

**NUCLEAR ENERGY AGENCY
STEERING COMMITTEE FOR NUCLEAR ENERGY**

Exclusion of Nuclear Installations in the Process of Being Decommissioned from the Application of the Paris Convention on Third Party Liability

(Note by the Secretariat)

This revised version of document NEA/NE(2014)14 includes a correction in the presentation of the equation on page 6 (multiplication parentheses have been added) in order to enable this corrected version to be adopted and made publicly available.

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Exclusion of Nuclear Installations in the Process of Being Decommissioned from the Application of the Paris Convention on Third Party Liability

1. Under the terms of Article 1(b) of the Convention on Third Party Liability in the Field of Nuclear Energy (the “Paris Convention”) of 29 July 1960, as amended by the Additional Protocol of 28 January 1964, by the Protocol of 16 November 1982 and by the Protocol of 12 February 2004, the Steering Committee for Nuclear Energy (the “Steering Committee”) may, if in its view the small extent of the risks involved so warrants, exclude any nuclear installation, nuclear fuel or nuclear substances from the application of the Paris Convention.

2. In 1989, the Nuclear Law Committee (NLC, at the time called the Group of Governmental Experts on Third Party Liability in the Field of Nuclear Energy) established a technical group with the Committee on Radiation Protection and Public Health (CRPPH) to investigate the question of whether, and if so how, nuclear installations in the process of being decommissioned could be excluded from the application of the Paris Convention. At that time, the technical group agreed that nuclear installations in the process of being decommissioned could be excluded from the application of the Paris Convention if they complied with certain criteria regarding the amount of residual radioactivity left in the installation [NE(90)7]. These criteria were approved by the Steering Committee, which is competent on the matter under Article 1(b) of the Paris Convention, on 20 April 1990 [NE/M(90)1] (hereafter, the “1990 Decision”).¹

3. Given that the criteria were based on the superseded 1985 Edition together with the 1988 Supplement of the Regulations for the Safe Transport of Radioactive Material of the International Atomic Energy Agency (IAEA), the NLC asked the CRPPH to propose appropriate new criteria which would be used when deciding whether to exclude a nuclear installation in the process of being decommissioned from the application of the Paris Convention.

4. The CRPPH took into account parallel work that was being undertaken at the IAEA with regard to developing exclusion criteria for the Vienna Convention on Nuclear Third Party Liability as adopted in 1963 or amended in 1997, and the 1997 Convention on Supplementary Compensation for Nuclear Damage.

5. On 13 June 2014, the CRPPH approved the “Recommendations of the CRPPH on Criteria for the Exclusion of Nuclear Installations Being Decommissioned from the Application of the Paris Convention” [NEA/CRPPH(2014)4] which provide that, in order for a nuclear installation in the process of being decommissioned to be excluded from the application of the Paris Convention, it must i) meet defined installation radioactivity exclusion criteria, based on a generic accident assessment; and then, if the defined installation radioactivity exclusion criteria are met, ii) comply with the competent national authority’s requests to submit, for review and appraisal, a comprehensive, installation-specific safety assessment to confirm that the defined dose criteria are met.

6. On 9 September 2014, the NLC noted the report by the Secretariat on the “Exclusion of Nuclear Installations in the Process of Being Decommissioned from the Application of the Paris Convention – Update of the Technical Criteria” [NEA/NLC/DOC(2014)2] which incorporates the CRPPH recommendations set out in NEA/CRPPH(2014)4, and recommended that the Steering Committee i) adopt the Draft Decision and Recommendation Concerning the Application of the Paris Convention to Nuclear Installations in the Process of Being Decommissioned set out in NEA/NLC/DOC(2014)2 and reproduced

1. The 1990 Decision, still in force today, is available on the NEA website at www.oecd-nea.org/law/paris-convention-dec-rec-int.pdf.

in NEA/NE(2014)14/REV1; ii) agree to make the Decision and Recommendation, the Appendix and the Explanatory Note set out in NEA/NLC/DOC(2014)2 and reproduced in NEA/NE(2014)14/REV1 publicly available; and iii) agree to abrogate the Decision and Recommendation Concerning the Application of the Paris Convention to Nuclear Installations in the Process of Decommissioning [NE/M(90)1].

7. The Steering Committee for Nuclear Energy will be invited:

- i) **to adopt** the Draft Decision and Recommendation Concerning the Application of the Paris Convention to Nuclear Installations in the Process of Being Decommissioned set out in NEA/NE(2014)14/REV1;
- ii) **to agree** to make the Decision and Recommendation, the Appendix and the Explanatory Note set out in NEA/NE(2014)14/REV1 publicly available;
- iii) **to agree** to abrogate the Decision and Recommendation Concerning the Application of the Paris Convention to Nuclear Installations in the Process of Decommissioning [NE/M(90)1].

DRAFT

**DECISION AND RECOMMENDATION OF THE STEERING COMMITTEE
CONCERNING THE APPLICATION OF THE PARIS CONVENTION TO
NUCLEAR INSTALLATIONS IN THE PROCESS OF BEING DECOMMISSIONED**

THE STEERING COMMITTEE,

HAVING REGARD to the Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960, as amended by the Additional Protocol of 28 January 1964, by the Protocol of 16 November 1982 and by the Protocol of 12 February 2004 (hereinafter referred to as the "Paris Convention"), and in particular Article 1(b) thereof;

CONSIDERING that, by virtue of that Article, the Steering Committee may, if in its view the small extent of the risks involved so warrants, exclude any nuclear installation, nuclear fuel or nuclear substances from the application of the Paris Convention;

HAVING REGARD to Article 8(b) and Article 10(b) of the Statute of the OECD Nuclear Energy Agency;

CONSIDERING that nuclear installations in the process of being decommissioned are covered by the provisions of the Paris Convention;

CONSIDERING that it should be made possible for Contracting Parties to cease the application of the Paris Convention when the decommissioning of a nuclear installation has reached a stage where the risks involved are so limited;

CONSIDERING that the technical exclusion criteria provided in its Decision and Recommendation of 20 April 1990 concerning the Application of the Paris Convention to Nuclear Installations in the Process of Decommissioning [NE/M(90)1], which is based on the superseded 1985 Edition together with the 1988 Supplement of the Regulations for the Safe Transport of Radioactive Material of the International Atomic Energy Agency, are no longer appropriate;

NOTING the attached Explanatory Note;

DECIDES that any Contracting Party may cease to apply the Paris Convention to a nuclear installation in the process of being decommissioned, provided that the provisions set out in the Annex to this Decision and Recommendation and any additional conditions which the Contracting Party may judge appropriate to establish are met;

DECIDES that the Decision and Recommendation of 20 April 1990 concerning the Application of the Paris Convention to Nuclear Installations in the Process of Decommissioning [NE/M(90)1] is hereby revoked;

RECOMMENDS that the Contracting Parties which make use of this option notify the other Contracting Parties, as well as the Secretariat of the OECD Nuclear Energy Agency; and

RECOMMENDS that the Secretariat of the OECD Nuclear Energy Agency, as appropriate, analyse periodically the experience gained by the Contracting Parties which use this option and report back to all the Contracting Parties.

APPENDIX

TO THE DECISION AND RECOMMENDATION OF THE STEERING COMMITTEE CONCERNING THE APPLICATION OF THE PARIS CONVENTION TO NUCLEAR INSTALLATIONS IN THE PROCESS OF BEING DECOMMISSIONED

Definitions

1. For the purpose of this decision and recommendation, “decommissioning” means all steps leading to the release of a nuclear installation from regulatory control. These steps include the processes of decontamination and dismantling.

General provisions

2. In order for a nuclear installation in the process of being decommissioned to be excluded from the application of the Paris Convention:

- a) The operations of the installation in the process of being decommissioned must have permanently ceased, and any nuclear fuel, radioactive material in process, radioactive waste (whether produced during operation or being stored), and radionuclide inventory must have been removed or decayed to the extent that the exclusion criteria and requirements specified in paragraph 3 hereunder are satisfied.
- b) The installation must remain under the control and subject to the regulations of the competent national authority.
- c) Provisions for containment and control of the remaining radioactivity must be in place, as considered appropriate for their purpose by the competent national authority.

Exclusion criteria

3. In order for a nuclear installation in the process of being decommissioned to be excluded from the application of the Paris Convention it must i) meet the installation radioactivity exclusion criteria in paragraph a) below, based on a generic accident assessment; and then, if criteria a) are met, ii) comply with the competent national authority’s requests to submit, for review and appraisal, a comprehensive, installation-specific safety assessment to confirm that the dose criteria described in paragraph b) below are met.

a) Radioactivity criteria

The generic criteria for allowable activity remaining in an installation in the process of being decommissioned listed below shall be used to decide whether such an installation is eligible for exclusion from the application of the Paris Convention. The radionuclide-specific activity criteria are based on a conservatively biased, generic accident assessment such that off-site exposure to a representative person assumed to be a member of the public would be no greater than 10 mSv in a year. The generic installation activity limits for nuclear installations in the process of being decommissioned are set out in the following table:

Installation Activity Exclusion Criteria by Isotope

Isotope	Fixed activity (Bq)	All other forms of activity (Bq)
Pu ²³⁹	1 E+13	1 E+12
Pu ²⁴¹	1 E+15	1 E+14
U ²³⁸	1 E+14	1 E+13
Cs ¹³⁷	1 E+13	1 E+12
Ni ⁶³	1 E+16	1 E+15
Co ⁶⁰	1 E+14	1 E+13
Fe ⁵⁵	1 E+16	1 E+15
Eu ¹⁵²	1 E+14	1 E+13
Eu ¹⁵⁴	1 E+14	1 E+13
Cl ³⁶	1 E+12 ²	
Sr ⁹⁰	1 E+14	1 E+13
Ag ^{108m}	1 E+13	1 E+12

Isotope mixtures:

In the case of a nuclear installation containing several (n) of the isotopes listed above, in the form of fixed activity (f) or any other form of activity (of), it will be necessary to ensure that the activities of the different isotopes present in the installation (A_i) collectively observe the following criterion:

$$\sum_{i=1 \text{ to } n} \left(\frac{A_{i \text{ of}}}{A_{i \text{ of lim}}} + \frac{A_{i \text{ f}}}{A_{i \text{ f lim}}} \right) \leq 1$$

where $A_{i \text{ of lim}}$ is the limit activity for isotope i present in any other form than fixed activity, and

where $A_{i \text{ f lim}}$ is the limit activity for isotope i present in the form of fixed activity.

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2. In a nuclear installation being decommissioned, Cl³⁶ is assumed to exist in an easily releasable form. It is also assumed to be fully releasable during accident circumstances, for example fires.

b) Dose criteria

If an installation has met the generic activity criteria specified in a) above, then it can undergo a comprehensive, installation-specific assessment of potential accident scenarios.

Nuclear installations in the process of being decommissioned for which the comprehensive, installation-specific safety assessment suggests that radiological off-site exposures, in terms of the assessed annual effective dose to a representative person under all reasonably conceivable operational conditions, including accidental occurrences and security events, and assuming that protective actions have not been taken, do not result in an assessed annual effective dose to the representative person assumed to be a member of the public of greater than 1 mSv, may be excluded.

Other exclusion considerations

4. It is recognised that radiation dose may, on its own, be an insufficient basis on which to decide to exclude a nuclear installation; therefore, Contracting Parties should consider whether any additional aspect relating to the magnitude and severity of potential nuclear damage requires evaluation in the assessment and decision process by the competent national authority.

Other regulatory and safety assessment aspects

5. Contracting Parties to the Paris Convention (CPPCs) shall ensure that decisions regarding exclusion from the application of the Paris Convention are taken within their national regulatory framework.

6. CPPCs shall require an appropriate safety assessment, including a regulatory review/assessment and prior approval process by the competent national authority to give reasonable assurance that the exclusion provisions and requirements are met in practice. The safety assessment shall consider relevant principles, requirements and guidance as set out in international legal instruments (e.g. conventions), IAEA Safety Standards and related documents. The safety assessment framework requires the description and specification, among other things, of: the scenarios to be considered which could lead to the potential release of radionuclides under accidental conditions; the environmental conditions to be assumed; the transfer of potentially released radionuclides in the environment; the exposure pathways to be evaluated; the dosimetry to be applied in evaluating radiation doses; and the assumptions to be made regarding the location and habits of the representative person. The results of the analysis shall be compared for compliance with the proposed exclusion criteria.

EXPLANATORY NOTE

FOR THE DECISION AND RECOMMENDATION OF THE STEERING COMMITTEE CONCERNING THE APPLICATION OF THE PARIS CONVENTION TO NUCLEAR INSTALLATIONS IN THE PROCESS OF BEING DECOMMISSIONED

Discussion and development of criteria for exclusion

As a starting point for the development of these criteria, the Ad Hoc Expert Group on the Exclusion of Nuclear Installations Being Decommissioned from the Paris Convention (EGPC) used the proposal made to the Committee on Radiation Protection and Public Health (CRPPH) at its 17-19 May 2011 meeting, which was dose-based, and the criteria proposed by the French delegation at the same CRPPH meeting, which was installation-activity based [NEA/CRPPH(2011)4]. In addition to these radiological aspects, which will be elaborated below, the EGPC discussed several issues and came to the following basic agreements:

- **Regulatory control:** The expert group agreed that regardless of whether a nuclear installation in the process of being decommissioned is excluded from the application of the Paris Convention, it must remain under the relevant national regulations for radiological protection until competent national authorities release the installation from such regulatory requirements. As such, in judging whether to release a nuclear installation from the application of the Paris Convention, it should be assumed that the installation licensee (the “operator”) will remain obliged to meet the requirements of all relevant national regulations, particularly the requirement of prior approval of any such exclusion, in its country.
- **Workers:** Workers at the installation will be subject to national regulatory requirements for occupational exposure, health insurance and occupational disease compensation schemes. Given this assurance, the expert group felt that occupational exposure would not need to be taken into account in any criteria used for releasing nuclear installations from the application of the Paris Convention.
- **Responsibility for safety assessment:** The expert group agreed that any request to exclude a nuclear installation in the process of being decommissioned from the application of the Paris Convention must come from the operator of the installation as defined in the Convention. As such, the responsibility for performing a safety assessment of the candidate nuclear installation, and for presenting the results to the competent national authority for review and assessment against the given criteria, rests with the operator.
- **Radiological criteria:** The expert group felt that when developing exclusion criteria, one should ensure an acceptable level of protection of a representative person who could be exposed by any nuclear installation in the process of being decommissioned which is considered for exclusion from the application of the Paris Convention. For this purpose, the potential detriment that the nuclear installation could cause would be characterised in terms of, among other considerations, the radiological exposure to the most highly exposed hypothetical representative person under all reasonably foreseeable operational conditions including accidental occurrences and security events.

In the Steering Committee decision of 20 April 1990 [NE/M(90)1], the criteria for the exclusion of a nuclear installation in the process of being decommissioned agreed by the Steering Committee were expressed in terms of the total activity remaining in the nuclear installation, noting that the activity under consideration in the criteria would be that remaining after any nuclear fuel and/or radioactive material in process, and radioactive waste produced during such operations, have been removed. For the 1990

assessment, one generic scenario was developed, and two credible source radionuclide inventories were used, supposing a commercial nuclear power plant and a large fuel reprocessing facility. Using these sources, and assuming a serious accident scenario, considered at the time as being conservative, calculations suggested that exposures to members of the critical group would not exceed about 50 mSv. In 1990, this level of exposure was judged to be acceptable in that the recommendations of the International Commission on Radiological Protection (ICRP) at the time (Publications 60 and 63) suggested that only doses on the order of 50 mSv and over would justify implementing post-accident countermeasures, such as evacuation or sheltering, because at less than 50 mSv the detriments of such protective actions would outweigh their benefits. Intervention levels, based on justification and optimisation, were then fixed at levels below which it would generally be judged unjustified to act, and many of these were on the order of 50 mSv. Based on these considerations, an expert group that was set up in 1990 by the CRPPH determined radionuclide-specific maximum activity threshold limits for fixed and other forms of activity for a nuclear installation graded according to the radiotoxicity of a radionuclide by using, for reasons of practicality, the A_2 -values from the *IAEA Regulations for the Safe Transport of Radioactive Material* (1985 version together with the 1988 supplement) as a suitable radiological hazard index.

The current recommendations of the ICRP (Publications 103, 109 and 111) have taken a markedly different approach for the management of exposure situations: the reliance on a generic, fixed dose criterion, below which the situation is acceptable and protective actions are not justified, no longer represents good radiological protection practice. Rather, protection is optimised for each situation, with the optimum level of protection taking into account the prevailing circumstances. Within this rather general framework, the ICRP has established two types of benchmarks: a) Dose Limits (1 mSv/y for public exposure and 100 mSv/5 years for occupational exposure) which the ICRP recommended for regulatory compliance purposes for planned exposure situations, and exceeding them would be a regulatory infraction; b) Dose Constraints and Reference Levels which the ICRP recommended for the different types of exposure situations, as values that would be planned not to exceed, and are intended to assist in the planning and selection of protection options for the prevailing circumstances. No fixed values are recommended for Dose Constraints and Reference Levels, but a series of bands (< 1 mSv/y; between 1 mSv/y and 20 mSv/y; and between 20 mSv/y and 100 mSv/y) are recommended depending on the type of exposure situation being considered.

In reaching an agreement on the radiological criteria to be used when considering whether a nuclear installation in the process of being decommissioned could be excluded from the application of the Paris Convention, the EGPC also considered that, in addition to the regulatory control and exposure assessment mentioned above, the guidance expressed by the current ICRP recommendations (Publications 103, 109 and 111) should be taken into account.

With these considerations in mind, the EGPC agreed that the radiological criteria for deciding whether a candidate nuclear installation could be excluded from the application of the Paris Convention should be based on a two-step process which will, firstly, ensure a certain degree of consistency and uniformity in the implementation of the proposed exclusion through the establishment of a set of activity threshold limits that all CPPCs would be obliged to use and, secondly, give reasonable assurance that the extent of risks involved in the decommissioning activities of a candidate installation is sufficiently low so that application of the third party liability regime of the Paris Convention is no longer necessary. The total installation activity criteria are based on a generic accident assessment yielding off-site³ exposures, to a representative person assumed to be a member of the public, of no greater than 10 mSv in a year. If the nuclear installation met the first criteria, a detailed, installation-specific assessment would be performed and if this yields an off-site exposure of less than 1 mSv in a year, to a representative person assumed to be

3. A “nuclear site” or a “site” is defined in this document as the industrial area housing one or more nuclear installations. As such, “off-site” is defined as being outside the nuclear site boundary.

a member of the public, then the nuclear installation in the process of being decommissioned would be eligible for exclusion from the application of the Paris Convention. Further, it was recognised that exposure is not the only aspect that competent national authorities may consider when judging the advisability of exclusion from the application of the Paris Convention. As such, while the extent, magnitude and severity of the circumstances considered in the safety assessment may not be evaluated as quantitative radiological criteria for these judgements, they may be qualitatively included in the assessment and decision process when considering the type and magnitude of the attendant nuclear damage, as defined in the Paris Convention. For example, assessment and evaluation of the magnitude and severity of potential nuclear damage generally draws on various scientific, technical, economic and social disciplines and requires resolution of multi-faceted, complex issues which may involve value judgement, actuarial considerations, socio-political judgement and security considerations.

Generic accident assessment assumptions

In order to generate the limiting activity criteria listed by radionuclide in the Annex to the Decision and Recommendation of the Steering Committee Concerning the Application of the Paris Convention to Nuclear Installations in the Process of Being Decommissioned, several generic accident assessment assumptions were made:

- The damage fraction: the fraction of the installation that is assumed to be affected by any modelled accident scenario is assumed to be 50%.
- Availability for release: some of the radioactive contamination and activity present in the nuclear installation will be “Fixed activity”, i.e., pursuant to the definition provided in document NE(90)7, activity induced in solid, non-flammable components of the installation which are not subject to significant wear, leaching or corrosion during the static phases or dismantling operations of the decommissioning period; or “All other forms of activity”, such as a smearable powder-like form, a fairly easily removable pipe scale, or some other forms of contamination or activity that could be potentially available for dispersal and release. For these two forms of residual activity or contamination, it is assumed that 10% of the “Fixed activity” contamination is available for release in case of an accident, and 100% of the “All other forms of activity” is available for release in case of a postulated accident (for Cl^{36} see footnote to Table 1).
- Release fraction: some elements are more volatile than others, and as such the fraction of the activity of a particular isotope that will actually be released during an accident scenario, such as fire, will vary with the element. The assumed release fractions are listed in Table 1 for each radionuclide that is considered.
- Installations considered: note that PWR, BWR, GCR and HWR reactors were considered, as well as fuel fabrication, enrichment, fuel reprocessing installations and other installations.

Table 1: Generic Accident Assessment Assumptions

Isotope	Damage fraction	Availability fixed / other forms	Release fraction
Pu ²³⁹	50%	10% / 100%	0.5%
Pu ²⁴¹	50%	10% / 100%	0.5%
U ²³⁸	50%	10% / 100%	0.5%
Cs ¹³⁷	50%	10% / 100%	10%
Ni ⁶³	50%	10% / 100%	1%
Co ⁶⁰	50%	10% / 100%	1%
Fe ⁵⁵	50%	10% / 100%	1%
Eu ¹⁵²	50%	10% / 100%	1%
Eu ¹⁵⁴	50%	10% / 100%	1%
Cl ³⁶	50%	100% ⁴	100%
Sr ⁹⁰	50%	10% / 100%	1%
Ag ^{108m}	50%	10% / 100%	5%

The resultant activity-based exclusion criteria proposed by the EGPC are listed in the Annex to the Decision and Recommendation of the Steering Committee Concerning the Application of the Paris Convention to Nuclear Installations in the Process of Being Decommissioned. Such criteria are relatively conservative, and some nuclear installations in the process of decommissioning will not, at first, be eligible for exclusion from the application of the Paris Convention. However, at some point in the decommissioning and dismantling process, the total activity present in the nuclear installation will meet the activity-based exclusion criteria, and thus any nuclear installation in the process of being decommissioned will eventually become eligible for exclusion from the application of the Paris Convention.

- **Approval requirements:** The CPPCs are generally responsible for ensuring that nuclear installations under their jurisdiction meet an adequate level of safety and protection against nuclear and radiation risks. The extent of that obligation is stipulated in the respective national legal framework and in relevant international and Euratom instruments to which the CPPCs may be a party. An exclusion of a nuclear installation from the application of the international nuclear liability regime must not affect these basic requirements.

4. In a nuclear installation being decommissioned, Cl³⁶ is assumed to exist in an easily releasable form. It is also assumed to be fully releasable during accident circumstances, for example fires.

The regulatory arrangements concerned with the exclusion of an installation from the application of the international third party liability regime may be implemented either as a separate regulatory process or as part of the overall regulatory control process for nuclear installations depending on and consistent with the nationally established legal, cultural, political and constitutional practices and procedures. Exclusion approvals for candidate nuclear installations may additionally be subject to certain conditions (approval requirements) and responsibilities of compliance with specific technical, organisational or administrative safety and regulatory requirements depending on the prevailing circumstances and operational status of the candidate installation.

The relevant regulatory requirements and procedures shall be implemented in a graded fashion to appropriately address the actual level of risks of the candidate installation.

In establishing or amending the applicable national exclusion regulatory framework and procedures, due account shall be given to the internationally recognised regulatory principles, practices and requirements.

- **Review and assessment requirements:** Prior to obtaining approval for exclusion, the operator (applicant) of the candidate installation should be required to submit a detailed assessment of the installation radionuclide inventory which shall be reviewed and assessed by the competent national authority. If this meets the total installation activity criteria, then the operator (applicant) of the candidate installation should be required to submit a detailed safety assessment report which shall be reviewed and assessed by the competent national authority. In practice, these two assessments could be filed together. The basic objective of the review and assessment is to determine whether the operator's submissions demonstrate that the candidate nuclear installation seeking exclusion complies from the point of exclusion and thereafter throughout the duration of the decommissioning and dismantling with the relevant exclusion criteria and requirements in accordance with clearly defined procedures. The regulatory review and assessment should be undertaken in a structured, transparent, accountable and systematic manner.

The competent national authority should issue – as appropriate – guidance on the format and contents of the documentation to be submitted by the operator (applicant) in support of applications for approval and communicate with the operator in order to state its expectations and to promote confidence in the regulatory process.

To the extent practicable, the regulatory review and assessment should be coordinated with the overall regulatory control plan for a candidate nuclear installation to ensure consistency and be conducted in accordance with national legislation and international recommendations.

- **Safety assessment process:** In planning and conducting the safety assessment, due consideration shall be given to relevant guidance and recommendations,⁵ as specified by the competent national authority.

The responsibility for carrying out the safety assessment rests with the applicant for the exclusion of the candidate nuclear installation. Where available and applicable, safety assessment information may be taken from existing materials, for example, environmental impact statements and safety analysis reports.

5. At the time of this decision, examples of relevant guidance and recommendations were given in IAEA 2009, Safety Guide No. WS-G-5.2 – Safety Assessment for the Decommissioning of Facilities using Radioactive Material.

The safety assessment to be undertaken for a candidate nuclear installation has the main objective of assessing and evaluating the safety performance of the installation for comparison with the exclusion criteria and requirements set out here, under all foreseeable operational conditions including accidental occurrences and security events. In doing so, a systematic and structured analysis approach should be employed which covers both high and low probability events. This includes all internal and external events and processes which may arise at the installation and which may have an impact on the physical barriers to confine the radioactive material or otherwise give rise to off-site radiation risks.

The degree of detail of the safety assessment depends on the type, nature and complexity of the installation and/or decommissioning activity being performed, that is, a graded approach should be employed in the safety assessment.

Description of the candidate nuclear installation and site characterisation: The purpose of the description of the candidate nuclear installation and characterisation of the site is to provide sufficient information to enable dose calculations to be performed. The description of the candidate nuclear installation comprises, among others things, information regarding the design, the activity inventory, the relevant safety characteristics (e.g., their associated systems, structures and components) and the operational history. The site characterisation includes, *inter alia*, information on the geological, hydrological and meteorological characteristics of the site and the vicinity, in conjunction with present and/or projected population distribution, land use, site activities and planning control. For candidate nuclear installations, the documentation should include a description of the proposed activities, including their interdependencies and their schedule.

Hazard identification and screening: In the process of the hazard identification, external and internal initiating events should be identified that cover all anticipated abnormal occurrences or accidental conditions, including high and low probability events, with the potential of causing harmful radiological consequences to the public, property or the environment. Initiating events include occurrences such as equipment failure, human errors, natural or security events. A systematic and logical approach should be chosen to identify potential hazards and initiating events that are suitable for the respective conditions. Screening methods should take into account all possible release and exposure pathways.

Scenario development: Relevant event scenarios should be considered, including human interactions and the failure of safety-relevant systems. The selection of bounding scenarios may reduce the number of scenarios to be analysed using approved analysis methods. A scenario generation strategy aims at producing a complete set of the most relevant scenarios, this being important for the consideration of relevant issues. Care must be taken to ensure that the selected scenarios provide an appropriately comprehensive picture of the key aspects of the system, their possible evolutionary pathways, critical events and system robustness.

Radiological consequence assessment and comparison with criteria: An assessment of radiological consequences shall be performed by using, as appropriate, deterministic and/or probabilistic methods for comparison with the radiological exclusion criteria and requirements.

When bounding scenarios are used, it is important to ensure that they include the maximum impacts from all the individual scenarios. For example, the bounding scenario may be a fire releasing major amounts of radioactive material into the environment. However, if any other scenario results in higher doses to the public, these estimated doses also have to be evaluated.

Independent peer review and confidence building: An independent peer review initiated by the applicant prior to submission of the application documents to the competent national authorities is a vital part of confidence building and the quality assurance programme. The independent review should be

performed by suitably qualified and experienced individuals who are different from those who carried out the safety assessment.

If the independent review (or the subsequent review by the regulatory bodies) indicates deficiencies in the safety assessment, e.g., additional scenarios to be considered or different assumptions in the consequence assessment, it may be necessary to revise and amend the assessment to take these factors into account.

Depending on the national regulatory system, the results of the safety assessment may be subject to a public stakeholder involvement process.

- **Regulatory review and approval aspects:** The decision to exclude a nuclear installation in the process of being decommissioned from the application of the Paris Convention is to be taken by the competent national authority.

The operator has to demonstrate through appropriate submissions that the candidate nuclear installation satisfies all relevant exclusion criteria and requirements set out here from the point of exclusion and thereafter throughout the duration of the decommissioning and dismantling activities.