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

Decision and Recommendation Concerning the Application of the Paris Convention on Third Party Liability in the Field of Nuclear Energy to Nuclear Installations for the Disposal of Certain Types of Low-level Radioactive Waste

(This Decision and Recommendation was adopted at the 133rd Session of the Steering Committee for Nuclear Energy held on 3-4 November 2016.)

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English - Or. English

DECISION AND RECOMMENDATION CONCERNING THE APPLICATION OF THE PARIS CONVENTION ON THIRD PARTY LIABILITY IN THE FIELD OF NUCLEAR ENERGY TO NUCLEAR INSTALLATIONS FOR THE DISPOSAL OF CERTAIN TYPES OF LOW-LEVEL RADIOACTIVE WASTE

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 for the disposal of low-level radioactive waste 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 to a nuclear installation for the disposal of certain types of low-level radioactive waste where the risks involved are so limited;

NOTING the attached Explanatory Note;

DECIDES that any Contracting Party may cease to apply the Paris Convention to a nuclear installation for the disposal of low-level radioactive waste, provided that the provisions set out in the Appendix to this Decision and Recommendation and any additional conditions which the Contracting Party may judge appropriate to establish are met;

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

RECOMMENDS that the Nuclear Energy Agency, as appropriate, analyses periodically the experience gained by the Contracting Parties which use this option and reports back to all the Contracting Parties.

APPENDIX

**TO THE DECISION AND RECOMMENDATION CONCERNING THE APPLICATION OF THE
PARIS CONVENTION ON THIRD PARTY LIABILITY IN THE FIELD OF NUCLEAR ENERGY
TO NUCLEAR INSTALLATIONS FOR THE DISPOSAL OF CERTAIN TYPES
OF LOW-LEVEL RADIOACTIVE WASTE**

Definition

1. “Radioactive waste” means waste within the definition in Article 1(a)(iv) of the Paris Convention.

General provisions

2. In order for a nuclear installation for the disposal of solid radioactive waste to be excluded from the application of the Paris Convention, it must:

- (a) meet the exclusion criteria set out in paragraph 3; and
- (b) remain, if applicable, under the control of and subject to the relevant national regulations during the operational and post-closure period of the installation as determined by the competent national authority.

Exclusion criteria

3. In order for a nuclear installation for the disposal of solid radioactive waste to be excluded from the application of the Paris Convention it must: i) meet the radioactivity concentration limits in paragraph a) below; and if these limits are met, ii) submit to the competent national authority, for review and appraisal, a comprehensive installation-specific safety assessment to confirm that the dose and criticality criteria described in paragraph b) below are met.

(a) *Radioactivity concentration limits*

A nuclear installation for the disposal of certain types of solid low-level radioactive waste may be excluded from the application of the Paris Convention if the average radioactivity concentration¹ of the radioactive waste disposed of/to be disposed of at the installation does not/will not exceed the generic activity concentration limits as set out below²:

¹ Averaged over the activity concentration over a maximum of 10 tonnes of packaged or unpackaged waste or over the mass of each large item of waste (e.g. steam generator, pressuriser or large vessel) greater than 10 tonnes.

² The radionuclide activity concentration limits are designed to limit public exposures to less than 10 mSv in a year, and assume that no protective or remedial actions have been taken. In setting the limits a reference basis including a disposal volume of 90 000 m³ was used.

| Radionuclide | Activity Concentration (Bq/g) |
|--------------|-------------------------------|
| H-3 | 10 000 |
| C-14 | 10 000 |
| Co-60 | 200 |
| Sr-90 | 200 |
| Tc-99 | 200 |
| Cs-137 | 200 |
| U-238 | 200 |
| Pu-239 | 100 |
| Am-241 | 100 |

Isotope mixtures:

For nuclear installations for the disposal of radioactive waste containing more than one radionuclide (n) the activity concentration of the different radionuclides (A_i) in paragraph 3(a) must meet the following criterion:

$$\sum_{i=1 \text{ to } n} \frac{A_i}{A_{i \text{ lim}}} \leq 1$$

where $A_{i \text{ lim}}$ is the activity concentration limit for radionuclide i.

(b) Dose and criticality criteria

If an installation meets the generic radioactivity concentration limits specified in paragraph 3(a), then it can undergo a comprehensive installation-specific safety assessment.

The installation may not be excluded unless the assessed annual effective dose off-site to a representative person, assumed to be a member of the public, under all reasonably foreseeable conditions during the period of regulatory control (including the operational period and a period post-closure), including accidental occurrences to the extent as stipulated in relevant national regulations and internationally recognised guidance, and assuming that protective or mitigating actions have not been taken, is less than or equal to 1 mSv per year³.

The installation-specific safety assessment must demonstrate that the criticality risk is negligible.

The installation-specific safety assessment must take into account the effective dose that may result from any non-nuclear waste that may be disposed of at the installation.

³ The radiation dose to the public resulting from security events should be assumed to be limited in accordance with national regulations and internationally recognised guidance. In addition the radiation dose to the public after regulatory control has been released, including from inadvertent human intrusion or low probability events, should be assumed to be limited in accordance with national regulations and internationally recognised guidance.

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 may consider whether any additional aspects 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 must ensure that decisions regarding exclusion from the application of the Paris Convention are taken within their relevant national regulatory framework.

6. Contracting Parties must 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 must consider relevant principles, requirements and guidance as set out in international legal instruments (e.g. conventions), Safety Standards of the International Atomic Energy Agency (IAEA), 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 installation-specific dose assessment carried out under paragraph 3(b) must take account, as appropriate, of the full list of radionuclides in the waste disposed of. The results of the analysis must be compared for compliance with the proposed exclusion criteria.

7. Contracting Parties must maintain (and if necessary establish) a compliance assessment process in order to ensure and demonstrate that the radioactive waste accepted by, and disposed of at, an excluded installation meets the exclusion criteria.

8. Contracting Parties must require that the competent national authority is informed if the operations at an excluded installation change to such extent that the exclusion criteria are no longer met.

9. Contracting Parties which use the option to exclude nuclear installations for the disposal of radioactive waste from the Paris Convention notify the other Contracting Parties, as well as the Secretariat of the OECD Nuclear Energy Agency. Periodically and as appropriate, the Secretariat should analyse the experience gained by the Contracting Parties which use the option to exclude installations from the Paris Convention, and report this back to all Contracting Parties.

EXPLANATORY NOTE

FOR THE DECISION AND RECOMMENDATION CONCERNING THE APPLICATION OF THE PARIS CONVENTION ON THIRD PARTY LIABILITY IN THE FIELD OF NUCLEAR ENERGY TO NUCLEAR INSTALLATIONS FOR THE DISPOSAL OF CERTAIN TYPES OF LOW-LEVEL RADIOACTIVE WASTE

Background

Article 1(b) of the Paris Convention on Third Party Liability in the Field of Nuclear Energy (the “Paris Convention”) authorises the Steering Committee for Nuclear Energy (the “Steering Committee”) to exclude any nuclear installation¹ or nuclear substances from the application of the Paris Convention “if in its view the small extent of risks involved so warrants”. In 2012, the delegation of the United Kingdom (UK) to the Nuclear Law Committee (NLC) of the OECD Nuclear Energy Agency (NEA) proposed that Article 1(b) be used to exclude nuclear installations for the disposal of low-level radioactive waste (LLW) and very low-level radioactive waste (VLLW) in view of the very low level of risk they may pose². The NEA Committee on Radiation Protection and Public Health (CRPPH) asked its Expert Group on Exclusion from the Paris Convention (EGPC) to explore the development of technical criteria for the exclusion of nuclear installations for the disposal of LLW and VLLW from the application of the Paris Convention.

The proposal for the exclusion of LLW and VLLW disposal installations was initially considered jointly with a similar proposal from the German delegation to update the technical criteria of the 1990 decision and recommendation of the Steering Committee on the exclusion of nuclear installations in the process of being decommissioned from the application of the Paris Convention; the updated decision and recommendation was adopted by the Steering Committee in October 2014 [NEA/NE(2014)14/REV1; NEA/SUM(2014)2]. The proposed exclusion of LLW and VLLW disposal installations follows a similar two-step framework as agreed for nuclear installations in the process of being decommissioned. As a result of extensive discussions within the EGPC, the draft exclusion approach and criteria were developed and proposed to the CRPPH and the NEA Radioactive Waste Management Committee (RWMC) during their April 2015 meetings. The bureau of the CRPPH, which was mandated by the CRPPH to decide on the matter [NEA/CRPPH(2015)8], approved on 27 October 2015 the “Recommendation of the CRPPH Regarding the Exclusion of Nuclear Installations for the Disposal of Certain Types of Low-Level Radioactive Waste from the Application of the Paris Convention” [NEA/CRPPH(2015)9] which is incorporated in the Appendix and Explanatory Note of the Steering Committee decision on the exclusion of nuclear installations for the disposal of certain types of low-level radioactive waste from the application of the Paris Convention.

Exclusion will apply only to installations for the disposal of certain types of solid LLW/VLLW. Radioactive waste is defined in Article 1(a)(iv) of the Paris Convention and is essentially radioactive waste

¹ The term “nuclear installation” or “installation” used throughout this document means a “nuclear installation” as defined in Article 1(a)(ii) of the Paris Convention. This article also provides that “any Contracting Party may determine that two or more nuclear installations of one operator which are located on the same site shall, together with any other premises on that site where radioactive material is held, be treated as a single nuclear installation”.

² The broad definitions of the radioactive waste categories used by the International Atomic Energy Agency (IAEA) are set out in the Annex of this Explanatory Note. However, these definitions are not used in the exclusion criteria set out in the decision of the Steering Committee concerning the application of the Paris Convention to nuclear installations for the disposal of certain types of low-level radioactive waste.

that originates from nuclear installations³. However, it is recognised that some installations for the disposal of such wastes may also receive other types of wastes for disposal under the relevant national regulations, such as non-radioactive wastes and radioactive wastes from ‘non-nuclear’ sites (e.g. medical wastes or wastes containing naturally occurring radioactive materials).

Typical LLW and VLLW to be considered here include soil and rubble with low levels of radioactive constituents from decommissioning of nuclear installations and other practices involving the use and management of radioactive materials.

The term ‘disposal’ refers to the emplacement of radioactive waste into a facility or a location with no intention of retrieving the waste. Disposal options are generally designed to contain the waste by means of passive engineered and natural features and to isolate it from the accessible biosphere to the extent necessitated by the associated hazard. While the term ‘disposal’ implies that retrieval is not intended, it does not mean that retrieval is not possible.

Examples of the types of installation covered by the exclusion (as defined in the IAEA Specific Safety Requirements on Disposal of Radioactive Waste (SSR-5)⁴) are:

- near surface disposal installations for VLLW/LLW originating primarily from nuclear fuel cycle activities in a facility similar to conventional landfills for industrial and household refuse and;
- special (near surface) disposal installations consisting of engineered trenches or vaults constructed on the ground surface or up to a few tens of meters below the ground surface level.

These disposal strategies are known and referred to in the IAEA Specific Safety Requirements on Disposal of Radioactive Waste (SSR-5) as “specific landfill disposal” and “near surface disposal”.

Criteria for exclusion

As a starting point for discussion of these criteria, the EGPC used the framework developed for the exclusion of nuclear installations in the process of being decommissioned that was agreed by the CRPPH at its May 2014 meeting [NEA/CRPPH(2014)10] and by the Steering Committee at its October 2014 meeting [NEA/NE(2014)14/REV1; NEA/SUM(2014)2]. This framework is a two-step process that involves the following radiological criteria:

1. Comparison of the activity concentration (averaged over a certain mass) for each of several important radionuclides in the radioactive waste for disposal at the installation against a limit. The limits are derived from a generic, conservative radiological assessment of the on-site activity that would not result in a public dose of greater than 10 mSv in a year at the site boundary.
2. If the activity concentrations are within the agreed limits, then a comprehensive safety assessment of the installation is performed to determine whether the public doses off-site, would not exceed 1 mSv in a year while the installation remains under regulatory control (including in the post-

³ “Radioactive products or waste” means any radioactive material produced in or made radioactive by exposure to the radiation incidental to the process of producing or utilising nuclear fuel, but does not include (1) nuclear fuel, or (2) radioisotopes outside a nuclear installation which have reached the final stage of fabrication so as to be usable for any industrial, commercial, agricultural, medical, scientific or educational purpose.

⁴ The IAEA Specific Safety Requirements on Disposal of Radioactive Waste (SSR-5), 2011 Edition, is available at www-pub.iaea.org/MTCD/Publications/PDF/Pub1449_web.pdf.

closure phase). If the criteria in these two steps are met, then the nuclear installation for the disposal of LLW and/or VLLW would be eligible for exclusion from the application of the Paris Convention, for as long as the installation accepts only radioactive waste that meets the specified activity concentration limits. It should be noted that the decision for nuclear installations in the process of being decommissioned [NEA/NE(2014)14/REV1] includes other conditions that should be met before exclusion could be granted, and these are also considered for exclusion of LLW/VLLW disposal installations below.

The generic radioactivity concentration limits in step 1 will provide a uniform definition of the radioactive waste for the purposes of excluding disposal installations from the Paris Convention across all Contracting Parties. The generic limits provide for a broad indication of whether a candidate installation is suitable to be considered for exclusion.

With regard to the generic criteria for step 1 (in the form of limits of radioactivity concentration), discussions have suggested that it would be more operationally effective to use the activity concentration of radionuclides (Bq/g) in the disposed waste (derived from consideration of exposure scenarios) rather than total activity, which was used as the criteria for the exclusion of nuclear installations in the process of being decommissioned. This would be complementary to step 2 in which a more in-depth consideration of inventory and other installation-specific factors would be done in a comprehensive installation-specific safety assessment. The calculation of the derived activity concentration limits would take into account the relevant mass of the waste associated with the exposure scenarios for the public. This would greatly facilitate the operational assessment of consignments of packaged or unpackaged waste being brought to the installation, and allow the radioactivity concentration of the waste to be directly judged against the exclusion criteria. Activity concentration is also the quantity that has been commonly used in other related contexts such as in several waste disposal assessment and regulatory documents including the Regulations for the Safe Transport of Radioactive Material⁵. The limits should be applied to the activity concentration averaged over a maximum of 10 tonnes of packaged or unpackaged waste or over the mass of each large item of waste (e.g. steam generator, pressuriser or large vessel) greater than 10 tonnes disposed of at the disposal installation.

The use of activity concentration as a suitable limiting criterion is supported by IAEA TECDOC 1380 (see Table 1) which shows that for the limiting (most restrictive) exposure scenarios it is the radioactivity concentration of the waste, derived from a relevant mass of waste, that determines the impact and not necessarily the entire capacity of a disposal site. Activity concentration was also the unit of measurement chosen in a document developed by the European Commission (EC) which suggests possible clearance levels for radionuclides in building rubble (EC RP 114) (see Table 1).

Other exclusion considerations

In addition to the radiological criteria, the EGPC discussed several other issues associated with an exclusion framework and came to the following basic agreements:

- **Regulatory control:** The expert group agreed that whether or not a nuclear installation for the disposal of LLW and VLLW is excluded from the application of the Paris Convention, it must remain under the relevant national regulatory arrangements until competent national authorities release the installation from such regulatory requirements. Near surface disposal installations are generally designed on the assumption that institutional control should remain in force for a certain time after closure to ensure and demonstrate that the installation has been safely closed

⁵ Regulations for the Safe Transport of Radioactive Material (IAEA Publ. SSR-6, 2012 Edition) are available at www-pub.iaea.org/MTCD/publications/PDF/Pub1570_web.pdf.

before regulatory control can be released. The institutional control period would also include, for example, the arrangements for maintaining information on the waste disposal installation.

- **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 for the disposal of LLW and VLLW 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 development of exclusion criteria may be based on assessing the potential radiation dose of a representative person who could potentially be exposed by any nuclear installation for the disposal of LLW and VLLW which is considered for exclusion from the application of the Paris Convention. For this purpose, the potential detriment that the candidate 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 and post-closure conditions and circumstances including accidental occurrences and security events to the extent as stipulated in relevant national regulations and internationally recognised guidance.

With these considerations in mind, the EGPC agreed that the radiological criteria for deciding whether or not a candidate nuclear installation could be excluded from the application of the Paris Convention should be based on a two-step process.

The first step will ensure consistency and uniformity in the implementation of the proposed exclusion through a set of activity concentration limits that all Contracting Parties would be obliged to use. The generic activity concentration limits will define the radioactive waste that may be disposed of at an installation being considered for exclusion without having to rely on international or national definitions of LLW or VLLW which may vary between Contracting Parties.

If the competent national authority is satisfied that radioactive waste disposed of at the nuclear installation in the past would have met the generic criteria, and future disposals of radioactive waste will also meet the criteria, then the second step is that a comprehensive, installation-specific assessment would have to be performed. If the installation-specific assessment confirms that the installation, under all reasonably foreseeable circumstances, would not give rise to an off-site exposure of more than 1 mSv in a year, then the installation would be eligible for exclusion from the application of the Paris Convention.

The dose to be calculated as part of the installation-specific assessment is the annual effective dose to a representative person off-site under all reasonably foreseeable normal and abnormal operational and, where relevant, post-closure conditions and circumstances, including accidental occurrences and assuming that protective or mitigating actions off-site have not been taken. The radiation dose to the public resulting from security events should be assumed to be limited in accordance with national regulations and internationally recognised guidance. In addition the radiation dose to the public after regulatory control has been released, including from inadvertent human intrusion or low probability events,

should also be assumed to be limited in accordance with national regulations and internationally recognised guidance.

The installation-specific assessment will give the competent national authority reasonable assurance that the extent of risks involved in the operational and post-closure activities and circumstances of a candidate installation is sufficiently small so that application of the third party liability regime of the Paris Convention is not necessary.

- **Other criteria:** Further, it is recognised that the degree of individual radiation exposure may not be the only aspect that competent national authorities may consider when judging the advisability of exclusion from the application of the Paris Convention.

Generic radioactivity concentration criteria

It was agreed that the generic exclusion criteria for a representative set of the most relevant waste disposal radionuclides (no more than 10) should be guided by the following principles:

Simple and demonstrable – The criteria should be simple to apply, focussed on the radionuclides and exposure pathways of most relevance and risk, and be readily demonstrable.

Well established – The criteria should ideally use well established criteria that are internationally accepted as far as possible thus avoiding the need to carry out any new assessment work that would need additional international agreement and verification.

Realistic – The criteria should be realistic, reasonable and aimed at screening out, on a uniform basis, exclusion of candidate installations that are clearly not suitable for the more detailed installation-specific test by competent national authorities. Provided that the generic criteria are met, operators will be required to carry out, among other assessments, an installation specific dose assessment to demonstrate to the competent national authority the ‘small risk’ at their particular site taking into account its actual characteristics, proposed inventory and activity concentration of the waste (this would normally be part of the national regulatory approval process in the Contracting Party).

With the above in mind the EGPC considered a number of options available for a set of generic limits on radioactivity concentration, including:

1. *IAEA-TECDOC-1380 – Derivation of activity limits for the disposal of radioactive waste in near surface disposal facilities*⁶

Section 5.5 of this report published in 2003 sets out the derivation of illustrative activity limits for a range of typical scenarios. An appropriate disposal scenario would need to be selected, for example the ‘trench’ facility (very conservative compared to an engineered vault) in clay geology in a temperate climate. The limits are based on a public dose of 1 mSv per year and would need to be scaled up by a factor of 10. TECDOC 1380 may be the most technically suitable and the best internationally agreed information.

⁶ 2003 Edition is available at www-pub.iaea.org/MTCD/publications/PDF/te_1380_web.pdf.

2. *EC Definition of Clearance Levels for the Release of Radioactively Contaminated Buildings and Building Rubble (EC RP 114)*⁷

The clearance levels⁸ in Annex 1 to the Euratom Basic Safety Standards Directive⁹ (BSSD) are calculated on the basis that the dose received by any person from a realistic set of routine and accidental exposure scenarios will not exceed 10 µSv per year. The BSSD notes that, exceptionally, individual Member States may decide that a practice may be exempted or cleared from regulatory control where appropriate without further consideration, in accordance with the basic criteria, even if the relevant radionuclides deviate from the clearance values given in Annex 1 to the Directive, provided that the following criteria are met in all feasible circumstances:

- a. the effective dose expected to be incurred by any member of the public due to the exempted practice is of the order of 10 µSv or less in a year; and
- b. either the collective effective dose committed during one year of performance of the practice is no more than about 1 manSv or an assessment of the optimisation of protection shows that exemption is the optimum option.

Higher values for clearance levels than those in Annex 1 of the BSSD may therefore be defined for specific materials or specific pathways taking EC guidance into account. A relevant example of this specific approach is described in EU Report 113¹⁰, and EC RP 114 on clearance levels for building rubble (1999), which is a major component of decommissioning waste.

If clearance levels taken from EC RP 114 were to be used as a basis for the generic limits for exclusion, then they would need to be scaled by a factor of 1 000 to be representative of a 10 mSv per year dose.

3. *UK Study into Radiological Capacity of Landfills (UK Study)*

The UK environment agencies sponsored a study into a generic framework for assessing the suitability of controlled landfills to accept very small volumes of solid low-level radioactive waste from the non-nuclear sector (e.g. hospitals) in addition to much larger amounts of non-radioactive wastes¹¹. This work accounted for a range of potential exposure scenarios.

Taking into account the assessment approaches, the range of illustrative results developed in the three studies and other considerations, the EGPC agreed that the proposed limits set out in the fifth column of Table 1 would be appropriate. The EGPC felt that, given the conservatism of the generic assessment process, simple, rounded numbers would be the most appropriate. It also felt that the limits on transuranic alpha emitters should be restricted to the lower bound of the range of values from the studies.

⁷ Definition of Clearance Levels for the Release of Radioactively Contaminated Buildings and Buildings Rubble, Radiation Protection 114, European Commission, 2000, is available at <http://ec.europa.eu/energy/sites/ener/files/documents/114.pdf>.

⁸ Clearance levels: values, expressed in terms of activity concentrations and/or total activity, at or below which radioactive substances or materials containing radioactive substances arising from any practice subject to the requirement of reporting or authorisation may be released from the requirements of the Directive.

⁹ 96/26/Euratom (to be repealed by 2013/59/Euratom which has similar requirements for clearance levels).

¹⁰ EC RP 113 is available at <http://ec.europa.eu/energy/sites/ener/files/documents/113.pdf>.

¹¹ The UK Study is available at www.sniffer.org.uk/files/7013/4183/8012/Technical_Reference_2010_update.pdf.

Table 1 – Assessed radioactivity concentration limits in waste from three different studies and the EGPC proposal

| Radionuclide | EC RP 114 Bq/g | IAEA TECDOC 1380 Bq/g | UK Study Bq/g | EGPC Proposal Bq/g |
|--------------|-------------------|--------------------------|------------------|------------------------------|
| H-3 | 100 000 | 4 000 | 80 000 | 10 000 |
| C-14 | 10 000 | 4 000 | 700 | 10 000 |
| Co-60 | 100 | 1 000 | 2 000 | 200 |
| Sr-90 | 1 000 | 20 | 200 | 200 |
| Tc-99 | - | 30 | - | 200 |
| Cs-137 | 1 000 | 200 | 200 | 200 |
| U-238 | 1 000 | 1 000 | 300 | 200 |
| Pu-239 | 100 | 700 | 100 | 100 |
| Am-241 | 100 | 800 | 100 | 100 |

Reference bases:

All limits relate to a public dose of 10 mSv/y.

EC RP114 assumes 100 000 tonnes of rubble per year.

IAEA TECDOC 1380 – assumes an indicative trench volume of 90 000 m³, clay geosphere, temperate climate

UK Study – illustrative radiological capacity derived from the study divided by an assumed volume of 90 000 m³ for comparison with the IAEA study.

General assessment and approval considerations

- **Approval requirements:** The Contracting Parties 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 Contracting Parties 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.

The regulatory arrangements concerned with the exclusion of an installation from the application of the international nuclear liability regime may be implemented either as a separate regulatory process or as part of the existing 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 the operational/post-closure status of the candidate installation.

The relevant regulatory requirements and procedures must 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 must 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 must be required to submit an application to the competent national authority to demonstrate that the radioactive waste disposed of/to be disposed of at the nuclear installation does not/will not exceed the generic activity concentration limits.

If the generic exclusion limits are met, then the operator (applicant) of the candidate installation must be required to submit a detailed safety assessment report to be reviewed and assessed by the competent national authority. In practice, this assessment could be submitted at the same time as the initial application. The basic objective of the review and assessment is to determine whether the operator's submissions provide adequate documentary evidence that the candidate nuclear installation seeking exclusion complies with the relevant exclusion criteria and requirements in accordance with clearly defined procedures. The regulatory review and assessment must be undertaken in a structured, transparent, accountable and systematic manner.

The competent national authority must 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 must 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.

Once excluded the operator of the excluded installation must inform the competent national authority of any changes to planned operations which would result in the exclusion criteria no longer being met; for example, if the operations are to be changed to include the disposal of radioactive waste which exceeds the generic radioactivity concentration limits.

Contracting Parties must maintain (and if necessary establish) a compliance assessment process in order to ensure and demonstrate that the radioactive waste accepted by, and disposed of at, an excluded installation meets the exclusion criteria.

- **Safety assessment process:** The safety assessment to be undertaken for a candidate nuclear installation has the main objective of assessing and evaluating the safety performance of the disposal installation for comparison with the exclusion criteria and requirements set out here, for the complete life cycle of the installation (operational and post-closure) and under all reasonably foreseeable operational conditions including accidental occurrences to the extent as stipulated in relevant national regulations and internationally recognised guidance, and assuming that protective actions have not been taken. The radiation dose to the public resulting from security events should be assumed to be limited in accordance with national regulations and internationally recognised guidance. In addition, the radiation dose to the public after regulatory control has been released, including from inadvertent human intrusion or low probability events, should also be assumed to be limited in accordance with national regulations and internationally recognised guidance. In conducting the safety assessment, a systematic and structured analysis approach must 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 physical barriers to confine the radioactive waste or otherwise give rise to off-site radiation risks.

In planning and conducting the safety assessment, due consideration must be given to relevant guidance and recommendations, 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 and risk assessment information may be taken from existing materials, for example, environmental impact statements, environmental safety cases and safety analysis reports.

The degree of detail of the safety assessment depends on the type, nature and complexity of the installation and/or activity being performed, that is, a graded approach must 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 other things, information regarding the design, the radioactivity 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 (including the potential impacts of climate change), in conjunction with present and/or assumed 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. The installation-specific dose assessment for step 2 must take account, as appropriate, of the full list of radionuclides in the waste disposed of.

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 and natural events. A systematic and logical approach must be chosen to identify potential hazards and initiating events that are suitable for the respective conditions. Screening methods must take into account all possible release and exposure pathways.

Scenario development: Relevant event scenarios must 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 must 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.

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 program. The independent review must 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 competent national authority) 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 for the disposal of LLW and VLLW from the application of the Paris Convention is to be taken by the competent national authority.

The operator must demonstrate through appropriate submissions that the candidate nuclear installation satisfies all relevant exclusion criteria and requirements set out here.

ANNEX

INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA) RADIOACTIVE WASTE CLASSIFICATION SCHEME

The definitions of the radioactive waste categories referred to in the Explanatory Note accompanying the decision of the Steering Committee on the exclusion of nuclear installations for the disposal of certain types of low-level radioactive waste from the application of the Paris Convention are as follows¹⁵:

Very low-level waste (VLLW): Waste that does not necessarily meet the criteria of exempt waste, but that does not need a high level of containment and isolation and, therefore, is suitable for disposal in near surface landfill type facilities with limited regulatory control. Such landfill type facilities may also contain other hazardous waste. Typical waste in this class includes soil and rubble with low levels of activity concentration. Concentrations of longer lived radionuclides in VLLW are generally very limited.

Low-level waste (LLW): Waste that is above clearance levels, but with limited amounts of long lived radionuclides. Such waste requires robust isolation and containment for periods of up to a few hundred years and is suitable for disposal in engineered near surface facilities. This class covers a very broad range of waste. LLW may include short lived radionuclides at higher levels of activity concentration, and also long lived radionuclides, but only at relatively low levels of activity concentration.

¹⁵ The Classification of Radioactive Waste, IAEA Safety Standards Series GSG-1, 2009 Edition, is available at: www-pub.iaea.org/books/IAEABooks/8154/Classification-of-Radioactive-Waste-General-Safety-Guide.