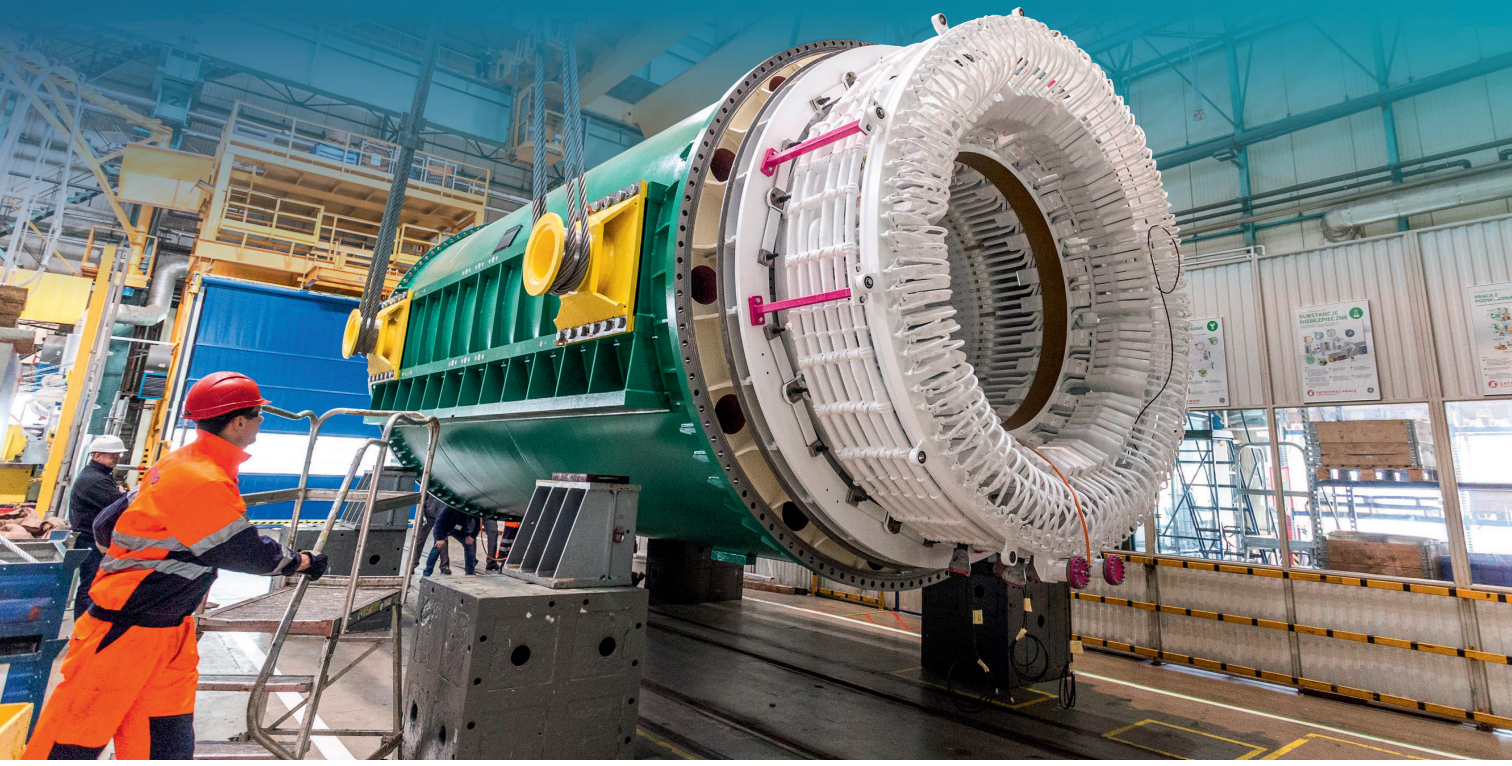
Legal Affairs
2019

Legal Frameworks for Long-Term Operation of Nuclear Power Reactors



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Legal Affairs

Legal Frameworks for Long-Term Operation of Nuclear Power Reactors

NEA No. 7504

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Cover photos: Workers at a GE factory in Poland prepare a massive generator stator for shipment to Darlington Nuclear Plant (GE Power).

Foreword

Legal Frameworks for Long-Term Operation of Nuclear Power Reactors comes at a time when more and more governments, as well as regional and international organisations, are focusing greater attention on nuclear energy's potential role in combating global climate change. At the same time, the nuclear energy sector is facing many complex issues, with legal systems playing an increasingly vital role in adjudicating public policy and regulatory questions, particularly in countries with long-established nuclear power programmes.

One of the issues receiving greater attention today is the potential long-term operation of nuclear power reactors. In Western Europe and North America, for example, many countries are currently assessing reactor operation past the 40-year mark and considering the continued operation of plants for as long as 80 years. Decisions to pursue long-term operation do not simply involve technical matters, but are complex, national decisions that concern long-term energy policy, economics and social licence. As a result, many of these decisions have been subjected to legal reviews in member and partner countries of the OECD Nuclear Energy Agency (NEA).

For many countries, if nuclear energy is to remain a part of their strategy to achieve a low-carbon energy future, the safe, environmentally sound and economical, long-term operation of nuclear power reactors must be ensured. Working towards this goal, the NEA has been leading technical work on the integrity and ageing of the components and structures of nuclear power reactors and has been at the vanguard of economic work assessing and analysing technical and economic data on upgrade and lifetime extension experience in its member countries. Complementing this work, the International Energy Agency's *Nuclear Power in a Clean Energy System* (2019) has highlighted the crucial need to expand the use of nuclear power in order to address climate change, as well as the vital role of long-term operation in OECD countries. Ongoing work by the United Nations Economic Commission for Europe analysing the role of environmental reviews in long-term operation and the European Nuclear Safety Regulators Group's first topical peer review on "Ageing management of nuclear power plants and research reactors" add further support for this same goal.

Legal Frameworks for Long-Term Operation of Nuclear Power Reactors adds a new dimension to national and international discussions about long-term operation. This first-of-a-kind report, addressing the legal and regulatory aspects of decisions to authorise or approve the long-term operation of nuclear power reactors in countries around the world, will serve as a key resource for not only lawyers, but also for policy makers, engineers and academics. While the choice to proceed with long-term operation is a matter of national policy, *Legal Frameworks for Long-Term Operation of Nuclear Power Reactors* demonstrates that enhancing knowledge in this important area is critical.

William D. Magwood, IV
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Acknowledgements

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The conception, drafting and overall co-ordination of the report was led by Ms Kimberly Sexton Nick, Deputy Head, NEA Office of Legal Counsel (OLC), along with Mr Pierre Bourdon, Legal Adviser, OLC. This report would not have been possible without the strong and enthusiastic support of the many NEA member and partner countries included within these pages. More than 80 individuals contributed in some way to the report. These individuals are listed in Annexes 3 and 4. The NEA would like to extend its gratitude in particular to the following members of the informal expert group for their in-depth review, suggestions and comments on the report:

Name	Organisation	Country
Mr Roland Dussart-Dessart	FPS Economy, SMEs, Self-employed and Energy	Belgium
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Mr Yves Guannel	Nuclear Safety Authority	France
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Mr Kohei Goto	Nuclear Regulation Authority	Japan
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List of abbreviations and acronyms

ACRS	Advisory Committee on Reactor Safeguards (United States)
AEA	Atomic Energy Act (United States)
AGR	Advanced gas-cooled reactor
AMP	Ageing management programme
ANVS	Authority for Nuclear Safety and Radiation Protection (Autoriteit Nucleaire Veiligheid en Stralingsbescherming) (Netherlands)
ARN	Nuclear Regulatory Authority (Autoridad Regulatoria Nuclear) (Argentina)
ASN	Nuclear Safety Authority (Autorité de sûreté nucléaire) (France)
BWR	Boiling water reactor
CFR	*Code of Federal Regulations* (United States)
CNCAN	National Commission for Nuclear Activities Control (Comisia Naţională pentru Controlul Activităţilor Nucleare) (Romania)
CNRA	Committee on Nuclear Regulatory Activities (NEA)
CNS	Convention on Nuclear Safety
CNSC	Canadian Nuclear Safety Commission
CSN	Nuclear Safety Council (Consejo de Seguridad Nuclear) (Spain)
EA	Environmental assessment
EAME	Environmental Agency of the Ministry of Environment (Slovenia)
EIA	Environmental impact assessment
ENSI	Swiss Federal Nuclear Safety Inspectorate (Eidgenössisches Nuklearsicherheitsinspektorat)
EU	European Union
FANC	Federal Agency for Nuclear Control (Belgium)
FSAR	Final safety analysis report
GEIS	Generic environmental impact statement (United States)
GOBC	Government Office for Baranya County (Hungary)
HAEA	Hungarian Atomic Energy Authority
HCTISN	High Committee for Transparency and Information on Nuclear Safety (Haut comité pour la transparence et l'information sur la sécurité nucléaire) (France)
IAEA	International Atomic Energy Agency
IPA	Integrated plant assessment
IRSN	Institute for Radiological Protection and Nuclear Safety (Institut de radioprotection et de sûreté nucléaire) (France)
LRA	Licence renewal application (United States)
LTE	Lifetime extension

LTO	Long-term operation
LWR	Light water reactor
MEAE	Ministry of Economic Affairs and Employment (Finland)
MENRU	Ministry of Ecology and Natural Resources of Ukraine
NA-SA	Nucleoeléctrica Argentina Sociedad Anónima
NEA	Nuclear Energy Agency
NEPA	National Environmental Policy Act (United States)
NGO	Non-governmental organisation
NLC	Nuclear Law Committee (NEA)
NPP	Nuclear power plant
NPS	Nuclear power station
NRA	Nuclear Regulation Authority (Japan)
NRC	Nuclear Regulatory Commission (United States)
NSCA	Nuclear Safety and Control Act (Canada)
NSSC	Nuclear Safety and Security Commission (Korea)
OECD	Organisation for Economic Co-operation and Development
ONR	Office of Nuclear Regulation (United Kingdom)
PHWR	Pressurised heavy water reactor
PR	Periodic review (France)
PRIS	Power Reactor Information System (IAEA)
PSR	Periodic safety review
PSRR	Periodic safety review report (Ukraine)
PWR	Pressurised water reactor
SALTO	Safety Aspects of Long Term Operation (IAEA)
SCA	Safety and control areas (Canada)
SER	Safety evaluation report (United States)
SF	Safety factors (IAEA)
SNRIU	State Nuclear Regulatory Inspectorate of Ukraine
SNSA	Slovenian Nuclear Safety Administration
SONS	State Office for Nuclear Safety (Státní úřad pro jadernou bezpečnost – SÚJB) (Czech Republic)
SSC	Systems, structures and components
SSM	Swedish Radiation Safety Authority (Strålsäkerhetsmyndighetens)
SSTC for NRS	State Scientific and Technical Centre for Nuclear and Radiation Safety (Ukraine)
STUK	Finnish Radiation and Nuclear Safety Authority (Säteilyturvakeskus)
TEPCO	Tokyo Electric Power Company (Japan)
TLAA	Time-limited ageing analyses
TSO	Technical support organisation
ÚJD	Nuclear Regulatory Authority of the Slovak Republic (Úrad jadrového dozoru)
UNECE	United Nations Economic Commission for Europe
WPLANS	Working Party on the Legal Aspects of Nuclear Safety (NEA)

Executive summary

In July 2019 the world's oldest operating nuclear power reactor passed 50 years since it was first connected to the electricity grid. Four other nuclear power reactors will also have passed 50 years of operation since they were first connected to the electricity grid before the end of 2019. With almost 70% of the world's operating reactors over 30 years of age, countries around the world are assessing whether to allow reactor operation to continue past the 50-60 year mark and potentially up to 80 years. Ensuring a proper legal framework for the long-term operation (LTO) of nuclear power reactors is a key component of such considerations. While there are numerous reports that address LTO from a technical standpoint, and some of these also incorporate a review of regulatory frameworks for LTO, *Legal Frameworks for Long-Term Operation of Nuclear Power Reactors* is the first report of its kind to comprehensively address the legal and policy aspects involved in a decision to allow or authorise long-term operation.

The aim of the report is to provide insight into the various laws, regulations and policies that contribute to different countries' approaches to LTO around the world, without any judgement as to the merits of one approach over another. The report is thus intended for a wide audience who may wish to better understand both the current state of international approaches to LTO and the detailed approaches of one or many countries.

Official information was provided by 25 countries (collectively referred to as the "reporting countries"), 24 of which are OECD Nuclear Energy Agency (NEA) member countries, and by an additional country that participates in certain NEA activities.[1] In total, the report covers 359 (or 80%) of the world's operating nuclear power reactors.

With information collected from countries that have both experience in and plans for LTO, the report should highlight some of the commonalities that emerge and the possible reasons for some of the variations. The overall review of different legal frameworks for LTO in these countries illustrates how even among countries with similar approaches, small distinctions can ultimately amount to major differences. A comprehensive analysis of the information provided by reporting countries draws the following main conclusions:

- Differences among reporting countries in the initial licensing frameworks for nuclear power reactor operation have a substantial impact on the legal frameworks for LTO. Initial authorisations for nuclear power reactor operation may be granted either for a specific, time-limited term or for an indefinite duration. This variation most often, but not systematically, determines whether a specific decision is taken to authorise the LTO of a nuclear power reactor.
- All reporting countries require a review of nuclear safety-related aspects of LTO by their national regulatory bodies, although authorisation or approval for LTO is in some instances granted by a ministry or by the government, rather than the regulatory body.
- Regulatory approaches to LTO are often described as either a periodic safety review (PSR) or a licence renewal. For reporting countries, however, the usual PSR and/or licence renewal dichotomy was not the most suitable distinction. Instead, the safety review in reporting countries is performed by either carrying out a PSR, an LTO-specific review or

1. It should be noted that not all reporting countries operate nuclear power reactors and not all countries that operate nuclear power reactors are pursuing LTO.

a combination of the two. It should be noted that such reviews do not necessarily lead to a formal licensing decision to authorise LTO.

- Of the reporting countries that require a specific authorisation for LTO, approaches vary in terms of the requirements for a new licence, a renewed licence, an amended or updated licence and a ministerial order.
- A legal requirement exists in the majority of reporting countries to perform a review of the environmental impacts prior to LTO, although the nature and extent of such reviews vary.
- In all reporting countries, new safety requirements related to LTO can be imposed through the LTO-review process. The ability to impose new safety requirements is, however, not always specifically linked to an LTO-approval process; in many reporting countries, new safety requirements may be imposed as part of the PSR process or in some cases at any time during reactor operation.
- Most reporting countries' legal frameworks provide rights to the public to access LTO-related information held either by public authorities, or, in some reporting countries, by licensees. Typically, these rights are provided under the general, environmental or national nuclear laws and therefore are not specific to LTO.
- The legal frameworks for LTO-related public participation vary among reporting countries. While not all reporting countries provide for public participation, for those that do, such requirements typically rest with the nuclear regulatory body or another decision-making authority (e.g. the public authority in charge of environmental protection or a local authority) and may entail public hearings, written comments and/or the dissemination of draft decisions for public consultation, as well as requirements for the decision-making authority to take into account comments received when reaching its final decision.
- Nearly all reporting countries allow legal challenges to the LTO process (often concerning the authorisation, approval or other type of decision made in the context of the LTO-review process). In most instances, the procedures for such challenges are determined by civil or administrative procedures that are not unique to the nuclear energy sector.

A detailed review of national approaches to LTO is also provided in the present report. In many ways, the country reports are the central part of *Legal Frameworks for Long-Term Operation of Nuclear Power Reactors*. Each country report is drafted so that it can be read and understood separately from the report as a whole. When applicable, each country report provides key data regarding the status of nuclear power reactor operation, important details about the designed and authorised periods, terminology, main laws/ regulations/documents for initial operation and LTO, responsible government bodies, application and review timing, scope of review (both safety and environmental), new safety requirements and transboundary notification. Each country report concludes, as far as applicable, with a review of the available avenues for access to information and public participation during the LTO-approval process in the individual reporting country, as well as the opportunities and procedures to initiate legal challenges.

With the information gathered for this report, it can ultimately serve as a resource for future exchanges concerning the legal aspects of LTO, with a view to further developing and strengthening the collective understanding of these issues.

Chapter 1. **Introduction**

1.1. **Background on long-term operation**

The first large-scale civilian nuclear power reactor began generating electricity in 1957. Nuclear power expanded rapidly in the 1960s through to the early 1970s, when the energy crisis raised the profile of nuclear energy in many countries. At the time, there was not enough experience with reactor operation to project plant lifetimes. The pace of reactor start-up slowed starting in the mid-1970s and through to the 1980s, as a result of a combination of factors including low oil prices and concerns following the accidents at Three Mile Island in the United States and Chernobyl in the Ukraine, at the time a part of the former Soviet Union.

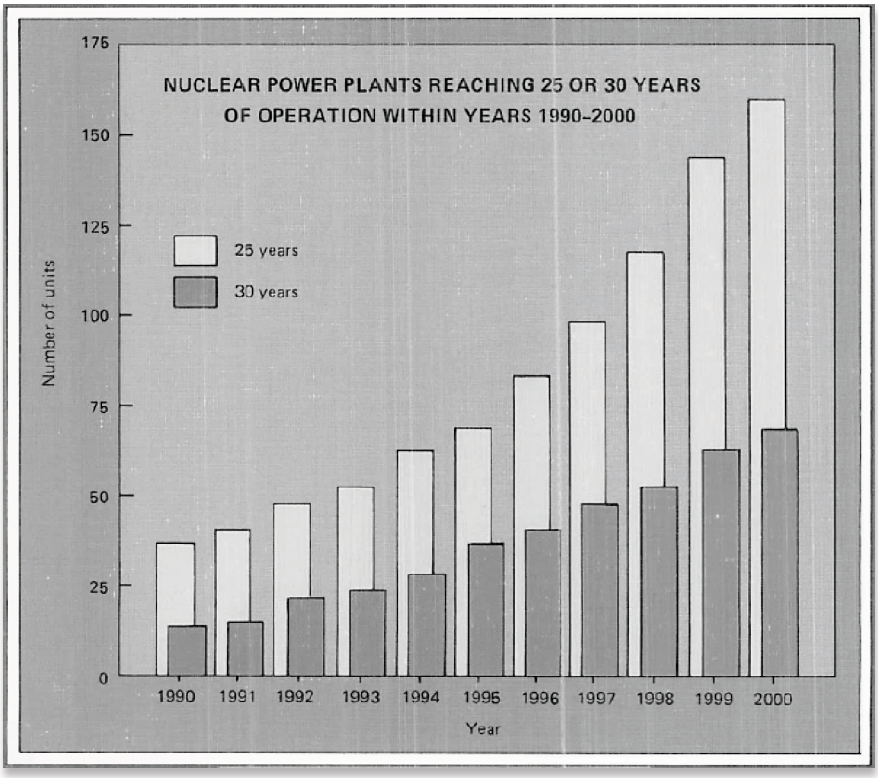
With fewer nuclear power reactors being licensed and brought online, alongside the competitive pricing of oil, the need arose to make the cost of nuclear electricity generation as low as practicably achievable, while also maintaining an appropriate safety margin. By the 1980s, reactor development and operation had reached a certain level of maturity, and issues related to the ageing of nuclear power plants (NPPs) began to receive increased focus. The first plant life extension (PLEX) programme, for example, began in the United States in 1983 and a year later the United Kingdom determined that the planned operating lifetime of 8 reactors could continue to 30 years.

By the mid-1980s, specific national plans and programmes for NPP ageing began to develop. In 1985 alone, Japan began its eight-year programme on "Development of Nuclear Power Plant Life Extension Technology", the United States began its "Nuclear Plant Aging Research (NPAR) Program", the International Atomic Energy Agency (IAEA) convened its first working group on the safety aspects of NPP ageing, and the first international conference on NPP ageing was held in California. Additional international symposiums and conferences followed in 1987 and 1988, in Paris,[1] Vienna[2] and Maryland.[3]

Although at that point nuclear power reactor operation had been a fact of life for 30 years, the largely experimental nature of the early years of development created a world where, in 1988, "no large nuclear power plant [had] yet entered its twenty-fifth year of operation, much less its fortieth."[4] A change would come in the 1990s with the number of older nuclear power reactors set to increase significantly, as indicated clearly by the figure on the cover of the 1987 Vienna symposium proceedings (see Figure 1.1).

1. NEA (1987), *Proceedings of a Symposium on Nuclear Power Plant Life Extension*, organised by the NEA in co-operation with the IAEA, Paris, 24-27 February 1987.
2. IAEA (1988), *Safety Aspects of the Ageing and Maintenance of Nuclear Power Plants*, Proceedings of a Symposium, Vienna, 29 June – 3 July 1987.
3. NUREG/CP-0100, *Proceedings of the International Nuclear Power Plant Aging Symposium*, 30-31 August and 1 September 1988, Bethesda, Maryland, United States.
4. Ibid., p. 1, Opening Remarks by S.K. Aggarwal.

Figure 1.1. **Nuclear power plants reaching 25 or 30 years of operation within the years 1990 and 2000**



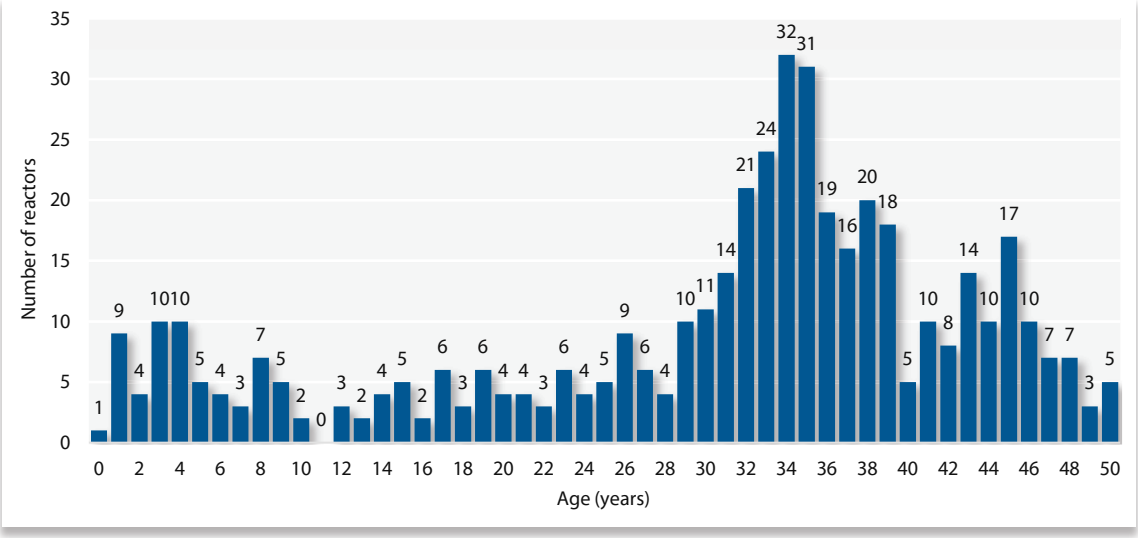
Source: IAEA (1988), *Safety Aspects of the Ageing and Maintenance of Nuclear Power Plants, Proceedings of a Symposium*, Vienna, 29 June – 3 July 1987.

From 2000 to 2011, only 45 new nuclear power reactors were connected to the grid worldwide.[5] At the time, recognising the ageing condition of reactors around the world, international co-operation continued to increase. The IAEA began its programme on the Safety Aspects of Long Term Operation (SALTO) in 2003 and then began development of its programme on International Generic Ageing Lessons Learned (IGALL) in 2009. A Senior Level Task Group on Long-term Operation of Nuclear Power Plants was formed at the NEA in 2010 to prepare a report on regulatory challenges in relation to the long-term operation of NPPs, and subsequently also addressing the impact of the Fukushima Daiichi NPP accident on LTO.

Because of the work carried out at national and international levels, knowledge and experience with nuclear reactor ageing has progressed significantly since the 1980s. In July 2019 the oldest operating nuclear power reactor, Beznau, unit 1 in Switzerland, passed 50 years since it was first connected to the grid. Four other nuclear power reactors also passed 50 years of operation before the end of 2019.[6] The international community now has decades of knowledge and experience ensuring the safe operation of nuclear power reactors during LTO.

5. NEA (2012), *The Economics of Long-term Operation of Nuclear Power Plants*, OECD Publishing, Paris, p. 19.
6. Nine-Mile Point, unit 1 and Ginna in the United States; and Tarapur, units 1 and 2 in India. IAEA (2018), Power Reactor Information System (PRIS), https://pris.iaea.org/PRIS/home.aspx (accessed: 28 Jan. 2019).

Figure 1.2. **Distribution of nuclear power reactors by age in the year 2019**



Source: Based on data from IAEA PRIS (accessed 21 June 2019).

Interest in long-term operation remains high for many reasons. Countries around the world are considering reactor operation past the 50-60 year mark and potentially up to 80 years. In addition, issues that were raised when LTO was first being considered – the need for economic power generation in the future if new nuclear power reactors are not licensed and brought online – continue to be relevant to this day. Ensuring that a proper legal framework for LTO is in place is a key component of such considerations.

1.2. Aims and objectives

Numerous reports address LTO from a technical standpoint and some of these consider the regulatory framework as well. However, no report has yet attempted to comprehensively address the legal and policy aspects involved in a decision to allow or authorise LTO, and none have included as many nuclear energy producing countries.

The aim of this report is not to provide recommendations or advice on whether to consider LTO or on the most appropriate approach to LTO; nor is it to identify good or best practices. While comparisons are made between approaches, for example, these are made without reference to specific countries. Instead, the aim of this report is to provide insight into the various laws, regulations and policies that contribute to different countries' approaches to LTO, without any judgement as to the merits of one approach over another. With the information gathered from countries that have both experience in and plans for LTO, the report should enable those interested in the laws applicable to this subject matter to understand the basis for some of the commonalities that emerge and to consider possible reasons for some of the variations that exist.

This report is intended for a wide audience of lawyers and policy makers, as well as other interested individuals who wish to better understand the current state of international approaches to LTO, as well as the more detailed approaches of individual countries (see Chapter 3). While keeping in mind that laws and regulations may change, this report nonetheless provides a snapshot in time, with all information current as of 30 June 2019.

1.3. Approach

On 27 November 2017, a survey entitled "Long-Term/Extended/Continued Operation of Nuclear Power and Research Reactors" (reproduced in Annex 1) was sent to all NEA member countries. The survey was originally prepared by the NEA Secretariat, but was revised and supplemented with additional questions following multiple rounds of consultation with members of the Working Party on the Legal Aspects of Nuclear Safety (WPLANS). The final survey represented the information that NEA member countries were hoping to learn in relation to the legal aspects of individual countries' approaches to LTO. It should be noted that information about the methodology of the survey is provided in Annex 1.

Responses were received from 20 NEA member countries as of 20 February 2018. Those responses were analysed, summarised and discussed by the WPLANS during its meeting on 16 March 2018. Based on these discussions, the WPLANS determined to move forward with the drafting of a report that would include a full canvassing of the issues covered, as well as summaries of each country's response.

Individual country reports were therefore drafted for review, comment and approval by each specific member country. To the extent possible, all country reports were drafted using the same format, presented in Annex 2. When necessary, the Secretariat supplemented the information provided by the delegations in their survey responses, consulting, *inter alia*, the regulatory body's website, the relevant laws and regulations, national reports to the Convention on Nuclear Safety (CNS)[7] review meetings, the IAEA's Power Reactor Information System (PRIS) website[8] and the IAEA's Country Nuclear Power Profiles website.[9] Each draft country profile was provided to the original survey respondent(s) and/or WPLANS member(s) for review and approval. Extensive discussions with the delegations took place over a number of months to agree on a final text.

A total of 23 country reports were provided in a draft report to the WPLANS for review during its meeting of 16 November 2018.[10] The WPLANS determined during this meeting to expand the scope of the survey so as to also include partner countries that participate in the activities of the NLC. One non-NEA member country was thus asked to provide a survey response, and one additional NEA member country also provided a survey response following the meeting.

Over the course of the first half of 2019, the Secretariat continued to review and update the country reports with the relevant delegations, as well as to draft additional sections of the report. In February 2019, five delegations volunteered to serve in an informal expert group to review and provide comments on the full draft report: Belgium, Canada, France, Japan and the United States. These countries represent a balance of approaches to LTO that greatly benefited the overall review of the report. Two rounds of review and comment were then undertaken by WPLANS members before the report was finally sent to the NLC to endorse its publication. It should be noted that the NLC's endorsement of this report does not represent an endorsement of the information provided in individual country reports or of the approach taken by any individual country for LTO.

1.4. Scope

As indicated above, the scope of the survey was broad and applied to both nuclear power and research reactors. The present report, however, applies only to nuclear power reactors. In many if not most instances, the laws and regulations related to research reactors differ from those related to nuclear power reactors. It was thus determined that a report with a narrower focus

7. Convention on Nuclear Safety (1994), IAEA Doc. INFCIRC/449, 1963 UNTS 293, entered into force 24 October 1996.
8. The IAEA's PRIS website is available at: https://pris.iaea.org/pris.
9. The IAEA's Country Nuclear Power Profiles website is available at: https://cnpp.iaea.org/pages/index.htm.
10. Three additional survey responses were received after the informal report was prepared.

on just nuclear power reactors would provide more useful, targeted and insightful information. Because non-nuclear power countries responded to the survey, an entry is included regardless of whether the country has an operating nuclear power reactor.

With this narrower scope, the report has been able to comprehensively address multiple, important themes. It addresses all of the significant legal and policy aspects relating to a country's legal and regulatory framework for LTO. Specific areas of focus include:

- the primary legal documents detailing the legal framework;
- the scope of the safety and environmental assessment for LTO, with a comparison to initial licensing reviews;
- the ability to impose new safety and environmental requirements;
- the degree of public access to information on safety and environmental issues;
- the extent of public participation in safety and environmental issues;
- legal challenges to safety and environmental issues.

1.5. Terminology

One of the first challenges that arose when initiating work on this report was in relation to terminology. Countries use different words to describe the same or similar concepts. The differences in the words used may be attributed to the specific licensing approach undertaken in each country, for example, periodic safety reviews (PSR) and/or formal LTO-specific licensing processes. Other differences in terminology can simply be attributed to translations from the original language into English.

In the beginning, the NEA Secretariat attempted to incorporate all of these terms into what was referred to as the "slash approach", as demonstrated in the title of the survey: "WPLANS Survey on long-term/extended/continued operation of nuclear power and/or research reactors". In order to cover as many systems as possible in a single questionnaire, the survey referred to the:

- original authorised/licensed/designed life;
- initial authorisation/licence;
- authorisation/licensing process;
- period of long-term/continued/extended operation;
- subsequent renewal/extension/continuation;
- applicant/licensee;
- requests/applications;
- reviews/assessments;
- court/body/authority;
- laws/regulations/documents; and
- governmental/regulatory body/bodies.

It was decided, however, that this same "slash" approach to terminology would not be used in the present report. Instead, generic words are used in Chapters 1, 2 and Annex 1, without direct reference to the specific meanings that these words may have in any given, national context. This approach, with respect to concepts that may be seen to be quite similar despite their individual contexts and different terminology, is meant to facilitate meaningful benchmarking of similar concepts across different regulatory systems. The report does not create any new definitions, but instead uses the following terminology to refer broadly to

concepts, according to the commonly understood definitions provided in various international documents, all of which are cited in the footnotes below:

- **Applicant**: "Any person or organization applying to a regulatory body for authorization (or approval) to undertake specified activities. (NOTE: Strictly, an applicant would be such from the time at which an application is submitted until the requested authorization is either granted or refused. However, the term is often used a little more loosely than this, in particular in cases where the authorization process is long and complex.)."[11]
- **Approval:** "The granting of consent by a regulatory body. (NOTE: Typically used to represent any form of consent from the regulatory body that does not meet the definition of authorization)."[12]
- **Authorisation:** "The granting by a regulatory body or other governmental body of written permission for a person or organization (the operator) to conduct specified activities."[13]
- **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."[14]
- **Licence**: "Any authorization granted by the regulatory body to the applicant to have the responsibility for the siting, design, construction, commissioning, operation or decommissioning of a nuclear installation."[15]
- **Licensee:** "The holder of a current licence."[16]
- **Licensing basis:** "A set of regulatory requirements applicable to a nuclear installation." Note: "The licensing basis, in addition to a set of regulatory requirements, may also include agreements and commitments made between the regulatory body and the licensee (e.g. in the form of letters exchanged or of statements made in technical meetings)."[17]
- **Long-term operation:** "Operation beyond an established time frame defined by the licence term, the original plant design, relevant standards or national regulations."[18]
- **Operating life/lifetime:** "The period during which an authorized facility is used for its intended purpose, until decommissioning or closure."[19]
- **Operator:** "Any person or organization applying for authorization or authorized and/or responsible for safety when undertaking activities or in relation to any nuclear facilities or sources of ionizing radiation." Note: "Operator includes, *inter alia*, private individuals, governmental bodies, consignors or carriers, licensees, hospitals, self-employed persons."[20]

11. IAEA (2019), IAEA Safety Glossary: Terminology Used in Nuclear Safety and Radiation Protection (2018 Edition), IAEA Doc. STI/PUB/1830, p. 21.
12. IAEA (2014), *Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards*, General Safety Requirements Part 3, IAEA Doc. No. GSR Part 3, p. 382; IAEA (2019), *supra* note 11, p. 21.
13. IAEA (2014), *supra* note 12, p. 383; IAEA (2019) *supra* note 11, p. 27.
14. IAEA (2019), *supra* note 11, p. 127.
15. CNS, Article 2(iii).
16. IAEA (2014), *supra* note 12, p. 400.
17. IAEA (2019), *supra* note 11, p. 127.
18. IAEA (2018), *Ageing Management and Development of a Programme for Long Term Operation of Nuclear Power Plants*, Specific Safety Guide No. SSG-48, IAEA, Vienna, p. 9, para. 2.30.
19. IAEA (2019), *supra* note 11, p. 127.
20. Ibid., p. 160.

- **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)."[21]
- **Regulatory body:** "An authority or a system of authorities designated by the government of a State as having legal authority for conducting the regulatory process, including issuing authorizations, and thereby regulating nuclear, radiation, radioactive waste and transport safety."[22]

To the extent possible, this generic approach is taken in Chapter 3 as well as with the country reports, although if a word has a specific national meaning, that word is used. If a country does not refer to "long-term operation", for example, but instead to "extended operation", this terminology is used for that country in Chapter 3. If a country has a "licensing process" as opposed to an "authorisation process", this terminology is used. Readers of this report are therefore encouraged to consult the country reports in Chapter 3 if they are in search of the specific national terminology applicable within a specific country.

1.6. Report structure

The report is structured into two main chapters, following the introduction. Chapter 2 provides the international context, with an overall review of the different approaches to LTO, critical to understanding the country reports in Chapter 3.

Chapter 2 also contains tables and figures that attempt to synthesise complex information into an easy-to-understand format. A few points should be noted about this approach. First, it is not always easy to make simple, definitive distinctions when dealing with complex subject matter. In many instances, the categories of information presented in the report are broad, and the distinctions between countries can be minor; therefore, the list of countries is not provided in Chapter 2. Second, the number of countries represented in the figures is always smaller than the total number of countries included in the report, because some reporting countries do not currently operate nuclear power reactors and others did not respond to every question in the survey. The term "responding countries" refers therefore to the number of countries that provided a response to that specific inquiry, whereas "reporting countries" refers to all 25 countries included in the report.

A detailed review of national approaches to LTO is provided in Chapter 3. These country reports are in many ways the central part of the report. Each county report is drafted so that it can be read and understood on its own, separate from the report as a whole. When applicable, each country report begins with a "Basic information" section that details the number of operating nuclear power reactors, as well as the number of NPP sites. It then indicates the number of nuclear power reactors operating at six distinct ten-year periods, as applicable. The number of nuclear power reactors operating past their original term of authorisation or design is then provided, as well as the number of nuclear power reactors that will enter the period of LTO in four distinct time periods, as applicable. Finally, the number of nuclear power reactors under construction in the country is indicated.

Two comments should be made about the data presented in the "Basic information" section of each country report. First, all data are accurate as of 30 June 2019. The nuclear power reactor data have been sourced from the PRIS database, and reactor age is calculated based on the date of first grid connection, unless specifically requested otherwise by a reporting country as a result of national statistical reporting. Second, and most importantly, because the determination to operate a reactor beyond the initial authorised or designed period includes

21. Ibid., p. 164.
22. IAEA (2014), *supra* note 12, p. 416.

numerous technical, policy and economic[23] decisions by the regulatory body, government and operator, there is no certainty at the time of publication that a specific reactor will enter the period of LTO in the future. The information presented in the country reports should thus not be read as an indication or determination that a reactor will continue to operate, or as any indication of the future of safety and environmental reviews, legal challenges, changes to national laws or policies, etc.

Following the "Basic information" section is the "Authorisation information" section, which provides important details about the designed and authorised periods, terminology, main laws/regulations/documents for initial and long-term operation, responsible government bodies, application and review timing, scope of review (both safety and environmental), new safety requirements and transboundary notification.

Each country report concludes, as far as applicable, with a review of the available avenues for access to information and public participation during the LTO-approval process in the country, as well as the opportunities and procedures to initiate a legal challenge. Information about the purpose and methodology of the information presented in the country reports is included in the annexes.

23. For more information about the economics of LTO, see NEA (2012), *supra* note 5. Because so many changes have occurred since 2012, an NEA Ad Hoc Expert Group on Maintaining Low-Carbon Generation Capacity through LTO of Nuclear Power Plants: Economic, Technical and Policy Aspects (EGLTO) was formed in 2018 to analyse the data and conclusions of the 2012 report and publish a new report, tentatively scheduled for release in 2020.

Chapter 2. **Review of approaches to long-term operation**

> *"Each Contracting Party shall establish and maintain a legislative and regulatory framework to govern the safety of nuclear installations."*[1]

Countries around the world have different approaches to the long-term operation (LTO) of nuclear power reactors on their territories. Even among countries with similar approaches, small distinctions can ultimately amount to major differences. Before addressing the national laws and regulations of individual countries in more detail, this chapter will provide the international context, with a general overview of the different approaches to LTO.

Regardless of the different approaches taken to LTO, the most fundamental principle is that "The safe operation of the nuclear power plant needs to be ensured during the period considered for long-term operation."[2] Expanding upon the role of the regulator in meeting this fundamental principle, the NEA, notably through its Committee on Nuclear Regulatory Activities, has explained that three additional principles are key in "defin[ing] and shap[ing] the development of a long-term operation programme":

- the regulatory body must be organised to regulate LTO;
- the goals and safety level for LTO need to be clearly defined;
- the operator's proposed programme for LTO needs to be evaluated.[3]

Lastly, the NEA has identified four LTO-related regulatory challenges, all of which are addressed in the present report:

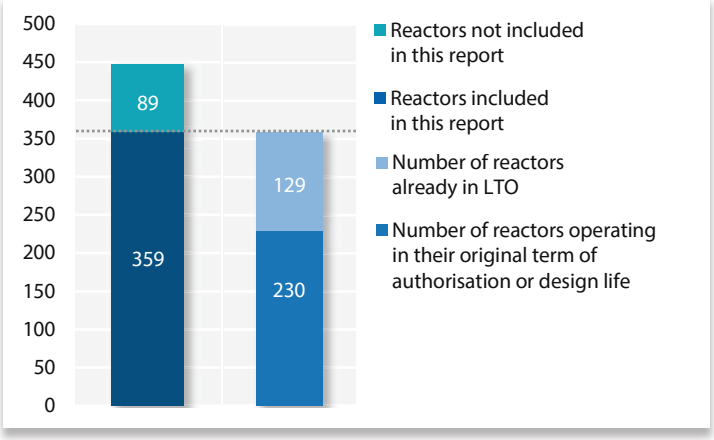
- developing a regulatory framework that is compatible with LTO;
- defining the scope of the regulatory assessment for LTO;
- assessing the safety basis of LTO;
- ensuring oversight of the reactor in LTO.[4]

1. Convention on Nuclear Safety (1994), IAEA Doc. INFCIRC/449, 1963 UNTS 293, entered into force 24 October 1996 (CNS), Article 7(1).
2. NEA (2012), *Challenges in Long-term Operation of Nuclear Power Plants*, OECD, Paris, p. 9.
3. Ibid., pp. 9-12.
4. Ibid., p. 13.

2.1. Background information on reporting countries

A total of 25 countries are represented in this report, 24 of which are NEA member countries and 1 of which participates in certain NEA activities, a near universal participation by the NEA member countries operating nuclear power reactors. NEA member countries are home to 346 of the world's 448 nuclear power reactors currently in operation,[5] or 77% of the world's reactors.

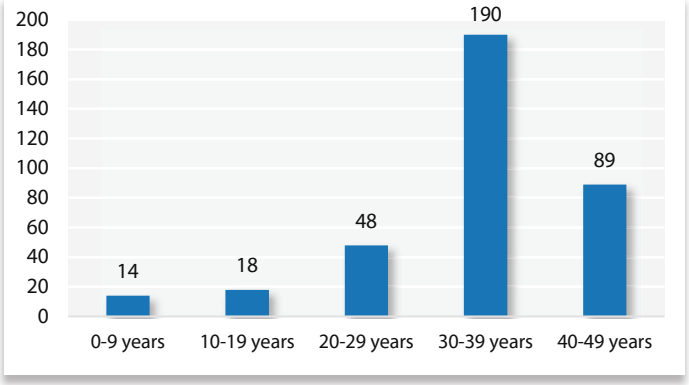
Figure 2.1. **Operating nuclear power reactors included in this report and status**



Of these, reporting countries are home to 344 nuclear power reactors or 99.4% of all reactors in NEA member countries. In total, when non-NEA member countries are included, this report covers 359 of the total operating nuclear power reactors around the world (80%) and 26 of the nuclear power reactors under construction around the world (48%).

Worldwide, 302 out of 448 nuclear power reactors are over 30 years of age (68%) and, of those, 96 are over 40 years of age (22%). The situation is similar for the reporting countries.

Figure 2.2. **Nuclear power reactor age distribution in reporting countries**



5. The total number of reactors currently in operation, according to the present report, is different than what is reported in the IAEA's Power Reactor Information System (PRIS) because one reactor classified as "operating" in PRIS is not counted as such by the governmental authority.

Of the nuclear power reactors covered in this report, 230 reactors are operating in the original term of authorisation or design life and 129 reactors are in long-term operation.

Box 2.1. **Report coverage at a glance**

- 25 total reporting countries; 24 of the 33 NEA member countries (~73%).
- NEA member countries operate 346 of the 448 reactors in operation around the world (77%).
- A total of 344 of the 346 NEA nuclear power reactors are included in the report (99.4%).
- 359 of the 448 operating reactors in the world are included in the report (80%).
  - 230 of these reactors are operating in the original term of authorisation or designlife, and 129 reactors are in long-term operation.
- 26 of the 54 reactors under construction in the world are included in this report (48%).

2.2. Licensing framework

> *"The legislative and regulatory framework shall provide for … a system of licensing with regard to nuclear installations and the prohibition of the operation of a nuclear installation without a licence."*[6]

2.2.1. *Term type*

At the very outset of a nuclear power programme, one decision is made that shapes the approach a country takes to allowing LTO: the approach to authorising initial nuclear power reactor operation. Among responding countries, initial authorisations for nuclear power reactor operation are given either for a specific time-limited authorisation term or for an indefinite duration. Of the responding countries, 60% provide a specific time-limited authorisation term, while 40% provide an indefinite duration authorisation.

2.2.1.1. *Specific time-limited authorisation term*

For the 12 responding countries that provide a specific time-limited authorisation term in the initial authorisation for nuclear power reactor operation, the terms and the rationale behind the terms vary. In general, the length of the specific term falls into three main categories: 10 years, 30 years and 40 years. Two responding countries, however, stated that the term varies based on the design life of the reactor. This is primarily because those countries operate two different types of reactors with two different design lives.

6. CNS, Article 7(2)(ii).

Figure 2.3. **Length of specific term**

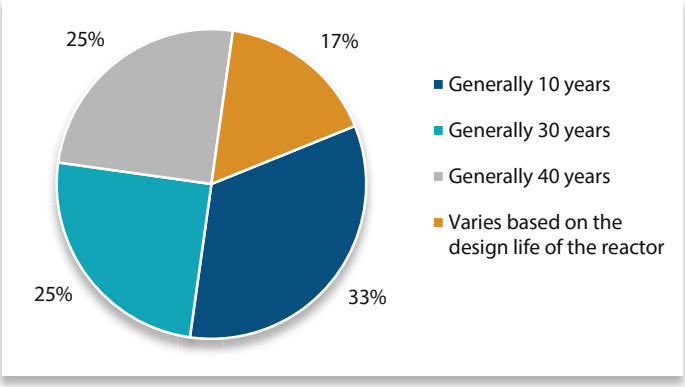


Table 2.1. **Term types for initial and long-term operation**

	Term type	Initial term length (*generally*)	Types of reactors	Notes on initial term length	Term length for LTO (*generally*)	Notes on term length for LTO
Argentina	Specific	10 years	PHWRs	Initial design life of reactors is approximately 30 years	10 years	Life extension programme is designed to allow another 25-30 years
Belgium	Indefinite	Indefinite	PWRs	Initial design life of reactors is 40 years	10 years	Three nuclear power reactors were allowed to generate electricity for ten additional years
Canada	Specific	10 years	PHWRs	Determined on a case-by-case basis; the initial design life of reactors is approximately 30 years	10 years	Refurbishment process can extend the life of a reactor for several decades (e.g. another 30 years)
Czech Republic	Indefinite	Indefinite	PWRs	Initial expected lifespan of reactors is approximately 30 years	Indefinite	No limit on operation as long as the reactor continues to meet its safety obligations subject to continuous safety assessment, a special safety assessment and PSRs, among other requirements
Finland	Specific	30 or 40 years	PWRs and BWRs	Determined on a case-by-case basis, usually based on the initial design life of reactors	Case-by-case basis (in practice, 20 years)	No limit on the number of renewals
France	Indefinite	Indefinite	PWRs	Initial design hypothesis for certain equipment is 40 years	Indefinite	No limit on operation as long as it fulfils its safety obligation, as reviewed during decennial periodic reviews
Hungary	Specific	30 years	PWRs	Based on initial design life of reactors	20 years	Only one extension allowed
Japan	Specific	40 years	PWRs and BWRs	--	20 years	Only one renewal allowed
Korea	Specific	30 years, 40 years and 60 years	PWRs and PHWRs	Based on initial design life of reactors	10 years	No limit on the number of renewals

Table 2.1. **Term types for initial and long-term operation** *(cont'd)*

	Term type	Initial term length (*generally*)	Types of reactors	Notes on initial term length	Term length for LTO (*generally*)	Notes on term length for LTO
Netherlands	Indefinite	Indefinite	PWR	Initial design life of the reactor is 40 years	Case-by-case basis	Operation beyond the 40-year technical design life specified in the Safety Report required an update of the Safety Report, which also required an amendment of the operating licence. The licence remained indefinite though the reactor's technical design life was extended for an additional 20 years
Romania	Specific	30 years	PHWRs	Based on the initial design life of reactors and other factors	Case-by-case basis	No limit on the number of renewals
Russia	Specific	30 years	PWRs, LWGRs and FBRs	Determined on a case-by-case basis according to the initial design life of the reactors and other factors	Case-by-case basis	No limit on the number of renewals
Slovak Republic	Indefinite	Indefinite	PWRs	--	Indefinite	No limit on operation as long as it fulfils its safety obligation, as reviewed during decennial PSRs
Slovenia	Specific	40 years	PWR	Based on the design life of reactors	10 years	Only 2 extensions allowed (for a total of 20 years)
Spain	Specific	10 years	PWRs and BWR	Determined on a case-by-case basis; the initial design life of reactors is approximately 40 years	10 years	Determined on a case-by-case basis
Sweden	Indefinite	Indefinite	PWRs and BWRs	The initial design life of reactors is 40 years	Indefinite	No limit on operation as long as it fulfils its safety requirements, as reviewed during decennial PSRs
Switzerland	Indefinite	Indefinite	PWRs and BWRs	--	Indefinite	No limit on operation as long as it fulfils its safety obligation; operation past 40 years requires proof of safety for LTO and a decennial PSR
Ukraine	Specific	30 years	PWRs	Based on the initial design life of reactors	10-20 years	No limit on the number of extensions
United Kingdom	Indefinite	Indefinite	AGRs and PWR	--	Indefinite	No limit on operation as long as it fulfils its safety obligation, including a decennial PSRs
United States	Specific	40 years	PWRs and BWRs	--	20 years	No limit on the number of renewals

Notes: AGR – advanced gas-cooled reactor; BWR –boiling water reactor; FBR – fast breeder reactor; LWGR – light water graphite reactor; PHWR – pressurised heavy water reactor; PSR – periodic safety review; PWR – pressurised water reactor.

Among the specific terms, some countries base the term on the design life of the types of reactors in operation in the country at issue, with light water reactors (LWRs) traditionally having a design life of 40 years and pressurised heavy water reactors (PHWRs) traditionally having a design life of 30 years. In contrast, other countries base the term on the periodic safety review (PSR) process, specifying that authorisations are only valid for ten-year terms.

All responding countries that utilise a specific term for initial authorisations also require a specific authorisation for approving LTO. This is due to the requirement that at the conclusion of each time-limited period, a new, renewed or amended authorisation is required.

2.2.1.2. *Indefinite duration*

An indefinite duration authorisation is understood to mean an open-ended authorisation, where a nuclear power reactor will be allowed to continue operating as long as it continues to meet the applicable legal and regulatory requirements. For those eight responding countries that provide an indefinite duration authorisation, the authorisation to operate remains in force subject to continuous regulatory oversight, as well as periodic safety reviews carried out either by the licensee or the regulatory body. Such reviews could result in additional safety requirements, or modified or amended licence conditions, or even an order to suspend or terminate operation.

It should be noted that one responding country provides an indefinite authorisation, but also incorporates the evidence for a technical design lifetime of 40 years in a safety report, which forms a part of the initial operation licence.

2.2.2. ***Authorisation or approval***

Whether a country employs a specific time-limited authorisation term or an indefinite duration authorisation often determines whether there is a specific regulatory decision at the time of long-term operation, leading to a specific authorisation for LTO. None of the eight responding countries that employ an indefinite duration authorisation require a specific authorisation for LTO. The existence of a specific authorisation as a prerequisite for allowing long-term operation is a critical component of the licensing framework for LTO and often, but not always, determines other downstream aspects of LTO authorisation, such as whether an environmental review is performed, whether public participation is legally required and whether legal challenges are allowed.

Figure 2.4. **Type of term for initial authorisations**

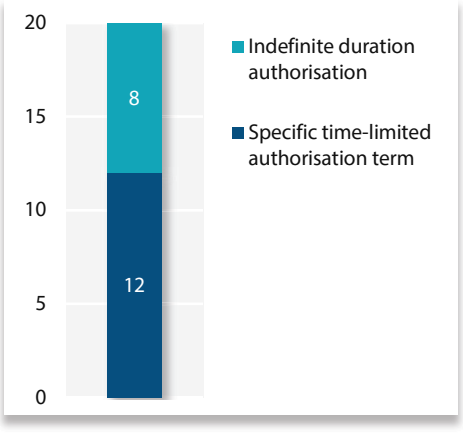
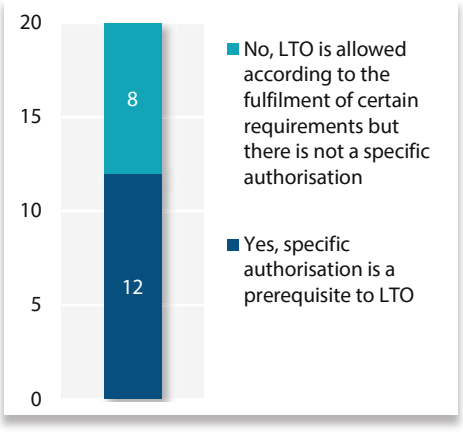


Figure 2.5. **Is there a specific authorisation for LTO?**



2.3. Governmental review and approval

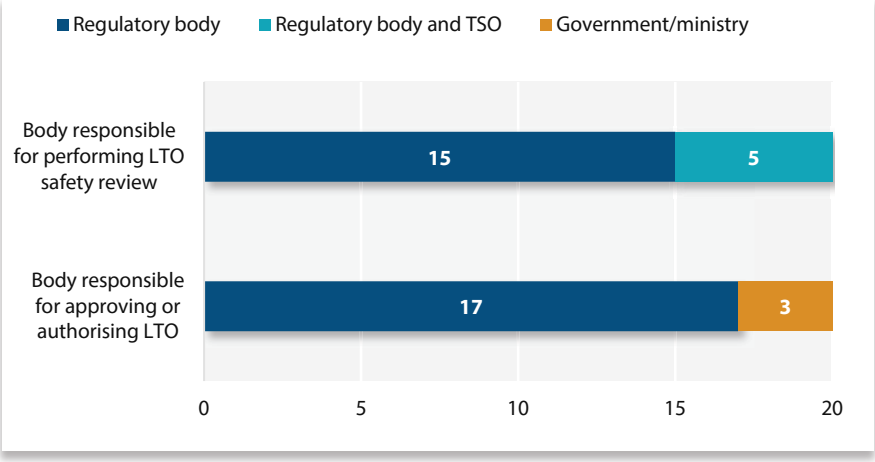
> *"Irrespective of the option chosen by the regulator, the operator's proposal to extend the life of its plant needs to be evaluated by the regulator."*[7]

Of the 20 responding countries that provide for LTO, all stated that their countries' regulatory bodies are involved in the LTO safety review. The regulatory body is entirely responsible for the safety review in 15 of those countries. In five other countries, the safety review is performed in co-ordination by the regulatory body and the technical support organisation (TSO). This difference stems from how the country has structured its regulatory body. Some countries' regulatory bodies have integrated the scientific and technical support services into their own structure and functions, whereas other countries have external TSOs, which are often other governmental bodies. Thus, regardless of whether the regulatory body alone is responsible for the safety review or if it is the regulatory body in concert with the TSO, there is overall consensus on the regulatory body's fundamental role in LTO.

In answering the question related to which governmental body is responsible for issuing the authorisation for LTO, multiple countries stated that there is no specific authorisation given for LTO. Even in those countries, however, most indicate that the regulatory body plays a role in reviewing and ultimately approving elements related to LTO, such as whether safety improvements must be made before continuing operation. In three responding countries, approval or authorisation for LTO is granted either by a ministry or the government on either the binding opinion of the regulatory body or based on the regulatory body's safety assessment.

The analysis here centres on the way each country defines and interprets words such as "authorise/authorisation", "approve/approval", "decide/decision" and even in some sense "review". As explained in the definitions in Chapter 1, "approve" in the present report is understood to mean something less formal than "authorise", and therefore Figure 2.6 should not be interpreted to mean that all countries are specifically authorising LTO. Instead, it should be interpreted as "which governmental body is ultimately responsible for the LTO-review process".

Figure 2.6. **Review and approval authorities for LTO**



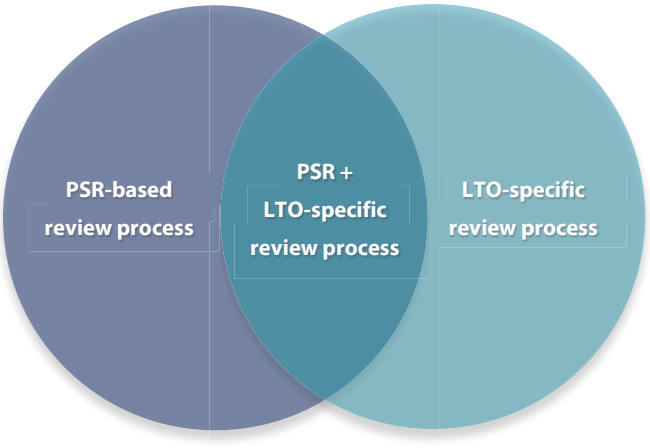
7. NEA (2012), *supra* note 2, p. 11.

2.4. Approaches to LTO

> *"Licence renewal and periodic safety review are two basic regulatory approaches that have been adopted for authorisation of long-term operation of nuclear power reactors. Some countries use aspects from one or both approaches in determining whether, and under what conditions, to allow long-term operation."*[8]
>
> *"Long term operation should be justified by safety assessment and, depending on the State, this justification may take place within a broader regulatory process, such as licence renewal or a periodic safety review".*[9]

It is often explained that there are two basic regulatory approaches to approving or authorising LTO – PSR and licence renewal – and that some countries use aspects of one or both in their regulatory processes. The responses received by countries indicate, however, that the usual PSR and/or licence renewal dichotomy is not the most apt distinction. Instead, a new distinction was necessary for this report because licence renewal is a specific process used by only three responding countries. Of the other nine responding countries that require a specific authorisation for LTO, four countries require a new licence, an additional four countries require an amended or updated licence and one country requires a ministerial order.

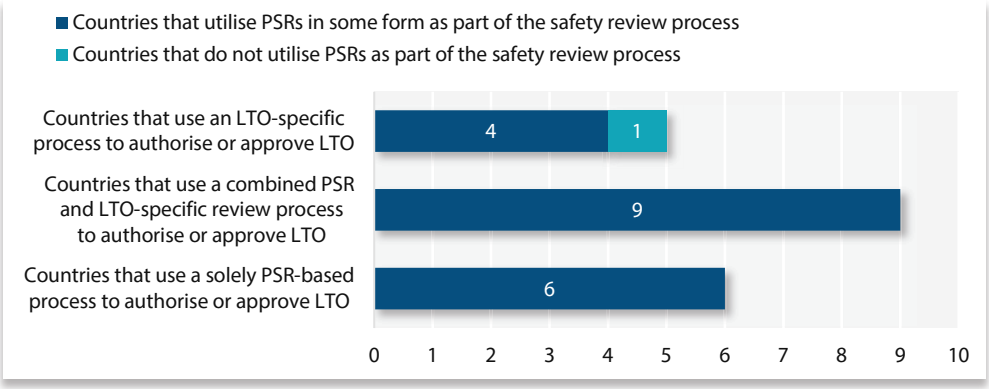
In this report, the approval or authorisation of LTO is therefore analysed as a PSR-based review process and/or an LTO-specific review process. As shown in the figure below, these processes are not necessarily distinct approaches as there are countries that undertake PSRs and also include an LTO-specific review process.



Because not all LTO-specific review processes (whether linked or not to a PSR) result in a licensing action, it is more precise to speak generically of an LTO-specific review process, which may or may not be linked to the decennial PSR, within which an LTO-specific licensing process is a subcategory.

8. Ibid., p. 29.
9. IAEA (2018), *Ageing Management and Development of a Programme for Long Term Operation of Nuclear Power Plants*, Specific Safety Guide No. SSG-48, IAEA, Vienna, pp. 9-10, para. 2.30.

Figure 2.7. **Regulatory approaches to approving or authorising LTO**



Periodic safety reviews are one approach to systematically assessing the safety of a nuclear power reactor[10] and "[i]n many States, PSR forms part of the regulatory system, though the scope and content of the PSR, the manner of its implementation and the regulatory activities relevant to the PSR vary depending on national regulations."[11] A PSR, typically performed every ten years, addresses many factors both related and unrelated to ageing management. Almost all responding countries undertake a PSR process to evaluate safety, though there is no international legal requirement to do so outside of the European Union (EU). Indeed, the EU secondary legislation requires the performance of a PSR at least every ten years, which must aim to "ensur[e] compliance with the current design basis and identif[y] further safety improvements by taking into account ageing issues, operational experience, most recent research results and developments in international standards" among other issues.[12] The 2014 Amended Safety Directive includes an explicit requirement to implement in a timely manner "reasonably practicable safety improvements to existing nuclear installations" in the framework of the PSR.[13] Countries that reported using solely the PSR for the LTO-approval process generally indicated that such PSR would have a more specific focus on aspects related to ageing management.

One country does not undertake PSRs in any way, according to the International Atomic Energy Agency (IAEA):

> some States prefer alternative arrangements to a PSR. For example, some States apply routine comprehensive safety assessment programmes that deal with specific safety issues, significant events and changes in safety standards and operating practices as they arise. … They allow safety to be improved on a continuous basis and avoid the need to implement concurrently a large programme of corrective actions.[14]

This country uses a solely-LTO-specific licensing process focused on an integrated plant assessment (IPA), time-limited ageing analyses (TLAAs) and ageing management programmes (AMPs). An additional four responding countries that do use a PSR approach to assessing safety do not incorporate the PSR into the LTO-review process, instead using an LTO-specific process. These four countries require a specific LTO authorisation resulting from the LTO-specific process – generally either a new or amended licence – as opposed to the other PSR countries which do not require specific LTO authorisation.

10. IAEA (2016), *Safety of Nuclear Power Plants: Commissioning and Operation*, Specific Safety Requirements, No. SSR-2/2 (Rev. 1), IAEA, Vienna, p. 17.
11. IAEA (2013), *Periodic Safety Review for Nuclear Power Plants*, Specific Safety Guide, No. SSG-25, p. 3, para. 2.3.
12. Council Directive 2014/87/Euratom of 8 July 2014 amending Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations, *Official Journal of the European Union* (OJ) L 219 (25 July 2014), Article 8c(b) (2014 Amended Safety Directive).
13. Ibid., Article 8a(2)(b).
14. IAEA (2013), *supra* note 11, p. 4, para. 2.8.

As explained by the NEA, and reinforced by these five countries, the LTO-specific process generally:

> entails a deterministic review of the operator's application considering the scope of the application, the ageing management review, and the safety analysis using time-limiting assumptions and proposed ageing management programmes. The purpose of this assessment is to ensure that the proposed ageing management programmes will provide adequate management of ageing throughout the long-term operation period, such that safety functions are maintained in the plant. This assessment includes the use of audits and inspections to verify acceptability of the proposed ageing management programmes, and validation of safety analysis using time-limiting assumptions.[15]

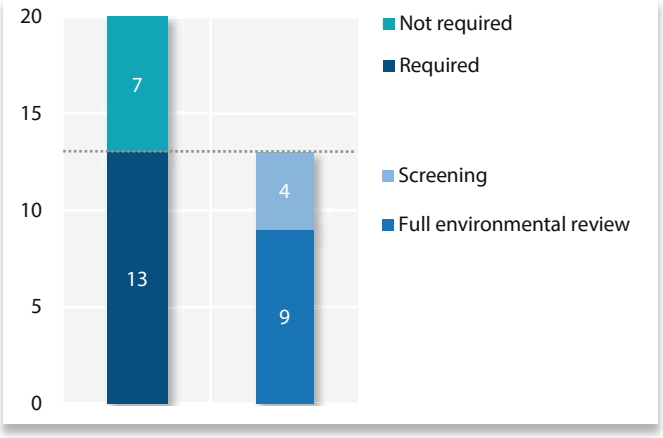
This can be a lengthy process, as indicated by regulatory reviews that sometimes allow for as long as four years to complete, but often require at least one year. One country responded that there are instances where the time for issuance of nuclear power reactor LTO authorisations has sometimes been extended by years for various reasons (for example, complex technical issues or ongoing adjudicatory hearings) and in one case to as much as 11 years.

2.5. Environmental reviews and transboundary notification

The assessment of environmental impacts is a long-standing and widely agreed requirement as part of construction and the commencement of operations for new nuclear power reactors. It is notably enshrined in EU secondary legislation[16] and in international legal instruments, such as the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention).[17]

While the requirement to perform an environmental review is generally clear and consistent in the initial licensing of major nuclear activities, differences exist among responding countries regarding whether there is a requirement to perform such an environmental review as part of the LTO-approval process. Of the responding countries, 65% reported performing some sort of an environmental review as part of the LTO-approval process, while 35% of responding countries reported no such requirement.

Figure 2.8. **Does the LTO-related review include a review of environmental issues**



15. NEA (2012), *supra* note 2, p. 22.
16. 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, as amended by the Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014, OJ L 124 (25 April 2014) (EIA Directive).
17. Convention on Environmental Impact Assessment in a Transboundary Context (1991), 1989 UNTS 310, entered into force 10 September 1997 (Espoo Convention).

This contrasted situation was acknowledged by the NEA in 2012:

> Some countries do not consider environmental issues when evaluating long-term operation. For those that do, there are a variety of different approaches taken to assess environmental issues in the context of long-term operation. The types of issues that may be considered include all or some of the following: uranium fuel cycle impacts, management of waste, surface water quality, aquatic ecology, groundwater use and quality, terrestrial resources, threatened or endangered species, air quality, land use, human health, socioeconomics, postulated accidents, decommissioning and environmental justice.[18]

Even among the 13 countries that reported having some requirement for an environmental review, the situation nonetheless varies. Of those, nine countries reported a legal requirement to perform a full environmental review as part of the LTO-approval process. Such environmental review is often – but not always – referred to as an environmental impact assessment (EIA). This review may be performed by the regulatory body or by another body (e.g. ministry, provincial authority or other governmental body in charge of environmental protection). Depending on the countries' legal frameworks, the concerned environmental review may be integrated in the LTO-specific process or PSR and/or may be performed separately from, or in parallel to, the two aforementioned processes. One responding country, for example, indicated that the radiological impacts of a nuclear power reactor on the environment are assessed as part of the PSR, and other environmental aspects are the subject of a separate EIA, which is mandatory in the licence renewal procedure leading to LTO. Four other countries reported performing an environmental "screening" as part of the LTO-approval process to assess whether the LTO entails any modification(s) that would require the performance of a full EIA.

Seven responding countries reported that no environmental review is required as part of the LTO approval. It should be noted that one of these countries reported that an environmental review is performed in the framework of its decennial periodic safety assessment, such assessment not being formally related to the LTO approval. Another country reported that while an EIA is not required, the radiological impacts of LTO on the environment are reviewed. Two other countries indicated that the performance of an environmental review would only be required in the event of a change to an underlying authorisation granted to the concerned nuclear power reactor.

A total of 19 reporting countries are parties to the aforementioned Espoo Convention. This convention, concluded under the auspices of the United Nations Economic Commission for Europe (UNECE), establishes a requirement for parties to carry out a transboundary EIA when planning certain types of activities that are likely to have a significant environmental impact within the territory of other parties. This Convention applies to a wide range of nuclear energy-related activities and includes an obligation for parties to notify and consult with other potentially affected parties.

Issues related to the application of the Espoo Convention to nuclear energy-related activities in general have already been the subject of several activities led by the parties to the convention, which issued good practice recommendations on this matter in 2017.[19] As of June 2019, however, the specific question of the applicability of the Espoo Convention to the LTO of nuclear power reactors remains subject to substantial legal review in various countries and in the EU, and is the subject of discussions among the parties to the Convention. In 2014, the Meeting of the Parties to the Espoo Convention (Espoo MOP) endorsed findings of the Espoo Implementation Committee concluding that in one specific case "the extension of the lifetime of the nuclear power plant … after the initial licence had expired, should be considered as a proposed activity

18. NEA (2012), *supra* note 2, p. 18.

19. UNECE (2017), *Good Practice Recommendations on the Application of the Convention to Nuclear Energy-related Activities: Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention)*, United Nations, Geneva.

under article 1, paragraph (v), of the Convention".[20] Faced with a growing number of LTO cases pending before the Espoo Implementation Committee, the Espoo MOP decided in 2017 to start drafting guidance on this specific issue and established an ad hoc working group to this effect. The work of the ad hoc group is expected to be completed and submitted for the review of the Espoo MOP in 2020.[21]

Most responding countries reported that the LTO of a nuclear power reactor does not systematically entail carrying out a notification[22] of potentially affected neighbouring states. Although the Convention on Nuclear Safety contains a clear obligation for contracting parties to "consult[] Contracting Parties in the vicinity of a proposed nuclear installation, insofar as they are likely to be affected by that installation and, upon request providing the necessary information to such Contracting Parties",[23] as with its obligations related to the provision of information (see Section 2.7), this obligation only applies to the siting of a proposed nuclear installation and therefore does not apply to LTO.

Three responding countries reported systematically requiring a transboundary EIA, including notification and consultation with potentially affected parties, as part of the LTO-approval process. It is worth noting that not only are these three countries parties to the Espoo Convention, they also assess the LTO of a nuclear power reactor within an LTO-specific process. One country specified that such transboundary notification is performed in accordance with regional guidelines in addition to the Espoo Convention. Six responding countries, however, indicated that transboundary notification could be required if certain criteria are met, such as if the extension of the operating licence could have a significant impact on the environment of another EU member state.

2.6. New safety requirements

> *"When necessary in the context of this Convention, the Contracting Party shall ensure that all reasonably practicable improvements are made as a matter of urgency to upgrade the safety of the nuclear installation."*[24]
>
> *"Comprehensive and systematic safety assessments are to be carried out periodically and regularly for existing installations throughout their lifetime in order to identify safety improvements…"*[25]

A critical component in the review of any request for LTO is whether there is a need for new safety requirements. A question thus arises regarding whether and how to impose such necessary safety improvements during the LTO-approval process. Although all responding countries stated that new safety requirements can be imposed during the LTO-approval process, how the new improvements are imposed differs, and whether the ability to impose new requirements is specifically related to the LTO review. The possibility of imposing new safety

20. Decision VI/2 adopted by the Meeting of the Parties to the [Espoo] Convention on Environmental Impact Assessment in a Transboundary Context at its sixth session, in UNECE (2014), "Report of the Meeting of the Parties to the Convention on its sixth session and of the Meeting of the Parties to the Convention serving as the Meeting of the Parties to the Protocol on its second session, Addendum, Decisions adopted by the Meeting of the Parties to the Convention", ECE/MP.EIA/20/Add.1-ECE/MP.EIA/SEA/4/Add.1, para. 68.
21. See UNECE (2018), "Progress report on the development of guidance on the application of the [Espoo] Convention to the lifetime extension of nuclear power plants", ECE/MP.EIA/2019/10.
22. For the purposes of this report, "notification" is used in the same way as the term is used in the Espoo Convention, meaning that a notification contains information on the proposed activity, including any available information on its possible transboundary impact, the nature of the possible decision; and an indication of a reasonable time within which a response is required, taking into account the nature of the proposed activity. Espoo Convention, Article 3(2).
23. CNS, Article 17(iv).
24. Ibid., Article 6.
25. IAEA (2015), "Vienna Declaration on Nuclear Safety: On principles for the implementation of the objective of the Convention on Nuclear Safety to prevent accidents and mitigate radiological consequences", IAEA Doc. INFCIRC/872, point 2.

requirements related to LTO exists among all the responding countries, even if the requirement is not specifically integrated into the LTO-review process, without an additional regulatory step, such as a backfit.

Responding countries generally fell into one or more of three broad categories:

1) those that can impose new safety requirements as part of the LTO-review process;
2) those that can impose new safety requirements as part of the PSR review process; and
3) those that can impose new safety requirements at any time.

Some countries did not fall perfectly into only one category. A number of countries stated that new requirements could be imposed as part of either the LTO or PSR review process, but that this was because new requirements could be imposed at any time. Because of the difficulty in drawing clear distinctions among the categories, it was determined not to provide exact figures in this area. Country-specific information can nevertheless be found in the country reports provided in Chapter 3.

Of the responding countries, 20% specifically link the imposition of new safety requirements to the LTO-approval process. These countries also tend to have specific time-limited authorisation terms, require a specific authorisation for approving LTO and use a combined PSR and LTO-specific process. Of these countries, some responded that new safety requirements can be imposed only through the LTO-approval process, if those new requirements are specifically related to the period of long-term operation. This often implies that the requirement must be related to ageing management. Any other new requirement not related to the period of long-term operation would have to be imposed through the generic regulatory process (through a backfit, a rulemaking, a licensing action, enforcement, etc.). Regardless of whether the new safety requirement is related to LTO or not, most of these countries have additional regulatory processes to introduce new safety requirements outside of the LTO-review process.

An additional 35% of the responding countries stated that new safety requirements can be imposed through the PSR review process.[26] Through the PSR review process, the operator reviews the overall safety of the plant against current national and international requirements, codes, standards and best practices, among other inputs. As a result of this review, new safety requirements may be imposed by the regulatory body.[27]

Finally, 45% of the responding countries reported that new requirements can be imposed at any time and that it is not necessary to wait for a specific event (like an LTO or PSR review process, though new requirements could be imposed then as well). Often, in these instances, the basis for the imposition of the new requirement was the continuous improvement of safety. The new requirements can either be licensee-specific, often through the use of regulatory orders, or they can be imposed upon all nuclear power reactors through the enactment of new legislation or new regulatory requirements, or the amendment of existing legislation or existing regulatory requirements.

2.7. Provision of information

> *"Public interest in long-term operation projects and decisions is high, so it is desirable that the regulatory framework include guidance with respect to availability of information to the public for both environmental assessments and long-term operation reviews."*[28]

26. It should be noted that this grouping does not distinguish between those countries that evaluate LTO through the PSR and those countries that separate the PSR process from the LTO process.
27. See, e.g. NEA (2002), *The Nuclear Regulatory Challenge of Judging Safety Backfits*, OECD, Paris, p. 8; and IAEA (2013), *supra* note 11.
28. NEA (2012), *supra* note 2, p. 15.

The right of the public to access certain types of information held by public authorities is a well-known general legal principle that is enshrined in the legal frameworks of most, if not all, NEA member countries. The international nuclear safety conventions briefly address the provision of information, but these obligations relate either to events[29] or to specific safety considerations (like emergency preparedness[30] and siting[31]), rather than to a generic requirement to make nuclear safety information publicly available. Instead, provisions regarding access to information are found in a growing number of international environmental instruments, most notably the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention),[32] to which 18 reporting countries are contracting parties, or the newly-adopted Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean (Escazú Agreement),[33] to which 1 reporting country is a signatory.

The Aarhus Convention establishes requirements regarding both access to environmental information held by public authorities on the request of a member of the public, as well as the collection and dissemination of environmental information by public authorities in the absence of a request.[34] The definition of environmental information under the Aarhus Convention is broad and notably includes "factors, such as substances, energy, noise and radiation, and activities or measures, including administrative measures, environmental agreements, policies, legislation, plans and programmes, affecting or likely to affect the elements of the environment …" The general duty for public authorities to disclose environmental information is also found in the EU secondary legislation, mainly in the Directive on Public Access to Environmental Information.[35]

While the overarching national legal frameworks regarding access to environmental information or access to information held by public authorities are not specific to nuclear energy or to LTO, most responding countries reported that such legal frameworks would be applicable within their respective LTO processes. Indeed, most responding countries reported a duty for the decision-making authority to either disseminate information to the public as part of the LTO-approval process, or to make information available to the public on request. The legal duty for the decision-making authority to disseminate information to the public as part of the LTO-approval process is often linked to the legal duty to provide for public participation as part of this process (see Section 2.8), considering that access to certain information may be considered a prerequisite for effective participation. The legal duty for the decision-making authority to provide information to the public on request is commonly limited by specific exemptions regarding confidential information, including for example information that if disclosed would adversely affect public security or commercial interests.

Several responding countries reported that provisions related to access to information in the LTO process are also included in their legal frameworks specific to nuclear energy, typically in their nuclear legislation or in the relevant legal instruments governing the functioning of their nuclear regulatory body. This is also in line with the EU secondary legislation, as the 2014

29. Convention on Early Notification of a Nuclear Accident (1986), IAEA Doc. INFCIRC/335, 1439 UNTS 276, entered into force 27 October 1986 (Early Notification Convention).
30. CNS, Article 16(2).
31. CNS, Article 17(iv); Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (1997), IAEA Doc. INFCIRC/546, 2153 UNTS 357, entered into force 18 June 2001 (Joint Convention), Articles 6(1)(iii) and 13(1)(iii).
32. Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (1998), 2161 UNTS 450, entered into force on 30 October 2001 (Aarhus Convention).
33. Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean (2018), C.N.195.2018, *not yet entered into force* (Escazú Agreement).
34. See UNECE (2014), *The Aarhus Convention: An Implementation Guide*, 2nd edition, United Nations, Geneva, pp. 75-117.
35. Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC, OJ L 041 (14 February 2003) (Directive on Public Access to Environmental Information).

Amended Safety Directive requires EU member states to "ensure that necessary information in relation to the nuclear safety of nuclear installations and its regulation is made available to workers and the general public, with specific consideration to local authorities, population and stakeholders in the vicinity of a nuclear installation".[36]

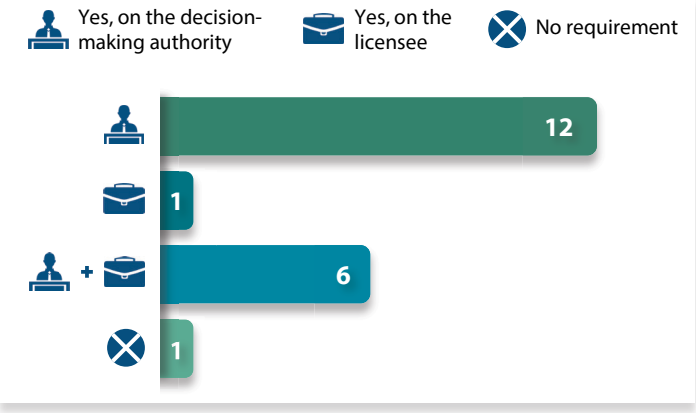
In many instances, as reported by responding countries, the national legal frameworks specific to nuclear energy detail which information has to be disseminated to the public as part of the decision-making processes of nuclear regulatory bodies, such as the publication of safety and/or environmental documentation supporting decisions, draft decisions or of any other relevant document. These requirements often constitute a basis for the dissemination of information by the nuclear regulatory body as part of the LTO process, regardless of the approach employed.

In some responding countries, the legal frameworks specific to nuclear energy include a duty for the licensee to provide information to the public, either through the mandatory dissemination of specific information or the general duty to provide information to the public on request. The aforementioned 2014 Amended Safety Directive includes a requirement for EU member states to ensure that "… the licence holders, within their fields of responsibility, provide in the framework of their communication policy … information on normal operating conditions of nuclear installations to workers and the general public …"[37]

In addition, some responding countries reported that their legal frameworks specific to nuclear energy establish specific bodies, either at a national or local level (for example, local information committees), tasked with providing information to the public on the safety of nuclear power reactors. These bodies, which are active throughout the operational life of a nuclear power reactor, may be involved in the framework of LTO.

Overall, responses indicate that the duty for the decision-making authority to provide access to information to members of the public on request is the most commonly reported legal requirement, which can be found in the legal frameworks of 17 responding countries. The duty for the decision-making authority to disseminate specific information as part of the LTO process is part of the legal frameworks of 13 responding countries. Moreover, seven responding countries reported that their legal frameworks include a legal duty for the licensee to either disseminate specific information or to provide access to information on request as part of the LTO process, most often in addition to the existing legal requirements concerning decision-making authorities.

Figure 2.9. **Is there a legal duty to provide information* to the public during the LTO-approval process?**



* Either through dissemination or on request.

36. 2014 Amended Safety Directive, Article 8(1).
37. Ibid., Article 8(1)(a).

2.8. Public participation

> *"There is now increased interest in many Member States in extending the operating lives of existing reactors and other nuclear facilities … Decisions of such magnitude often involve extensive consultation by national governments or operators with the full range of stakeholders."*[38]

Closely linked to the principle of access to environmental information, the principle of public participation in environmental decision-making is now found in the legal frameworks of most, if not all NEA member countries, and is part of several international legal instruments, including the aforementioned Aarhus Convention.

The so-called second "pillar" of the Aarhus Convention lays down several legal requirements regarding public participation in environmental decision making. The provisions of Article 6 on public participation in decisions to permit or licence specific, listed activities are the most relevant, as "nuclear power stations and other nuclear reactors" are covered.[39] Under Article 6, each party shall provide the public affected or likely to be affected by, or having an interest in, the environmental decision making (the "public concerned") with an opportunity to participate in such decision making. This entails legal requirements to, *inter alia,* notify the concerned public about the decision making early in the process, providing the concerned public with specific information, reasonable time frames for effective participation and the possibility to submit comments either in writing or, as appropriate, in hearings. In addition, each party shall ensure that due account is taken in the final decision of the outcome of the public participation. Article 6(10) requires each party to apply the aforementioned requirements *mutatis mutandis* and where appropriate when updating or reconsidering the operating conditions of aforementioned activities. Legal requirements regarding public participation in environmental decision making are also included in the EU secondary legislation, most notably in the Public Participation Directive,[40] as well as in the EIA Directive and Water Framework Directive.[41] At the time of writing this report, the application of the aforementioned legal frameworks to the LTO of nuclear power reactor is subject to legal review within some NEA member countries and at the EU level, as well as within the framework of the Aarhus Convention.[42]

The NEA observed in its 2012 report on LTO that:

> As for public participation, it should be noted that the involvement level of the public may vary depending on the plant licensing phase (e.g. plant siting and initial licensing as compared with long-term operation) and the country's regulatory framework.

38. IAEA (2011), *Stakeholder Involvement throughout the Life Cycle of Nuclear Facilities*, IAEA Nuclear Energy Series, No. NG-T-1.4, IAEA, Vienna, p. 11.
39. Aarhus Convention, Annex I(1).
40. Directive 2003/35/EC of the European Parliament and of the Council of 26 May 2003 providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC, OJ L 156 (25 June 2003) (Public Participation Directive).
41. Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, OJ L 327 (22 December 2000) (Water Framework Directive).
42. Notably, the Aarhus Convention Compliance Committee issued findings and recommendations in October 2018 concluding that

    > the Party concerned [should] take the necessary legislative, regulatory and administrative measures to ensure that, when a public authority reconsiders or updates the duration of any nuclear-related activity within the scope of article 6 of the [Aarhus] Convention, the provisions of paragraph 2 to 9 of article 6 will be applied.

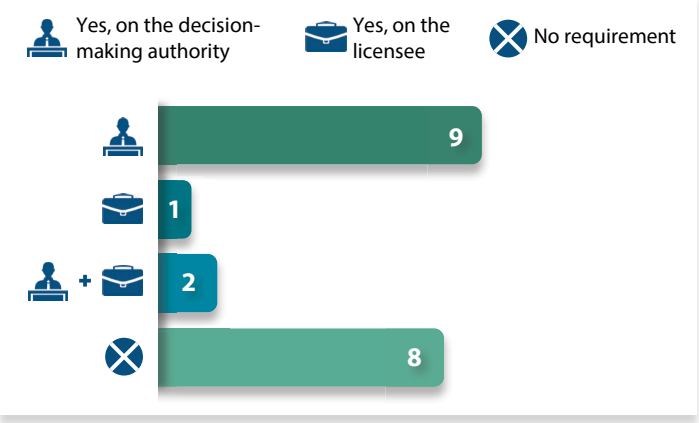
    "Findings and recommendations with regard to communication ACCC/C/2014/104 concerning compliance by the Netherlands, adopted by the [Aarhus Convention] Compliance Committee on 4 October 2018" (2019), ECE/MP.PP/C.1/2019/3, p. 18, para. 89. These findings and recommendations have not yet been adopted by the Meeting of the Parties to the Aarhus Convention.

> In some regulatory frameworks, the public has the right to participate in regulatory reviews through legal processes that entail hearings on certain aspects of the matter under review.[43]

To a large extent, this report echoes the 2012 NEA report as responding countries have described contrasting requirements regarding public participation as part of the LTO-approval process. A majority of responding countries reported that their legal frameworks for LTO include requirements regarding public participation. Such requirements typically rest with the nuclear regulatory body or on another decision-making authority (e.g. public authority in charge of environmental protection or local authority) and may entail public hearings, comments in writing and/or the dissemination of draft decisions for public consultation, as well as requirements for the decision-making authority to take into account the comments received when reaching its final decision. One responding country reported that its legal requirements regarding public participation in the LTO-approval process rests with the licensee and not the decision-making authority, and two responding countries indicated that such legal requirements in their respective frameworks apply to both the decision-making authority and the licensee. Overall, eight responding countries indicated that their legal frameworks do not include any requirement for either the decision-making authority or the licensee to solicit public participation as part of the LTO-approval process.

When considering the underlying approach to LTO approval, as described in Section 2.4 of this report, almost all of the responding countries that approve LTO through an LTO-specific review provide a legal requirement to solicit public participation as part of the LTO-approval process. This appears to be particularly true for countries that approve the LTO of a nuclear power reactor through a new, renewed or amended time-limited licence. Based on the reported information, the situation appears different for countries that use only PSRs to approve LTO. Several responding countries that reported not having a legal requirement to solicit public participation in the LTO-approval process explained that such a situation results from the absence of any such requirement in the legal frameworks governing PSRs.

Figure 2.10. **Is there a legal duty to solicit public participation during the LTO-approval process?**



2.9. Legal challenges

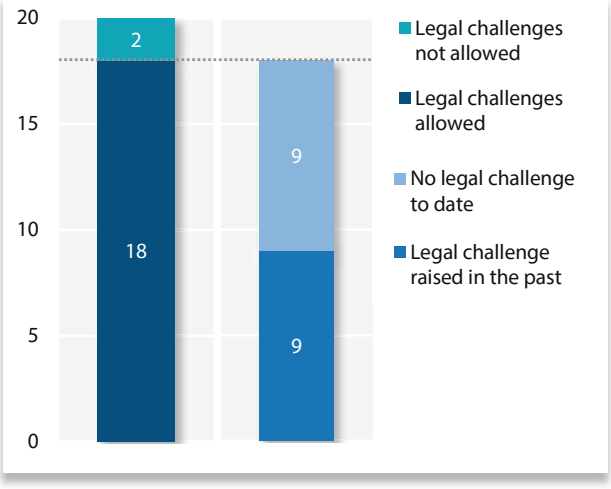
In general, each country's legal framework for legal challenges to licensing decisions in the field of nuclear energy depends on its national legal culture, which in many respects also depends on each country's national culture. This cannot be emphasised enough, especially as it relates to

43. NEA (2012), *supra* note 2, p. 15.

the LTO-approval process. In most instances, the procedures for challenging LTO authorisations, like those for challenging licensing decisions, are determined by civil or administrative procedures that are not unique to nuclear energy or in fact not related to nuclear energy in any way. As is most often the case, the legal framework for challenges to licensing decisions comes from the country's overarching administrative law/procedure or civil law/procedure.

Legal challenges either to an LTO authorisation or approval, or to the LTO-review process itself, are allowed in nearly all responding countries. Although allowed, legal challenges related to the LTO process have been reported in just half of the 18 responding countries.

Figure 2.11. **Are legal challenges related to the LTO process allowed and have legal challenges* been raised in the past?**



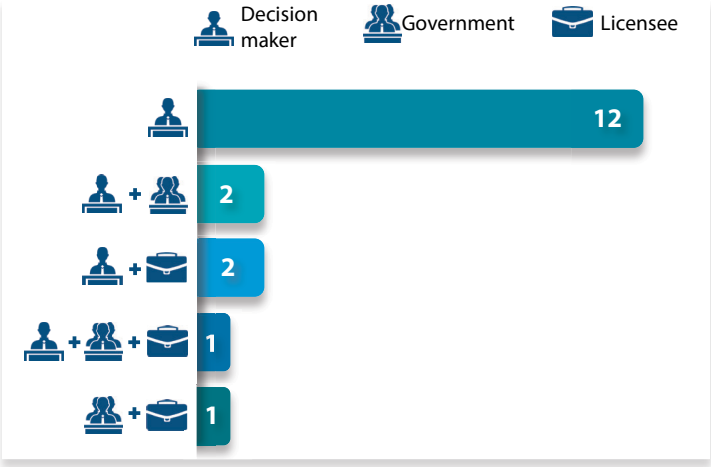
* Only for those that allow legal challenges.

At the outset of any challenge, one question must be answered: who is legally allowed to raise a challenge? The answer is generally anyone with a sufficient interest, which can be individuals, groups of individuals, non-governmental organisations and licensees, among others. Many countries employ general principles of judicial standing in making the determination that a potential party has a sufficient interest in the matter to support their participation in the case. Some countries include a geographical (proximity) standard as one way of demonstrating standing. Geographical zones can vary greatly, from automatic standing for residents within a 3-5 km radius in one country and up to an 80 km radius in another country. Other countries indicate that geography (proximity) is a factor, among others, to be considered when determining a potential party's interest.

When an aspect of the LTO process is challenged, there are a number of potential parties that could be subject to a challenge. Of the countries that allow challenges, almost all provide an opportunity to challenge the party that made the decision at issue. An additional four responding countries each provide an opportunity to raise a challenge against the government as well as the licensee. Six responding countries provide an option to challenge more than one party, whether it is the licensee and the government; the licensee and the decision maker; the licensee, the government and the decision maker; or the decision maker and the government.

The choice of where to direct the challenge depends on what is being challenged and the type of challenge being raised. All responding countries allow challenges to some type of decision made in the context of the LTO process. The term "decision" here should be understood in the broadest sense as including both LTO authorisation decisions as well as decisions to amend or modify licence conditions or requirements on the basis of a PSR- or LTO-related reviews.

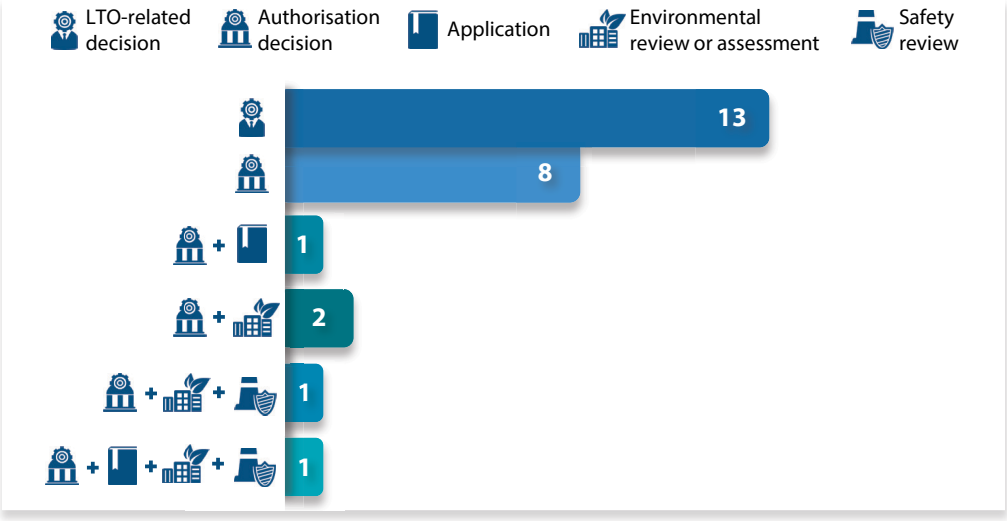
Figure 2.12. **Who are the potential subject parties (i.e. defendants) to a challenge?**



All of the 11 responding countries that have specific time-limited authorisation terms provide for an opportunity to challenge that decision. One country that requires an amended licence as part of the LTO process also provides for an opportunity to challenge that authorisation decision. The additional five countries that allow challenges to be raised to LTO-related decisions have indefinite licences and therefore there is no authorisation decision to challenge. Thus, the opportunity relates to other LTO-related decisions, such as decrees or additional provisions, or licence modifications or amendments, or other process-related decisions taken during the PSR- or LTO-related review.

A variety of other challenges are also possible in a number of responding countries, not all of which are encompassed in Figure 2.13. For example, some countries allow constitutional challenges or challenges to the laws governing LTO. Some countries allow challenges to the safety review while a few others also allow challenges to either the environmental review or assessment (or a decision that stems therefrom). Not surprisingly, the two responding countries that allow challenges to be raised against the LTO application also allow a challenge to be raised against the licensee.

Figure 2.13. **What are the potential subjects of a challenge?**

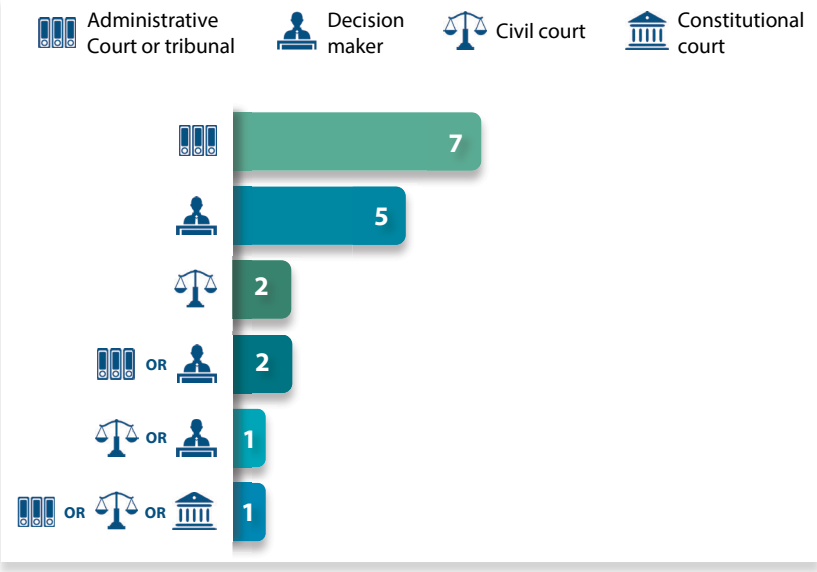


The majority of challenges are based in administrative procedure. This flows from the fact that the majority of the subject parties at issue are the governmental decision makers. In only one instance is the decision maker to be challenged though a civil procedure rather than an administrative procedure. Again, similar to other discussions related to subject parties and subject matters of the challenge, some countries offer more than one type of opportunity for challenge. Two responding countries provide both a civil and an administrative procedure, while one responding country provides an administrative, civil and constitutional procedure, with the choice of procedure depending on the subject matter and subject parties being challenged.

Figure 2.14. **What kind of procedure is the challenge?**

Finally, an important question is where the challenge should first be raised. Some countries allow, or in some cases even require, that legal challenges first be raised to the administrative body that made the decision, i.e. the decision maker. Other countries have no first level administrative process, with challenges raised first, and in some cases only, before a civil court. Others have an intermediate approach, requiring challenges to be raised instead before an administrative court or tribunal, for example.

Figure 2.15. **Where should the challenge first be raised?**



All 16 responding countries that provide for an administrative law procedure require that those challenges first be raised either before an administrative court or tribunal, or to the decision maker.

The appeal process varies considerably among responding countries. Some countries have a multi-layered process with challenges first raised to the decision maker – with the first appeal to an appellate body within the decision maker – then an appellate civil court and finally the country's supreme court. Other countries, however, do not provide for the possibility of appeals from the court of first instance. The majority of responding countries that provide the opportunity for legal challenges do, however, offer the possibility of at least one appellate option.

Chapter 3. **Country reports**

Argentina

Basic information

Argentina has three nuclear power reactors operating at three nuclear power plants (NPPs) as of December 2018. All three of Argentina's reactors are pressurised heavy water reactors (PHWRs). The three nuclear power reactors are operating at the following lifetimes:

- 0-9 years 1
- 30-39 years 1
- 40-49 years 1

One of Argentina's nuclear power reactors is operating past its original licensed life as of December 2018. Another nuclear power reactor is shut down for life extension. The third nuclear power reactor started its commercial operation in 2016.

Argentina has one nuclear power reactor under construction.

Authorisation information

Designed and authorised periods

Until 2003, operating licences in Argentina did not have a defined time limit. Following a review to analyse and update the two then-operating NPP licences, the Board of Directors of the nuclear regulatory body approved two major changes:

- providing a specific ten-year period for operating licences; and
- requiring a formal periodic safety review (PSR) for granting a new operating licence.

These changes were incorporated into a new licence for the Atucha I NPP in 2003 and for the Embalse NPP in 2007. The Atucha II NPP was given a five-year licence in 2016 with the intention that it be extended for a ten-year period, conditioned upon the successful completion of a set of regulatory requirements.

The regulatory practice in Argentina considers long-term operation (LTO) as operation beyond an established time frame defined by the licence term or the original plant design. The incorporation of this practice into regulatory standards is under development.

Table 3.1. **Nuclear power reactors in Argentina**

Reactor licensing information

	Online	New licence given under PSR framework	Expiration of operating licence	Reactor shut down for life extension	Licence issued for LTO	Current licence expires
Atucha I	1974	2014	2018[1]		2018	2024
Embalse	1983	2007[2]	2017	2016		2019
Atucha II	2016[3]	2016	2021/2026			

1) Original design lifetime reached. 2) The 2007 licence was amended in 2016 to cover the period of refurbishment activities until 2019. 3) Between 2014 and 2016, Atucha II operated under a commissioning licence.

To extend operation after the expiration of the ten-year operating licence, a PSR must be submitted and approved by the nuclear regulatory body to extend operation for an additional ten years. Subsequent renewals are allowed on the basis of the PSR. The life extension programme is designed to extend the operational lifetime of the Argentinian nuclear power reactors for another 25-30 years.

Terminology

In Argentina, there is no specific terminology for the process of extending the licensed life of a nuclear power reactor. The period of nuclear power reactor operation after the originally licensed life is called "long-term operation".

Main laws/regulations/documents for initial and long-term/extended operation

The legal and regulatory framework in Argentina for nuclear power reactor authorisations is comprised of the following:

- the National Law on Nuclear Activity (Law No. 24,804/97) ("National Nuclear Law");
- Regulatory Decree No. 1390/98 (implementing the National Nuclear Law);
- Nuclear Regulatory Authority Standards, AR 0.0.1 "Licensing of Type I Installations"; and
- Nuclear Regulatory Authority Standards, AR 3.7.1 "Documentation to be submitted to the Regulatory Authority prior to the commissioning of a nuclear power plant".

The main law governing LTO in Argentina is the National Law No. 26,566/2009, *Decláranse de interés nacional las actividades que permitan concretar la extensión de la vida de la Central Nuclear Embalse* [Declaration of national interest in the activities to allow the life extension of the Embalse NPP]. This Law also applies to Atucha I and II as well as to the construction of any other NPP under the responsibility of Nucleoeléctrica Argentina Sociedad Anónima (NA-SA) (the state operating company).

Responsible government bodies

The Nuclear Regulatory Authority (Autoridad Regulatoria Nuclear – ARN) is responsible for reviewing the application for licence renewal and also for issuing the renewed licence.

Application and review timing

There is no defined date by which a request for LTO must be submitted or by which the ARN must complete its review. By regulatory practice, a request to extend the operating licence has been submitted five years in advance of the original licence expiration.

Scope of review

Safety

As previously mentioned, since 2003 a PSR is a necessary condition for licence renewal. PSRs must be conducted every ten years and the results of the PSR must be approved by the ARN before a licence renewal request will be granted.

The scope of the safety review/assessment is based on two International Atomic Energy Agency (IAEA) documents:

- IAEA (2013), *Periodic Safety Review for Nuclear Power Plants*, Specific Safety Guide, IAEA Safety Standards Series No. SSG-25, Ch. 3, "Input from the Periodic Safety Review in Assessing Long Term Operation or Licence Renewal", IAEA, Vienna; and
- IAEA (2009), *Ageing Management for Nuclear Power Plants*, Safety Guide, IAEA Safety Standards Series No. NS-G-2.12, IAEA, Vienna.

The main document governing LTO is the licensing basis document, which is developed on a case-by-case basis. The licensing basis document is developed by the ARN following an assessment of the following, as listed in the licensing basis document:

- an updated safety analysis report;
- time-limited ageing analyses (TLAA);
- a safety improvement programme;
- plant programmes to support the safety factors relating to plant design;
- the actual condition of the systems, structures and components (SSCs) important to safety;
- equipment qualification and ageing; and
- programmes for promoting safety culture.

Special attention is given to the plant safety factors to ensure that the licensing basis remains valid during the period of LTO. The plant ageing assessment includes both a condition assessment as well as a life assessment, which are part of an integrated strategy to assess the ageing degradation of the active and passive components and ensure that the SSCs are able to be maintained and that the licensing basis remains valid during the period of LTO.

At the conclusion, the licensing basis document is jointly signed by NA-SA and the ARN to define the licensing of the project.

Environmental

The scope of the environmental review for LTO is defined by the Environmental Authority in the province where the NPP is located and is the same as that which is performed for the initial operating licence. An environmental impact assessment (EIA) is required for LTO. The ARN is only involved in the radiological aspects of the report, which are mainly included in Chapter 2 of the Updated Safety Analysis Report. The non-radiological aspects of the EIA are under the jurisdiction of the provincial government authorities.

New safety requirements

New safety requirements can be imposed upon the licensee during the authorisation process for LTO. The regulatory body can impose, upon its decision, new safety requirements through the issuance of "regulatory requirements", which have the same enforceability as regulatory standards.

Transboundary notification

The LTO authorisation process does not include a requirement for transboundary notification and consultation.

Public participation

Public participation is allowed during the LTO authorisation process. The legal duty to solicit public participation falls on the decision-making authority; the licensee does not have any legal duty to solicit public participation. The decision-making authority in this instance, however, is not the ARN; instead, the decision maker is the provincial Environmental Authority. Therefore, public participation is not required during the licensing process conducted by the ARN.

The legal duty for the decision-making authority is found in environmental regulations both at the national and sub-national level, which are enforced by the national and provincial governments. At the national level, this is found in the General Environmental Law (Law No. 25,675), Articles 19-21.

Stakeholders may participate in the LTO authorisation process. Under the national General Environmental Law, this is defined to include individuals and non-governmental organisations, academic and scientific organisations, as well as different actors from different sectors having an impact on the environment.

The specific type of participation is regulated at the regional/provincial level. In general, participation may be through public hearings and/or a public audience.

Access to information

Both the decision-making authority and the licensee have a legal duty to provide information to the public during the LTO process. The legal duty is found in:

- the Right of Access to Public Information (National Law 27,275);
- National Decree No. 1172/2003 on Access to Public Information; and
- the ARN's Director Board Resolution 67/04.

The ARN must provide all safety-related information that is considered "public", which is typically the Updated Safety Analysis Report. Any other information is determined on a case-by-case basis.

In addition, the provincial government authority must typically provide the EIA and any supporting documents.

The licensee must provide all information as requested by the public, on a case-by-case basis, with exceptions for certain information, such as confidential information.

Legal challenges

Legal challenges to LTO authorisations are allowed. LTO authorisations have been subjected to legal challenges.

There are specific procedures to challenge LTO authorisations, but these are not unique procedures to nuclear power. These are civil, administrative and environmental procedures and are found in:

- the National Constitution of the Argentine Republic, Article 43;

- the National Nuclear Law, Articles 28 and 29;[1]
- the Administrative Procedure Law (Law No. 19,549);
- the General Environmental Law; and
- provincial regulations.

Any affected parties, the ombudsman and the associations that meet the objectives (for example, the environment) can challenge an authorisation for LTO. There is no geographical component to establishing standing.

In addition, a judge can unilaterally declare a rule/regulation on which the harmful act is based to be unconstitutional. For example, a judge in a contentious-administrative jurisdiction could nullify an administrative act granting a licence renewal, as can the Supreme Court of Justice.

The licensee and the ARN are the subject parties of the challenge. The application and the authorisation decision are the subjects of the challenge.

A request for nullity of an administrative act granting a licence can be made when:

- the act damaged rights and freedoms protected by the Constitution;
- the act was undertaken by a government agency that lacked subject matter or territorial jurisdiction;
- the act constituted a criminal offence or was issued as a result of a criminal offence;
- the act dictated totally and absolutely disregarding the legally-established procedures;
- the acts dictated without the rules that contain the essential rules for the formation of the will of the collegiate bodies;
- the express or suspected acts contrary to the legal system by which faculties or rights are acquired when the essential requirements for their acquisition are lacking; or
- there is any other reason that is expressly established in a provision of legal rank.

The challenge can be raised after each of the licensing stages have been completed and the authorisation granted through the administrative act of the regulatory body. The challenge must first be raised with the ARN.

The next level of appeal is either the Administrative, Federal or Civil Court (depending on the nature of the challenge). The basis for the appeal is the same as for the initial challenge (as listed above).

The next level of appeal is to the Supreme Court of Justice, where the appeal must relate to injury to rights and freedoms protected by the Constitution. This is the body of final resort.

1. Article 28 establishes the Administrative Procedural Law as it applies to the ARN's relationship with the public and Article 29 requires the ARN to notify and issue preventive measures in the event of a violation of the National Nuclear Law.

Belgium

Basic information

Belgium has seven nuclear power reactors operating at two nuclear power plants (NPPs) as of June 2019. All seven nuclear power reactors are pressurised water reactors (PWRs). These seven nuclear power reactors are operating at the following lifetimes:

- 30-39 years 4
- 40-49 years 3

Belgium has three nuclear power reactors operating past their original designed life as of June 2019. The current legal framework in Belgium does not allow for any other nuclear power reactor to enter the period of long-term operation (LTO) in the future.

At present, Belgium does not have any nuclear power reactors under construction.

Authorisation information

Designed and authorised periods

The initial licences for nuclear power reactor operation in Belgium are granted with an indefinite term. These licences are issued in the form of a Royal Decree, on the positive advice of the Federal Agency for Nuclear Control (FANC). Therefore, the operation of a nuclear power reactor beyond its original designed life is assessed through the fourth decennial periodic safety review (PSR) for each concerned nuclear power reactor and not through a renewal of the initial licence, which remains valid during the LTO period.

The FANC issued a strategy note for the LTO of Belgian nuclear power reactors, with a scope limited to the nuclear power reactors that will enter the period of LTO following the upcoming fourth PSR. The strategy note for the Doel 1 and 2 and the Tihange 1 nuclear power reactors is referenced as FANC Note No. 008-194. This strategy note requires the operator to provide for an ageing management strategy, a review of the time-limited ageing analyses (TLAAs) and a design review compared to the current standards, with a view to define the required design upgrades in addition to the PSR methodology provided by the International Atomic Energy Agency (IAEA).

Terminology

In Belgium, the period of nuclear power reactor operation after the original designed life is referred to as the period of long-term operation or LTO. There is no specific terminology to refer to a specific process of authorising the operation of a nuclear power reactor beyond its initial designed life, since such process is included within the PSR framework.

Main laws/regulations/documents for initial and long-term/extended operation

The legal framework for LTO in Belgium is provided by the Act of 31 January 2003 on the Progressive Phase-out of Nuclear Energy for the Industrial Production of Electricity (Nuclear Phase-out Act), as amended by the:

- Act of 18 December 2013 (2013 Amending Act);
- Act of 28 June 2015 (2015 Amending Act); and

- Act of 12 June 2016 (2016 Amending Act).

The Nuclear Phase-out Act defines the maximum electricity generation period for all NPPs in the country. In accordance with its provisions, the Doel 1 and 2 and Tihange 1 nuclear power reactors are allowed to generate electricity for a total period of 50 years, while all other nuclear power reactors have to cease operation after 40 years. As a result, it is expected that all nuclear power reactors operated in Belgium will cease operation within the 2022-2025 period. Therefore, at present, LTO in Belgium is only authorised for an additional period of ten years, which may not be subsequently extended.

Responsible government bodies

The FANC – the national nuclear regulatory body – is the body responsible for approving the final action plan submitted by the licensee with regard to LTO, with the support of its technical support organisation Bel V, and after receiving a positive advice by an independent Scientific Council. The FANC does not issue any specific authorisation for LTO, as such approval is granted through the PSR process. However, following the PSR process, a Royal Decree has usually been issued to provide for the additional operating requirements enabling the LTO, which complement the initial licences for operation of the concerned nuclear power reactors. Two such Royal Decrees were adopted on 27 September 2015 regarding the Tihange 1 nuclear power reactor and the Doel 1 and 2 nuclear power reactors.

Application and review timing

FANC Note No. 008-194 establishes a schedule for the licensee to provide the relevant information for LTO as part of the PSR. In accordance with this schedule, the LTO-related documents must be submitted approximately four years prior to the PSR anniversary date.

In addition, FANC Note No. 008-194 indicates that an agreement between the FANC and the licensee on the required design upgrades should be reached three-and-a-half years prior to the PSR anniversary date. These target schedules have been successfully met regarding the LTO for the Tihange 1 and Doel 1 and 2 nuclear power reactors.

Scope of review

Safety

The LTO-related safety assessment in the PSR notably includes a review of ageing management issues and plant programmes for maintenance, equipment qualification, in-service inspection, surveillance and monitoring, and monitoring of chemical regimes. It also includes a TLAA review and a design review compared to the current standards. This LTO-related review is, however, narrower in scope than the initial safety review for the operation of NPPs, where the entire licensing basis is assessed.

The main nuclear safety-related document to be submitted by the licensee to justify the LTO as part of the PSR is referred to as an LTO Synthesis Report.

Environmental

The FANC performed an environmental screening during the fourth PSR for the Tihange I and Doel I and II nuclear power reactors, to confirm that the hardware modifications related to the LTO action plans did not require an environmental impact assessment (EIA) to be carried out under the European Union (EU) EIA Directive.[1]

1. 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* (OJ) L 124 (25 April 2014) (EIA Directive).

The licensee is also requested to submit an environmental impact screening note regarding the hardware modifications required as part of the LTO action plan.

New safety requirements

The FANC may decide to impose new safety requirements upon the licensee during the PSR process. More generally, the FANC continuously updates the regulatory basis to comply with the relevant international standards. Discussions are held with stakeholders on new draft regulations, and operators are requested to update the design of their installations as part of the PSR process, taking into account upcoming regulations that may not yet have been adopted.

Transboundary notification

The Belgian legal framework does not provide for a systematic requirement to perform a transboundary notification as part of the PSR of a nuclear power reactor. However, as previously mentioned, the FANC performed an environmental screening during the fourth PSR for the Tihange I and Doel I and II nuclear power reactors to confirm that the hardware modifications related to the LTO action plans did not require an EIA to be carried out under the EIA Directive.

Public participation

In Belgium, the PSR process does not include a requirement either for the FANC or the licensee to solicit public participation.

Access to information

Likewise, the PSR process does not include any legal duty for either the FANC or the licensee to provide specific information to the public regarding the LTO-related aspects of the PSR. However, in accordance with the Act of 5 August 2006 on Public Access to Environmental Information, members of the public may request access to information held by public authorities, such as the FANC, as such information relates to the environment.

In practice, the FANC published several documents related to the LTO of the Doel 1 and 2 and Tihange 1 nuclear power reactors on its website, including the environmental screening documents prepared by the licensee and the FANC.

Legal challenges

Several types of legal challenges may be brought against LTO in Belgium, and such challenges have already been raised to oppose the LTO of the Tihange I and Doel I and II nuclear power reactors.

The first type of challenge that may be brought in relation to LTO is a constitutional challenge against the legislative acts allowing for the possibility granted to the licensee to generate electricity from its nuclear power reactors beyond 40 years of service, in this instance the Nuclear Phase-out Act or its amending acts. The Belgian Constitutional Council reviews such challenges on the basis of the constitutional validity of the concerned legislation and issues its ruling in first and last instance.

A constitutional challenge was introduced by two Belgian non-governmental organisations (NGOs) against the 2015 Amending Act on 5 January 2016, and the case remains pending as of October 2018.

The second type of challenge that may be brought in relation to LTO is an administrative challenge against the Royal Decree adopted following the PSR covering the period of LTO, which establishes the additional operating requirements complementing the initial licences for the

operation of nuclear power reactors. Such challenges may be brought before the Belgian Council of State (Conseil d'Etat), which issues its ruling in the first and last instance. Administrative challenges to Royal Decrees may be brought by any person or organisation directly affected by the concerned administrative decision within 60 days after its publication in the *Official Gazette*. There is no specific geographical component determining the standing for such challenges, although the court may take geography into account in its determination of whether claimants are directly affected by the decision. The legal basis for challenging Royal Decrees is governed by the general administrative law. The Belgian State and the FANC act as defendants in such proceedings.

Administrative challenges have been introduced by a Belgian NGO before the Council of State on 1 December 2012, seeking the suspension and annulment of the two Royal Decrees of 27 September 2015 and of the associated FANC decisions of 30 September 2015. On 16 June 2016, the Council of State decided to reject the request for suspension of these Royal Decrees due to the lack of urgency, and the procedure regarding annulment remains pending as of October 2018.

The third type of challenge that may be brought concerning LTO is a request for an environmental injunction before the Belgian civil courts. This is a specific civil procedure governed by the Act of 12 January 1993 establishing a Right of Action for the Protection of the Environment. In this instance, claimants may request an order to discontinue the operation of a nuclear power reactor on grounds that such operation violates provisions of the Belgian national environmental law. Contrary to the rules regarding administrative challenges, claimants are not bound by any specific time limit to request an injunction. The defendant in such proceedings is the licensee that operates the concerned nuclear power reactor. Such challenges should be introduced in the first instance before the President of the Court of First Instance (Tribunal de première instance) and may be appealed before the Court of Appeals (Cour d'appel). The Court of Appeals' decision may be appealed to the Court of Cassation (Cour de cassation), the highest civil court of Belgium, on a limited number of legal grounds, precluding the submission of new evidence.

Canada

Basic information

Canada has 19 nuclear power reactors operating at 4 nuclear power plants (NPPs) as of June 2019. All 19 of Canada's reactors are pressurised heavy water reactors (PHWRs) of the Canada Deuterium Uranium (CANDU) design. The 19 nuclear power reactors are operating at the following lifetimes:

- 20-29 years 4
- 30-39 years 9
- 40-49 years 6

The pressure tubes that comprise the core of a CANDU reactor are, typically, the major, life-limiting components. There is no set time at which they enter a period that could be called long-term operation (LTO). However, as they approach a life of approximately 30 years, they require careful reassessment to demonstrate ongoing, safe operation. The life of the reactor can be extended for several decades (e.g. another 30 years) through refurbishment by replacing the pressure tubes and modernising and enhancing other major equipment and systems. Following the refurbishment, the reactor is considered new, to a large degree, in terms of known, life-limiting factors.

For the purposes of this summary, nuclear power reactors in Canada are assumed to be in extended operation once they commence operation after a refurbishment involving the replacement of the pressure tubes. Five of Canada's nuclear power reactors have entered extended operation as of June 2019; they have been refurbished and have had their pressure tubes and other components replaced. Four nuclear power reactors that are currently operating are not planned to be refurbished; their ongoing safe operation in the near- to medium-term is being confirmed through detailed assessments. The other ten operating nuclear power reactors that have not entered extended operation already are planned to be refurbished and will enter extended operation in each of the following time periods:

- 2020-2029 8
- 2030-2039 2

Canada has no nuclear power reactors under construction.

Table 3.2. **List and status of nuclear power plants in Canada**

Reactor	Licensee		Gross capacity (MW)	Construction start	First criticality	First grid connection	Operating status
Bruce A, Unit 1	Bruce Power		830	1 Jun. 1971	17 Dec. 1976	14 Jan. 1977	Operating
Bruce A, Unit 2			800	1 Dec. 1970	27 Jul. 1976	4 Sep. 1976	Operating
Bruce A, Unit 3			830	1 Jul. 1972	28 Nov. 1977	12 Dec. 1977	Operating
Bruce A, Unit 4			830	1 Sep. 1972	10 Dec. 1978	21 Dec. 1978	Operating
Bruce B, Unit 5	Bruce Power		872	1 Jul. 1978	15 Nov. 1984	2 Dec. 1984	Operating
Bruce B, Unit 6			872	1 Jan. 1978	29 May 1984	26 Jun. 1984	Operating
Bruce B, Unit 7			872	1 May 1979	7 Jan. 1986	22 Feb. 1986	Operating
Bruce B, Unit 8			872	1 Aug. 1979	15 Feb. 1987	9 Mar. 1987	Operating

Table 3.2. **List and status of nuclear power plants in Canada** *(cont'd)*

Reactor	Licensee		Gross capacity (MW)	Construction start	First criticality	First grid connection	Operating status
Darlington, Unit 1	Ontario Power Generation		934	1 Apr. 1982	29 Oct. 1990	19 Dec. 1990	Operating
Darlington, Unit 2			934	1 Sep. 1981	5 Nov. 1989	15 Jan. 1990	Operating
Darlington, Unit 3			934	1 Sep. 1984	9 Nov. 1992	7 Dec. 1992	Operating
Darlington, Unit 4			934	1 Jul. 1985	13 Mar. 1993	17 Apr. 1993	Operating
Gentilly-2	Hydro-Québec		675	1 Apr. 1974	11 Sep. 1982	4 Dec. 1982	Safe storage
Pickering, Unit 1	Ontario Power Generation		542	1 Jun. 1966	25 Feb. 1971	4 Apr. 1971	Operating
Pickering, Unit 2			542	1 Sep. 1966	15 Sep. 1971	6 Oct. 1971	Safe storage
Pickering, Unit 3			542	1 Dec. 1967	24 Apr. 1972	3 May 1972	Safe storage
Pickering, Unit 4			542	1 May 1968	16 May 1973	21 May 1973	Operating
Pickering, Unit 5	Ontario Power Generation		540	1 Nov. 1974	23 Oct. 1982	19 Dec. 1982	Operating
Pickering, Unit 6			540	1 Oct. 1975	15 Oct. 1983	8 Nov. 1983	Operating
Pickering, Unit 7			540	1 Mar. 1976	22 Oct. 1984	17 Nov. 1984	Operating
Pickering, Unit 8			540	1 Sep. 1976	17 Dec. 1985	21 Jan. 1986	Operating
Point Lepreau	NB Power		705	1 May 1975	25 Jul. 1982	11 Sep. 1982	Operating

Source: Canadian Nuclear Safety Commission.

Authorisation information

Designed and authorised periods

In Canada, the Canadian Nuclear Safety Commission (Commission or CNSC) has discretion to determine the term of any licence, and it generally grants ten-year licences for the operation of major facilities. Licence renewals, which encompass periodic safety reviews (PSRs), are the mechanism for continually assuring safe operation as the reactor ages.

Licence renewal is allowed as long as the Commission decides, given that it has flexibility in determining licence durations and conditions. If a nuclear power reactor is ageing to the point where safety could be a concern, or approaching the time when the licensee has indicated it will cease operating it, the Commission can impose specific requirements to continually assure safety. For example, the Commission can impose requirements related to detailed reassessments of the ongoing safety of pressure tubes or other components, or it could impose requirements related to assuring that the licensee will approach the end of life in an orderly fashion with sufficient resources and regard for safe operation and shutdown. For nuclear power reactors that will undergo extended operation, the Commission can also impose specific requirements related to preparation for, execution of, and start-up after the refurbishment. All of these requirements would be included in the licence. The Commission has exercised these powers for the renewals of licences of nuclear power reactors that have, or are being, refurbished.

As reactors approach an age of approximately 30 years, flexible licence periods allow the Commission to align the period and any specific licence requirements with the planned time frames for either permanent shutdown or refurbishment.

Terminology

In Canada, the process of nuclear power reactor relicensing is called "licence renewal". It should be noted, however, that licence renewal generally occurs every ten years and is therefore not always related to extended operation.

No single term has been used exclusively for the period of operation up to and around 30 years, although terms such as continued operation or extended operation have been used. Although the term "long-term operation" could be used to describe operation following the

replacement of pressure tubes, that term is not used widely either; reactors that have had pressure tubes replaced would be more accurately described as being in extended operation or operating in a refurbished state.

Main laws/regulations/documents for initial and long-term/extended operation

The legal and regulatory framework in Canada for nuclear power reactor initial authorisations includes the following:

- the Nuclear Safety and Control Act (NSCA) (S.C. 1997, c. 9), and regulations made pursuant to it, such as:
  - General Nuclear Safety and Control Regulations (SOR/2000-202);
  - Radiation Protection Regulations (SOR/2000-203);
  - Class I Nuclear Facilities Regulations (SOR/2000-204);
  - Nuclear Security Regulations (SOR/2000-209);
- the Canadian Environmental Assessment Act 2012 (S.C. 2012, c. 19, s. 52). This Act is a "planning tool" to consider the potential adverse environmental effects of carrying out a project, including a project to site, construct and operate a nuclear reactor; it enables the federal government to consider many aspects of a project, such as "alternative means of carrying out the project". Extended operation is not a project that is subject to this assessment process;
  - under its predecessor legislation, the Canadian Environmental Assessment Act 1992 (S.C. 1992, c. 37), an environmental assessment (EA) for extended operation was required, and several extended operation projects have been the subject of an EA prior to licensing under that legislation;
- the Nuclear Liability and Compensation Act (S.C. 2015, c. 4, s. 120); and
- various regulatory documents, such as:
  - CNSC RD-346, "Site Evaluation for New Nuclear Power Plants";
  - CNSC RD/GD-369, "Licence Application Guide: Licence to Construct a Nuclear Power Plant";
  - CNSC REGDOC-1.1.3, "Licence Application Guide: Licence to Operate a Nuclear Power Plant";
  - CNSC REGDOC-2.3.1, "Conduct of Licensed Activities: Construction and Commissioning Programs";
  - CNSC REGDOC-2.5.2, "Design of Reactor Facilities: Nuclear Power Plants";
  - other CNSC regulatory documents and Canadian Standards Association (CSA) Group Standards.

In addition to these, for licence renewal and extended operation, the following additional regulatory documents are used, among others:

- CNSC REGDOC-2.3.3, "Operating Performance: Periodic Safety Reviews";
- CNSC REGDOC-2.6.3, "Fitness for Service: Aging Management".

Responsible government bodies

The CNSC, the national nuclear regulatory body, is responsible for reviewing the application for licence renewal and also for issuing the renewed licence.

Application and review timing

As described above, operating licences are subject to periodic renewal, and the standard licence term is currently ten years. A licence renewal application and subsequent licence are the mechanisms to authorise extended operation. The timing of these renewals (i.e. licence durations) is flexible and is set by the Commission, so there is no particular time limit for these requests that is prescribed.

There is no specific requirement for the timeliness of the regulatory process related to licence applications. The fact that activities at a power reactor have to be licensed, pursuant to the NSCA, and the flexibility given to the Commission related to setting licence periods and licence conditions, ensures that such requests are addressed in an acceptable manner and time frame.

Typically, CNSC staff finishes its assessment of a renewal application five to six months before the expiration of the current licence. This allows time for public review of the assessment; participation by the licence applicant, CNSC staff and intervenors at a Commission public hearing (typically in two parts); and the Commission's rendering of the decision related to the next licence, before the current licence expires.

Scope of review

Safety

The scope of the safety review is the same as that performed during the initial authorisation process.

Since requests for extended operation are typically handled through licence renewals, the scope of the assessment is governed by the framework established for licence renewals. The applicable regulations for renewal of a Class I nuclear facility prescribe what is required for such an application. The CNSC assesses the application in the context of regulatory requirements and CNSC expectations for 14 safety and control areas (SCAs).[1] Generally, including renewals involving a request to operate after major refurbishment that includes replacement of pressure tubes, the CNSC also assesses the applicant's PSR, which encompasses all 14 SCAs, though the SCAs dealing with physical design and fitness for service receive particular attention.

For licensing decisions, CNSC staff analysis and recommendations to the Commission are included in Commission Member Documents (CMDs), considered by the Commission in its public hearing process. A Commission licensing decision includes a Record of Decision, which includes a summary of the evidence considered, the reasons for its decision and a licence.

Environmental

The scope of the environmental review for extended operation is different than that performed during the initial authorisation process. The environmental protection SCA is an area of focus in the evaluation of licence renewal applications. CNSC assessment under this SCA reviews the applicant's environmental risk assessment (analysing past performance and a predictive risk assessment for future performance), documentation describing the environmental management system, an environmental monitoring programme and an effluent monitoring programme.

Under the NSCA, the CNSC conducts an environmental review as part of the licensing process for the extended operation of an NPP. The environmental review addresses the impacts of the refurbishment work and of extending the facility's operation for several decades on the environment, including human health. The scope of the environmental review includes a risk assessment of past performance of the facility, as well as a predictive assessment of the risks posed to the environment for the activities required for extended operation (e.g. refurbishment), as well as a predictive assessment for the extended operation of the NPP.

1. The 14 SCAs are: 1) management system; 2) human performance management; 3) operating performance; 4) safety analysis; 5) physical design; 6) fitness for service; 7) radiation protection; 8) conventional health and safety; 9) environmental protection; 10) emergency management and fire protection; 11) waste management; 12) security; 13) safeguards and non-proliferation; and 14) packaging and transport.

The environmental review report is submitted by the CNSC staff as part of its CMD recommendations to the Commission. The results of the CNSC's Independent Environmental Monitoring Program, and other sections of the overall CMD staff recommendations, document the CNSC staff recommendations arising from review of the licensee's application with respect to environmental protection. The Commission's Record of Decision also addresses aspects of environmental protection, as the Commission sees fit.

One of the main areas of focus for a review of extended operation is the changing societal expectations and the need to engage and/or consult with Indigenous peoples. There is a continually growing expectation that the public and Indigenous communities have access to data and information so that they can perform a certain level of analysis in order to be fully informed about and understand a project. The data and information demands are often (but not exclusively) related to the environment and environmental protection.

New safety requirements

New safety requirements can be imposed on an applicant during the authorisation process for extended operation. New safety requirements are typically introduced as part of PSR, whereby the applicant evaluates gaps against modern standards, codes and practices and proposes improvements to close the gaps. The Commission assesses the gaps and proposed improvements, and then it imposes new requirements through the licence renewal.

Besides the completion of improvement plans resulting from PSRs, the licensees also implement other new safety requirements during licence periods as circumstances dictate. In its licensing authority, the Commission may, in addition to changing conditions at renewal, also amend an existing licence to include a new requirement. This entails a public hearing process and adequate notice and opportunity to be heard, given to the licensee. For urgent matters, the Commission, designated officers and inspectors have the authority to issue orders to licensees.

Transboundary notification

The Convention on Environmental Impact Assessment in a Transboundary Context,[2] an international environmental convention developed under the auspices of the United Nations Economic Commission for Europe (UNECE), prescribes transboundary notification and consultation obligations on its parties, which includes Canada. The Espoo Convention requires transboundary notification in the situation where the three conditions below are applicable:

- the project in Canada is likely to have a significant transboundary impact on another party to the Espoo Convention;
- the project is subject to a federal EA; and
- the project is listed under the Espoo Convention.

Given that the extended operation authorisation process is not subject to a federal EA in Canada, there is no requirement for transboundary notification and consultation under the Espoo Convention.

The NSCA does not prescribe any specific transboundary notification requirement for licensing. However, applicants for a licence must include in their application "the proposed program to inform persons living in the vicinity of the site of the general nature and characteristics of the anticipated effects on the environment and the health and safety of persons that may result from the activity to be licensed", and the Commission must hold a public hearing for its licensing; in this hearing, intervenors are not limited to Canadians. Although there are no transboundary notification requirements, the CNSC can use existing communication mechanisms through formal arrangements (such as the Canada-United States Great Lakes Water Quality Agreement) to notify and keep interested parties outside of Canada informed.

2. Convention on Environmental Impact Assessment in a Transboundary Context (1991), 1989 UNTS 310, entered into force 10 September 1997 (Espoo Convention).

Public participation

Public participation is allowed during the authorisation process for extended operation.

Under the NSCA, subsection 40(5), "Public hearings", states that the Commission shall hold a public hearing with respect to the proposed exercise by the Commission of the power to issue, renew, suspend, amend, revoke or replace a licence. While the applicant is the sole "party" to such a proceeding, members of the public, non-governmental organisations, municipalities, industry, unions and Indigenous peoples can participate in the licensing process as intervenors, and participant funding is offered to some. CNSC staff participate as experts to support the Commission as expert advisers. Both written and oral interventions are allowed. All hearings for Class I facilities (power and research reactors, manufacturing and processing plants, etc.) and uranium mines and mills must be conducted in public and the information made available to all interested persons. In the public hearing, applicants address interventions and public queries.

CNSC document RD/GD-99.3, "Public Information and Disclosure", sets out the requirements for public information and disclosure by the licensee. Applicants for a licence must include in their application "the proposed program to inform persons living in the vicinity of the site of the general nature and characteristics of the anticipated effects on the environment and the health and safety of persons that may result from the activity to be licensed". A standard licence condition requires the licensee to implement and maintain a "Public Information and Disclosure" programme.

Access to information

Both the decision-making authority and the applicant have a legal duty to provide information to the public during the authorisation process for extended operation.

For the CNSC, this duty is found in the NSCA and the CNSC Rules of Procedure (SOR/2000-211). Regarding the safety review, the CNSC staff's detailed analysis and recommendations are all made part of the public record of the proceeding before the Commission. Regarding the environmental review, the CNSC must make the environmental review public.

For the applicant, anything filed with the CNSC under the NSCA and various regulations must be made available to the public, except for security-related or commercially sensitive information. This includes the application, supporting evidence that meets the regulations' application requirements and addresses the 14 SCAs (and other relevant topics). Many licensees choose to post the data on their websites.

In addition to the NSCA public hearing process, the CNSC is a government institution that is subject to Canada's Access to Information Act (Revised Statutes of Canada (RSC), 1985, c. A-1). This legislation provides all those in Canada with the ability to ask government institutions to provide access to records held by them, subject only to exceptions and exclusions that are specific and limited.

Legal challenges

Legal challenges to decisions authorising extended operation are possible. There is a specific court procedure to challenge such decisions, but this is not a procedure unique to nuclear power. This is a civil procedure and it is found in the Federal Courts Act (RSC, 1985, c. F-7), Section 18.1, "Application for judicial review". The Federal Courts Act provides that an application for judicial review may be made by anyone directly affected by a decision, act or omission by a statutory decision maker. There is no geographic component in establishing standing, and it is possible for an applicant to have public interest standing to challenge a decision made under the NSCA.

The applicant/licensee and the Attorney General of Canada are the parties who respond to a challenge to a decision. Judicial review is available only in respect of a final decision. For nuclear projects, a licensing decision under the NSCA could be the subject of a judicial review application, as could an EA conducted under the Canadian Environmental Assessment Act 2012. Appeals of the judicial review decision are made to the Federal Court of Appeal.

Pursuant to the Federal Courts Act, the court may grant relief if the decision maker:

- made a jurisdictional error;
- failed to observe a principle of natural justice, procedural fairness or other required procedure;
- made an error in law or acted contrary to law; or
- based its decision on an erroneous finding of fact.

On the substance of a decision under review, the Federal Court applies a standard of reasonableness. A successful judicial review application generally results in the decision being quashed and the matter referred back to the decision maker for reconsideration in accordance with the court's decision.

After a judicial review decision by the Federal Court of Canada, appeal to the Federal Court of Appeal is possible. On appeal of a judicial review decision by the Federal Court of Canada, the Court of Appeal is required to determine whether the lower court identified the appropriate standard of review and if so, whether it was applied correctly. If the lower court applied the wrong standard, the Appeal Court applies the correct standard. If the lower court applied the correct standard, the Appeal Court ensures it was applied properly and, where necessary, remedies errors that were made.

This decision can be appealed to the Supreme Court of Canada. Leave of the Supreme Court is required; leave is granted only if the court finds the matter to raise a legal question of general importance. The Supreme Court of Canada is the court of final resort.

There has not been a licensing decision on extended operation that has been subjected to legal challenge, but there has been a judicial review application and subsequent appeal,[3] of an EA determination made by the CNSC for the refurbishment of four nuclear power reactors at an NPP.

3. Greenpeace Canada et al. v. Attorney General of Canada and Ontario Power Generation Inc., 2016 FCA 114.

Czech Republic

Basic information

The Czech Republic has six operating nuclear power reactors as of June 2019, consisting of six VVER reactors operating at two nuclear power plants (NPPs). These six nuclear power reactors are operating at the following lifetimes:

- 10-19 years 2
- 30-39 years 4

At present, the Czech Republic has four nuclear power reactors operating past their initial designed life. Two additional nuclear power reactors may potentially enter the period of long-term operation (LTO) in the period 2030-2039.

The Czech Republic does not have any nuclear power reactors under construction as of June 2019.

Authorisation information

Designed and authorised periods

In accordance with the legal framework in the Czech Republic, the licence for nuclear power reactor operation is granted with an indefinite term. Therefore, the LTO of a nuclear power reactor is based on a continuous safety assessment taking into account controlled ageing and a special safety assessment, which must be performed 24 months before the end of the originally expected life span of such reactor and is focused mostly on ageing management and the status of systems, structures and components (SSCs) of the concerned nuclear power reactor. In addition, the licensee is required to perform a periodic safety review (PSR) of a nuclear power reactor every ten years, even though the PSR process is not formally linked to entering the period of LTO.

Terminology

The period of nuclear power reactor operation after its initial designed life is most commonly referred to as long-term operation in the Czech Republic, based on the similar approach and terminology of the International Atomic Energy Agency (IAEA). However, this term does not stem from any official legislative or regulatory text and is unofficially used to define the operation of a nuclear power reactor beyond the originally expected minimum design life span. Moreover, the originally expected minimum design life span is not determined for a facility as a whole and usually cannot be found as a single value in the relevant design documentation, but rather refers to the expected minimum design life span of critical components of the reactor, mainly the reactor's pressure vessel.

There is no specific terminology to refer to the process of authorising the LTO of a nuclear power reactor, as this process does not exist in the Czech legal framework. Instead, the Czech framework builds on the combination of the continual safety assessment of the concerned reactor and the above-mentioned special safety assessment, complemented by the general powers of the regulatory body to withdraw any licence in case of severe non-compliance with legal requirements. Both types of assessments are conducted in accordance with Decree No. 162 of 2017 on Requirements for Safety Assessment pursuant to the Atomic Act.

Main laws/regulations/documents for initial and long-term/extended operation

The main laws, regulations and documents for the operation of nuclear power reactors are:

- Atomic Act No. 263 of 2016;
- Decree No. 329 of 2017 on Requirements for Nuclear Installation Design;
- Decree No. 378 of 2016 on Siting of a Nuclear Installation;
- Decree No. 21 of 2017 on Assuring Nuclear Safety of Nuclear Installations; and
- Decree No. 162 of 2017 on Requirements for Safety Assessment pursuant to the Atomic Act.

Responsible government bodies

All the safety-related aspects of LTO for nuclear power reactors are supervised by the State Office for Nuclear Safety (SONS) (Státní úřad pro jadernou bezpečnost – SÚJB), which is the national nuclear regulatory authority in the Czech Republic. SONS is responsible for providing continuous oversight of the operator throughout the lifetime of the nuclear power reactor, including the LTO period, to ensure safe operation.

Application and review timing

There is no application related to the operation of a nuclear power reactor during the LTO period, as there is no administrative proceeding or decision related to LTO. According to Decree No. 162 of 2017, a special safety assessment shall be conducted 24 months prior the end of originally expected minimum life. It is worth noting that the timing of the decennial PSRs is not directly linked to the LTO period: the first PSR shall be conducted within six years of the commissioning of a nuclear power reactor and the subsequent PSRs shall be conducted regularly within ten years from the date of the previous PSR. Should the terms of both the special safety assessment and the PSR coincide, the former shall be performed within the PSR framework.

Scope of review

Safety

In accordance with Section 23(3) of Decree No. 162 of 2017, the aforementioned special safety assessment, which is conducted 24 months before the end of the originally expected life span of a nuclear power reactor, shall include:

a) the degree of ageing of SSCs influencing nuclear safety, the damage of which can limit the extent to which these perform their safety function;

b) the reliability of the SSCs influencing nuclear safety, which is recorded within the framework of the continuous safety assessment;

c) the compliance with past criteria and preservation of safety margins of the SSCs influencing nuclear safety, taking into account ageing effects;

d) the ability of SSCs influencing safety to perform their safety functions laid down in the nuclear power reactor design;

e) the validity of time-limited ageing analyses (TLAAs); and

f) the effectiveness of the preservation of knowledge regarding the nuclear power reactor and operational experience gained throughout the previous life cycle of the nuclear power reactor.

In addition, the ageing of SSCs and other aspects closely related to LTO are also assessed within the PSR framework, in accordance with Section 13 of Decree No. 162 of 2017.

Finally, the licence holder is required pursuant to Section 49(1)(s) of the Atomic Act to continuously monitor the state of its nuclear power reactor and its SSCs regarding their controlled ageing. In accordance with Annex 1 of Part 1(f) of the Atomic Act, the licence holder is required to maintain an "operational controlled ageing programme", the content of which is specified in Sections 11 and 12 of Decree No. 21 of 2017.

Environmental

In accordance with the aforementioned Decree No. 162 of 2017, the radiological protection-related effects of the nuclear power reactor on the environment are assessed by the operator as part of the PSR, and this process is supervised by SONS. However, since the licence for operation is issued for an indefinite period, there is no specific environmental assessment for LTO. An environmental impact assessment (EIA) is only required prior to starting operation of a nuclear power reactor or prior to undertaking major changes to such installation, in accordance with Act No. 100 of 2001 on Environmental Impact Assessment and/or the Act No. 83 of 2006 (Construction Act). These include any major changes needed for the LTO of a nuclear power reactor, insofar as these shall be necessary.

New safety requirements

New safety requirements may be imposed on the operator of a nuclear power reactor at any time, either through amendments to the relevant legislation, mainly the Atomic Act and its implementing legislation, or in the framework of the continuous safety assessment of the concerned reactor. In the absence of transitional provisions, new legislative or regulatory requirements are legally binding on all licence holders, regardless of when such licences were granted.

Transboundary notification

A transboundary notification is only required by the aforementioned Act No. 100 of 2001 prior to starting operation of a nuclear power reactor or prior to undertaking major changes to such operation. Otherwise, there is no notification requirement regarding the LTO of a nuclear power reactor, since the licence for operation is issued for an indefinite period of time.

Public participation

The Czech Republic legal framework includes a requirement to provide the public with an opportunity to participate in the EIA process, in accordance with the Act No. 100 of 2001. As previously explained, an EIA is only required prior to starting operation of a nuclear power reactor, or prior to major changes to such installation, which may or may not be required in relation to LTO.

Access to information

As a general rule, the Czech Republic's decision-making authorities (i.e. SONS, as well as other governmental bodies) are obliged to provide to the public all information related to their respective competences, in accordance with Act No. 106 of 1999 on Free Access to Information. Therefore, SONS would be obliged to communicate any kind of information related to LTO on request by a member of the public, with exceptions specifically enumerated in the legislation (e.g. confidential information, personal data, etc.). Such requirements regarding free access to information do not extend to licensees, which have no legal obligation to provide information to the public in relation to LTO.

Legal challenges

In accordance with the legal framework in the Czech Republic, the licence for nuclear power reactor operation is granted with an indefinite term. Therefore, there is no administrative decision to authorise LTO that may be subject to a legal challenge.

Finland

Basic information

Finland currently has four nuclear power reactors operating at two nuclear power plants (NPPs). Of these, two of the reactors are pressurised water reactors (PWRs) and two are boiling water reactors (BWRs). As of June 2019, the four nuclear power reactors are operating at the following lifetimes:

- 30-39 years 2
- 40-49 years 2

Three of the nuclear power reactors are operating past their original designed life and one nuclear power reactor will exceed its original designed lifetime in 2020. All of the operating nuclear power reactors have operating licences to operate past their original designed lifetime.

Finland has one nuclear power reactor under construction since 2005.

Authorisation information

Designed and authorised periods

Operating licence terms are determined on a case-by-case basis when the licence is granted. There is a possibility for subsequent licences because of the case-by-case determinations.

The original designed lifetime of the 2 BWRs at the Olkiluoto NPP is 40 years. The previous operating licences for 20 years expired at the end of 2018 for both Olkiluoto units, meaning 40 and 38 years of operation at the end of 2018. In September 2018, the government approved new operating licences for both the units allowing operation until the end of 2038.

The original designed lifetime of the 2 PWRs at the Loviisa NPP was 30 years. The previous operating licences for both Loviisa units expired in 2007, after 30 years and 27 years of operation. The two Loviisa units received licences for an additional 20 years of operation until the end of 2027 and 2030 respectively. Fortum Power and Heat Ltd, the operator of the Loviisa units, is now considering the future of the two PWRs at the Loviisa NPP after the current operating licences expire.

Terminology

In Finland, there is no specific terminology for either the process of extending the designed life of a nuclear power reactor, nor is there any specific terminology for the period of nuclear power reactor operation after the original designed life. The licences are always handled as new licence applications, and new decisions (rather than renewals or extensions of the current licence) are based on a full evaluation of all aspects.

Main laws/regulations/documents for initial and long-term/extended operation

The legal and regulatory framework in Finland for nuclear power reactor authorisations is comprised of the following:

- Nuclear Energy Act of 1987 (No. 990/1987 as last amended by Act No. 905/2017);

- Nuclear Energy Decree of 1988 (No. 161/1988 as last amended by Decree No. 1001/2017);
- Finnish Radiation and Nuclear Safety Authority (Säteilyturvakeskus – STUK) Regulations (STUK Y/1-4/2016);
- STUK YVL Guides, which provide binding safety requirements for new nuclear facilities and other uses of nuclear energy that at the same time allow the licensee to propose alternative procedures or solutions that will implement the same level of safety required under the Nuclear Energy Act. Separate enforcement decisions are made by STUK on how new requirements contained in new or revised YVL Guides are applied to operating nuclear facilities or those under construction and to licensees' operational activities; and
- governmental decisions.

In environmental planning and permitting for the licensing of a nuclear power reactor, the following laws, regulations and documents apply in Finland:

- the Act on Environmental Impact Assessment Procedure (No. 252/2017);
- the Decree on Environmental Impact Assessment (No. 277/2017);
- the Environmental Protection Act (No. 527/2014); and
- the Environmental Protection Decree (No. 713/2014).

Responsible government bodies

In Finland, the Ministry of Economic Affairs and Employment (MEAE) (Työ- ja elinkeinoministeriö Arbets- och näringsministeriet – TEM) is responsible for preparing the operating licence. The operating licence is granted by the government. This decision is based on the overall good of society but also on the nuclear safety assessment carried out by STUK, the national regulatory body for nuclear safety. After completing its safety assessment and receiving statements from the Advisory Commission on Nuclear Safety and from the Ministry of the Interior, STUK submits the statement on safety to the MEAE.

Application and review timing

There is no specific time frame by which the licensee is required to apply for an operating licence. Similarly, there is no specific date by which the MEAE is required to complete the licensing process. A minimum of one year, however, is generally required to complete the process. However, according to the Nuclear Energy Act, the uses of nuclear energy always require a licence and the initiation of the licensing process is the operator's responsibility whether it is the first licence or a subsequent licence.

Scope of review

Safety

A safety assessment is performed during every operating licence application process and periodic safety review (PSR), according to legislation and regulatory guides.

In Finland, the operating licence is granted for a specific period and the licensee must demonstrate that safety can be maintained and the integrity of the main components can be ensured throughout this period. Therefore, ageing management of the plant and the systems, structures and components (SSCs) is required from the beginning of operation and is reviewed during the safety assessment as part of the operating licence application process.

STUK is responsible for performing an independent safety assessment and providing a statement to the MEAE reflecting STUK's view on the status of the safety of the plant and on the licensee's capability to maintain and operate the plant safely. The government is responsible for making the operating licence decision.

Environmental

Environmental impacts are assessed before starting new nuclear facility projects and in connection with a major plant modification that could have an impact on the environment. The need for an environmental impact assessment (EIA) is assessed by the MEAE before receiving the operating licence application for nuclear installations. An EIA is required before a decommissioning licence application. Monitoring of the state of the environment is done continuously during the operation of the plant according to a separate environmental permit.

New safety requirements

New safety requirements can be imposed upon the licensee through the operating licence application process.

When assessing the operating licence application, STUK may introduce requirements on how plant safety shall be improved during the operating licence period. The normal procedure in introducing new requirements is to amend STUK's regulations and regulatory guides when such improvements are needed. These new rules and requirements apply immediately to new reactors, while separate enforcement decisions are made by STUK on how the new requirements shall be taken into account for existing reactors. The expectation is that the existing reactors will follow the new requirements, as far as reasonably practicable, and plant changes may be required based on new safety requirements between the PSRs or operating licences. In many cases, the new requirements shall be implemented when carrying out plant modifications in existing reactors.

Transboundary notification

According to the 1976 Guidelines for Communication between Finland, Norway, Sweden and Denmark on Security Issues related to the Nuclear Installations Constructed Near the Border (SopS 19/1977), when licensing the construction or operation of a nuclear facility, or if there is a change in the operating licence terms, the neighbouring country has to be notified and provided with relevant information about the project, the location information of the nuclear facility included.

Public participation

Public participation is allowed during the licensing process in Finland. The legal duty to solicit public participation in the licensing process falls on the decision-making authority; the licensee does not have any legal duty to solicit public participation.

The legal duty to solicit public participation is found in the Sections 13, 23 and 23a of the Nuclear Energy Act and Sections 25, 29 and 37 of the Nuclear Energy Decree. The public participation process is organised by the MEAE and is open to anyone. The MEAE will circulate the licence application for comment, hold public hearings and solicit written opinions.

Access to information

The decision-making authority has a legal duty to provide information to the public during the licensing process. This duty is found in:

- the Nuclear Energy Act, Section 23;
- the Nuclear Energy Decree;
- the Act on the Openness of Government Activities (No. 621/1999); and
- the Administrative Procedure Act (No. 434/2003).

According to the Act on the Openness of Government Activities, and specifically Sections 7 and 19, the decision-making authority must make public certain documentation related to the operating licence application.

The licensee, on the other hand, does not have a legal duty to provide information to the public during the licensing process. However, all the documents that are submitted to the MEAE are public.

Legal challenges

Although legal challenges to licensing decisions are allowed, such decisions have not been subjected to legal challenges to date.

There is a specific procedure to challenge licensing decisions, but this is not a unique procedure to nuclear energy. Rather, this is an administrative procedure found in the Administrative Judicial Procedure Act (No. 586/1996). Under the Administrative Judicial Procedure Act, both those who are affected by the immediate consequences of the licence and the licensee may legally challenge a licence renewal decision. There is no geographical component to establishing standing to raise such a challenge.

The governmental decision maker is the subject party of the challenge and the authorisation decision is the subject of the challenge.

Challenges must first be raised before the Supreme Administrative Court within 30 days after the release of the decision in question. The challenge must be based on a claim that the decision is against the law. No appeals are allowed following the decision of the Supreme Administrative Court.

France

Basic information

France has 58 nuclear power reactors operating at 19 nuclear power plants (NPPs) as of June 2019. This fleet is entirely composed of pressurised water reactors (PWRs). The 58 nuclear power reactors are operating at the following lifetimes:

- 10-19 years 1
- 20-29 years 9
- 30-39 years 43
- 40-49 years 5

As of June 2019, there are 5 nuclear power reactors operating past 40 years. The period of 40 years of operation corresponds to the initial design hypotheses for certain equipment. No final determination has yet been made as to how many nuclear power reactors will continue to operate past 40 years in the future. However, should all the currently operating nuclear power reactors continue to operate, those will enter the period of operation past 40 years in each of the following time periods:

- 2019-2029 43
- 2030-2039 10

France has one nuclear power reactor under construction as of June 2019.

Authorisation information

Designed and authorised periods

The initial licence for nuclear power reactor operation in France is granted without a specific term. In accordance with Article L. 593-6 of the Environmental Code, the operator is responsible for the safety of its nuclear power reactor throughout its operation, and the Nuclear Safety Authority (Autorité de sûreté nucléaire – ASN) may order the shutdown of any nuclear power reactor at any time in case of a "serious and immediate hazard", pursuant to Article L. 593-22 of the Environmental Code.

In addition, the operator of a nuclear power reactor is required to perform a periodic review (PR) every ten years, following which the ASN issues a position on conditions of operation for the following ten years, in accordance with Articles L. 593-18 and L. 593-19 of the Environmental Code. It is expected that the period of nuclear power reactor operation past 40 years will mainly be covered by the 4th PR for the concerned reactors. In accordance with Article L. 593-19, the licensee shall provide its PR report to the ASN and the Minister in charge of nuclear safety and, if necessary, communicate its proposed provisions to remedy any anomaly or better address the "protected interests" stated in Article L. 593-1 of the Environmental Code, i.e. public security and health, protection of nature and the environment. The aforementioned provisions proposed by the licensee during a PR after 35 years of operation of a nuclear power reactor are subject to a formal authorisation by the ASN. It is important, however, to note that the ASN's authorisation does not concern the continued operation of the concerned nuclear power reactor itself, but only provisions proposed by the licensee to improve the protection of "protected interests" stated in Article L. 593-1 of the Environmental Code.

Terminology

In France, there is no dedicated authorisation for long-term operation (LTO). Instead, the continued operation of a nuclear power reactor past 40 years is subject to the fulfilment of a decennial PR. There is no specific terminology to refer to the period of operation beyond the initial designed life of a nuclear power reactor.

Main laws/regulations/documents for initial and long-term/extended operation

The main laws and regulations governing the initial and long-term operation of nuclear power reactors in France are the following:

- Articles L. 593-1 to L. 596-14 of the Environmental Code, which have notably been modified by:
  - Act No. 2006-686 of 13 June 2006 on transparency and security in the nuclear field;
  - Act No. 2015-992 on Energy Transition for Green Growth;
  - Legislative Ordinance No. 2016-128 of 10 February 2016 containing various nuclear provisions.
- Decree No. 2007-1557 of 2 November 2007 concerning basic nuclear installations and the supervision of the transport of radioactive materials with respect to nuclear safety, as amended by:
  - Decree No. 2016-846 of 28 June 2016.
- Ministerial Order of 7 February 2012 setting the general rules related to basic nuclear installations (NOR: DEVP1202101A), as amended.

In addition, the ASN has issued several documents regarding the operation of nuclear power reactors past 40 years. In 2009, the operator of the 58 French nuclear power reactors notified ASN of its intention to extend the duration of operation of all its operating nuclear power reactors well beyond 40 years and to preserve the possibility to operate those reactors up to 60 years. Accordingly, in 2013 the operator submitted to ASN a generic studies programme that would serve as a basis for the 4th PR of all operating 900 MWe and 1 300 MWe reactors, i.e. 34 and 20 reactors respectively (CODEP-DCN-2013-013464). The ASN, with the support of its technical support organisation (TSO), the Institute for Radiological Protection and Nuclear Safety (Institut de radioprotection et de sûreté nucléaire – IRSN), reviewed this generic programme and in April 2016 issued a position statement on the guidelines for the generic studies programme for the 4th PR regarding all the 900 MWe nuclear power reactors (CODEP-DCN-2016-007286). The ASN has not yet issued a position statement regarding the 1 300 MWe reactors.

Responsible government bodies

The ASN, the national nuclear regulatory body, is responsible for reviewing, with the support of IRSN, the PR carried out by the licensee. The ASN is also responsible for authorising the provisions proposed by the licensee during the PR, in accordance with Articles L. 593-19 and L. 593-15 of the Environmental Code. In accordance with the aforementioned articles, the Minister in charge of nuclear safety shall receive the PR report prepared by the licensee, as well as the ASN's analysis of this report and the technical requirements (*prescriptions techniques*) made by ASN in this regard.

Application and review timing

While the French legislative and regulatory framework does not provide for a specific review timing for PRs, in accordance with Article L. 593-18 of the Environmental Code, the PR frequency may not be less than once every ten years. In accordance with Article 24 of Decree No. 2007-1557 of 2 November 2007, as amended, the licensee is considered as having fulfilled all its PR-related obligations when it communicates its PR report to the Minister in charge of nuclear safety and to the ASN.

Scope of review

Safety

The scope of the assessment of the PR comprises two parts:

- The first part is an evaluation of the condition and conformity of the facility to the applicable rules, as well as an ageing management review. These verifications can include checks on the initial design studies as well as field inspections of equipment not concerned by maintenance programmes, or tests conducted every ten years. Any deviations detected during these investigations must be restored to conformity within a time frame commensurate with their potential consequences.
- The second part is a safety reassessment, which aims to improve the level of safety in light of the experience acquired during operation, changing knowledge, the requirements applicable to newer facilities and international best practices. Following these reassessments, the licensee is required to identify the modifications it intends to make to reinforce safety.

To benefit from the standardisation of the NPP reactors, these two parts are first subject to a generic design programme for a given plant series (i.e. 900 MWe, 1 300 MWe or 1 450 MWe reactors).

Regarding in particular the 4th PR for the 900 MWe reactors, which will cover the period of operation past 40 years, the licensee expressed to ASN its desire to reuse the ageing management approach implemented for the 3rd PR, which ASN approved with additional requirements, including:[1]

- the identification of the ageing mechanisms in the light of national and international experience and of the appropriate research and development (R&D) programmes, taking account of the increased operating life beyond 40 years; and
- demonstrating the mechanical strength of the vessels beyond their fourth ten-year outage inspection.

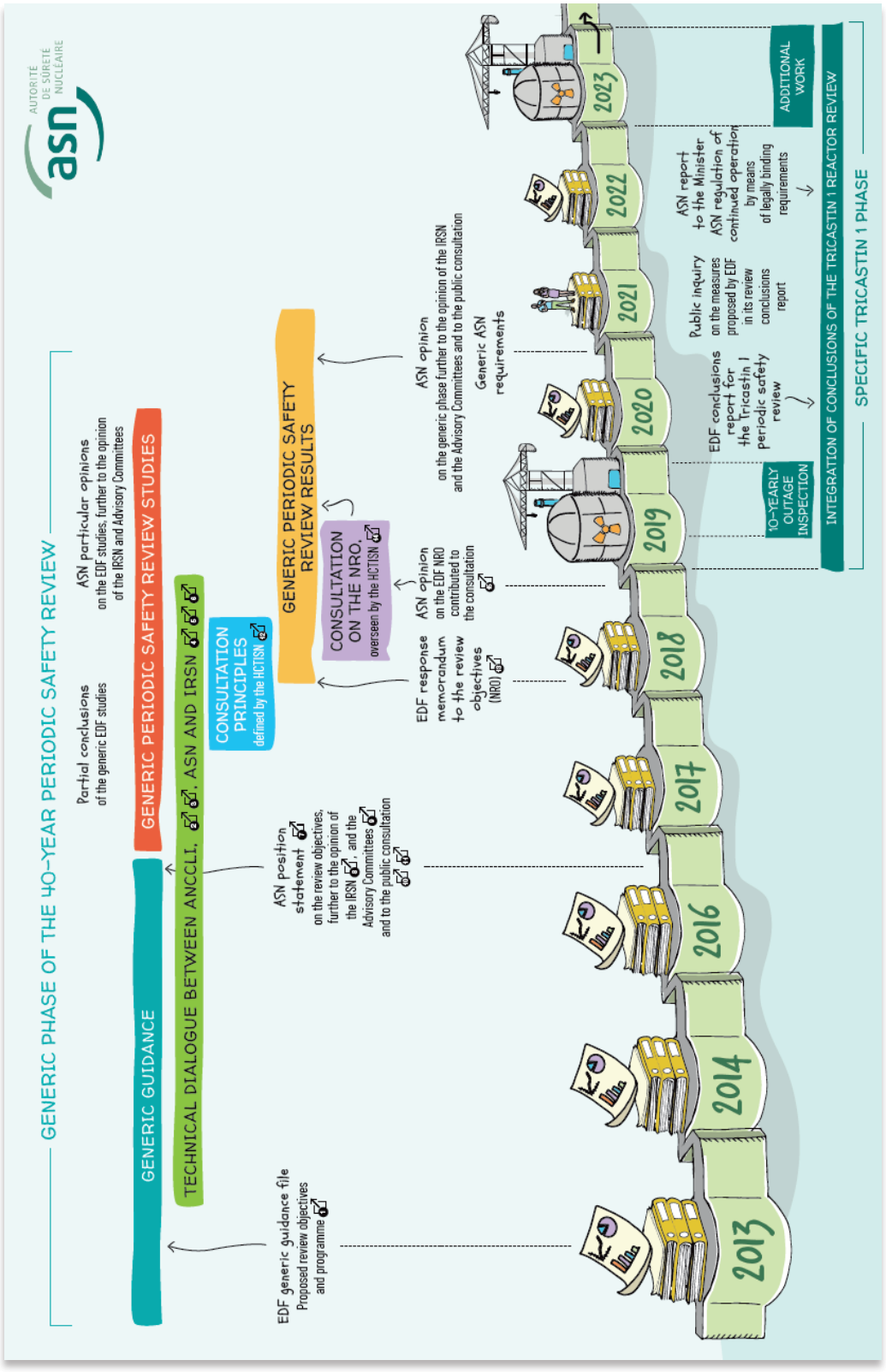
In April 2016, the ASN issued its opinion (letter CODEP-DCN-2016-007286) regarding the guidelines and additions to be made to the licensee's generic programme for the 4th PR of all 900 MWe reactors, with a view to its operational implementation, in particular with regard to the management of ageing and obsolescence of the systems, structures and components (SSCs) of such reactors.

Environmental

In accordance with Article L. 593-18 of the Environmental Code, the PR performed by the licensee and submitted to the ASN shall cover all the "protected interests" identified by Article L. 593-1, i.e. public security and health, protection of nature and the environment. The scope of the environmental review as part of the PR is defined by the Ministerial Order of 7 February 2012 setting the general rules related to basic nuclear installations, as amended. In addition, the ASN Resolution No. 2013-DC-0360 of 16 July 2013, as amended by Resolution No. 2016-DC-0569 of 29 September 2016, lists the relevant environmental documentation that should be provided as annex to the PR report.

1. With the support of the IRSN, the ASN examined the generic programme submitted by the licensee and consulted its Advisory Committee for Reactors (Groupe permanent d'experts pour les réacteurs nucléaires – GPR). It then issued its opinion in a letter addressed to the licensee (CODEP-DCN-2013-013464 of 28 June 2013).

Figure 3.1. **Periodic review process in France**



Source: Nuclear Safety Authority (Autorité de sûreté nucléaire – ASN).

New safety requirements

In accordance with Article 24 of Decree No. 2007-1557 of 2 November 2007, as amended, and Article L. 593-19 of the Environmental Code, the ASN may impose new technical requirements following a PR carried out by the operator. In addition, 5 years after submitting the PR report after 35 years of operation, the licensee is required to submit an interim report to ASN on the condition of the reactors' equipment important to nuclear safety. Based on this report, ASN can supplement its technical requirements.

Transboundary notification

The legal framework applicable to PRs does not include a systematic requirement for transboundary notification.

Public participation

The legal framework applicable to the 4th PR, which covers the period of nuclear power reactor operation past 40 years, provides for a public participation mechanism. In accordance with Article L. 593-19 of the Environmental Code, the provisions proposed by the licensee following a PR taking place beyond 35 years of operation of a nuclear power reactor are subject to a public enquiry, prior to their submission to the ASN for authorisation.

The procedure for public enquiries is defined by Articles L. 123-1 to L. 123-18 of the Environmental Code. In accordance with this framework, the public enquiry is organised by the competent decision-making authority and managed by an enquiry commissioner or commission depending on the nature and importance of the proposed provisions. The enquiry lasts for at least 30 days, which may be extended by a further period of 15 days.

In addition to the aforementioned legal requirement, a public consultation on the safety improvements of the 900 MWe nuclear power reactors as part of the 4th PR was launched under the auspices of the High Committee for Transparency and Information on Nuclear Safety (Haut comité pour la transparence et l'information sur la sécurité nucléaire – HCTISN), with the participation of the ASN, IRSN, the National Association of the Local Information Committees and Commissions (Association nationale des Comités et Commissions locales d'information – ANCCLI) and the licensee.[2] This public consultation, which is not a legally binding requirement, aims at better involving the public in decisions regarding the continued operation of these nuclear reactors past 40 years. During this consultation, which will take place from 3 October 2018 to 31 March 2019, members of the public are invited to express their comments on a report on the objectives of the 4th PR (Note de réponse aux objectifs) provided by the licensee,[3] either via electronic communications or during public hearings. In accordance with the principles set by the HCTISN, the ASN, the licensee and other stakeholders involved in the procedure will publicly disclose how they take into account the remarks expressed by the public during the consultation. Two independent guarantors were appointed to ensure the objectivity and completeness of this procedure.

The ASN also provides members of the public with an opportunity to participate in its decision-making process. In accordance with Article L. 123-19-1 of the Environmental Code, the ASN has a legal duty to submit its draft regulatory resolutions to public consultation. Similarly, the ASN also has a legal duty to submit its draft licensing resolutions to public consultation in accordance with Articles L. 123-19 and L. 123-19-2 of the Environmental Code. In addition, the ASN voluntarily submits its draft guides and other draft documents, such as the draft opinions and position statements related to the 4th PR of the 900 MWe nuclear power reactors, to public consultation, notably if such documents have a direct and significant impact on the environment.

2. More information on this public consultation is available (in French) at: https://concertation.suretenucleaire.fr.
3. A summary of this report is available (in French) at: www.hctisn.fr/IMG/pdf/EDF_Synthese_NRO_310818_cle872e4d.pdf.

Access to information

The above-mentioned public participation mechanisms, and notably the public enquiry and public consultation, do include the obligation of providing information to the public regarding the 4th PR.

In addition, while it is not specifically related to the operation of nuclear power reactors past 40 years, both the ASN as a regulatory authority and the licensee have a general duty to provide environmental information to the public. Articles L. 124-1 and following of the Environmental Code provide for the general right of the public to access environmental information received or created by public authorities. Moreover, Article L. 125-10 of the Environmental Code establishes a special right for the public to access information held by operators of basic nuclear installations regarding the risks or negative impacts of such installations with regard to the aforementioned "protected interests" under Article L. 593-1 of the Environmental Code.

Furthermore, the provision of information to the public is also ensured by the aforementioned Local Information Commissions (Commissions locales d'information – CLI) in accordance with Articles L. 125-17 to L. 125-33 of the Environmental Code and by the HCTISN in accordance with Articles L. 125-34 to L. 125-40 of the same code.

Legal challenges

As previously mentioned, the provisions proposed by the licensee during a PR after 35 years of operation to remedy any anomaly or improve the protection of the "protected interests" under Article L. 593-1 of the Environmental Code are submitted to the ASN for authorisation.

The legal framework in France allows for legal challenges to such authorisation. This is an administrative procedure, which is not specific to long-term operation or to nuclear energy. In accordance with Article R. 311-1 of the Code of Administrative Justice, such legal challenges shall be introduced before the Council of State as a court of first and last instance.

Germany

Basic information

In Germany, seven nuclear power plants (NPPs) are in operation as of June 2019. Six of the NPPs are pressurised water reactors (PWRs) and one is a boiling water reactor (BWR). For each NPP, statutorily fixed end dates have been set by which the operation must end. These dates are as follows:

- NPP Philippsburg (operational since 1985): 31 December 2019;
- NPP Grohnde (operational since 1985): 31 December 2021;
- NPP Gundremmingen C (operational since 1985): 31 December 2021;
- NPP Brokdorf (operational since 1986): 31 December 2021;
- NPP Isar 2 (operational since 1988): 31 December 2022;
- NPP Emsland (operational since 1988): 31 December 2022; and
- NPP Neckarwestheim 2 (operational since 1989): 31 December 2022.

Therefore, no NPPs will be operated in Germany beyond 2022.

Since 2002, according to Section 7, Paragraph 1, Sentence 2 of the Atomic Energy Act,[1] no further licences will be issued for the construction and operation of installations for the fission of nuclear fuel for the commercial generation of electricity.

1. Gesetz über die friedliche Verwendung der Kernenergie und den Schutz gegen ihre Gefahren (Atomgesetz) [Act on the Peaceful Utilisation of Atomic Energy and the Protection against its Hazards (Atomic Energy Act)] of 23 December 1959, in the version of 15 July 1985 (Bundesgesetzblatt [Federal Law Gazette] (BGBl.) 1985 I, p. 1565), last amendment of 10 July 2018. An English translation of the Atomic Energy Act as last amended on 15 December 2016 is available at: www.bfe.bund.de/SharedDocs/Downloads/BfE/EN/hns/a1-english/A1-07-16-AtG.pdf?__blob=publicationFile&v=2.

Hungary

Basic information

Hungary has four nuclear power reactors operating at one nuclear power plant (NPP) as of June 2019. All of the reactors are pressurised water reactors (PWRs). These four nuclear power reactors have been operating for 30-39 years.

Hungary's four nuclear power reactors are operating past their original licensed life as of June 2019.

Hungary has no nuclear power reactors under construction as of June 2019, though a site licence for a new two-unit site has been issued.

Authorisation information

Designed and authorised periods

In Hungary, the initial licence for a nuclear power reactor has a specific term of 30 years, which is defined by the design lifetime of the reactor and justified in a safety report.

The service life of the reactor can be extended by an additional 20 years through the licensing process for lifetime extension (LTE). This 20-year LTE cannot be further extended.

Terminology

In Hungary, the process of extending the licensed life of a nuclear power reactor is called "authorisation for operation beyond design lifetime (operation licence)".

The operating period following the original licensed/designed life is called "operation beyond the design lifetime".

Main laws/regulations/documents for initial and long-term/extended operation

The main law in Hungary governing initial nuclear power reactor authorisations is Act CXVI of 1996 on Atomic Energy (Atomic Act) and its implementing governmental decrees.

LTE is also governed by the Atomic Act, as well as Government Decree 118/2011 (VII. 11.) "on the nuclear safety requirements of nuclear facilities and on related regulatory activities" and its "Nuclear Safety Code", Annex 4, Volume 4, "Operation of nuclear power plants".

Responsible government bodies

The Hungarian Atomic Energy Authority (HAEA) (Országos Atomenergia Hivatal – OAH), the national nuclear regulatory body, is responsible for reviewing the LTE application as well as for issuing the renewed licence.

Application and review timing

Four years prior to the end of the originally licensed life, the licensee must notify the HAEA of its intent to extend the design lifetime of the reactor and submit the LTE programme creating the necessary conditions for operation beyond the design service lifetime. The licence application for LTE must be submitted to the HAEA one year prior to the expiration of the original licence.

There is no set time frame by which the HAEA must complete its review of the licence application. As part of its review, the HAEA will make a determination on the approval or rejection of the application and, if the review results in an approval, issue a new operating licence (with possible conditions and restrictions).

Scope of review

Safety

Periodic safety reviews (PSRs) are required in Hungary every ten years. The PSR is conducted based on a government decree and an HAEA guideline on the implementation of the PSR.

The licensee is required to evaluate the status of the nuclear power reactor and prepare a PSR report, which is then provided to the HAEA. The HAEA reviews and evaluates the PSR report. Based on the HAEA's review of the PSR report, the HAEA may require that safety improvement measures be carried out during the next ten-year cycle. The PSR is closed through an HAEA resolution that may limit the validity of the licence if the risk justifies it or may order the implementation of safety improvement measures to reduce any unacceptable risk.

The PSR process is, however, separate from the LTE process. As part of the LTE process, the HAEA follows the implementation of the PSR safety improvement measures, as well as the experiences gained in the process to evaluate the LTE. The scope of the review of the LTE application is different, and it encompasses:

- systems, structures and components (SSCs) important to nuclear safety;
- those system components that do not belong in the above point, but the failure of which may hinder the SSCs important to nuclear safety to perform their functions; and
- SSCs included in the scope by specific authority decisions.

To obtain the licence for operation beyond the design lifetime, the licensee shall perform a comprehensive review to demonstrate that the ageing processes that require ageing management have been identified and are appropriately managed during the extended lifetime so that ageing processes do not endanger the ability of system components to function. Based on the results of the comprehensive review, the licensee shall identify whether new ageing management programmes need to be developed and implemented or if any of the available programmes need to be modified. In doing so, the licensee must:

- review and validate and/or update the time-limited ageing analyses (TLAAs);
- update the final safety analysis report;
- update the operational limits and conditions; and
- prepare additional modified documents as required.

Environmental

The review of the licence application for LTE includes an environmental review. This review is conducted by the Government Office for Baranya County (GOBC),[1] which is the relevant environmental protection authority. An environmental impact assessment (EIA) is conducted by the licensee and is submitted as an annex to the licence application, which is then reviewed and approved by the GOBC.

It should be noted that there was no requirement for an EIA during the initial licensing of the four currently operating nuclear power reactors. Therefore, it was made obligatory that before the LTE request would be granted, an EIA that leads to an environmental licence be performed. The environmental licence is not issued by the HAEA, but rather by the GOBC.

1. The capital or county government offices are territorial state administrative organs of the government with general competence and, as such, are the highest administrative units at the territorial level.

New safety requirements

New safety requirements can be imposed upon the licensee through the PSR process. In addition, new safety requirements can also be imposed through specific safety reviews like the comprehensive and transparent risk and safety assessment required by the European Commission after the Fukushima Daiichi NPP accident (the so-called "stress tests", referred to as "Targeted Safety Reassessment" or TSR in Hungary).

Transboundary notification

The LTE authorisation process does include a requirement for transboundary notification and consultation within the framework of the EIA.

Public participation

Public participation is allowed during the LTE authorisation process. The decision-making authority has a legal duty to solicit public participation. This duty is found in the Atomic Act, Section 11/A(1)(a), (4) and (5).

The applicant/licensee, however, does not have a legal duty to solicit public participation.

During the LTE process in Hungary, those defined as "clients" (in addition to the licensee, this includes owners of all real estate situated within the impact area and those persons whose rights for the real estate are recorded in the real estate register) as well as non-governmental organisations (NGOs) may participate in the authorisation process. Prior to making a decision on the licence application, the HAEA is required to obtain the opinion of the public by holding a public hearing. The HAEA must inform the stakeholders about the location and time of the public hearing at least 15 days before the hearing through public notice and by publication on its website. In addition, the special authorities contributing in the procedure must also be informed about the location and time of the public hearing at least 15 days before the hearing.

Access to information

The decision-making authority has a legal duty to provide information to the public during the LTE process. As with public participation, this duty is found in the Atomic Act, Section 11/A. The HAEA must provide to the public the record of the public hearing.

Within the framework of the EIA, Government Decree No. 314/2005 (XII. 25.) Korm. on Environmental Impact Assessments and the Single Environmental Use Approval Procedure, Section 21, "Information and involvement of the public in the single environmental licensing procedure" provides the requirements for the GOBC.

The licensee, on the other hand, does not have a legal duty to provide information to the public during the LTE process.

Legal challenges

Legal challenges to LTE authorisations are allowed. LTE authorisations, however, have not yet been subjected to legal challenges. The procedure to challenge LTE authorisations is an administrative court procedure and it is outlined in the following laws:

- Act CL of 2016 on the Code of General Administrative Procedure;
- Act I of 2017 on the Code of Administrative Court Procedure; and
- the Atomic Act.

Those defined as “clients” as well as NGOs may legally raise challenges to LTE decisions. The HAEA is the subject party of the challenge. The LTE authorisation decision is the subject of the challenge.

Potential parties have 30 days following the issuance of an LTE authorisation decision to raise a challenge. This challenge must be submitted to the decision-making authority (the HAEA) within 30 days. This will then be forwarded to the Budapest-Capital Regional Court within 15 days. This is the court of final resort and no further appeals are available.

Italy

Basic information

Italy has four operating research reactors, no operating nuclear power reactors and no nuclear power reactors under construction as of June 2019.

Japan

Basic information

Japan has 37 nuclear power reactors in operation, or that have suspended their operation, at 16 nuclear power stations (NPSs) as of June 2019. Of these, 25 reactors have applied for the conformity review to meet the regulatory requirements set after the Tokyo Electric Power Company (TEPCO) Fukushima Daiichi NPS accident, and 12 have not taken action to either apply for the conformity review or declare decommissioning as of June 2019.

An additional 20 reactors are under decommissioning. Of these, 15 reactors have been approved for decommissioning (including the 6 reactors at the TEPCO Fukushima Daiichi NPS, 2 reactors declared decommissioning but have not yet applied the decommissioning plan, and 3 reactors submitted the decommissioning plan to the regulatory body.

Table 3.3. **Status of reactors**

Total reactors		**37**	PWR 16 BWR 21
Applied for conformity review		25	PWR 16 BWR 9
	Under review	10	PWR 4 BWR 6
	Approved	15	PWR 12 BWR 3
	Restarted	9	PWR 9 BWR 0
No action yet taken		12	PWR 0 BWR 12
Under decommissioning		**20**	GCR 1 PWR 8 BWR 11

Among the 37 reactors that have either already applied for the conformity review (25 reactors) or whose future plans are not yet known (12 reactors), 16 reactors are pressurised water reactors (PWRs) and 21 are boiling water reactors (BWRs). The 37 reactors are at the following lifetimes:

- 0-9 years 1
- 10-19 years 4
- 20-29 years 15
- 30-39 years 13
- 40-49 years 4

Following the TEPCO Fukushima Daiichi NPS accident, the operational period was limited to 40 years and an extension of up to 20 years was possible upon approval by the regulatory body. Thus far, 4 nuclear power reactors were approved for the 20-year extension as of June 2019.

The remaining 33 reactors will reach the 40-year operation limit in each of the following time periods:

- 2020-2029 13
- 2030-2039 15
- 2040-2049 5

In addition to these, three nuclear power reactors are under construction and two of them have applied for the conformity review as of June 2019.

Authorisation information

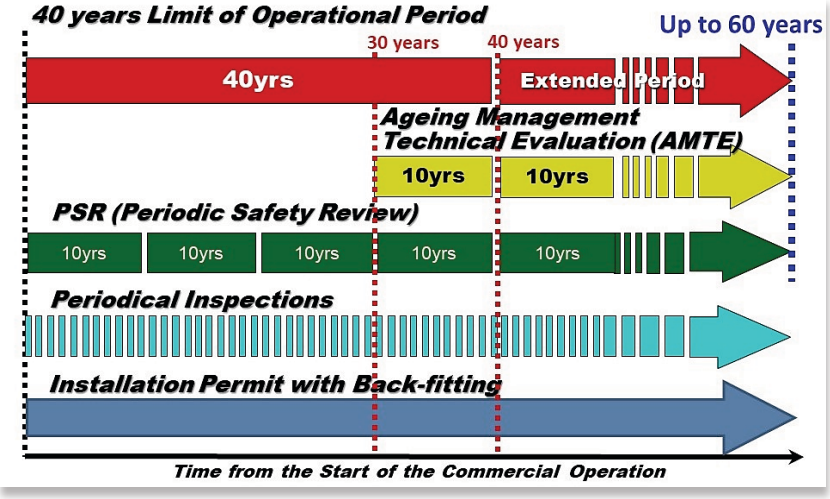
Designed and authorised periods

In Japan, the operational period for a nuclear power reactor has a specific term of 40 years from the day on which construction work for installing the said reactor has passed the inspection set forth in Article 43-3-11(1) of the Reactor Regulation Act[1] for the first time, known as the pre-service inspection (Article 43-3-32(1) of the Reactor Regulation Act).

A period of extended operation can be authorised for up to 20 years. A subsequent period of extended operation is not possible.

Figure 3.2 provides a schematic view of the operational period, overlaid with the relevant regulatory requirements. An Ageing Management Technical Evaluation (AMTE) is required every 10 years after a nuclear power reactor's operational period reaches 30 years (Article 82 of the NRA Ordinance Concerning the Installation and Operation of Commercial Power Reactors). A periodic safety review (PSR) is required every ten years for all reactors as part of Periodic Safety Assessment of Continuous Improvement (takes place every five years), and the assessment also includes a probabilistic risk assessment and a stress test.

Figure 3.2. **The operational period and other relevant regulations**



Source: Nuclear Regulation Authority, Japan

1. Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors, Act No. 166 of 10 June 1957 (Reactor Regulation Act).

Terminology

In Japan, the process of extending the operational period of a nuclear power reactor is called "approval of extension". The term for the operational period following the initial 40-year operational period is called "extended operation".

Main laws/regulations/documents for initial and long-term/extended operation

The main law governing both initial nuclear power reactor authorisation as well as the authorisation of extended operation is the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors (Reactor Regulation Act).

Responsible government bodies

The Nuclear Regulation Authority Japan (NRA), the national regulatory body, is responsible for reviewing the application for extension of the operational period, as well as for the conformity review to the new regulatory requirements.

Application and review timing

Applications for extended operation must be submitted not less than one year before the expiration of the operational period (i.e. the 40-year period since the day on which the reactor first passed the pre-service inspection). The operational period may be extended only once upon the expiration thereof by obtaining the approval of the NRA (Article 43-3-32(2) of the Reactor Regulation Act).

Looking back at past reviews, the NRA has completed its review and approval processes by the due dates.

Scope of review

Safety

The safety review for authorising extended operation consists of an assessment of the status of degradation of the reactor and any other equipment due to their extended operation (Article 43-3-32(5) of the Reactor Regulation Act). The conformity of the reactor to the regulatory requirements in effect at the time the 40-year operation limit is reached is a prerequisite for the extension approval. Therefore, applicants for extended operation must apply for the conformity review before applying for the extension.

Applicants for the extension must submit three documents, which describe the i) results of a special inspection; ii) results of an assessment of the status of degradation; and iii) a Long Term Maintenance Management Program, with an application for extension of the operational period (Article 113(2) of the NRA Ordinance Concerning the Installation and Operation of Commercial Power Reactors).

Applicants must perform a special inspection to assess the current state of the plant in detail, especially to detect any degradation, carry out a technical evaluation of any degradation and describe their Long Term Maintenance Management Program.

Based on the result of the special inspection, applicants must assess the degradation status and document the result for the assessment of degradation status. The assessment includes a technical ageing evaluation wherein all class 1, 2 and 3 systems, structures and components (SSCs) are analysed and the ageing degradation of SSCs are predicted. In addition, applicants must demonstrate how it conforms both with the technical criteria for six types of degradation phenomenon, as well as with the technical criteria for the seismic and tsunami safety evaluation considering plant ageing.

Then, applicants must make a Long Term Maintenance Management Program considering the result of the assessment of degradation status. The Program includes additional maintenance measures during the extended operation period.

The NRA may grant the approval for extended operation only if it finds that the reactor will continue to operate in conformity with the standards for ensuring the safety during the period of extended operation specified in the NRA Ordinance Concerning the Installation and Operation of Commercial Power Reactors.

The result of the review for extension of the operational period is summarised and published by the NRA.

Environmental

There is no environmental review in the authorisation process for extended operation. Licensees are, however, required to conduct an environmental assessment within the framework of the Periodic Safety Assessment of Continuous Improvement as stipulated in the Reactor Regulation Act (Article 43-3-29). The Periodic Safety Assessment of Continuous Improvement requires the licensee to conduct an evaluation of the safety of the power reactor facility not later than six months after the day on which the periodic facility inspection ends. For reactors restarting after the conformity review with the regulatory requirements set after the TEPCO Fukushima Daiichi NPS accident, the first assessment should be conducted within six months after the first periodic inspection ends. The licensee must report the results of the evaluation to the NRA without delay and disclose the results.

New safety requirements

Regardless of whether a reactor is new or existing, all operational reactors must conform to the latest regulatory requirements. Thus, when a regulatory requirement is amended, licensees must take necessary measures to conform to the new requirement within a certain grace period (Article 43-4-23 of the Reactor Regulation Act). This process takes place outside of the authorisation process for extended operation.

Transboundary notification

There is no requirement for transboundary notification and consultation in the authorisation process for extended operation.

Public participation

While neither the decision-making authority nor the licensee has a legal duty to solicit public participation for the review of extended operation, the NRA solicits public comments on drafts when it introduces new requirements or amends them.

Access to information

To ensure the transparency of the decision-making and authorisation processes to the public, all documents relating to the evaluation performed by the licensee and the review performed by the NRA are open to the public, and the NRA Commission Meetings and conformity review meetings are broadcast whenever possible. Minutes of those meetings are posted on the website within several days after the meetings.

In addition to the above information disclosed by the NRA, as one of the administrative organisations of government, the NRA has a legal duty to provide documents on request, unless the information is classified as information not subject to disclosure under the Act on Access to Information Held by Administrative Organs.

On the other hand, the licensee has no duty to provide information to the public during the long-term operation (LTO) process.

Legal challenges

Legal challenges to authorisations for extended operation are allowed. Authorisations for extended operation have been subjected to legal challenges.

There are two procedures to challenge authorisations for extended operation and both are administrative. These procedures can be found in the following two laws:

- the Administrative Complaint Review Act; and
- the Administrative Case Litigation Act.

Both an administrative complaint and an administrative case litigation can be filed by a person who has a legal interest to seek action for revocation of an original administrative disposition. An individual can select to either bring a challenge to the agency (the Administrative Complaint Review Act) or bring a case to the court (the Administrative Case Litigation Act).

There is a geographical component to establishing standing to challenge an authorisation decision for extended operation. The question is whether or not it is possible that the area in question suffers serious damage as a direct result of a nuclear reactor accident, etc. This determination will be made on a case-by-case basis, considering the distance between the residential area and the nuclear reactors in light of a social norm.

The authorisation decision is the subject of the challenge.

Administrative Complaints under the Administrative Complaint Review Act

The NRA is the subject party of a challenge raised under the Administrative Complaint Review Act.

For an administrative complaint, the request for review must be filed not later than three months from the day following the day on which the relevant person comes to know that the disposition or judgement of administrative appeal was reached.

The request for review must first be raised with the NRA and the NRA will make an administrative disposition on the appeal. When the person seeks revocation of the administrative disposition on appeal, an administrative case litigation can be filed (see the following paragraphs on Administrative Lawsuits under the Administrative Case Litigation Act).

Administrative Lawsuits under the Administrative Case Litigation Act

The NRA and the Minister of Justice can both be the subject parties of a challenge raised under the Administrative Case Litigation Act.

For an administrative lawsuit, the request for revocation of the original administrative disposition or administrative disposition on appeal must be filed not later than six months from the day following the day on which the relevant person comes to know that the original administrative disposition or administrative disposition on appeal was reached.

The request for revocation of the original administrative disposition or administrative disposition on appeal must first be raised in the appropriate district court.

For suits requesting revocation of an administrative decision, appeals are to be brought before the high court. The legal basis to raise an appeal can be found in Article 281 of the Code of Civil Procedure.

Appeals from the high court are to be brought before the Supreme Court, which is the court of final resort. The legal basis to raise an appeal can be found in Article 311 of the Code of Civil Procedure.

Korea

Basic information

Korea has 24 nuclear power reactors operating at 6 nuclear power plants (NPPs) as of June 2019. Of these, 20 of Korea's reactors are pressurised water reactors (PWRs) and 4 are pressurised heavy water reactors (PHWRs). The 24 nuclear power reactors are operating at the following lifetimes:

- 0-9 years 5
- 10-19 years 4
- 20-29 years 7
- 30-39 years 8

One of Korea's nuclear power reactors is operating past its original licensed life as of June 2019. Korea's nuclear power reactors will enter the period of long-term/continued/ extended operation in each of the following time periods:

- 2020-2029 10
- 2030-2039 4
- 2040-2049 4
- Post 2050 5

Korea has five nuclear power reactors under construction.

Authorisation information

Designed and authorised periods

In Korea, licences are issued for a specific term and that term is determined by the design life of the reactor. The design life for PHWRs in Korea is 30 years, for PWRs the design life is 40 years and for an advanced PWR the design life is 60 years.

A periodic safety review (PSR) report is required every ten years and continued operation can be authorised for an additional ten years beyond the original design life.

Terminology

In Korea, the terminology for the process of extending the licensed life of a nuclear power reactor is called "authorisation for continued operation".

The period of nuclear power reactor operation after the originally licensed life is called "continued operation".

Main laws/regulations/documents for initial and long-term/extended operation

The main law in Korea for nuclear power reactor authorisations is the Nuclear Safety Act.

The main document governing the authorisation for continued operation is the "Enforcement Decree of the Nuclear Safety Act" and in particular Articles 36(4), 37(2), 38(2) and 39. Further details are provided in an Ordinance of the Prime Minister, the "Enforcement Regulation of the Nuclear Safety Act", in particular, Articles 20(2), "Details of Periodic Safety Review" and 21(4) "Standards for Periodic Safety Reviews".

Responsible government bodies

The Korea Institute of Nuclear Safety (KINS), the technical support organisation in Korea, is responsible for reviewing the application for continued operation.

The Nuclear Safety and Security Commission (NSSC), the national nuclear regulatory body, is responsible for issuing the authorisation for continued operation.

Application and review timing

As mentioned above, a PSR is required by the operator every ten years from the date of the operating licence. The PSR report must be submitted to the NSSC within 18 months of the 10-year anniversary of the date the operating licence was granted. The NSSC must complete its examination of the PSR, its review of the results of the KINS safety review and issue the results of its review within 12 months.

Applications for continued operation must be submitted by the operator to the NSSC between two to five years before the expiration of its original design life, including every ten years thereafter. The NSSC must examine the report and issue the results of its review within 18 months.

Scope of review

Safety

To apply for continued operation following the original design life, in addition to undertaking a PSR, the operator must submit a Lifetime Analysis Report on Major Equipment, which contains an assessment of the life of major systems, structures and components in consideration during the period of continued operation.

Environmental

The authorisation process for continued operation does include an environmental review in the form of a Radiation Environmental Report, which assesses the changes in the radiological environmental impact since the issuance of the operating licence. According to the "Standard Format and Content of Radiation Environmental Report for Nuclear Power Utilization Facilities" (Notice No. 2017-16 of the NSSC), the following should be included in the Report:

- overview of the construction plan;
- status of environment and facility;
- environmental impact due to construction, operation and accidents;
- environmental monitoring plan;
- overview and result of gathering residents' opinion; and
- an overall assessment.

The Report predicts along which path(es) effluents or emissions move(s) and how far it spreads, as well as assesses radiation doses.

New safety requirements

New safety requirements can be imposed upon the licensee during the authorisation process for continued operation through the assessment of the PSR report.

Transboundary notification

The authorisation process for continued operation does not include a requirement for transboundary notification and consultation.

Public participation

Public participation is allowed during the continued operation authorisation process. While the decision-making authority does not have a legal duty to solicit public participation, the operator does have such a duty. This duty is found in Article 103, "Gathering of Residents' Opinion", in the Nuclear Safety Act.

During the operator's preparation of the Radiation Environmental Report, the operator shall gather opinions from residents within the scope determined by the NSSC, upon making the draft Radiation Environmental Report available to the public for inspection or by holding a public hearing. The operator must describe, in general, each resident's opinion in the final Radiation Environmental Report, whether the opinion will be reflected in the assessment and, if not, why not. In such cases, a public hearing shall be held if there is a request from the head of a local government having jurisdiction over the area in which residents' opinions are to be gathered, or from the residents within the scope prescribed by Presidential Decree.

Access to information

As in the above for public participation, the decision-making authority does not have a legal duty to provide access to information during the authorisation process for continued operation, but the operator does have such a duty. The duty is the same as specified above in Article 103, to make the draft Radiation Environmental Report available to the public for inspection.

Legal challenges

Legal challenges to authorisations for continued operation are allowed. Continued operation authorisations have been subjected to legal challenges.

There are no specific procedures to challenge authorisations for continued operation. Instead, general administrative law procedures are utilised. Articles 107(2) and 107(3) of the Korean Constitution provides for an administrative litigation and an administrative appeal. The procedures for a challenge can be found in the Administrative Appeals Act and the Administrative Litigation Act.

The licensee and residents in a limited geographical region can challenge authorisation decisions for continued operation. The administrative agency that made the decision is the subject party of the challenge. In the case of a challenge to the authorisation for continued operation, the subject party would be the NSSC. The authorisation decision is the subject of the challenge.

There are two main types of challenges that can be raised in both an administrative appeal and an administrative litigation. The first is a request for revocation or modification of an agency decision based on a claim that the administrative agency's decision is illegal. The second is a request to affirm either the effectiveness or ineffectiveness of an administrative agency decision, or the existence or non-existence of such decision.

In addition, under an administrative appeal, a request can be made for a specified disposition against an illegal or unjust decision of refusal or omission rendered by an administrative agency with respect to an application by the relevant party. In an administrative litigation, a request can only be made that a court declare that such omission is illegal.

For an administrative appeal, challenges must be raised before the Administrative Appeals Commission or before the administrative agency within 90 days from the date a disposition is known and not later than 180 days after the date on which the authorisation was granted. For an administrative litigation, challenges must be raised before the Administrative Court within 90 days from the date a disposition is known and not later than one year after the date on which the authorisation was granted.

Decisions of the Administrative Court are appealed to the High Court, while decisions of the Administrative Appeals Commission can be appealed before the District Court based on a claim that the adjudication itself is illegal. Appeals from decisions of the High Court can be raised before the Supreme Court, which is the body of final resort.

Netherlands

Basic information

The Netherlands has one operating nuclear power reactor as of June 2019, which is a pressurised water reactor (PWR) located at Borssele. This nuclear power reactor started its commercial operation in 1973, with an initial technical design life of 40 years. It therefore entered its period of operation beyond the initial designed life in 2013 and has been operating for 45 years as of June 2019. At present, there are no nuclear power reactors under construction in the country.

Authorisation information

Designed and authorised periods

In accordance with the legal framework in the Netherlands, the initial licence for the operation of a nuclear power reactor is granted with an indefinite term. While the operating licence for the Borssele nuclear power plant (NPP) is granted for an indefinite term, the technical design life of the Borssele NPP, however, was demonstrated for up to 40 years of operation (until the end of 2013). This demonstration was laid down in the original Safety Report, which forms a part of the initial operation licence granted in 1973. In 2013, the operator demonstrated that the installation could still meet the technical requirements after 2013 (until at least the end of 2033). Therefore, in 2013, the Safety Report was updated with this documentation and the technical design life (duration of the operation for which technical safety has been demonstrated) was adjusted accordingly. Because the Safety Report was part of the licence, the licence also had to be amended. Apart from updating the Safety Report, there was no need for physical changes of or works at the installation, nor for an update or reconsideration of the operating time of the licence, because the licence has been issued for an indefinite period.

It is important to note that the procedure to amend the operating licence of a nuclear power reactor beyond its technical design life has been distinct from the periodic safety review (PSR), which is carried out every ten years. This approach was taken in order for the Safety Report process to be carried out in a timely manner; although combining or integrating the Safety Report process with the 2013 PSR was possible, it would have been too late. If it had been handled within the PSR process, the PSR would have been routine, but with special emphasis on ageing management and time-limiting aspects.

Due to the indefinite term of the initial operating licence, there is in theory no definitive standard time limit for the operation of a nuclear power reactor. Therefore, the total operating period of a nuclear power reactor depends on the demonstration of its safety, subject to the approval of the nuclear regulatory body. In the case of the Borssele NPP, the operation beyond the original technical design life was authorised for an additional 20 years, from 2013 to 2033, by updating the Safety Report. This authorisation is subject to additional confirming measurements and assessments that shall be provided by the operator to the nuclear regulatory body by 2020 at the latest.

Apart from this, in 2006 the government of the Netherlands concluded an agreement, referred to as “the Covenant”, with the owners of the Borssele NPP. The Covenant did not relate to the long-term operation (LTO) licence or restrict it in any way. Also, without the Covenant, the LTO licence would have taken place in the same way. The Covenant was the result of a long-lasting political discussion with the Dutch parliament in the period 1995-2006 about the final shutdown date of the Borssele NPP. The operator of the Borssele NPP agreed in the Covenant on

the limitation of the operating time, that is licensed for an indefinite term, to the ultimate shutdown date of 31 December 2033, in exchange for certainty and clarity about this date. This limitation of the operating time of the Borssele NPP with an ultimate shutdown date remained subject to the explicit condition that the NPP would continue to operate safely during the agreed period. The Covenant also includes terms concerning substantial investments by the operator and its shareholders to promote the transition to more sustainable energy management systems ("sustainability package"). Finally, supplementary agreements have been made in relation to the reactor's safety and the decommissioning of the Borssele NPP.[1] It should be noted that since 2011 the ultimate shutdown date of 31 December 2033 is also laid down in the Nuclear Energy Act. The licence is still valid for an indefinite period.

Terminology

The terminology in the Netherlands for the process of extending the designed life of a nuclear power reactor (the duration of the operation for which technical safety has been demonstrated) is referred to as LTO or extension of the design life. The period of operation beyond the original designed life of a nuclear power reactor is referred to as extended design life.

Main laws/regulations/documents for initial and long-term/extended operation

The main laws, regulations and documents governing the initial nuclear power reactor authorisations, as well as the operation beyond the initial technical design life of such reactors, include:

- the Nuclear Energy Act of 21 February 1963 (Stb. 1963, No. 82), as amended;
- the Decree on Nuclear Installations, Fissile Materials and Ores of 4 September 1969 (Stb. 1969, No. 403), as amended;
- the Ministerial Regulation on the Safety of Nuclear Installations of 6 June 2017 (Stcrt. 2017, 30889). This regulation is based on Directive 2014/87/Euratom of the Council of 8 July 2014 amending Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear facilities as transposed into the Dutch regulatory framework (during the LTO licence amendment, the Ministerial Regulation based on the 2009 version of the European Union (EU) Nuclear Safety Directive was applicable);
- the International Atomic Energy Agency (IAEA) codes and guides, and for LTO in particular: IAEA (2008), *Safe Long Term Operation of Nuclear Power Plants*, IAEA Safety Reports Series No. 57; and IAEA (2009), *Periodic Safety Review of Nuclear Power Plants*, Draft Safety Guide No. 426, revision of Safety Guide NS-G 2.10, now IAEA (2013), *Periodic Safety Review for Nuclear Power Plants*, Specific Safety Guide, IAEA Safety Standards Series No. SSG-25 as final document;
- Authority for Nuclear Safety and Radiation Protection (Autoriteit Nucleaire Veiligheid en Stralingsbescherming – ANVS) guidance document Dutch Safety Rules (VOBK), published in 2015 (not yet available during the LTO licence amendment);
- the Environmental Management Act of 13 June 1979 (Stb. 1979, No. 442), as amended;
- the Decree on Environmental Impact Assessment of 4 July 1994 (Stb. 1994, No. 540) as amended;
- the relevant provisions of the General Administrative Law of 4 June1992 (Stb. 1992, 315) as amended.

1. More information on the Covenant may be found in the National Report of the Kingdom of the Netherlands for the Seventh Review Meeting (March-April 2017) under the Convention on Nuclear Safety, available at: http://english.autoriteitnvs.nl/binaries/anvs-en/documents/report/2016/09/06/national-report-of-the-kingdom-of-the-netherlands-for-the-seventh-review-meeting-march-april-2017/rapport-voor-de-7de-internationale-toetsingsconferentie-verdrag-nucleaire-veiligheid.pdf.

Responsible government bodies

At the time of the LTO licence amendment in 2013, the body responsible for reviewing the application for LTO and for its authorisation was the Minister of Economic Affairs. Since 1 August 2017, the regulatory body is the ANVS. The ANVS carries out its duties independently.

Application and review timing

The legal framework in the Netherlands does not provide for a fixed date/period regarding an amendment of an operating licence to allow for LTO. In the case of the Borssele NPP, the ANVS required the licence holder to prepare an application for LTO in 2007, after 34 years of operation. The formal application for an amendment of the (indefinite) operating licence was submitted in 2012, more than one year prior to the end of the design life. Between 2007 and 2012, the licence holder, in agreement with the Minister of Economic Affairs, carried out the process to produce all the documents required for the safety case, which were reviewed by the Minister. In addition, two IAEA Safety Aspects of Long Term Operation (SALTO) missions were conducted during this period, respectively in 2009 and 2012. In the safety case, the licence holder provided the substantiation for a design life of 60 years for the Borssele NPP within the relevant technical parameters. As a result, the Safety Report attached to the operating licence had to be updated with the results of the safety case and of the two aforementioned SALTO missions. This update required an amendment of the operating licence.

In parallel, the regular PSR process took place during the 2011-2013 period as did the post-Fukushima EU stress tests, both of which led to further amendments of the licence in 2015 and required safety improvements during the 2012-2018 period. A limited number of safety-related improvements is/will be further implemented during the 2018-2020 period, and the next PSR is expected to be carried out in 2021-2023 (evaluation phase) and 2024-2028 (implementation of safety improvement measures).

Scope of review

Safety

The scope of the safety review for the LTO programme is limited to the ageing management and time-limited aspects of the nuclear power reactor. Thus, this scope is narrower than that of decennial PSRs, which are a legally distinct process. Both processes could and would have been combined or integrated if the PSR had been scheduled earlier. As previously mentioned, the scope of the safety-related review of the LTO programme was assessed by an IAEA SALTO mission in 2009, to ensure that such review would be comprehensive and state-of-the-art.

As part of the safety review of the LTO programme, the following documents have to be provided by the licence holder:

- all reports resulting from the framework defined in IAEA Safety Reports Series No. 57, including adequate programmes for maintenance, in-service inspection, surveillance, chemistry and equipment qualification;
- the assessment of design calculations and safety analyses containing time-related assumptions (40 years);
- the ageing assessments and ageing management programmes;
- all reports resulting from the framework defined in IAEA Draft Safety Guide 426 (today final as SSG-25), Safety Factors (SF) 10 ("Organization, the management system and safety culture") and SF 12 ("Human factors");[2] and

2. IAEA (2013), *Periodic Safety Review for Nuclear Power Plants*, Specific Safety Guide, IAEA Safety Standards Series No. SSG-25, pp. 40-44, 46-47, IAEA, Vienna.

- various documents regarding non-technical issues in the areas of organisation, administration and human factors.

At the end of its review of the LTO programme, regulatory body (since 2017, the ANVS) issues assessment reports for the aforementioned documents, as well as an all-encompassing Safety Evaluation Report, prior to the granting of an amended operating licence.

Environmental

An environmental impact assessment (EIA) is not systematically required as part of the LTO programme review. An EIA would only be required if the safety-related assessment of the LTO programme demonstrated the need for physical changes to the nuclear power reactor that would be imposed through the LTO licence amendment process. In the case of the Borssele NPP, the Minister of Economic Affairs (as the former regulatory body) concluded at that time that there was no need for any physical changes of the installation to authorise LTO; the only change that was needed in the context of LTO was an update of the Safety Report that was annexed to the licence. Therefore, taking into account the unlimited term of the initial operating licence, there were no expected changes to environmental impacts to assess.

New safety requirements

The regulatory body (since 2017 the ANVS) can decide on its own initiative to add new safety requirements as part of the amendment of the operating licence to allow for the LTO of nuclear power reactors. In addition, new requirements can be imposed by ANVS on the licence holder at any time, on a continuous improvement basis, in accordance with the Ministerial Regulation on the Safety of Nuclear Reactors.

Transboundary notification

The LTO programme assessment by ANVS does not include any specific requirement for transboundary notification. Transboundary notification always depends on the outcome of the EIA screening. When the outcome is that significant adverse transboundary environmental impacts may be expected, transboundary notification is required. There is no obligation to do so in the absence of such effects. The latter was found to be the case in the context of the LTO licence amendment for the Borssele NPP in 2013. The amendment of the Borssele NPP licence was needed because of the necessary update of the Safety Report, which was annexed to the operating licence. There was no need for a modification of the installation as such, nor for an update or reconsideration of the validity of the operating licence, as the operating licence was valid for an indefinite time and limited by the Nuclear Energy Act to the ultimate shutdown date of 31 December 2033. Nevertheless, in 2013, the Belgian authorities in the border region and the Belgian regulatory body, the Federal Agency for Nuclear Control (FANC), have been actively informed by the Dutch regulatory body about the LTO licence procedure and the possibility to express views.

Public participation

The legal duty to solicit public participation during the LTO-approval process depends on the outcome of the LTO-review process. The decisive question is whether other or greater environmental impacts are to be expected if the licence is granted than those that were previously considered in the context of the earlier issued licence. Although the regulatory body did – in accordance with the Netherlands' General Administrative Law and Article 17(1) of the Nuclear Energy Act – solicit public participation during the LTO process in 2013, the Dutch Nuclear Energy Act did not require the regulatory body to do so. As previously indicated, in the specific case of the Borssele NPP, no physical changes to the reactor or update or reconsideration

of the validity of the operating licence was necessary due to LTO, and therefore no environmental impacts were to be expected.[3]

As part of the public participation process, any individual and/or organisation, including those residing/registered abroad, is allowed to express their views on the draft licence decision orally, in writing or via electronic communication. The draft licensing decisions are normally open for public comments for a period of six weeks. The views expressed by members of the public may relate to technical safety or to other environmental aspects, e.g. radiological protection or conventional environmental aspects. However, views that do not relate to the concerned licence decision and to the interests protected by the Nuclear Energy Act, or that are not duly motivated, have little chance of success. Public hearings may be organised by the regulatory body upon request from members of the public and at the regulatory body's own initiative depending on the nature and the complexity of the licence decision, including the environmental impact, social impact and/or political sensitivity. The views expressed by members of the public are made part of the final licensing decision, and the ANVS has a duty to respond to those views with appropriate justification.

The duty to solicit public participation in the licence procedure rests solely on the ANVS as the regulatory body and does not extend to the licence holder. The information provided by the applicant in the licence application has to be sufficient to allow for effective public participation.

Access to information

The regulatory body also has a legal duty to provide information to the public during the authorisation process, in accordance with Section 3.4 of the General Administrative Law in the Netherlands.

The safety-related information that must be made available to the public includes the application, the Safety Evaluation Report, all the aforementioned documents generated by the licence holder and/or the regulatory body as part of the assessment, the draft licensing decision and the final licensing decision. In addition, the regulatory body must also make the EIA available to the public, if an EIA is required.

The legal duty to provide information to the public rests on the regulatory body and on the licence holder in accordance with the aforementioned Ministerial Regulation on the Safety of Nuclear Installations. The licence holder shall provide the population, local authorities and stakeholders in the vicinity of the nuclear installation with the necessary information about its safety. This includes the provision of information about normal operations of the nuclear installation and the immediate provision of information about any abnormal event taking place in the nuclear installation with non-negligible consequences from a nuclear safety perspective, or in the event of a radiation incident, accident or radiological emergency in that facility. In providing information, the licence holder shall pay particular attention to the population, local authorities and stakeholders in the vicinity of the nuclear installation.

Legal challenges

Legal challenges to any amendment of an operating licence of a nuclear power reactor, including LTO, are allowed in the Netherlands, in accordance with the general Administrative Law (Chapters 6 and 8).

This administrative law procedure is open to any individual and/or organisation that is an interested party and that earlier expressed their views on the draft licensing decision, as described above. An organisation is an interested party if it appears from the statute of that

3. Regarding the "Findings and recommendations with regard to communication ACCC/C/2014/104 concerning compliance by the Netherlands: Adopted by the Compliance Committee on 4 October 2018", ECE/MP.PP/C.1/2019/3 (21 Jan. 2019) (see also paragraph 42), the Netherlands is considering an adjustment to Article 17 of the Nuclear Energy Act so that for any future change in the duration of a nuclear activity (for both operating and design life), the licensing procedure always includes public participation.

organisation that is has a direct interest in the licensing decision. An individual is an interested party when he or she lives within a radius of 20 km from the concerned NPP. This 20 km radius is the result of jurisprudence of the Council of State (Raad van State) and corresponds to the emergency preparedness zone in place at that time.

Legal challenges to the authorisation of LTO are directed against the decision of the regulatory body to amend the operating licence, including LTO, and the regulatory body therefore acts as the defendant in the proceedings.

The main legal basis for such a challenge is found in:

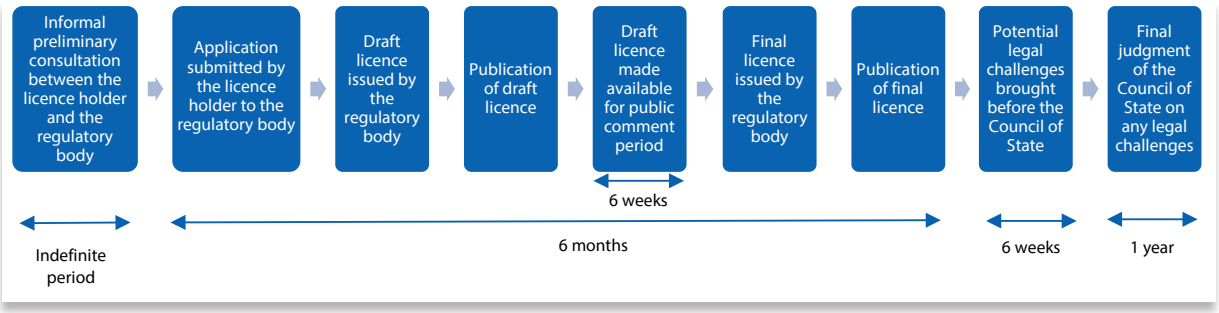
- Article 15(b) of the Nuclear Energy Act, which states that a licence may only be denied to the applicant in the interest of: the protection of people, animals, plants and goods (whether from radiation-related or non-related impacts); the security of the state; the storage and security of fissile materials and ores and the security of installations; the payment of compensation due to third parties for damage or injury inflicted on them; and the fulfilment of international obligations.

This legal basis is further detailed by:

- Article 18 of the Decree on Nuclear Installations, Fissile Materials and Ores, which states that no licence may be granted under Article 15 of the Nuclear Energy Act if the licence holder does not meet the requirements regarding radiation protection (justification, ALARA and dose limitation) and the requirements regarding design-basis and beyond design-basis accidents;
- nuclear safety principles, as described in the Ministerial Regulation on the Safety of Nuclear Installations, which are based on the IAEA (2006), *Fundamental Safety Principles*, IAEA Safety Standards Series No. SF-1; and
- radiation protection principles as described in Decree on the Basic Safety Standards (Bbs).

Legal challenges to a decision to amend a licence must be raised no later than six weeks after the final licensing decision is issued and published. These challenges are brought before the Council of State, which is the highest independent court in the administrative legal order in the Netherlands. For such challenges, the Council of State acts as the court of first and final instance, which means that its decision cannot be appealed to another national court.

Figure 3.3. **Timeline of licensing procedure and legal challenges in the Netherlands**



Source: Authority for Nuclear Safety and Radiation Protection (Autoriteit Nucleaire Veiligheid en Stralingsbescherming – ANVS).

In practice, a legal challenge to the decision of the Minister of Economic Affairs to authorise the LTO for the Borssele NPP was introduced before the Council of State in 2013 (Judgment 19 February 2014; ECLI:NL:RVS:2014:517).[4]

4. An unofficial translation of this ruling is available at: www.unece.org/fileadmin/DAM/env/pp/compliance/C2014-104/Correspondence_with_communicant/fmCommC104_19.09.2014/1.h_2014-02-14_Judgement_Raad_van_State_eng.pdf.

Poland

Basic information

Poland has one operating research reactor, no operating nuclear power reactors and no nuclear power reactors under construction as of June 2019.

Portugal

Basic information

Portugal has one operating research reactor, no operating nuclear power reactors and no nuclear power reactors under construction as of June 2019.

Romania

Basic information

Romania has two nuclear power reactors operating at one nuclear power plant (NPP) as of June 2019. Both of the reactors are pressurised heavy water reactors (PHWRs). These two nuclear power reactors are operating at the following lifetimes:

- 10-19 years 1
- 20-29 years 1

Romania's two nuclear power reactors are operating within their original licensed life as of June 2019. These two nuclear power reactors will enter the period of long-term operation (LTO) in each of the following time periods:

- 2020-2029 1
- 2030-2039 1

Romania has two nuclear power reactors under construction as of June 2019.

Authorisation information

Designed and authorised periods

In Romania, the operating licence for a nuclear installation is issued by the National Commission for Nuclear Activities Control (Comisia Naţională pentru Controlul Activităţilor Nucleare – CNCAN), the regulatory authority of Romania, for a specific period. In the past, the regulatory practice was to issue the licence for a nuclear power reactor with a specific term of ten years, with the possibility of the licence being renewed every ten years, taking into account the periodic safety review (PSR).

On 3 January 2019, a new regulation on licensing (NSN-22) came into force, which establishes that operating licences for nuclear installations are granted for the periods estimated by the applicant, taking into consideration the design basis, the ageing mechanisms, the operational experience available and the possibility for refurbishment. The licence can be revised and modified. The estimated period of operation can be revised and either extended or reduced based on the safety reviews (including the ten-year PSRs) performed during the operational lifetime of the nuclear installation. The existing licences will be subject to renewal in accordance with the new regulation NSN-22.

LTO is allowed for as long as it can be demonstrated that the safety analyses and design basis and licensing basis can remain valid, provided that the licensee complies with the operating limits and conditions. In general, the design lifetime of the PHWRs in Romania is equivalent to approximately 30 years of operation. Operation past this is considered LTO and is only allowed following an extended outage, where refurbishment occurs. In accordance with the new licensing regulation, refurbishment and LTO are considered part of the operational phase and are covered by specific limits and conditions in the operating licence.

Terminology

In Romania, the process of extending the licensed life of a nuclear power reactor is called "licence renewal", consisting basically of the revision and modification of the operating licence and of its specific limits and conditions.

There is no specific term for the operating period following the original licensed or designed life.

Main laws/regulations/documents for initial and long-term/extended operation

Law No. 111/1996 on the safe deployment, regulation, licensing and control of nuclear activities (Law) provides the legislative framework governing the safety of nuclear installations. The Law empowers the national nuclear regulator to, among other functions, issue mandatory regulations and issue licences for nuclear installations and activities.

In accordance with the new regulation NSN-22, the refurbishment and the re-commissioning and continued operation post-refurbishment are considered components of the operational phase of a nuclear installation. These activities are covered by specific limits and conditions in the operating licence, which takes account of the results of the PSR and greater focus is placed on ageing management to ensure that sufficient safety margins exist for the entire period for which the licence is requested and granted.

Responsible government bodies

The CNCAN – the national nuclear regulatory body – is responsible for reviewing the licence renewal application as well as for issuing the renewed licence.

Application and review timing

There is no specific requirement mandating when the licensee is required to apply for licence renewal. However, the new regulation NSN-22 includes a recommendation to all potential applicants to submit the necessary licensing basis documentation 18 months prior to the envisaged date for starting the actual activities for which the licence is needed. The regulations require that at all times the licensee demonstrates that the safety analyses and design basis for the nuclear installation remain valid and safe operation can be ensured for the period to be covered by the licence.

There is also no specific requirement mandating when the CNCAN must complete its review of the licence renewal application. Looking back at past reviews, the CNCAN generally completed its review process between six months to one month in advance of the due date.

Scope of review

Safety

As with the initial licensing, the scope of the licence renewal review encompasses a review of the current updated final safety analysis report (FSAR). In Romania, the FSAR is a living document and is updated on a continual basis. An updated FSAR for each unit is submitted to the CNCAN every two years. The updated FSAR contains the safety demonstration for the plant, taking into account the physical status of the installation, the impact of ageing, the safety upgrades performed and the current safety requirements, among other factors. In addition, a PSR is also required for each licence renewal.

The main document submitted to the CNCAN to justify operation post-refurbishment is the updated FSAR.

The CNCAN documents its review in various review and inspection reports, as well as with minutes of meetings that document the basis for the decision to request more information, to issue a licence or to reject an application.

Environmental

An environmental permit, issued by the Ministry of the Environment, is required at the initial licensing stage. The environmental permit is issued by the Ministry of the Environment and is necessary for starting the actual operation of the nuclear unit. The permit is valid for the entire period of operation, subject to annual verification performed by the Ministry of Environment.

The procedure for obtaining the initial environmental permit for a nuclear installation includes the obligation to perform and submit an environmental impact assessment (EIA).

New safety requirements

New safety requirements can be imposed through the normal enforcement process related to the current licence. It is not necessary to wait for licence renewal.

Transboundary notification

If an EIA is performed for licence renewal, neighbouring countries that could be affected by the installation are notified on the basis of the Espoo Convention,[1] to which Romania is a contracting party. This consultation process is managed by the Ministry of Environment, with support from the CNCAN with regard to the nuclear safety-related aspects.

Public participation

Public participation is allowed during the licence renewal process. The decision-making authority has a legal duty to solicit public participation. In Romania, this requirement is applicable for all installations requiring an environmental permit. The process for public consultation is managed by the Ministry of Environment and any interested party (including members of the public and non-governmental organisations) can provide comments, ask questions and offer suggestions. This can be done through a website hosted by the Ministry of Environment or through participation in public hearings organised by the Ministry of Environment. The CNCAN participates to provide input on nuclear safety-relevant topics.

The licensee, however, does not have a legal duty to solicit public participation. This is because the licensing process is administered by the national authorities, which act on behalf of the public. The licensee does, however, have general legal obligations to inform the public of its activities and of any incidents.

Access to information

The decision-making authority has a legal duty to provide environmental information to the public during the licence renewal process. This duty is found in specific environmental regulations regarding the EIA, which transpose relevant European Union (EU) Directives.[2] There is no duty, however, to provide nuclear safety-related information. But, in practice, although there is no explicit requirement to disclose nuclear safety information, basic nuclear safety information is provided in any public discussion of environmental protection.

The licensee, on the other hand, does not have a legal duty to provide information to the public during the licence renewal process.

1. Convention on Environmental Impact Assessment in a Transboundary Context (1991), 1989 UNTS 310, entered into force 10 September 1997 (Espoo Convention).
2. 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* (OJ) L 26 (28 Jan. 2012); 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, OJ L 124 (25 Apr. 2014).

Legal challenges

Legal challenges to licence renewal authorisations are allowed. Licence renewal authorisations, however, have not yet been subjected to legal challenges.

There is no specific procedure to challenge licence renewal authorisations. Law No. 111/1996[3] and Government Emergency Ordinance (GEO) No. 195/2005 on environmental protection[4] grant the right to challenge authorities' decisions in court, but there is no specific procedure provided for nuclear projects. The general legal procedure for filing a complaint against an authority in a court of law (Court of Appeal in Romania) is found in the Law No. 554/2004 on Administrative Litigation, as the licence renewal authorisation is considered an administrative document.

Any person (natural or legal) who considers they have been prejudiced or injured by a public authority's decision can challenge such decision in court. Depending on the issuing authority, the subject parties of the challenge can be the CNCAN or the Ministry of Environment. The authorisation decision, whether a licence renewal or an environmental permit, is the subject of the challenge.

The prejudiced or injured person must demonstrate an interest in filing their complaint. The prejudiced or injured person's claim is that they hold substantive rights or legitimate interests that have been prejudiced by an administrative authority through an administrative decision or failure to resolve a petition within the required deadline.

According to Article 2(1) of Law No. 554/2004, an injured right is "any fundamental right provided by the Constitution of Romania or by law, which has been harmed through an administrative decision". According to the same article, a private legitimate interest is "the possibility to require a certain conduct, in view of securing a subjective future and predictable right". A public legitimate interest is "an interest related to the rule of law and the constitutional democracy, the guaranteeing of the citizens' fundamental rights, liberties and duties, the satisfaction of the requirements of a community, the establishing of the jurisdiction of public authorities".

Any challenge must first be raised before the issuing authority, through a preliminary administrative procedure, prior to the formal complaint procedure in the court of law. In the case of a licence renewal authorisation, the challenge must be brought to the CNCAN. The challenge can be initiated after the licence renewal decision has been made and up to 30 days after the licence has been issued, in accordance with Article 7 of Law 554/2004. In exceptional cases, the prescription period can be extended up to six months. In the case of an environmental permit, any challenge must be raised before the licence renewal is issued. Once the licence has been issued, the procedure provided by Law 554/2004 must be used.

In the preliminary administrative procedure, the issuing authority will perform an investigation to verify if an administrative act or decision, such as a licence, was issued without a valid legal basis (i.e. there are faults in the legal basis for the authority's administrative decision, in this case the issuance of a licence). Otherwise, if all legal provisions in force have been complied with, in principle, there is no basis to overturn or modify a licensing decision.

If the response received from the issuing authority is not satisfactory to the petitioner, under the Administrative Litigation Law, an appeal can be brought to the Courts of Appeal in the territorial area where the headquarters of the issuing authority is located.

A decision by the Court of Appeal can be appealed again to the High Court of Cassation and Justice, which is the next level court after the Courts of Appeal. This appeal is based on the Code of Civil Procedure of 1 July 2010, Law No. 134/2010. This is the court of final resort.

3. Law No. 111/1996, Article 54, "Any natural or legal person having suffered a prejudice as a result of abuses made by the Commission or another body provided under this Law may lodge a complaint within thirty days with the contentious business falling within the competence of the administrative courts."

4. GEO No. 195/2005, Article 18, "Litigations generated by the issuing, revision, suspension or cancellation of the regulating documents shall be settled by the competent administrative disputed claims courts."

Russian Federation

Basic information

The Russian Federation has 35 nuclear power reactors operating at 10 nuclear power plants (NPPs) as of June 2019. Of these, 20 of the reactors are VVERs (a type of pressurised water reactor), 13 are light water-cooled graphite moderated reactors (with 10 reactors of the RBMK model and 3 reactors of the EGP model) and 2 reactors are fast breeder reactors. The 35 nuclear power reactors are operating at the following lifetimes:

- 0-9 years 7
- 10-19 years 2
- 20-29 years 2
- 30-39 years 14
- 40-49 years 10

Russia has 28 nuclear power reactors operating past their original licensed life as of June 2019. The additional seven nuclear power reactors will enter the period of extended operation in each of the following time periods:

- 2019-2029 2
- 2040-2049 3
- Post-2050 2

Russia has four nuclear power reactors under construction as of June 2019.

Authorisation information

Designed and authorised periods

The initial licence for nuclear power reactor operation in Russia provides for a specific operating period. The length of the term depends on safety justification documents and other documents provided by the licensee for the review. In general, the design lifetime of nuclear power reactors in Russia has been approximately 30 years. A periodic safety review (PSR) must be conducted every ten years of operation if the licence has been issued for more than ten years.

A new licence may be issued for various specific periods of extended operation (10 years, 15 years, etc.), and the length of the term is defined on the basis of the documents submitted by the licensee for review. A PSR must continue to be conducted every ten years during the period of extended operation if the licence has been issued for more than ten years.

Terminology

In Russia, the process of extending the licensed life of a nuclear power reactor is called “lifetime extension”. The operating period for the power reactor under a new licence is known as the “period of extended operation”. The terms are defined in the Federal Rules and Regulations “Major Requirements for Lifetime Extension of NPP Units” (NP-017-18).

Main laws/regulations/documents for initial and long-term/extended operation

Initial authorisations for nuclear power reactors are issued in accordance with the following:

- Federal Law No. 170-FZ, 21 November 1995 "On the Use of Atomic Energy" (Atomic Energy Law);
- Decree of the Government of the Russian Federation No. 280, 29 March 2013 "On Licensing Activities in the Field of Atomic Energy Use" (Licensing Decree);
- "Administrative Procedures for the Public Service of Licensing Activities in the Field of Atomic Use to be provided by the Federal Environmental, Industrial and Nuclear Supervision Service" (Order of the Federal Environmental, Industrial and Nuclear Supervision Service No. 453, 8 October 2014; Amendments: Order of the Federal Environmental, Industrial and Nuclear Supervision Service No. 444, 24 October 2017) (Order on Administrative Procedures);
- Federal Law No. 3-FZ, 9 January 1996 "On Radiation Protection of the Public" (Radiation Protection Law);
- Decree of the Government of the Russian Federation No. 1044 "On the Federal State Supervision in the Field of Atomic Energy Use" (15 October 2012); and
- "Provision on Safety Review (Safety Analysis Review) Procedure of Nuclear Facilities and (or) Types of Activities in the Field of Use of Atomic Energy" (approved by the Order of the Federal Environmental, Industrial and Nuclear Supervision Service No. 160, 21 April 2014).

Authorisations for extended operation are issued in accordance with the following:

- Federal Rules and Regulations in the Field of Atomic Energy Use "General Provisions for NPP Safety" (NP-001-15);
- Federal Rules and Regulations in the Field of Atomic Energy Use "Major Requirements for Lifetime Extension of NPP Units" (NP-017-18);
- Federal Rules and Regulations in the Field of Atomic Energy Use "Requirements to Resource Management of Equipment and Pipelines of Nuclear Power Plants" (NP-096-15); and
- Safety Guide "Recommendations to the Report on In-depth Safety Analysis of NPP Power Units under Operation (OUOB AS)" (RB-001-05).

Responsible government bodies

According to Article 26 of the Atomic Energy Law, the national nuclear regulatory body, the Federal Environmental, Industrial and Nuclear Supervision Service (Rostechnadzor), organises the safety review. The review itself is conducted by technical and scientific support organisations (TSOs) of the national nuclear regulatory body. For NPP units sited on Russian territory, the review is conducted by the Scientific and Engineering Centre for Nuclear and Radiation Safety (SEC NRS).

In addition, according to Article 26 of the Atomic Energy Law as well as to the Licensing Decree, authorisations (licences) for conducting activities in the field of atomic energy use, including a new licence for the extended operation period, are granted by regulatory bodies, namely Rostechnadzor.

Application and review timing

In compliance with Article 4 of the Federal Rules and Regulations in the Field of Atomic Energy Use "Major Requirements for Lifetime Extension of NPP Units" (NP-017-18): "Not less than five years prior to the end of the design life or extended operation period an operating organisation must conduct a safety assessment of an NPP unit and on the basis of the results of this assessment must make a decision on the possibility of continuing its operation or on decommissioning. This decision must be taken with the participation of reactor and NPP design developers."

State service on licensing of activities in the field of atomic energy use shall be provided in no more than 95 working days (excluding time spent on organisation and review of documents justifying nuclear and radiation safety of nuclear installations, radiation sources, nuclear material storage, radioactive substances, radioactive waste repositories and/or defined activities, provided by a licensee), if all the documents required by Rostechnadzor from federal executive bodies for the provision of licensing service were provided on time.

The review timing is set in the Terms of Reference for safety review (safety justification review). The review timing depends on the volume of documents provided in the application for a licence and on potential nuclear and radiation hazards of a facility.

Scope of review

Safety

As part of the review process for authorising extended operation, in accordance with paragraph 1.12 of Appendix 3 of the Order on Administrative Procedures, the licensee must submit the following documents, among others, justifying nuclear and radiation safety during the period of extended operation:

- final safety justification report updated according to the current condition of the NPP or a new document for safety justification of the NPP during extended operation;
- technical procedures for NPP operation;
- level 1 and 2 probabilistic safety assessments;
- emergency operating procedures for the NPP unit;
- beyond-design-basis (including severe) accident management guidance;
- personnel protection plan in case of an accident;
- quality assurance programme for NPP operation;
- measures compensating for deviations from the requirements of the Federal Rules and Regulations in the Field of Atomic Energy Use;
- programme of work for elimination of deviations from the requirements of the Federal Rules and Regulations in the Field of Atomic Energy Use;
- instructions, programmes and schedules for maintenance, repair, testing and verification of systems important for safety (submitted in compliance with Rostechnadzor request after submission of an application for a licence);
- additional documents:
  - NPP lifetime extension preparation programme and report on the results of its implementation;
  - report on the results of NPP global assessment;
  - regulations for monitoring of technical condition of NPP components, updated with regard to ageing factors;
  - standard programme for operation monitoring of metal equipment, pipelines and other NPP components during the period of extended operation;
  - ageing management programme for NPP equipment and pipelines;
  - justification of residual lifetime of non-restorable components (equipment, buildings, installations, building constructions) important for safety and report on the results of investigations aimed at defining their residual lifetime;
  - report on the replacement of degraded equipment;
  - report on the results of modernisations;
  - report on NPP compliance with the criteria and requirements of current Federal Rules and Regulations in the Field of Atomic Energy Use;
  - acceptance certificate on the results of the NPP lifetime extension preparation programme.

Environmental

There is no environmental review as part of the authorisation process for extended operation.

New safety requirements

If new laws, federal rules and regulations or other official documents are issued, all the new requirements shall be imposed upon the licensee during the authorisation process for extended operation.

Transboundary notification

The legal framework applicable to lifetime extension does not include a systematic requirement for transboundary notification.

Public participation

Public participation during the authorisation process for extended operation is not allowed.

Access to information

Neither the decision-making authority nor the licensee have a legal duty to provide information to the public during the authorisation process for extended operation.

Legal challenges

Legal challenges to the decisions taken in the process of state service provision and either actions or inactions of Rostechnadzor are allowed.

In accordance with the Order on Administrative Procedures, a licensee/applicant may raise a complaint against either the actions or inactions of Rostechnadzor in a pre-trial procedure as described in Part V of the Order on Administrative Procedures or may raise a legal challenge in accordance with the procedure described in the Arbitration Procedural Code of the Russian Federation (No. 95-FZ, 24 July 2002). There is no specific geographical component to challenge the authorisation.

The decision of the First Instance Arbitration Court may be appealed on the basis of Chapters 34, 35 and 36.1 of the Arbitration Procedural Code first to the court of appellate instance, then to the court of cassational instance and then finally to the court of supervisory instance.

Slovak Republic

Basic information

The Slovak Republic has four operating nuclear power reactors operating at two nuclear power plants (NPPs) as of June 2019. All four reactors are pressurised water reactors (PWRs). These four nuclear power reactors are operating at the following periods:

- 10-19 years 1
- 20-29 years 1
- 30-39 years 2

In the Slovak Republic, the latest periodic safety reviews (PSRs) were conducted as follows:

- in 2008 for the Bohunice V2 nuclear power reactor;
- in 2011 for the Mochovce NPP; and
- in 2018 for the Bohunice NPP.

Moreover, one additional PSR will be conducted in 2020 for the Mochovce NPP.

The Slovak Republic has two nuclear power reactors under construction as of June 2019.

Authorisation information

Designed and authorised

The initial authorisations for nuclear power reactor operation are granted with an indefinite term. Therefore, long-term operation (LTO) considerations and related safety aspects are part of the PSR process, which takes place every ten years in accordance with the national legislation (the Atomic Act). In addition, there is no legally defined limit to the duration of the LTO of a nuclear power reactor. A nuclear power reactor may operate as long as it fulfils its safety obligations, notably reviewed by the decennial PSRs.

Terminology

As previously mentioned, the operation of a nuclear power reactor is not time-limited, in accordance with the Slovak national legislation. Modifications of the present terminology for LTO are ongoing, with an aim to align it with the provisions of the Atomic Act, current practice in the Slovak Republic as well as the latest International Atomic Energy Agency (IAEA) terminology/definition.

Main laws/regulations/documents for initial and long-term/extended operation

The main laws and regulations of the Slovak Republic governing the initial nuclear power reactor authorisations, as well as the operation of such nuclear power reactors beyond their initial designed minimum life, are:

- Act No. 541/2004 on Peaceful Use of Nuclear Energy (Atomic Act) and on the Amendment and Supplementing of Certain Acts, as amended;

- Act No. 87/2018 on Radiation Protection and on Adjustment and Changes to other Acts;
- Decree No. 33/2012 of the Nuclear Regulatory Authority of the Slovak Republic on the Regular, Comprehensive and Systematic Evaluation of the Nuclear Safety of Nuclear Installations, as amended by Decree No. 106/2016 and by Decree No. 71/2019, which entered into force on 15 March 2019;
- Act No. 24/2006 on Environmental Impact Assessment and on the Amendment and Supplementing of Certain Acts, as amended; and
- Act No. 50/1976 on Territorial Planning and Construction Order (Act on Construction), as amended and supplemented by other legal provisions.

Responsible government bodies

The body responsible for reviewing the PSR, under which the LTO-related assessment is carried out, is the Nuclear Regulatory Authority of the Slovak Republic (Úrad jadrového dozoru – ÚJD), the national nuclear regulatory body. According to the Atomic Act, the PSR itself is conducted and undertaken by the licensee.

Application and review timing

The licensee is required to conduct a PSR every ten years. The comprehensive LTO programme and other related documentation, which are part of the PSR covering the period of LTO, shall be transmitted to the ÚJD at least 12 months prior to when the next PSR is due.

There is no required date by which the ÚJD is required to complete its review of the PSR documentation, which may include on-site inspections and/or require additional information to be provided by the licensee. Looking back at the previous practice, the PSR process usually starts one-and-a-half years prior to the end of the operating decade.

Scope of review

Safety

The safety-related aspects of the LTO assessment, as part of the PSR, mainly consist of:

- a review of the life management of safety-relevant systems, structures and components (SSCs);
- an audit of the time-limited safety analyses (TLAAs) performed for safety-relevant SSCs;
- a review of ageing management programmes for active and passive safety-relevant SSCs, the life cycle of which is due to be longer than the life initially foreseen for the nuclear power reactor project;
- an audit of the nuclear installation's operational guidelines and procedures; and
- an audit of the system of retention of knowledge and experience on the nuclear installation, obtained during its planning, construction, commissioning and operation phases.

The aforementioned SSCs of particular relevance regarding the LTO-related assessment include:

- selected SSCs that must be functional during operation to ensure:
  - the integrity of the pressure limit of the reactor's cooling circuit;
  - the ability to shut down the reactor and keep it in safe shutdown conditions; and
  - the ability to prevent and mitigate the consequences of emergency incidents, which would cause a potential leak of radioactivity.
- selected SSCs not previously specified, the malfunction of which could prevent the sufficient fulfilment of safety functions of the previously mentioned equipment.

The safety-related documentation related to the LTO, as part of the PSR, includes:

- a document on the LTO concept;
- an LTO programme;
- an LTO quality management programme and organisational provisions;
- the methodology of the selection of SSCs included in the LTO programme, along with the list of all SSCs included in this programme;
- the methodology of the evaluation of ageing management programmes;
- ageing analyses;
- a review of maintenance and qualification programmes; and
- other supplementary documents.

The ÚJD may issue two types of documents following its review of the PSR (based on the types of findings identified by the ÚJD during the review of the PSR proceedings conducted by the licensee):

- "Records" – in case no negative findings are identified; or
- "Protocol" – in case findings are identified and need to be implemented.

If the licensee does not comply and subsequently implement the provisions listed in the Protocol, the ÚJD has a right to impose the following administrative sanctions:

- reduction in output or suspension of operation;
- imposition of penalty;
- withdrawal of the licence or authorisation; and
- withdrawal of the certificate of professional competence.

Environmental

The LTO-related assessment as part of the PSR does not include a specific assessment of environmental issues. There is no specific documentation related to environmental issues required by the national regulatory body to make its determination as part of the PSR process.

New safety requirements

The ÚJD may decide to impose new safety requirements as part of the PSR process.

Transboundary notification

The PSR process, given its primary focus on the safety-related aspects with regard to the nuclear power reactor's operation, does not include any specific requirement for transboundary notification and/or consultation.

Public participation

The Slovak Republic legal framework does not provide for any obligation on either the ÚJD or the licensee to provide the public with an opportunity to participate in the PSR process, to which the LTO-related assessment belongs.

Access to information

Similarly, the Slovak Republic legal framework does not provide for any obligation on either ÚJD or the applicant to provide the public with information regarding the LTO-related assessment as part of the PSR. Nevertheless, ÚJD has decided, on a voluntary basis, to prepare and subsequently publish a PSR report that has been made available to the public on the ÚJD website, along with the plan, overview and results of the undertaken inspections.

In addition, members of the public may request access to information held by public authorities, such as the ÚJD, in accordance with the Act No. 211/2000 on the Freedom of Information and Act No. 205/2004 on Collection, Preservation and Dissemination of Information on the Environment and on Adjustments and Completion of other Acts. Such access may be restricted regarding sensitive information, defined by the Atomic Act as information, the disclosure of which could be used to plan or perform activities aimed at causing disruption or destruction of a nuclear installation and thereby could adversely affect public safety and cause environmental or economic damage.

Last, the ÚJD publishes its Public Communication Strategy as well as its annual reports every year, including in English.

Legal challenges

The ÚJD's administrative decisions are legally challengeable. These are issued in case of negative findings not rectified by the licence holder.

Slovenia

Basic information

Slovenia has one operating nuclear power reactor as of June 2019. This is a pressurised water reactor (PWR) that has been in operation for between 30-39 years.

At present, Slovenia's nuclear power reactor is operating within its original design life. The only operating nuclear power reactor in Slovenia will enter the period of long-term operation (LTO) in the 2020-2029 period.

At present, there are no nuclear power reactors under construction in Slovenia.

Authorisation information

Designed and authorised periods

Slovenia's nuclear power reactor has a design life of 40 years. This reactor was granted a 40-year operating licence that conformed with the reactor's design life. A decision was made in 2012 to allow for the extension of the operating licence of the reactor beyond 2023 for an additional period of 20 years, if certain conditions are met. This decision is subject to the successful completion of the decennial periodic safety review (PSR) and more specifically of the PSR that covers the period of LTO.

Terminology

In Slovenia, there is no specific terminology to refer to the process of extending the designed life of a nuclear power reactor. The extension of the designed life of a nuclear power reactor is thus carried out in the process of extending its operating licence, following the successful completion of the PSR process.

Formally, in the Slovenian legislation, there is no specific terminology to refer to the period of nuclear power reactor operation after the initial design life.

Main laws/regulations/documents for initial and long-term/extended operation

The main laws and regulations governing the initial nuclear power reactor authorisation and the LTO of nuclear power reactors are the:

- Ionising Radiation Protection and Nuclear Safety Act (ZVISJV-1, *Official Gazette of the Republic of Slovenia* (RS), No. 76/17);
- Resolution on Nuclear and Radiation Safety in the Republic of Slovenia – for the period 2013-2023 (*Official Gazette RS*, No. 56/2013);
- Rules on Radiation and Nuclear Safety Factors – JV5 (*Official Gazette RS*, No. 74/16); and
- Rules on Operational Safety of Radiation and Nuclear Facilities – JV9 (*Official Gazette RS*, No. 81/16).

Responsible government bodies

The Slovenian Nuclear Safety Administration (SNSA) (Uprava Republike Slovenije za jedrsko varnost – URSJV), the national nuclear regulatory authority, is responsible for conducting the PSR, within which the LTO-related assessment is conducted. The SNSA is also responsible for issuing the authorisation for lifetime extension.

Application and review timing

The operator must submit the content, scope and timing of implementation of the PSR no later than 40 months before the expiration of the operating licence to the SNSA for approval.

The SNSA must issue its decision on the PSR report submitted by the licensee within 60 days of receipt of the complete application. The approval of the PSR report is a pre-condition for the SNSA's decision to extend the validity of the operating licence.

Scope of review

Safety

The scope and content of the safety-related review as part of the PSR is provided in Appendix 9 of the Rules on Operational Safety of Radiation and Nuclear Facilities – JV9. Overall, the scope of the safety review is focused on a review of changes during the past period of operation (e.g. changes of standards, of legislation or any type of changes in the nuclear power reactor), while the review for initial licensing is much broader.

The safety-related documentation to be produced by the applicant as part of the LTO-related assessment in the PSR is included in the PSR report. The most important documents related to LTO are the ageing management programme (AMP) and the time-limited ageing analyses (TLAAs). The AMP determines whether ageing processes are being managed effectively and if the required safety margins are maintained.

Following its safety review, the SNSA issues a decision on the approval or rejection of the PSR, as well as an updated licence for operation.

Environmental

An environmental impact assessment (EIA) must be performed as part of the PSR to authorise the LTO of a nuclear power reactor. The content of the EIA is defined by Annex 4 of the European Union (EU) EIA Directive.[1]

The Environmental Agency of the Ministry of Environment (EAME) must issue its environmental consent prior to the SNSA's decision to extend the operating licence of a nuclear power reactor.

New safety requirements

New safety requirements can be imposed upon the operator by the SNSA following its consideration of the PSR report, should such report demonstrate a need for improvement of nuclear safety. Otherwise, new safety requirements can be imposed upon the operator at any time by new legislation or amendments to existing legislation. New or revised legislation may define a specific time frame for the implementation of new safety requirements through provisional clauses.

1. 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* (OJ) L 124 (25 April 2014) (EIA Directive).

Transboundary notification

If during the EIA procedure for issuing an environmental consent, the EAME concludes that the extension of the operating licence could have a significant impact on the environment of another EU member state, the EAME shall send a notification to the competent authority of that member state, which shall contain:

- a description of the intended intervention and the available information on its possible transboundary environmental impacts;
- information on the nature of the decision by which the intended environmental impact is authorised or refused; and
- a time limit within which the concerned member state should inform the Ministry on whether it wishes to participate in the procedure for assessing the effects of the intended intervention on the environment.

Public participation

Public participation is allowed during the LTO authorisation process. In accordance with the current legal situation, the duty to provide for public participation in the EIA procedure solely rests on the EAME and does not extend to the applicant/licensee.

In accordance with the Environmental Protection Act (*Official Gazette RS*, 41/2004 and subsequent amendments) and the most recent case law on its application for LTO, the EAME must provide the public with access to the application for obtaining the environmental consent on the LTO project, with exceptions pertaining to the confidential nature of specific information (e.g. information related to physical protection or security matters), a report on environmental impacts and a draft decision on the environmental consent. In addition, the public must be given an opportunity to comment on those documents.

Access to information

The EAME has a legal duty to provide information to the public during the lifetime extension process. As mentioned above, as part of the EIA procedure, the Ministry of Environment must provide the public with the application for environmental consent for the LTO project, a report on its environmental impacts and the draft decision on environmental consent. This duty rests solely on the EAME and does not extend to the applicant.

The PSR process does not include any such requirement for the SNSA to provide the public with specific information related to LTO of nuclear power reactors as part of the safety review.

Legal challenges

The legal framework in Slovenia allows for challenges to the authorisation of LTO, and such challenges have been made in the past regarding LTO.

It is possible to challenge in court the SNSA's decision to approve the PSR report issued by the licensee (Ionising Radiation Protection and Nuclear Safety Act, Article 81(6)) or to extend the operating licence of a nuclear power reactor. In addition, it is possible to legally challenge the decision made by the EAME to grant its environmental consent for the extension of the operating licence. Such challenges are administrative and follow the main rules defined by the General Administrative Procedure Act (*Official Gazette RS*, 24/2006 – Official Consolidated Text and subsequent modifications), as well as rules provided by the Environmental Protection Act as regards challenges to the environmental consent.

Challenges to a decision by the EAME to grant or deny its environmental consent may be introduced by: the applicant; persons residing in the area or owners or possessors of any property, where the planned activity may cause environmental damage that can affect human health or cause property damage; and non-governmental organisations (NGOs) registered in Slovenia as operating in the public interest for the protection of the environment. There is no specifically predefined geographical component to establish the standing of persons to challenge the EAME's decision on environmental consent.

For both challenges to the environmental consent or to the SNSA decisions to approve the PSR report or extend the operating licence of a nuclear power reactor, challenges must be first brought to the issuing authorities, respectively the EAME and the SNSA.

Challenges to the decision to extend the operating licence must be brought to the SNSA within 15 days from the date on which the decision was notified. Challenges may be introduced on grounds of:

- misapplication of substantive law;
- incomplete or incorrectly determined facts by the SNSA;
- lack of legal authority to issue a decision; or
- violation of the provisions of the General Administrative Procedure Act and/or procedural provisions of other applicable legislation.

Should the issuing authority dismiss the challenge introduced against either the environmental consent or the decision to extend the operating licence, the claimants may request that a body of second instance within the Ministry of Environment reviews the first instance decision. Such appeals must be raised within 15 days from the date on which the first instance decision was notified. The body of second instance may decide to issue a ruling or to refer the case back to the body of first instance with specific instructions. The legal basis for second instance challenges is identical to that of first instance challenges.

Claimants may decide to appeal the decision made by the second instance body of the Ministry of Environment to the Administrative Court, which acts as the court of last resort. Such appeals may be formed on grounds of misapplication of substantive law, incomplete or incorrectly determined facts by the issuing authority, violation of the provisions of the General Administrative Procedure Act and/or procedural provisions of other applicable legislation or all other grounds for invalidity or nullity of administrative acts.

Spain

Basic information

Spain has seven nuclear power reactors operating at five nuclear power plants (NPPs) as of June 2019. Six of the reactors are pressurised water reactors (PWRs) and one is a boiling water reactor (BWR). The seven nuclear power reactors have been in operation for 30-39 years.

Spain's seven nuclear power reactors are operating within their original designed life as of June 2019. These seven nuclear power reactors will enter the period of long-term operation (LTO) in the 2020-2029 period.

Spain has no nuclear power reactors under construction as of June 2019.

Authorisation information

Designed and authorised periods

Nuclear power reactors in Spain have an original design lifetime of 40 years. Spanish legislation, however, does not provide a predetermined lifetime for nuclear power reactors, thus allowing the possibility to extend the operating lifetime of nuclear power reactors beyond the originally designed lifetime of 40 years.

There is also no predetermined operating licence duration; instead, licence duration is determined on a case-by-case basis. Since 1999, the practice has been to grant licence renewals for ten years. Similarly, the period for LTO is not predetermined but rather assessed on a case-by-case basis. Therefore, according to Spain's regulatory regime, the service lifetime of a nuclear power reactor is not fixed, but is instead based on the actual operating conditions of each reactor, as well as the technical improvements made on a voluntary basis by the operator or as requested by the Nuclear Safety Council (Consejo de Seguridad Nuclear – CSN), as justified by safety assessments considering life-limiting processes and features of systems, structures and components (SSCs).

Terminology

In Spain, the process of granting an operating licence for a nuclear power reactor every ten years is called "licence renewal". The operating period for the power reactor under a renewed licence beyond the design lifetime is known as "long-term operation or LTO".

Main laws/regulations/documents for initial and long-term/extended operation

The legal and regulatory framework in Spain for nuclear power reactor authorisations is comprised of the following:

- the Nuclear Energy Act (Law 25/1964 of 29 April), which establishes the legal framework for the development and implementation of the peaceful applications of nuclear energy and ionising radiation. It establishes an authorisation regime, following international conventions, subject to further regulatory development. The Law does not mention renewal of authorisations, although it establishes that the authorisations are valid for a certain period;

- the Law Establishing the Nuclear Safety Council (Law 15/1980 of 22 April), which governs the Spanish nuclear regulator, the CSN; and
- the Regulation on Nuclear and Radioactive Facilities (Royal Decree 1836/1999 of 3 December), which regulates the regime of administrative permits for both nuclear and radioactive facilities and other specific activities related to the application of ionising radiation.

In addition to these, the following additional binding regulations and non-binding guides apply to the LTO authorisation process:

- CSN Instruction No. IS-22, of 1 July 2009, on safety requirements for the management of ageing and long-term operation of nuclear power plants, which allows for LTO in Article 4.2 because it regulates the possibility to request a renewal of the nuclear power reactor operating permit beyond the period foreseen in the initial design and the technical documents that must be included;
- CSN Instruction No. IS-26, of 16 June 2010, on basic nuclear safety requirements applicable to nuclear installations, which introduced the periodic safety review (PSR) that must be conducted and documented every ten years, which are independent from the licence renewal process; and
- Safety Guide GS-01.10, Revision 2, on Nuclear Power Plants Periodic Safety Reviews (May 2017), which updates the safety review system and establishes the objectives, scope, contents, deadlines and applicable requirements (also taking into account national and international experience on performing PSRs, lessons learnt after the Fukushima Daiichi NPP accident, as well as the 2009 and 2014 European Union [EU] Nuclear Safety Directives[1]). The guide states that the service lifetime can be longer than the designed life and builds on International Atomic Energy Agency (IAEA) (2013), *Periodic Safety Review for Nuclear Power Plants*, IAEA Safety Standards, Specific Safety Guide No. SSG-25, IAEA, Vienna. The technical aspects are based on the US Nuclear Regulatory Commission (NRC) Regulations (*Code of Federal Regulations* (CFR), 10 CFR Part 54, "Requirements for renewal of operating licences for nuclear power plants").

Responsible government bodies

The Ministry for the Ecological Transition ("the Ministry") is responsible for granting the initial authorisation and the renewed licences, including LTO authorisations. Authorisations are granted through Ministerial Orders.

These authorisations are based on the mandatory report addressing nuclear safety and radiation protection matters issued by the CSN, the national nuclear regulatory body.

Application and review timing

Assuming the average licence period of ten years, if the next licence renewal period will cover the phase of LTO, the applicant must provide additional information and submit the application further in advance than in non-LTO renewals.

Specifically, three years before the expiration of the current licence, the operator must submit an application and all LTO documentation. The LTO documentation for the safety review is detailed in CSN Instruction IS-22, Article 4.2, "Ageing management, including the period of long-term operation", which specifies that requests for licence renewal beyond the period foreseen in the initial design should include, among other reports, an "integrated ageing

1. Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations, *Official Journal of the European Union* (OJ) L 172 (2 July 2009) (2009 Safety Directive); Council Directive 2014/87/Euratom of 8 July 2014 amending Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations, OJ L 219 (25 July 2014) (2014 Amended Safety Directive).

assessment and management plan", made up of a series of ageing management studies providing a reasonable guarantee of the functionality of safety-related and safety-relevant elements forming part of their scope during the new period of operation.

In addition, three years before the expiration of the current licence, the operator must also submit the PSR "basis document", anticipating how the PSR will be performed. The basis document includes the following information:

- the scope of the PSR;
- the methodology to perform the PSR;
- the establishment of the rules, codes and practices according to which the review is going to be carried out;
- the methodology for the global evaluation of the results of the review of the safety factors; and
- the organisation and planning for the PSR.

One year before the licence expiration, the operator must submit the final PSR and the other documents (not related to LTO) to the Ministry. Because the authorisations are granted or denied based on a mandatory report by the CSN, all documentation will be sent by the Ministry to the CSN to analyse. After assessing the results of the PSR carried out by the operator, the CSN sets additional safety requirements for the licensee, if it considers this necessary. These additional safety requirements will be mandatory.

According to the Regulation on Nuclear and Radioactive Facilities, the CSN assessment report must be sent to the Ministry at least one month before the current licence expires. In practice, and on average, a proposed technical report is made by the CSN General Directorates four months before the due date. This proposed report will then be approved by the Plenary of the CSN and finally sent to the Ministry in due time according to the Regulation on Nuclear and Radioactive Facilities.

This report is binding on the Ministry, both if the CSN determines to reject the licence and also if, in determining to grant the licence, additional obligations are necessary. The Ministry will adopt a resolution once it receives the CSN report.

Scope of review

Safety

Safety Guide GS-01.10, Revision 2 details the factors that have to be analysed covering all safety aspects of the nuclear power reactor. Among these is Factor 4, concerning "ageing", which determines if the facility has effective ageing management programmes implemented and if they are properly managing all ageing aspects of the SSCs important for safety, so that safety functions can be performed either during the designed life of the NPP or during LTO.

Also, in the licence renewal application, the CSN has to analyse the PSR documents in addition to the ageing management aspects. A PSR is the process of conducting additional analyses and complements the nuclear safety assessments that take place regularly in an NPP, providing a global and integrated vision of its various nuclear safety aspects. Although, legally speaking, licence renewal is independent of the PSRs, the timing is parallel. According to CSN Instruction IS-26, Article 3.19, at least every ten years the licensee must conduct and document a PSR with the goal of making an overall assessment of the behaviour of the installation during the considered period by means of a systematic analysis of all nuclear safety and radiation protection aspects. This is further developed by Safety Guide GS-01.10, Revision 2. The scope of the PSR also includes the assessment of programmes under way to improve safety in the facility or the establishment of new programmes, if necessary. One of the most important aspects of this process is the analysis of the updated regulations to check whether new requirements that may apply to the facility have been included.

Environmental

The scope of the review of the environmental radiological impact of licence renewal is the same as for the initial authorisation. Therefore, as part of the LTO application, the operator has to update the following documents:

- the study of radiological impacts associated with LTO; and
- the reviewed proposal for the Management Plan of radioactive waste and spent fuel corresponding to the LTO.

Regarding other environmental impacts, an environmental impact assessment (EIA) for the licence renewal is not required by law.

New safety requirements

New safety requirements can be imposed upon the applicant through the LTO process. Once the licence is granted, the CSN can also impose new safety requirements in the course of the regular nuclear safety assessments.

Transboundary notification

The LTO authorisation process does not include a requirement for transboundary notification and consultation.

Public participation

Article 83 of the Common Administrative Procedure of Public Administrations Act (Law 39/2015 of 1 October) states that in any administrative procedure, the competent body in charge of the resolution may arrange a public information process when required by its nature, and thus this process would be, in principle, allowed. That is to say, Spanish legislation allows public participation in administrative procedures, and thus during the LTO authorisation process, but neither the decision-making authority nor the applicant has a legal duty to solicit public participation. To date, no public participation has been carried out for an LTO authorisation.

In addition, Article 82 of the same law envisages a hearing procedure, which is a form of participation in the process, but limited to those having legitimate interest, who may present allegations within 10 days.

Furthermore, according to the Regulation on Nuclear and Radioactive Facilities and to the Nuclear Energy Act, the Ministry, before granting an authorisation (including LTO authorisations), must submit a copy of all the documentation to those Autonomous Communities with competences in urban planning and environmental affairs in which territory the facility is located, as well as those with territory within the surrounding area established in the basic standards on nuclear and radiological emergency planning, in order to allow these Communities to present allegations within one month.

Access to information

In addition to the above, the decision-making authority has a legal duty to provide information to the public during the LTO process. This duty is basically found in:

- the Act Regulating the Rights of Access to Information, Public Participation and Access to Justice in Environmental Matters (Law 27/2006 of 18 July) (the "Aarhus Law"), which recognises the right of any legal or natural person to access environmental information, as well as the government's obligation to disseminate this information. It applies to a broad range of matters, including energy issues and radioactive wastes, and thus is applicable to all NPP authorisation processes;

- the Law Establishing the Nuclear Safety Council (Law 15/1980 of 22 April), Article 14, which deals with transparency issues in a general manner in all CSN activities; and
- the Act on Transparency, Access to Public Information and Good Governance (Law 19/2013 of 9 December), which increases and strengthens transparency in public activity and guarantees access to information.

Nevertheless, the applicant does not have a legal duty to provide information to the public during the LTO process.

In practice, the CSN reports to the Ministry prior to the adoption of the resolutions that the Ministry may approve on matters related to the granting of authorisations for nuclear installations, which are published in the *Official State Gazette*. Under Article 14 of the Law Establishing the Nuclear Safety Council, the CSN shall provide access to information and facilitate citizen and civil society involvement in its operational issues. Therefore, the CSN must keep citizens informed of all relevant facts related to nuclear and radiological facility operations, especially on all issues related to safe performance, radiological impacts on people and the environment, events and incidents taking place therein, as well as the corrective measures implemented to prevent event reoccurrence.

In order to facilitate access to the information, the CSN must use information and communications technologies, such as the corporate CSN website. The CSN must also promote and take part in information forums in the surrounding areas of nuclear facilities to address operational issues, especially regarding emergency preparedness and any events at the facility.

As for environmental information, Article 7 of Law 27/2006 establishes the minimum content of the information that is to be disseminated.

Legal challenges

Legal challenges to LTO authorisations are allowed. LTO authorisations have been subjected to legal challenges. There are specific procedures to challenge LTO authorisations, but these are not unique to nuclear power. There is both an administrative procedure and also a judicial procedure known as "contentious administrative jurisdiction", which are regulated by two different laws:

- the Common Administrative Procedure of Public Administrations Act (Law 39/2015 of 1 October), specifically Chapter II, Title V, (Articles 112, 114, 123 and 124); and
- the Contentious Administrative Jurisdiction Act (Law 29/1998 of 13 July) (LJCA), specifically Chapter I (Articles 1 and 2) and Chapter II (Article 6, Article 11) of Title I, Title III and IV.

Under the administrative procedure, Article 4 of Law 39/2015 addresses the concept of interested persons, which are basically those who initiate the procedure as holders of rights or a legitimate interest, individual or collective, or those having rights or legitimate interests that might be affected by the decision. This means a situation different to the general public, so that an act of a public authority may have influence in its legal sphere.

Under the contentious administrative procedure, Article 19 of Law 29/1998 provides that standing is determined by general rules of administrative litigation; therefore, natural or legal persons having rights or legitimate interests, Administrations of Regional Communities, local entities, corporations and associations when they are authorised by law and any citizen in exercise of the popular action may raise a challenge.

In Spain, there is no rule per se establishing geographically specific standing criteria. Instead, in Spanish Administrative Law, the concept of "legitimate interest" applies. This means that the person must be affected by an administrative act (in this case the operating licence) in a direct way in the person's legal interest. When considering the special link of the person to the subject of the procedure, the geographical component might be taken into account in order to prove that link.

The Ministry is the subject party of the challenge. The authorisation decision is the subject of the challenge. Through the administrative procedure, challenges are raised before the same body that granted the decision, therefore the Ministry; however, there is no legal obligation to bring the challenge directly before the Ministry. Alternatively, a challenge may be brought before the Contentious Administrative Chamber of the National Audience if certain requirements are fulfilled. To bring a challenge first to the Contentious Administrative Chamber, it must concern:

- regulations and administrative acts that exhaust administrative remedies, whether definitive or procedural, if the latter is decided on the merits, prevent the continuation of the proceedings, or cause irreparable damage or vulnerability of rights or legitimate interests;
- illegality of the regulation itself under which the appealed administrative act was issued;
- illegality of the authorisation or non-compliance with the law regulating the authorisation regime;
- the administration's failure to act; or
- "de facto procedures" carried out by the administration (i.e. those where the Administration is empowered to pursue a course of action without legal warrant).

The challenge can be initiated once the authorisation to operate is granted and published in the *Official State Gazette*. There are, however, two distinct prescription periods for challenging administrative acts, depending on which procedure is initiated:

- within the administrative procedure, when an action is challenged before the same body that granted the decision (i.e. the Ministry): one month from the day following the publication of the act in question;
- within the contentious-administrative procedure, when an action is challenged before the Contentious Administrative Chamber of the National Audience: two months from the day following the publication of the act in question;
- within the administrative procedure, if the challenge is dismissed by express or implied decision by the body that granted the decision (i.e. the Ministry), it may be appealed to the Contentious Administrative Chamber of the National Audience.

Decisions from the Contentious Administrative Chamber of the National Audience can be appealed to the Contentious Administrative Chamber of the Supreme Court, according to Articles 86 and 87 of the LJCA. The Supreme Court is the court of final resort. This is the so-called "appeal of cassation" and it will only be admitted when the appellant can prove that the decision in question has "jurisprudential interest", i.e. when there is no case law so far on that subject, when the decision is contrary to the existing line of jurisprudence, when the regulation under which the appealed act was issued is declared void, or when the appeal concerns acts issued by the government (or the Government Council in the case of Autonomous Communities), among other factors. It should be noted that the Supreme Court only looks into the matters of law; no further evidence is allowed.

Sweden

Basic information

Sweden has eight nuclear power reactors operating at three nuclear power plants (NPPs) as of June 2019. This fleet is composed of five boiling water reactors (BWRs) and three pressurised water reactors (PWRs). These eight nuclear power reactors are operating at the following lifetimes:

- 30-39 years 6
- 40-49 years 2

As of June 2019, there are 2 nuclear power reactors operating past their initial designed life, which is 40 years. No final determination has yet been made as to how many nuclear power reactors will continue to operate past their initial designed life in the future. However, should all the currently operating nuclear power reactors continue to operate, the 6 remaining nuclear power reactors would enter the period of operation past 40 years in the period 2020-2029.

Sweden has no nuclear power reactor under construction as of June 2019.

Authorisation information

Designed and authorised periods

The initial licences for nuclear power reactor operation in Sweden are granted with an indefinite term. This means that the operation of a nuclear power reactor is allowed as long as the licensee meets the requirements set by the applicable laws, government ordinances, regulation of the nuclear regulatory authority and conditions provided by the initial licence.

Terminology

There is no specific authorisation for long-term operation (LTO) in Sweden due to the aforementioned indefinite term of the initial operating licence; instead, the continued operation of a nuclear power reactor past its initial analysed and designed life is subject to the fulfilment of a decennial periodic safety review (PSR). The period of operation past the initial designed life is referred to as "continued operation".

Main laws/regulations/documents for initial and long-term/extended operation

The main laws and regulations governing the initial and continued operation of nuclear power reactors in Sweden are the following:

- the Act on Nuclear Activities (1984:3), as amended;
- the Ordinance on Nuclear Activities (1984:14), as amended;
- the Radiation Protection Act (2018:396);
- the Ordinance on Radiation Protection (2018:506);

- the Swedish Radiation Safety Authority's (Strålsäkerhetsmyndighetens – SSM) Regulations and General Advice concerning Safety in Nuclear Facilities (SSMFS 2008:1), as last amended by Regulation on 24 May 2018 (SSMFS 2018:12); and
- the SSM's Regulations and General Advice concerning the Design and Construction of Nuclear Power Reactors (SSMFS 2008:17).

It should be noted that a major review of the Radiation Safety Authority's code of statutes is in progress, which includes the aforementioned Regulations SSMFS 2008:1 and SSMFS 2008:17. These regulations will be replaced by more comprehensive regulations in mid-2020. These new regulations will contain more detailed requirements for the PSR, including clearer provisions on time-limited ageing analyses (TLAAs) and systematic evaluation of the effectiveness and validity of applied ageing management programmes.

Responsible government bodies

The body responsible for reviewing the PSR required to enter the period of continued operation is the SSM, the national nuclear regulatory body. After completing its review of the PSR, the SSM publishes its regulatory assessment together with any order imposing new requirements for measures to improve security and radiological protection.

Application and review timing

The determination for the specific timing of PSRs is made by the SSM; however, a PSR has to be carried out by the licensee at least once every ten years in accordance with the Act on Nuclear Activities. According to an SSM regulatory document, a PSR must always be conducted before the originally analysed and designed lifetime of a reactor has passed. According to the same document, the licensee shall provide its PSR report to the SSM so that it has adequate time to complete its review and assessment before the end of the originally analysed and designed lifetime. There is no predetermined time frame for the SSM to complete its review of the PSR report provided by the licensee.

In situations where continued operation of a nuclear power reactor past its initial analysed and designed life is planned, but there is not sufficient time to produce a complete PSR before the transition to LTO, the SSM has determined that the licensee must present its programme for LTO at least two years prior to the end of the initial analysed and designed life. This programme shall at the very least include the information contained in paragraph 4.54 of Requirement 16, "Programme for long term operation" in *Safety of Nuclear Power Plants: Commissioning and Operation*.[1] The review and decision process that follows is schematically shown in Figure 3.4.

Scope of review

Safety

The PSRs consist of an overall assessment of the nuclear safety and radiological protection at the concerned nuclear power reactor. In accordance with Section 10(a) of the Act on Nuclear Activities, this assessment shall be conducted taking into account the developments in science and technology and should include analyses and descriptions of the way in which the reactor's design, function, organisation and operations fulfil the requirements imposed by the Act on Nuclear Activities, the Environmental Code and the Radiation Protection Act (2018:396), in addition to all regulations and conditions established under the aforementioned legislation. The PSR shall also include the licensee's plans for improving the safety and radiological protection at the concerned nuclear power reactor until the next PSR or its decommissioning and dismantling. Reasonably practicable safety improvements shall be implemented in order to

1. IAEA (2016), *Safety of Nuclear Power Plants: Commissioning and Operation*, IAEA Safety Standards Series No. SSR-2/2 (Rev. 1), IAEA, Vienna, p. 19.

maintain the level of safety and to ensure that older facilities, as much as possible, can achieve a comparable level of safety as new nuclear facilities.

As part of the PSR, the licensee shall pay particular attention to:

- the circumstances under which the activities are carried out;
- how equipment and facilities are affected by operation and ageing;
- experiences from operations and similar activities; and
- developments in science and technology.

When reviewing and assessing a PSR prior to a reactor entering the stage of continued operation, the SSM particularly focuses on issues related to organisation, competence and staffing, as well as ageing management and TLAAs.

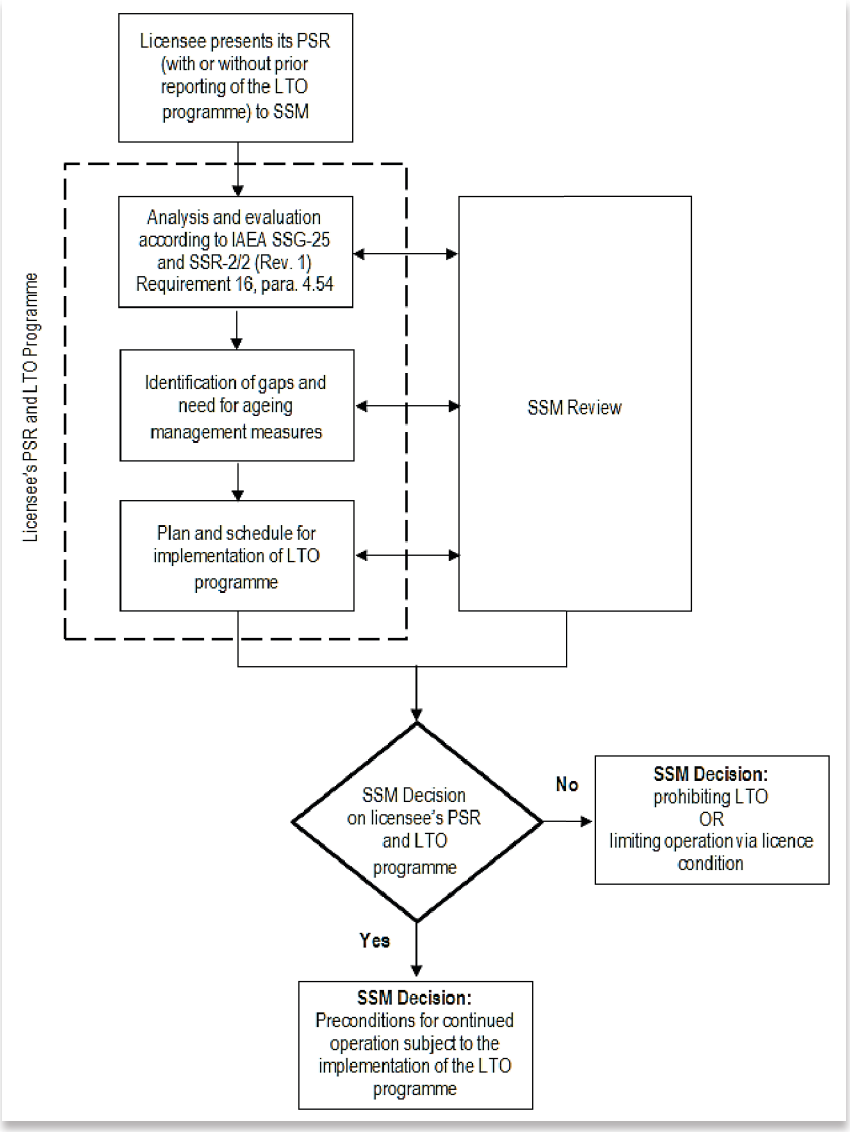
At the end of its PSR, the licensee shall submit to the SSM a report, which shall include all the documents and information equivalent to that of the International Atomic Energy Agency (IAEA) (2013), *Periodic Safety Review for Nuclear Power Plants*, IAEA Safety Standard, Specific Safety Guide No. SSG-25, IAEA, Vienna, and incorporate the TLAAs at least equivalent to the specifications of the IAEA (2015), *Ageing Management for Nuclear Power Plants: International Generic Ageing Lessons Learned* (IGALL), Safety Report No. 82, IAEA, Vienna.

After completing its review of the PSR report provided by the licensee, the SSM issues an in-depth review report, which includes conclusions on safety and radiological protection, as well as measures required to be taken to ensure that safety and radiological protection are maintained and improved until the next PSR. The SSM may order the licensee to implement such improvements within a certain time.

The SSM has a strong mandate as a regulatory authority. According to the Nuclear Activities Act, the SSM may, when granting a licence or during the term of validity of a licence, decide that certain conditions are necessary for safety. The SSM may also decide additional measures are necessary and issue orders and prohibitions to the licensee to ensure that the Act, or regulations or conditions issued under the Act, are observed.

Normally, new safety requirements are implemented through a regular process including reviewing or revising existing SSM regulations or issuing new SSM regulations. Thus, during special circumstances, the SSM may consider it more effective to impose licence conditions or issue an order. An example of new safety requirements by licence conditions is the requirement of independent core cooling for nuclear reactors.

Figure 3.4. **PSR and LTO-review process in Sweden**



Source: Ministry of the Environment.

Environmental

In accordance with the Swedish legal framework, the PSR process does not include an assessment of environmental impacts for the concerned nuclear power reactor. The environmental impacts are reviewed during the initial licensing process, and the licensee is required to ensure during operation that such environmental impacts do not exceed the initially agreed limits, under the monitoring of the relevant public authorities. A reassessment of the environmental impacts would, however, be required in case of modifications to the nuclear power reactor requiring an amendment to the initial licence or a new licence. This has, for example, been relevant when a licensee has applied for permission to increase the thermal effect at a nuclear power reactor.

In addition, the operation of a nuclear power reactor requires an environmental permit, granted under the Environmental Code. This permit may be reviewed by the relevant public authorities, namely the Swedish Environmental Protection Agency; the Legal, Financial and Administrative Services Agency; the County Administrative Boards; the Swedish Civil

Contingency Agency; and the Swedish Agency for Marine and Water Management. Such revisions would require a reassessment of the environmental impacts of the concerned nuclear power reactor, for example if its operation causes any significant damage that was not anticipated when the permit was granted or if a significant improvement to human health or the environment can be achieved by the use of a new process or treatment technology to improve the safety of a structure. The reviews of environmental permits are, however, not directly linked to PSRs or to the continued operation of a nuclear power reactor.

New safety requirements

As previously mentioned, the SSM may decide to impose new safety requirements following its review of the PSR report provided by the licensee. In general, the SSM may impose new safety requirements at any time outside of the PSR process if necessary, within its role of regulatory authority.

Transboundary notification

The PSR process does not include any legal requirement for transboundary notification and consultation.

Public participation

There is no legal duty for either the SSM or the licensee to solicit public participation during the PSR process leading to the continued operation of a nuclear power reactor.

Access to information

The legal framework in Sweden establishes a general duty for the SSM to provide information to the public, as part of the principle of public access (open government), which is enshrined in Chapter 2-3 of the Freedom of the Press Act (1949:105). The Freedom of the Press Act is included in the Swedish Constitution. This principle entitles the general public to access all official documents submitted to, or drawn up by, public authorities, including the SSM, such as letters, decisions and inquiries. Information may only be withheld by public authorities if classified as confidential under the Public Access to Information and Secrecy Act (2009:400). This legal duty does not, however, extend to the licensee.

In addition, members of the public may access specific information regarding nuclear safety through the Local Liaison Safety Committees, which are established in every region where an NPP is located.

Legal challenges

As previously explained, there is no specific authorisation granted by the SSM for the continued operation of a nuclear power reactor, given the indefinite term of initial operation licences. Therefore, there is no decision to authorise the continued operation that could be subject to a legal challenge.

However, the SSM may decide to issue new specific safety requirements to the licensee following a PSR, if the review concludes that nuclear safety and/or radiological protection at the concerned nuclear power reactor require improvements. The SSM's decision to impose new safety requirements can be subject to a legal challenge. Appeals against decisions made by the SSM with a mandate in the Act on Nuclear Activities are made to the government.

Switzerland

Basic information

Switzerland has five operating nuclear power reactors operating at four nuclear power plants (NPPs) as of June 2019. Of these, three reactors are pressurised water reactors (PWRs) and two are boiling water reactors (BWRs). These five nuclear power reactors are operating at the following lifetimes:

- 30-39 years 1
- 40-49 years 4

In Switzerland, nuclear power reactors expected to be operated for more than 40 years are considered to be in long-term operation (LTO). As of June 2019, Switzerland has four nuclear power reactors operating in LTO. The additional nuclear power reactor is expected to enter the period of LTO in 2020-2029.

There are no nuclear power reactors currently under construction in Switzerland. Article 12a of the Nuclear Energy Act of 21 March 2003, which entered into force on 1 January 2018, prohibits the construction of any new nuclear power reactors.

Authorisation information

Designed and authorised periods

While the initial licences for nuclear power reactor operation may be granted for a specific period, at present, all the licences of operating nuclear power reactors have been granted with an indefinite term, and nuclear power reactors may operate as long as their operator(s) fulfil their safety obligations.

Accordingly, there is no requirement for licence renewal or specific authorisation for LTO. Instead, the operation of a nuclear power reactor beyond 40 years demands a proof of safety for LTO, in addition to the decennial periodic safety review (PSR), in accordance with Articles 34 and 34a of the Nuclear Energy Ordinance.

Terminology

In Switzerland, the period of operation of a nuclear power reactor beyond 40 years of operation is referred to as long-term operation or LTO. There is no specific terminology or procedure to authorise LTO, as the possibility to operate past 40 years requires successfully completing the PSR process, which includes the proof of safety for LTO.

Main laws/regulations/documents for initial and long-term/extended operation

The main laws and regulations governing initial operation and LTO in Switzerland are the:

- Nuclear Energy Act of 21 March 2003 (SR 732.1); and
- Nuclear Energy Ordinance of 10 December 2004 (SR 732.11).

In particular, LTO requirements are laid down by:

- the Nuclear Energy Act, Article 22(2)(e);
- the Nuclear Energy Ordinance, Articles 34 and 34a; and
- ENSI-A03 (Guideline for Swiss Nuclear Installations), *Periodic Safety Review for Nuclear Power Plants*.

Responsible government bodies

The body responsible for reviewing the PSR, to which the review for LTO belongs, is the Swiss Federal Nuclear Safety Inspectorate (Eidgenössisches Nuklearsicherheitsinspektorat – ENSI), the national nuclear regulatory body. As previously explained, ENSI does not issue any specific authorisation for LTO.

Application and review timing

Swiss nuclear power reactors operate with unlimited licences. In accordance with the Nuclear Energy Ordinance, Article 34, the holder of an operating licence for a nuclear power reactor must carry out a comprehensive PSR every ten years. The documents related to the PSR have to be submitted to ENSI at least two years at the latest before the end of any operating decade. For the period following the fourth operating decade, proof of safety for LTO must also be submitted as part of the PSR (Article 34a of the Nuclear Energy Ordinance).

There is no specific due date for ENSI's review of the LTO documentation. It might be that the LTO review takes longer than the PSR, but also that the LTO review is finished faster than the PSR. In practice, the LTO review as part of the PSR for the Beznau I and II nuclear power reactors was completed in November 2010, 1 year past 40 years of operation for Beznau I and 2 years prior to 40 years of operation for Beznau II. The LTO review for the Mühleberg NPP was completed in December 2012, 1 month after 40 years of operation.

Scope of review

Safety

The scope of the safety-related LTO review includes:

- proof that the design-limits for the parts of the plant technically of safety relevance will not be reached during the planned period of operation;
- backfitting and technical or organisational improvements planned for the upcoming operating decade;
- measures intended to guarantee sufficient numbers of staff with the required expertise for the planned period of operation.

The main documents provided by the applicant to justify LTO in Switzerland are contained in the PSR documentation, including the additional required proofs of safety specifically relevant to LTO (see the above-mentioned Guideline ENSI-A03).

Environmental

There is no specific environmental assessment as part of the LTO-related aspects of the PSR. As such, there is no specific documentation related to an environmental review as part of the PSR for nuclear power reactors.

New safety requirements

In Switzerland, the safety of a nuclear power reactor is an ongoing process (Nuclear Energy Act, Article 22(2)(g)); hence ENSI may order additional safety or backfitting measures at any time, including following the PSR that covers the period of LTO.

Transboundary notification

There is no specific requirement for transboundary notification and consultation as part of the LTO process. But, Switzerland has bilateral committees with all neighbouring countries where information is exchanged regularly in a continuous way.

Public participation

There is no specific requirement for either ENSI or the applicant to provide the public with an opportunity to participate in the PSR process, to which the LTO-related assessment belongs.

Access to information

There is no specific requirement for either ENSI or the applicant to provide information to the public as part of the PSR, to which the LTO-related assessment belongs. However, the Federal Act on Freedom of Information in the Administration (Freedom of Information Act – FoIA) grants the public a right to request access to information held by public authorities, such as ENSI, unless such information is classified as confidential.

In addition to this requirement, Article 74 of the Nuclear Energy Act states that the relevant public authorities shall regularly inform the public about the condition of nuclear installations and any matters pertaining to nuclear substances and radioactive waste. Both ENSI and the Swiss Federal Office of Energy (SFOE) regularly inform the public, notably through their respective web pages.

Legal challenges

Legal challenges in connection to LTO, which is part of the PSR, are allowed in Switzerland. However, to date there has not been any such legal challenge.

As seen, there is no requirement for licence renewal or specific authorisation for LTO, the latter being part of the PSR. If a member of the public wants to challenge the fact that the nuclear power reactor is continuing its operation, the plaintiff has to request a decision from ENSI about the nuclear power reactor's continuation of operation.

The procedure to challenge the LTO of a nuclear power reactor is governed by the general administrative jurisdiction rules, and this type of challenge is not specific to nuclear energy. Accordingly, the procedure is governed by the Swiss Federal Act on Administrative Procedure (SR 172.021) and more specifically its Articles 5, 25(a) and 44ff.

Pursuant to this procedure, any "party" may lodge a request for a public authority to refrain from enacting, discontinuing or revoking an administrative decision. Parties are defined as persons whose rights or obligations are intended to be affected by the ruling and other persons, organisations or authorities who have a legal remedy against the ruling, in accordance with Article 6 of the Swiss Federal Act on Administrative Procedure.

According to the case law in the field of nuclear energy, the standing determination includes a geographical component, as the proximity of persons to a nuclear power reactor is sufficient to demonstrate the required interest. More specifically, the persons living in a 3-5 km radius from a nuclear power reactor, i.e. in "zone 1" under Article 3(2) and Annex 3 of the Ordinance on Protection in Case of Emergency in the Vicinity of a Nuclear Power Plant (SR 732.33) have a

right to request and obtain a decision. For persons living within a 20 km radius around the nuclear power reactor, i.e. "zone 2" under the aforementioned Ordinance, the Swiss Federal Supreme Court has left the question open as to whether the sole geographical component is sufficient to demonstrate a current interest worthy of protection.

The subject of the challenge is either the authorisation for operation of the nuclear power reactor, or any amendment to such authorisation, which is granted by the Federal Department of the Environment, Transport, Energy and Communications (Le Département fédéral de l'environnement, des transports, de l'énergie et de la communication – DETEC), or any permit delivered by ENSI. As a general rule, DETEC has competence for issuing construction and operation licences, as well as for authorising significant amendments to the initial licence. In the event of amendments that do not deviate significantly from the initial licence, but which may have an influence on nuclear safety or security, the holder is required to obtain a permit from ENSI. A plaintiff may request from either DETEC or ENSI that it refrain from, discontinue or revoke unlawful acts, rectify the consequences of unlawful acts or confirm the illegality of such acts.

The legal basis for challenging an authorisation issued by DETEC is provided by Article 67(1) of the Nuclear Energy Act, pursuant to which the licensing authority shall withdraw a licence if either the prerequisites for granting it are no longer met or if the licence holder fails to comply with a ruling or ordered measure despite having been reminded to do so. The conditions governing the granting of an operating licence are mentioned in Article 20(1) of the Nuclear Energy Act. The legal basis for challenging a permit issued by ENSI is laid down by Article 72(2) of the Nuclear Energy Act, according to which ENSI shall order all necessary and reasonable measures aimed at preserving nuclear safety and security.

Appeals to decisions issued by either DETEC or ENSI shall be lodged before the Swiss Federal Administrative Court, which acts within its competence as ordinary administrative jurisdiction. These decisions are challenged on the basis of Article 44 and 47(1)(b) of the Swiss Federal Act on Administrative Procedure, as well as Article 1, 31, and 32(1)(e) of the Federal Administrative Court Act of 17 June 2005 (FACA, SR 173.32).

The Federal Administrative Court rulings may in turn be appealed in front of the Supreme Court of Switzerland, which is the court of last resort. The legal basis for such appeal is provided for by Articles 82, 86 and 89 of the Federal Supreme Court Act of 17 June 2005 (FSCR; SR 173.110).

Turkey

Basic information

Turkey has one nuclear power reactor under construction as of June 2019.

Authorisation information

Designed and authorised periods

The initial authorisations for nuclear power reactor operation will be granted with an indefinite term. Any authorisation for long-term operation (LTO) would be part of the periodic safety review (PSR) process, which will take place every ten years.

Terminology

In Turkey, there is no specific terminology to refer to either the process to authorise the operation of a nuclear power reactor beyond its initial design life or the period of operation beyond the initial design life.

Main laws/regulations/documents for initial and long-term/extended operation

The main law governing initial nuclear power reactor authorisations is the Decree on Licensing of Nuclear Installations, 1983. There are no provisions yet in the licensing and regulatory system governing the authorisation of LTO.

Responsible government bodies

In the event of a request for LTO, the Turkish Atomic Energy Authority (TAEA) – the national nuclear regulatory body – would be responsible for reviewing the request and for granting the authorisation.

Public participation

There are no provisions yet in the licensing and regulatory system governing the authorisation of LTO.

Access to information

There are no provisions yet in the licensing and regulatory system governing the authorisation of LTO.

Legal challenges

Although there are no provisions yet in the licensing and regulatory system governing the authorisation of LTO, legal challenges to such an authorisation could, presumably, be allowed based on the general Administrative Jurisdiction Law.

In this instance, any real or legal person could raise a challenge. There could be a geographical component to establishing standing to challenge an authorisation based on the person's residing or working near the plant, but no specific criteria are set.

The TAEA would be the subject party of the challenge. The authorisation decision would be the subject of the challenge. Challenges would have to be raised to the Administrative Court within 60 days of the decision. A decision by the Administrative Court could be appealed to the Regional Administrative Court, which is the court of final resort.

Ukraine

Basic information

Ukraine has 15 nuclear power reactors operating at 4 nuclear power plants (NPPs) as of June 2019. All 15 of Ukraine's reactors are pressurised water reactors (PWRs). The 15 nuclear power reactors are operating at the following lifetimes:

- 10-19 years 2
- 20-29 years 3
- 30-39 years 10

Ukraine has nine nuclear power reactors operating past their original licensed life as of June 2019. The additional six nuclear power reactors will enter long-term operation (LTO) in each of the following time periods:

- 2019-2029 4
- 2030-2039 2

Ukraine has two nuclear power reactors under construction as of December 2018.

Authorisation information

Designed and authorised periods

In Ukraine, the initial licence for a nuclear power reactor has a specific term of 30 years, based on the design-basis life established for Ukrainian nuclear power reactors.

LTO is authorised for 10-20 years and this can be subsequently extended based on the results of the periodic safety review (PSR) process.

Terminology

In Ukraine, the period of nuclear power reactor operation after the original licensed life is referred to as the period of long-term operation or LTO. Ukraine employs the PSR process to extend the design life of nuclear power reactors.

Main laws/regulations/documents for initial and long-term/extended operation

The legal and regulatory framework in Ukraine for nuclear power reactor initial authorisations includes the following three laws and one regulatory document:

- Law of Ukraine on the Use of Nuclear Energy and Radiation Safety (8 February 1995, No. 39/95-VR);
- Law of Ukraine on Authorising Activity in the Field of Nuclear Energy Use (11 January 2000, No. 1370-XIV);
- Law of Ukraine on the Procedure for Making Decisions on Locating, Designing and Building Nuclear Facilities and Objects Designed for Treating Radioactive Waste that are of National Significance (8 September 2005, No. 2861-IV); and

- General Provisions on Nuclear Power Plant Safety, NP 306.2.141-2008.

In addition to those laws and regulations, the following additional regulatory documents are utilised during the LTO process:

- General Requirements for NPP Long-Term Operation resulting from Periodic Safety Review, NP 306.2.099-2004;
- Requirements for Periodic Safety Review of NPPs. NP 306.2.214-2017; and
- General Requirements for Ageing Management of Components and Structures and Long-Term Operation of NPP Units, NP 306.2.210-2017.

Responsible government bodies

The State Nuclear Regulatory Inspectorate of Ukraine (SNRIU), the national nuclear regulatory body, is responsible for reviewing the LTO application and also for issuing the amended licence.

Application and review timing

Three years prior to the end of a reactor's design lifetime, the applicant must apply for LTO. The results of the initial review of the application and accompanying documents shall be provided to the applicant within 30 working days of the receipt of the application.

Through a state expert review of nuclear and radiation safety of the PSR report (PSRR), the SNRIU's technical support organisation (TSO), the State Scientific and Technical Centre for Nuclear and Radiation Safety (SSTC for NRS), reviews the application for completeness and accuracy of the information provided in the submitted documents. This review must not exceed two years from the day the application is received. If necessary, however, the SNRIU may decide to set another deadline, which must not exceed three years (Law of Ukraine on Authorising Activity in the Field of Nuclear Energy Use, Article 12). Usually, the SNRIU completes its review two weeks in advance of the due date.

Scope of review

Safety

The scope of the safety review is the same as that performed during the initial authorisation process. When an applicant determines that it wishes to apply for LTO, the following documents must be submitted to the SNRIU:

- an NPP Licensing Plan for LTO Beyond Design Lifetime, which includes reporting documents that justify safe LTO and an application for licence amendments;
- a Programme of NPP Unit Preparation for LTO;
- a PSRR;
- an Ageing Management Programme (AMP).

According to the General Requirements for Ageing Management of Components and Structures and Long-Term Operation of NPP Units, NP 306.2.210-2017, the following operational and technical measures are part of the LTO NPP unit preparation programme:

- assessment of technical conditions (TCA) of systems, structures and components (SSCs), including a plant-specific safety analysis and time-limited ageing analysis (TLAA);
- lifetime extension of the SSCs or their replacement;
- ageing management review of structures and components;
- safety improvements (including improvements associated with post-Fukushima Daiichi measures);

- seismic and harsh environment qualification;
- radioactive waste management for LTO;
- the creation of conditions for spent fuel storage;
- elimination of (or compensation for) deviations from norms, rules and regulatory requirements on nuclear and radiation safety;
- development of the PSRR; and
- execution of licence provisions and permissions provided by the regulatory bodies.

The results of the implementation of these measures are the main inputs for regulatory decision making on whether to authorise LTO.

The applicant's PSRR includes the results of the activities foreseen by the Programme of NPP Unit Preparation for LTO, demonstrates the current state of safety at the nuclear power reactor and is used for safety justification until the next PSR or the end of operation. In accordance with NRS regulations, rules and standards, the PSRR consists of 15 chapters finalised as individual documents, which includes a comprehensive safety analysis report and 14 individual documents for each safety factor (SF).[1] LTO may be allowed only if the safety level of the NPP unit is not lower than that established by current regulations and rules on nuclear and radiation safety. In accordance with current legislation, a decision on LTO is made by the SNRIU based upon conclusions of the SSTC for NRS's expert review of the PSRR. This decision is taken in the form of an amendment to the operating licence (Law of Ukraine on Authorising Activity in the Field of Nuclear Energy Use, Article 14).

Environmental

The LTO application review includes an environmental review. As part of the safety review, PSRR chapter SF-14, "Environmental impact of power unit operation", focuses on the radiological impact of nuclear power reactor operation and includes required inputs related to the reactor's radiological monitoring programme. The applicant submits this in a report on "environmental impact of power unit operation".

In addition, in accordance with the Law of Ukraine on Environmental Impact Assessment adopted by the Parliament in December 2017, an applicant must prepare an environmental impact assessment (EIA) report, which should contain, at a minimum, the following:

- a description of the planned activity and its purposes;
- a description, where appropriate, of the planned activity's reasonable alternatives, including a no-action alternative;
- a description of the elements of the environment that are likely to be significantly affected by the planned activity or alternatives thereof;
- a description of the potential environmental impact of the planned activity or its alternatives and the impact rate assessment;
- a description of mitigation measures aimed at minimising the adverse environmental impact;
- an explicit indication of predictive measures and underlying assumptions, as well as the relevant environmental data used;
- a description of the knowledge gaps and uncertainties revealed while preparing necessary information;

1. IAEA (2013), *Periodic Safety Review for Nuclear Power Plants*, Specific Safety Guide, IAEA Safety Standards Series No. SSG-25, IAEA, Vienna.

- where appropriate, a summary description of monitoring and management programmes; and
- where appropriate, a non-technical summary supported by visual materials (maps, graphs, etc.).

In addition, the applicant must also submit a report on public hearings, with results of transboundary consultations.

The applicant's EIA report is submitted to the Ministry of Ecology and Natural Resources of Ukraine (MENRU) for review. The result of the EIA report review is the "EIA conclusion", which includes the results of the analysis of the EIA report, information received from the public during public hearings and the results of the transboundary consultations. The EIA conclusion is then submitted to the SNRIU to make the ultimate LTO decision.

New safety requirements

New safety requirements can be imposed upon the applicant during the authorisation process for LTO. The adoption of new nuclear and radiation safety regulations, rules or standards, or modifications and supplements to them, must not, however, cancel or reduce the existing authorisation's term of validity.

Transboundary notification

The LTO process includes a requirement for transboundary notification and consultation, which is defined by the Law of Ukraine on Environmental Impact Assessment (Article 14). The decision to carry out a transboundary EIA is made by MENRU in accordance with the procedure established by the Cabinet of Ministers of Ukraine on the basis of available information provided in the applicant's EIA report or through the request of a foreign state.

If MENRU decides to carry out a transboundary EIA, MENRU must officially notify the potentially affected state(s) within three working days from the date of the decision. The notification shall contain information about the planned activity, including available information on its possible transboundary impact, the possible decision and the procedure for assessing the transboundary environmental impact of the planned activity. The notification shall specify the deadline for the affected state(s) to indicate whether they intend to participate in the transboundary EIA, which must not be less than 30 days from the receipt of such notification by the affected state.

The applicant provides for the preparation and translation of the draft notification, the EIA report and any other required documentation, which is determined on a case-by-case basis. MENRU carries out the consultations with the affected state(s) and, together with the affected state(s), ensures that the public hearing on the planned activities and EIA report are carried out with public representatives of these countries. The results of the transboundary EIA are approved by MENRU and are an integral part of the conclusion on the EIA.

Public participation

Public participation is allowed during the authorisation process for extended operation. Both the decision-making authority and the applicant have a legal duty to solicit public participation during the LTO process. This duty is found in the following laws and resolutions:

- Law of Ukraine on the Use of Nuclear Energy and Radiation Safety (8 February 1995, No. 39/95-VR);
- Law of Ukraine on Access to Public Information, No. 2939-VI of 13.01.2011;
- Resolution of the Cabinet of Ministers of Ukraine "On Approval of the Procedure to Hold Public Hearings in Nuclear Energy Use and Radiation Safety", No. 122 of 18.07.1998; and

- Resolution of the Cabinet of Ministers of Ukraine "On Approval of the Procedure to Involve the Public into Discussion of the Issues Regarding Decision-Making, Which May Have Impact on the Environment", No. 771 of 29.06.2011.

Citizens and citizen's associations may participate in public hearings, which are organised as a meeting where public representatives make comments and provide opinions concerning an LTO decision that is under consideration.

Access to information

Both the decision-making authority and the applicant have a legal duty to provide information to the public during the LTO process. This legal duty is found in the same laws and resolutions as for public participation.

As part of the SNRIU's safety review, it must provide the public with the:

- certificate of comprehensive inspection to confirm State Enterprise National Nuclear Energy Generating Company (SE NNEGC) Energoatom's preparedness for the nuclear power reactor's LTO;
- conclusions of the state expert review on nuclear and radiation safety of the PSRR; and
- draft decision on LTO.

Regarding the environmental review, the SNRIU must provide the public with the conclusion of the state expert review of the EIA report, including information received during the public hearings and transboundary consultations.

As part of the safety review, the applicant must provide to the public the:

- application for licence amendments;
- comprehensive plant-specific safety analysis based on the PSRR;
- non-technical summary of documents on plant-specific safety during LTO; and
- comprehensive analysis of soil conditions for the foundations of buildings and structures at the site.

As part of the environmental review, the applicant must provide the following additional documents to the public:

- PSRR chapter SF-14, "Environmental impact of power unit operation";
- the EIA report;
- the NPP Ecological Audit Report;
- the organisation of environmental radiation monitoring in the area around the nuclear power reactor;
- a non-technical summary of the report "Development of Environmental Impact Assessment of NPP Operation"; and
- the report on public hearings on the plant-specific LTO safety case with the results of transboundary consultations.

Legal challenges

Legal challenges to decisions authorising long-term operation are allowed, though no such challenge has yet been raised.

There is a specific procedure to challenge such decisions, but this is not a procedure unique to nuclear power. This is an administrative procedure and it is provided in the following laws and codes:

- Law of Ukraine on the Use of Nuclear Energy and Radiation Safety;
- Law of Ukraine on Central Executive Bodies;
- Law of Ukraine On Environmental Impact Assessment; and
- Code of Administrative Legal Proceedings of Ukraine.

A legal challenge may be raised by any legal person or individual. There is no pre-determined geographic component to establishing standing in such proceedings. Instead, the standing determination is made on a case-by-case basis.

The subject of a legal challenge can be an LTO authorisation decision made by SNRIU, the results of the PSRR state expert review made by SSTC for NRS or an EIA conclusion made by MENRU. The defendant is the decision-making authority whose authorisation decision is challenged. The licence holder may also participate in such proceedings. The challenge must be based on a claim that the decision is against the law.

A challenge must first be raised before the local administrative court where the issuing authority is located within three months of the publication of the applicable decision. An appeal can be raised before the appellate administrative courts, pursuant to the Code of Administrative Legal Proceedings (CALP) of Ukraine. Pursuant to Article 23 of the CALP, a final appeal can be raised before the Supreme Court of Ukraine.

United Kingdom

Basic information

The United Kingdom has 15 operating nuclear power reactors as of June 2019, located at 8 nuclear power plants (NPPs). This fleet is composed of 14 advanced gas-cooled reactors (AGRs) and 1 light water reactor (LWR). The 15 nuclear power reactors are operating at the following lifetimes:

- 20-29 years: 1
- 30-39 years: 10
- 40-49 years: 4

Of the 14 AGRs, 7 are already operating past 35 years of operation in the United Kingdom as of June 2019. It is currently planned that the remaining seven AGRs will start operating past their initial designed life during the 2019-2023 period.

Work is underway on construction of two nuclear power reactors at the Hinkley Point C NPP.

Authorisation information

Designed and authorised periods

Licences for nuclear power reactor operation in the United Kingdom are initially granted without a definite term. Accordingly, there is no legal requirement for an operational licence renewal or specific authorisation within that regulatory scheme for the operation of a nuclear power reactor beyond 35 years of operation. However, the continued operation of a nuclear power reactor throughout its lifetime requires decennial periodic safety reviews (PSRs).

Terminology

Given the regulatory approach adopted, there is currently no specific terminology within the United Kingdom legal framework for the operation of a nuclear power reactor to refer to the process of extending the lifetime of a nuclear power reactor.

Main laws/regulations/documents for initial and long-term/extended operation

The main laws, regulations and documents governing the initial construction and operation as well as the long-term operation (LTO) of nuclear power reactors in the United Kingdom are:

- the Nuclear Installations Act 1965 (c. 57), as amended;
- the Planning Act 2008 (c. 29), as amended;
- the Electricity Act 1989 (c. 29), as amended;
- the Environmental Permitting (England and Wales) Regulations 2016 (No. 1154); and
- the Radioactive Substances Act 1993 (c. 12), as amended.

Nuclear sites are also regulated under other licences, permits and authorisations issued by regulators, such as a generation licence issued by the Office of Gas and Electricity Markets (OFGEM), the economic regulator, under the Electricity Act 1989. These documents include conditions and requirements that must be complied with throughout the life cycle of the site. The national nuclear regulatory body, the Office of Nuclear Regulation (ONR) has issued a list of Standard Licence Conditions attached to Nuclear Site Licences.[1]

Responsible government bodies

The government body responsible for assessing the decennial PSRs, which are required for the continued operation of a nuclear power reactor throughout its lifetime, is the ONR.

Other government bodies are responsible for environmental and urban planning-related aspects of such operation, namely the Environment Agency, Natural Resources Wales or the Scottish Environmental Protection Agency – depending on the location of the concerned reactor – and the relevant local planning authorities.

Application and review timing

All operating nuclear power reactors in the United Kingdom are required to undertake a decennial PSR, in accordance with the Standard Licence Conditions attached to Nuclear Site Licences, and in particular Licence Condition (LC) 15. The timing of PSRs is the licensee's prerogative, subject to the general requirement that the period between two PSRs should be no more than ten years. The licensee may produce a PSR considerably before the due date. Prior to undertaking the work related to a PSR, it is advisable for a licensee to engage in preliminary discussions with ONR.[2] Following the submission of a PSR by the licensee, the ONR is expected to provide its collated findings within a reasonable period, typically no more than nine months.

In addition, all nuclear power reactors are subject to periodic shutdown requirements for the purposes of examination, maintenance, inspection and testing, in accordance with LC 30. For the fleet of AGRs, the maximum operating period between such shutdowns is 36 months, while this period has typically been 18 months for the single LWR operating in the country. This process includes the requirement to request the ONR's consent prior to starting up the nuclear power reactor following each periodic shutdown.

Scope of review

Safety

The scope of the PSR is described by the ONR Nuclear Safety Technical Assessment Guide on PSR (NS-TAST-GD-050 Revision 6), in accordance with the ONR Safety Assessment Principles (SAPs) and the relevant legislation, notably the Nuclear Installations Act 1965.

In particular, in considering ageing, degradation and obsolescence processes (hereafter referred to as "ageing"), the PSR should determine whether:

- a systematic and effective ageing management programme is in place;
- adequate arrangements have been made to fulfil required safety functions during future plant operation; and
- there are any features that would limit plant life.

1. The list of the Standard Licence Conditions attached to Nuclear Site Licences is available at: www.onr.org.uk/documents/licence-condition-handbook.pdf.
2. More information is detailed in the ONR Guide on Periodic Safety Reviews, available at: www.onr.org.uk/operational/tech_asst_guides/ns-tast-gd-050.pdf.

This review includes the technical aspects of ageing management, such as:

- the ageing management methodology;
- the extent of understanding of relevant age-related degradation mechanisms;
- any system, structure and component (SSC) specific acceptance criteria;
- operating guidelines aimed at controlling the rate of ageing degradation, and ageing detection and mitigation methods; and
- the actual condition of SSCs.

It also includes a review of the management arrangements required to deliver the aforementioned technical aspects, such as policies, procedures, performance indicators, staffing, resources and record keeping. The PSR should highlight any ageing features that require attention before the next PSR, and the licensee should then ensure that these are addressed during appropriate interim reviews.

Following its assessment of the PSR, the ONR issues a project assessment report, which serves as a basis for any necessary subsequent ONR action.

Environmental

There is no dedicated legal requirement to carry out an environmental review to continue the operation of a nuclear power reactor past its initial designed life. Such review would only be required if the continued operation of the reactor includes the need to vary a pre-existing environmental permit granted by the relevant environmental agency (i.e. either the Environment Agency, Natural Resources Wales or the Scottish Environmental Protection Agency) during the initial licensing of the concerned nuclear site. Such environmental permits are generally not time-limited.

New safety requirements

In accordance with the Nuclear Installations Act 1965, the ONR may impose new safety requirements upon the licence holder following the PSR, in order to ensure that the licence holder demonstrates compliance with the safety case for the concerned nuclear power reactor.

Transboundary notification

Where the continued operation of a nuclear power reactor requires varying an existing environmental permit, the relevant environmental agency (i.e. the Environment Agency, Natural Resources Wales or the Scottish Environmental Protection Agency) would assess the potential transboundary impacts in order to determine whether a transboundary notification is required under the legislation transposing the European Union (EU) legislation and the Espoo Convention.[3]

Likewise, any significant change to the underlying planning authorisation (including, as relevant, a development consent order under the Planning Act 2008, consent under the Electricity Act 1989 and any Town and Country Planning permission) would require the relevant authorities to assess the need for transboundary consultation in accordance with the aforementioned legislation.

There is no dedicated legal requirement for transboundary notification as part of the PSR process.

3. Convention on Environmental Impact Assessment in a Transboundary Context (1991), 1989 UNTS 310, entered into force 10 September 1997 (Espoo Convention).

In addition, any change to plans for nuclear sites requiring an increase in discharge limits would normally be subject to a submission from the United Kingdom to the European Commission under Article 37 of the Euratom Treaty.[4]

Public participation

There is no legal requirement for either ONR or the licence holder to provide for public participation as part of the PSR process. Therefore, any public involvement mechanism is established at the discretion of the licence holder. In practice, the licence holder for the operating nuclear power reactors carries out engagement with stakeholders, including the public interest groups and regulators, for example though Site Stakeholder Groups.

The relevant environmental agencies (i.e. the Environment Agency, Natural Resources Wales or the Scottish Environmental Protection Agency) do provide for public participation during the initial environmental permitting for new nuclear sites, including an obligation to consult on applications. In the event of a subsequent application from an operator, or a decision by the environment agencies to vary an existing environmental permit, those agencies may consult on applications and proposed decisions, depending on the scope of the proposed change to an environmental permit, in accordance with the Environment Act 1995 (c. 25) and the Environmental Permitting (England and Wales) Regulations 2016. However, as stated previously, there may not be any need to vary an environmental permit to allow for the operation of a nuclear power reactor past its initial designed life. The duty to provide for public participation as part of the environmental permitting process rests solely on the environment agencies and does not extend to the operator of a nuclear power reactor.

In addition, should there be any requirement for a material change to an underlying planning permission, a consent issued under the Electricity Act 1989 or a development consent order issued under the Planning Act 2008, then the relevant authorities (the Secretary of State or local planning authority) would be required to provide for public consultation.

Access to information

Any individual has the right to solicit information from the public authority in charge of decision making under the Freedom of Information Act 2000 (c.36), as amended, and the Environmental Information Regulations 2004 (No. 3391), the latter of which implements the EU legislation and the Aarhus Convention.[5] This requirement would apply to the ONR, environmental authorities and local planning authorities, as part of their respective decision-making power.

In addition, the ONR publishes information on its website in relation to regulatory decisions, such as Project Assessment Reports, and notes from Site Stakeholder Groups, where there is no commercial confidentiality and/or security risk. Similarly, the environment agencies also publish their decision documents and carry out environmental monitoring in the vicinity of nuclear sites, the results of which are published in the annual "Radiation in Food and the Environment (RIFE) Report".[6]

While the general duty to provide information to the public on request under the freedom of information and access to environmental information legislation does not concern the operators of nuclear power reactors, such operators are required to carry out environmental monitoring of the nuclear sites and publish their results pursuant to the Environmental Act 1995 and Environmental Permitting (England and Wales) Regulations 2016.

4. Treaty Establishing the European Atomic Energy Community (1957), 298 UNTS 167, entered into force 1 January 1958 (Euratom Treaty) (consolidated version *Official Journal of the European Union* (OJ) C 203 (7 June 2016)).
5. Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (1998), 2161 UNTS 450, entered into force 30 October 2001 (Aarhus Convention).
6. The annual RIFE Reports are available at: www.gov.uk/government/publications/radioactivity-in-food-and-the-environment-rife-reports-2004-to-2016.

Legal challenges

The legal framework in the United Kingdom provides for the possibility to introduce legal challenges to ONR decisions required for the continued operation of a nuclear power reactor (such as ONR decisions to vary a condition in a licence or otherwise impose new safety requirements following a PSR). However, no such challenge has been introduced to date.

The procedure to challenge such decisions is governed by the Civil Procedure Rules (CPR), Part 54 – Judicial Review and Statutory Review. This is a specific civil procedure regarding judicial review, which however is not limited to nuclear energy-related activities.

In accordance with the legal framework in the United Kingdom, anyone with a "sufficient interest", including non-governmental organisations, may introduce a challenge to such decisions. There is no predetermined geographical component to establishing standing in such proceedings.

The defendant in this instance is the decision-making authority, whose authorisation decision is challenged, i.e. the ONR, the environmental agencies and/or the local planning authorities. The licence holders may intervene in such proceedings as an "interested party", as such a claim would directly affect them.

The legal basis for such challenges is the illegality, irrationality (unreasonableness) or procedural impropriety (natural justice) of the concerned decision.

Challenges must be raised within three months after the publication of the decision.

These challenges are introduced in the first instance before the High Court in England and Wales or the Outer House of the Court of Session in Scotland, depending on the location of the relevant nuclear power reactor. The initial decision of these courts may be appealed, respectively to the Court of Appeal in England and Wales or the Inner House of the Court of Session in Scotland. In turn, the decisions of courts of appeal may be appealed further to the Supreme Court, which acts as the authority of final resort.

The legal framework in the United Kingdom also provides for the possibility to introduce legal challenges to decisions on modifying planning permissions granted under the Planning Act 2008. Under that Act, such challenges must be introduced before the High Court in England and Wales within six weeks after the publication of the decision. Other decisions, such as those granted under either the Town and Country Planning Act 1990 or the Electricity Act 1989, are also challengeable in court.

United States

Basic information

The United States has 97 nuclear power reactors operating at 59 nuclear power plants (NPPs) as of June 2019. Of these, 65 reactors are pressurised water reactors (PWRs) and 32 are boiling water reactors (BWRs). The 97 nuclear power reactors are operating at the following lifetimes:

- 0-9 years 1
- 20-29 years 5
- 30-39 years 43
- 40-49 years 48

The United States has 48 nuclear power reactors operating past their original licensed life as of June 2019. The additional 49 nuclear power reactors will enter the period of extended operation in each of the following time periods:

- 2020-2029 44
- 2030-2039 4
- Post-2050 1

The United States has two nuclear power reactors under construction as of June 2019.

Authorisation information

Designed and authorised periods

The initial licence for nuclear power reactor operation in the United States has a specific term of a maximum operating period of 40 years.

A renewed licence can be issued for a period of extended operation of up to 20 years. A renewed licence can be subsequently renewed for an additional operating period of up to 20 years.

Terminology

In the United States, the process of extending the licensed life of a nuclear power reactor is called “licence renewal”.

The operating period for the power reactor under a renewed licence is known as the “period of extended operation”.

Main laws/regulations/documents for initial and long-term/extended operation

Initial authorisations for nuclear power reactors are issued in accordance with the:

- Atomic Energy Act of 1954, as amended, 42 USC 2011 et seq. (AEA), which is a comprehensive federal statute that regulates possession and use of radioactive material and facilities that produce or use such material; and

- National Environmental Policy Act of 1969, 42 USC 4321 et seq. (NEPA), which requires federal agencies to assess the environmental effects of their proposed actions prior to making decisions.

Initial authorisations under the AEA are implemented in Title 10 of the *Code of Federal Regulations* (CFR), and specifically:

- 10 CFR Part 50, "Domestic licensing of production and utilization facilities" (operating licences); and
- 10 CFR Part 52, "Licenses, certifications, and approvals for nuclear power plants" (combined licences).

The licence application review is conducted in accordance with the "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition" (NUREG-0800).

The AEA also governs licence renewal, and this is implemented in:

- 10 CFR Part 54, "Requirements for renewal of operating licenses for nuclear power plants"; and
- 10 CFR Part 51, "Environmental protection regulations for domestic licensing and related regulatory functions".

Nuclear power reactor licence renewal applications (LRAs) are reviewed in accordance with the "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants" (NUREG-1800, Revision 2). The Generic Aging Lessons Learned (GALL) Report (NUREG-1801, Revision 2) is referenced by NUREG-1800 and is utilised by applicants in their LRA and in the review of the LRA. Applications for subsequent licence renewal (operation beyond 60 years) are reviewed in accordance with the "Standard Review Plan for Review of Subsequent License Renewal Applications for Nuclear Power Plants" (NUREG-2192); this document references the "Generic Aging Lessons Learned (GALL) Report for Subsequent License Renewal" (NUREG-2191).

For nuclear power reactors, the licence renewal/subsequent licence renewal environmental review is conducted in accordance with the "Standard Review Plan for Environmental Reviews for Nuclear Power Plants, Supplement 1: Operating License Renewal" (NUREG-1555, Supplement 1, Revision 1). The "Generic Environmental Impact Statement (GEIS) for License Renewal of Nuclear Plants" (NUREG-1437, Revision 1) provides the technical basis for the identification of environmental issues. These documents are referenced by applicants for licence renewal and subsequent licence renewal and are utilised in the environmental review of those applications.

Responsible government bodies

The US Nuclear Regulatory Commission (NRC), the national nuclear regulatory body, is responsible for reviewing the application for licence renewal and also for issuing the renewed licence.

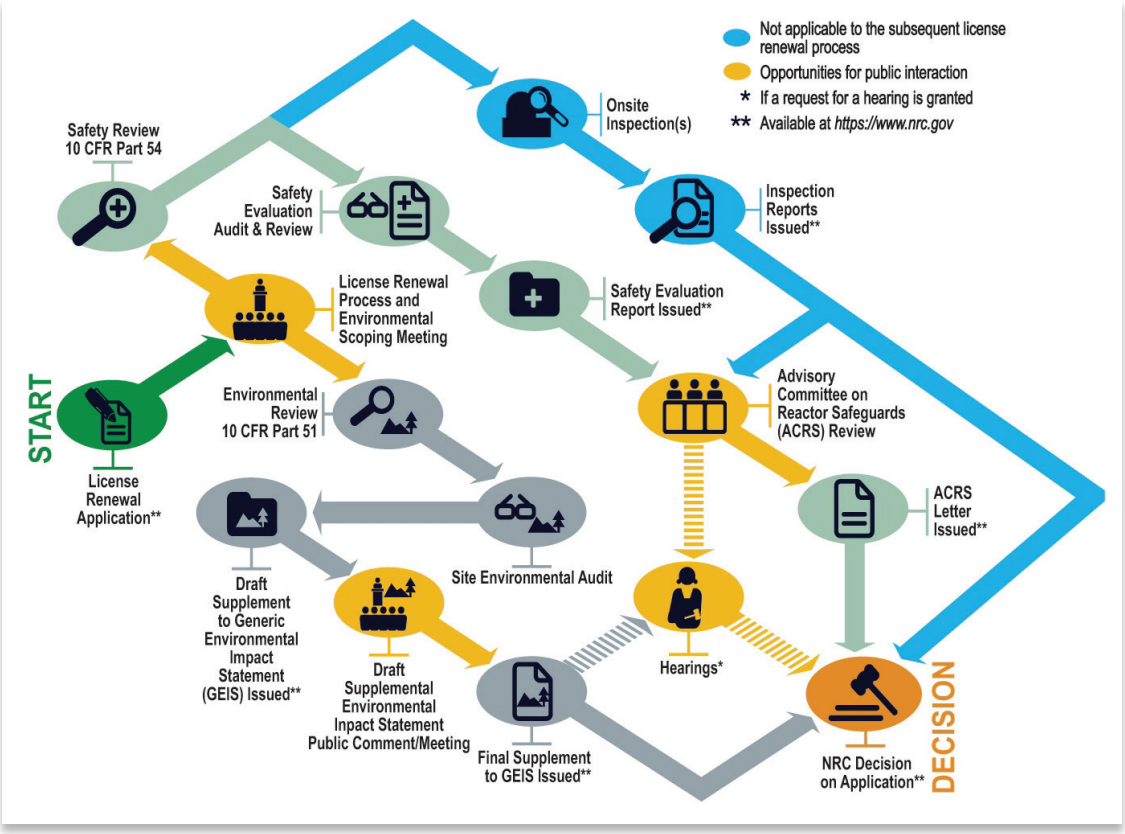
There are other federal agencies, such as the US Environmental Protection Agency (EPA), and state governmental bodies involved in the licence renewal review process regarding various required water permits and certifications, as well as certifications regarding coastal zone management. In addition, the NRC may consult, as appropriate, with other federal agencies, for example the National Marine Fisheries Service, the US Fish and Wildlife Service, and/or the Advisory Council on Historic Preservation.

Application and review timing

LRAs for power reactors may be submitted no sooner than 20 years before expiration of the existing licence. If the application is submitted at least five years before expiration of the existing licence, the existing licence will not be deemed to have expired until the application has been finally determined (i.e. approved or denied by the NRC); rather, the licence is considered to be in a status of "timely renewal" (10 CFR 2.109).

There is no requirement for the NRC to complete its review of an LRA within any specific time period. The NRC staff's target review time without adjudicatory hearings is 22 months and with hearings it is 30 months. However, these targets are not mandatory, and a renewed licence will not be issued until the NRC finds there is reasonable assurance that the plant can operate safely throughout the period of extended operation. Licence renewal reviews have generally been completed within 22 months of receipt of the application in the absence of adjudicatory hearings, although complex technical issues have extended this time by years in some cases. Adjudicatory hearings have sometimes extended the time for issuance of nuclear power reactor renewed licences, to as much as 11 years in one case. The NRC staff has recently implemented an optimised review process that targets completion of licence renewal/subsequent licence renewal reviews in 18 months.

Figure 3.5. **Licence renewal process**



Source: US Nuclear Regulatory Commission.

Scope of review

Safety

The regulations in 10 CFR Part 54 require applicants to submit an LRA containing the applicant's integrated plant assessment (IPA), time-limited ageing analyses (TLAAs) and ageing management programmes (AMPs). The scope of the safety review for power plant LRAs addresses plant systems, structures and components (SSCs) that are:

- safety-related and relied upon to remain functional during and following design-basis events to ensure certain specified functions;

- non-safety-related but the failure of which could prevent satisfactory accomplishment of certain specified functions; and
- relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the NRC's regulations for fire protection, environmental qualification, pressurised thermal shock, anticipated transients without scram and station blackout.

The LRA also includes a supplement to the final safety analysis report (SAR) and any additions or changes to the technical specifications, as described in 10 CFR Part 54.

The NRC staff issues audit reports based on audits during the review, the NRC region's inspection report, a safety evaluation report (SER) with open items and a final SER. The recent optimised review process no longer includes issuance of an SER with open items but rather focuses on producing a final SER.

Following completion of the NRC staff's safety review, the Advisory Committee on Reactor Safeguards (ACRS)[1] conducts an independent review of the NRC staff's SER, audit reports and inspection reports. The applicant presents an overview of its LRA, and the NRC staff presents the findings of its safety review to the ACRS Subcommittee for License Renewal in a public meeting. Based on the results of this public meeting and its independent review, the ACRS Subcommittee provides a recommendation to the ACRS Full Committee regarding renewal of the licence. As the independent advisory body to the Commission, the ACRS Full Committee prepares a letter of recommendation to the Commission regarding renewal of the licence. This ACRS letter is required per 10 CFR 54.25 for issuance of the renewed licence.

Environmental

The applicant must include an environmental report as required by 10 CFR 51.45 and 51.53(c) in its LRA. As described in 10 CFR 51.71(c), the licence renewal environmental review supports a determination of whether the adverse environmental impacts of licence renewal are so great that preserving the option of licence renewal for energy planning decision makers would be unreasonable.

The NRC issues a scoping summary report defining the scope of the proposed action and identifying significant issues raised during the scoping process (10 CFR 51.29). This report informs the draft Supplemental Environmental Impact Statement (SEIS), a supplement to the GEIS, which is issued for public comment. A final SEIS (including any changes resulting from public comments and the NRC's response to public comments) and then a Record of Decision summarising the results of the licence renewal environmental review are issued by the NRC. The final SEIS will:

- incorporate the generic findings on "Category 1" issues set out in the GEIS, as applicable and as supplemented by any new and significant information; and
- provide an evaluation of "Category 2" site-specific environmental impacts.

A list of the Category 1 and Category 2 issues is set out in Table B-1 of 10 CFR Part 51, Appendix B.

During its environmental review, the NRC considers the reasonably foreseeable environmental impacts of the proposed action (i.e. licence renewal), the no-action alternative (i.e. not renewing the operating licence) and the environmental consequences of a range of reasonable replacement power alternatives (including the construction and operation of new power plants using different power generating technologies) that would replace the nuclear power reactor's generating capacity.

1. The ACRS is a statutorily mandated (42 USC 2039) independent advisory committee made up of technical experts that, *inter alia*, reviews and reports on LRAs. By law, the ACRS is mandated to hold a public hearing for each reactor case and make its reports available to the public.

New safety requirements

The licence renewal safety review may identify areas where a plant needs to implement additional ageing management activities to provide reasonable assurance that the activities authorised by the renewed licence will continue to be conducted in accordance with the current licensing basis (CLB) and that any changes made to the plant's CLB for licence renewal are in accord with the AEA and the NRC's regulations. If the new requirement is specifically linked to the licence renewal term only, it would typically be imposed as a condition in the renewed licence. It is possible, however, that the licence renewal review may disclose an existing safety issue for which a "backfit" is required in order to provide reasonable assurance of adequate protection of public health and safety under the existing licence; in that case, an "order" could be issued to the licensee imposing the new requirement outside the licence renewal process.

Transboundary notification

There is no specific requirement for notification of and/or consultation with foreign governments, but such actions may be taken as part of the NRC's consultations and notifications depending upon the location of the facility at issue.

Public participation

Public participation is allowed during the licence renewal process in the United States. The legal duty to solicit public participation in the licence renewal process falls on the decision-making authority; the applicant does not have any legal duty to solicit public participation.

Public participation is addressed in US law, under AEA Section 189.a, 42 USC 2239.a (hearings) and also in US regulatory requirements:

- 10 CFR 2.105(d), "Notice of proposed action";
- 10 CFR 2.309, "Hearing requests, petitions to intervene, requirements for standing, and contentions";
- 10 CFR 54.27, "Hearings";
- 10 CFR 51.28, "Scoping – Participants";
- 10 CFR 51.73, "Request for comments on draft environmental impact statement"; and
- 10 CFR 51.95(c), "Postconstruction environmental impact statements".

NRC regulations in 10 CFR 51.28 require the NRC to invite the public; federal, state, and local agencies; and any affected Indian Tribe(s) to participate in the environmental impact statement (EIS) scoping process for the environmental review. Similarly, NRC regulations in 10 CFR 51.73 and 51.74 require the distribution of draft environmental review documents to the same participants for public comment.

Members of the public; federal, state and local governmental agencies; and any affected Indian Tribe(s) may participate in the licence renewal process. Hearings may be convened at the request of any organisation; state, local or Tribal governmental entity; or member of the public who demonstrate(s) standing to intervene and submit(s) at least one admissible contention. Interested states, local and Tribal governmental entities may also participate in hearings without having to request a hearing or file a petition to intervene. Anyone may participate in the environmental comment process, without demonstrating standing to intervene or participating in a hearing.

Access to information

Both the decision-making authority and the applicant have a legal duty to provide information to the public during the licence renewal process. The NRC's legal duty can be found in the following NRC regulations:

- 10 CFR 54.11, "Public inspection of applications", which specifies that applications and documents submitted to the NRC in connection with LRAs are made available for public inspection in accordance with the regulations in 10 CFR Part 2;
- 10 CFR 2.390, "Public inspections, exemptions, requests for withholding", which requires that all documentation prepared by the applicant or the NRC must be disclosed except for certain information (e.g. proprietary or privileged information) that is properly withheld in accordance with 10 CFR 2.390. The non-withheld documents are made publically available in the NRC's Public Document Room as well as via the Internet in the NRC's Agencywide Documents Access and Management System (ADAMS);
- 10 CFR 2.101, "Filing of application", which states that the applicant's LRA and environmental report will be made publicly available;
- 10 CFR 9.15, "Availability of records" and 9.21, "Publicly-available records"; and
- 10 CFR 51.95(c), "Postconstruction environmental impact statements: Operating license renewal stage".

In addition, NEPA mandates that US agencies such as the NRC ensure that environmental information is made available to public officials, citizens and affected Indian Tribe(s) before decisions are made.

After the applicant submits the LRA, the NRC issues a *Federal Register*[2] notice that indicates that the NRC has received the LRA and provides information on how the public can access the application. Another *Federal Register* notice is issued, informing the public when the LRA has been accepted for docketing and providing a notice of opportunity for hearing. The results of the NRC staff's safety review are published in the SER, which is made available to the public; the SER is also available electronically in ADAMS. Additionally, the public can provide comments to the ACRS on the staff's review of the LRA in advance of the ACRS meeting. The NRC staff's review documents (and other documents related to its review) are also subject to disclosure under the Freedom of Information Act (FOIA) (5 USC 552).

The applicant is required to provide copies of its application to various governmental agencies, in accordance with 10 CFR 2.101.

Legal challenges

Legal challenges to licence renewal are allowed, and LRAs have been subjected to legal challenges. The opportunity to challenge licence renewal is provided by the AEA Section 189.a (42 USC 2239.a) and by 10 CFR Part 2, including 10 CFR 2.309. This is a unique civil administrative procedure applicable to civilian nuclear power applications.

Hearings may be convened at the request of any organisation; state, local or Tribal governmental entity; or any member of the public who demonstrate(s) standing to intervene and submit(s) at least one admissible contention. Interested states, local and Tribal governmental entities may also participate in any hearings that are held.

2. The *Federal Register* is the official daily publication in the United States for rules, proposed rules, and notices of federal agencies and organisations, as well as executive orders and other presidential documents.

There is a geographical component to establishing standing to challenge licence renewal. In this instance, a proximity presumption has been applied by the Atomic Safety and Licensing Boards (ASLB),[3] establishing standing to intervene for persons who reside or conduct substantial activities within 50 miles of the facility in question.

The applicant and the NRC are the subject parties of the challenge. The LRA, the NRC staff's review and the staff's proposed licence renewal decision are the subjects of the challenge. The basis for the challenge is an alleged failure to satisfy applicable laws and regulations, including both safety and environmental requirements. Applicants must demonstrate that they have satisfied all applicable safety requirements. The NRC staff's compliance with NEPA and other applicable laws may also be challenged.

Under 10 CFR 2.104, "Notice of hearing", the NRC is required to publish a notice of hearing in the *Federal Register*. 10 CFR 2.309 requires the filing of petitions to intervene/requests for hearing within 60 days after publication of the notice of opportunity for hearing; late petitions/requests for hearing require a showing of good cause for the delay. Petitions/requests for hearing must be filed before the NRC or the presiding officer or ASLB that is established to preside over the proceeding.

The presiding officer/ASLB's decision can be appealed to the NRC, whereupon the Commissioners act as an appellate body. 10 CFR 2.341(b)(4), "Review of decisions and actions of a presiding officer" identifies the bases upon which an appeal may be filed, which include: errors of material facts; errors of law; the existence of substantial and important questions of law, policy or discretion; prejudicial procedural errors; and any other considerations the Commission may deem to be in the public interest.

Appeals from the Commission's decision can be filed before the US Court of Appeals for the District of Columbia Circuit or the Circuit in which the facility is located. In general, appeals may be filed based on claims of material error of fact or law or an abuse of discretion. Appeals from the US Court of Appeals may be filed before the US Supreme Court via a petition for *writ of certiorari*, which the Supreme Court may grant or deny as it deems appropriate. The Supreme Court is the court of final resort.

3. The ASLB is an independent trial-level adjudicatory body of the NRC. Each panel of the ASLB is usually composed of three administrative judges: two technical or scientific experts and one attorney.

Annex 1. Survey on Long-Term/Extended/Continued Operation of Nuclear Power and Research Reactors

Before the "Survey on long-term/extended/continued operation of nuclear power and/or research reactors" was sent to the NEA Nuclear Law Committee (NLC) for response, it benefited from two rounds of review and comments by members of the NEA Working Party on the Legal Aspects of Nuclear Safety (WPLANS). This process ensured that the survey fully captured the different processes, concerns and issues faced by NEA member countries. Such a comprehensive approach endeavoured to address all of the possible legal and regulatory situations in NEA member countries. The final, 10-page survey contained 55 questions in 5 sections, each of which is addressed in detail below:

- basic information;
- basic authorisation information;
- substantive authorisation information;
- public participation in authorisations of long-term/extended/continued operation;
- legal challenges to authorisations of long-term/extended/continued operation.

Basic information

The purpose of the basic information section is to understand the national context for each survey response, as well to collect up-to-date background information related to long-term operation (LTO). The questions in this section focus on the number of nuclear power reactors operating and under construction in participating countries, as well as on the age of the operating reactors. In addition, the survey requested information on how many reactors are operating past their original term of authorisation or design, and how many are entering the period of LTO in four specific time periods.

Basic authorisation information

The purpose of the basic authorisation information section is to obtain clear answers on terminology and background information to determine whether enough commonalities exist to gain consensus on the use of LTO-related terminology. The questions in this section focus on determining the type of term used for the initial authorisation for nuclear power reactors; clarifying certain information to determine if uniform terminology can be used to refer to both the process of extending the term of authorisation or design of a nuclear power reactor, as well as the period of operation after such extension; and understanding which governmental or regulatory body is responsible for reviewing and issuing authorisations for LTO.

Substantive authorisation information

The purpose of the substantive authorisation information section is to understand in detail the laws, regulations and procedures for LTO, as well as to compile standard information so as to compare and contrast the different approaches. The questions in this section focus on

application and review deadlines; the scope of the safety and environmental reviews; requirements for environmental reviews; requirements for transboundary notification and consultation; documents submitted and generated by both the applicant and reviewing authority; whether authorisations can be subsequently renewed or extended; and whether new safety requirements can be imposed.

Public participation in authorisations of long-term operation

The purpose of the public participation section is to gain clarity on the policies, processes and procedures for public participation in the LTO-approval process, if any, and to determine the potential differences between what is required by law and/or regulation compared to what is done in practice. Accordingly, the questions in this section mainly focus on whether public participation is allowed or even required by the decision-making authority or by the licensee as part of the authorisation process; the type and scope of participation allowed; the existence and scope of a legal duty to provide information; and the nature of the safety or the environmental information to be provided to the public during the authorisation process.

Legal challenges to authorisations of long-term operation

Finally, the purpose of the legal challenges section is to understand whether and/or how challenges can be raised in relation to LTO authorisation decisions. The questions in this section focus on the possibility to allow for such challenges; whether such challenges have previously been raised; and the types and features of the procedures for challenges in participating countries (e.g. whether it is an administrative or civil procedure, rules regarding the standing, time frames for challenges, before which bodies challenges are raised, the nature of the appeals process).

Survey on Long-Term/Extended/Continued Operation of Nuclear Power and Research Reactors

Country name: Respondent(s):

For now, the responses to this survey will only be shared with the Working Party on the Legal Aspects of Nuclear Safety (WPLANS) and the Nuclear Law Committee (NLC). If a report is published based on the survey, can your survey response be included in an appendix? ☐ YES, please include this survey response. ☐ NO, do not include this survey response. ☐ I will decide later.

Subject of responses	
☐	My country has operating nuclear power reactors (whether or not my country has research reactors) and I am answering the survey as it is written.
☐	My country only has research reactors. In answering the survey, where a question relates to nuclear power reactors, I am answering as if it relates to research reactors.
☐	Regardless of whether my country has nuclear power reactors, in answering the survey, where a question relates to nuclear power reactors, I am answering as if it relates to research reactors.

For any questions regarding this Survey, please do not hesitate to contact Kimberly Sexton Nick at:
Tel.: +33 (0)1 45 24 10 38
Email: kimberly.nick@oecd.org

Survey summary

This survey is intended to obtain information related to Intermediate Output Result 1.1, "Legal Framework for Long-Term Operation" in the 2017-2018 WPLANS Programme of Work [NEA/NLC/WPLANS(2017)2]. As explained in that document, while high-level comparative work has been done in this area, more detailed analysis of the legal frameworks for authorising long-term operation (LTO), with an emphasis on understanding the scope of the authorisation reviews, would be beneficial.

This survey is intended to compile information and identify commonalities and differences in the legal frameworks for authorising LTO in NEA member countries. As explained in the [NLC?] Programme of Work, specific areas of study, among others, are:

- primary legal documents detailing the legal framework;
- scope of the safety and environmental assessment for authorising LTO, with a comparison to initial licensing reviews;
- ability to impose new safety and environmental requirements;
- public participation in safety and environmental issues;
- legal challenges to safety and environmental issues.

Cover page

Respondent(s): The individual(s) listed as "Respondent(s)" will be the NEA Secretariat's point(s) of contact for any questions.

Subject of responses: The survey is intended to cover both nuclear power reactors and research reactors. Each section of the survey first asks questions related to nuclear power reactors. The second to last question in each section asks whether any of the above information is different for research reactors. If the information in your responses relates both to nuclear power reactors and research reactors in your country, you can check the "NO" box. If there are any differences, you can check the "YES" box and explain those differences in as little or as much detail as you would like.

Some countries, however, only have research reactors or would rather not respond regarding nuclear power reactors. To facilitate those countries' responses, the option is provided to respond to the entire survey as if the main questions were asked regarding research reactors. For example:

- Question 6: "What are the main laws/regulations/documents governing initial nuclear power reactor authorisations in your country?"
  - The NEA Secretariat will understand your response to be to the question: What are the main laws/regulations/documents governing initial research reactor authorisations in your country?
- Question 14: "At what point in reactor life/by what date/by what period of time is the applicant/licensee required to request/apply for long-term/continued/extended operation?"
  - The NEA Secretariat will understand your response to be to the question: At what point in research reactor life/by what date/by what period of time is the applicant/licensee required to request/apply for long-term/continued/extended operation?

Basic information

The objective in this first section is to get a general understanding of the status of nuclear power in each country. For any question where your country has no nuclear power reactors and/or no research reactors, put the number zero ("0") in the box.

BASIC INFORMATION					
1	What is the total number of operating nuclear power reactors and research reactors in your country?				
	Nuclear power reactors:		Research reactors:		
2	How many nuclear power reactors and research reactors are in operation in your country in each of the following periods of operation?				
	1-9 YEARS	Nuclear power reactors:		Research reactors:	
	10-19 YEARS	Nuclear power reactors:		Research reactors:	
	20-29 YEARS	Nuclear power reactors:		Research reactors:	
	30-39 YEARS	Nuclear power reactors:		Research reactors:	
	40-49 YEARS	Nuclear power reactors:		Research reactors:	
	50+ YEARS	Nuclear power reactors:		Research reactors:	
3	What is the total number of nuclear power reactors and research reactors under construction in your country?				
	Nuclear power reactors:		Research reactors:		
4	What is the total number of nuclear power reactors and research reactors operating past their original authorised/licensed/designed life?				
	Nuclear power reactors:		Research reactors:		
5	How many nuclear power reactors and research reactors will enter the period of long-term/continued/extended operation in each of the following time periods?				
	2017-2019	Nuclear power reactors:		Research reactors:	
	2020-2029	Nuclear power Reactors:		Research reactors:	
	2030-2039	Nuclear power reactors:		Research reactors:	
	2040-2049	Nuclear power reactors:		Research reactors:	
	Post-2050	Nuclear power reactors:		Research reactors:	
BASIC AUTHORISATION INFORMATION					
6	What are the main laws/regulations/documents governing initial nuclear power reactor authorisations in your country? ANSWER:				
7	Does the initial authorisation/licence for nuclear power reactors have a specific term or an indefinite term? [Please tick the appropriate box.]				
	☐	Specific term	☐	Indefinite term	
	If your answer was “Specific Term”, what is the specific term? ANSWER:				

8	What is the terminology for the process of extending the authorised/licenced/designed life of a nuclear power reactor in your country? [Please tick the appropriate box.]			
	☐	License renewal	☐	Authorisation for continued operation
	☐	Periodic safety review	☐	No specific terminology
	☐	Other [please specify]:		
9	What is the terminology for the period of nuclear power reactor operation after the original authorised/licenced/designed life in your country? [Please tick the appropriate box.]			
	☐	Long-term operation	☐	Extended operation
	☐	Continued operation	☐	No specific term
	☐	Other [please specify]:		
10	What are the main laws/regulations/documents governing the authorisation of long-term/continued/extended operation in your country? ANSWER:			
11	Which governmental/regulatory body/bodies are responsible for the following activities:			
	a.	Reviewing/assessing the request/application for long-term/continued/extended operation? ANSWER:		
	b.	Issuing the authorisation for long-term/continued/extended operation? ANSWER:		
12	Is any of the above basic authorisation information different for research reactors? [Please tick the appropriate box.]			
	☐	YES, some or all of the above basic authorisation information is different for research reactors.	☐	NO, all of the above basic authorisation information for nuclear power reactors also applies to research reactors.
	IF YES, PLEASE EXPLAIN:			
13	Please provide any additional/clarifying information that might be useful for NEA member countries. ANSWER:			
SUBSTANTIVE AUTHORISATION INFORMATION				
14	At what point in reactor life/by what date/by what period of time is the applicant/licensee required to request/apply for long-term/continued/extended operation? ANSWER:			
15	At what point in reactor life/by what date/after what period of time is/are the governmental/regulatory body/bodies required to complete the review/assessment process for the request/application for long-term/continued/extended operation? ANSWER:			
	a.	Looking back at past reviews/assessments, on average, how far in advance of the required due date did the governmental/regulatory body/bodies complete the review/assessment process? (E.g. usually, half a month in advance to the due date, at the latest.) ANSWER:		
16	Does the review/assessment of the request/application for long-term/continued/extended operation include a review/assessment of environmental issues? [Please tick the appropriate box.]			
	☐	YES	☐	NO
17	What is the scope of the review/assessment for long-term/continued/extended operation?			
	a.	Safety ANSWER:		
	b.	Environmental (if applicable) ANSWER:		
18	Is the scope of the safety review/assessment different from that performed during the initial authorisation/licensing process? [Please tick the appropriate box.]			
	☐	YES	☐	NO
	IF YES, PLEASE EXPLAIN:			

19	Is the scope of the environmental review/assessment different from that performed during the initial authorisation/licensing process? [Please tick the appropriate box.]			
	☐	YES	☐	NO
	IF YES, PLEASE EXPLAIN:			
20	Does the authorisation/licensing process for long-term/continued/extended operation include a requirement for transboundary notification and consultation?			
	☐	YES	☐	NO
	If your answer is YES, what are the notification and consultation requirements? ANSWER:			
21	What are the main documents submitted by the applicant/licensee to justify long-term/continued/extended operation?			
	a.	Safety ANSWER:		
	b.	Environmental (if applicable) ANSWER:		
22	What are the main documents generated by the governmental/regulatory body/bodies as part of its review/assessment?			
	a.	Safety ANSWER:		
	b.	Environmental (if applicable) ANSWER:		
23	For how long is long-term/continued/extended operation allowed? ANSWER:			
24	Can the authorisation be subsequently renewed/continued/extended? [Please tick the appropriate box.]			
	☐	YES	☐	NO
	If your answer is YES, for how long? ANSWER:			
	If your answer is NO, has your country affirmatively decided against subsequent renewal/extension/continuation or is it still evaluating the prospect? ANSWER:			
25	Can new safety requirements be imposed upon the applicant/licensee through the authorisation process for long-term/continued/extended operation? [Please tick the appropriate box.]			
	☐	YES	☐	NO
	If your answer is YES, can new safety requirements be imposed through other processes, in addition to the authorisation process for long-term/continued/extended operation? ANSWER:			
	If your answer is NO, through what other process(es) can a new safety requirement be imposed? ANSWER:			
26	Is any of the above substantive authorisation information different for research reactors? [Please tick the appropriate box.]			
	☐	YES, some or all of the above substantive authorisation information is different for research reactors.	☐	NO, all of the above substantive authorisation information for nuclear power reactors also applies to research reactors.
	IF YES, PLEASE EXPLAIN:			

27	Please provide any additional/clarifying information that might be useful for NEA member countries. ANSWER:			
PUBLIC PARTICIPATION IN AUTHORISATIONS OF LONG-TERM/CONTINUED/EXTENDED OPERATION				
28	Is public participation allowed during the authorisation process for long-term/continued/extended operation? [Please tick the appropriate box.]			
	☐	YES	☐	NO
29	Does the decision-making authority have a legal duty to solicit public participation during the authorisation process for long-term/continued/extended operation? [Please tick the appropriate box.]			
	☐	YES	☐	NO
	If your answer is YES, in what law/regulation is this duty found? ANSWER:			
30	Does the applicant/licensee have a legal duty to solicit public participation during the authorisation process for long-term/continued/extended operation? [Please tick the appropriate box.]			
	☐	YES	☐	NO
	If your answer is YES, in what law/regulation is this duty found? ANSWER:			
31	Who may participate in the authorisation process for long-term/continued/extended operation? ANSWER:			
32	What type of public participation is allowed during the authorisation process for long-term/continued/extended operation? ANSWER:			
33	Does the decision-making authority have a legal duty to provide information to the public during the authorisation process for long-term/continued/extended operation? [Please tick the appropriate box.]			
	☐	YES	☐	NO
	If your answer is YES, in what law/regulation is this duty found? ANSWER:			
	If your answer is YES, what information must the decision-making authority provide to the public during the authorisation process for long-term/continued/extended operation?			
	a.	Safety ANSWER:		
	b.	Environmental ANSWER:		
34	Does the applicant/licensee have a legal duty to provide information to the public during the authorisation process for long-term/continued/extended operation? [Please tick the appropriate box.]			
	☐	YES	☐	NO
	If your answer is YES, in what law/regulation is this duty found? ANSWER:			
	If your answer is YES, what information must the applicant/licensee provide to the public during the authorisation process for long-term/continued/extended operation?			
	a.	Safety ANSWER:		
	b.	Environmental ANSWER:		

35	Is any of the above public participation information different for research reactors? [Please tick the appropriate box.]			
	☐	YES, some or all of the above public participation information is different for research reactors.	☐	NO, all of the above public participation information for nuclear power reactors also applies to research reactors.
	IF YES, PLEASE EXPLAIN:			
36	Please provide any additional/clarifying information that might be useful for NEA member countries. ANSWER:			
LEGAL CHALLENGES TO AUTHORISATIONS OF LONG-TERM/CONTINUED/ EXTENDED OPERATION				
37	Are legal challenges to the authorisation of long-term/continued/extended operation allowed? [Please tick the appropriate box.]			
	☐	YES	☐	NO
38	Has an authorisation of long-term/continued/extended operation been subjected to a legal challenge in your country? [Please tick the appropriate box.]			
	☐	YES	☐	NO
39	Is there a specific procedure to challenge such authorisations? [Please tick the appropriate box.]			
	☐	YES	☐	NO
	If your answer is YES, is this a unique procedure specific to nuclear power? [Please tick the appropriate box.]			
	☐	YES	☐	NO
40	In what law/regulation/document is the procedure to challenge an authorisation of long-term/continued/extended operation found? ANSWER:			
41	What type of procedure is this? [Please tick all items that apply.]			
	☐	Civil	☐	Administrative
	☐	Criminal	☐	Other [please specify]:
42	Who can legally challenge the authorisation? ANSWER:			
43	Is there a geographical component to establishing standing to challenge the authorisation, such as a requirement to reside within a certain distance from the nuclear power reactor? [Please tick the appropriate box.]			
	☐	YES	☐	NO
	If your answer is YES, what is the geographical component? ANSWER:			
44	Who is the subject of the authorisation challenge? [Please tick all that apply.]			
	☐	Applicant/licensee	☐	Nuclear safety authority (or nuclear regulatory body)
	☐	Another governmental body [please specify]:	☐	Other [please specify]:
45	What is the subject of the authorisation challenge? [please tick all that apply]			
	☐	Application	☐	Governmental/regulatory body's/bodies' review
	☐	Authorisation decision	☐	Other [please specify]:

46	On what legal basis can the authorisation be challenged? ANSWER:			
47	At what stage in the authorisation process for long-term/continued/extended operation can/must the challenge be initiated? ANSWER:			
48	Before which court/body/authority must the challenge first be raised? ANSWER:			
49	Can the initial decision be appealed to a higher court/body/authority? [Please tick the appropriate box.]			
	☐	YES	☐	NO
	If your answer is NO, skip to question No. 54. If your answer is YES, in front of which court/body/authority must the appeal of the initial decision be brought? ANSWER:			
50	On what legal basis can the first decision be appealed? ANSWER:			
51	Can the appellate decision be appealed again to a higher court/body/authority? [Please tick the appropriate box.]			
	☐	YES	☐	NO
	In your answer is YES, in front of which court/body/authority must the appeal of the appellate decision be brought? ANSWER:			
52	On what legal basis can the appellate decision be appealed? ANSWER:			
53	Is this the court/body/authority of last resort (i.e. the court/body/authority of highest power on these matters)? [Please tick the appropriate box.]			
	☐	YES	☐	NO
	If your answer is NO, what is the court/body/authority of last resort and what is the process for achieving finality of decision? ANSWER:			
54	Is any of the above information on legal challenges different for research reactors? [Please tick the appropriate box.]			
	☐	YES, some or all of the above information on legal challenges is different for research reactors.	☐	NO, all of the above information on legal challenges for nuclear power reactors also applies to research reactors.
	IF YES, PLEASE EXPLAIN:			
55	Please provide any additional/clarifying information that might be useful for NEA member countries. ANSWER:			

Annex 2. **Format of country reports**

[Country]

Basic information

[Country] has __ nuclear power reactors operating at __ nuclear power plants (NPPs) as of June 2019. The __ nuclear power reactors are operating at the following lifetimes:

- 0-9 years
- 10-19 years
- 20-29 years
- 30-39 years
- 40-49 years
- 50+ years

[Country] has __ nuclear power reactors operating past their original authorised/licensed/designed life as of June 2019. The additional ___ nuclear power reactors will enter the period of long-term/continued/extended operation in each of the following time periods:

- 2020-2029
- 2030-2039
- 2040-2049
- Post-2050

[Country] has __ nuclear power reactors under construction as of June 2019.

Authorisation information

Designed and authorised periods

Terminology

Main laws/regulations/documents for initial and long-term/extended operation

Responsible government bodies

Application and review timing

Scope of review

Safety

Environmental

New safety requirements

Transboundary notification

Public participation

Access to information

Legal challenges

Annex 3. **Reporting organisations and contact persons**

We would like to thank our numerous contacts worldwide in national administrations and in public companies for their helpful co-operation.

Argentina	Sergio Cabado, Ministry of Energy and Mining
Belgium	Roland Dussart-Desart, FPS Economy, SMEs, Self-employed and Energy
Canada	Jasmine Saric, Canadian Nuclear Safety Commission Lisa Thiele, Canadian Nuclear Safety Commission
Czech Republic	Eduard Klobouček, State Office for Nuclear Safety Karel Künzel, State Office for Nuclear Safety
Finland	Jaakko Louvanto, Ministry of Economic Affairs and Employment
France	Marc Léger, French Alternative Energies and Atomic Energy Commission Olivia Passerieux, French Alternative Energies and Atomic Energy Commission
Germany	Thomas Christian Helling-Junghans, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
Hungary	László Czottner, Hungarian Atomic Energy Authority Judit Silye, Hungarian Atomic Energy Authority (formerly) Zsolt Zombori, Hungarian Atomic Energy Authority
Italy	Isabella Palombini, Italian Permanent Delegation to the OECD
Japan	Kazuhiro Sawada, Permanent Delegation of Japan to the OECD
Korea	Ho Byeong Chae, Korea Institute of Nuclear Safety Young Soon Jang, Korea Institute of Nuclear Safety Sang Won Kim, Korea Institute of Nuclear Safety Kigab Park, Korea University
Netherlands	Rob Jansen, Authority on Nuclear Safety and Radiation Protection Patricia Sormani, Authority on Nuclear Safety and Radiation Protection

Poland	Karol Sieczak, National Atomic Energy Agency
Portugal	Paulo Areosa Feio, Permanent Delegation of Portugal to the OECD Pedro Rosário, Regulatory Commission for the Safety of Nuclear Installations
Romania	Madalina Tronea, National Commission for Nuclear Activities Control Janeta Steti, National Commission for Nuclear Activities Control (formerly) Şerban Constantin Valeca, Technologies for Nuclear Energy State Owned Company, Institute for Nuclear Research Pitesti
Russia	Diana Urmanova, Scientific and Engineering Centre for Nuclear and Radiation Safety
Slovak Republic	Martin Pospíšil, Nuclear Regulatory Authority Ľudovít Šoltés, Slovenské elektrárne, a.s.
Slovenia	Aleš Škraban, Slovenian Nuclear Safety Administration
Spain	Irene Dovale Hernández, Ministry for Ecological Transition David García López, Nuclear Safety Council
Sweden	Christoffer Sheats, Ministry of the Environment
Switzerland	Sandra Knopp Pisi, Federal Department of the Environment, Transport, Energy and Communication, Swiss Federal Office of Energy
Turkey	Serhat Alteri, Nuclear Safety Department Ismail Aydil, Permanent Delegation of Turkey to the OECD
Ukraine	Sergii Kostenko, SE NNEGC Energoatom Illia Krasnukha, SE NNEGC Energoatom Liliia Kukharchuk, SE NNEGC Energoatom Daria Pyshna, SE NNEGC Energoatom
United Kingdom	Lucy Tanner, Department of Business, Energy and Industrial Strategy Keith Vincent, Department of Business, Energy and Industrial Strategy Kate Ward, Department of Business, Energy and Industrial Strategy
United States	Brooke P. Clark, US Nuclear Regulatory Commission Sherwin E. Turk, US Nuclear Regulatory Commission Marian Zobler, US Nuclear Regulatory Commission
NEA	Pierre Bourdon, Office of Legal Counsel Kimberly Sexton Nick, Office of Legal Counsel Chiara Petroli, Office of Legal Counsel

Annex 4. Working Party on the Legal Aspects of Nuclear Safety

The OECD Nuclear Energy Agency (NEA) Nuclear Law Committee (NLC) established the Working Party on the Legal Aspects of Nuclear Safety (WPLANS) in 2016 to strengthen the NLC's work at the intersection of nuclear law and nuclear safety. Although the NLC had for many years been expanding the scope of its work to include areas outside its traditional focus of nuclear third party liability, the creation of the WPLANS was the first concerted effort to systematically address this important area of nuclear law. Members of the WPLANS include senior legal experts from national regulatory bodies, ministries and government-owned nuclear companies, all of whom have first-hand experience in addressing the legal aspects of nuclear safety-related issues.

The WPLANS' mandate is to exchange information on member countries' respective legal and administrative systems for the licensing and regulation of nuclear installations and other uses of nuclear material; promote the development, strengthening and harmonisation of member countries' legal frameworks for the licensing and regulation of the safe and peaceful use of nuclear energy; and enable the NEA to serve as a centre of information for the legal aspects of nuclear safety. The initial WPLANS' programme of work contains five topics to be addressed, the first of which is the legal frameworks for long-term operation (LTO).

Questions sometimes arise from those involved in the technical aspects of nuclear safety about the role of lawyers in such matters. Often referred to as "defenders of the process", lawyers are involved in many aspects of nuclear safety, including:

- drafting laws and regulations;
- reviewing safety and environmental reports;
- providing advice on whether safety and environmental requirements have been met;
- enforcing legal obligations;
- evaluating whether documents and information can or should be made publicly available;
- ensuring that the public has an opportunity to participate;
- defending legal challenges.

Each of these duties factor in to the licensing and regulation of the long-term operation of nuclear power reactors. It is with this logic in mind that WPLANS developed this first comprehensive report to provide a complete understanding of the many non-technical and legal issues involved in the LTO-approval process. To the extent possible, the WPLANS will endeavour to update this report as necessary, at least every five years. It is hoped that this report may also serve as a reference point for future exchanges respecting the legal aspects applicable to LTO, with a view to further development and strengthening of the collective understanding of these issues.

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The Legal Frameworks for Long-Term Operation of Nuclear Power Reactors

With almost 70% of the operating nuclear power reactors over 30 years of age, countries around the world are assessing whether to allow reactor operation past the 50-60 year mark and potentially up to 80 years. Ensuring a proper legal framework for the long-term operation (LTO) of nuclear power reactors is a key component of such considerations.

The aim of this report is to provide insights into the various laws, regulations and policies that contribute to different countries' approaches to LTO. By collecting information from more than 20 NEA member and non-member countries, this report highlights both commonalities among approaches as well as possible reasons for variations. Ultimately, the information gathered can serve as a vital resource for future exchanges respecting the legal aspects of LTO, with a view to further development and strengthening of the collective understanding of these issues.

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