meeting of the Parties includes text related to notification in paragraph 4 (a) and (c).

78. The Party of origin should take both the *Good Practice Recommendations* and decision IS/1 into account when determining which Parties it notifies about a lifetime extension. Such notification may result in the conclusion that a transboundary procedure is not necessary. In line with decision IS/1, Parties should make the most careful consideration on the basis of the precautionary principle and available scientific evidence when determining for the purpose of notification which adverse impacts are likely, significant and transboundary. [Furthermore, the Party of origin is also encouraged to take into consideration whether the nuclear power plant in question operating today was planned and constructed before the Convention's entry into force. It should also be noted that the risk perception may vary from Party to Party and may also change over time.]

79. Article 3 (7) of the Convention allows any Party that considers itself to be affected by a significant adverse transboundary impact of a proposed activity to hold discussions with the Party of origin. In a situation where neither specific information on the likely significant adverse transboundary impacts nor any other general characteristics of the proposed activity are considered sufficient by the Party of origin to arrive at a definite conclusion on whether significant adverse transboundary impacts are likely, the Party of origin is encouraged to notify widely in order to reach a mutual understanding. A wide notification may thus help to avoid long and burdensome procedures.

## **V. Lifetime extension of nuclear power plants subject to a decision of a competent authority in accordance with an applicable national procedure**

### **A. Espoo Convention framework**

80. This chapter deals with the decision element of the definition of "proposed activity" as provided in article 1 (v) of the Convention: "'Proposed activity' means any activity or any major change to an activity subject to a decision of a competent authority in accordance with an applicable national procedure."

81. Article 2 of the Convention contains general provisions regarding the obligations of the Parties under the Convention. Article 2 (2) addresses the requirement to take the necessary legal, administrative or other measures to implement the Convention:

Each Party shall take the necessary legal, administrative or other measures to implement the provisions of this Convention, including, with respect to proposed activities listed in appendix I that are likely to cause significant adverse transboundary impact, the establishment of an environmental impact assessment procedure that permits public participation and preparation of the environmental impact assessment documentation described in appendix II.

82. Article 2 (3) states that the environmental impact assessment must be undertaken prior to a decision to authorize or undertake a proposed activity:

The Party of origin shall ensure that in accordance with the provisions of this Convention an environmental impact assessment is undertaken prior to a decision to authorize or undertake a proposed activity listed in appendix I that is likely to cause a significant adverse transboundary impact.

83. Any interpretation of article 2 (2) and (3) must be made in line with other provisions of the Convention such as articles 1 (v) and 6, as well as with the purpose of the Convention.

84. In accordance with article 2 (2) of the Convention, Parties have committed themselves to having in place and taking all the legal, administrative and other measures necessary to implement the Convention effectively within the domestic legal order. Consequently, to comply with the Convention, and as provided for in article 2 (3) with respect to all proposed activities that fall within the scope of the Convention, each Party must undertake an

environmental impact assessment in accordance with the Convention, prior to proceeding with its decision-making to authorize or undertake such activities. Moreover, a “final decision” on the proposed activity is one of the core obligations under the Convention, which Parties must implement in accordance with article 6.<sup>40</sup>

## **B. Characteristic features of a “decision”**

85. In practice, both the construction and operation of all nuclear power plants are subject to an authorization<sup>41</sup> regime and undergo continuous safety assessment, monitoring (including environmental monitoring) and inspection throughout their entire lifecycle, overseen by the relevant competent authorities. In addition, it is the responsibility of these authorities to ensure that operation complies with the conditions of the relevant authorization and that the operator takes any required action to ensure compliance and nuclear safety. The lifecycle of a nuclear power plant does not necessarily include a lifetime extension. While some Parties have established decision or authorization procedures related to the lifetime extension of their nuclear power plants, other Parties do not have these procedures.

86. Depending on the specific procedure of the Party in question, a competent authority has to carry out assessments and evaluate the operation of a nuclear power plant at various points, inter alia in the context of a [decision on] lifetime extension. Such considerations include the question of whether: the nuclear power plant may continue its operation unchanged (or without any major changes); an intervention is required in order for the operation to continue; or the operation has to cease. The conclusions drawn by a competent authority may be viewed as an administrative decision or the triggering factor for an administrative procedure leading to such a decision. However, it is important to note that not all administrative decisions serve the purpose of an authorizing function within the meaning of the Convention (see chapter V, section B.3 below).

### **1. Subject of the decision**

87. The term “decision” may apply in national procedures to authorizations that have the purpose of allowing the operator to carry out (or continue to carry out) a certain proposed activity. Therefore, a final decision in the sense of the Convention is typically related to the initial permitting of the proposed activity or an authorization to carry out major changes in the operation of the nuclear power plant.

88. According to article 2 (3) of the Convention, environmental impact assessment is carried out to inform a “decision to authorize or undertake a proposed activity”. Furthermore, the definition of “proposed activity” in article 1 (v) of the Convention puts the focus on decisions taken in the framework of an “applicable national procedure”. Each Party has the responsibility to determine what could be, according to its national legislation, a final decision of lifetime extension relating to the extension, renewal or modification of authorizations allowing previous operation.

89. If such a decision is identified, and if the criteria outlined in the previous chapters are met, then, in accordance with the Convention, a transboundary environmental impact assessment must be carried out as part of informed decision-making and an informed final decision on lifetime extension.

### **2. Characteristics of the final decision**

90. What counts when determining what is a final decision is not the title (for example, “licence” or “permit”) but rather whether the authorizing function with regard to the rights or duties of the operator is equivalent to that of a licence, a consent or a permit. Internal

<sup>40</sup> See Implementation Committee Chair’s letter to the Co-Chairs of the ad hoc working group of 4 June 2020, with the Committee’s opinion on article 2 (2) and (3), available under the “Informal documents” tab at [www.unece.org/index.php?id=53209](http://www.unece.org/index.php?id=53209).

<sup>41</sup> In this chapter, the term “authorization” is used as an umbrella term for authorizations, permits, licences and other permissions.

procedures or considerations of a competent authority are therefore not sufficient to meet the criteria of a “decision” as laid down in the Convention.

91. In addition, article 6 (1) of the Convention requires Parties to take account of the outcomes of the environmental impact assessment in the final decision on the proposed activity:

The Parties shall ensure that, in the final decision on the proposed activity, due account is taken of the outcome of the environmental impact assessment, including the environmental impact assessment documentation, as well as the comments thereon received pursuant to article 3, paragraph 8, and article 4, paragraph 2, and the outcome of the consultations as referred to in article 5.

92. Indeed, as laid out in the preamble of the Convention, the transboundary environmental impact assessment is related to the decision procedure as it is a tool designed for decision makers to have more knowledge about the environmental impacts of projects and the public’s opinion. It therefore has to be undertaken prior to the final decision.

### **3. Findings following daily operational routines and specific safety reviews**

93. In the context of a nuclear power plant, findings related to daily operational routines are not to be considered decisions within the meaning of the Convention. In the same way, a specific safety review, such as a periodic safety review,<sup>42</sup> is in itself, due to its nature and purpose, not a decision within the meaning of the Convention either. The same is true of any reports and findings that may result from a specific safety review.

94. Such findings may include situations where:

(a) A competent authority finds that the nuclear power plant is operating within its licence conditions and regulatory requirements and can continue operation unchanged, or that there are licence conditions that ought to be fulfilled to operate within the permit;<sup>43</sup>

(b) A competent authority may order the operation to be provisionally suspended for a certain period of time in order to allow the operator to come into compliance with its licence conditions or regulatory requirements;

(c) There are inspection findings that require subsequent measures to be applied.

95. Both daily operational routines and specific safety reviews may be followed by an authorization issued in order to transpose the findings of that review. Depending on the findings, the authorization may require the operator to carry out safety improvements at the plant before continuing its operation or in parallel with its continued operation. In some countries, the operator must receive an authorization from the competent authority in order to be allowed to operate following the review. In such cases this authorization may meet the criteria of a decision. It is also sometimes the case that a specific safety review is used in support of the decision-making process for a licence extension or renewal. However, [such cases are not to be automatically interpreted as authorizing decisions on lifetime extension as] there is no systematic correlation between periodic safety reviews and the authorization regime.

## **C. Multistage authorization procedures**

96. In some Parties, the authorization procedure for a lifetime extension could take place in a series of stages, where one of those stages is a principal decision and another is an implementing decision.

97. The transboundary environmental impact assessment in respect of any proposed activity should, in principle, be carried out as soon as it is possible to identify and assess all potential significant adverse transboundary impacts that the proposed activity is likely to have

<sup>42</sup> See the glossary of terms in annex I to the present document.

<sup>43</sup> For example, the need to clarify certain aspects of the management system and measures related to waste management.

on the environment. As an implementing decision cannot extend beyond the parameters set by the principal decision, the impacts that the proposed activity may have on the environment should be identified and assessed prior to the principal decision.<sup>44</sup> Only if those impacts are not identifiable at that time can the transboundary environmental impact assessment be carried out prior to the later implementing decision.

#### **D. Lifetime extensions by a specific domestic law**

98. The Convention does not provide a definition for “decision” but, by referring to a “competent authority” and a “national procedure” in article 1 (v), it seems to place the focus primarily on administrative decisions: “‘Proposed activity’ means any activity or any major change to an activity subject to a decision of a competent authority in accordance with an applicable national procedure.”

99. This interpretation is also compatible with the definition of “competent authority” in article 1 (ix), which refers to national authorities “responsible for performing the tasks covered by this Convention” or “entrusted by a Party with decision-making powers”: “‘Competent authority’ means the national authority or authorities designated by a Party as responsible for performing the tasks covered by this Convention and/or the authority or authorities entrusted by a Party with decision-making powers regarding a proposed activity.”

100. Both definitions strengthen the argument that the Convention, in this respect, applies to administrative processes and resulting decisions.

101. However, in some Parties, the lifetime of a nuclear power plant is not extended by an administrative decision of a competent authority but rather by a specific domestic law adopted by a legislative body such as parliament or another competent institution. The relevant provisions of the Convention quoted above refer to authorities and administrative decisions, but do not specifically mention legislative or judicial bodies; nor, however, do they explicitly exclude them.

102. In this respect, it is not relevant to consider the title of the body or institution, but rather the authorizing function. Indeed, in accordance with an applicable national procedure, it is possible for a legislative or judicial body to operate in an authorizing capacity for a proposed activity. In this case, the lifetime extension may in fact be considered to have been granted by a legislative or judicial body acting in an authorizing capacity, therefore requiring the Convention to be applied. However, this may only be assumed if the domestic law is precise and unconditional and defines the essential characteristics of the lifetime extension, so that these are no longer a matter for reconsideration in the implementing decision.<sup>45</sup>

103. This specific domestic law could be a stage in a multistage authorization procedure, as discussed in chapter V, section C above.

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<sup>44</sup> Similar considerations can be found in the Court of Justice of the European Union judgment of 29 July 2019 in Case No. C-411/17, paras. 85 and 86.

<sup>45</sup> Similar considerations can be found in the Court of Justice of the European Union judgment of 29 July 2019 in Case No. C-411/17, paras. 87 and 88.

## Annex I

### Glossary of terms

1. Throughout the guidance, some terms of a cross-cutting nature are referenced. This annex lists definitions given by the International Atomic Energy Agency:<sup>1</sup>
2. Beyond design basis accident:  
Postulated accident with accident conditions more severe than those of a design basis accident.
3. Design life:  
The period of time during which a facility or component is expected to perform according to the technical specifications to which it was produced.
4. Design basis accident:  
A postulated accident leading to accident conditions for which a facility is designed in accordance with established design criteria and conservative methodology, and for which releases of radioactive material are kept within acceptable limits.
5. Design extension conditions:  
Postulated accident conditions that are not considered for design basis accidents, but that are considered in the design process of the facility in accordance with best estimate methodology, and for which releases of radioactive material are kept within acceptable limits. For nuclear power plants, design extension conditions comprise conditions in events without significant fuel degradation and conditions in events with melting of the reactor core.
6. Long-term operation:  
Operation beyond an established time frame set forth by, for example, licence term, design, standards, licence and/or regulations, which has been justified by safety assessment, with consideration given to life-limiting processes and features of systems, structures and components.<sup>2</sup>
7. Normal operation:  
Operation within specified operational limits and conditions. For a nuclear power plant, this includes start-up, power operation, shutting down, shutdown, maintenance, testing and refuelling.
8. Periodic safety review:  
A systematic reassessment of the safety of an existing facility (or activity) carried out at regular intervals to deal with the cumulative effects of ageing, modifications, operating experience, technical developments and siting aspects, and aimed at ensuring a high level of safety throughout the service life of the facility (or activity).
9. Severe accident:  
Accident more severe than a design basis accident and involving significant core degradation.

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<sup>1</sup> Definitions without further reference are taken from the *IAEA Safety Glossary: Terminology used in Nuclear Safety and Radiation Protection. 2018 Edition*.

<sup>2</sup> IAEA, "Safe Long-term Operation of Nuclear Power Plants", Safety Reports Series No. 57 (Vienna, 2008), p. 1.

## Annex II

### Factors relevant when determining lifetime extension as a “major change”

1. The following illustrative factors may, among others, be relevant when determining on a case-by-case basis whether a lifetime extension amounts to a major change:

- (a) [Increased use of natural resources as compared to the limits envisaged in the initial licence;
- (b) Increased production of waste or spent fuel as compared to the limits envisaged in the initial licence;
- (c) Increased emissions, including of radionuclides and discharge of cooling-water, as compared to the limits envisaged in the initial licence;
- (d) Increased risks deriving from ageing components;
- (e) Upgrading works and/or safety upgrade of such an extent requiring significant alteration of the physical aspects of the site;
- (f) Enhanced risk perception and obsolescent safety concepts;
- (g) Changes in the surrounding environment;
- (h) Climate change adaptation and mitigation measures;
- (i) Duration of the lifetime extension;
- (j) Lack of a transboundary environmental impact assessment in the past.]

2. It should also be considered that certain impacts of nuclear power plants on the environment may have decreased over the years due to modifications of the licence or changes made within the limits of the existing licence.

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